

*On the Mechanism of Parturition.* By WILLIAM LEISHMAN, M.D., Fellow of the Faculty of Physicians and Surgeons, and of the Obstetrical Society of London; Physician to the Glasgow Royal Infirmary, and the University Lying-in-Hospital.

If any apology were necessary in introducing the subject of the following essay, a subject which is so clearly and ably expounded

by the teachers of modern times, it would be found in the fact that it remains still too much as a theory. It is a theory fully demonstrated, no doubt, and admitted by all to be of the very deepest importance in its application to practice; but it will, I think, be conceded that in the hands of the mass of general practitioners it is viewed more as a mathematical fact, than as a physiological process every step of which must be studied with care, and that not in books alone. I can readily believe that there is scarcely a practitioner in midwifery who could not demonstrate with accuracy and precision the mechanism of parturition with dry bones and phantoms; but how many are there who have taken the trouble to confirm the theory which they know so well, by patient and repeated observation of nature? Given a cranial presentation, we content ourselves with the knowledge of the fact that nature will, in the vast majority of cases, happily complete the labour; but if after the lapse of many hours we are puzzled to know what impedes its progress, there can be no doubt that our ignorance is almost always caused by our having failed to master *practically* the details of the normal process. I maintain that a man can no more be a thorough accoucheur without this knowledge as his guide, than he can treat disease without recognizing a standard of health; and I would confidently appeal for confirmation of my assertion to those who from their eminence and experience are frequently consulted in cases of difficulty and danger. I would ask, for example, if it is not for them a matter of frequent occurrence to be summoned, and that too by men of education and ability, when the anterior position of the face constitutes the impediment to delivery, and yet it is left for them to make the discovery.

But let me not, in pressing this point, be misunderstood. My meaning will be greatly misapprehended if I am assumed to counsel that in all cases the practitioner should accurately observe the position of the head at the brim, and carefully follow it in its changes when it has become engaged in the cavity. Such a course would be repugnant to propriety and wrong in practice. But what I would urge is this, that students should be taught more from nature and less from phantoms, and that every practitioner should, either in the course of his hospital midwifery practice or in his subsequent career, carefully study the whole process in a few cases; thus establishing a standard, any important deviation from which he will very soon be able at once to detect and, it may be, to remedy.

Another point which conduces to lower the status of midwifery as an art, and consequently to discourage its study in nature, is the tendency which has existed at all times and in all ages, in the minds of some, to consider its practice as in some measure deroga-

tory to the dignity of a professor of the healing art. Indeed we find confirmation of this in every page of the history of midwifery, and even in the present day the feeling has not died out; but nothing is more clear than that, exactly in proportion as midwifery was from time to time divorced from medicine, it was thrown into ignorant hands, and became degraded into a handicraft. I cannot sympathize with those who maintain that the practice of midwifery should be left in the hands of women, and that the physician or surgeon should only be called on emergencies, as it follows my opinion as a corollary, that the surgeon who has not gone through much of the drudgery of the midwife can be of little use if summoned in cases of difficulty only.

Viewed merely as a physiological act, the progress of labour—evincing as it does, and that especially in the human family, one of the most marvellous adaptations of means to an end which is revealed to us by nature—is no mean or undignified subject of study. The structure of the pelvis in the human race, has always been such as to oppose a greater force to the expulsive efforts than in the lower animals. We do not, of course, mean to say with the bishop of Natal, that the divine curse, “*In dolore paries*,” was never pronounced; but we are surely justified in assuming that the erect posture was always the essential characteristic of man, and that the form of the pelvis is not (as some seem to have believed) adapted to oppose the dynamical forces of labour, but rather to place a barrier to the statical pressure which is incident to the erect posture, and consequently peculiar to the human race. Although the effect of civilization and sedentary occupations has been, as Aristotle showed long ago, to enhance the sufferings of women in labour, this is a question with reference to which there has been some exaggeration: yet it is certain that, although few women would be inclined to agree with Medea that she would rather be killed twice in the wars than bear a child, to call labour “the pleasing punishment that women bear” is justly regarded by them as the greatest of poetical licences.

But to pass from such thoughts to a more strict consideration of our subject, I may be permitted shortly to state my object and plan. It must, I think, be already evident that the object of this essay is far more a plea for the study of nature than to introduce any new theories, still less to induce others to view the art in a light too exclusively mechanical. Impressed with the belief that the mechanism of parturition, a knowledge of which may well be termed the keystone of the art of midwifery, is in our day but imperfectly understood by many, I venture to bring it here under the notice of the profession. Of late years the subject seems to have attracted more attention than perhaps at any period since the



days of Naegele; and this is perhaps due to the confusing effects which the varied modes of description, adopted by the many able modern writers on midwifery both in this country and abroad, have had upon the mind of the profession, leading individuals to study for themselves what in truth it is exceedingly difficult to describe clearly and accurately in writing. And hence, as an almost inevitable result, new views have been propounded which, as inevitably, have conduced in later years to perplexity and doubt in regard to what was previously comparatively clear. My main object in the following paper is to place before my readers, as clearly as the difficulty of the subject and my powers of description will admit, the great mechanical laws which guide us in the practice of the obstetric art. I shall endeavour also to place before them, with such fair and impartial criticism as I may think necessary, all the more modern views which appear to me to be worthy of special notice. While perfectly aware that I am entering upon a task of more than ordinary difficulty, I am not without hope that the amount of thought and study which I have devoted to the subject may render my observations in some measure worthy of the attention of my professional brethren.

A study of the rise and progress of the obstetric art has been to me so interesting that I do not hesitate to introduce a history of the mechanism of parturition, touching lightly on the earliest times, but noticing as we go along such improvements in the practice of the art as may seem to have a bearing more or less direct on our subject. I will thus think it unnecessary to notice such points as the erroneous ideas of Hippocrates and his followers on conception and the growth of the fœtus—views which were generally adopted, or modified by wild theories, until the discovery by Harvey of the circulation of the blood. But I may state at the same time that it is my intention, both in reference to the history of the subject and otherwise, to give to the expression "mechanism of parturition" a somewhat more extended signification than it usually bears.

All writers on the history of medicine seem to agree, that the practice of midwifery was in the first ages entirely in the hands of women. It would appear, however, that the art had not prospered in their hands. Hyginus says that a law was passed in Athens at a very early period, by which women and slaves were absolutely prohibited from practising physic. We learn, however, that even thus early the strong-minded women of the period did not shrink from authorship, as the works of one Cleopatra have been handed down, and were published somewhere about the middle of the sixteenth century, forming one of a collection of separate memoirs, which was called the "*Harmonia Gynæciorum*." It has been thought that this Cleopatra



was no other than the celebrated queen of Egypt who came to such a tragical end on the tomb of her lover, Mark Antony; but this theory rests entirely on the fact of the authoress having a sister named Arsinoe, and is evidently disbelieved by most commentators. Smellie, in his learned "Introduction," states it as extremely improbable, "as the study and exercise of such an art was not at all suited to the disposition of such a young voluptuary as Queen Cleopatra is described to have been." Other women, too, wrote in these early times, but nothing from this source has been preserved of interest or merit.

It is in the works of Hippocrates that we find the first reliable trace of a profound intellect and a truly scientific mind being applied to the observation of the phenomena of parturition. The works indeed on this subject which are attributed to Hippocrates are for the most part passed over as unauthentic by most modern critics, but are nevertheless of deep interest to the student of midwifery, and were certainly written before Aristotle, if not during the life of Hippocrates, who died in the fifth century before the Christian era. It is of course no part of my object to undertake a critical examination of the obstetrical Hippocratic writings, but will confine myself to a brief notice of that portion which illustrates the history of our subject. The head, according to Hippocrates, is the only natural presentation; and when the child either lies across or presents with the feet, the woman cannot be delivered. In enumerating the difficulties of cross birth, he makes use of the well-known illustration of the olive in the bottle, which, he says, can be easily drawn through the neck in its long diameter; but if the long diameter be thrown across the neck, either the bottle will break or the olive be crushed. Had he but pushed this illustration to its legitimate conclusion, viz., that the olive may be extracted by either end of its long diameter, how many centuries of bungling midwifery would have been saved! But he altogether failed to recognize this, and advises us to turn by the head in this as well as in transverse cases. The result of this practice seems, as we may well suppose, to have been attended with a frightful mortality, "in which case," he says—*i. e.*, when the feet present—"either mother or child, or both (for the most part) perish." He advises us further, in difficult labour, to administer sternutatories, which are still used by midwives in the delivery of the placentas; also to anoint the parts, and shake the woman at intervals until the child be born. In performing his operation of turning by the head he directs us to place the woman on her back, with her hips raised higher than the head. He gives clear directions for performing the operation of craniotomy, observing that the cranial bones must be carefully removed by forceps, to prevent a laceration of the soft parts of

the mother. He also used an instrument which closely resembles the crotchet, and which he directs us to fix with due precaution on the clavicles after the head has been broken up.

In the reign of Tiberius, Celsus, an eminent physician of that time, wrote his work, "De Medicina," and gives us what cannot but be considered an important link in the history of our subject. In the chapter on the method of extracting a dead fœtus, he recognizes, as did Hippocrates, three presentations—head, feet, and transverse; but he evidently considers the last only as a preternatural position. This is manifest from the instructions given for the management of transverse cases:—"Medici vero propositum est, ut eum manu dirigat vel in caput, vel etiam in pedes, si forte aliter compositus est." It is proper to state that Aristotle had clearly an idea of this; but as he does not state it with anything like the precision of Celsus, the commentators seem to have given to the latter the credit of having originated this improvement in the art. Celsus gives also minute directions for introducing the hand, one finger after the other, until the whole hand gain admittance, and for separating the head from the body in the case of transverse presentations.

Moschion, who is supposed to have lived at Rome in the reign of Nero, pushes the views of Celsus further. In enumerating the causes which render labour difficult, he proposes to extract the living child by the feet in four different cases: 1st, when it presents with one foot only; 2nd, when both feet are in the vagina, but separated the one from the other; 3rd, the knees; 4th, the nates. In the first case he reduced the foot which was out, and then seized both; in the second he approximated them; and in the two last cases he recommends us to push back the child and then to draw it down by the feet.

The works of Ætius were written about the fourth or fifth century of the Christian era, and consist, as regards our subject, principally of a careful compilation of the works of those who had gone before him. Among the untoward circumstances which he details as causes of difficult labour, he mentions a narrow pelvis, the presence of polypi, and obliquity in the position of the womb. He states further that an ankylosis of the *ossa pubis* at their point of junction is a fertile cause of difficult labour, by preventing the separation which would otherwise occur, and that distension of the rectum or bladder may be a mechanical impediment to delivery. He observes also that difficult labour is due, as well to a faulty condition of the child, as to the maternal parts. If the child or any of its parts is unduly large, labour is impeded by the fact that the motions and leaping of the child, which was supposed even in comparatively modern times to contribute greatly to its delivery, were thereby interfered with. After reca-



pitulating the views of his predecessors he mentions some other causes of obstruction to the course of labour, such as thick membranes which refuse to break, or thin membranes which break too soon. External causes, too, are held as contributing to the result—cold by contracting, and heat by relaxing the parts. If the obstruction be due to deformity of the pelvis, he directs the woman to be seated on a stool, her knees being bent and kept apart, by which means the vulva will be dilated, and the cervix extended in a straight line. Fumigations, oils, and emollients generally, are recommended to relax the parts; the urine, if in great quantity, is to be drawn off. If a polypus obstruct labour it is to be removed, and imperforate hymen is to be divided. When two or three children present in the neck of the uterus, those that are highest are to be raised up to the fundus until the lowest be first delivered.

In his twenty-third chapter, "De foetus extractione ac exsectione," which he takes from Philumenus, some points of great interest occur which we must not hastily pass over. In order, he tells us, to form an accurate opinion of the impediment which exists to the progress of labour, we are to use an instrument which I cannot but believe to be essentially the speculum of later years. The commencement in the Latin version of the sentence alluded to will scarcely admit of doubt on this point:—

"Chirurgus autem difficultatis causam, per instrumentum pudendum diducens, conspicatur. At si caput foetus locum obstroxit, in pedes vertatur, atque ita educatur. Quod si ita impactum fuerit, ut nullo modo retrudi possit, uncinus attractoriusculo aut ore aut mento infigatur, et ita infans extrahitur hoc modo ut instrumentum tractorium in dextro manu teneatur, uncinus vero ipsius digitis occultatus per sinistram manum leniter reintroducat, et in aliquo ex dictis locis figatur, et deinde alterum instrumentum ex altera parte oppositum similiter immittatur ac infigatur, ut aequalis et ad neutram partem declinans attractio fiat, eaque tutior ne forte unum instrumentum in attrahendo elabatur, ac foetum dimittat. Atque ita aequaliter non solum indirectam sed etiam ad obliqua trahatur, et digitus pinguedine aliqua illitus, intra uteri os, et impactum corpus immittatur, et circumcirca ducatur."

What else, indeed, can we imagine a single instrument (*instrumentum*) to be, which, by separating or stretching wide the external parts, enables us to see (*conspicor*) the presenting part and the impediment to its delivery?

The first point made obvious by this, which is more pregnant with interest than any other passage which I have chanced upon in the ancient writers, is, that the modern practice of turning in cases of difficult cranial presentation is of very ancient date. Besides this, we not only have the use of the crotchet (*uncinus attractorius*) described with as much accuracy as it is twelve centuries later in the works of Mauriceau and Peü; but further, we may note that the use of the crotchet, as here recommended, and the resulting



combination of forces, brings the author very near to a conception of the forceps of modern times. No one can fail to observe that the mechanical principle of the midwifery forceps was not only adopted by this author in practice, but was by him thoroughly understood. He directs us to apply the second crotchet at a point on the cranium opposite to the first, and then to pull in a direction downwards in order that the traction may be equal, and in the axis of the opposing forces (*ad neutram partem declinans*). Had he but thought of the possibility of applying the same principle to the delivery of the living child, he would almost inevitably have discovered the forceps. But, as in the case of Hippocrates and the olive, these speculations are perhaps more interesting than instructive.\*

Paulus Ægineta, who was the last of the old Greek medical writers, classifies labour as natural and preternatural, and is the first who includes under the first division footling as well as cranial presentations. This is the only piece of originality in his works on this subject, as in all other respects he appears to have copied from Ætius. Paulus appears to have flourished about the end of the sixth, or the beginning of the seventh century.

Three Arab physicians, whose names are celebrated in the history of medicine, Serapion, Rhazes, and Avicenna, have also written on midwifery; but none with such care and at such length as the last. The fillet was contrived by Rhazes, and its use is advocated by Avicenna; but what to us is the most interesting point in the writings of the Arabian school, is the evidence which we there find that the forceps were first invented and employed by the physicians of that period for the extraction of a living child. Avicenna gives us no description of this instrument, so that in all probability it had been for some time in use among his Arabian predecessors; but in recommending in cases of difficult labour, first the fillet, then the forceps, and failing these the perforator and crotchet, he leaves no room for doubt that this is in reality the forceps of modern times.† But it is in

\* It would have been matter of interest to the curious in such matters, and would have still further tested the accuracy of this observation, had it been possible to compare the Latin version as given above with the Greek original. The first eight books of Ætius were published at Venice in Greek in 1534, but the latter eight, from which the extracts are derived, appear to have remained in MS. Several editions in Latin containing the whole sixteen books have, however, been published; and the one from which I quote, "Contractæ ex veteribus medicis Tetrabiblicæ," is complete, and was translated and published by Cornarius in 1549.

† The passage alluded to occurs in the chapter, *De regimine ejus, cujus partus fit difficultis causa magnitudinis factus*. After giving directions for the use of the fillet, he adds—"Quod si illud non confort, administrentur forcipes, et extrahatur cum eis. Si vero non confort illud, extrahatur cum incisione, secundum quod facile fit, et regatur regimine factus mortui."—Lib. iii. cap. 28.

the writings of Alsaharavius, another Arabian physician (assumed by most of the commentators to be the same as Albucasis), that this instrument is actually described. This author, who lived in the eleventh or twelfth century, describes two kinds of forceps, the *misdach* and the *almisdach*, both being, according to the Latin version, circular and full of teeth. It is, however, worthy of note that in the Arab original, which Smellie appears to have seen in the Bodleian library at Oxford, the *misdach* is described as straight, and the *almisdach* as curved.

From this period, until the discovery of the art of printing in the middle of the fifteenth century diffused a knowledge of the writings of the ancients through the civilized world, our art appears to have made but little progress. Indeed we may even say with truth that after the decline of learning in the East, the art of midwifery as practised in Europe was far inferior to what obtained among the Arabian and even among the later Grecian writers, which we may easily understand if we reflect that Hippocrates was the text-book in the hands of all, and that his errors long continued to influence the practice of midwifery, until the rise of science slowly cleared away the mists of ignorance and superstition. We may pass over, therefore, the epoch between the twelfth and sixteenth centuries as the dark ages of our art; and we shall find that even after the lapse of so considerable a period, the ideas commonly entertained were far less advanced than in the days of Paulus and Avicenna. In the year 1565, Dr. Raynalde published in London an English translation of a work by Eucharius Rodian, which had been translated into various continental languages, and was held in great esteem all over Europe. This author tells us that when the child presents in the natural way with the head, its face is turned towards the foreparts of the mother; and further, that if any other part but the head should present, the case is preternatural; so that even in footling cases the child must be turned by the head, thus adopting the most objectionable feature in the practice of Hippocrates. Nor in the other works published during this century, among which we may mention those of Eros and Rocheus, and the collections entitled "*Gynæciorum Commentaria*," and the "*Harmonia Gynæciorum*," do we find any substantial improvement until we come to the sixteenth century, from the commencement of which modern midwifery may be said to date.

Nothing, probably, tended so much to maintain the art in its degraded position as the prohibitory enactments which, during that period, prevented the study of human anatomy by dissection. We cannot, therefore, doubt but that the revival of anatomy under Vesalius, who gave the first good representation of the organs of generation, gave the great impulse, the effects of which



soon became evident. Still more clearly did his pupil and follower, Columbus, evince the rising tendency to regard the art in a more scientific light than before. The numerous dissections of pregnant women which were made by himself, or under his supervision, seem to have given this writer a more clear and correct idea of the posture of the child in the womb than is shown perhaps in the works of any writer down to the days of Smellie. The errors subsequently promulgated by Mauriceau and others were long admitted as true, while the older and more accurate views of Columbus were neglected. Among the crowd of writers of this period several deserve special mention.

First, we have in the works of Jacobus Rueff, which were published at Zurich, a drawing of an instrument called the *speculum matricis*, which he used for dilating the *os internum*, but this does not seem to me to merit the name of speculum nearly so much as that which *Ætius* used. The same writer says that footling cases should be brought by the feet, and to this the importance is due of being in modern times probably the first step in the right direction. He is far, however, from recognizing presentations of the pelvic extremity as natural, as he says that if the hands are by the side of the head in a footling case the child must be turned and delivered by the head, which he also recommends in all cases of breech presentations.

Passing over a whole host of contemporaneous writers of inferior merit, we may pause for a moment to observe the works and the career of the celebrated surgeon Ambroise Paré, who did as much, or perhaps even more, for midwifery, as he did for surgery proper; so much so, that Smellie has called him "the famous restorer and improver of midwifery." Paré, who writes at considerable length, and embodies in his work opinions both ancient and modern, frankly confesses that although he has carefully studied the position of the foetus in utero, he has been unable to come to a satisfactory conclusion as to what is to be considered the normal position. He advises turning by the feet in difficult cranial presentations; but if this cannot be done he recommends craniotomy or delivering by the crotchet, which he directs us to fix by the method of *Ætius* in the orbit, mouth, or below the chin. If the head remains in the womb, he strongly recommends the use of frightful-looking instruments invented by a certain M. de Alechamps, called *pieds de griffons*, of which drawings are given. He gives us also a drawing at another place of a *speculum matricis*, closely resembling the anal speculum of modern times, which he used in the extraction of polypi; and, in treating of prolapsus, he figures pessaries which differ in no essential respect from those in use at the present day. He then dilates at some length, and on the whole with considerable accu-



racy, on the causes of difficult labour. After pointing out with great clearness the serious nature of the impediment caused by cicatrices, the result of former midwifery accidents, he enumerates the various positions of the fœtus which interfere with or prevent delivery, and concludes by noting the bad effects of a premature escape of the water, and a failure of the pains. Some of the impediments described are quaint and odd enough, as the following extract will show :—

" *Aussi celle qui accouche devant le terme, enfante difficilement, ainsi qu'un fruit (comme une pomme ou poire ou autre) n'estant en sa maturité, tient ferme et fort pas la queue, et lors qu'il est en sa parfaite maturité tombe plus-tost et plus facilement de l'arbre.*"

The works of Guillemeau, who was a pupil of Ambroise Paré, are also well worth a passing notice, as we find that while adopting the general conclusions of his master, he attaches unusual significance to the motion of the fœtus itself as a means of speedy and safe delivery. A weakly child, he says, has not sufficient strength to dissolve the ligaments and vessels, and break asunder the membranes wherein he is inclosed; and a boy being stronger, his efforts at egress are sooner successful. He does not seem to have any idea of the muscular structure of the womb, although he speaks elsewhere of the "fibres which doe contract the bladder."\* A very interesting point, and one which I cannot but regard as of the highest interest with reference to our subject, is the fact that he distinctly recognized the yielding nature of certain of the hard structures of the pelvis, and states as one of the causes of dystochia in women of advanced age "that the bones are too closely joyned together, and the cartilages very hard, which cannot so well yeeld and bee dilated."†

About this time the establishment of the Hôtel Dieu and other hospitals in Paris gave a great impetus to the study of surgery and midwifery, and we have now clear evidence of a steady and gradual improvement in both arts. Passing over the first half of the seventeenth century, we come to the publication, in 1668, of a work which will always retain a well-merited celebrity in the literature of our subject, the treatise of Mauriceau, "*Sur les maladies des Femmes grosses, et de ceux qui sont accouchés.*" Both he and his copyists describe the vagina and the womb as a single cavity, under the name of "matrice," the vagina being invariably designated as the "col de la matrice." This point requires notice, as it is evident that the latter expression has been by some supposed to mean the neck of the womb. The author

\* English translation; London, 1612.

† *Op. Cit.*—The idea of this was probably taken from *Ætius*. See page 186.

gives an excellent account of the manner in which the *os uteri* disappears during labour, the whole "matrice" then becoming truly one cavity. His view of the position of the child during gestation and labour is as follows:—Up to the seventh or eighth month the child is situated in the centre of the womb, the head being towards the fundus, and the face looking directly forwards. About this period an important change takes place in the position of the child, which if it happens sooner is attended with danger. The weight of the head and upper part of the infant having now become relatively greater, it causes the child to turn a somersault forwards (*faire la culbute en devant*), so that the face is now turned *directly* backwards to the promontory of the sacrum.\* The violent movements which sometimes occur about the seventh month, and which were attributed by former writers to an attempt on the part of the child to get out at this term, are due, in Mauriceau's opinion, to this change in position, the child being uncomfortable and unaccustomed to the new position. This, he says, is what Hippocrates means in the book concerning delivery at the eighth month when he says—"Incipit autem laborare puer ante partum, et interitus periculum subit quum in utero vertitur." Labour, he says, is much more severe in the case of a male than a female child, which assertion proves that he had no faith in the theory of Guillemeau. The pains are to be made the most of, thus:—

"On lui recommandera surtout de faire bien valoir ses douleurs, en retenant son haleine, et poussant le plus fortement qu'elle pourra vers le bas dans le moment qu'elles lui prendent."

He directs that the woman should walk about during the first stage of labour, and points out with a graphic accuracy the signs which enable us to determine when the second stage of labour has set in. As an illustration of the difference between the cry of a woman in the first and in the second stage, he states that the ear of his professional brother, M. Delacuisse, was so sensitive to this that he habitually went to sleep, during his attendance, with the most perfect equanimity, well knowing the first cry after the complete dilatation of the *os* would rouse him to his duty. He perfectly understands the mechanical advantage of head over footling presentation, distinctly recognizing the fact that the muscles of the belly as well as the fibres of the uterus contract; these, he says, acting with much greater advantage against the rounded back and nates of the child than against its cephalic extremity. He gives minute directions for the delivery of a dead child by means of the crotchet and an instrument of his

\* Mauriceau criticises Columbus, who had, as we have seen, ideas on the subject of the position of the fœtus in utero, which were in reality more correct than those of Mauriceau himself.



own invention called the *tire-tete*, but has no knowledge whatever of the forceps. Mauriceau seems also to have some indistinct and inaccurate idea, in footling cases at least, of the turn which takes place in the pelvis; for after stating that it is necessary that the face should look backwards, he gives directions for turning the child during its descent, *unless this has already taken place*, so as to make the heels look exactly forward. Mauriceau's second volume, which is purely clinical, and contains a detail of about eight hundred cases, was published in 1706, and shortly after this the works of Peü, Dionis, and Deventer appeared.

On the whole, I am inclined to believe that we do not owe much to any of these writers, as in many respects their works are far inferior to those of Mauriceau. To the curious, the work of Peü will afford an amusing illustration of unblushing arrogance and vanity, mixed up with some examples of the *odium medicum* which quite put modern squabbles into the shade. He appears to have been looked on with contempt by Mauriceau who puns upon the "omen in nomine"—*Hinc illæ lachrymæ!* The religious element is strong in the book, so strong indeed that his critics thought that it was in part, at least, written by a priest. I would refer those whose curiosity would lead them to ascertain the most approved method of baptizing an infant in utero by means of a syringe, to the book itself. Although we do not find in this work so much originality as the author would have us believe, there are some portions which are far from being unworthy of notice. Thus, he denies what some previous authors have asserted, viz., that the pubic bones separate as a rule during labour. He says, however, that the sacrum and coccyx yield in every labour, and that occasionally the sacro-iliac synchondrosis separates in a wonderful manner. He gives three cases in illustration of this latter observation, in which he says that the sacrum and ilium were separated by about half the width of the finger, and took several months to close. He was in the habit of delivering with the crotchet in cases of puerperal convulsions, and occasionally in other cases when the child was alive, having first baptized it with his syringe. He takes great credit to himself for his method of applying the crotchet, but I do not find any material difference between it and that of others, except that he preferred fixing it in the ear instead of the orbit, mouth, or chin. Dionis has some novel views on the mechanism of impregnation, which having no immediate connection with our subject we will pass over. His views, however, on other points are not nearly so far advanced as those of Mauriceau, and if there was no date on his title-page, we would be inclined to refer the work to the beginning of the seventeenth instead of the beginning of the eighteenth century. Thus he adopts and even exaggerates the errors of Guillemeau, stating



that the stronger the infant the greater the pains, and that boys cause more pain than girls, because they struggle more to get out and consequently come into the world more rapidly. He also advises us to prevent the woman from forcing *until the last pains*, which is not only directly the opposite of what is recommended in modern times, but is contrary to what is enjoined by the most skilful of his contemporaries and predecessors.

Deventer, a physician practising at Dort in Holland, published in 1704 a work which, among much that is good, contains an ingenious exposition of an erroneous doctrine, which had been obsolete for centuries, but which had the effect for many years of giving more or less the tone to subsequent writers on midwifery, among whom we might enumerate Morgagni, Mesnard, and a host of others. Nothing is more clear on a careful examination of his work than this, that he has rested his conclusions more on theory than on fact; and, indeed, to the reader of the present day, the pertinacity with which he imputes to obliquities of the womb almost all the evils that parturient flesh is heir to, appears truly absurd. We shall see, however, that on the advance of the art generally, and especially in its progress on the continent, this theory of uterine obliquity exercised a most baneful and lasting influence. "It surprises me," says Ould, writing in after years, "that a man should impose on the learned world in a matter so demonstrably false." Deventer also lays down certain rules for the management of the coccyx during labour, and maintains that in showing how, by passing the hand into the vagina with the palm towards the rectum, the coccyx may be forced back, he has made a discovery which should render his name immortal. The book is in many respects interesting, and the author, having had considerable experience in cases of pelvic deformity, has not failed to recognize that in such the most common and most important cause of obstruction is a projecting forward of the sacrum. He, as well as La Motte, who wrote in 1715, declaims against the use of instruments, and recommends turning by the feet in all cases of difficult cranial presentation. Neither of these writers seems to have had any idea of the forceps.

There can be no doubt, however, that for many years before this the forceps had been revived in modern times, and used in England and elsewhere by the Chamberlens. The date of the discovery is clearly fixed by a pamphlet in the possession of Dr. Churchill at a period prior to 1648; but it was not till the discovery of the instruments themselves in 1715, on the purchase of a property which had belonged to one of the Chamberlens, that they came into general use in England. They appear to have been used in Germany as early as 1673, but not in France till a much later period. The reader is referred to

Mulder's "*Historia Forcipum*," or to any of the modern works on midwifery for further information in this subject. If the Chamberlens deserve credit for having discovered or restored to modern art the forceps, they also merit universal condemnation for having made, for their own benefit, a secret of a discovery which was calculated in so eminent a degree to save life and alleviate human suffering.

About this time also the vectis seems to have come into use. This was one of the instruments found along with the other midwifery instruments of the Chamberlens; and as it is beyond doubt that Dr. Chamberlen, in his wanderings on the continent, in consequence of his being involved in some of the political troubles of his time, had some communication in Holland with Roonhuysen, to whom the discovery of the vectis is usually conceded—although some have maintained that the instrument used by Mauriceau was essentially the vectis, and others have gone so far as to assert, but on what authority I know not, that Celsus was the inventor—it is, of course, impossible to say whether Roonhuysen disclosed his secret to Chamberlen, or obtained his information in the first place from him. But I am inclined to think that Dr. Churchill's hypothesis is the correct one, drawn as it is from the knowledge of the fact that it was understood before this time that the Dutch had some marvellous means of delivering women, and that Chamberlen was never known to make any disclosure with reference to the vectis, although he undoubtedly had revealed in secret his discovery of the forceps.

The discovery, however, of these and certain other mechanical expedients for the management of difficult labour could not fail to exercise a most important influence, not only directly on the mechanism of parturition, but indirectly in turning professional attention to the question in its mechanical bearings. This is very clearly seen in the work of Mesnard, published in 1743. This work is written in the catechetical style, and in it the author argues at some length against the probability of the pubic bones separating, which, he says, could only take place by means of a simultaneous separation of the ilium from the sacrum, which, he says, would cripple every woman. The movement of the coccyx backwards, is the only movement of the bones which he admits to take place. On the whole his observations are interesting, as this is a vexed question even to the present day. The writer seems also to have a very tolerable idea of the mechanical hindrance which results from the face being directed forwards; but, in addition to this, he states another reason, which shows that the idea still held ground that the child laboured for its own delivery. In answer to a question as to the causes which render the labour difficult when the face is forwards, he gives this reply:—



"C'est parce qu'un enfant qui présente la face dans cette situation, ne peut pas faire valoir ses accousses, avec autant de force que s'il la présentait en dessous. Il est de cela comme de deux hommes qui nagent ensemble; celui qui nage sur le dos, quoiqu'il fasse plus d'efforts que celui qui se met sur le ventre, n'avance cependant pas à beaucoup près, autant que le dernier."

Mesnard, like all the writers of his time, followed Deventer in ascribing an undue importance to obliquities of the womb; and Smellie says, although I have been unable to find any reference to this in the work itself, that he substituted curved for straight crotchets. He used, however, forceps, which he calls "tenettes en cuiller."

The nature of the forceps then used, and the mode of employing them in those days in our own country, is clearly shown in the works of Giffard and Chapman. The former, in his admirable clinical treatise, says, with reference to the head, "that it will mould itself almost into any form, like wax;" and recommends that in hip cases the feet should always be brought down, although he confesses that he has often known a child to be born with the nates first, and yet live. A woman, he says in another place—and this he seems to consider as a valuable practical hint—should always in forcing down recover her breath slowly, so as to maintain as much as possible the advantage which she has gained. But the point most interesting to us in the work is the description which he gives of his mode of procedure in those cases where the face is directed forwards. Thus, in Case XXXV., in which the head was in this position, he says—"I therefore passed one side of my extractor between the child's head and the *os pubis*, and lifting it off from thence I brought it backwards and somewhat downwards;" and from this and other similar passages I infer, that knowing how much easier was the labour in those cases where the face was backwards, he always attempted by operative interference to bring the head into the more convenient position. His extractor, as well as the forceps of Chapman, was straight and fenestrated, and differed in no essential particular from that of the present day. Chapman's "Treatise on the Improvement of Midwifery" was addressed chiefly to women, and the first edition was published in 1730. In it he seems to have followed the bad example of the Chamberlens in making a secret of the matter; but some severe criticisms which appeared in the "Medical Essays," published at that time in Edinburgh, and probably other similar animadversions, seem to have had the effect of inducing him to unveil the mystery; for we find in his third edition (1759) a drawing and complete description of the instrument. Shaw, another English writer of this time, was far behind the age; for he says in one place that "the parts give way to the motion of the fetus and the throes of the mother," and in

another "that the instrumental method of delivery, except the Cæsarian operation, is always death to the child."

Such was the state of the art in this country towards the middle of the last century. On the continent the investigation of Ruysch with reference to the muscular structure of the uterus, and the excellent works of Puzos, Roederer, Levret, and others, had all contributed to the advancement of the art. But as regards the ideas which were entertained in regard to the position of the child during labour or, in other words, the mechanism of parturition, no real and decided advance had been made, and we recognize but dimly here and there, in the works of these and other writers, mere glimmerings of the truth. The head was stated by all to lie during natural labour in the conjugate diameter, with the face towards the sacrum.

But a new era was about this time inaugurated in the history and progress of midwifery, by the discovery and announcement by Sir Fielding Ould of Dublin, of the fact that the head during natural labour did not occupy this position. It is beyond doubt that the theory of the mechanism of labour propounded by Ould was, as we shall see, very erroneous; but to him the credit is manifestly due of having made the first step in the observation of nature, on which was gradually reared the superstructure which we now call the theory of the mechanism of parturition. The following extract will show clearly in what his opinion differed from that previously held:—

"When a child presents itself naturally, it comes with the head foremost, and (according to all authors that I have seen) with its face towards the sacrum of the mother. So that when she lies on her back, it seems to creep into the world on its hands and feet. But here I must differ from this description in one point, which at first sight may probably seem very trivial. The breast of the child does certainly lie in the sacrum of the mother, but the face does not; for it always (when naturally presented) is turned either to the one side or the other, so as to have the chin directly on one of the shoulders."

From this and from the context, it is clear what was the reasoning and conclusion of Ould. He found frequently on examination, the length of the oval of the head corresponding to the oval of the brim; and assuming this latter to be the transverse, he was not unnaturally at a loss to see what great advantage was thus gained in theory, if the long diameter of the head was removed from the conjugate of the brim in order merely that the long diameter of the shoulders should be substituted. To meet this objection, he concludes with an ingenuity which, although it failed when tested by experience, merits not the less our admiration, that the long diameter of the shoulders corresponded to the same pelvic diameter as the head, or, to use his



own words, "so as to have the chin directly on one of the shoulders."

The next step in advance was also accomplished by an English accoucheur, and is to be found in the work of Smellie, whose labours for the advancement of the obstetric art are as well known and as cordially recognized on the continent as they are here, and merit something more than mere mention at our hands. This able and faithful observer of nature states it as his opinion, and quotes cases in confirmation thereof, that the opposition which the pelvic bones present during labour to the progress of the head is in certain rare cases relaxed by a yielding which occurs both at the sacro-iliac and pubic junctions, and he also mentions as an impediment an ankylosis of the coccyx. He is the first who gives anything like accurate measurements of the pubic cavity in its various parts, clearly adopting Ould's view that the long diameter of the head finds and assumes in the transverse of the brim the most suitable space; but to this he adds, as the result of his observations, that the same diameter of the head changes at the outlet into the conjugate, which his measurement clearly shows to be the best, especially when he considers that three quarters of an inch are gained by the receding of the coccyx. The careful and repeated observation of this fact, and the application of the theory to the practice of his art, makes the work of Smellie one which may even now be read with benefit by the most experienced.

"That part of the head which presents," he says further on, "is not the fontanelle (as was formerly supposed), but the space between the fontanelle and where the lambdoidal crosses the end of the sagittal suture, or, in other words, the crown or vertex." Alluding to the tumour of the scalp, he says—"Sometimes this lengthening or protuberance is found at a little distance from the vertex, backward or forward, or on either side," which words show that, while he was too accurate an observer to overlook the fact, he still considered that as an exception which subsequent investigation has shown to be the rule. A similar remark might be made with reference to another passage, where he states that "when the head first presents itself at the brim of the pelvis, the forehead is to one side and the hindhead to the other, and sometimes it is placed diagonally in the cavity." This, however, cannot be taken as meaning much; for, although the general tenor of his description of the process is to the effect that the head does not quit the transverse position until it has descended into the cavity so far as to allow the face to turn into the hollow of the sacrum, yet it is probable that in recording with that honesty which is so characteristic of him, even while citing facts which tend to overthrow his own theories, this observation, he would not pro-

bably see more in it than this—that the change had partly taken place a little earlier than usual; for it is clear that if the head passes from the transverse to the conjugate diameter, it must at some point assume a diagonal direction. A careful perusal of this most admirable work puts it beyond a doubt that Smellie was much nearer the truth than many who came after him.

But viewing it merely in reference to the position which its author holds as having made an important addition to previous knowledge on the subject, we must now see what he says as to the position of the shoulders, which Ould placed, so to speak, in the same diameter as the head. Although he does not absolutely controvert the views of Ould on the position of the shoulders, it is evident both from the admirable plates with which his work is illustrated, and the contents of the work itself, that he entertained very different ideas on the subject. It is perfectly clear from his description of the child's situation in the uterus, and of the impediment which results by the hitching of the shoulders against the sacrum and pubis, that he never considered it as possible that the relation between the long diameter of the head, and that of the shoulders, was altered in labour in the manner described by Ould. In his "Rules for using the Forceps," we find a collection of sound practical maxims which in many respects cannot, even in the present day, be improved upon; and this part of the work, as well as his collection of clinical cases, shows how wonderfully he has appreciated the mechanical facts then known, in their bearing on the practice of his art. As the result of his labour, the art of midwifery was revolutionized. The views of Mauriceau and La Motte, which were even adopted by Ould, with reference to the "culbute" at the 8th month, and the statements of all authors previous to Ould, in regard to the position of the head at the brim, crumbled away before the logic of facts. The book went through several editions in our own country, and carried conviction to the minds of all the leading obstetricians on the continent by means of the French and German translations, which are to the present day looked upon as among the standards of obstetrical literature.

Such a man, however, could not escape without much detraction and venomous criticism. But this is a fact which we might well pass unnoticed, were it not for the fact that in the work of one of these critics we find an observation which we must note in passing. The book is entitled—"A Letter (of 230 pages, 8vo!) to William Smellie, M.D., with remarks by John Burton, M.D., wherein the various gross mistakes and dangerous methods of practice," &c., &c, and is for the most a piece of foolish vituperation, mixed up with a show of learning. The following extract is, however, interesting, as embodying the view of one who con-



tributed in no small measure, at a subsequent period, to the progress of the art, and is further worth our notice as being a somewhat ingenious explanation of the facts observed by Smellie. He writes as follows, assuming the head to be in what he considers the normal position—viz., the antero-posterior—but he evidently cannot deny that the head, in some cases at least, assumes a position approaching to the transverse. The mechanism described is, in all probability, what would occur if the antero-posterior were the actual position:—

“If, therefore, the Head be not too large, nor the Pelvis too strait, the Forehead will easily slip into the Pelvis in that Position. But, should either of these vary, then the Apex, or rather back of the Head, will be strongly pressed against the Pubes, and the projecting Part of the Sacrum will compress the round Part of the Forehead; in which Case let the Person also consider that the pushing Force is applied immediately to that Part of the Head where the first Vertebra of the Neck joins it, and that the Center of Motion is there, and he will soon be convinced what a very small Obliquity will make the round Part of the Forehead slip from off the projected convex Part of the Sacrum into one of its Concave Sides (when there is no resistance), especially if he considers the great Difficulty that is required to keep the round Bodies in the same Point of contact, when the Force is apply'd in the Manner as above, while there is no Resistance on each Side. This any Person may soon be satisfied of, if he will apply the Head of the Child that is large to a strait Pelvis, and let the propelling Force be apply'd in the same manner as while the Child is in the Womb. I must further add, that that Part of the Child's Head which is compressed, either by the Pubes or Sacrum, will yield more considerably than the Back or under Part of the Head, and is more firm and hard, to which the propelling Force is applied. Thus you see, here is no Occasion either to misplace the Child, or to allow it any Sagacity to account for this Alteration, since the Mechanical Laws of Motion, &c., are sufficient for the Purpose.”

I have already alluded to the opposition which the art of midwifery has encountered in its progress, from those who considered with Rodericus à Castro, that its practice was beneath the dignity of a man, and who might say with Bartholini—“*Obstetriciam artem nec exercui nec exercere volo;*” but it becomes evident, from a consideration of the state of midwifery at the period at which we have arrived, that very little of this feeling now existed, and that on the continent, as well as in this country, many of the ablest of the physicians and surgeons of that time devoted their entire energies to its advancement. But there is evident at this time in the works of most of the continental writers a tendency to exalt theory at the expense of fact, which is due, I imagine, in great measure to the work of Deventer. Ultimately the views of Smellie were all but unanimously adopted; and it is clear that the eminently practical nature of his work had the result of turning the minds of his continental contemporaries into that more practical channel, by a close adherence to which they were ultimately enabled to add

to and to develop the new-born theories of Smellie. One or two of these we will notice briefly, before proceeding to consider the next step in the development of the theory of the mechanism of parturition.

Early in the year 1757 Roederer wrote as follows, and the quotation will suffice to show what was peculiar and what worthy of interest in his views, which are less advanced than those of Smellie, but which we shall find adopted by subsequent writers, even as late as the beginning of the present century. But while he refused to adopt the views of Ould and Smellie, it is evident that he was convinced that the views generally held were far from correct:—

"In utero factus ita compositus est, ut in thoracem mentum reflectatur, ad uteri fundum facies dirigatur, et in superiorem pelvis aperturam solum occiput descendat conicum atque acutum. Hic quidem sine ullo negotio a superiore pelvis apertura occipitis spex admittitur, a primo dolorum impetu depulsam; atque adeo, si ad istam superiorem aperturam respiciamus, indifferens est, quisnam sit capitis positus, modo pars conica atque arcuissima, occiput nempe, descendat."

Puzos alludes in clear and succinct terms to the malformations of the pelvis, to the natural and unnatural movements of the womb, and to the various means of obviating those obstacles which render labour more protracted and painful. He also makes public the fact, that a child could with safety be turned and delivered *by one foot*; but this practice was derived from M. Clement, whose pupil he had been.

Shortly after this, in 1761, the work of Levret appeared. This author had the honour of founding a distinct school of midwifery, in which is carried to its greatest extent that practice of subordinating fact to theory, to which I have already alluded. Translated into German, it was adopted in that country even more than in France, and for many years left its stamp on the obstetrical literature of Germany. We might term it not inaptly the obstetrico-mathematical school; and a study of it is instructive, as showing into what extremes we might be led by viewing the matter in a light purely mechanical. In his earlier writings, the views of Levret on midwifery are characterized by many of the errors of a former age, as well as those into which he was led by the peculiar tendency of his mind. Many of these errors, however, he lived to retract with a frankness which merits our approbation—"L'accouchement," he writes, "est une opération naturelle, véritablement mécanique et susceptible de démonstration géométrique;" and from these few words as a sample, we may infer what is the nature of the whole. Observation by the senses has yielded throughout to results attained by the aid of pencil and compasses in the closet. Among the errors into which,



as the result of this tendency, this really able man fell, I will instance only the geometrical fallacies into which he is led in his demonstration of the mechanism of the dilatation of the uterus, and the no less inaccurate manner in which he arrives at the *quod erat demonstrandum*, in showing how, according to all known laws of geometry and mechanics, the uterus must empty itself of its contents.

Nothing is clearer than that the writers of that day had taken up a false idea, which had a most pernicious effect on the progress of the art. They were in the habit of considering the act of labour as a mere form of ordinary mechanism, and they sought to assimilate to this position all that nature and the operator did. This false view led to another. They concluded that the operator must do more than nature. They indicated to nature the way in which the child should move, like the globe, in curves, which might be calculated with mathematical precision, according to the laws of gravitation; and as they very soon concluded that nature could not confine herself to the prescribed path, they saw in each variation nothing but a fault which the operator in every case must remedy. The result was that they infinitely multiplied these, and, according to endless genera and species, drew out rules for assistance. If they had in the infancy of the art trusted too much to the aid of nature, they now trusted to it too little.

Such was the state of matters on the continent when the translations of Smellie's work appeared; and while it attracted the attention and admiration of all, those who fully recognized the necessity of studying nature in preference to all mere theories were guided by it in a course which soon led to important results. I trust that my anxiety to place this matter in a clear light before my readers, will be my excuse for the length to which I have carried the translation and analysis of the works of Saxtorph and Solayrés de Renhac. Without a thorough knowledge of what these men have contributed to science, it is impossible to understand the question as it stood before Nægele. As these works have never been translated, and are somewhat rare, I think no one who takes an interest in midwifery will think that labour lost, which places before him a record of what was discovered by writers between Smellie and Nægele. During this period England had decidedly lost the prestige and position in things obstetrical, in which the labours of Ould and Smellie had placed her. The development of the truth was worked out by the hands of those whose names are scarcely known in this country; and if we look at the state of knowledge in this country at the time that Dr. Rigby translated Nægele's essay, we cannot doubt but that we were far behind our continental brethren. There is, I think,

a tendency on the part of most English writers to attribute to Naegele even more than he deserves, and it is, therefore, from a wish to render honour where honour is due, that I shall attempt to show what share of what is known in this country as the doctrine of Naegele is due to the two eminent men I have named.

Matthias Saxtorph was born in 1740, and was educated at the University of Copenhagen, where he received instruction in midwifery from the celebrated Berger. Having been thoroughly instructed in physics and mathematics previous to beginning his medical studies, he paid particular attention to the mechanism of parturition. The force and originality of his writings, and the great success of his practice, soon raised him to an eminent position; and at the time of his death, in the year 1800, he stood at the head of the profession in his own country. In the year 1772 he published an essay under the following title—"Theoria de diverso partu ob diversum capitis ad pelvim relationem mutuum experientia fundata." The only work, however, which I have seen is a German edition of his various papers published after his death,\* and it is from this that I have made the following translations.

The question with which the names of Saxtorph and Solayrés are more especially connected, is the discovery and announcement of the fact, that the head passes down into the pelvic cavity in a position which corresponds neither to the transverse nor conjugate diameters, but is intermediate between the two, or oblique. But while it is to the labours of these men that the general diffusion of this new doctrine was undoubtedly due, and while I am inclined to believe that the conclusions of Solayrés were the result of independent observation, yet there can be no doubt that this position of the head had been recognized and imparted to his pupils by the same Berger whose pupil Saxtorph was at a period not later than 1759. Of this fact there is internal evidence in Saxtorph's works, and especially in a note to one of his papers, when he says—"In a similar manner Berger saw the true position of the head in labour, and imparted it in his lectures."

But while this puts it beyond doubt that the position alluded to was recognized by Berger, there can be little doubt but that it would, but for Solayrés and Saxtorph, probably have remained unknown. The following admirable description by Saxtorph shows how clear was the idea which he had on the subject:—

"That there is a determinate relation between the pelvis and the child's head during the whole of labour, is a fact which Smellie has proved before me. He has, however, in this a different opinion from me in so far as he asserts that the longitudinal diameter of the head—between the forehead and hindhead—enters into what (in his opinion) is the greatest diameter of the brim, namely, the

\* Gesammelte Schriften v. P. Schoel; Kopenhagen, 1803.



transverse, when the head in natural labour enters the pelvis. With reference to this theory I may remark as follows:—

"1. The *transverse* or *greater* diameter according to Smellie, which intersects at right angles the smaller (by some called the *conjugate*) diameter of the brim, is not, as Smellie believes, the greatest of all the diameters of this opening. For there is another diameter which we can easily examine in the dried pelvis, and which I call the *oblique* diameter. I consider it as running in the brim from the junction of the sacrum and ilium obliquely forwards towards the pubic bone of the opposite side, so that the right angle which is formed in the centre of this opening by the first diameter, as observed by Smellie, is divided by this diameter into two parts. 2. This oblique diameter, which lies between the conjugate and transverse diameter is, in the dried pelvis, very great; but it appears to be smaller in the recent state when the pelvis is covered with muscles, because the *prosa* muscle, which runs towards the thigh from its insertion to the lumbar vertebrae, covers with its belly the hinder part of the brim near the promontory of the sacrum. Hence this diameter, which is in itself the greatest, appears smaller in the human body.

"According to the oblique diameter here described, the sagittal suture of a well-proportioned head is directed in ordinary labour, at the time when the presenting vertex enters the brim in the axis of the pelvis. This is obvious, 1st, By examination in the uterus during the interval of the pains. Thus we may feel through the *ce uteri* and the thin membranes of the ovum, the anterior fontanelle directed obliquely backwards to the one ilium or the other, and also the sagittal suture lying in the oblique diameter of the pelvis, so that we find it distinctly separated as well from the conjugate as from the transverse diameters. 2nd, By the anatomical relation of the parts which have been determined in cases where the characters of ordinary labour were observed, and the woman died before delivery."

In the remarks which follow as to the reasons which cause the head to assume this position, the author makes it evident that he still imagined the head to lie, before entering the brim, in the conjugate diameter. Viewed in connection with what I have quoted from Burton,\* the following extract has a greater interest than it would perhaps otherwise have had:—

"When the uterus acts upon the child lying in the axis of the pelvis, the head hitherto swimming freely in the *liquor amnii* finds at its entrance to the pelvis, on account of its greater circumference, a greater opposition from the promontory of the sacrum, which is pressed into the posterior segment of the uterus. This prominence directs the smooth round forehead of the child which is in contact with it only in one point, and which is sufficiently movable, by a gentle motion sideways into a space where it has sufficient room, namely, between the promontory itself and the inner sharp excavated edge of the ilium; consequently the sagittal suture of the presenting vertex enters of necessity into the oblique diameter of the brim. . . . The smooth forehead of the foetus, when it comes into contact with this prominence, sinks gliding to the side."

As regards the position of the head at the outlet, Saxtorph confirms, in every particular, the views of Smellie; but his description is much more complete. He combats with great ability and clearness of expression the views of those who

\* See page 200.

oppose his doctrine. The importance of method in examination is forcibly stated as follows:—

“An improper mode of examination often hinders the recognition of truth: when, for example, the woman is not placed in such a position that the finger may find an easy entrance for examination; when the woman, as is here the fashion, lies on soft pillows; when her body is not held motionless in the proper posture, or the intervals between the pains is neglected for the examination of the position of the head; or when, although all these circumstances are observed, the finger is not carefully and observingly carried round all the parts of the head and the margins of the pelvis, by which means only it can reach them. If the nearest parts only and not those deeper are observed, we cannot recognise with exactness the fontanelle lying high, and obliquely backwards, together with the presenting sutures, nor their relation to the extent of the pelvis. On this account accoucheurs often (like physicians with the pulse) differ with each other as regards the position of the head on account of the different modes of examining, although they examine the same woman at the same period of her labour. If one carefully examines the above, and conducts his examination properly, at the proper time and in a proper manner, I believe that it will be difficult to no one to examine each position of the head which I have noted, in every ordinary case.”

If we turn now to the admirable essay of Solayrés de Renhac, of whom indeed, but for Naegele and Baudelocque, we would never have heard, we find that this calls for more than ordinary attention as one of the most able and original works in the whole range of obstetric literature. In the works of Solayrés, as well as in those of Smellie and Saxtorph, nothing is more conspicuous throughout than the manner in which all their theories are founded on patient and repeated examination of facts. “Il n'avait que la nature pour maître,” says Baudelocque, in alluding to his deceased master in terms of graceful and affectionate admiration; and it is true that the same remark might be applied with almost equal justice to all who have contributed in any great measure to the real advancement of our art. Solayrés, who died like Roederer in the prime of life, left behind him, in his essay entitled “*Dissertatio de Partu, viribus maternis absoluto*,” which was published in 1771, a work which merits the highest praise. In it he describes the head as descending in the oblique diameter, and not in the transverse; but he does not enter upon this point with such minuteness and accuracy as Saxtorph. It is in the description and classification of his cranial positions that we find evidence of what originality is his. As regards the obliquity of the head there is no probability of his having had any communication either with Berger or Saxtorph, and indeed as regards the latter I rather think that the original Danish work did not appear till 1772. Naegele, however (and, probably quoting from him, Dr. Churchill), gives the date of both publications (*i.e.*, the original treatises of Saxtorph and Solayrés) as 1771. As it is only by giving the translation at full length of



that passage relative to the cranial positions that the reader can judge of the merits of this author, I shall do so as literally as possible, omitting only those passages which relate to the obliquities of the uterus, a point in regard to which his views are tainted by the theories of Deventer. Although I do not consider myself qualified to give an opinion, I am inclined to agree with Baudelocque that the work is by no means written in very good Latin. Naegele warmly defends the style, and characterizes it as "beautiful and flowery, and exhaling a breath of the old Latin;" but I think that, even to readers who have no pretension to learning, the style will appear somewhat clumsy and, making all allowance for misprints, in some respects inaccurate.

It may be well to explain that the foetal head is regarded by Solayrés as composed of five surfaces or ovals, four of which meet together at a point posteriorly, to which reference is often made. His detail of these will show his meaning:—"Ovatum capitis superius; ovatum inferius, sive calvariae basin; ovatum anterius, vel faciem proprie dictam; ovatum laterale dextrum; ovatum laterale sinistrum; conjunctionem quatuor ovatorum quae constituunt calvariam seu occiput."

#### FIRST SPECIES.

(*Head in antero-posterior diameter; face backwards.\**)

"In this species the suture (sagittal) is situated in the direction of the anterior diameter, the posterior fontanelle to the symphysis pubis, the anterior to the sacrum, the lambdoidal suture being anterior and inferior to the coronal, which is situated behind and a little higher. This position of the foetal head in the superior aperture of the pelvis is so rare, that we scarcely find it once or twice in twenty labours."

This is the position which is called the first, and is described as the most frequent by Deventer, Meunard, Levret, and Roederer. Our author goes on to describe—

#### THE MODE IN WHICH IN THE FIRST SPECIES THE HEAD OF THE CHILD PROCEEDS IN ITS DESCENT INTO THE PELVIS.

"In order that the mechanism by means of which the head of the child advances when it presents in this position may appear clear, it must be observed, 1st, That the extremities, trunk, and head are adapted to an oval form, whose major diameter extends from the apex of the head to the buttocks; 2nd, That the articulation of the trunk with the head is nearer to the posterior part of the inferior oval than the chin, and can bend with more ease forward on the face than backward; 3rd, That the occiput is smoother and less extended than the face; 4th, That the trunk of the child is bent on its anterior surface, which is in contact with the vertebral column of the mother, while the posterior surface looks to the pubic symphysis.

\* I introduce these by way of note, as the modern phraseology will guide the reader.

"The uterine forces which impel the foetus so situated are communicated to its vertebral column, which pushes forward the back part of the head at the same time at which the base of the inferior maxilla accurately impinges on its own breast. While the uterine contractions urge the child into the pelvis, the posterior fontanelle is observed to correspond more and more to the centre of the pelvis; which cannot take place unless the face be turned to the fundus of the uterus, or a little towards the sacrum, as some contend. The head proceeds inclining backwards in this direction until it reaches the point where the face of the sacrum begins to be bent forwards. It proceeds then according to the direction of the anterior part of the sacrum, until it reaches the sacro-sciatic ligaments, the coccyx, and the perineum; and then, reflected from the sacrum, coccyx, and the said ligaments, it passes under the arch of the pubis. When this takes place, the posterior fontanelle is placed in front, and the coccyx and perineum are forced downwards. This cannot happen unless the posterior part of the neck comes to the symphysis pubis. If now the uterine contractions continue, part of the force is directed against the symphysis pubis, while another part is reflected on the anterior fontanelle and the chin. But no part of the force can be reflected to the anterior fontanelle and thence to the chin unless the face, turned from the direction of the fundus of the womb, has adapted itself to the anterior surface of the sacrum. The face indeed is turned more quickly and more readily into the sacrum when the passage of the occiput under the pubic arch is easier. The occiput has scarce occupied the pubic arch, when the uterine contractions, forcing forward the chin, oblige it (i.e. the occiput) to raise itself upwards to the anterior commissure of the vulva, when the head discovers itself in this situation. At length by the action of the same force the head is entirely expelled from the vulva, the face being turned to the anus. The major diameter of the trunk of the child, which extends from shoulder to shoulder, answers to the small diameter of the inferior aperture; hence the head will be arrested beyond the vulva, until one shoulder is carried forwards and another backwards, while the face follows the direction of one or other of the shoulders. By this change of position the major diameter of the trunk enters the major diameter of the inferior aperture."

## SECOND SPECIES.

*(Head in antero-posterior diameter; face forwards.)*

"The direction of the sagittal suture, which lies from before backwards and from above downwards, with the anterior fontanelle behind the ossa pubis, and the posterior fontanelle to the sacrum, makes known this species.

"The manner in which the head advances in this species is such, that when the woman is standing the uterus and child incline forwards. The occiput enters first into the cavity of the pelvis, the head at length reaches the apex of the sacrum, the coccyx, and the perineum. When this has taken place, the superior part of the coronal suture answers to the pubic arch, which is easily recognized by the presence of the anterior fontanelle towards the internal surface of the pubis. The superior part of the parietal bones answers to the sub-pubic angle (*angulo reflexo anteriori*), but cannot glide under it, as has been declared to take place above in the preceding species. When the head is forced against the coccyx and perineum in this position, unless the dimensions of the pelvis considerably exceed those of the head, and the uterine effort is strong, it is with great difficulty, if ever, that the woman is delivered by the natural powers.

"It is to be noticed that in labour of this kind, terminated by means of uterine contraction alone, the perineum is not unfrequently ruptured, unless the child's head is small, the coccyx well bent backwards, and the perineum very dilat-able. This position of the head is obnoxious to the same difficulties as those



which attend the vice which arises from the too great descent of the pubis towards the region of the sacrum, which is vulgarly called *Bassin Barré*.

### THIRD SPECIES.

(*Head in right oblique diameter; face backwards.*)

"The sagittal suture follows the direction of the oblique diameter from left to right, the posterior fontanelle being to the left and forwards, the anterior to the right and backwards, the right ear being in front and to the right, &c.

"The head proceeds in this position in a manner not dissimilar from the first species, until the head reaches the coccyx and perineum. There is, however, this difference between them, that the posterior fontanelle, which descends behind the pubis, by approaching to the centre of the pelvis in proportion as the labour comes towards completion, in this way descends from left to right, and at the end unceasingly towards the centre of the pelvis. When once the head attains the sacrum, coccyx, and perineum, it is arrested by these impediments, so that in that direction it can proceed no further. Having reached this stage, the head, which has now quite descended into the pelvis, is in the same way impelled towards the pubic arch; then the middle and posterior part of the right parietal bone immediately corresponds to the excavation of the sub-public arch. The head ought now to proceed in this direction; but this cannot take place because a part of the parietal bone which sticks at the superior border of the pubic arch does not permit the head to go from before forwards. Whence it happens that, urged by stronger uterine contractions, the head, which is detained by the insurmountable force of sacrum, coccyx, sacro-sciatic ligaments and ischiatic spines, escapes by rotating from left to right towards the sub-public angle, which obstructs it less. You may not inaptly compare the theory of this motion with that which causes a kernel to escape from the pressure of the finger."

A good illustration of what the author means here is afforded us. If we press a cherry stone fresh from the fruit between the fingers, it escapes from between them, and is propelled with considerable force. He continues:—

"Scarcely is the position of the body changed when soon the occiput, drawn on by the contraction, glides under the arch of the pubis, and at length emerges from the maternal parts, according to the same law as obtains in the first species."

### FOURTH SPECIES.

(*Head in right oblique diameter—face forwards.*)

"In this species the sagittal suture lies in the oblique diameter; the posterior and superior fontanelle answers to the connection of the right ilium with the sacrum, the anterior being directed to the cotyloid cavity of the left ilium. The left ear is to the right and forwards.

"The progress of the head in this species is the same as in the second. In this alone it differs, that the posterior fontanelle, which in the second species descends looking to the sacrum, in moving towards the centre of the pelvis, is turned in the direction of its connection with the right ilium. Scarcely has the head reached the apex of the sacrum, the coccyx, and the perineum, than the centre, or almost the centre, of the right parietal bone answers to the superior part of the sub-public angle. It not unfrequently happens that the head, being forced to this depth into the cavity of the pelvis, describes, in consequence of

the activity of the uterine contractions, the eighth part of a circle (*semiquadrantem circuli*), from left to right, by which rotation this species is converted into the second, and sometimes into the third. But in the latter case the head describes a quarter of a circle and a half (*quadrantem circuli cum semisse*) from right to left. A happy issue of the labour requires a wide pelvis and powerful uterine contraction; if either of which should be absent, one is compelled by absolute necessity to call in the aid of art."

In the above description it is quite clear how he assumes the change into the second position to take place. It is by no means so easy, however, to follow his meaning with reference to the change into the third. If he means that to attain the third position the head must describe a quarter of a circle, and a half more after having reached the second, the thing would be obvious enough; but then the change would be a continuation of the movement from left to right, and not from right to left as described. There can be little doubt, however, that this was his meaning, but it is to be regretted that there is so much confusion in the expressions used.

#### FIFTH SPECIES.

(Head in left oblique diameter—face backwards.)

"The sagittal suture follows the direction of the oblique diameter, the posterior fontanelle being placed towards the right cotyloid cavity, the anterior to the left sacro-iliac synchondrosis, &c.

"Other things being equal, the advance of the head is precisely the same as in the third species, it being necessary to observe only with reference to the mechanism that the change of situation takes place from right to left. In this species the head rotates generally with greater difficulty from right to left than in the third from left to right. The obstacles to this rotation depend on the situation of the rectum."

#### SIXTH SPECIES.

(Head in left oblique diameter—face forwards.)

"In this species the sagittal suture follows the direction of the oblique diameter; the posterior fontanelle towards the left sacro-iliac synchondrosis, the anterior towards the right cotyloid cavity; right ear to left, and forwards, &c.

"The advance of the head in this species is towards the right side as, other things being equal, in the fourth species to the left side."

We assume, then, that Solayrés discovered for himself the oblique position of the head, and the above extract shows that, in addition to classifying cranial positions in a manner that had never previously been attempted, he clearly recognized the fact, that in those cases in which the face was towards the pubes nature, by her own unaided efforts, in some cases turned the face backwards into a position more suitable for delivery. In his description of the first species, he also points out with greater precision than any of his predecessors the manner in which the delivery of the shoulders took place.

It was fortunate that before his death Solayrés had found an



apt pupil in the celebrated Baudelocque, who promulgated and improved upon the doctrines of his master in a work which is well known to every accoucheur. In this treatise Baudelocque confesses that the chapter on the mechanism of parturition is little more than a translation of the essay from which we have quoted so largely. In this, however, he scarcely does justice to himself, as his description of the movement of the face from before backwards is much more clearly expressed, and also more correct, than was that of Solayrés. Like him, he divides cranial presentations into six species; but as the numbers do not represent the same position, I will shortly indicate them, adopting, for the sake of clearness, the modern terms, which will convey in these days a more distinct impression:—

1st,	Head in the right oblique diameter	(face backwards).
2nd,	“ left oblique	“ “
3rd,	“ conjugate	“ “
4th,	“ right oblique	(face forwards).
5th,	“ left oblique	“ “
6th,	“ conjugate	“ “

In his description of the mechanism of the fourth position, he says:—

“ Il arrive cependant quelquefois, mais trop rarement pour le bonheur de la femme et de l'enfant même, que la tête en descendant, se rapproche de la deuxième position; de sorte que l'occiput se tourne en devant au lieu de se porter du côté du sacrum. Ces exemples de quatrième position, réduite comme spontanément à la deuxième et de-là, à celle qui est la plus ordinaire au détroit inférieur, semblent indiquer ce que nous devons faire pour épargner à la femme les plus grandes difficultés de son travail; car en s'y prenant de bonne heure, souvent on parvient à faire suivre à la tête cette direction favorable.”

It will, I think, be admitted, that whatever interpretation we may put on the analogous passage in Solayrés, this is a great and decided advance, for to reduce his observation to the standard of Baudelocque's nomenclature, he states that the fourth position changes into the sixth, and sometimes into the first, a statement very different from and much less accurate than that of Baudelocque. The latter divides the surface of the child into twenty-three regions, and states that his six positions might be infinitely multiplied, as it is quite possible that the head of the child might occupy any position intermediate between any two of these quoted. He considers that the muscles attached to the pelvis may exercise some influence on the progress of labour, by changing slightly the relation between the axes of the pelvis and the trunk. In other respects his views are very far in advance of those entertained by most of his contemporaries, and his work obtained for him a lasting and deserved reputation.

The works of those who wrote at and even considerably after this period, except in so far as they gradually adopted the views of Baudelocque, do not evince much originality or tendency to advancement; indeed, in many instances there is evident a leaning towards old and exploded theories. In addition to those already named, the works of Portal, Astruc, Saccombe, Van Solingen, and Alphonse le Roy claim notice among a host of others. The work of Astruc is chiefly remarkable for his having been among the first to include, in the modern system of classification, footling along with cranial cases as natural. "Les accouchemens naturels," he says, "sont de deux espèces—dans l'une, l'enfant se présente par la tête et dans l'autre par les pieds." He also has the tendencies of the geometrical school strongly developed, reduces all his operations to a geometrical certainty, and states thus the mechanical problem—"Une cavité extensible, d'une certaine capacité, étant donnée, en tirer un corps flexible d'une longueur et d'une grosseur données, par une ouverture dilatable jusqu'à un certain point." Saccombe and Van Solingen both seem to have imagined that they had made some discoveries of great importance. "Tel est le procédé," writes the former, "de la nature, dont la découverte, qui m'appartient, sera établie sur deux bases inébranlables, l'expérience et l'observation;" while the other chimes in with a sonorous pomposity, which is lost in translation, with a modest assurance that he has done for practical midwifery that which "der erhabene Newton in der Natur im Allgemeinen that, ein System dessen Dauer unvergänglich bleiben wird, weil Wahrheit sein unerschütterlicher Grundpfeiler ist." It is difficult to discover, however, what is his claim to style himself the Newton of midwifery. As regards Le Roy, most of his novelties are pirated from Solayrés, and his name is known now only in association with that of M. Sigault, in an attempt to establish the operation of symphysectomy, which had been devised by the former.

Of the English obstetricians of the time none perhaps deserves such notice in regard to our subject as Johnson, an examination of whose work shows, that not only was he more advanced in his views than Smellie, but that his opinion with reference to the head only wants clearness of expression to enable us to class his name with Solayrés and Saxtorph. White, another contemporaneous writer, describes the mechanism of the advance of the shoulders in terms even more precise than Solayrés. In expressing his astonishment that this point had been so long neglected, he says:—

"The greatest breadth of the head being in a line which forms a right angle with one that passes through the shoulders, it necessarily follows that all the turns made by the shoulders must be opposite to those of the head. When the



head passes with the face towards the sacrum, and the hind part to the pubes, the shoulders must pass sideways, and *vice versa*."

Leake, Hamilton, Osborne, and Denman contributed much by their works to the advancement of midwifery in general; but as regards the mechanism of parturition, there is little in their writings that merits notice. In some respects, indeed, their views are less advanced than many of their predecessors; and Denman goes so far as to condemn, in pretty decided terms, the tendency of his age to regard labour in a mechanical light. Had he warned his readers merely against the danger of regarding it in a light too exclusively mechanical, he would therein have done good service, but he goes much farther than this, when he writes:—

"It does not appear that any ill consequences would follow an erroneous opinion of the manner in which the head of the child is protruded through the cavity of the pelvis, in a natural labour; for, no assistance being wanted, no principle was required for the regulation of our conduct."

This quotation, taken without the context, is true enough, but it is quite evident that he greatly undervalued the importance of a knowledge of the mechanism of parturition. There can be no doubt that his great influence and remarkable ability conduced in no small measure to divert the attention of practitioners from this, so that the subsequent promulgation of the modern views in this country, by means of Dr. Rigby's translation of Naegele's celebrated essay, took the profession very much by surprise. As to the argument itself little need be said. That opinions somewhat similar still prevail is, as I have stated, my principal reason for writing this essay; and I confess I cannot see that such reasoning is a whit more logical than if I should assume a man to be a fool who for years had assured his life or his house, simply because he still lived to pay his premium, or his house had never been burned. Nor must we forget William Hunter who, though he rejected the forceps, and was evidently inclined to leave too much to nature, conferred an inestimable benefit on the progress of midwifery by his writings, and especially by his researches on the anatomy of the gravid uterus.

In the literature of England, therefore, we need not look during this period for much on which we need pause, inasmuch as attention had been in some measure diverted from that course of investigation which might be expected to lead to results interesting and instructive to us. Among continental obstetricians, however, the question attracted as much attention as ever, as is abundantly shown in the writings of the time, the mere mention of which would carry the notice beyond all reasonable bounds. I will therefore select one or two for brief comment, in so far only as they show some progress, or the reverse. Besides the

works of Bang and Professor Boer, of Vienna, those of Stein and Schmitt seem to have attracted considerable attention in Germany up to the beginning of the present century. Both of these writers, however, argued against the probability that the vertex was the presenting part, agreeing in this respect with Roederer and Van Solingen. Stein was a staunch adherent of the mathematical school. "As the working of a machine," he says, "may be understood by its management, and by a study of the forces employed therein, in like manner the occurrence of both natural and preternatural labour depends on mechanical principles. All labours, therefore, are susceptible of mathematical demonstration."\*

Schmitt, in a series of essays which display great ability and some originality on his part, and which were published at Vienna in a collected form,† brings our knowledge of the subject up to the beginning of the present century. He points out that what Van Solingen claims as a new doctrine, is nothing but a revival of the views of Roederer, viz., that the presenting part is the apex of the hindhead (*hinterhauptspitze*), and not the vertex. To these views he gives a decided support, and is manifestly led into the error by looking at the position of the head more with reference to its relation to the outlet than to the brim or cavity—a course of error which has been all along productive of much confusion, inasmuch as authors in this respect have in all probability differed merely in having taken their observations from a different point of view; the result being that their descriptions are essentially different, although their actual appreciation of the phenomena is probably identical. In regard to German midwifery, writers in that language certainly use terms which, when once clearly understood, convey an impression very much clearer than any English words with reference to the various obliquities of the head and the intersection of the pelvic and cranial planes. But a confusion arises from the fact that even the use of these is attended with some vagueness, as also the terms horizontal and perpendicular, so that to the English reader it is often no easy task to penetrate the author's meaning. We shall see in the sequel that the result of this has been to render it a matter of dispute, even at the present day, what is to be regarded as the opinion of Naegele with reference to the position of the head at the brim, so that on this point there is still far from unanimity among accoucheurs.

This is yet another fruitful source of error which, in a study of the earlier midwifery writers, and indeed I may say of writers even within the last thirty years, must on no account be overlooked; and that is the erroneous ideas which were entertained

\* *Theoretische Anleitung zur Geburtshilfe*. Marburg. 1797.

† *Geburtshilfliche Fragmente*. Wien. 1804.



on the relation which the pelvic brim bore to the horizontal plane. Although many writers before Naegele described the plane of the brim as inclined, no one before him imagined the inclination to amount to an angle of  $60^{\circ}$ , so that in the erect attitude of the body the apex of the coccyx fell into the same horizontal plane as the middle of the back of the *symphysis pubis*. Before this all was vague; and, as is shown by the horizontal position of the brim in old articulated skeletons, and also by the term "horizontal," which is still used, though incorrectly, as descriptive of the upper pubic ramus, there seemed to be a general idea that the plane of the brim was much nearer being parallel with the horizon than is actually the case. Nothing is necessary by way of remark, to show how this, too, tends to obscure the meaning of all but the most recent writers on midwifery.

To return, however, to Schmitt, whose descriptions while characterized by ability lack the clearness and precision of some of his predecessors, we find one observation or line of argument, which, albeit somewhat whimsical, is not devoid of interest. Referring to the opinion expressed by Roederer that it is difficult to adopt the view of Smellie, inasmuch as we can recognize no turning power (*vertentem vim*) in the uterus itself, he answers very rightly that "we are not authorized to deny natural appearances which daily take place under our eyes, because we do not see the reason of it;" but he goes on to state that for him the stumbling-block is removed, inasmuch as he recognizes in this very turning power of the uterus the sole cause of the rotation of the head in the pelvis.

"For what then serves the rotation of the head, if it does not render its passage easier? While the head so turns, it is more easily driven through; nature does not economize the space but the force; which means that she makes the head pass through more space in order to spare the force, exactly as we do in removing a fast-sticking stopper from a bottle or a charge from a gun. This general law of the mechanics of organic motion, nature follows under all circumstances, where it is a question of the propulsion of a solid body through a hollow cavity. For it is proved that all organic motion takes place in a direction which holds an intermediate place between the axial (*gerade*) and the circular, that is, in a spiral direction. Nature avails herself in labour of this law, not only during the passage of the head, but during the passage of the whole of the trunk after the head is born."

He then goes on to say that other writers have erred in ascribing the cause to the resistance which the head meets with in the side parts of the pelvis, and to the convenient space afforded by the hollow of the sacrum, for that the real cause is grounded more deeply in the directing power, which, in conformity with mechanical laws, is afforded by the uterus. He continues:—

"We even see in footling cases the feet begin to rotate while they are still concealed within the pelvis, and the whole trunk is still within the womb, for

the obvious reason that the rotation proceeds from the womb, and does not begin in the pelvis.

“When the face is directed forwards, and therefore must describe  $\frac{1}{2}$  of a circle in its passage through the pelvis (a fact which perhaps happens oftener than many seem to believe), if we succeed in turning the face backwards we rotate only the part on which we are operating, and not the whole child. This remains immovably in its original situation unless a pain occurs at the same moment, by which means the parallel gliding motion which he has in view is brought about, in which case the operator can do much good if he is sufficiently skilful to take advantage of the proper moment.”

To this I would only add by way of commentary, that as it becomes evident on a perusal of his work, that Schmitt is a true student of nature and an honest observer of facts, I am inclined to accept the above with more respect than the general oddity of his view would at first sight appear to warrant.

It is evident from the works of Kilian, Mampe, and many other writers of the early part of this century, that, during this period, although the subject of the mechanism of parturition was treated by all at great length and in many cases with eminent ability, no very brilliant or well-marked advancement took place until there appeared in 1819, in *Meckel's deutsche Archiv*, an essay by the celebrated professor of Heidelberg which placed the matter in a light so clear, that all that has been written on the subject from that to the present time has been little more than a repetition or corroboration of his views.

(To be continued).



*On the Mechanism of Parturition.* By WILLIAM LEISHMAN, M.D., Fellow of the Faculty of Physicians and Surgeons of Glasgow, and of the Obstetrical Society of London; Physician to the Glasgow Royal Infirmary, and the University Lying-in-Hospital.

(Continued from p. 215.)

It is unnecessary for me to enter upon an elaborate critical examination of Naegele's admirable essay, seeing that his arguments and doctrines are familiar to every English obstetrician; but as an exact appreciation of these is absolutely necessary in order to understand what follows, I shall complete my historical notice with a brief summary of his views, endeavouring, as far as I can, to throw light upon such of his doctrines as have been misunderstood or controverted by later writers. I shall thus, I trust, bring out in a bolder relief whatever other views I may think it necessary to bring forward.

Be it observed, in the first place, that the German obstetricians of that time had already adopted that division of cranial presen-

tations into four, which still obtains both in this country and in Germany. But it was universally admitted that the second was in all respects the converse of the first, and was next to it in point of frequency. There was, moreover, considerable discrepancy of opinion with reference to the manner in which the head entered and passed through the pelvic cavity; but the view usually held by the most eminent teachers—such as Weidmann, Siebold, Froriep, La Chapelle, and others—was that the vertex was the presenting part, and that the head entered the pelvis *directly* in the axis of the brim, and quitted it in the axis of the outlet, the face looking *directly* backwards towards the hollow of the sacrum.

To all these conclusions Naegele objected. In the first place he maintained, with reference to the relative frequency of the various vertex presentations (*scheitellagen*), "that the third is, next to the first, by far the most frequent of all the positions of the head." He further confidently asserted, as the result of much experience and careful observation, that this position had been found by him at the commencement of labour in the proportion of two to five in relation to the first, and that the former was almost invariably changed into the second, which thus became reduced into a very subordinate position in point of importance, being not only the least frequent of the four vertex presentations, but met with even more rarely than face cases. The effect of this astounding discovery was to show that, instead of this spontaneous rotation being a rare but happy termination of an unfortunate position, it was the ordinary course which nature followed in the mechanism of those cases which end with the forehead to the left sacro-iliac synchondrosis. Naegele thus considered the first and third cranial positions to be the ordinary forms of vertex presentation, the second to be a mere phase in the progress of the third, and the fourth to be a rare variety of the early stage of the first.

In the second place, Naegele states that the head does not enter the brim *directly*, but *obliquely*, "so that the greatest breadth of the skull (from one *tuber parietale* to the other), as also the breadth of its base, never in its passage in ordinary circumstances coincides with the diameter of the brim." On this point he says also:—

"The head has not at the brim a direct (*gerade*), but a perfectly oblique position, so that the point which lies lowest or deepest is neither the vertex nor the sagittal suture, but the right parietal bone. The sagittal suture is nearer to the promontory of the sacrum than to the pubes, and divides the *os uteri*, which is directed backwards and generally somewhat to the left, into two very unequal parts. . . . The higher the head is, the more does its long diameter approach the transverse diameter of the brim, and the more oblique is its position, on account of which the right ear can generally be felt without difficulty behind the pubes, which would not be the case if the head had a perpendicular direction."



These extracts leave no room for doubt that his meaning was really a lateral flexion of the head, or an approximation of the ear to the corresponding shoulder; and to this I would direct special attention, as it is a point which is denied by some eminent obstetricians, although almost universally taught in the British schools.

He also points out, in the third place, that not only does the obliquity described by Saxtorph and Solayrés—viz., that according to which the head is directed from one sacro-iliac synchondrosis to the opposite *foramen ovale*—obtain at the brim, but that, at the outlet, this obliquity is also maintained so that the head does not pass with the long diameter in the antero-posterior direction, but with the sagittal suture directed obliquely across the long diameter of the external opening of the vulva. He expresses this in the following terms:—

"It is not, however, the apex of the hindhead (*hinterhauptspitze*) that first advances under the pubic arch, but the head comes in such a position that the posterior and superior part of the right parietal bone first passes the plane of the outlet, and remains in this position until it has passed through the outlet of the pelvis with the greatest circumference which it offers to it; when it then turns itself with the face completely round to the right thigh of the mother. If while the head is engaged in the external passages, we follow the sagittal suture with the tip of the finger from the posterior fontanelle, the examining finger will be found to pass in a direction from the left descending ramus of the pubes to the right ascending ramus of the ischium. It is the posterior and upper part of the right parietal bone which first enters and clears the external parts. . . . The sagittal suture will not be found following the direction of the central line of the sacrum, but obliquely from left to right."

The descriptions above quoted apply, as will be seen, to the mechanism of the ordinary or first cranial position only. The three points to which I have drawn attention do not by any means represent all that is original in Naegele's essay; but they will suffice to indicate the main features of his doctrines, and to determine the position which he holds with reference to his predecessors. I need scarcely add, that although there is not one of the doctrines of Naegele that has not been questioned by some one or other, his views as stated above were almost universally adopted, and may with perfect propriety be stated to be essentially the modern theory of the mechanism of parturition. His admirable descriptions of the mechanism of face and nates presentations merit scarcely less attention; but these we will pass over for the present, and defer all criticism of his views in general until we come to consider each in reference to the systematic description which follows.

I may premise by stating, that the remarks which follow shall be confined almost entirely to presentation of the vertex, or

—if it be thought more exact to say so—of the vertex and parts immediately adjoining. Of these again I shall adopt but four, after the manner in which they are classified by most modern authors. I do not attempt to deny that others sometimes occur as *presentations*; but, I think we may fairly assume it as the result of the combined observations and experience of almost all the best authorities, that such never, in ordinary circumstances, occur as cranial *positions* in the pelvic cavity. But, even if we admit that such positions do occasionally occur, is the advantage which we might gain by admitting them into a system of classification which is intended, among other things, for the guidance of students, not more than counterbalanced by the element of complexity which we thereby introduce into the subject? It matters little, indeed, provided we understand the subject, whether we divide them, with Ritgen, Flammant, and Ramsbotham, into eight; with Solayrés, Baudelocque, and La Chapelle, into six; with Saxtorph, Capuron, and Busch, into four; or with Kilian, Naegele, and Rigby, into two. Indeed, were I perfectly convinced that Naegele's statements as to the relative frequency of the second and third positions were correct, I would adopt his; but being by no means satisfied on this point, I adopt the four ordinary positions, as being the next in point of simplicity, and familiar to all.\*

That the forehead lies forward in a large number of cases, and that the natural termination of such cases is with the occiput forwards, are facts which were undoubtedly discovered by Naegele, and which can be corroborated by any one with some tact and a little patience. But that the third position occurs so frequently, in comparison with the first, as two to five cases, and that the

\* It has been very generally denied that Naegele admitted two positions only (See, for example, review of Dr. R. U. West's essay on this subject, *Lancet*, Feb. 28, 1857), but this is manifestly an error. Naegele certainly alludes to the other positions, as was essential to his argument; but a careful study of his essay renders it clear that Dr. West was perfectly right in asserting that he (Naegele) did not consider the other two as normal positions. Naegele the younger and Dr. Rigby both follow Naegele in this, calling what is generally classed as the third, the second; while the former expressly says in his work (*Die Lehre vom Mechanismus der Geburt*, von Hermann Franz Naegele, Mainz, 1838,) in speaking of his father, that "he first reduced the number of regular positions to two." I would remark here further, with reference to a work to which I shall have occasion repeatedly to refer, that Dr. West has laid himself open to misconstruction by referring to the author of the above Treatise as Naegele. The author of the well known treatise which was translated by Dr. Rigby was *Franz Carl Naegele*. Both father and son occupied the chair of midwifery at Heidelberg, but the former is the Naegele whose name is so well known in this country in connection with our subject. The name of the younger Naegele is best known to English readers with reference to his admirable treatise on obstetric auscultation.



second is as an original position almost as rare as cases in the conjugate diameter, is an assertion which—*quantum valeat!*—my experience does not corroborate. Since Naegele wrote, and especially of late years, opinions on the subject have varied much, and of these I shall quote two, as representing the most diverse and extreme views of the case.

At a meeting of the Dublin Obstetrical Society in December, 1861,\* Dr. Halahan read a paper on the Mechanism of Labour, in which, after approving in general terms of the conclusions of Naegele, he states, as the result of a careful and constant investigation of some thousands of cases, that the head is always so placed at the commencement of labour, that the face is directed forwards; that the fourth position changes at the beginning of labour into the first; and that the third does not change into the second until the head is distending the perineum. On the other hand, Dr. West of Alford, to whose elaborate paper on Cranial Presentations† I have already referred, is of opinion that here Naegele is quite wrong, and adheres to the old opinion that the second is, next to the first, the most common presentation. Thus of 481 cases in which he had an opportunity of observing the original position—

306	presented	the	cranium	in	the	first	position.
151	“	“	“	“	“	second	“
15	“	“	“	“	“	third	“
9	“	“	“	“	“	fourth	“

It is proper to explain here, however, that these results do not actually differ so much from those of Naegele as the figures taken by themselves would lead us to believe, seeing that the author includes as third and fourth cases only those which end as such. A point of undoubted originality and great interest in his essay is the distinction which he draws between mere *bregmato-cotyloid* varieties of the first and second position, and *fronto-cotyloid* positions which end with the face forwards; but this point we may pass over for the present, as it will fall to be reconsidered when we come to treat of the third and fourth cranial positions.

In the meantime, I would notice shortly some reasons which are given by this writer for the erroneous results which are arrived at by some observers. Nothing is clearer to any one who has practically devoted his time to the study of this subject, than that a faulty method of examination once acquired is likely not only to give results which are wrong, but is very apt to

\* Dublin Quarterly Journal, 1862. † Glasgow Medical Journal, 1856.

be persevered in by the observer, and more or less to influence his whole future career as regards the study of a particular point. Into an error such as this Dr. West considers that Naegele has fallen, and that as, by constantly adopting the practice of examining with the right hand while the woman is on her left side, the hand passed more readily downwards, he was led to assume that certain points of the cranial surface were, because more easily reached, actually nearer than certain other parts, which in reality were equidistant. Dr. West says that, to obviate this, we should put the woman on the right side, and examine with the left hand, when we shall often find that we have been in error. This hint is well worthy of the attention of those who are commencing a study of the subject, but I can scarcely imagine that a man like Naegele—whose industry must, as his works abundantly prove, have obtained for him the perfection of the *tactus eruditus*—could be so led astray. The two opinions here quoted show, I believe, the most extreme views which have been announced on this subject since the days of Naegele; and while each merits attention as the work of an accoucheur of great experience, they will serve to show us how widely views differ on this subject.

A considerable number of obstetricians, however, do not agree closely with Naegele as regards the comparative frequency of second and third presentations, although many of them admit that these results are probably due to their observations being made at a period too late in the labour for accurate results. Others, again, are clearly of opinion, that Naegele's conclusions are rather too sweeping in this respect, and that the second position does actually occur as a primary position more frequently than he would have us believe. But to this we shall recur.

Such, then, being the state of matters at the present day, we may now pass on to a consideration of the various cranial presentations, adopting, as I have before said, the four ordinary vertex presentations as the most simple classification.

Among the many difficulties which we encounter in a study of this subject, none is so embarrassing to the student as the want of proper definition, and the lack of scientific accuracy in the use of certain terms. If, for example, we select the expression just used, "vertex presentation," and seek in the books of modern writers a categorical answer to the questions, "What is the vertex?" or "What is a presentation?" we shall find that these terms are used in the loosest possible way; so that it is essential, before going further, that we should have a perfectly clear idea of what they really signify, or at least of the sense in which they are used in this essay.

The vertex, or crown of the head, is described in Todd's Cyclopædia as synonymous with the anterior fontanelle; by many



writers, it is said to be the posterior fontanelle; by Dr. Ramabotham, a point a little in front of the posterior fontanelle; by Smellie, the whole space between the two; and by Schmitt, a point midway between the anterior and posterior fontanelle. Perhaps of all these the most usual description is that which places the vertex in, or close to, the posterior fontanelle. I confess that I am unable to see that we can with propriety attach any other meaning to the term "crown or vertex," than that it is that part of the head which is highest in the erect posture. If so—and this is surely its simple and obvious meaning—it can neither be the anterior nor posterior fontanelle, but a point intermediate between the two, varying somewhat according to the peculiar formation of various crania, so that it is difficult to determine the exact point. If it were absolutely necessary to describe such, we should probably closely approach the truth by placing it, with Schmitt, at a point midway between the two fontanelles. But if we consider the infinite varieties which obtain in the comparative position of the two fontanelles, as regards the pelvic axes, so that any one point of the sagittal suture may in certain cases present, it then becomes obvious, that to the term vertex we must attach a more extended signification, if we would avoid complicated systems of classification. On these grounds I prefer to consider the sagittal suture in its whole length, and the parietal bone (once called *os verticis*) as far as its tuber, as the vertex in midwifery, as by so doing I shall be able to term the whole four presentations, in all stages and varieties, as true presentations of the vertex.

As regards the word "presentation," the difficulties are even greater, and the confusion among various writers more embarrassing. If we imagine a series of planes radiating from a common centre in front of the pubes, and passing to the posterior part of the pelvic wall—the upper of these being the plane of the brim, the lowest that of the outlet—the parabolic curve which passes through the centre of these is manifestly the axis of the pelvis. Now, if we are forced to name a *point* as the presentation, we might with some show of propriety adopt that definition which limits the presentation to that point on the surface of the child's head through which the axis of the pelvis passes.\* But the objection to this is to be found in the fact, that it is practically impossible to determine this with anything approaching accuracy, and therefore we must adopt for our information and guidance in practice some more simple, if less accurate, idea of the term. This being, then—so to speak—beyond the pale of scientific accuracy, every one has been left to attach his own interpretation to the

\* Dr. Matthews Duncan—Edinburgh Medical Journal. 1861.

phrase, some regarding it as the part lowest in the pelvic cavity; some as the part which the finger first touches when introduced in the axis of the outlet; and others as the part which is lowest with reference to the plane of that part of the cavity in which the head is situated. Of these the last is the most correct. Dr. Tyler Smith, who seems to have recognized both the difficulty and importance of clearly understanding what a presentation is, suggests "that it would be best to define the presenting part in every kind of cranial position or presentation as that portion of the foetal head felt most prominently within the circle of the os uteri, the vagina, and the ostium vaginae, in the successive stages of labour." This definition is so far faulty in overlooking the relation which the head bears to the bony pelvis, but it is nevertheless the most correct and intelligible of any that I have seen.

In making an examination during labour, in order to determine either the "presentation" or the "position," we may introduce the finger in the axis either of the cavity or the outlet; but as regards the brim, the finger cannot be conveniently passed in its axis, so that we are easily led into error as to that part of the child's head through which this axis passes. The reason of this becomes obvious if we remember that the angle of inclination of the pelvic brim to the horizon is no less than  $60^\circ$ , and that the finger introduced in the axis of the outlet meets the axis of the brim pretty nearly at a right angle. It will be understood that I use here the term "axis of the outlet" in the sense in which Dr. West employs the expression "axis of examination," which he correctly describes as forming a right angle with the axis of the brim. It is certainly improper to consider the axis of the outlet in the skeleton as the real axis of this part in a practical and obstetrical sense.

No term in midwifery is perhaps more loosely used than the expression, "at the brim," and we must ask, therefore, during what part of the progress of labour the head may be said to occupy that position. I will pass over the question as to the propriety of the head being described as at the brim when the vertex only has passed its plane, and before it has experienced any resistance from the bony structures, as it is my wish to simplify, and not to complicate; but as regards the time when the head may be said to have passed the brim, it is, I think, essential that this should be determined with more exactness than is to be found in any work of midwifery with which I am acquainted. It is evidently from lack of this that the same terms have come to be used as signifying different things, and, not less frequently, different terms to signify the same thing. When the whole vault of the cranium has passed the brim, it has, of course, entered the cavity; but it gives rise to purposeless complication if we describe one part of the head in its



relation to the cavity, and another with reference to the brim, their places and axes being so different. On this account I consider that the head should be described as "at the brim" until its bulk has passed this part, which does not take place until the head has begun to experience some resistance from the floor or converging walls of the pelvic cavity. I would, moreover, observe that, in passing the brim, the head offers first the vertex, then its great transverse or bi-parietal measurement, and lastly its great antero-posterior or occipito-frontal diameter, so that, although the whole vault of the cranium occupies the cavity, it cannot fairly be said to have cleared the brim until the occipito-frontal diameter has passed. A refer-

Fig. 1.\*



ence to fig. 1 will render this more intelligible. On this account, and if we make due allowance for the obliquity with which this diameter passes the pelvic entrance, we shall, I think, be entirely justified in describing both the presentation and the position with reference only to the axis of the brim, until the vertex has reached the floor of the pelvis. If, therefore, overlooking for the present

\* Fig. 1.—Diagram to illustrate the parts of the child's head which successively enter the brim. No note is here taken of obliquity, as the object is simply to show that the great transverse diameter passes quite into the cavity before the antero-posterior diameter is engaged in the brim. It will be observed that the occipito-frontal measurement is not taken as at right angles to the cervico-bregmatic measurement, as in most descriptions of the anatomy of the fetal cranium. Were the anterior fontanelle the presenting point, this would be correct; but assuming, as I do, that the presenting point is considerably behind the anterior fontanelle, I think it is much more correct to draw the diameter from the most projecting part of the occipital bone (the *hinterhauptspitze* of German writers), as this is not only the largest measurement in this direction, but is actually the diameter which is offered at the brim, and of importance mechanically. This is the sense in which, in the sequel, I use the term occipito-frontal diameter.

A B Bi-parietal plane.  
c d Occipito-frontal plane.

the various obliquities of the head, we consider it as passing downwards and backwards in the axis of the brim, and view it only in relation to this, until it assumes another direction, and comes under the influence of other forces, we shall regard it in the manner which is clearest, simplest, and most practical. It may be said that the description of Dr. Tyler Smith, above quoted, is essentially the same as this, inasmuch as the axis of the uterus and of the brim are usually considered to coincide; but I think that it is much better to consider the position with reference to the firm, unyielding brim, than in the relation which it bears to the dilatable os, which not only varies somewhat in situation, but is liable to accidental change of form during the course of labour. The head having reached the floor of the cavity, and having become exposed to the resilient forces of those parts, moves successively downwards, forwards, and upwards. And here we cannot do better, during the whole duration of this stage, than consider the presentation "as that part which is felt most prominently within the circle of the vagina and ostium vaginae."

By adopting this plan, we avoid all reference to the axis of the cavity, and render the whole subject infinitely more simple, by regarding the presentation in its relation to the brim axis at one state of labour, and to the outlet at another. I do not attempt to maintain that this is strictly correct; but it has at least the merit of being intelligible, and will serve to define my meaning in regard to what follows.

It is with regret that I feel myself compelled to pass over the important and interesting physiological considerations which attach to the active forces of parturition. The mere history of this part of the subject, indeed, beginning with the errors of Levret and the investigations of Ruysch, would form a chapter of the highest interest; but the extent to which I have already carried the history of the subject forces me to confine myself almost exclusively to the relations which exist between the child's head and the cavity through which it has to pass during labour.

In entering upon a consideration of the first cranial position, that namely in which the forehead is turned during labour to the right sacro-iliac synchondrosis, we should clearly understand what are the various parts which enter the brim in succession (see fig. 1), and the relation which these bear to the brim. It will be remembered that three kinds of obliquities are usually described as occurring here, each being stated to have a mechanical advantage over the more direct mode of entrance. The first is that described by Saxtorph and Solayrés, according to which the long diameter of the head occupies the oblique diameter of the brim; the second is the obliquity described by Naegele and most



of his followers, by means of which the right parietal protuberance enters the brim before the left; and the third that by means of which the great occipito-frontal diameter accommodates itself in almost all cases to the brim, by the occiput preceding the frontal bone in its descent. Each of these merits a special consideration.

I. *The obliquity of Saxtorph and Solayrés.*—That the head in the vast majority of cases presents itself at the beginning of labour in a direction approaching to the oblique of the brim, and that as labour advances it passes more decidedly into that diameter, are facts almost universally admitted. There are, however, some obstetricians of eminence, among whom I may mention Cazeaux and Ramsbotham, who consider that the transverse position occurs so frequently as to warrant our retaining it in a system of classification. I am perfectly willing to admit that, with a wide pelvis and a small head, there is scarcely any position that may not occur, but I think the weight of the evidence is entirely against the probability of the transverse position being anything but extremely rare in its occurrence. It is well known to all accoucheurs that frequently (but by no means always, as Naegele says) the ear may be felt at the beginning of labour immediately behind the pubes, and it is important that the exact diagnostic value of the ear in this situation be accurately determined. On this subject Dr. West in his essay has some important remarks which I have, to some extent at least, had an opportunity of confirming. It is quite evident that this frequent position of the ear behind the symphysis pubis is often looked upon as evidence that the other ear is in the middle line of the sacrum, and consequently that the long diameter of the head is in the transverse of the brim; but so far from that being the case, he says that on finding, for example, the right ear in this position, and indicating that the face is to the right, we may be sure that the head is decidedly oblique, and in the first cranial position. I cannot, I confess, go quite so far as Dr. West; but I have on more than one occasion introduced my hand when the right ear was in this position, and found the left, not indeed, as he says, "at the left ilium or thereabouts," but certainly and very decidedly to the left of the promontory of the sacrum. This subject requires and deserves further investigation, but I am inclined to believe that the position is in most cases indicative only of that situation intermediate between the transverse and oblique diameters of the brim, which the head so frequently occupies in the early stage of labour.\*

\* Since writing the above, I find that a similar observation has been made by MM. Dubois and Cazeaux. The latter expresses it as follows:—"Si l'on place

It is undoubted that early in labour the position is frequently more transverse than it is at a later period, but it is by no means easy to ascertain what is the cause of this alteration. I am inclined to think that it is determined, to some extent at least, by the shoulders of the child coming into contact with the projecting lumbar vertebræ, aided it may be, in the case of a living child, by the motion of the superior extremities. It is conceivable at least that the motion of the arm of the child should tend to turn the shoulder, and consequently the head, into an oblique position, seeing that the arm next the lumbar vertebræ would find a resistance to which nothing analogous exists on the smooth anterior wall of the uterus. It is certainly difficult to understand how, without the operation of some such cause, the long diameter of the head should turn at so early a stage of labour from the transverse position into one where, taking the soft structures into consideration, it actually has less room.

II. *Bi-parietal obliquity*.—It will be understood that, in considering the second kind of obliquity—that, to wit, by means of which the head being bent on its occipito-frontal axis brings the left ear, in the position which we are considering, towards the left shoulder—I must, in pursuance of my plan, view the head in reference to the axis of the brim alone. The presenting point of the cranium I shall consider throughout, until the head reaches the floor of the cavity, as that through which the axis of the brim passes, its situation being altered only by a variation in the different kinds of obliquity.

Almost all modern writers, including the most eminent

une tête de fœtus à terme au niveau du détroit supérieur de manière que le diamètre occipito-frontal soit parallèle au diamètre oblique gauche, la forme de la tête du fœtus ne permet pas que le diamètre bipariétal soit parallèle à l'oblique droit. Dans cette position, en effet, l'extrémité postérieure de ce diamètre bipariétal correspond bien à la symphyse sacro-iliaque gauche, mais l'extrémité antérieure, au lieu d'aboutir à l'éminence iléo-pectinée, correspond au milieu de la branche horizontale du pubis."

The same observation might with perfect propriety be applied to the ears, which, when the centre of the sagittal suture presents, are directly above the parietal protuberances, so that the position described by M. Cazeaux has only to be made a little more transverse to correspond in all respects with that which I have observed. This confirms me in my opinion, that Dr. West carries the conclusion which he founds on his interesting observation a little too far. To him, however, is manifestly due the credit of showing—what any one may verify for himself—that the presence of an ear at the pubes, so far from proving the head to be in a transverse position, is actually evidence of its obliquity. In differing from him in what is perhaps a trifling matter of detail, I have no wish to impugn either his general accuracy or the originality of his views. It will be noticed, with reference to the above and a subsequent quotation from Cazeaux, that the "diamètre oblique gauche" is our right oblique diameter, and in like manner the "diamètre oblique droit" must be read as the converse.



obstetricians of our time, agree in adopting Naegele's view with reference to this obliquity. It is therefore with much diffidence and hesitation that I here submit a contrary opinion, although I have only convinced myself of its truth after a careful and laborious study of the progress of labour. I am persuaded that, in a pelvis of ordinary dimensions, the usual course of labour is for the head to enter directly in the axis of the brim, with the sagittal suture equidistant from pubes and sacrum. The accompanying illustrations show this more plainly, and in both the observer will remember that he is looking *upwards and forwards*, the axis of vision corresponding to that of the brim. The direct position, as here shown, is in most respects the same as that which was

Fig. 2.\*

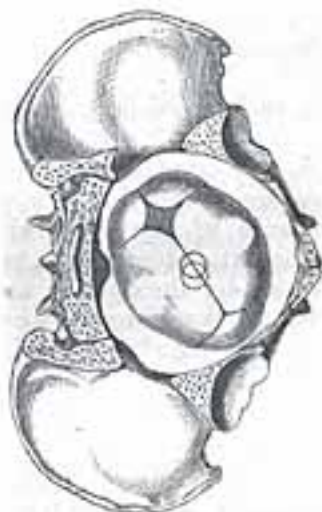
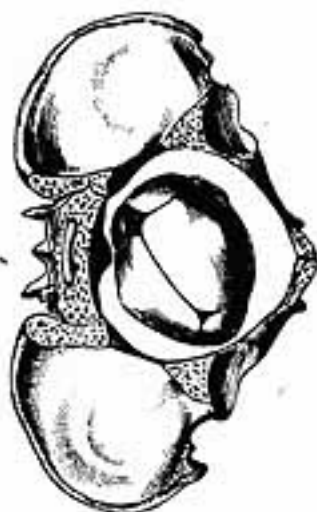


Fig. 3.



taught by the leading obstetricians who immediately preceded Naegele. He, however, discovered and first announced the incontrovertible fact which is set forth in the following words:—

“The finger which is introduced in the central or middle line of the pelvic cavity, and brought in contact with the head, will touch the right parietal bone in the vicinity of the tuber. . . . . At the brim, the head does not assume a perpendicular, but a perfectly oblique position (*keine gerade, sondern eine ganz schiefe Stellung*), so that the part which is situated lowest or deepest is neither the vertex nor the sagittal suture, but the right parietal bone.”

\* In Figs. 2 and 3, the floor of the pelvis has been removed by a section, including the greater part of the walls of the cavity. In fig. 2, the head is represented as descending directly in the axis of the brim. The dotted circle shows the effect on the apparent position of the os uteri of a slight displacement to the side. In fig. 3, the head is represented as descending in the position described by Naegele.

I repeat that the fact thus stated in general terms is incontestable, inasmuch as it obviously refers to the axis of the cavity; but Naegele goes beyond this, and pushes his conclusions much further than the facts of the case warrant, when he says that the sagittal suture is nearer the promontory of the sacrum than the symphysis pubis, and that the bi-parietal measurement can never during labour coincide with the diameter of the pelvic entrance. I may mention here that, although I began my study of the subject with a firm conviction that Naegele was right in this particular, I have been step by step driven to the conclusion that he is perfectly wrong. It is perhaps unnecessary for me to say that the view which I take of the position of the head at the brim is, albeit somewhat heterodox, far from original. Nor is the doctrine without powerful supporters, as this is the view entertained and clearly expressed by Velpeau and Cazeaux in France, and more recently in this country by Dr. Matthews Duncan; and several other observers, among whom I may mention Drs. West and Paterson,\* have arrived independently at the same conclusions, which they have expressed in a more cursory but not less decided manner, than the obstetricians first-mentioned. M. Cazeaux expresses it as follows:—

"Avant la rupture de la poche des eaux, la tête du fœtus est légèrement fléchie sur le devant de la poitrine, et les rapports des diamètres de la tête avec les diamètres du détroit supérieur sont les suivants; le diamètre occipito-frontal est parallèle au diamètre oblique gauche du détroit supérieur; le diamètre bipariétal est parallèle au diamètre oblique droit; la circonférence occipito-frontale de la tête est parallèle au pourtour du détroit supérieur; l'axe de ce détroit supérieur passe par le diamètre trachélo-bregmatique."

The arguments of Naegele on this point are stated, as indeed all his views are, with great clearness and precision, and are, I admit, apparently conclusive and convincing. But I do not despair of being able to show that he has been led into error, if my readers will only deign to put aside for a time a preconceived opinion and study the subject in nature. I may fail in any argumentative attempt to show that Naegele was wrong, or I may be met with reasoning more subtle than my own; but I would only ask that, as my arguments are founded upon practical research, those who would refute them should test the matter fairly—a task which will involve some labour, but which is within the power of every practitioner in midwifery.

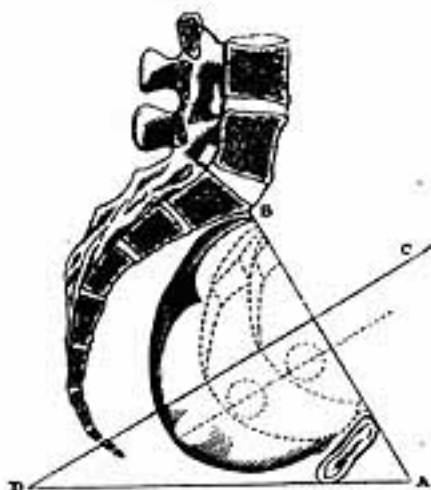
In admitting the general accuracy of most of Naegele's descriptions, I assume that the fundamental error from which, more than any other, his mistake arose, was an ignorance at the time he wrote his essay, on the subject of the great obliquity of the brim in

\* Glasgow Medical Journal, October, 1862.



respect to the horizon. There must, I think, have been remaining in his mind some remnant of the old idea of the *horizontal* brim; for it must be remembered that his attention was not directed to the subject of the relation which the pelvis bears to the trunk and limbs, until some years after the date of the publication of his paper on the mechanism of parturition. If the brim were indeed parallel to the horizon, or nearly so, the fact of the finger meeting the parietal bone in the vicinity of its tuber would be clear and irrefragable evidence of the so-called lateral or bi-parietal obliquity of the head. But if we do not allow ourselves

Fig. 4.\*



to lose sight of the fact that the brim is inclined at an angle of  $60^\circ$ , and that the vertex or presenting part passes downwards

\* Fig. 4 shows the great amount of lateral obliquity (*quâ* the horizon) of the head advancing in the axis of the brim, the centre of the sagittal suture being, although much nearer the *sacrum*, exactly midway between the promontory of that bone and the symphysis pubis. It shows also how, during the whole of this stage of labour, the right tuber parietale may be described, in general terms, as the part which first meets the finger, or as lowest in the pelvis, advancing as it does in the direction of the dotted line parallel to the axis of the brim. If the head were in the transverse position, the sinking of the tuber parietale would be still more decided, but in that case it would be slightly to the left of the middle line.

A B The plane of the brim meeting the horizon at an angle of  $60^\circ$  at A.

C D The axis of the brim passing through the centre of the sagittal suture, and the second bone of the coccyx, and meeting the horizon at D at an angle of  $30^\circ$ .

and backwards so obliquely as to meet the horizon at an angle of 30°. Even admitting that the right parietal bone in the vicinity of its tuber is the lowest part in the pelvis, I cannot see how this is to be accepted as evidence of anything else than that the head is advancing directly in the axis of the brim, but very obliquely with regard to the cavity, and still more so with reference to the horizon, as is shown in the accompanying diagram.

If to this great and admitted obliquity we superadd that which, according to Naegele, separates the sagittal suture from the axis of the brim, so as to bring the middle part of the suture opposite the fourth division of the sacrum; "whether," says the younger Naegele, "the head stands deeper or shallower," we must first believe that the trachelo-bregmatic measurement is as nearly as possible parallel to the horizon.

The first difficulty which shook my conviction in the accuracy of Naegele's statement was here encountered. Granting for the moment that his description is correct, let any one take a foetal skull and place it in the dried pelvis in such a position that the vertex is approaching its floor, with the sagittal suture directed as above described, when he will find—and there is, I think, no avoiding this conclusion—that the ear could in all circumstances be felt with the greatest ease; and yet we all know that it is almost always a matter of considerable difficulty to reach the ear at this stage, even more so indeed than when the head is situated higher. This difficulty has not by any means been overlooked by Naegele; but having adopted one fundamental error, he makes this the standard by which he gauges deviation from his theory, and thus is inevitably led further astray. He explains it thus—"The higher the head is, the more oblique is its direction, for which reason the ear can generally be felt behind the pubes without difficulty, *which would not be the case if the head had a straight direction.*"

I admit that on the first blush this argument has a significance, which it does not, however, maintain on closer examination. In the first place, he commits himself to the opinion that this alleged obliquity has no reference to the resistance which the head experiences from the pelvis, inasmuch as it is greater before this resistance can have come into play. He then goes on to assume that the fact of the ear being felt behind the pubes at an early stage of labour, is a proof of this obliquity. With reference to this point, I would remark that he seems to me, throughout his whole essay, to put too much weight on the facility with which the ear may be felt at the beginning of labour. That it may in many cases be so felt is an undoubted fact; but as far as my experience goes, I have in the great majority of cases found it



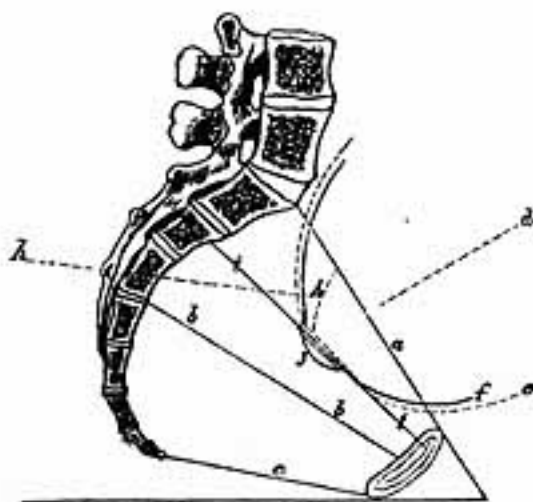
no such easy matter to reach the ear in any stage of labour as Naegele would have us believe. When I can so reach it, it only proves to me, what Naegele himself admits, that the head approaches the transverse diameter more than usual. For it must be remembered that the upper part of the pubic symphysis is that which is nearest to the outlet, and that, on account of the inclination of the brim, when the ear moves to the side it moves at the same time *upwards* along the ileo-pectineal line, and consequently further from the finger. This then is a mere assertion of Naegele's; his proofs are in no degree incompatible with the idea of a direct entrance of the head. I am quite willing to admit that in some extreme cases in which the ear is felt with unusual ease, as well as on other rare occasions, there may be some exceptional obliquity; but I am perfectly convinced that this is the exception, and the direct entrance the general rule. But there are other arguments familiar to every obstetrician which must be met and, if possible, refuted.

"The sagittal suture," says Naegele, "divides the os uteri, which projects backwards and generally somewhat to the left, across into two very unequal segments." Mark how ingeniously he argues from a preconceived opinion, and trims his facts to suit his theory. We may allow the alleged inequality of the segments in the meantime to pass; but as this is quite insufficient to account for the amount of obliquity which he describes, he maintains that the os is displaced in the very directions which suit his argument—viz., backwards and to the left. For it will be observed, on a reference to fig. 2, p. 288, that the effect of a slight displacement to the left is, in the direct position at the brim, to throw the small segment forwards, and it will be understood at a glance that the further effect of a displacement backwards would be to leave the sagittal suture concealed by the anterior lip of the os; whereas, by bending the head towards the left shoulder, his theory restores the relative positions of os and suture. This is the flimsiest of all his arguments, inasmuch as it is purely theoretical, and depends entirely for its accuracy on the correctness of his original statement in regard to the obliquity. The difficulties in determining the relations of the os during labour are very great; but taking, as I do, the fact of the sagittal suture crossing the os at the beginning of labour as evidence of the direct entrance of the head, I see no reason to doubt that the centre of the os corresponds pretty nearly to the axis of the brim. I even doubt the general accuracy of the assertion that the smaller segment is behind, and I have certainly, at an early stage of labour, found it to vary considerably in this respect. Dr. Paterson, who, although admitting this fact, is nevertheless convinced that the head enters the brim directly, attempts to account for it by sup-

posing that the os is displaced forwards;\* but I rather think that he has no more proof to offer of this statement than Naegele had of his, or than I might have if I chose to assert that the os was always displaced to the right merely because this would suit my purpose. I wish as much as possible to exclude all mere theories which will not admit of proof.

The statement which accompanies the above, to the effect that the sagittal suture is much nearer the promontory of the sacrum than the pubes, is equally erroneous. But, with reference to this, a certain misapprehension is apt to occur, if we use, instead of the words of Naegele, the expression, "nearer the sacrum," which some modern writers employ. For, as a natural consequence of the head advancing in the axis of the brim, the suture is beyond all doubt nearer *the sacrum*; but it is as certainly no nearer *to the promontory of the sacrum*. I think there is no one who has a correct idea of the relation which the pelvis bears to the vertebral column, and who will introduce

\* Dr. Paterson illustrates his position by the accompanying diagram:—



- a Angle of brim-plane, 60°
- b Angle of mid-plane, about 30°.
- c Angle of outlet-plane, about 10°.
- d Axis of brim.
- e Dotted line, outline of uterus-section.
- f Outline of cranium.
- j Caput succedaneum.
- h Position of sagittal suture.
- i i Line showing angle of plane of opening os uteri.



his whole hand with a view to determine the position of the head at the brim, who will fail to arrive at the same conclusion as that which I have attained. For my part, I have left no means untried by which this might be tested. On introducing an instrument which is well known to surgeons as Professor Buchanan's rectangular staff for lithotomy, I have been able to place the angle on the second bone of the coccyx, inclining the short limb until it coincided, as nearly as I could guess, with the axis of the brim, when it never failed to guide me, if properly placed, to the sagittal suture, or some point very near it, on either side. I have even attempted a crucial experiment by measuring, by means of a flexible scale, the distance from the sagittal suture to the promontory of the sacrum on the one hand, and the pubes on the other; and although, for obvious reasons, the results were not so accurate as to warrant of themselves any definite conclusion, they certainly tended to confirm my belief.

But the greatest difficulty of all, and the fact which, more than anything else, seems to confirm Naegele's theory, is the situation in which the tumour called the caput succedaneum forms, in those cases in which the waters have escaped, and the head is exposed at an early period of labour to the pressure of a rigid and undilatable os. On this point I have to acknowledge my obligation to Dr. Matthews Duncan, whose researches on the evidence afforded by the situation of the swelling, as described by Naegele, has all but solved my only remaining doubt on the subject. Every accoucheur has had frequent opportunities of confirming the accuracy of the following statement of Naegele's, and which apparently affords striking corroborative proof of the accuracy of his assertions:—

"In certain circumstances a swelling of the cranial integuments forms after the os has begun to dilate, which, in the further progress of labour, when the os changes its situation and direction, and the head its position against it, disappears again by degrees; nevertheless, as dilation proceeds, it may still be felt for some time, although much softer. This swelling (in that position of the head which we are talking of) is situated upon the right parietal bone, close to its upper edge, and equidistant from both angles. Sometimes a small piece extends over the suture to the parietal bone; its circumference depends upon the degree of dilatation which the os uteri had attained."

Now this situation of the swelling may indicate one of three things:—The os may either be inclined forwards, or it may be subjected to greater pressure at certain points of its circumference, or, again, the head may be placed obliquely. Of these, with the proof which I elsewhere have of the direct entrance of the head, I consider the last as the most improbable of the three. It must always be remembered that, to account for the degree of obliquity described by Naegele, we must adopt in addition his theory that

the os is displaced backwards and to the left; but nevertheless we must endeavour to account for the fact that the bulk of the swelling at least is to be found at the right parietal bone. I have already alluded to the theory advanced by Dr. Paterson, that the os is inclined forwards, which would, if correct, afford a most satisfactory explanation of the phenomena as detailed above. Proof of its accuracy is, however, wanting, and indeed the difficulties which an examination offers are such that we cannot hope for a strict demonstration of the fact, even if true, unless we were to argue from the assumed fact that the entrance of the head was direct, and thus adopt the very error in reasoning which has led Naegele astray.

The theory by which Dr. Matthews Duncan attempts to account for this, demands a separate consideration. This able writer is of opinion, that it is a mistake to suppose that the thickest or most prominent part of the swelling corresponds to the centre of the area upon which it has been formed, but that this is to be found in the direction in which the least resistance is offered to its formation. Applying this argument to the formation of the swelling in this stage, he says:—

"The caput succedaneum of the first stage of labour is often formed after the head has passed the brim of the pelvis, and is lodged in the upper half of the cavity of the bony pelvis. Were we to be cautious and exact in reasoning, all such swellings should be excluded from the argument, for evident reasons. It is only those formed at the plane of the brim, or very near it, that can, under any circumstances, afford assistance in settling this question: under the actual deficiencies of exact data, we must be content with stating principles. Now, it is evident that the direction of the caput succedaneum of the first stage will be that of least resistance—that is, the direction of the axis of the undilated vagina; in other words, the caput will be thickest when the head is least supported, and may, in other parts within the centre of the os uteri, be so inconsiderable as not to attract notice. Further, and for the same reason, the centre of the caput succedaneum, or the centre of the os uteri, will not correspond with the thickest portion of the swelling, but in this case be behind it, or near the left parietal bone. The oblique direction downwards and forwards of the vagina will lead the caput in that direction, and the support given by the posterior wall of the vagina to the posterior half of the space inclosed in the circle of the os uteri will cause thickness of the swelling over the right, and comparative thinness over the left parietal bone, and displacement of the thickest portion of it forward in the pelvis, that is, in the direction of the right parietal and away from the left parietal bone."

This explanation is extremely ingenious, and affords to me the only explanation of the facts described by Naegele, which gives a rational and satisfactory solution of the problem, in conformity with the phenomena which I myself have observed. For its absolute accuracy I cannot vouch; but I cannot help thinking that it is in the main correct, or at least that it points out the direction in which we are to search for truth.



My last argument is one which, while of itself it goes for nothing, is at least admissible as corroborative proof, and is drawn from a consideration of the *cui bono*? No such argument would for a moment stand against a single observed fact, and we have too many instances of this in the history of the subject to permit us to tread otherwise than warily on such dangerous ground. But after all we may surely ask what is the use of this alleged obliquity? It is not only said to take place before the head is actually engaged in the brim, but, according to Naegele, is more marked then, and cannot therefore be due to any resistance from the hard parts of the pelvis. But even if it did not occur till the head experienced the resistance of the brim itself, it is inconceivable what mechanical advantage would result therefrom, as there is ample room and to spare in any well formed pelvis for the bi-parietal measurement of a full sized foetal cranium. In the case of the long diameter of the head, we are able, without any difficulty, to assign a cause for the obliquity which causes the occiput to pass in advance of the forehead, but in this case I cannot conceive a single theory which will bear examination for a moment. I can perfectly imagine how it may exceptionally occur, being rendered necessary by a deformed pelvis, a distended rectum, or some other cause, but I am perfectly convinced that the rule in the vast majority of cases is, that the head enters the brim *directly*, in—or nearly in—the axis of the pelvic brim.

III. *Occipito-frontal obliquity*.—The third kind of obliquity described by obstetricians is that by which the occipito-frontal diameter of the head is accommodated to the corresponding oblique diameter of the brim and cavity. It may be described most simply as a flexion of the head; this at least is what almost invariably takes place, to an extent which varies according to the relative proportions of the head and pelvis. In certain cases of contraction of the brim this obliquity becomes more pronounced, and may then cause the posterior fontanelle or even the upper part of the occipital bone to be the presenting part. In cases again where the space is ample, the occiput may advance very slightly in advance of the forehead, or the occipito-frontal plane may even pass down parallel in all respects with the plane of the brim.

The cause of this obliquity has never been better explained than by Solayrés. To understand this it is only necessary to remember, that the force is communicated to the head from the uterus and other expulsive muscles through the vertebral column of the child; and again, that this is articulated much nearer the posterior than the anterior part of the base of the cranium. Consequently, if the resistance which the pelvis offers to the advance of the cranium be equal at both ends of the ovoid, it is certain that, unless other forces come into play, the posterior end or occi-

put must precede the other. At the same time, by means of this movement the chin becomes firmly pressed against the chest, and the mobility of the head being thus checked, the expulsive force is applied at a greater mechanical advantage.

When the head has passed the brim and is fully engaged in the cavity of the pelvis, it soon begins to experience a resistance from the gradual approximation of the internal surfaces of the ischial planes. At this period the head may fairly be considered with reference to the cavity, and in this respect the lateral obliquity is very well marked. This, however, simply arises from the fact that the head still maintains in the cavity that obliquity which is the inevitable sequence of its advance in the axis of the brim. As the forehead of the child has, in its course along the back part of the cavity, to traverse an arc of a circle very much greater than that which corresponds to the posterior surface of the pubes, we would anticipate what actually does take place, viz., that the chin now leaves the breast, and that the anterior end of the ovoid descends considerably in advance of the other, as regards the plane of the brim, this relation being again reversed at a more advanced stage, as we shall see in the sequel. This successive change in the obliquity of the long diameter is well expressed by Dr. Murphy, when he says that it may in the course of labour be described as "ocillating on its transverse measurement." At this stage the long diameter of the head still occupies the right oblique diameter.

We now approach a period in the progress of labour which is to us of extreme interest in a mechanical point of view—that, namely, during which the forehead is turned into or towards the hollow of the sacrum, so as to bring the whole cranium of the child into relations which differ widely from the above, and which must now be considered with reference no longer to the entrance, but to the outlet of the pelvis. Some notice is here necessary of the causes which bring about this change, and especially of certain anatomical structures which contribute more especially to the result.

Of these the most important, inasmuch as they are the fixed points of resistance which determine the direction of motion, are the ischial planes and spines. These bones, by gradually converging as they descend, encroach greatly on the transverse measurement of the floor of the cavities, and thus force the head to assume a different position with reference to the bony canal. Dr. Tyler Smith, whose description of the mechanism is one of the clearest and simplest I am acquainted with, says most truly that "the key to the pelvic mechanism, in an obstetric sense, may be said to be the spinous processes of the ischia." It is by the pinching together of these parts that what was, higher in the



pelvis, a diameter sufficiently spacious to receive the long diameter of the head, becomes so contracted as to forbid its further progress in this position. Both for this reason, and on account of the new direction in which it has to advance, it is obvious that the long diameter of the head must move out of this contracted transverse diameter, which has now become the smallest. The evident and admirable manner in which the various parts are constructed with a view to the attainment of this end, cannot fail to command the attention both of the physiologist and the accoucheur.

On account of the somewhat abrupt projection inwards of the ischial spines, the advantage, mechanically, of the oblique position of the head now becomes sufficiently evident. In comparing the mechanism of this stage with the principle of the screw, Naegele makes use of an illustration which gives the student a more simple and accurate idea of the subject than could be imparted by an elaborate dissertation; and those treatises are undoubtedly the best where, as in Dr. Tyler Smith's manual, this principle is fully recognized and its important bearing pointed out. The result of this, on the left side, is to cause the occiput to glide downwards and forwards, it being guided towards the outlet of the pelvis by the plane of the ischium, and prevented from moving in the contrary direction by the left ischial spine. On the right side, again, the forehead is prevented by the rigid ischial spine from moving forwards, while the yielding of the sacro-sciatic ligaments determines the motions backwards, corresponding to the movement of the occiput in the front part of the pelvis. This is the simplest view which can be taken of the mechanism of this stage, and of the causes to which it is due.

Much importance is attached by some writers to the inclined planes of the ischia as determining causes of this screw-like motion. It is evident that the inclined plane formed by the internal surface of the ischium is the main cause of the ordinary course which the occiput follows in its descent, and to this result the inner surface of the descending pubic ramus contributes; but I cannot see how the posterior ischial plane, as it is called, can to any great extent aid in determining the direction which is assumed by the forehead. In the dried bones there is usually to be found an irregular and faintly-marked line, which runs from the pectineal eminence to the spine of the ischium. This is described by some obstetricians as dividing the internal surface of the ischium into two planes, which are obliquely inclined in opposite directions, and of which the anterior causes the occiput to move forwards, and the posterior of the opposite side determines the motion backwards of the forehead. There can be no doubt, however, if we examine the pelvis with the soft parts still

adhering, that the function of the posterior plane is exaggerated, that it certainly plays a part very far inferior to the anterior plane, and, indeed, I am inclined to think, contributes very little to the result, while any prominent notice of it tends to complicate the subject. The so-called anterior plane, along with the ischio-pubic ramus, and the soft structures, muscular and membranous, which cover the obturator foramen, form a large surface which is bevelled off in front, and is in every respect admirably adapted to the end in view. But as regards the motion backwards of the forehead, it is the unyielding margin of the notch and the rigid spine which, by resisting the advance of the head in that direction, immediately guides the forehead to the sacro-sciatic ligament, and this, yielding so far to the pressure, leads the forehead downwards and backwards towards the sacrum. The mechanism here is widely different from that by which the occiput is conducted along the spacious and unyielding plane.

Until Naegele described the mechanism of parturition, it was assumed that the forehead turned directly backwards into the hollow of the sacrum, and that from this period until the head made its final exit from the pelvis and soft parts of the mother, a line drawn from above downwards through the centre of the sacrum would divide the child's head into lateral and symmetrical halves. This at least was the general opinion, and is asserted by Dr. West even at the present day, but some observers had already observed that this was not the case. Johnson, for example, says, that "from this apex (the posterior fontanelle) the sagittal suture may be found to run obliquely backwards to one side of the perineum." But it is undoubtedly to Naegele that we are indebted for a correct view of the mechanism of this stage of labour. It was he who first showed clearly, that at no period during the course of labour did the long measurement of the head occupy the conjugate diameter of any part of the pelvis, but retained during the whole course of labour a direction which is more or less oblique according to the stage of labour.

When the head reaches the floor of the pelvis, and gradually performs this movement of rotation, it still retains the lateral obliquity which it received by reason of the inclination of the brim; so that viewed with reference to the cavity, and no longer in relation to the brim, there is a well-marked lateral obliquity. The screwing motion which the head now undergoes is by no means rapidly effected. On the contrary it generally takes place very gradually, so that in many cases we can feel a certain amount of rotation occurring during every pain, the head passing downwards and forwards during the pain, and upwards and backwards during the interval. This may frequently be observed to occur many times in succession.



Having now fully entered upon its movement of rotation, the head becomes exposed to a set of forces quite distinct from those which have up to this time been the sole cause of its movements. The tissues which form the floor of the pelvis, although they yield to some extent before the advance of the head, constitute by their resiliency an opposing force, which, while it effectually bars the further advance of the head in this direction, determines a motion which is the resultant of this and the force from above, and being intermediate in its direction between these, is consequently downwards and forwards. Solayrés called the former a *reflected* force, and describes the mechanism in terms already quoted—"Hujus motûs rationem haud immerito contuleris cum eâ, quæ nucleus prementes digitos fugit."

But before the head can escape from the soft parts it has to complete its rotation, and descend until the span of the pubic arch can admit of the escape of the occiput. In order to admit of this, the coccyx yields before the advancing head, and thus admits to some extent of the descent of the frontal end of the ovoid; but this motion being necessarily limited, the resistance of the unyielding apex of the sacrum is soon experienced. The part of the head which at this period is in relation with the apex of the sacrum is the superior part of the right division of the frontal bone, while the coccyx is extended over the contiguous surface of the parietal bone, close to the fontanelle; and this being pressed against the sacrum, the latter acts as a fulcrum on which the long diameter of the head moves as a lever, its posterior extremity being driven downwards, so as to enable it to pass under the pubic arch. The tumour in the perineum now forms at each pain, and becomes gradually more and more developed, and at the same time the presenting portion of the head makes its appearance between the vulva. On account of the rotation which has taken place, it is no longer the neighbourhood of the right parietal protuberance which the examining finger first meets, but the upper and posterior quarter of the same bone, not far from the posterior fontanelle. Naegle's description of the mechanism of this stage of labour leaves little to be desired, and there can be no doubt that it is a very rare thing for the rotation to be complete into the hollow of the sacrum. This indeed can only occur when the outlet is unusually large, and the soft parts at the floor of the pelvis unduly lax and dilatable.

The position which the head occupies in escaping beneath the arch from the soft parts is frequently described in an incomplete and unsatisfactory manner, and some confusion appears to exist in the minds of those who have been most occupied with a consideration of the subject. Dr. West considers, as we have seen, that the head is born in the conjugate diameter, and thus

shares the opinion of most of those who wrote before Naegele. Dr. Matthews Duncan, again, says "that obliquity, or lateral obliquity, of the fetal head when passing through the outlet of the pelvis, *not described by Naegele and his followers*, does occur in natural parturition."

It is a matter of no great difficulty to convince oneself of the error of Dr. West's view in this respect, and the general accuracy of the description given by Naegele; but it is by no means so easy to determine exactly what is the nature of the obliquity which we observe at the brim. As regards the statement made by Dr. Duncan, and quoted above, I conclude that he is right in saying that there is a lateral obliquity of the head in passing the outlet of the pelvis, but that his statement otherwise is wrong. He is, I am convinced, mistaken when he says that Naegele did not describe this obliquity, and still more so when he extends the assertion to his followers; and he is consequently mistaken in assuming that the view which he takes is an original one. In describing the mechanism of labour in the last stage of the first cranial position, Naegele is unfortunately a little vague in his details—a fault, indeed, which is scarcely to be found elsewhere in his admirable essay; but to me it is clear, from his description, that he recognizes the obliquity, although he omits to mention it as such. He certainly talks of lateral obliquity with reference only to the brim (*Beckeneingang*); but I cannot conceive that his description of the advance of the head through the os externum can admit of any other interpretation than that this was his view, and that he recognized not only the phenomena, but the rationale of the process. Thus, in describing the circumference which the head offers to the os externum in its passage, he describes this as "a circumference which does not coincide with its transverse diameter (*viz.* from one parietal protuberance to the other), but a circumference which intersects the small and great diameter of the head at an acute angle." This surely cannot imply anything else than an admission that the head emerges with a certain amount of lateral obliquity as regards the os externum.

But I am confirmed in the interpretation which I put upon Naegele's words, not only by the description which is given by his son—in which his father's views are accurately reflected, and in some instances more clearly expressed—but by the form of expression used by Naegele himself in reference to some of the other positions. He says, for example, "that the right tuber parietale will be distinctly felt clearing the labia some time before the left;" and again, in alluding to the mechanism in third cases which end as such, he says "the upper and anterior quarter of the left parietal bone is the part of the head which continues lowest during its whole passage through the pelvic cavity, as



also through the vagina and external opening." As for the followers of Naegele, many of them express it still more distinctly. Dr. Tyler Smith, for example, writes thus:—

"When the right tuber parietale has passed through the ostium vaginae, the circle of the outlet intersects the head between the two tuberosities in a diagonal direction. The same occurs with respect to the left tuber parietale in the second position, and in the occipito-anterior termination of the third position. So, also, in occipito-posterior deliveries, the two tuberosities do not pass through at the same time. In the fourth position it is the right, and in the third the left tuber which first escapes. Thus the bi-parietal diameter of the head always passes through the pelvis and soft parts in an oblique direction, so that the largest lateral diameter never engages the opposite sides of the canal at the same time."

Few authors, however, express themselves in such clear and explicit terms with reference to the exit of the head, and many describe—or, I should rather say, seem to describe—only that obliquity by means of which the head still maintains, in some measure, the relation which it bears to the right oblique diameter. In point of fact, however, we may with perfect propriety describe here, as Naegele and his followers do at the brim, three kinds of obliquity. The first is that by means of which the occiput is forced in advance of the forehead, the latter being arrested at the inferior part of the sacrum; the second causes the long diameter of the head to occupy a position intermediate between the oblique and conjugate measurements of the pelvic cavity and outlet; and the third is that which we have just considered, which causes the right parietal protuberance, in the position which we are considering, to precede the left in passing the plane of the outlet. It is a much easier matter to investigate the position of the head at the outlet than to determine its relation at the brim, as we can in the former case refer the position to real determinate diameters, and not to mere imaginary lines in which we have at best nothing approaching to mathematical accuracy. The manner in which I have studied the position of the head at the brim is sufficiently simple, and at the same time almost free from the possibility of error, if conducted with sufficient care. If one end of a cord be held by an assistant in close relation with the tip of the coccyx, and the other carried forward along the middle line of the vulva to the centre of the symphysis pubis, this line must indicate with sufficient accuracy the conjugate diameter of the outlet, or in fact that diameter whose relation to the head chiefly enables us to determine the position of the latter.

I must premise, with reference to the position of the head which I have observed in this manner, and which I am about to describe, that it must be considered merely as the ordinary position of the head in a labour of the first kind, the relative proportions of the maternal parts and of the head being normal. Putting aside all

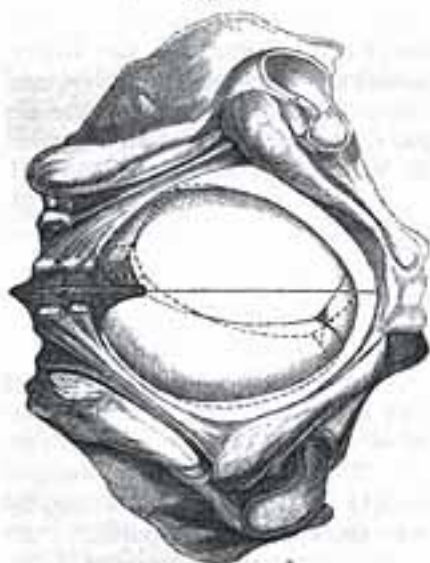
deformities at the outlet, the circumstances in which—other things being equal—we find these various obliquities most strongly marked, are presented in the case of a woman who is above thirty-five years of age, and in labour for the first time; and here also, by reason of the slowness with which the concluding stage of labour is effected, we can best examine the whole phenomena, including the formation of the caput succedaneum. On the contrary, in multiparæ the ligamentous and soft parts are often so relaxed that the head passes through almost—and, I believe, in some cases altogether—directly, without availing itself of any of the obliquities, except that first described. What may be called the normal process is intermediate between the two. When the caput succedaneum, or presenting portion of the head, first appears between the vulva, and comes to press on the cord steadily held in the position above described, a line may be drawn, by means of a camel-hair pencil and a little ink, using the cord as a guide, and carrying it as far over the presenting parts as may be possible during the height of a pain. This line being produced in both directions after birth, indicates that portion of the head which answers to the conjugate diameter at the time when the head first makes its appearance between the vulva, and is represented by a line drawn from about the middle of the right limb of the lambdoidal suture, over the vault of the cranium, to the most projecting part of the left division of the frontal bone, or a point slightly external to this. This line crosses the sagittal and coronal sutures, the former at a point much nearer the anterior than the posterior fontanelle. At this period the right parietal protuberance may be felt behind the tuberosity of the right ischium, while the corresponding point on the left parietal bone may be felt considerably higher, near the inferior margin of the sacro-sciatic ligament, and on a level with the tip of the coccyx.

The only passage in Nægele's description which appears to me inaccurate, and which seems to give a colour to Dr. Matthews Duncan's statement that he ignores the lateral obliquity of the head, is where he says that the sagittal suture "takes the direction of a line drawn from the left descending ramus of the pubis to the right ascending ramus of the ischium." Such a statement is, to say the least of it, a very loose one, and is not only quite incompatible with the idea of a lateral obliquity, in which the right parietal bone precedes the left, but would absolutely require the left parietal bone to be lower than the right, in order to bring the sagittal suture forwards and to the left, into the position described by Nægele. The direction of the sagittal suture I have found to be at this time from the left descending ramus of the pubes to the right sacro-sciatic ligament, somewhat nearer its sacral than its ischiatic extremity.



As the head descends, the rotation is effected to a still greater extent, and at the same time the occipital end of the ovoid is pushed still further in advance. The characteristic tumour in the perineum, so well described and figured by Smellie, is formed by the parietal bones, but chiefly by the right one, and now becomes more prominent. The posterior margin of the vulva becomes thinner, and the anterior wall of the rectum pulled forward in the manner so familiar to all. The occiput comes more prominently forward, and now contributes with the superior and posterior part of the right parietal bone to form the presentation, until the occiput escapes, often with much suddenness, from under the pelvic arch. If, at this moment, the position of the head be tested in the manner detailed above, the cord being kept in contact with the head until it is born, the line will be found to pass from a point in the lambdoidal suture, about an inch to the right of the posterior fontanelle, to the centre of the left orbit. In its course it

Fig. 5.\*



crosses the sagittal suture close to the anterior fontanelle, or more frequently—on account of the lateral obliquity of the head—it does not come in contact with the sagittal suture at all, but passes obliquely through the greater fontanelle, especially when this is of more than ordinary size. In making its final exit from

\* This figure shows the true position described above, looking from below. The dotted lines show the earlier position of the two. I have borrowed this method of representation from below from Dr. Tyler Smith's Manual.

the soft parts, unless this takes place with too great rapidity, it may generally be observed that the right parietal bone first escapes, and that the centre of the posterior margin of the vulva is not in relation with the sagittal suture and central line of the face, but with a continuation of the line just described over the left malar bone.

It will be observed that the general result of my conclusions on this point tends to confirm the opinion first enunciated by Naegele, and so admirably described by him. I trust, however, that I do not arrogate too much to myself in hoping that my observations may tend to render the subject more clear, taken as they are from a point of view somewhat different, and may be of some use in confirming views which have of late been called in question.

After the head has passed the external parts, the face sweeping over the perineum, it rotates towards the inner surface of the right thigh of the mother, this movement being induced by an alteration in the position of the shoulders, which descend in the left oblique diameter. These rotate, however, in the contrary direction to the head, and the position now taken by the latter may be assumed as confirming our diagnosis of the position while in the cavity. This, however, is by no means invariable, and numerous cases are on record where the rotation continues in the same direction, the left shoulder coming first. Sometimes, as Naegele admits, and as most accoucheurs have seen, the shoulders pass in the transverse diameter of the outlet; and Schmitt even describes a case where "the face of the born head turned itself first to the one and then to the other side of the thigh of the mother, as if to ask of nature in what direction the descent of the shoulders could best take place." Care should be taken not to place too much reliance on this phenomenon in determining the original position of the head in the pelvic cavity.

During this last stage of labour, and especially when the head is in the act of passing the external parts, the perineum and soft parts of the mother are stretched to such an extent that rupture in every case seems imminent. The duration of this period of labour depends, as we know, on a variety of causes, and of these one of the most important in a mechanical sense is rigidity of the parts, which protracts labour by the absence of due dilatability. In all times this has been recognized as an impediment to labour, and the efforts of the obstetricians of every age have been turned in this direction. In early times, however, it was simply a question of shortening labour and encouraging dilatation, although we may assume that the ancients and their followers deemed this treatment by means of emollients and lubricants as that which was most likely to avert a laceration of the parts. It is



a significant fact, however, that in no instance do we find them attaching an undue importance to laceration of the perineum, and indeed, in most cases, they avoid all mention of it whatever.

In these days, however, the great bugbear of natural labour seems to be a laceration of the perineum, and a method has been devised for avoiding this, which we are directed to employ in every case, and which has received the sanction and approval of almost all the most eminent obstetrical teachers of modern times. This "support of the perineum" has such an obvious practical bearing on the mechanism of parturition, that I shall not hesitate to consider the matter in all its bearings, particularly as it is a subject to which I have for several years paid much attention. I have elsewhere\* entered at length upon the history of the practice, so that I shall merely recapitulate shortly the more important points, as these are of some importance in a general consideration of the whole subject; and I may add that I shall have some errors to correct, and explanations to give, as the result of experience or reading subsequent to the date of my former paper.

The means adopted by the ancients in their attempts to facilitate the last stage of the birth of the child may be very briefly dismissed, seeing that there is but little variety in the object with which external or internal remedies were prescribed, although there is an amusing diversity in the nature of the medicaments. Baths prepared with emollient herbs, the oil of violets, or the oil of roses, were perhaps the favourite external applications, and were perhaps somewhat more useful than the infusion of swallows' nests which was prescribed internally. Lubricants and emollients, indeed, varied with the addition of such substances as dragons' blood, oil of St. John's-wort, and yolk of egg, are the only means which seem to have been adopted in the treatment of this stage of labour for the first three centuries after the revival of midwifery. Not, indeed, till towards the middle of last century, do we find the subject noticed generally by writers on midwifery, and other methods suggested for its prevention. A very short sketch of the various means proposed will suffice to show how the practice of the present day became gradually developed.

I rather think that the idea of support of the perineum first occurred to Giffard who, in detailing one of his cases where he had applied the forceps, says:—

"But as there was danger of tearing the perineum should I have proceeded further in that manner, I therefore withdrew my instrument, and afterwards clapped my hand flat to her back near the anus, and whenever the pain seized her I pressed my hand against that, and by pressing and drawing it downwards at the same time, I forced the crown more forwards and lower into the passage."

\* Glasgow Medical Journal, January, 1860.

After this time (1734) we find some notice of the subject in most works on midwifery, but the means recommended vary considerably. Pugh says—"You must use plenty of pomatum, lubricating the parts well, stretching lengthways when the pains are off and circularly when the pains are on, taking all possible care not to rend the perineum." Puzos gives formulæ for the various emollients and lubricants which he has used, but states as the result of long practice and matured experience, that the indiscriminate use even of these is injudicious, and sometimes hurtful.

Ould conceived that a great mechanical advantage was attained in a proper treatment of the coccyx, and recommends, in preference to Deventer's plan, that the thumb should be pushed into the anus, and the finger pressed against the sacrum, in order that we may have counter-pressure in pushing back the coccyx. Smellie was the first in this country to recommend the dilatation of the external orifice by the introduction of the fingers in the form of a cone, and many subsequent writers have been induced by his high authority as an obstetrician to adopt a similar mode of procedure. This method, however, has now fallen into disuse, and is seldom or never employed. Another recommendation of Smellie's, which is also hinted at by Ould, is to press the head forwards beneath the pubic arch by introducing the fingers into the rectum—which mode of treatment, by the way, has been quite recently resuscitated and introduced as a novelty. Roederer recommends the following plan in his code of practical directions to midwives:—

"She will place on the sides of the vaginal orifice the index and middle fingers of each hand. At each recurrence of a pain, she will press with the fingers, thus placed, the perineum towards the sacrum, and will cause the head to descend, which, finding no further obstacle, will emerge without injury to the perineum."

Puzos and Deleurye consider that interference is uncalled for. Speaking of natural labour, the latter says:—"This kind of labour requires no assistance, the presence of the practitioner being necessary only to watch over accidents which might occur, to open the membranes which enclose the water," &c.

Solayrés, as is evident from his essay, devoted some thought and attention to the subject, and only sanctions the practice in a very cautious and qualified manner. He writes as follows:—"Tunc unâ vel alterâ manu perineo adaptatâ, obstat, ne promptior sit capitis detrusio, dum conatur illud ducere a commissurâ posteriori ad anteriorem." He only directs us, however, to do this when the pain is violent, and when there is danger of the head being born too rapidly, but he adds:—"Si remissi et moderati dolores sunt, sensim et sine sensu dilatantur (i.e.



*partes molles*), et absque laceratione e vulvâ sese extricat caput infantuli." Dr. Denman seems in like manner to have treated the matter in this cautious way, and only employed mechanical support in first cases.

So far as I can learn, Professor Hamilton of Edinburgh was the first to teach that this should form a part of the duty of the obstetrician, in every case, natural or unnatural; and as his description is in all essential particulars that taught in every school, and practised with more or less rigour by the great majority of the profession, I shall quote it here at length:—

"From the time that the head begins to bear upon the soft parts at the bottom of the pelvis, a little butter or pomatum may be further rubbed on the perineum and labia, and occasionally repeated as the dryness of the parts requires. When the perineum begins to swell, it must be firmly supported by the palm of the hand to press against it in the time of a pain. For this purpose the hand should be applied in such a manner as not only to give a suitable support to the perineum, but, as the head advances, to regulate its progress by pressing the perineum as it were backwards in a direction towards the coccyx. In a first labour when the pains are strong and forcing, and the parts moist and slippery, the hand alone is often insufficient to prevent the hazard of laceration; a cloth, smoothly folded like a thick compress, and large enough to cover the whole perineum and fundament, should therefore be employed. By this means the miserable consequences will be prevented, to which the neglect of the perineum may expose the woman. For by this support the overstretching of the perineum will be lessened, the sensibility of the parts diminished, the passage gradually opened, and the head of the child will advance through the vagina in a safe, slow, and gentle manner." . . . . . "When the head is completely protruded through the external orifice, the perineum must be released by cautiously sliding it back over the face and chin of the child; and this ought to be further insured by passing a finger below the chin, and passing it slowly round and round."

I have said that this is in all essential particulars the doctrine of the present day, although it is certain that the lubrication and pressing back of the perineum are now fallen into disuse. With some eminent exceptions, all the leading practitioners since the beginning of the present century adopted it. Baudelocque, Capuron, Burns, and Dewees, give an unhesitating adherence to the views detailed above, and Osborne goes so far as to say that "by proper management of the second stage of labour, perineal laceration may invariably be prevented." Naegele, however, whose opinion on this subject is specially entitled to respect, expressed his disapproval of the practice, and says that "under ordinary circumstances any support of the perineum is unnecessary."

At the present day, writers on midwifery are all but unanimous in recommending that the perineum be supported in every case. Indeed, with the single exception of Dr. Tyler Smith, I am not aware of any systematic English writer who does not, to a greater or less extent, give his adherence to the views of Hamilton. It

is surely reasonable to expect that, where such unanimity exists with regard to practice, there should be something analogous in the reasons assigned for it. We find however, in reality, that so far from writers agreeing on this point, scarcely any two of them give exactly the same reason. Dr. Graily Hewitt, who in his able essay on this subject enters very fully into the matter, places the statements of various writers in apposition, with the result of showing that they differ among themselves to such an extent as almost to reduce the whole question *ad absurdum*. Some say that the progress of the head should be opposed, others that it should not be resisted; some press the perineum forward, others backward; while the greater number try to combine with their idea of support pressure of such a kind as will tend to direct the head forwards under the arch.

Having long been convinced of the utter uselessness of a systematic support of the perineum, I am, moreover, strongly impressed with the idea, that the practice actually in some cases brings about the very evil which it is intended to prevent. No one, I presume, attempts to deny that there are certain cases where rupture will take place, do what we may to prevent it. I am sure at least that no writer at the present day endorses the opinion of Osborne as given above. Now, if there is any truth in the statement that support prevents laceration, it follows that I, who never support the perineum, must meet with laceration more frequently than those who do. So far, however, from this being the case, I am now pretty well convinced that the more assiduously the perineum is supported in natural labour the greater is its danger of rupture; and I am perfectly certain, that in my practice a severe laceration is quite as rare as it is in the hands of those of much greater experience and ability who support the perineum. I am glad, however, that the truth of my assertion does not rest solely on my own limited experience, but is amply confirmed by men of such undoubted talent and vast practical experience as Tyler Smith, Swayne of Bristol, and West of Alford. But even with such testimony in favour of my views, I am perfectly conscious that it is vain to hope that a practice of such respectability and standing could be much influenced merely by my assertion, unless I can support it with some reasoning having at least an appearance of plausibility. I shall therefore take note of the causes which are assumed to produce this accident in the concluding section of my essay.

(To be concluded.)



*On the Mechanism of Parturition.* By WILLIAM LEISHMAN, M.D., Fellow of the Faculty of Physicians and Surgeons of Glasgow, and of the Obstetrical Society of London; Physician to the Glasgow Royal Infirmary, and the University Lying-in-Hospital.

(Concluded from p. 309.)

1. Among the causes which lead to a rupture of the perineum, certain deformities of the pelvis of the mother come first to be considered; but, as we cannot enter upon a detailed consideration of these, it must suffice to mention their nature in general terms. Any deformity, in fact, which causes the head of the child to descend lower than usual before making its extension movement under the pubic arch, cannot fail to increase the danger of rupture. Such deformities, for instance, as an approximation of the tuberosities of the ischia, or an insufficient curvature of the sacrum, would tend to this result.

2. Deformity or mal-presentation on the part of the fœtus. This is scarcely less obvious as a cause, and with it we may rank those cases which end with the forehead toward the pubes.

3. Rigidity of the perineum and *ostium vaginae*. This is the cause against which all preventive treatment, of which I have given examples, was for so long directed, and there can be no doubt but that such a state of the parts would greatly increase the risk. Dr. Graily Hewitt treats this "rigidity" very lightly

as a cause of rupture, and probably he is right in considering that its importance has been greatly exaggerated. On this point he says:—

“The results of my own observation have led me to believe, that most of the so-called cases of ‘rigidity’ are cases in which the perineal structures are rigid, simply because they have not yet been put on the stretch. Cases of ‘rigidity,’ it will be recollected, are most common in primiparæ. In such cases, the expulsion of the head through the pelvis and vagina occupies a long time. A period arrives when the head is low down; the attendant imagines that the further descent is arrested by the perineum; and finding this dense, thick, and resisting, as the perineum naturally is, the case is forthwith called one of ‘rigid perineum,’ and means are in the next place devised for the purpose of overcoming the rigidity, and of preventing the anticipated laceration; the fact being that the period of liability to laceration has not even arrived.”

If Dr. Hewitt means here that there is no such thing as rigidity of the perineum, I cannot agree with him; but there can, I think, be no doubt that the term is very frequently misapplied. Under this head we may include cicatrices, as well as change of form in the perineum itself—a state of parts the occasional existence of which I cannot deny, as it has been noticed by able and accurate observers; but I rather think that it is a somewhat fanciful cause of rupture, and certainly no valid argument for systematic support.

4. Too great rapidity in the progress of labour. This may be the result of excessive violence in the uterine contractions, or may be caused simply by an unusual capacity of the pelvic canal, constituting the form described by continental writers as *æqualiter justo major*. I freely concede that, in a case such as this, the obvious treatment is so to manage the progress of the head as to admit of the gradual and safe dilatation of the perineum. But, even admitting that this can be best attained by a support of the perineum, does it follow that this is called for in every case? Am I to believe that nature, after making such admirable provision for the earlier stages of labour, bungles matters to such an extent at the end as to render the aid of the obstetrician in every case necessary to remedy a mechanical deficiency? Surely no one can answer this question without seriously re-considering the facts of the case. Could I only prevail upon those who support the perineum to observe the process of dilatation in nature in a few cases, resolutely keeping their hands in their pockets as far as the perineum is concerned, I am perfectly sure that the so-called support would no longer be the rule of every day practice.

5. The injudicious or unskilful use of instruments.

6. Persistence of the hymen. In those rare cases in which the hymen is persistent, any danger of rupture might probably be averted by a cautious section of this membrane; but if this



were not done, it is likely enough that the rent, which must of necessity take place before the head can be born, would extend backwards into the perineum, and even through it into the rectum. It is from an analogous cause that lacerations are more frequent in first than in subsequent labours. In the former, the fourchette is almost invariably ruptured, and the laceration thus begun is apt to extend, with a tithe of the force which would be necessary to tear it, did its edge remain intact—exactly as happens in paper, cloth, or any similar fabric.

7. The mechanical support of the perineum. It is probable that no one will attempt to deny that the causes hitherto cited actually induce rupture of the perineum; but, as regards the cause now mentioned, I cannot doubt that my assertion will be received with incredulity. I am inclined to think that in my paper on this subject the importance of this as a cause of rupture was somewhat exaggerated, and I should therefore wish it to be clearly understood that I only consider this a possible cause, if mechanical support is carried to an extreme. We find that, putting aside the not inconsiderable number of practitioners who leave the perineum to nature, the great majority of those who practise midwifery treat the perineum in a manner which is equivalent to no support at all, in a manner which can do no good, and which, I freely confess, can do no harm. Were this gentle support—such, for example, as is recommended by Dr. Churchill—the universal practice, the only object of these remarks would be to convince those who support the perineum, that this irksome duty is quite unnecessary.

It is evident, however, that, in many cases, a much stricter signification is attached to the doctrine. I have frequently had occasion to observe the literal interpretation which students put on the theory, and the manner in which they put it in practice; and I even fancy I can tell from what text-book they have derived their *modus operandi*, by the more or less assiduous manner in which they attend to the perineum. Can we wonder, for example, that they view the exit of the head with trembling apprehension if they take their notions from Dr. Ramsbotham, when we know that this eminent accoucheur, in his well known treatise, thus details the duty of the attendant:—

“As soon as the head has come to press on the external parts, it becomes our duty to take our seat by the bedside and never to move from our position till the child has passed. This we do to protect the perineum, and to prevent laceration.” . . . . “Place your elbow against the bedstead, regarding it as a fixed point, and allow the perineum to be forced against your hand.”

If this form of procedure were recommended only in cases when, from the operation of some of the causes detailed above, rupture

was deemed to be imminent, there would be much less room for argument; but when we are told to proceed thus in every case, even in lingering labour where the perineum dilates with unusual slowness, the question may be met on more general grounds. My principal reason for stating that the practice as suggested in the above quotation may lead to rupture, is the fact that if an amount of pressure sufficient to constitute support be employed, that part of the perineum which is between the hand and the advancing head is prevented from taking a part in what nature manifestly intended to be a general stretching or dilatation. This argument is taken up and treated at considerable length by Dr. Graily Hewitt, to whose able essay on this subject I would refer those who wish to investigate the matter more thoroughly. Those who support the perineum, and who condescend to argument on the subject, lay great stress on the fact—which I shall not attempt to controvert—that when the hand is suddenly removed from the perineum, or when, as Dr. Ramsbotham says, the woman removes the perineum from the hand by a sudden jerk, rupture is especially apt at that moment to occur. From this they infer that support is essential, but to me the fact only proves that they have, by their so-called support, rendered the parts quite unfit to bear the usual dilatation. It may prove that, if you begin with support, you must persevere in it; but it is no proof of the propriety of support “from the time that the head comes to press against the perineum.”

In 1846, Dr. Tyler Smith, in a paper in the *Lancet*, entitled a “Sketch of the Relation of the Spinal Marrow to Parturition and Practical Midwifery,” drew attention to a fact which, if true, is a powerful argument against a support of the perineum. And that it is true is obvious from the fact that it had already been observed by Smellie and some of the earlier obstetricians, although they only observed the fact, but were unable in those days to assign the reason. Dr. Smith observed that the whole parturient canal, from the os uteri to the ostium vaginae, becomes, during the second stage of labour, the excitor source of the most powerful reflex expulsive efforts; and no part shows this more decidedly than the perineum itself. Surely to excite stronger efforts on the part of the uterus in cases where the contractions are already too powerful for the safety of the perineum, is something more than doubtful practice.

In a correspondence which took place in the *British Medical Journal* some years since, and which resulted in eliciting from Dr. Graily Hewitt the paper to which I have alluded, may be found, perhaps, all the arguments which could be adduced in favour of perineal support; and no one can fail to observe that these are both few in number, and for the most part extremely



weak in character. That which deserves, from the eminence of its propounder, most attention, is to be found in a letter forming part of this correspondence from Dr. Murphy, in which he says, after employing the old argument founded on the withdrawal of the hand, that the object of supporting the perineum is two-fold:—"First, to prevent or allay irritation, and to diminish congestion, so that the act of dilatation may not be interfered with; secondly, to counteract too violent action of the uterus." These lines, as an argument, are surely unworthy of the distinguished accoucheur who penned them.

Drs. M'Clintock and Hardy consider support necessary, but they frankly admit the fact, that when the perineum is not supported, laceration occurs much less frequently than might have been anticipated. They then think it necessary to explain why laceration does not occur in these cases, on the hypothesis—

"That inasmuch as these females are almost always involuntarily subjected to the deprivation we have mentioned, they habitually use their utmost endeavour to retard the birth of the child when they feel the head in the vagina, in the hope of aid reaching them before the critical moment of delivery; and another reason is, that such patients have been spared the ill effects arising from vaginal examination."

Am I not justified in stating that such a line of argument shows a weak cause?

Another reason which I have heard not unfrequently adduced in favour of support of the perineum is, that the woman *expects* assistance, and imagines, naturally enough, that all this manipulation tends to hasten the termination of labour. This, although we cannot call it a scientific argument, is not without some weight, and is quaintly expressed by Dionis, who, in protesting against too much interference during labour, says:—

"Il y a des femmes qui ne croiroient pas être bien secourues si l'accoucheur n'y avoit toujours la main; il ne peut pas se défendre de toucher celles qui sont dans cette opinion, et il faut qu'il le fasse plutôt pour guérir leur imagination que pour leur être d'aucun secours."

We may recognize, however, in the principle of perineal support, an important indication in practice. While I think that the practice is worthless in most cases, and mischievous in some, I am far from wishing to imply that in those cases where we have some special reason to dread the occurrence of rupture, means should not be attempted to prevent the accident. I may therefore state shortly what, in my opinion, is the duty of the accoucheur during this stage of labour.

After the head has reached the perineum, the finger may be kept gently in contact with the head and the *fourchette*, in the manner

recommended by Dr. Tyler Smith. We shall thus be enabled to judge of the violence of the pains, and the progress which the head is making. In the great majority of cases, it will be found that the head, advancing and retreating in the manner so familiar to all, makes during each pain an almost imperceptible advance, dilating the perineum and other soft parts in the most perfect, complete, and satisfactory manner. The hand should be placed on the vault of the advancing cranium, and this should if possible be detained, were it even for a few seconds, in the state of "crowning," so as to let this last stage be as gradual as possible. If the head is advancing too rapidly, restrain its advance very gently by direct pressure against the head. Many obstetricians say, "Do not oppose the progress of the head;" but I cannot conceive how support can act otherwise than by restraining the advance of the head in direct proportion to the amount of force employed in supporting. The obvious treatment in such a case is to cause the head to imitate as nearly as possible the normal process; and by adopting this plan we avoid all manipulation of the perineum itself, and all chance of exciting reflex contractions of the expulsive muscles. If there is a want of the usual lubricating fluid, it may possibly be of advantage to borrow a leaf from the book of the ancients, and artificially supply the want. It is very generally asserted that one result of support is to direct the head forward under the pubic arch, and, although this is denied by Dr. Hewitt, I am inclined to think that it may to some extent act in this way. It is very questionable, however, whether we are justified in thus aiding nature in every case. In cases of slow and lingering labour this may be done, I think, with considerable advantage; but the mode recommended by Smellie—that of preventing the retrogression of the head by the finger in the anus during the interval of the pains—is not only more effectual, but, at the same time, safer. I certainly think that by this process, by pressure of the sacrum, and even by support of the perineum, we may in some cases aid the forward movement of the head.

Rupture is most likely to occur, not so much in those cases in which there is a general rigidity of the parts, as when the perineum itself dilates, while the ostium vaginae does not. This may be the result, either of rigidity confined to the latter, or of an elongated perineum; and it is attended not unfrequently by rupture of, and even by birth through the perineum, and this in spite of the most assiduous support. It has been recommended that when we have reason to believe that rupture is about to occur, we should incise the perineum lengthways on either side of the raphe; but it is probable that this is never practised now. Another method, and to my mind a preferable



one, is that which is practised by Simpson, Scanzoni, and others, according to which a rent is commenced with the finger nail or a blunt-pointed cutting instrument on either side of the vulva. In this case the subsequent advance of the head causes the tears to be continued in this direction to an extent sufficient to admit of its egress; but as the laceration is seldom more severe than the ordinary rupture of the fourchette in first cases, it heals up at once, and rupture in the median line is avoided with certainty. With reference to this mode of treatment it is evident that, although it may be highly beneficial in the hands of the eminent professors of Edinburgh and Wurtzbourg, it would be most unwise to teach such a doctrine to the student or the tyro in the art, as he would be almost certain to perform the operation in cases where it was quite unnecessary.

I would only add, by way of summary of my views in this respect, and before passing to subjects of greater importance, that, while I am quite aware that "support," as usually practised, is harmless, I am most firmly convinced that it is useless. I am scarcely less firmly persuaded, moreover, that in many cases the result is the reverse of beneficial, and I can bring myself to look upon it in no other light than as a barbarous relic of "meddlesome midwifery."

In entering upon a consideration of the other cranial positions, we are struck in *limine* with the discrepancies which are to be observed in the statement of various observers, as to their comparative frequency. Till Naegele wrote, there was perfect unanimity among obstetricians as to the second position being next in point of frequency to, and in all respects the converse of, the first; but the effect of his researches upon the minds of all modern practitioners has been to modify greatly, and in most cases entirely to overthrow, the conclusions of his predecessors. Manifestly, therefore, and in order to avoid a mass of statistical details, it is unnecessary to do more here than to compare the statistics of Naegele, and of those whose conclusions come nearest to his, with the results attained by other modern observers who differ from him more or less widely. It is beyond doubt that the original doctrines of Naegele are to the present day more implicitly believed in in this country than in France, or even in Germany; and this is obviously due to the fact that many of our most eminent accoucheurs have taught and still teach these doctrines, while some have confirmed their accuracy by subsequent research. All this is shown in the following analysis, but it is therein further made evident that there are many men of undoubted talent and experience who decline to accept the *ipse dixit* of Naegele as of greater weight than the evidence of their own senses. The following table shows the percentage of

each of the four vertex presentations as deduced from the published statistics of the observers quoted.

	First Position.	Second Position.	Third Position.	Fourth Position.	Not Classified.
Naegele,.....	70·	—	29·	—	1·
Naegele, the Younger,.....	64·64	—	32·88	—	2·47
Simpson and Barry,.....	76·45	·29	22·68	·58	—
Bell,.....	72·9	1·6	24·8	·7	—
Dubois,.....	70·83	2·87	25·66	·62	—
Murphy,.....	63·23	16·18	16·18	4·42	—
Swayne,.....	86·36	9·79	1·04	2·8	—
West,.....	63·61	31·39	3·11	1·87	—

By means of this tabular arrangement, we see at a glance the extent to which one observer differs from another, but we must look a little closer at the figures to discern their true import. In the first place, we may observe that the two Naegeles regarded the second and fourth positions as so exceptional that they did not include them at all in their system of classification, contenting themselves with the assertion that, when present, there were either some special circumstances which induced the irregularity, or that the observations were not made soon enough. The elder Naegele, indeed, says that, next to presentations of the third kind, those of the face come next in point of frequency, while the second is classed with the conjugate as the rarest of all. The younger Naegele again, who, while he enters into statistical details much more deeply, repeats and corroborates his father's doctrines, lays himself open in more than one place to criticism, in respect of the manner in which he disposes of his statistics to suit his own views. For example, he states in the observation from which I have deduced the figures placed opposite his name in the preceding table, that his conclusions are founded on 3795 cases of vertex presentation; but instead of placing these fairly under the four heads which constituted essentially the classification of the German school, he coolly says, "After deducting 94 cases, in which the original position of the head could not be made out with certainty on account of various circumstances, (*verschiedener Umstände wegen*), we have 3701 carefully observed cases of cranial presentation." Now these 94 cases form nearly two and a half per cent. of the whole, and if divided, as we cannot doubt they ought to have been, between the positions numbered second and fourth, would have brought the statistics of Naegele very near to those of Dubois, whose observations accord, perhaps as closely as those of any other, with the prevailing ideas of the present day. From what is said by the younger Naegele, we may infer that a similar method of computation was adopted by his father, and if so, the conclusion is inevitable that the Naegeles have pushed their theory of the



right oblique diameter too far in refusing to admit the exceptions, which in their case would only have tended to confirm the rule.

The statistics of Simpson and Barry, and of Bell, confirm the conclusions of Naegele more nearly than any others; but it will be observed that in both cases a certain percentage of second and fourth presentations is admitted, which becomes more marked in the case of Dubois.

The conclusions arrived at by the three observers whose names are placed last on the list, show indeed a startling discrepancy with the results given above, and are of themselves sufficient to show that the doctrines of Naegele are by no means definitely settled. Dr. Murphy's conclusions are the result of a careful personal observation of sixty-eight cases of vertex presentation, in the Dublin Lying-in Hospital, in which he found the second position to occur as frequently as the third. The grounds of his conclusions, as stated, are no doubt less satisfactory than if they had been based on a larger number of observations; but at the same time we must confess that the results obtained by so able and experienced an accoucheur as Dr. Murphy, must be held as more likely to be correct than when the observations on which statistics are founded are entrusted in a great measure to others. Dr. Swayne appears, in the first place, to have had a larger number of first cases than any other observer, but in other respects his experience is strikingly opposed to the idea generally received. He has found, for example, that the second comes after the first, and that the fourth is actually more frequent than the third, and details cases which show that he had seldom any difficulty in detecting presentations of the second kind at an early period of labour. Dr. Swayne's views are confirmed by Dr. Millar, the professor of midwifery in the University of Louisville U.S., whose statement on this point is as follows:—"I find, by reference to my notebook, that the fourth position has occurred in my notes oftener than the third, but both together less frequently than the second." The statistics furnished by Dr. West should not perhaps have been included in the above table, inasmuch as the basis of his classification differs, as we have already seen, very materially from that of all other observers. In classing as third and fourth cases only those which end as such, he of course swells the number of the second, to an extent which, unless this were understood, would appear incredible. This, of course, vitiates the comparison instituted in the table, in so far as he is concerned, as he gives us no indication of the number of those second cases which were originally third. The percentage of the first position as observed by him, will be noticed to coincide very closely with that of Dr. Murphy.

In attempting to reconcile such conflicting statements as these, we cannot fail to become convinced of the fact that, even in the most experienced hands, it is no easy matter to determine the position of the head in the early stage of labour. It is not to be conceived that all the observers above quoted can be right. It is equally clear, that nature must have some law according to which the head of the child enters and passes through the pelvis of the mother. But is it in our power to determine what is this law of nature, and in what an observer has erred? Can we so reduce the law to statistical details as to place the matter for ever on a basis of irrefragable evidence? No one, perhaps, in the present state of the art would be bold enough to answer this question in the affirmative. For my own part, I am convinced that there is here ample room for renewed observation and research; but unless a man can bring to bear upon the subject a mind unwarped by prejudice or preconceived ideas, his testimony will be of little avail. Take, for example, the case of the second position. Who has not been summoned again and again to the bedside of a woman in labour, to find the head in the lower third of the pelvis and in the second position? In such a case, the disciple of Naegele would probably record in his notebook, "A case of third position, in which rotation had occurred before my arrival." He is driven to this conclusion if he adopts Naegele's theory *in toto*, but yet as regards the individual case the evidence is Naegele's, and not his. Or, again, if he really finds the head early in labour undoubtedly in the second position, he classifies it as irregular, and assumes the presence of some of the "various circumstances," in which only, says Naegele, this position can occur.

Although my experience is too limited to warrant me either in reducing it to statistical detail or confident assertion, my impression is that Naegele's views are in this, as in some other respects already noticed, far from accurate. Granting that the first position is by far the most frequent, occurring as it does in about 70 per cent. of all vertex presentations; and granting further, as I do, that Naegele's discovery—that the third is, as a primary position, next to the first in point of frequency—is correct: I am persuaded that both second and fourth cases occur more frequently than is generally supposed, certainly much more frequently than Naegele would have us to believe. I rather think, that if we were to strike an average between the percentages yielded by the statistics of Dubois and Murphy respectively, we should come very near the truth. It accords at least very closely with my own experience.

The proportion thus deduced stands as follows:—

First Position.	Second Position.	Third Position.	Fourth Position.
67·03	9·52	20·92	2·52



The second cranial position is in all respects, as regards both pelvis and head, the exact converse of the first, and it is difficult to understand why nature avoids it in so large a proportion of cases. Before Naegele wrote, when it was supposed by all obstetricians that the second was not only the converse of the first, but next to it in point of frequency, it was very generally believed that the preponderance of first over second cases was due to the position of the rectum to the left side, this viscus contracting to some extent the left oblique diameter. It is somewhat strange that Naegele should, as he does, reject this theory as improbable, seeing that it was very obviously in his favour when he argues that all cases, almost without exception, lie originally in the right oblique diameter; but perhaps we should, instead of being surprised at this, take it as an evidence of his impartiality. Certain it is that few obstetricians now believe that the rectum has much, if any influence, in inducing one presentation in preference to another. It is clear, however, that the rectum must have an influence on the progress of labour, especially if distended; and indeed, even if empty, it is conceivable that the thickness of the coats of the bowel may tend to make a tight fit tighter. The head of the child, however, in ordinary circumstances, descends in this position with no greater difficulty than in the first, whether the position be primary, or a mere step in the progress of the third; and emerges with the left parietal protuberance lowest, and the frontal suture turned slightly to the left. After the head has escaped, the face rotates generally, but not invariably, to the left thigh of the mother, and the left shoulder passes out first. We may note here—and the same observation is applicable, *mutatis mutandis*, to first positions—that, not unfrequently, when the left shoulder comes in view beneath the pubic arch and is apparently on the point of being born, it is arrested there; while the right shoulder, sweeping rapidly over the perineum, actually passes out first.

Before passing to a consideration of the third and fourth, or two occipito-posterior positions, we may notice what is not only a matter of interest, but of great practical importance; viz., the proportion of these cases which become reduced during the progress of labour into the second and first respectively. The proportion ending with the face to the pubes varies very considerably according to the statistics of different observers, and this is somewhat to be wondered at, seeing that it is an occurrence which could not well be overlooked or misunderstood. Naegele did not believe in the face-to-pubes termination of these cases except "under peculiar circumstances," such as a small head or a large pelvis; but I do not know of any accoucheur of large experience who has not met with such cases, there being

no peculiar circumstances whatever to account for them. Dr. West, in 481 cases, met with 15 in which the head was born or about to be born in the third, and 9 in which it was in the fourth position; or in the ratio of 3.11 and 1.87 per cent. respectively. This includes, however, those cases in which he rectified artificially the position of the head, on the assumption that, had he not interfered, they would certainly have ended with the face to pubes. Drs. Simpson and Barry found, and their observations were subsequently confirmed by Dr. Bell, that in the third position spontaneous rotation occurred in 96 per cent. As regards the fourth position, it would seem that spontaneous rotation is less likely to occur than in the third; but the number of such cases being so small, statistical data on this point are insufficient. In Dr. Bell's cases rotation occurred in 43 per cent. only, while 57 per cent. ended with the face to the pubes.

In the third cranial position, the head is placed in the right oblique diameter of the pelvis, the occiput being turned to the right sacro-iliac synchondrosis, and the forehead to the left cotyloid cavity. On introducing the finger it comes into contact with the left parietal protuberance, and the great fontanelle can usually be reached without difficulty, by passing the finger forward along the sagittal suture. It is not always easy to distinguish this fontanelle with certainty, as its size is frequently so much diminished by pressure that it feels quite like the posterior fontanelle. If, however, we feel four sutures passing into it, we may be quite sure of the position, unless there are *ossa triquetra* present, when the diagnosis is uniformly obscured. When the ear can be reached at the pubes, all doubts are at once solved by its position.

This presentation may end in two ways. In the vast majority of cases the head performs a rotation of three-eighths of a circle, the forehead passing backwards towards the hollow of the sacrum by the left sacro-iliac synchondrosis, and the occiput coming forwards by the right foramen ovale, until the head, having become reduced to the second cranial position, passes out with the occiput under the pubes, precisely as happens in ordinary occipito-anterior positions. Baudelocque, and those observers who wrote before Naegele, recognized this as an occasional termination of the third position, but regarded it as very rare and exceptional. In venturing to dissent in some measure from the conclusions of Naegele, we cannot but confess that his discovery, which has been so amply confirmed by the observations of others, of the frequency with which the third occurs as a primary position, is one of such importance as, of itself, to make his name famous. Without a knowledge of this fact, the accoucheur who applied himself to the study of cranial positions must have been constantly at fault. If he found the sagittal suture in the right oblique diameter at the



commencement of labour, and in the left at its close, he must have concluded that his former observation was wrong; whereas now, when we recognize the position first named, we know that the chances are twenty-four to one that, if the forehead is directed forwards, it rotates into the second, and that labour is terminated without any marked increase of suffering or difficulty.

Naegele, however, goes too far when he says that labour in this case takes place "with the same expense of strength, without greater difficulty, &c., than the labour where the head takes the direction of the first or most common position." That the mere rotation takes place with great ease, and without any great expenditure of strength, when the head has descended far enough to admit of the change, is an assertion which is, in all probability, strictly correct. But that the labour from first to last is as easy as a case of first position, is an extreme view of the case, which experience does not warrant. Where I have had an opportunity of comparing the duration of labour in successive pregnancies in the same woman, I have almost uniformly found that the entrance and descent of the head previous to rotation has been effected with comparative slowness, and not unfrequently with marked difficulty. Madame Boivin expresses this clearly, and I think correctly, when she says—

"Dans cette position oblique du sommet, comme dans la quatrième position, il faut s'armer de patience, et engager la femme à prendre son parti sur la longueur du travail. Nous l'avons vu se prolonger trois, quatre, et cinq heures, au-delà du temps ordinaire."

It is often said that observers fail to recognize third cases, because the rotation into the second position has taken place early in the labour; but this is far from being strictly correct, seeing that the change seldom occurs in third cases until the head has reached the inferior third of the pelvic cavity, or even in some cases the floor of the pelvis. This rotation is one of the most interesting features in the mechanism of parturition, but it is by no means easy to understand the physical laws on which the movement depends. An observation is recorded by Dubois, where, in the case of a woman who died shortly after giving birth to a dead child, the midwives in attendance opened the uterus, and, after introducing the child in the third cranial position, forced it gradually downwards until it passed through the vulva. They had little difficulty in getting it into the cavity of the pelvis, but it required a great increase of the force employed, when the head came to experience the resistance of the perineum and pelvic floor. On three successive occasions in which the experiment was performed, and without any movement of rotation being communicated to it by the hand of the operators, the head was

found to rotate into the second position before passing the vulva. On a fourth attempt, it passed with the face to the pubes, the resiliency of the parts having been destroyed. The best explanation of the causes which induce this phenomenon of rotation, is perhaps that given by M. Cazeaux. The theory, which I translate from the last edition of his "*Traité des Accouchements*," is very similar to that propounded by Dr. Simpson, which is probably more familiar to English readers:—

"The uterus is placed pretty nearly in the direction of the axis of the brim; the sum of its expulsive forces, or, to speak more clearly, the sum of its contractions, may therefore be represented as acting in the direction of the axis of the brim. When the head is placed in the third position, the occiput, pushed down by the uterine contractions transmitted to it by the spine, descends in the direction of the axis of the brim, that is to say, from above downwards, and from before backwards, and continues to descend until it meets the resistance of the inferior and lateral part of the pelvis, or the soft structures of the perineal floor. There, if the resistance be ever so little, it is arrested, and from that time the direction in which the occiput progresses must of necessity change. This resistance may be represented by a force whose direction is perpendicular to the surface impinged upon, and which is applied to the head of the child at its point of contact with the posterior surface of the cavity. This point of contact is evidently, in the case which we are considering, the right lateral and posterior part of the head, which impinges against some point of the posterior wall of the cavity: the head of the child, or rather the occipital extremity of the head, is from thenceforth propelled by two different forces, of which the one acts upon it from above downwards, from before backwards, and a little from left to right (this is the uterine contraction), while the other acts upon it from behind forwards, and a little from below upwards (this is the force of resistance represented by a perpendicular drawn from the surface impinged upon). In combining the forces brought into play by the resistance on the one hand, and the uterine force transmitted by the cord in the direction of the axis of the brim on the other, we obtain, by means of a parallelogram, a diagonal or resultant of forces which indicates the direction of the movement which ought to take place. Now, in constructing this parallelogram, it becomes evident that the occiput should move forwards, downwards, and to the right, since the diagonal or resultant of the forces is directed from behind forwards, from above downwards, and from left to right."

Dr. Tyler Smith considers that the spinous process of the ischium is the determining cause of the ultimate direction of the head in the third position. "If," he says, "the occiput is driven below and behind this point, the head emerges from the pelvis in the position it held at the commencement of its passage through the pelvis, or nearly so." In looking upon this as the determining cause of the ordinary and comparatively limited rotation which occurs in first and second cases, I believe he is, in the main, right; but I cannot agree with him in thinking that the same cause determines the rotation in third and fourth cases. Dr. Simpson thinks that the influence of the ischial spines has been greatly exaggerated, and probably he and Dubois are not far from the truth in the views which they express.



It is scarcely necessary to add, that in this, as in all the other positions where rotation occurs, the body of the child participates in the rotation. We owe to Smellie and Gerdy the correct ideas which now prevail on this point, as it was by them that the absurdity of the opinion held by many of the earlier writers on the subject of this rotation was first pointed out and clearly explained. An observation made by Dubois would seem, however, to show that, in very rare and exceptional cases, the body does not participate in the rotation, the neck being twisted round, while the body remains immovable; but even this is, to say the least of it, extremely doubtful.

Dr. West considers that the rotation does not take place until the head reaches the floor of the pelvis, because, until this takes place, the forehead cannot pass into the hollow of the sacrum. This, however, is manifestly insufficient to account for the fact, and indeed I cannot see what bearing it has on the rotation into the second position. If the occiput were to rotate forwards before it encounters the resistance of the inferior part of the pelvis, it is difficult to see how the promontory of the sacrum could prevent the motion, seeing that the forehead might rotate to the left sacro-iliac synchondrosis without encountering any resistance whatever from the promontory of the sacrum. If Dr. West merely means that the head cannot rotate into the hollow of the sacrum until it has descended to the floor of the cavity, he is no doubt right; but this theory affords of itself no satisfactory explanation of the fact that it cannot, as a rule, rotate or be rotated into the second position, until it has reached a certain stage in the progress of labour. It must be remembered that rotation of the face into the hollow of the sacrum is a subsequent step of the process, and forms no part of the rotation which converts a case of third position into a second.

Some peculiarities have been observed in the nature and extent of the rotation which occurs in these cases. It was remarked, for example, by Dubois, and his observation has subsequently been confirmed by Cazeaux and others, that the head sometimes rotates too far, the occiput passing to the *left* of the pubic symphysis, and then by a retrograde movement passing under the arch, like an ordinary case of first position. The same observer describes cases in which rotation did not occur until labour was so far advanced that the head was actually distending the perineum, and especially one, which was seen by the pupils of his clinique, where the advancing head was seen through the vulva, and where the parietal protuberances were engaged in the aperture before rotation took place. Such cases, however, must be regarded as extremely exceptional, as the change takes place in general

much earlier than this, and the labour ends without difficulty as a case of second position.

In a certain number—about 4 per cent.—of these cases, rotation does not occur, and the head is born with the forehead, instead of the occiput, under the pubes. Naegle was of opinion, and many, perhaps most, modern accoucheurs agree with him, that this termination does not occur except under peculiar circumstances, and that there is uniformly a small head, a large pelvis, or some other circumstance sufficient to account for this unusual occurrence. Dr. West and others, however, assert that the head is not unfrequently born with the face to the pubes, while there are no special circumstances whatever to account for this peculiarity. In cases where this takes place, the expulsive forces, instead of acting on the occiput in the manner above detailed, and involving the movement of rotation, become directed against the frontal end of the long diameter. The anterior fontanelle now becomes unusually distinct, and very near to the external aperture, so that the finger, when introduced for the purpose of examination, comes first in contact with this part. While the ordinary third position is but rarely made out except by careful examination, this variety is much more easily recognized from the proximity of the fontanelle; and on this account it is very frequently stated as a symptom of the ordinary third position, that the fontanelle is very near and distinct, whereas in ordinary cases it is well up behind the pubes, and is often to be made out only with difficulty.

Dr. Swayne of Bristol pointed out a circumstance as occurring in these cases which must not be overlooked, as it is not unlikely to mislead. He states that a vacant space may be felt under the pubic arch, owing to the small size of the frontal part of the head before it has been moulded by the pressure of parturition. The same observer has noted another fact, which is founded upon the general relations of the os uteri, and which he looks upon as of considerable importance in a diagnostic point of view. The posterior lip of the os is, he says, pushed downwards by the advancing occiput to a much greater extent in occipito-posterior than in occipito-anterior positions, and the result is that the axis of the opening os is directed downwards and forwards, instead of downwards and backwards.

Another reason tending to direct the attention of the practitioner to this position, is the fact that now the labour, which may hitherto have gone on well enough, becomes manifestly impeded, and the practitioner is thus led to look for the cause. In this case, even if the great fontanelle is much lower than usual, we are not to assume that the labour is of necessity about to terminate with the forehead under



the pubes; for if the pelvis is roomy, and the head movable, rotation may yet occur, the forehead going up and the occiput coming down. But if the forehead becomes more and more driven in advance, the fontanelle passes backwards towards the coccyx, and the left frontal protuberance becomes the presenting part. At this time the orbits and nose may be easily felt behind the pubes, and as labour progresses the forehead comes into view. Cazeaux says that the superciliary arch may sometimes be seen, and that on one occasion he saw the upper eyelid. Under the influence of powerful uterine contraction, the occiput is now driven downwards, while the parts already mentioned move somewhat upwards and to the left, while the occiput sweeps over the perineum, the forehead passing generally a little later, followed by the orbits, nose, mouth, and chin successively. If, as is almost always the case, the head is attended with considerable difficulty in its progress, it becomes moulded into a form which, as compared with the ordinary occipital projection in a tedious occipito-anterior case, is very peculiar, seeing that the occiput is flattened, and that portion of the encephalon which is contained in the posterior part of the head is forced forwards, so as to cause a corresponding increase of bulk in the anterior region. The final movement is performed, according to Cazeaux, by an extension of the head, the nape of the neck, pressed against the anterior commissure of the perineum, being the centre round which the rotation occurs, just as happens in an ordinary labour when the occiput is under the pubes. The head, in passing out, preserves its obliquity in a more marked degree than usual, and the perineum, being stretched to a much greater extent than in occipito-anterior cases, is somewhat more liable to rupture than under ordinary circumstances.

The principle on which Dr. West's classification, to which we have already had occasion more than once to refer, depends, is based on the division of occipito-posterior positions into *bregmato-cotyloid* and *fronto-cotyloid* varieties. The first of these varieties is, he maintains, the position described by Burns, Nægele, Boivin, and others; while the *fronto-cotyloid* is that comparatively rare variety which is so apt to terminate with the face to the pubes. The latter alone constitute his third and fourth cases, while the *bregmato-cotyloid* are considered by him as mere varieties of the first and second. Face-to-pubes cases he refuses to classify as vertex presentations, in which he is perhaps right, if he means by "vertex" the posterior fontanelle, or a point just in front of it. But if we apply to the term the signification in which it is used in this essay—viz., the crown of the head, extending from fontanelle to fontanelle, and from one parietal protuberance to the other—we

shall be able, I think, to include Dr. West's positions, excluding perhaps, if he will have it so, that period of labour in which the upper part of the forehead is the presenting part. In Dr. West's very able essay, the distinguishing features of these two varieties are brought very clearly, and with much originality of idea, under our notice. It is difficult to see the necessity of his new classification; but no one who will take the trouble to read an essay which attracted much attention at the time it was written, both in this country and abroad, can fail to be impressed with his earnestness and candour, however they may differ from him in regard to some of his doctrines. The great point for which he argues is the importance, in a diagnostic point of view, of a clear distinction between his two varieties, and in this he is certainly right; for if artificial rectification is practicable (and we have no reason to doubt it), it is manifestly of the deepest importance that we should recognize as early as possible when the case is one likely to require interference, so that we may be in readiness when the proper time arrives. Dr. West's essay is further, as we shall see presently, of the greatest practical importance in its bearing on the important subject of artificial rectification.

Another termination of occipito-posterior positions consists in a rotation of the head on its transverse axis, the case being thus changed into a face presentation. The direction which is given to the vertex by the inclination of the uterus is, according to M. Guillemot, a frequent cause of this change; so much so, that in his opinion, out of three occipito-posterior positions, one ends as a face presentation. It is, for obvious statistical reasons, impossible to agree with M. Guillemot on this point; but as his description of the manner in which the change takes place, as doubtless it occasionally does, is probably correct, I append it here:—

"L'occiput, arrêté contre un des points de la partie postérieure du bassin, au lieu de s'avancer sur le périnée par le détroit périnéal, remonte dans la courbure du sacrum en exécutant le mouvement de rotation, et en se renversant en arrière sur la poitrine. Pendant ce temps, le front et la face descendent derrière les pubis, et se portent en arrière et en bas jusqu'à ce que le menton vienne s'engager sous l'arcade. La tête qui est totalement renversée en arrière, traverse le détroit périnéal, comme dans une présentation de la face."

The opinion seems to be very generally entertained that, in the fourth position, the engagement of the head is usually more difficult, and its rotation much slower, than in the third; and this idea is, as we have seen, confirmed in a marked degree by such meagre statistics as we can bring to bear on the subject. It is difficult to avoid the conclusion that this is due to the rectum, which must certainly encroach more or less on the left oblique diameter of the pelvis. Madame Boivin has on this



subject a curious, and perhaps not altogether fanciful theory, which she expresses as follows:—

“La cause qui prolonge la durée du travail, dans le cas de position occipito-cotyloïdienne droite, vient encore ajouter à la difficulté que présente celle-ci. Non seulement dans le cas présent, le front ne peut rouler aussi facilement que l'occiput sur le plan incliné antérieur du bassin, mais la réplétion du rectum peut s'opposer encore à l'accès de l'occiput dans la courbure du sacrum, cependant cet obstacle de la part du rectum peut déterminer l'occiput à se rapprocher de la paroi antérieure du bassin; et si l'on a remarqué que cette conversion de la tête a plus souvent lieu dans ce cas que lorsque l'occiput est à droite et en arrière, ne conviendrait-il pas mieux de laisser le rectum dans son état de plénitude, que de l'évacuer, comme on l'a conseillé? Sans doute que, si l'occiput ne se déterminait point à avancer d'aucun côté, il faudrait injecter le rectum et le vider; mais alors, au lieu de se porter en avant, où il a tant de chemin à faire, et plus de difficulté à vaincre, il se porterait dans la courbure du sacrum, dont il se trouve plus près que l'arcade des pubis.”

The meaning of this in a few words is, that as there is a greater likelihood in fourth than in third cases of the occiput passing into the hollow of the sacrum, we should rather leave the rectum full, as by emptying it we actually facilitate that movement which we have most reason to dread.

On account of the difficulty which the head in this position experiences in entering the pelvis, the head frequently rotates at a much earlier period than obtains in the third position. This at least is an assertion which is frequently made; and if true, it is obvious that the rotation must be due to other mechanical causes than those which usually bring about the rotation in cases of third position. It is a fact familiar to every obstetrician that positions frequently become changed at the brim, before the head actually enters the cavity; and this occurs while the head is still floating freely in the waters, and is in no respect engaged in the brim. I think we have reasons for considering it as probable that a breech may even be thus changed into a head case, or a head into a face; and certainly one position of the head may very easily be substituted for another in circumstances where, an entrance being found difficult or impracticable, the position of the head becomes changed. In the only case in which I had an opportunity of observing a presentation of the ear—a presentation so rare that its existence is frequently denied—this, without the slightest difficulty, and without any assistance on my part, passed in a few pains into a presentation of the first kind. It is thus evident that changes do occur at the brim when the head finds a difficulty in entering, but before it has actually become engaged in the cavity; and it is in all probability in this way that these alterations occur in the case of the fourth position. Dr. Halahan, whose conclusions are founded upon great experience, thinks that this occurs so frequently as to be the rule, any

other being the exception; his view being, as we have already seen, that the head is *always* at the commencement of labour in the third or fourth position, but that at an early stage the fourth changes into the first, while the third only changes into the second when the head descends to the floor of the pelvis. In all respects, as regards the hard structures, we may regard the fourth position as the converse of the third, in the same sense as the second is stated to be the converse of the first.

By far the most important point, however, in connection with the subject of occipito-posterior positions, is undoubtedly the question of artificial rectification. Can we rectify by artificial means an occipito-posterior position? If so, at what period, and in what manner, can the rectification be effected? and to these questions we may add a third—In what circumstances are we justified in interfering with the course of nature in order to effect the change?

In reply to the first of these questions we may, I think, with perfect confidence assert that, under certain circumstances, the position of the head may be, and has been, rectified. In confirmation of this assertion, we have the evidence of many of the most eminent accoucheurs of which our country can boast. More than a century ago Smellie, after having repeatedly but in vain attempted to drag through the head in a case of this kind, bethought him of trying to turn the face backwards into the hollow of the sacrum. Success attended his first attempt—a result which “gave him great joy,” and opened his eyes to a new field of improvement “on the method of using the forceps in this position.” Clarke, Burns, and others, stated that rectification could be brought about in many cases by the use of the finger alone. Among accoucheurs of our own day, Drs. Murphy and West have perhaps expressed their views with most emphasis in favour of the feasibility of this proceeding, which may therefore, we are entitled to conclude, be fairly considered as perfectly possible in certain cases.

As regards the period of labour at which the rectification may be effected, we find much difference of opinion among accoucheurs. By many writers the question is put in such a way that we are entitled to infer from their statement, that the change may be effected with equal ease, or rather with equal difficulty, at any stage of labour. If this is the view which is intended to be conveyed by those who so express themselves, it is certainly erroneous; and of this we may easily convince ourselves by attempting the rectification of the ordinary third position (the *bregmato-cotyloid* of Dr. West) in a few cases, when we shall find that the head cannot in ordinary circumstances be turned back until it has reached that stage of the labour when nature of herself induces the rotation. In such cases, I have never been



conscious of aiding the rotation one whit, although I have actually felt the head turn while I was manipulating. A professional friend lately told me of a case of occipito-posterior position in which he repeatedly attempted, by means of the forceps, to bring about the turn, but without avail. Having paused for a few minutes, but without withdrawing the blades of the instrument, his attention was attracted by a rattling noise made by the forceps, the blades at the same time slipping away from their hold of the head, and, on examination, he found that nature had done with ease what he had been in vain attempting to do, and that the head had completed its movement of rotation during a single pain. Such facts as these show that rotation cannot be effected in all stages of labour, but that it is only under certain circumstances that we can interfere with a reasonable prospect of success. My impression is, that rotation can only be effected by artificial means when the head is free above the brim, or when it has quite descended to the floor of the pelvis. In the former case we should be most likely to succeed with long, straight forceps, the handle being pressed back against the perineum, and gently turned until the head was brought into the desired position. The practical advantage of operation in such a case would be to place the head in the most suitable direction, if nature did not do so of her own accord—as in the case, to take an extreme example, of an obliquely-distended pelvis, in which the long diameter of the head was in the least favourable position. It must be rarely, however, that circumstances call for operative interference at this stage of labour; and it must be remembered that we are now talking merely of the circumstances in which the operation is feasible, and not of cases in which it is advisable. Whatever the circumstances may be in which we attempt to rectify the position of the head, there can be no doubt of the fact that a most important influence is exercised by the state of the uterus as regards the waters. If these have completely escaped, and the uterus tightly surrounds the body of the child, the rotation of the body is interfered with, and consequently that of the head is rendered much more difficult.

The circumstances, probably, in which we are warranted in interfering, with a better prospect of success, are to be found in that stage of labour where the head, in the third or fourth position, has descended to the floor of the pelvis. Under ordinary circumstances, rotation will spontaneously occur; but in those cases in which the occiput is simply arrested, and the forehead comes lower and lower until we can distinctly feel the orbits and nose, we have every reason to fear that rotation will not take place. I gather from Dr. West's paper that he considers the *fronto-cotyloid* as an original position—a position, that is to say, in which the

frontal end of the long diameter precedes the occipital during the whole course of labour. He admits, however, that the ordinary *bregmato-cotyloid* variety may become changed during labour into the *fronto-cotyloid* in the manner described by most modern accoucheurs. If this be so, the position may be vicious from the beginning, or it may become so by a perversion of the expulsive forces during the course of labour. If we admit the occurrence of the former class of cases, I think they must be held as of rare occurrence, while the latter form the general rule.

It will be remembered that, during the descent of the head in this position, the expulsive force is directed against the occiput, the spinal column being articulated much nearer it than the frontal end of the head. So long, therefore, as the former meets with no resistance, it passes downwards in the axis of the brim; but, when it experiences the opposing force at or near the floor of the pelvis, one of two things may happen: it may either move in the direction of the resultant of the combined forces—*i.e.*, from above downwards, and from before forwards; or it may, from some peculiarity in the form or relations of the parts, simply become arrested by the first impediment it meets with, while the force becomes misdirected against the forehead in the following stage of labour. Perhaps the simplest view which we can take of this is to consider the long diameter of the head as a lever. In the ordinary progress of such a case as we are considering, the fulcrum is at the frontal end, and the power near the occipital end of this diameter. So long as the resistance which is opposed to the descent of the frontal end, and which constitutes the fulcrum, is sufficient for this purpose, the descent of the occipital end continues, and the rotation is merely a more complicated phase of this mechanism. But if the occiput be arrested in its descent, the fulcrum is transferred to the occipital, and the power to the frontal end, respectively, the result being the gradual descent of the forehead, and the more than probable termination of the labour in this position.

Various methods have been suggested by means of which the artificial rectification of the head may be effected, these methods being either manual or instrumental, or both of these combined. It is perfectly clear that, if the forehead has come down, no mere rotation can bring about the change which we desire to effect. Rotation must in all cases be so managed that it is combined with a descent of the occiput, and a corresponding retreat of the forehead. Indeed, as regards artificial rectification, it would probably be more correct to say that the latter was the movement of primary importance, while the rotation was really a matter of secondary consideration. That most writers have taken this view of the case, is evident from the fact that we are almost always directed



to manipulate so as to cause the forehead to pass upwards. If we can succeed in this restitution of the forehead, rotation will almost certainly occur; but if we fail, some other means must be adopted. Dr. Meigs, in the belief that we are more likely to succeed if we draw the occiput down, than if we push the forehead up, recommends the former procedure in the following words:—

"Now, as the edges of the parietal bones override the edge of the occipital bone, which gives a good purchase for two fingers, which, when applied upon that lodge, are generally enabled to draw the vertex downwards to the required position; whenever this operation is to be attempted, it should be tried during the absence of the pains; and when the vertex is once pulled downwards, it ought to be retained in its place until a new pain comes on, as this enables the operator to secure whatever advantage he has gained."

Schmitt—who thought, as will be remembered, that the movements of rotation had their origin in the uterus, and were not due to the mere mechanical relation of the parts—says that we should only attempt to rotate during a pain, as we may then cause the head to participate in the rotatory influence, which he holds to be communicated from the womb by means of what he fancifully calls a "parallel gliding motion." Dr. Bell asserts that by changing the woman from the left to the right side, rotation may be brought about more surely than by the above method of operative interference. Theoretically, this may possibly operate beneficially by changing the axis of the uterus, and consequently the direction of the forces; but practically, we can see no reason to place much weight on the observation. Dr. Bell says that, since he adopted this method of treatment, he has never found a third case terminate with the face to the pubes. But this of itself manifestly proves nothing.

Instrumental aid is not unfrequently necessary in these cases to terminate a tedious labour, which, it may be, is becoming dangerous to the life both of mother and child. It is quite obvious that that mode of operation must be the best, in which the tendency is most clearly apparent to imitate the ordinary course of nature. The forceps, which can act only by dragging the head downwards in the position it then occupies, are therefore, as a general rule, unsuitable. If the pelvis be very large, or the head very small, we may succeed in dragging the latter through; but, as a rule, we shall find it to be a matter of great difficulty. Nor are the forceps at all well suited for rotating the head, as we cannot in any measure, by their action, cause the forehead to ascend, and without this we know that rotation cannot be effected. The method which is most correct in theory, and also—to judge by the cases cited by Dr. West—most successful in practice, is that recommended and

practised by him. The operation consists in a combination of manual and instrumental forces, by the action of which the forehead moves upwards and backwards, and rotation occurs. The instrument employed is the vectis, which, with the aid of the finger, can fulfil all the conditions necessary for rotation in a much more satisfactory manner than the fingers alone or the forceps can do. This mode of procedure is, however, only to be adopted when we fail with the hand. The importance of this subject demands a more detailed examination of Dr. West's views.

Were we to interpret his doctrines strictly *au pied de la lettre*, we might say that he somewhat exaggerates the probability of success in our attempts at rectification. We cannot avoid forming this opinion, if we consider that his meaning really is, what his words here and there would seem to imply, that rectification can be effected in any stage of labour. On thoroughly sifting, however, all that has been written on this subject by this painstaking observer, it becomes obvious that he expresses very strong doubts as to the feasibility of artificial rectification before the head has quite reached the floor of the pelvis. These doubts, indeed, are so stated that I think I am justified in assuming that he shares the opinion expressed in this essay, that the proper time to interfere is when the head has quite reached the floor of the pelvis. That the forehead descends, and not the occiput, in those cases which are about to terminate with the face to pubes, is a fact which had been clearly pointed out by previous observers; but the distinctions between the two positions, which he terms *bregmato-cotyloid* and *fronto-cotyloid*, respectively, are stated by him in a clear and practical way. Dr. West's leading idea is, that so long as the vertex descends—and by this he means a point a little in front of the posterior fontanelle—it matters little whether the face is turned backwards or forwards, a view which, as we have already seen, was very nearly that held by Roederer. If, in the quotation referred to, we substitute the word "vertex" for "occiput," the passage would read as follows, and we may thus look upon the doctrine of West as an amplification of the views of Roederer:—"Indifferens est quisnam sit capitis positio, modo pars conica atque arcuissima, *vertex* nempe, descendat." Whether or not he is correct in his assertion that the cases which end with the face to the pubes are originally *fronto-cotyloid* and, consequently, faulty positions from the beginning, I cannot with any confidence assert. My strong impression, however, is that they are, in the great majority of cases at least, originally *bregmato-cotyloid*, and that they are changed into the *fronto-cotyloid* variety by that perversion of the expulsive forces which I have attempted to explain. This is evidently the view which is taken of it by



Schmitt and those observers who look upon this as a premature separation of the chin from the breast of the child.

On the subject of artificial rectification, I shall let Dr. West speak for himself, as in the detail of these cases his theory and method of operating will be much more clearly shown, while their importance in a practical point of view will be more distinctly recognized. The cases as detailed are notes made at the time in his midwifery register:—

"CASE I.—*Face to Pubes—Third Position of Cranium—Artificial Rectification.*—December 28, 1853.—Could feel nothing but anterior fontanelle, which was nearly closed, and turned towards left side, and the sutures were scarcely perceptible. The anterior fontanelle feeling like the posterior came down, and presently I felt the nose at the symphysis. Thinking the pains did not press the head down while in this position, I turned the face to the left side again; and then, when I could feel an ear at the pubes, I pressed behind it till the occiput came to the arch. Labour over with two more pains. *Observes*—In rectifying the position of the head, after the nose has been felt at the symphysis, it is not sufficient to merely bring the ear to the symphysis, as the frontal end of the head will still be lowest, and the head will merely be brought back to the vicious position which had resulted in the turn of the face to the pubes, and if so left, will again get wrong, or perhaps get impacted, the head being with its whole length in the transverse diameter of the outlet. It is necessary to bring the ear to the side; and at the same time it is expedient to raise up the anterior fontanelle, that the vertex may descend; for it must be borne in mind that *that* is the material point to be effected.

"CASE II.—*Face to Pubes—Fourth Position of Cranium—Artificial Rectification.*—January 27, 1854.—On first examining, I found the head in the fourth position, a considerable portion of the frontal bones down, the anterior fontanelle towards the right side, and the posterior fontanelle out of reach altogether, the right coronal suture pointing to symphysis pubis. After the next pain, I found the *frontal* suture at the symphysis, the anterior fontanelle being central, or nearly so, and the right coronal suture far away to the left side of the symphysis. Turned the anterior fontanelle backwards, and waited for another pain. The forehead came forwards again. Turned it backwards again, at the same time raising it up until I felt the posterior fontanelle, the right *lambdoidal* suture pointing to the symphysis. With two more pains the labour was over, with the occiput under the arch.

"CASE III.—*Right Ear at Pubes—Artificial Rectification.*—February 12, 1855.—Felt anterior fontanelle near coccyx, and right ear at pubes. Felt part of the cheek on right side of symphysis. Head had escaped from os uteri. Pains had been very strong for some time, with the liquor amnii evacuated. Thinking that because the forehead had got down into the pelvis the occiput would not be able to find its way to the arch, and that the forehead would turn there instead, I pressed the ear to the right side, and the occiput coming down, passed under the arch. The labour was completed immediately after. As the revolution of the head was in the anterior fontanelle, that part was felt in exactly the same position, with reference to the coccyx, after the rectification as before.

"CASE IV.—February 13, 1853.—Feeling anterior fontanelle low down, and slightly to the left of the coccyx, I felt round the right side for the posterior fontanelle, but could not find it. I then passed the finger to the symphysis, thinking to find the ear, when it struck on the left eye (close to the symphysis, but slightly to the right of it), and on the root of the nose (close to the left side of it). The os uteri was fully dilated, the head on the perineum, and the woman had been only two or three hours in labour. I therefore did not attempt recti-

fication, and in three or four pains the child was born, the frontal suture having passed rather nearer the central line of the pelvis."

The first three of the above are cases in which rectification was effected without much difficulty, by manual interference alone. The details are eminently interesting and instructive. Whether the cases are managed according to the method of West and most others, by pushing the forehead up, or in accordance with the direction given by Meigs, by pulling the occiput down, the result is the same. The rotation, as I have said, is a secondary matter, as the great point which we must strive to attain is to put the head in such a position as to enable the occiput to descend, when the rotation will of necessity ensue. Should we fail in our attempt at rectification by this method, we may succeed by combining the leverage of the vectis with the action of the fingers, passing the blade upwards behind that ear which is turned towards the sacrum. Unless the head is unusually large, the forceps will act only by pulling the forehead still further down, and in all probability making the case worse than it was before.

Dr. Bedford, the professor of obstetrics in the University of New York, says with a strange inaccuracy to which there is no parallel in his justly popular work, that when the forceps are applied in this position, the handles "instead of being elevated, must be depressed, for the purpose of bringing the chin from the sternum, so that when the head is delivered, the instrument will be at a right angle with the spine." This novel view was lately commented upon at a meeting of the Obstetrical Society of Dublin by Dr. Kidd, who appears to entertain views on this subject which are closely analogous to those expressed in this paper.\*

We have seen that in the ordinary (*bregmato-cotyloid*) variety the descent of the head is more difficult than in occipito-anterior cases, and in some cases the difficulty is very well marked. In such cases the forceps may be used with advantage, as the indication of treatment is to cause the head to descend to that stage at which rotation usually occurs. But even here the vectis will be found much more effectual, as it is only by it that we can direct the extractive force against the occiput, the descent of which is the main object. I append another instructive case from Dr. West's register, as illustrating this point:—

\* CASE V.—*Third Position—Delivered by Vectis.*—September 27, 1854.—Head descending very unsatisfactorily, and not pressing on lips of os uteri. When it was well dilated and dilatable, I delivered with the vectis. The position was an ordinary presentation of the third kind, with the anterior fontanelle close to left

\* Transactions of the Dublin Obstetrical Society. Dublin Quarterly Journal, Nov. 1863, p. 460.



side of symphysis. I introduced the vectis by the left side of perineum, and passing it to the right side of the mother, it fixed readily on the mastoid process over the left ear. As I made traction, the vectis (with the ear), turned to the pubes, and thence to the acetabulum, and presently the head was born. I could still feel the whole of the os uteri when I introduced the vectis. It was flabby and very dilatible, but the head would not descend into the pelvis so as to press on it and pass through it—a good example of bregmato-anterior variety as proved by movements of vectis, and mark of vectis under left ear. *N.B.*—I did not guide the head in its descent; I merely made traction, and as it was pulled down it turned of itself, carrying the vectis round with it."

The above remarks, I may repeat, do not apply to those cases in which the head of the child is unusually small, or the pelvis of the mother very large, as such cannot be expected to be subjected to the usual laws of the mechanism of parturition. I would remark further, that the descent of the forehead is in all probability more likely to result from the arrest of the advance of the occiput in a large than in a small pelvis, or with a small in preference to a large head, and this for very obvious reasons. The above will, I think, suffice to show that instrumental interference with these cases may be the reverse of beneficial, unless the operator be well assured of the position of the head, and thoroughly understand the mechanism of the process by which nature effects delivery in the ordinary cases of occipito-posterior position.

Irregular presentations of various kinds have been described, such as presentations of the forehead, the occiput, the ear, &c., but these are all so exceptional as to be, practically, of little importance. In cases of pelvic deformity, also, the position may be greatly altered or modified, but under no circumstances can we class these among the phenomena of natural labour.

My intention originally was to include in this essay a consideration of the mechanism of breech, footling, and face presentations. My observations, however, on the ordinary cranial positions, have led me so much further than I anticipated, that I am now, although with some regret, precluded from entertaining this idea. Perhaps I may on a future occasion recur to the subject, when I trust that a more extended experience and special study of the subject may render my observations of greater practical worth, and more free from the many defects of the existence of which no one is more conscious than I. When I have ventured to differ from those whose opinion I respect, and whose experience is vastly greater than my own, I have done so only after much careful study and consideration. Even if I be correct, I well know that nothing is more difficult than to overthrow established opinion. To those who cannot view the matter apart from all preconceived theory or prejudice, and who will not test my views by the observation of nature, I would only

say, with Goethe—"Es ist diess nicht zu verwundern, solche Leute gehen im Irrthum fort, sie müssten umlernen, und das wäre eine sehr unbequeme Sache."