A Clinical Lecture ON DYSMENORRHOEA.

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DYSMENORRHOEA, according to common usage, means pain accompanying menstruation. Only about 40 per cent. of women menstruate without discomfort; 60 per cent. have some pain. In about 11 or 12 per cent. of young unmarried women the pain is bad enough to lay them up each month.

Menstruation is the expulsion of the broken-down endometrium. The endometrium is the essential part of the uterus. It exists for the purpose of receiving an ovum and then forming a placenta whereby that ovum can be nourished. It is provided with a thick layer of muscular tissue for the purpose of expelling the ovum when the proper time has come; but this is an appendage necessary for the delivery of a child; the mucous membrane is the part essential for its development. This mucous membrane is thin during childhood, and becomes thick and vascular at puberty. When it has reached its full development, if no fertilized ovum comes into contact with it, it is broken down into a pulp, haemorrhage takes place from vessels opened up by the breaking down of the tissue, the cervix is dilated, and the blood and broken-down mucous membrane are expelled, by uterine contractions like those which expel the fetus and the placenta, though less in extent.

Every month for some thirty years this mucous membrane is regenerated, and if not supplied with a fertilized ovum it is broken down again.

With this cycle of change in the endometrium there go other changes. Before menstruation there is an afflux of blood to the pelvic organs. From this fullness of blood, and from the growth of the mucous membrane, the uterus is a little larger before menstruation than after it. There is a similar afflux of blood to the breasts, which in consequence often ache before and during menstruation. There is before menstruation a slight rise in the blood pressure and a little rise in temperature, amounting on the average to about half a degree. There is some weakness and increased irritability of the nervous system. Women are usually conscious, when menstruation is coming on, that they are weaker, less inclined for exertion, more easily tired, both in body and mind, and more irritable. If the patient is subject to migrainous headaches, these are especially apt to recur just before or with menstruation. If she is epileptic she is at this time especially liable to fits.

There are two kinds of pain from which women may suffer when they menstruate. One pain is that produced by the physiological congestion of the pelvic organs which precedes menstruation. The other pain is caused by the contractions of the uterus which should expel its contents. The first pain is the commoner, and is felt more or less by most women when they menstruate.

The pain due to physiological pelvic congestion is a general aching diffused over the whole pelvic region—over the lower abdomen, lower part of back, and often down the thighs. It is often accompanied with aching in the breasts. It is a continuous pain, not one that comes in short, sharp paroxysms. You may be told that it comes and goes, but when you inquire as to the length of each attack and remission, the answer will be that the pain continues steadily for two or three hours at a time, and then remits for an hour or two. It comes on gradually; you are not told of its waking the patient in the middle of the night. It begins from a day or two to a week before menstruation, and is not relieved until the flow has become as copious as is customary for that patient. It is always better while the patient is lying down. It is never bad enough to produce objective evidence of severe suffering. The patient is in least discomfort when she is still; she does not writhe with pain, nor vomit, nor perspire, nor faint. She may look languid and tired; but there is no other external sign of suffering.

We know little as to the reasons why some women suffer much from the flow of blood to the pelvis which precedes menstruation, and others little. Women who menstruate copiously suffer more than those who menstruate scantily, and I hold it reasonable to think that a considerable monthly haemorrhage implies a considerable congestion preceding it, and that this is why the more copious menstruations are commonly the more painful.

In most morbid conditions of the pelvic organs which produce pain, that pain is worse just before menstruation. But it is not usual to apply the term "dysmenorrhoea" to a case in which there is pain not only preceding or with menstruation, but at other times as well.

There is one morbid condition which produces abnormal congestion of the uterus and consequent pain. If the uterus is bent back and the utero-sacral ligaments are well marked and firm—their characters differ much in different subjects—the veins which return the blood from the body of the uterus will be pressed upon by these ligaments, the return of blood will be hindered, the body of the uterus will become swollen and tender, and the patient will suffer pain before and during menstruation, and often at other times as well. This abnormal pain with menstruation is cured if the uterus is prevented from falling back. In these cases the pain is not usually limited to the time of menstruation, although it may be. Therefore such cases are spoken of as retroversion or retroflexion, not as dysmenorrhoea.

In some cases the patient refers her monthly pain especially to the situation of the ovary. She points to a spot about two inches internal to the anterior superior iliac spine, and says the pain is there; and she may add that it goes through to the back, and indicate a spot over the sacro-iliac synchondrosis of the same side. When your fingers on the abdomen press down on to the spot pointed to, the patient manifests more pain than when you press anywhere else. There is doubt whether when you press in this way you really exert pressure specially upon the ovary; but this is a side issue of small importance. Sir James Simpson applied to cases presenting this kind of monthly pain the name of "ovarian dysmenorrhoea." This is nothing but a name—a label. It conveys no information, and helps in no way in treatment. It would seem to imply that the pain is due to some condition of the ovary. A hypothetical pathology of the ovary has been constructed to account for such cases. It has been said that the tunica albuginea is too thick, so that the follicles cannot burst properly. Morbid conditions of the ovary have been described which have been supposed to cause pain, such as "cirrhosis," "congestion," "oedema," "dropsy of follicles," etc. In the most conspicuous and best-known disease of the ovary—cystic disease—there is as a rule no pain until the cyst is big enough to press upon something else. Concerning the other ill-marked morbid conditions that are supposed to cause such suffering, all I can tell you, and all I think I need tell you, is that if you were to put upon a plate half-a-dozen ovaries, not much enlarged or adherent, removed from women who had this ovarian pain, and put with them half-a-dozen other ovaries taken from the bodies of women who were accustomed to menstruate without pain, there are no criteria by which anyone could pick out the ovaries of those who had pain when they menstruated. So long as we cannot distinguish a painful ovary from one that is not painful, it is idle to say that we know anything of the morbid conditions of the ovary upon which pain depends.

The severity of pain depends not solely on its local cause, but also on the sensitiveness of the patient. One person will be prostrated by pain which another would hardly notice. We have no means of measuring pain; but if we had we should doubtless find that there is not only a personal equation which can be measured of the quickness of transmission of nerve impulses, but also a personal equation of the amount of pain necessary to upset the equilibrium of the nervous system. Very severe pain produces manifestations that can be seen, but if pain is not so bad as to do this, we are dependent for knowledge about it on what the patient tells us. The patient's statements are conditioned not merely by what she actually feels, but by her wish for sympathy, her faith in medication, and her command of language. For these reasons similar local changes may produce different manifestations in

different patients, and in the same patient at different times.

This fact is very important, for it is an always present source of error in diagnosis, prognosis, and treatment. You may be led into an erroneous diagnosis because the patient gives you an incorrect account of her pain. If there is nothing but the physiological monthly congestion of healthy pelvic organs, no treatment (except such as modifies the nervous tone) will affect the pain, and if the patient is so sensitive that she is prostrated by trifling ailments, you will not alter this idiosyncrasy by any treatment of dysmenorrhoea.

This general aching due to pelvic congestion is one kind of pain, and a common kind. Some women when they menstruate have another and different kind of pain, due to uterine contraction.

Contraction of the uterus, like that of most muscles, is not usually painful. Muscular contraction is continually going on in the alimentary canal, and is not felt by healthy persons; but in some morbid conditions it becomes painful, and is called colic. The uterus contracts and relaxes alternately throughout pregnancy, but the patient is not aware of it. The pain of labour is only in very small part, if at all, due to uterine contraction; it is due to the stretching open of the soft parts, and is acute in proportion to the sensitiveness of the parts that are being stretched open.

The uterine contractions which expel the menstrual flow are little or not at all felt by most women; but in a few they are painful, and this is dysmenorrhoea in the literal sense of the word.

Cases occur in which painful uterine contractions accompany menstruation because there is obstruction to the exit of the flow. Very rarely this obstruction is in the canal, which may be contracted by cicatricial tissue formed after an operation on the cervix, or by a new growth bulging into it. Now that amputation of the cervix is seldom practised, cicatricial contraction of the cervical canal is a clinical curiosity, and the same may be said of blocking of the canal by a new growth.

In some patients the endometrium, instead of breaking down into a pulp, is shed in a large piece or pieces, and such a piece may stick in the cervical canal and provoke contractions which are painful. This is called membranous dysmenorrhoea. Some physicians, who have taken great pains to instruct their patients and nurses to search for these membranes have found them to be very common. The frequency with which they are found depends upon the care with which the patient's urine, and the napkins or pads used by her, are examined to find them. Unless they are looked for they are seldom found. In this form of dysmenorrhoea, the pain is not very severe. It depends much upon the tone of the patient's nervous system: often the patient will pass a membrane one month with pain and one the next month without pain.

It was at one time said by nearly all writers upon the diseases of women that ante flexion causes dysmenorrhoea. A theoretical explanation was given. It was said that the canal was bent at an angle and kinked, and so the menstrual flow could only get out with difficulty and pain. This explanation was plausible, and obtained wide acceptance for a time because it seemed in harmony with the fact that in women with dysmenorrhoea it is common for the uterus to be bent forward. But after a time, persons interested in the question began to look at specimens instead of diagrams. Specimens show no angle but a gentle curve of the canal, no more obstructing the flow of fluid along it than do the natural curves of the healthy male urethra. Twenty years ago the frequency of ante flexion was investigated by two independent observers in different countries, and it was shown that ante flexion is present with exactly the same frequency in women who menstruate without pain as in those who menstruate with pain. The result of both investigations was to show that more or less ante flexion is the natural shape of the uterus in the virgin; it is exceptional for it to be straight. No one has ever brought forward any evidence to controvert these statements. The persons who say that ante flexion causes dysmenorrhoea make the statement without any foundation in fact for it.

It was at one time widely taught that the common cause of menstrual pain was narrowness of the os externum. This idea was supported by the frequent cure of the pain by dividing

the vaginal portion with scissors. But in most cases in which this treatment succeeded, the os uteri could not have been so very small, for it would allow the end of the scissors blade to enter, and a good deal of blood can quickly escape from a hole as large as a scissors point. And cases are now and then seen in which the os externum is so small that only a fine probe can be passed through it, and in some such cases menstruation is painless.

Stricture of the os internum has been said to cause dysmenorrhoea; but such a stricture has never been seen except in diagrams.

Dysmenorrhoea has been said to be a result of imperfect development of the uterus. The evidence for this is to my mind far from conclusive. I find that my cases of spasmodic dysmenorrhoea began to menstruate at about the same age as the generality of women. Cases in which the function was late in establishment are not among them more frequent than among women in general. It has been, in my experience, quite exceptional to find in spasmodic dysmenorrhoea a uterus appreciably smaller than it ought to be.

In some of the worst cases of painful menstruation there is neither narrowing of the canal nor the passage of membrane. The disease is a nervous one. In about two-thirds of the cases the monthly pain dates from the beginning of the function; in about one-third the patient, after menstruating for a time without pain, then comes to suffer. When acquired it is usually at an early age—in the great majority of cases before 25. It may be acquired later; I have known it begin as late as 37, and it may be acquired by women who have had children, but this is exceptional.

It is exceptional for such patients—for reasons that will readily occur to you—to seek advice early. Two-thirds of the patients whom I had treated had suffered for six years or upwards before coming for treatment.

There are no physical signs by which you may recognize spasmodic dysmenorrhoea. The diagnosis has to be made from the character of the pain. The pain due to uterine contraction differs from the diffused continuous aching of pelvic congestion. Some patients have both pains: first, the general aching of uterine congestion, and then the spasms of uterine colic.

There is, and with our present means of investigation must be, a certain amount of unavoidable error in the diagnosis of dysmenorrhoea, because we have no means of objectively determining the character of the pain, or even its presence. We are absolutely dependent upon the patient's statements—that is, we see the case through a distorting medium. I shall have to point out to you ways in which the patient may unintentionally mislead you.

The pain of spasmodic dysmenorrhoea is far more severe than any other kind of menstrual pain. It is common for patients to say that when it is present they cannot lie still; they roll about with pain, it doubles them up, keeps them awake at night, makes them perspire and sometimes faint. In about one-fourth of the cases it causes vomiting. When the pain is so severe as this the patient is incapacitated while it lasts. Cases of spasmodic dysmenorrhoea are not all equally bad; there are degrees in this kind of pain as well as in others. But menstrual pain of extreme severity is almost always of the spasmodic kind. This great severity is the most characteristic feature of spasmodic dysmenorrhoea. The pain of pelvic congestion is never so severe. A patient who has only this latter pain may lie down because she is more comfortable when doing so, but if any strong reason exists why she should not lie down she can keep about.

The pain of spasmodic dysmenorrhoea is of short duration. I have known it last ten minutes only, but during that time be so severe as to make the patient vomit. It comes on suddenly; sometimes wakes the patient in the middle of the night. Its duration is usually less than twenty-four hours, and it only exceptionally lasts longer than two days. Careful inquiry has to be made into this point. Patients who have two kinds of pain—the aching due to pelvic congestion, which may precede the flow by several days, and the spasms of uterine colic, which only last a few hours—may not differentiate their pains, but tell you simply that their pain begins so many days before the flow appears. Hence, before concluding from its duration that pain is not spasmodic, you must inquire into its kind.

The uterine contractions which cause the pain of spasmodic dysmenorrhoea are intermittent. Hence when you ask the patient what her pain is like she will tell you that it comes in sudden, sharp pangs, and between these twinges of pain there is either no pain or a dull, general aching in the pelvic region. Each attack of pain is of short duration, usually only a minute or two. To find out the character of the pain often needs careful inquiry, for often patients whose only pain is that due to pelvic congestion, will tell you that the pain is not constant, but comes and goes; and only on closer questioning you elicit that these attacks of pain last two or three hours at a time, and are not sudden and brief like uterine colic. This is an important character of spasmodic dysmenorrhoea, the pain is sudden, sharp, and short.

The pain of spasmodic dysmenorrhoea is not relieved by lying down. In the worst cases the patients say they cannot lie down, or if they lie down they cannot lie still. They roll about with the pain. This helps in distinguishing the pain of uterine colic from that of pelvic congestion. The continuous aching of the latter is lessened by recumbency and by lying still. But these statements, though true of most cases, apply not to all. Some patients with uterine spasm think they are better when lying down. Some have both pain from pelvic congestion and spasmodic pain, and then they will be more comfortable when recumbent. Although the pain of pelvic congestion is relieved, it is not always removed, when the patient lies down. Hence the two kinds of pain cannot always be differentiated by this sign alone. There are a few cases in which it seems as if the spasm were tonic; in which the patient complains of very severe, but persistent pain; not intermittent but continuous: and cured by dilatation of the cervix: but these cases are exceptional.

Spasmodic dysmenorrhoea has no tendency to spontaneous cure. I have known a patient suffer from it throughout the whole of her menstrual life. In cases of exceptional severity it may grow worse. About twenty-five years ago I saw a patient, then aged about 45, who had suffered ever since her catamenia began from pain every month so severe as to make her vomit. In her early youth she consulted Sir James Clark, who was at that time Physician to the Queen, and was by him advised not to have any local treatment. As she got older the monthly attacks of vomiting came to last longer and longer, till at length she was almost continuously sick. In some cases in which pain has lasted long and been severe it has seemed to me that the body of the uterus was larger than in most nulliparae, as if some hypertrophy had taken place. But it is so difficult to be sure of a slight increase in size that this is only a conjecture.

The natural cure of spasmodic dysmenorrhoea is by pregnancy. But the disease is often accompanied by sterility, which may be cured by the dilatation. In about one-third of my patients who were married and sterile the cure of the dysmenorrhoea was followed by pregnancy.

The best drugs for the relief of uterine colic are antipyrin and phenacetin. In slight cases these give adequate relief, and, as we know not of any harmful results from their occasional use, if these drugs relieve there is no need for further treatment. If these drugs fail, powerful narcotics, such as morphine or chloroform, will, if given in sufficient doses, quiet the pain, and I have known cases so bad that the pain could not be otherwise controlled. But it is a bad thing for a young woman to use these drugs every month, and, if this is necessary, local treatment which will remove the pain is preferable.

In a few cases I have found guaiacum remove the pain. I give 10 gr. of guaiacum resin in a tablespoonful of malt extract, twice or three times a day, beginning a week before menstruation is expected. I know not how this drug acts, nor know I how to pick out the cases that it will cure: but I know that it sometimes will cure.

The local treatment of spasmodic dysmenorrhoea is to dilate the cervix. This is best done by the passage of bougies. In most cases the cervical canal will admit a No. 6 bougie easily. A little resistance is usually met with when about No. 9 is reached. When a bougie has been passed which entered with difficulty and fits tightly, after it has remained two or three minutes in the canal it will be loosely held and a size larger can be passed. I have generally continued the dilatation until the bougie met with considerable resistance. This

usually begins with the passage of No. 12 or thereabouts. I know not what is the minimum dilatation that is sufficient to cure. I have known the passage of No. 8 bougie, in a case of spasmodic dysmenorrhoea and sterility, followed by pregnancy. Before the introduction of dilatation as a means of treatment it was known that occasionally menstruation could be prevented from being painful by the passage of the uterine sound shortly before its occurrence. Hence extensive dilatation is not always necessary. The enlargement of the canal that dilatation produces lasts for some months, and one would suppose that the larger the dilatation the longer will the effect last, but I have few facts with which to support this opinion.

The cervix does not always yield to the dilating agent with the same readiness. In about one-sixth of my cases I have it recorded that unusual resistance was met with. The fact of such unusual resistance does not in my experience modify the prognosis.

Dilatation does not invariably cure. I have gone through some records of cases to find out what proportion of cases are cured. I find that in at least two-thirds of cases benefit follows. That no relief followed in one-third of the cases dilated does not imply that one-third of cases of spasmodic dysmenorrhoea are incurable; it is partly accounted for by some cases having been dilated in which the dysmenorrhoea was not of the spasmodic kind. In some of these the patients' statements may have been misleading; in others, the diagnosis was known to be doubtful and the dilatation was done either because nothing else offered any prospect of benefit, or for some reason other than the cure of the dysmenorrhoea. But allowing for the inclusion of these cases, I think it must be admitted that some cases of spasmodic dysmenorrhoea are not cured by dilatation. Some cases are not cured even by pregnancy. If I say that cure follows in three-fourths of cases, I think I am within the truth. Among my cases in which the disease was primary (that is, dated from the beginning of menstruation), the proportion of cures was larger than among those in which the pain began to be felt at a later age. How long does the benefit last? It is so difficult, for reasons that I need not go into, to keep such patients in communication with their physician, that I cannot say anything very exact about this. The cure may last throughout the patient's whole menstrual life. One patient, whose cervix I dilated in 1878, she being then aged 27, I saw in 1900. She had menstruated with little or no pain ever since the dilatation, and the irregularity of the menopause had begun. This case justifies the assertion I have made. In some cases the cure is temporary only; the pain returns, and is again removed by a further dilatation.

As an example I may relate the following case. A patient began to have severe menstrual pain when aged 31. In June, 1893, she being then aged 35, the cervix was dilated, but not by me, so that I have no information as to the method or extent of the dilatation. After it she menstruated without pain till April, 1894, when it returned, and I saw the patient. Bougies from 7 to 11 were passed, and after this menstruation was painless till August. Then bougies from 8 to 12 were passed. Menstruation was again free from pain until November. In January, 1895, I passed bougies from 8 to 13, after which the patient menstruated without pain until August, 1896. In September bougies from 9 to 14 were passed. Ever since, up to the time I last saw her, in July, 1901, she has menstruated without pain. This case gives ground for thinking that the permanence of benefit may depend upon the amount of dilatation. Owing to the difficulty of watching a number of cases over long periods of years, I think it hopeless to attempt an estimate of the proportion of cases in which dilatation has to be repeated more than once.

I have told you about this treatment little that will be new to most English gynaecologists. It has so long been known to most of us, that it is surprising to find textbooks published in which it is not mentioned, and yet this is so. In the very latest German textbook, published in 1902, dilatation is not mentioned in the chapter on dysmenorrhoea. There are other methods of dilating the cervix, but the way I have just described is the best: so I need not speak of any other.

If all other treatment fail, and the dysmenorrhoea is so severe as to wreck the patient's life, as, for instance, by pre-

venting her from earning a livelihood, it can be cured by removing the ovaries. This is so grave a measure, that it should not be done without most careful consideration by the patient as well as by her doctor. The risk to life of the operation is trifling. The reason against it is that it destroys the possibility of maternity, and lessens the patient's prospect of marriage. The younger she is the greater is the injury thus done her, and the less she will be able to rightly understand its extent. Hence the proposition of this remedy should be postponed as long as possible, and its effects should be fully explained to the patient through her nearest female relative, or some female friend in whom she has confidence.

THE PROBLEM OF THE PREMATURE INFANT.*

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THE premature infant is born with the skin and the skeleton, and the organs of a seven-months fetus. He is called upon to play the part of a newborn infant with the *personalia* of a fetus. He is admirably fitted to continue living in the uterus, but is ill provided to meet the exigencies of an extra-uterine existence. He is suddenly forced into surroundings of a kind which impose upon him urgent calls to which he is little able to respond. His tissues have not had time to mature, and he is not ready for so complete a change in environment. He is like some dweller in the hot plains of India who has been transported in a moment of time on some "magic carpet of Tangu" to the chill summits of the "frosty Caucasus," with no opportunity for acclimatization such as a gradual transit affords; he is suddenly submitted to the severe strain which so marked a change in surroundings entails; it is possible that the marvellous adaptive mechanisms of the human body will overcome the difficulties of adjustment of capabilities to requirements, but there will be danger till this condition of physiological equilibrium is reached. So the premature infant is quickly transferred from the warm fluid medium of the liquor amnii with its practically constant temperature to the variable circumstances of an extrauterine life; he loses the preparatory transition-time of the third trimester of intrauterine existence, and although he may react with extraordinary success to his new environment, yet in many instances he fails to do so, and pays the heavy penalty of premature death. In too many cases there is a defective adjustment of capabilities to requirements; this is almost inevitable, for the requirements are exacting and the capabilities inefficient; he may then escape death only to carry a debility with him which projects a baneful influence far into his postnatal life. This is the danger he runs, this is the price he has to pay for his earlier advent into the life that is after birth. Essentially the error is one of the time relations; if he had been a little longer in the uterus he had been better able to withstand the trying changes of birth; but he is an untimely birth. The problem is one of adaptation, of utilization of manifestly imperfect powers to obtain results which are not easily to be got. Life is full of such problems; the individual is often being brought into circumstances to which he finds it difficult and sometimes impossible to adapt himself; he is often called upon to discharge duties which he could have done better had he had a little longer for preparation. The strain and stress of life lie in these emergencies, and happily the requisite strength often emerges to overcome them; but the problem of the premature infant is peculiarly urgent, for he is so dependent upon conditions external to himself. Upon the obstetrician falls the responsibility of aiding the prematurely born child in his struggle with the exigencies of his new environment. The more thoroughly he understands the problem the more effective will his management of it prove. Let me therefore endeavour to set forth in detail the conditions which I have briefly indicated above.

VARIABILITY OF VIABILITY.

The premature infant differs from the immature fetus in the possession of viability, that is to say, he is capable of an

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independent existence outside the mother's uterus, an existence, it must be added, which is not limited to a few hours, but is potentially possible for months and years. Not only must his heart beat, his limbs move, and his lungs respire, but his digestive organs must also be capable of a certain amount of functional activity, and his tissues be able to assimilate nourishment brought to them through the alimentary canal. So much is certain; but when attempt is made to fix the uterine age at which viability may be said to be acquired difficulties are at once encountered. It is not easy, for instance, exactly to estimate the uterine age of any fetus; consequently, when one speaks of a premature infant born at the seventh month of pregnancy, one can only mean that the maternal symptoms and the physical examination of the mother and the infant pointed to that as the most probable date. Neither fetal size nor weight can be regarded as sure indications of fetal age, and the knowledge we possess of the chronology of the developmental processes is not exact enough to permit the drawing of accurate conclusions from them. Another difficulty exists in the fact that the maternal health during pregnancy has an influence upon the viability of the infant; thus, the seven-months fetus of a healthy mother may be altogether viable, whereas the seven-months fetus of a syphilitic mother may be absolutely non-viable. The age of attainment of viability will, therefore, vary with the state of health of the parents. Even if the exact uterine age of the premature infant could be determined with sufficient accuracy, there would still be the varying factor of the infant's vitality as influenced by the varying circumstances of intrauterine health; the viability of the child depends, therefore, not only upon the number of months spent in the uterus, but also upon the character of the life of these months.

It may, however, be asked whether it is not possible to fix some date which will take into account these factors of variability and give what may be regarded as a reasonable estimate of the uterine age when viability is attained. Let us, for instance, maintain that a fetus born of healthy parents, showing no obvious morbid state—either of disease or of deformity—and having an estimated age of 6½ calendar months, is viable. Such an assumption is perfectly reasonable, and will be accepted by every obstetrician; yet the statement cannot be regarded as final, for in ten years it may be possible to make a similar one with respect to the fetus of 6 or even of 5½ months. Improvements in the management of premature infants, such as have been made possible by the introduction of the incubator and the exclusion of sepsis, have already, so to say, pushed the age of viability back; it is probable that a better understanding of the problem to be solved may lead to the devising of therapeutic, dietetic, and hygienic measures which will push it still further back. Be this as it may, it is a fact of prime importance to remember that the age of viability is not a fixed but a variable date.

The variability of viability need not, however, be interposed here to delay the discussion of the problem of the premature infant, for in this contribution the type of prematurity which is considered is that of the infant expelled from the uterus at the seventh month of intrauterine life. Every one will admit the viability of a seven-months fetus. The difficulties such an infant encounters and the dangers he runs may be regarded as the average difficulties and dangers of prematurity; they will be fewer in the eight-months and greater in the six-months fetus, for of course prematurity passes by degrees into maturity at the ninth month of intrauterine life, and merges into immaturity at the fifth.

ANATOMY OF THE PREMATURE INFANT.

The premature infant, as has been already stated, possesses the skin and the skeleton and the internal organs of a seven-months fetus; but it is necessary to enter a little more into details, and to define the anatomical characters which are contained in this brief generalization. The weight of the premature infant varies from 3 to 4½ lb., and the length is about 16 in. The skin has a delicate, almost transparent, appearance, but has lost the bright red colour of earlier fetal life; there is little subcutaneous tissue, so that the face has still a somewhat senile look, and the outlines of the limbs and trunk are sharp and not rounded. The lanugo plentifully covers the extensor surfaces of the limbs as well as the face