

The Natural Limit of the Duration of Human Gestation

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In the English Law Courts on July 20, 1921, in the case of *Gaskill v. Gaskill*, it was decreed that what was to all intents and purposes a normal case of uterine pregnancy could extend over a period of 331 days and I would observe and emphasize the fact that this period of 331 days was reckoned neither from the commencement nor from the cessation of the last menstruation but from the latest date on which insemination by the husband could possibly have occurred.

Such a declaration emanating from an English Court is most assuredly to the scientific and medical world a matter of no mean importance as quite inadvertently it may find its way into textbooks and be thus for a greater or less length of time disseminated not only as a feasible but as a tenable and universally accepted proposition, consequently it behooves us without undue delay to discuss it and at the same time determine whether it is a scientifically sound pronouncement. In order that we may be in a position to arrive at some definite conclusion thereon it is imperative that we should even somewhat briefly review our known facts concerning human pregnancy.

I would, however, at the outset remark that most of the phenomena associated with the reproductive process in woman are extremely intricate and somewhat obscure and for these reasons unfortunately they have proved only too favorable to the propagation of beliefs which, as we shall presently learn, are clearly erroneous and they have become so deep rooted in the minds of many that they will not be easily eradicated.

Most of my readers no doubt have either seen it stated or have been informed that women who have never menstruated and who are incapable of menstruating have and may nevertheless become pregnant. Now, because of the number of women I have seen who have lived many years in wedlock and who had never menstruated, I have no hesitation in asserting that such a statement as the foregoing must have originated through and must be attributable to some error of judgment and carelessness in the investigation and interpretation of facts. No one can validly challenge the statement that the ability to harbor and sustain and develop a fertilized ovum is indissolubly connected with the ability and power to display the recognized phenomena of menstruation. An abundant supply of readily available oxygen is absolutely necessary for starting and carrying on in the fertilized ovum those chemical reactions and changes which are metabolic in character and which are concomitants of the phenomena of life; and if the generative organs of the woman cannot function autogenetically and manifest the phenomena of menstruation then because the blood-vessels which should respond to the demands of a fertilized ovum have never been and can never be autogenetically activated, and because the oxidative

powers and processes of the generative organs never consequently exceed those necessary for maintaining the organs merely in a resting state, gestation cannot occur. To this very important assertion we shall again have to refer to later.

It will moreover be readily conceded that except when menstruation is held in abeyance by lactation no woman living a regular marital life is justified in entertaining the notion that she has conceived, and no medical man is ever suspicious of the existence of uterine pregnancy in the case of any woman until and unless a menstrual period is missed. Solely on this account but aided and guided of course by statistics it became and is even still customary to reckon the stages of advancement and the probable date of parturition in any given case of pregnancy either from the commencement or the cessation of the last menstrual discharge. That this rough and ready method of reckoning has to a certain extent proved satisfactory and successful is indisputable and the reason of this we shall presently take note of, but it nevertheless must be very evident to all medical practitioners that it is not only unscientific but unsound. Embryologists even have not escaped the pitfall for they, too, have unfortunately adopted this same datum from which to reckon the age of any given embryo and assign dates to the various stages of embryonic development.

The modicum of success which has attended the aforesaid method of foretelling the probable date of parturition is entirely due to the fact that a large percentage of women menstruate every twenty-four to twenty-eight days and to the fact that gestation begins—in the case of every woman who has conceived—at a definite and fixed time. On account of a misinterpretation of facts there has prevailed and even still prevails the belief that when fertilization takes place it is most commonly effected immediately after a menstrual period. Today it must to us seem somewhat remarkable that this belief should ever have been seriously entertained, because it was well known throughout the ages that the Jews were a prolific people and that the strict Jewess, in bygone days anyway, adhered to and observed most religiously the Mosaic law which forbade her to have intercourse with her husband until she had numbered seven clear days from the cessation of her menstrual discharge and had had the prescribed bath. Over and above this we are in possession of abundant clinical evidence that fertilization may take place as a result of a fruitful intercourse occurring at any time during the intermenstrual resting period seven clear days from the cessation of her menstrual discharge of one period to two days prior to the date of the next expected menstruation.

Firmly implanted in most minds there exists the further erroneous belief that the beginning of gestation follows immediately on fertilization. Let us

for the moment assume that fertilization and the beginning of gestation are simultaneous events. Then because fertilization may be effected at any time during the intermenstrual period the infant resulting from an ovum fertilized immediately after a menstrual period would, according to our present method of reckoning the probable date of parturition, be born three weeks at least before the infant resulting from an ovum fertilized just before an expected menstruation, and it clearly would be futile for us even to attempt to prognosticate the date of the birth of any infant. The aforesaid belief has no valid basis for its existence and maintenance and if we would view aright the question of the natural limit of the duration of human gestation we must banish it forthwith from our minds.

In support of this statement I would adduce at the outset our knowledge of what happens in the case of the germination of vegetable seeds and the incubation of birds' eggs. The egg of the domestic hen may be kept for twelve or fifteen days and then incubated while the seed of some cereals may be kept for years and then subjected to the conditions favorable for germination. Here then we are forced to accept the dogma that the fertilized cereal seed, although endowed with the power of life, requires the timely cooperation of some favorable extrinsic agent or agents to start life in it, and what is true of the vegetable seed is likewise true of the fertilized bird's egg and the fertilized human ovum. As indisputable clinical evidence that gestation begins at a definite and fixed time in the case of every woman after a fruitful intercourse I would instance the fact that it is impossible for even the most experienced medical practitioner to detect by physical examination the existence of uterine pregnancy in the case of any woman earlier than fourteen days after the date when the first missed menstrual period was expected and for the reason that at this stage the pregnant uterus is approximately of the same size and consistency in every normal case. In a case where fertilizing was effected and gestation begun immediately after the cessation of a menstrual period one would naturally expect the pregnant uterus fourteen days after the first missed period to be larger than in a case where fertilization was effected and gestation begun just before the date when the first missed period was expected. In the former case the pregnancy would be nearly three weeks anyhow in advance of the latter. As corroborative evidence I would instance the fact that morning sickness, which is a common symptom associated with the pregnant state, is never experienced earlier than the time when the first missed period was expected, and this is the first symptomatic evidence we have of the presence of an actively progressing germ plasm. It is because gestation begins at a definite and fixed time in the case of every woman who has conceived that our prognostication of the probable date of parturition meets with any measure of success at all, and no matter when the fruitful intercourse may have occurred it is because gestation begins at a definite and fixed time that we are unable to detect the existence of uterine pregnancy earlier than fourteen days after the date when the first missed period was looked for. The latter pronouncement holds good also of those cases in which menstruation is wont

to recur every five or six weeks instead of every twenty-four or twenty-eight days. As I have already observed, an abundant supply of readily available oxygen is necessary to start in the human ovum those chemical changes which characterize life, and as the generative organs in the resting stage cannot furnish this requirement the germ plasm, endowed with the power of life but as yet incapable of displaying the phenomena of life, awaits the activation of the generative organs which but for the presence of a fertilized ovum would induce menstruation; for menstruation, like the beginning of gestation, requires an abundant supply of oxygen. If now we reflect, scan carefully and interpret aright our facts, we are forced to conclude that gestation in the human female begins invariably when the generative organs begin to be activated for the occurrence of a menstrual period which is inhibited because of the demands of a fertilized ovum.

Embryologists, therefore, in reckoning the age of any given human embryo and in assigning dates to the various depicted stages of our embryonic development will sooner or later be compelled by force of circumstances to make their calculations not from the date of cessation of the last menstruation nor from the alleged date of one insemination but from the date on which the first missed period was expected.

Having determined that the time when gestation starts corresponds in all cases with the time when the first missed period was expected, let us now turn our attention to the question of the natural limit of this physiological process, and on this point we may glean some important information from the happenings in cases of full time extrauterine pregnancy. When gestation occurs outside the uterus the fetus in its abnormal location may nevertheless attain maturity and be as perfectly nourished and developed as if it had been lodged in the uterus. If, however, it is not delivered, by an abdominal section of the mother, before the natural limit of the duration of gestation is reached, it perishes. Fortunately and yet unfortunately it dies without a struggle and without the mother being in a position to throw any light upon or express any opinion as to the time when it probably perished. That it dies self-poisoned through a lack of oxygen there can be no doubt. We, however, are not altogether without circumstantial evidence as to the probable time when it perished.

I have elsewhere and on many occasions drawn attention to the fact that after a normal pregnancy and parturition if the mother makes no attempt to suckle the child it not infrequently happens that the menstrual function reasserts itself about six weeks after the confinement, or, roughly speaking, about eleven and a half months after the date of the last menstruation in the case of a woman who is in the habit of menstruating every twenty-four to twenty-eight days. Now in some cases of full time extrauterine pregnancy and while the infant is still located in the mother's body we witness this same tendency for the menstrual function to reassert itself about eleven and a half months after the date of the last menstruation. This being so we may take it that so far as the reestablishment of the menstrual function is concerned the normal removal of the

practically mature infant from the uterus is an event analogous with the intramaternal death of the full-time extrauterine infant. Judging, therefore, from what happens in cases of full time extrauterine pregnancy it is quite evident that there is a well defined natural limit to the duration of human gestation. If we would reckon scientifically and soundly we must reckon, however, from the time when gestation starts, i. e., from the date on which the first missed period was expected. Reckoning from this datum

statistical evidence supports the opinion that the limit of duration of human gestation is nine lunar months or 252 days. For the guidance of those practitioners who may continue to rely upon the customary and rough and ready methods of reckoning the probable date of parturition I would observe that their allowance of ten lunar months holds good only in cases where the menstrual cycle of the woman does not exceed that of one lunar month or twenty-eight days.

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