

An essay on the symptoms of pregnancy from the earliest stage to the period of quickening : with a physiological explanation of the physical and mental changes produced by the impregnated uterus upon the system of the mother / by John Morley.

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AN ESSAY
ON
THE SYMPTOMS OF PREGNANCY,
FROM
The earliest Stage
TO
THE PERIOD OF QUICKENING.

WITH
A PHYSIOLOGICAL EXPLANATION OF THE PHYSICAL AND MENTAL
CHANGES PRODUCED BY THE IMPREGNATED UTERUS
UPON THE SYSTEM OF THE MOTHER.

TO WHICH WAS AWARDED
DR. HOPKINS'S PRIZE GOLD MEDAL FOR 1828-29.

BY JOHN MORLEY.

*Non est homo tumultuarium et incogitatum opus. Cogitavit nos ante natura
quàm fecit.*

SENECÆ BENEF. VI, c. 23.

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TO E. J. HOPKINS, M. D.

PHYSICIAN ACCOUCHEUR TO THE WIVES OF SOLDIERS OF THE
THREE REGIMENTS OF FOOT GUARDS ;
TO THE WESTMINSTER AND SOUTHWARK LYING-IN INSTITUTIONS ;
LECTURER ON MIDWIFERY IN THE THEATRE OF
ANATOMY AND MEDICINE,
WEBB STREET, MAZE POND, BOROUGH.

SIR,

Venturing for the first time before the tribunal of public opinion, I feel that I need the countenance of one whose character, talents, and experience shall, so far as it is allowable, shield my errors and imperfections from the oft merciless pen of criticism ; and gain for these pages at least a candid perusal. It is therefore with the greatest pleasure that I avail myself of permission to dedicate this Essay to yourself, in acknowledgment of obligation for the scientific principles derived

from your lectures, of the valuable experience gained from your extensive field of practice, and of the uniform kindness personally experienced as a pupil.

With every feeling of respect and gratitude,

I am, Sir,

Your obliged Pupil,

J. MORLEY.

PREFACE.

THE Author of the following Essay fears, that, by many, his motives in submitting it to the public may be construed into the usual blind partiality to one's own productions, which ensures so frequently either neglect or censure.

He begs leave, however, candidly to assure the reader, that he would not have committed the following pages to the Press, if his own good opinion had been his only encouragement ; but he has been induced to think it not unworthy of the public eye, from the favourable opinion expressed of it, as well by those eminent individuals who deemed it worthy of the first of Dr. Hopkins's annual prizes for 1828—29, as by several other distinguished professional friends, to

whose judgment he has been accustomed to pay the greatest deference. Without arrogating to himself any merit on the ground of originality, to which he is conscious the following essay can have but little claim, he still hopes, that, in addition to a concise and methodical statement of facts, it will be found to contain some observations not entirely unworthy the attention of the junior members of the profession.

AN ESSAY
ON
THE SYMPTOMS OF PREGNANCY,
&c.

THIS subject, which our teacher, in his spirit of liberality and zeal for improvement, has presented to the consideration of the candidates for his annual prize, is generally acknowledged by authors to be one of considerable difficulty, and at the same time not less important than difficult.

Sensible of this, I should not have ventured upon the present undertaking, were it not from a conviction, that, however inferior my attempts may prove to those of my competitors, an investigation of this subject cannot fail to be of the greatest advantage to myself, and that the labour bestowed upon it will bring with it its own reward.

With respect to the first part of our subject, or the signs of pregnancy, a few considerations will convince us of its importance, of the difficulties connected with it, and of its deserving therefore the serious attention of the medical practitioner.

As a part of ordinary practice, there are few cases in which we shall be consulted with greater solicitude and anxiety on the part of the patient, than in those of dubious pregnancy. But its importance rises higher in our estimation when regarded as a branch of medical jurisprudence; no part of which is attended with more uncertainty, or requires greater discrimination and exercise of judgment on the part of the medical witness, than this; since upon the solution of questions relating to it, when required in a Court of Justice, may depend the property, the reputation, and even the life of the female.

Independently of the difficulties attending cases of dubious pregnancy abstractly considered, we sometimes meet with a combination of certain adventitious circumstances materially increasing them; as for instance, in the female's being powerfully interested in the concealment of her condition, whilst the cause of humanity, morality, and the preservation of our species imperiously demand that the real nature of the case should be ascertained. In other cases, on the contrary, we may find that appearances of pregnancy are assumed from interested motives; as, in order to ensure or confirm marriage, to prevent collateral relatives from succeeding to the possession of property, to delay the execution of the sentence of death, or otherwise to avoid or mitigate punishment.

I allude to these circumstances to show how indispensable an intimate acquaintance with this

branch of forensic medicine is, to men who may be called upon to decide the fate of their fellow-creatures in the important cases of accusation of concealment of pregnancy, supposition of children, the procuring of abortion, &c. ; and that, when required to perform this duty, they should be qualified to give an opinion of which medical science may not be ashamed, and of which neither justice nor humanity may complain.

For true it is that instances are not wanting in which the most serious errors have been committed, as to the existence or non-existence of pregnancy : As when females, who, after having been formally examined and pronounced not pregnant by medical witnesses, have nevertheless been found in that state in the place of dissection after their execution.* And recently we have received an account † from Berlin, of the Cæsarian operation having been performed upon a young woman, in a case of supposed extra-uterine conception : But no fœtus, no tumour, nor even enlargement of any viscus, was to be found.

Before proceeding to describe the symptoms of pregnancy previous to quickening, it will be necessary to state at what period I have supposed this event to take place.

According to authors, and in reality, the time is exceedingly various ; as early as the tenth‡

* Such cases are related by Ambrose Pare, Mauriceau, Devreux, and others.

† See Medical Gazette for August 23, 1828.

‡ Denman.

week, and as late as the seventh * month, may be considered as the two extremes, the medium between which is perhaps the most common and nearest the truth.

Until the end then of the fourth month, or about the twentieth week, the following remarks as to symptoms are to be considered as applicable.

I would here observe with respect to the time of life, to which the occurrence of pregnancy is limited, that it usually corresponds to that of menstruation; and may therefore vary, inasmuch as both the cessation and commencement of this function are earlier in some, and later in other females, than the ordinary period. As a general rule, however, it may be considered, that, in our climate, no female becomes pregnant under thirteen years of age, nor beyond fifty; though, to this, remarkable exceptions might be adduced. In the year 1816, a Mrs. Ashby,† of Firnby, near Spilsby, was delivered of twins in her fifty-fourth year; and Haller relates cases of pregnancy at the ages of fifty-eight, sixty-three, and even seventy years,—rare and extraordinary, it is true; but of which it is well to be aware, lest, meeting with such, we might be disposed too hastily to deny their possibility.

The usual evidences of pregnancy may be conveniently divided into those to be derived from

* Dewees p. 106.

† Edinb. Ann. Register, vol. ix. p. 508.

its effects upon the system generally, and into those which are local or only affect certain organs.

In most females soon after impregnation, from the remarkable sympathy existing between the uterine organs and the system at large, we find the general health considerably affected, and phenomena are produced peculiarly characteristic of the important changes going on in the uterus.

In some few instances, the female, by certain peculiar sensations, is apprized of her condition immediately after conception; but, in general, it is not until the supervention of more remote symptoms that she supposes herself pregnant. As one of the earlier and more frequent indications, we may consider somewhat acute and pungent pains in the region of the loins and pelvic viscera, which commonly occur within about a week after conception; and, in the progress of this event, the digestive, the vascular, and the nervous systems become affected.

That the digestive function is so, is soon apparent from an irritable and dyspeptic state of the stomach,—sickness, nausea, or vomiting, more especially in the morning; a deficient or vitiated appetite,—there being either loathing of food, or an eager desire for uncommon articles of diet.*

* The longings of pregnant women are chiefly for certain nice articles of food; but sometimes for coals, sealing-wax, flax, tar, chalk, raw meat, and live fish. LUDOVICUS VIVES tells of a woman who longed for a bite in the back of a young man's neck, and would have miscarried if she had not been

The countenance loses its freshness, and becomes paler; the lower eyelid is of a dark or leaden colour; and the whole body becomes, in a degree, emaciated.

There is frequently a change in the secretion of the salivary glands, it being unusually viscid and tenacious, and of a very white and frothy appearance, or so much increased in quantity as to constitute salivation.

The matter of perspiration is often perceived to have a peculiar and undefinable odour.

Of the influence of pregnancy on the vascular system we have also marked evidence; there is, in most cases, even when the general health is least affected, a febrile disposition, with fulness of the pulse and considerable increase of heat,—a condition which, within certain bounds, may be regarded as truly natural, and is probably intended to answer some important purpose as to the nutrition and growth of the fœtus. Of this increased excitement we have a further proof in the appearance of the blood, which, independently of any morbid affection, is always found to have the sily or buffy coat. But, upon this, as an evidence of pregnancy, we cannot place much dependence; as any local inflammation, or even a suppression of the menses, accompanied with

gratified; and LANGIUS of another, who had set her heart upon biting a piece from a baker's shoulder. The husband bribed the baker at so much per bite; he stood two manfully, but his courage failed on the proposal of a third.—ELLIOTSON'S "Blumenbach."

febrile excitement, may give to the blood the same appearance as during gestation.

When we consider the close sympathy which at all times exists between the uterine organs and the brain, it is not surprising that the nervous system should be considerably influenced by pregnancy: During this period it seems to be unusually susceptible of almost all kinds of external impressions; hence circumstances, which at other times would be regarded as trifling, and excite but little attention, are now often productive of fear and alarm; the temper is more irritable, and the disposition less patient and gentle than natural; there are occasionally depression of spirits and disposition to melancholy,—states of mind requiring, on the part of friends and attendants, more than ordinary forbearance and tenderness.

The above signs of pregnancy, as affecting the system generally, are by no means to be considered as constant and invariable; they are (at least some of them) rather to be regarded as morbid deviations from the course of nature in perfect health. Some females are so fortunate as to experience scarcely any of them, and others only a part. They are, however, of such frequent occurrence, that, considering them in combination with more certain symptoms, and bearing in mind the morbid affections upon which they may possibly depend, they will materially assist in forming a diagnosis.

But to the second class of symptoms, or the

local, these objections do not apply with equal force: They belong alike to every variety of constitution, and are the natural and almost universal attendants on pregnancy; these therefore will require a more particular and careful examination. The whole of them may be conveniently comprised under the following heads:

I. Suppression of the Menses.

II. Increased size and altered position of the Uterus.

III. Developement of the Mammæ.

IV. Motion of the fœtus in utero.

I. SUPPRESSION OF THE MENSES.

It is a general law of the animal economy, that, during the evolution of the foetus, the function of menstruation should be suspended. In ordinary cases, therefore, the cessation of this discharge is one of the best and most certain indications of pregnancy. I believe, no writer attaches greater importance to this sign than Denman ; who, in a negative sense, considers it a never-failing one, and lays it down as a general principle, that no female, continuing to menstruate, can at the same time be pregnant,—he at least never having met with an instance to the contrary : A similar remark to which is also made by Burns. Such having been the experience of two of the most eminent of Accoucheurs, it may at least be regarded as a proof that exceptions to this law are of rare occurrence. But that this, like many general laws in physiology, has its exceptions and variations, there can be little doubt. The cases on record of regular menstruation during pregnancy are too numerous, and are attested by writers and practitioners of too great respectability and distinction, to admit of being denied by a candid mind. To instance one or two : Dr. Heberden* relates a case, in which the menses returned regularly during four

* Heberden's Commentaries,

pregnancies up to the time of delivery ; and Dr. Hossack, one in which the same happened during three pregnancies. Instances of menstruation continuing during the three or four first months, are still more common. Deventer† relates a singular case of a female, who had never menstruated before her first pregnancy, but who, as soon as she became so, regularly menstruated up to the time of delivery, which was the case as often as she had children ; so that with her the return, and not the suppression, of the menses, was the strongest indication of pregnancy. The above facts are sufficient to show, that we are not warranted, in every case of continued menstruation, to conclude from that circumstance alone the non-existence of pregnancy ; and still less is the suppression of this discharge to be considered a sufficient evidence of its existence. This independently of pregnancy, we know to be a common occurrence ; and, when attended, as it sometimes is, with intumescence of the lower part of the abdomen and other signs of pregnancy, it is liable to be mistaken for it : In general, however, it may be easily distinguished by the symptoms becoming more aggravated in proportion to the continuance of the suppression ; whereas, if it depend upon pregnancy, they gradually subside, and leave the female in the enjoyment of her usual health.

The final cessation of the menses is often

† A similar one also by Dewees.

attended with symptoms, which give rise to a false idea of pregnancy in the mind of the female: In such cases some discrimination, with a careful and combined view of the various indications, is necessary on the part of the medical attendant before he gives a positive opinion.

When there is reason to suspect that it is the object of the female to conceal pregnancy, we should be aware that imposition has been sometimes attempted, by staining the linen with blood, so as to feign a continuance of the menstrual discharge. A case of this kind is related by Belloc,* of a young woman in the third month of pregnancy when he examined her.

Although, then, in some respects the suppression of the menses is a somewhat equivocal sign, and liable to certain exceptions, it may upon the whole, when occurring under favourable circumstances, be safely regarded as one of the most certain and satisfactory indications of pregnancy; that is, when, continuing beyond the third month, it does not produce symptoms of amenorrhœa, or materially affect the general health, and is at the same time combined with other usual signs.

* Cours de Médecine Légale, p. 47.

II. INCREASED SIZE AND ALTERED POSITION OF THE UTERUS.

OF all the evidences of pregnancy this is the most obvious, and most open to common observation: It is, however, separately considered, as liable to mislead as any of the rest. The increase of the uterus begins from the earliest period of pregnancy; even previous to the descent of the ovum, its fundus is somewhat expanded; and, in proportion to its size, it enlarges much faster during the early than in the later months of gestation. The first effect of this enlargement is to produce a sinking and flatness of the abdomen, rather than any prominence; this is caused by the womb, from its increased weight, descending lower in the pelvis, and drawing down the intestines with it. This then may be regarded as one of the earlier indications, though a somewhat equivocal one,—as enlargement from any other cause might produce the same effect. The tumour of the gravid uterus is not perceptible, either by the eye or the hand, until it is so far developed that its fundus extends some way above the margin of the pubes; and the earliest period at which this occurs is about the eighth or tenth week, commonly in the third month, and sometimes not till the

beginning of the fourth. The causes of this variation, as to time, are several. Of those which render the appearance of the tumour earlier, and more prominent than usual, are—a small or contracted pelvis, as in such case the womb cannot be so long detained within its boundaries;—laxity of the abdominal parietes, enabling the uterus to advance with greater facility;—great thinness of the abdominal parietes, as in slender and emaciated subjects;—and the increased curvature, and consequent increased anterior convexity, of the lumbar vertebræ, seen in females admired for the symmetry of their shape:—These tend in a remarkable degree to throw the enlarged uterus towards the anterior part of the abdomen.

Of the causes, which, on the other hand, retard or obscure the appearance of the tumour, one is a corpulent habit, which will often prevent its being either seen or felt at an early stage. In other individuals the pelvis may be of such a capacious size, as to contain the uterus while yet considerably expanded without its rising above the pubes.

Again: When circumstances justify a suspicion of the female's endeavouring to conceal pregnancy, we should remember, that, as far as the present indication is concerned, this is readily effected at so early a period by tight bandaging, a studied deportment, or other artifices of dress: And sometimes this end is so well accomplished, that females have been delivered of several

children * without the public having had the least suspicion of the matter.

But the most important and conclusive indications of pregnancy depending on the alterations in the uterus, are to be derived from manual examination, or as the French express it, *le toucher*;—a means which should invariably be resorted to in every dubious case, as it is the only one by which a satisfactory diagnosis is to be obtained between pregnancy and certain morbid enlargements which are sometimes mistaken for it. These examinations are made *per vaginam*, and by applying the hand over the abdomen externally. The earliest indications to be derived from a vaginal examination are from the state and situation of the *os* and *cervix uteri*.

When the womb is not gravid, the lips of the *os tincae* are always open, and will even admit of the tip of the little † finger; but, soon after the entrance of the ovum into the uterus, it is almost entirely closed,—the small aperture remaining being filled up by a secretion of ropy mucous from the follicles of the cervix. As the uterus enlarges, the *os* gradually changes from the transverse to the circular form; and at this early stage it is more difficult to detect, than at any other period, being situated higher up in the vagina. But as the developement of the uterus continues, it becomes heavier, and its fundus more expanded,

* Fodere *Medicine Legale*, Tom. v.

† Burns p. 172.

so as to present a larger surface to the pressure of the intestines from above : From these combined causes it is found, at about the second month, to have descended considerably lower in the pelvis, so that the *os tincae* is felt projecting nearer to the *os externum*, thus producing an apparent shortening of the vagina, which continues till the uterus emerges from the pelvis, when it appears again to become elongated. These changes are readily observed in women labouring under *procedentia uteri*, or who have a tendency to it. The cervix is the last part of the uterus that takes upon it the action of enlargement, which during the first three or four months is confined to the fundus and body : There is, consequently, during this period, a marked distinction between the comparatively narrow cervix and the more expanded body of the uterus.

But the most decisive and satisfactory evidence of pregnancy to be derived from manual examination, is a knowledge not only of the progressive developement of the womb, but also of its contents. This may sometimes be obtained by a careful external examination instituted in the following manner : The bladder being evacuated, and the fæcal contents of the bowels removed, the female is to be laid upon her back, with the head and knees a little elevated in order to prevent tension of the abdominal muscles ; one hand is then to be extended over the hypogastric region, in such a way that the thumb may touch the umbilicus, and the little finger the pubes. The woman is

then desired to make a strong expiration ; and, the practitioner grasping the uterus at the same time with the hand, certain irregularities may be felt, apparently caused by the limbs of the fœtus ; and, if the hand be previously dipped in cold water, the motion of the fœtus may frequently be excited ; although the woman may not at any former time have been conscious of it.

But a more certain mode of ascertaining the existence of a fœtus is by a vaginal examination. This is best effected by placing the female in the upright posture and standing against the wall of the room, when one or two fingers are to be introduced into the vagina, while, with the other hand or by an assistant, pressure should be made against the fundus so as to steady it and prevent its advancing too much ; by raising the fingers at this time so as to allow the uterus to rest upon them we may form a pretty accurate idea of the nature of its contents from its weight, and a still more correct one by suddenly elevating the finger, so as it were to throw the uterus upwards : And if immediately after (the finger being kept stationary) a sensation is perceived as of a hard body descending and striking against it, we have an almost indubitable proof of the presence of a fœtus ; and I am not aware that any morbid enlargement of the uterus would be likely to convey a precisely similar sensation—although an accumulation of fluid, or other morbid affections independently of pregnancy, might produce increase of weight, enlargement, and a spherical

form in proportion to their extent. The above indications, derived from manual examination, may obtain in some cases in the third month; but, in general, it is not until the middle or end of the fourth that they are decisive.

The enlargement of the abdomen from ascites and ovarian dropsy, is occasionally liable to be mistaken for pregnancy. In common abdominal dropsy, the swelling is general, diffused, and undefined from the beginning; whereas in pregnancy the first enlargement is immediately over the pubes, from whence it progressively ascends. The fluctuation of ascites is commonly stated to be a diagnostic mark between it and pregnancy: But if the liquor amnii be large in quantity, it also will occasion very evident fluctuation; and, in such case, a proper distinction can only be made by a vaginal examination.

In ovarian dropsy the tumour is not so round, firm, or so regularly progressive, as in pregnancy; and in its commencement it is situated laterally on one or both sides, as one or both ovaries are affected: Hence it is important to attend to the patient's own statement of the origin and progress of the swelling. It is generally movable when the female is laid on her back; and as the orifice of the uterus also moves with it, by passing the finger up the vagina, we thus obtain another distinctive mark. The limits of this paper, I perceive, will not admit of entering further into the consideration of other morbid affections and certain anomalous cases which might be mistaken for pregnancy.

III. DEVELOPEMENT OF THE MAMMÆ.

FROM the sympathy existing between the uterus and mammæ, these organs generally act simultaneously or reciprocally; hence enlargement of the mammæ is an invariable attendant upon pregnancy: They usually begin to develope at about the third month, though sometimes they are little altered before the latter period of gestation. This is, however, a somewhat equivocal indication, as it may proceed from suppression of the menses independently of pregnancy; and, in fact, from almost any morbid enlargement of the uterus. The areola, or dark circle around the nipple, is by some considered as one of the best individual marks of pregnancy; but it is only in the first that much dependence can be placed upon it. In succeeding pregnancies, it is sometimes absent; and, at other times, a trifling irritation, or other cause, may produce it.

The formation of milk may be noticed as being, in some cases, co-eval with the swelling of the mammæ; but in the early months this secretion is mostly of a thin serous nature, having little of the lacteous character. It is, however, at any time an uncertain indication, as in women not pregnant it may arise from suppression of the menses, and may be excited by sucking or friction. Milk may also form in the breasts of

women long past child-bearing, and in those of children. In females giving suck during pregnancy, the quality of the milk is changed; it becomes serous and unfit for the nutrition of the infant, that takes it with great reluctance or altogether refuses it.*

* Richerand Phis., Tom. ii, p. 416; Magendi, Tom. ii, p. 431.

IV. THE MOTION OF THE FŒTUS.

THIS brings me to the last sign which we have to consider, viz., the phenomenon of quickening, which is generally looked forward to by females, in dubious cases, as an event putting an end to all doubt as to their condition ; and it is on this account important, that the symptoms of pregnancy previous to it should be especially understood, as it is for the most part before its occurrence that the professional man is had recourse to for his opinion.

By the term *quickening* is commonly understood the first sensation which the mother has of the motion of the child. But it is perhaps more correctly defined as consisting in the impregnated uterus rising out of the pelvic into the abdominal cavity ; a definition which better explains the occasional peculiarities and variations in the mode of its occurrence. It was formerly supposed, that, at quickening, the fœtus became first endowed with a principle of animation ; and, to the present day, the code of our criminal law is absurdly founded on this idea : As if an animal body could *grow*, and even acquire the greater part of its developement, without at the same time being *alive* !

During the early months of gestation, while

the womb is yet within the pelvis, the * mother is not conscious of the motion of the child; probably on account of its insufficient strength, its confined situation, the greater proportionate quantity of the liquor amnii, and the adjacent parts being less sensible than the soft and yielding parietes of the abdomen.

As the sensations of quickening, then, appear to depend upon the ascent of the womb from the pelvis into the abdomen, they will evidently vary according to the mode in which this ascent takes place. It is sometimes slow and gradual, when a languid and indistinct motion is first perceived in the hypogastric region; which, by degrees, becomes stronger and extends higher up, but is not attended by any other remarkable effects.

It is in such cases very possible for the effects of wind, or other intestinal motion, to be mistaken for those of the child. But when this ascent takes place suddenly, it is strongly marked by a peculiarly powerful and unexpected sensation, immediately followed by a feeling of fluttering; the former probably depending upon the ascent of the womb; and the latter, on the motion of the fœtus, no doubt powerfully impressed by its sudden change of situation. There is, further, in some cases, sickness with feelings of faintness, or complete syncope; and, if the habit be irritable, a kind of hysterical fit is not

* Burns, p. 213.

uncommon. As the period of gestation at which quickening takes place, has been already alluded to, I have here only to add with respect to the causes of its variation, that it is early when the pelvis is small and contracted, or when the liquor amnii large in quantity, or the developement of the ovum and uterus greater and more rapid than usual; and that, under contrary circumstances, it will be considerably later.

There is yet another, and comparatively novel mode of ascertaining the existence of pregnancy, on which, though it relates chiefly to the latter months of gestation, it will be proper to make a few observations; for it was expressly alluded to by the proposer of this essay as a point for consideration: I mean the application of the stethoscope.

Particular attention has been paid to this subject by M. Kergaradec, of Paris; who, as far as I know, is the only author who has written upon it exclusively. This gentleman commenced his investigations with the view of ascertaining, if possible, the agitation of the liquor amnii when the foetus moved in the uterus; and though on this point he obtained no satisfactory result, he was in other respects more successful. While making his examinations one day upon a female near her time, and endeavouring to follow the movements of the foetus, he was suddenly struck by a sound, to which he had never before attended, resembling the ticking of a watch placed close to his ear: This experiment many times repeated, was constantly followed by the same result.

Reflecting on this phenomenon, he, by attention, distinctly recognised the double pulsations returning at regular intervals, which are caused by the contractions of the heart. On counting them repeatedly, he found they varied from one hundred and forty-three, to one hundred and forty-eight, in the minute; the pulse of the mother at the same time being only seventy. This put it beyond doubt, that what he heard was, in reality, the action of the foetal heart; the situation of the pulsations, and the difference in their number, rendering it impossible to confound them with the circulation of the mother. These pulsations were felt on the left part of the abdomen, occupying an extent of about a foot, in a vertical direction, from a few inches below the umbilicus to a little above the crural arch. In a transverse direction they were more limited, not being at all audible on the right side of the median line, nor to a great distance on the left. During the continuance of these examinations, viz., throughout the last fortnight of gestation, the pulse of the mother varied from fifty-four, to seventy-two, per minute; and that of the child from one hundred and twenty-three, to one hundred and sixty; but the relation between them, as to frequency, was not constant.

While on one occasion in the above case Ker-garadec was endeavouring to hear the pulsations of the foetal heart on the right side of the abdomen, he distinguished regular and simple pulsations, perfectly synchronous with the pulse of

the mother ; their force was such as resembled the action of several large vessels, or of a great number of vessels, acting at the same time, and accompanied by a peculiar noise approaching the *bruit de souffle*, heard in certain diseases of the heart and large vessels. These sounds were confined to a small and circumscribed space on the right side, a little below the umbilicus, and were not audible in any part of the left side.

In reasoning on this phenomenon, Kergaradec concluded, that it bore some relation to the point of insertion of the placenta, and that he heard, in short, the pulsations of the placentary blood-vessels. He argued that they could not proceed from the foetal heart ; the absolute want of synchronosy proving them to be independent of it ; nor from the abdominal aorta, or any of its larger branches, because the space in which they were heard was too confined, and too distant from the great vascular trunks ; besides being separated by the uterus and the entire ovum. Nor, again, could they proceed from the vessels of the uterus, greatly enlarged during the gravid state, as in that case they would have been heard not in one particular part only, but in different parts of the extensive surface of the uterus, now distended by a full-grown foetus.

Nor are these phenomena confined to the last stage of gestation : In the majority of cases examined by Kergaradec, they were observed from the fifth month and upwards ; and by a friend of his, the pulsations corresponding to the

insertion of the placenta were perceived at the middle and beginning of the fourth month ; and, on one occasion, not later than the third.

In confirmation of the accuracy of these experiments, it is sufficient to say, that they were repeatedly made and approved of by Lænnec.

It appears, then, that the evidence to be derived from the stethoscope is valuable, on account of its positive and satisfactory nature. In the perception of the fœtal circulation, we have not only the most certain and unequivocal proof of pregnancy, but also of the vitality of the child. In a negative sense, however, this evidence is slight ; the absence of the fœtal circulation being of course no proof of the non-existence of pregnancy, nor a sufficient one of the death of the fœtus, as its position and other circumstances might prevent the action of the heart being audible.*

* For further information on this subject, see "*Memoire sur L'Auscultation Appliquée a l'etude de la Grossesse.*"—Par M. KERGADEEC. In which the author anticipates several important results from the use of the stethoscope ; as ascertaining the exact position of the child in utero—the point at which the placenta is attached previous to performing the Cæsarian operation—the existence of extra-uterine pregnancy—of twins—and the effect of the moral and physical affections of the mother on the child.

It now remains to consider the physiology of the changes produced by the impregnated uterus upon the system of the mother, confessedly more difficult than the former part of our subject; and upon which I fear the explanations I have to offer will not be thought altogether satisfactory or conclusive, and in the present state of physiological science this indeed can scarcely be expected.

In tracing the effects of impregnation to their primary cause, we must refer them to the application of the male semen, which operates either directly as a local stimulus on the uterine organs, or, mediately, by circulation and absorption. In one of these modes, it is probable, that the semen exerts its primary and immediate influence upon the *nervous system*.

This, I think, appears from the nature of the mysterious phenomena which follow, consisting in the derivation from the parent of an entire new system, and its concentration into the small space occupied by the incipient embryo, where, on a scale almost inconceivably minute, must the vital functions and the laws by which they are regulated be established and carried on, in the same harmony and perfection as in the full-grown man.

It is evident that this must be chiefly effected by a complicated process of secretion, separating

from the maternal blood all the varieties of matter of which the growing embryo is composed, in a manner analogous to what is going on in the adult. Now, it has been satisfactorily proved by experiment, and particularly by those of Dr. Wilson Phillip, that the nervous influence is essential to the process of secretion;* divide, for instance, the eighth pair of nerves, and the secretion of the gastric fluid is prevented, and digestion destroyed. May we not, then, fairly infer, that the nervous system is as much concerned in the process of gestation, as in the ordinary secretions of the body; and that it is to be regarded as the primary agent in the changes effected during this state, as well in the system of the mother as in the ovum?

In endeavouring further to explain these changes, beginning with the physical, I shall observe, in some measure, the order in which the symptoms of pregnancy have been already noticed.

First, then, with respect to the effects of the impregnated uterus on the digestive system, indicated by nausea, vomiting, and various dyspeptic symptoms. These are attributed by some to the mechanical pressure of the uterus against the coats of the stomach; but this explanation, if not an erroneous, appears at least to be an insufficient, one; as it can only apply to the later periods of pregnancy: Whereas the affections in question

* See chap. v. and sec. ii. of chap. vii. of "Experimental Inquiry into the Laws of the Vital Functions."

are chiefly troublesome in the commencement, and mostly subside as the uterus becomes more distended: They must, therefore, depend on some other cause than mere pressure. It was supposed by Haller,* that the pica longings, or vitiated appetites of pregnant women, were caused by a nausea excited in the sensitive stomach by the absorbed male semen circulating during the first months with the blood. By others they have been attributed to a retention of the catamenia; but it is, I conceive, erroneous to suppose that this secretion, as such, is in reality retained in the system; it being altered in its nature, and directed to a new purpose. Perhaps these effects are best explained by referring them to the sympathy existing between the stomach and the new and irritating state of the uterus, through the medium of the great sympathetic nerve, by branches from which they are connected; and, further, that in most cases the stomach is rendered more susceptible of being thus influenced by a degree of morbid predisposition; it being difficult to conceive that a process purely natural should be productive of morbid effects: The admission of this sufficiently explains why some females are exempt from these disorders, while others suffer so much from them.†

* "Physiology," vol. ii. p. 330.

† The analogy found to exist between nervous influence and the electric fluid, seems to strengthen the probability of the relation between the uterus and other important viscera being dependent upon nervous communications.

With a view of ascertaining how far this analogy holds, with regard to the uterine organs, some experiments were

As the natural consequence of these dyspeptic affections prevailing to a considerable extent may be regarded the wasting, and somewhat emaciated, state of body occasionally produced by pregnancy; especially when we consider that there is going on at the same time a large and constant derivation of nutritious matter from the system of the mother towards the support and growth of the fœtus.

But it is not in all cases that pregnancy operates thus unfavourably; it sometimes produces a salutary change on the whole system: So that the female enjoys better health during gestation than at other times; and when the constitution is strong and the general health good, a state of plethora is frequently induced, which, towards

instituted by Moreau, and others, the result of which was exceedingly curious and interesting. Female Guinea pigs, at the age of puberty, were selected for this purpose; one of which was prepared so as to expose to view all the viscera of the abdomen and chest, as well as several nerves and muscles. So soon as the violent and convulsive motions, necessarily resulting from so painful an operation, had in a great measure subsided, the ovaries were in the first place subjected to the influence of a powerful galvanic apparatus; and, although very little action was excited in the organs themselves, it was evident that a powerful impression was communicated through them to the surrounding parts, which were thrown, at each discharge, into a state of convulsive and spasmodic agitation.

These phenomena became still more apparent, when the Fallopian tubes and uterus were acted upon in the same way, the excitement in which was manifested by spasmodic and tremulous motions of many of the surrounding organs.—Vide “Moreau Histoire Naturelle de la Femme.” Tom. iii. p. 121.

the latter period of gestation, may even require medical interference. These effects are obviously to be attributed to the increased excitement of the sanguineous system, combined with a healthy and active state of the digestive organs, often at this time too well-supplied by a full and nutritious diet, and thus giving rise to the formation of a superabundant quantity of blood.

The changes effected by pregnancy upon the vascular system consist, chiefly, in a general increased excitement—an alteration in the appearance of the blood—and great local determinations, particularly to the uterus.

An increased action in the circulation commences soon after impregnation, when, according to the strength of the constitution, the pulse becomes fuller, stronger, and quicker, the vitality of the capillary vessels appears to be augmented, and also the animal heat. This excited or febrile condition of the system prevails in the greatest degree at about the third month; after which it begins gradually to subside, the pulse becoming slower and less strong till towards the approach of parturition, when the action of the heart and arteries acquires a new energy. As to the cause of this increased excitement, it may perhaps in part be attributed to the stimulus imparted by impregnation to the nervous system; between which, and the vascular, the relation is so close, that whatever acts as an excitant or depressant on the one produces a corresponding effect on the other.*

* "Fodere *Medicine Legale*," tom. i., p. 436.

But a more intelligible and obvious explanation is, to regard it as the secondary effect of the great local action going on in the uterus, according to a well-established law in pathology ; that no local excitement or irritation can continue long without producing an effect on the system at large in proportion to their extent. The gravid uterus, therefore, may be considered as bearing some sort of analogy, in its effects on the system, to inflammation of any part, or other local injury.

The buffy appearance of the blood during pregnancy evidently depends upon its excited circulation ; which, by causing it to coagulate more slowly, gives time for a more complete subsidence of the red particles, whilst the fibrin which constitutes the buffy coat remains upon the surface.†

One of the most remarkable effects of pregnancy is the great local determination of blood to the uterus, and evidently an essential one, as this fluid is the immediate source from whence the ovum acquires its developement. This increased local action, which commences immediately after impregnation, is probably excited by the stimulus of the semen, influencing first the nerves, and through them producing the subsequent changes in the action of the uterine blood-vessels ; of which one of the most important is the interruption of the menstrual discharge, or, at least, such a change in its nature that it becomes subservient to the developement of the

† Notes of Mr. Grainger's Lectures.

uterus or its membranes; and probably of the decidua in particular; a circumstance which in some measure accounts for the occasional continuance of the menses during the first two or three months of pregnancy: For during this time, according to eminent authorities,* the inferior portion of the uterus is not *always* occupied by the deciduous membrane, but remains free and unembarrassed as before impregnation; from this portion, therefore, the menstruous discharge may still continue.

Apparently predisposing to the determination of blood to the uterus, and to the consequent developement of its vessels, are certain anatomical peculiarities in the organization of the female. The descending portion of the aorta, it is remarked by Soemmerring, is larger than the ascending, the reverse of which obtains in men; in the female also, before its division into the common iliacs, its coats are thinner and softer than in the male; and the arteries which are distributed to the ovaries and uterus, are larger and more pliable than the veins, which are smaller and more dense.

To the determination of blood are to be attributed the changes induced in the uterus itself during gestation, its astonishing increase in size, particularly as it respects the calibre of its blood-vessels, some of which become so large as to admit of the tip of the little finger. This, by some, is adduced as a proof of the arteries being

* Dr. Hunter, Burns, Denman, Baudelécoque. Vide Dewees' "Compend. of Midwifery," p. 95.

endowed with an action peculiar to themselves, in addition to that derived from the heart; the fibrous texture of the uterus is now so fully developed as to be distinctly recognized as muscular; the lymphatics also are seen to be extremely numerous, forming a plexus which nearly covers the body of the uterus, and some of them so enlarged as to admit of the introduction of a crow quill.

With respect to the developement of the mammæ in pregnancy, so great is the consent between these organs and the uterus, that they appear to be regulated by the same laws, and influenced by the same causes;—they together acquire the developement necessary to their functions, and at about the same time undergo a change which renders them no longer capable of performing them;—a plethoric state seems common to both, as is observed on the approach of each menstruation, or during a suppression of this discharge;—the mammæ become loose, flaccid, and pendent, from the same causes which produce relaxation of the uterus, as profuse discharges, repeated pregnancies, &c., if the ovum perishes in the womb, or an abortion be threatened, the developement of the mammæ discontinues, and they diminish;—immediately after delivery, the great determination to the uterus being no longer required, the breasts become still more enlarged, and a copious secretion of milk follows, as though a metastasis or revulsion had taken place, bearing some analogy to that which occasionally succeeds, in the intestines or kidneys, to a sudden

cessation of the cutaneous perspiration. This sympathy is perhaps partially explained, by a reference to the anatomical connections of the uterus and mammæ, of which the most remarkable is the vascular by the anastomosis of the internal mammary with the epigastric arteries and veins; they also communicate through the medium of the great sympathetic—by the lymphatic vessels and the continuity of the cellular tissue. With respect to the anastomosis of the internal mammary with the epigastric artery, we are assured by Riolan,* that he has found this in the body of a recently-delivered woman of the thickness of a writing quill; and it is to this communication that he attributes the relation existing between the uterus and mammæ.

However this may be, there is, no doubt, some passage of communication between these organs, since their consent is so remarkable.

As to the dark areola observed around the nipple, it appears to depend upon a congested state of the capillary veins, which in this part are arranged in a peculiar manner, so as to form numerous circles.

Towards the close of gestation we observe certain affections, which are obviously produced by the mechanical pressure of the uterus; such are the enlargement of the veins of the lower extremities, sometimes amounting even to varicose dilatation, the pressure of the uterus on the iliac veins preventing the free return of venous blood; this is chiefly met with in women whose occupa-

* "Fodere Physiologie Positive," Tom. ii, p. 259.

tion obliges them to be much upon their feet ;—an occasional œdematous swelling of the lower extremities and the frequent occurrence of cramp, from the compression of the lymphatic vessels, and the sacral and sciatic nerves ;—increased sensibility of the integuments of the abdomen, from their great distention ;—from pressure upon the bladder, this viscus is rendered less capacious, hence a more frequent necessity of passing the urine ;—lastly, the impeded respiration towards the close of gestation evidently depends upon the more difficult descent of the diaphragm, in consequence of the abdominal viscera being forced upwards by the womb ; an inconvenience in a great measure provided against by the greater capacity of the lower part of the abdomen compared with the chest, which in the female is considerably shorter than in the male.

The peculiar symptoms which attend quickening are chiefly referrible to the sudden removal of the pressure of the uterus upon the iliac vessels, and more especially the syncope ; the sudden rush of blood to the lower extremities producing a temporary exhaustion in the vessels of the brain.

One of the most remarkable effects of pregnancy is seen in its influence upon certain important diseases. Hence, in places where the plague or other contagious affections are epidemic, it is found that pregnant women are less liable to become infected than others, though when once attacked they more speedily sink ; because the

ordinary affections of pregnancy, though at first slight, readily assume a character of malignancy.

Chronic affections of very long standing, and disorders of a serious, and even fatal tendency, are frequently arrested during gestation. Of this we have the most striking example in pulmonary consumption, every symptom of which will often subside soon after conception; and the female continues free from the disease till after delivery; though probably she could not have survived more than a few weeks, or at most months; the life of the mother being apparently prolonged solely for the sake of her offspring. Though in most cases the suspension of consumption is only for the term of gestation, there have been instances in which, from a rapid succession of pregnancies, the phthisical diathesis has been entirely subdued, leaving the patient in the enjoyment of established health.

Of this effect I can offer no further explanation than by supposing, that the increased local action in the uterine organs produces such a diminution of that in the lungs, as to render it no longer morbid; on the principle of counter-irritation, or in the same way that phthisis is sometimes checked by the formation of an abscess in a remote part, or by the appearance of a cutaneous eruption.

An occasional effect of pregnancy, of which cases are related by various authors,* is that of

* WARDROP "Med. Chir. Trans." vol. v. p. 359. COOPER'S "Surg Dict." p. 482.

greatly retarding the union of fractured bones, or altogether preventing it till after delivery. Others again, as Richerand, Magendi, and Boyer, declare their experience to be the reverse of this;—a difference sufficiently accounted for, by referring to the opposite conditions of the system frequently connected with pregnancy; when it occasions the cachectic and emaciated state before alluded to, it is not surprising that the union of a fracture should be retarded; nor that it should take place in the usual time, when no such effect is produced, but, perhaps, a contrary state of sanguineous excitement and plethora. Haller attributed this non-union of fractures to the quantity of earthy matter, of which the fœtus must necessarily deprive the mother.—Others, again, have asserted, that the vital powers, being so occupied in directing a proper supply towards the uterus and ovum, in a manner neglect to establish the local action essential to ossific union.

In the last place, we have to direct our attention to the mental changes produced by the impregnated uterus upon the system of the mother; of which, I confess, I can give but a partial and very imperfect explanation, since they are obviously connected with a subject no less incomprehensible, than the mysterious relation existing between matter and mind. Of these changes one of the most prominent features is, a greatly increased sensibility to the impressions of sur-

rounding objects, and of the ordinary occurrences of life; of which, in addition to the evidences mentioned in a preceding page, I may instance the great caution always necessary to be observed in the communication of painful intelligence to a pregnant female, and the consequences which may attend it, sometimes proving fatal to the fœtus by producing abortion, and greatly endangering the life of the mother: Hence the importance, during gestation, of carefully avoiding all causes of sudden alarm, and whatever might occasion violent mental agitation.

At the risk, perhaps, of being charged by some with a vulgar, and almost superstitious credulity, I might here go so far, in proof of the great force of mental impressions during pregnancy, as to instance the possibility of the organization of the fœtus being effected by them: Not that the generality of stories of this kind are to be considered worthy of credit; but some few out of the many are so striking and singular, as to render it almost impossible to reject the idea of the effect produced being connected with the cause assigned;—an opinion which is favoured by professional men of great respectability and eminence of the present day.*

* Of these are Dr. Elliotson and Blundell.

This opinion of mental impressions upon the mother, affecting the formation of the child, seems to be of very ancient date.

The stratagem of Jacob, as related in the writings of Moses, by which he obtained from his master, Laban, the best and strongest of his cattle, might suggest an experiment well worthy the attention of the Physiologist at the present

As to the physiology of this increased mental sensibility, it is, no doubt, correct to attribute it

day. "And Jacob took him rods of green poplar, and of the hazel and chesnut tree, and piled white strakes in them, and made the white appear which was in the rods; and he set them before the flocks in the gutters in the watering troughs, when the flocks came to drink. And the flocks conceived before the rods, and brought forth cattle ring-streaked, speckled and spotted." (Gen. xxx. 37—39.)

The Jews are said to have been so solicitous about the beauty of their children, that care was taken to have some very beautiful child placed at the door of the public baths, that the women, at going out, being struck with his appearance, and retaining the idea, might all have children as fine as he. The Chinese take still greater care of their breeding women, to prevent uncouth objects of any kind from striking their imagination. Musicians are employed at night to entertain them with agreeable songs and odes, in which are set forth all the duties and comforts of a conjugal and domestic life; that the infant may receive good impressions even before it is born, and not only come forth agreeably formed in body, but well disposed in mind.—See Ency. Brit. Art. "Callipædia."

Of the numerous instances related in proof of the effect of mental impressions upon the fœtus, the following, published by BENNETT, in the "London Medical and Physical Journal," for July, 1827, is noticed by Dr. ELLIOTSON as one of the most remarkable and authentic:—"A woman gave birth to a child with a large cluster of globular tumours growing from the tongue, and preventing the closure of the mouth, in colour, shape, and size, exactly resembling our common grapes; and with a red excrescence from the chest, as exactly resembling the wattle of a turkey-cock. On being questioned, before the child was shown her, she answered, that whilst pregnant she had seen grapes, longed intensely for them, and constantly thought of them; and once was attacked by a turkey-cock." Both growths were successfully removed by Mr. BENNET.—ELLIOTSON'S "Blumenbach."

to an altered condition of the nervous system ; to its increased susceptibility, induced by a peculiar but unknown influence of the uterus, or, perhaps, depending in some measure on an excited state of the circulation, and a consequent increased supply of arterial blood to the brain, which we know to be its natural and essential stimulus ; an explanation, however, which, it must be acknowledged, amounts to little more than an expression of ignorance ; since of the nature of the change in the nervous system we know nothing, and *less, if possible, of the mode in which it influences the mind.*

Other mental affections commonly induced by pregnancy, are extreme solicitude and anxiety—lowness of spirits—melancholy, and fearful anticipations of the future—indicated by frequent expressions of apprehension as to the final issue of approaching confinement. These feelings may, in a measure, depend upon physical causes, or the corporeal affections of pregnancy. By Burns they are stated to be intimately connected with sympathetic effects upon the medulla spinalis and oblongata ; arising either directly from the uterus, or immediately through the state of the bowels.

A more obvious and intelligible, though less physiological, explanation of this condition of mind is to be found in the peculiar feelings with which we may naturally suppose the state of gestation to be contemplated by the female, and more especially its consummation in the critical

event of parturition, the near approach of which she must be anxiously anticipating, and frequently with exaggerated ideas of its dangers and sufferings; an event emphatically characterized as "*the hour of nature's sorrow*," a period in which the female is doomed to experience, in a greater or less degree, the force of the sentence pronounced by the Almighty upon the first of mothers, when unto the woman he said, "*I will greatly multiply thy sorrow and thy conception; in sorrow shalt thou bring forth children;*" *—a curse which experience has proved to have fallen upon woman in a heavier degree than upon any of the inferior animals, from which, in fact, they are comparatively exempt; though for this no *natural* or *physiological* reason can be assigned.

The more remarkable though less frequent of the mental effects of pregnancy, which, though unable to explain, I shall mention, are the changes it sometimes induces in the intellectual powers and moral habits. The former in some cases become enfeebled or impaired, whilst in others they are endowed with an energy and activity which they do not possess under ordinary circumstances,—changes sometimes carried to such an extent as to produce a state of mental alienation,† or the more happy effect of removing this malady.

The changes in the moral dispositions and

* Genesis iii. 16.

† MOREAU "*Histoire Naturelle de la femme*," Tom. ii., p. 191.

affections are often most singular and unaccountable—strange predilections or antipathies are formed ; hence individuals, for whom the female had previously the strongest attachment and esteem, become suddenly the objects of her hatred and aversion ; sometimes the mind is tormented by strong propensities to actions of a vicious and even criminal nature, the execution of which is but with difficulty prevented by a sense of moral restraint.

To describe the mental effects of pregnancy, of which the above are some of the principal and more obvious, in all their variations and modifications, would be impossible, since they are multiplied by innumerable causes,—as an organization possessing unusual nervous sensibility,—a too sedentary or too laborious life,—the luxurious and delicate habits of wealth, or the contrary ones of extreme poverty,—and in some measure by a constitution of mind peculiar to and identifying each individual of our species.

THE END.