An Address
ON
**SOME CHANGES IN OBSTETRIC PRACTICE SINCE
THE FOUNDATION OF THE MEDICAL
SOCIETY OF LONDON.**

DELIVERED BEFORE THE SOCIETY ON OCTOBER 8TH,

BY

HERBERT R. SPENCER, M.D., B.S., F.R.C.P.,
OBSTETRIC PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL;
PRESIDENT OF THE SOCIETY.

THE Medical Society of London was founded in 1773 at an important period in the history of British midwifery. The renaissance of midwifery occurred later in England than in Continental countries, and dated from the publication in 1651 of William Harvey's *De generatione animalium* with the chapter on "Labour," which was the first original English work on midwifery. The conservative principles and the observation of Nature which Harvey advocated had been carried on by a succession of teachers, of whom Smellie—one of the greatest obstetricians of all times and countries—had died only ten years before the Medical Society was founded; he was succeeded by William Hunter, Denman, Osborn, and others.

The practice of midwifery during the preceding century had been slowly passing into the hands of men midwives since Clément had been ennobled by Louis XIV and appointed "accoucheur" to Madame la Vallière in 1673. The advice of Harvey to imitate Nature, "who is a perfect operatrix," had been in the main followed by British obstetricians, who have always considered the interests of the mother superior to those of the child. This attitude, which is indubitably the best for cases where the pelvis and child are of normal dimensions, led to the death of many children and mothers when it came to be applied in cases of contracted pelvis. For cases of slight contraction the powers of Nature were often sufficient, aided by the "hanging-legs" position of the mother (Scipione Mercurio, 1595). Version (an ancient operation which had been revived by Ambroise Paré, and recommended by Harvey "when there is necessity for handiwork in the business") and forceps (invented by Chamberlen and greatly improved by Levret, Smellie, and Benjamin Pugh) proved unsatisfactory when serious contraction of the pelvis had to be dealt with. Experience has shown that these measures involve considerable risk to the mother and child; and the dreadful alternative, embryotomy, necessitates the sacrifice of the child.

It was just at this time that important advances were made in the study of the contracted pelvis. Smellie in 1754 had been the first to give a representation of the rickety pelvis. At the same time he measured the diagonal conjugate of the pelvis, and R. W. Johnson in 1769 published his method of direct measurement of the true conjugate diameter with the hand. In 1772 Stein published a description of his internal pelvimeter, and in 1775 Baudelocque

described his instrument, which is still used for the measurement of the external diameters of the pelvis. Smellie's plates (published in 1754) and W. Hunter's *Gravid Uterus* (1774) raised the artistic representation of pregnancy and labour to the highest point of excellence.

Sir Fielding Ould, who was master of the Rotunda Hospital from 1760 to 1766, made the first observations on the entrance of the head into the pelvis and laid the foundations of the "mechanism of labour." He pointed out the danger of the high forceps operation in cases of contracted pelvis, invented an instrument (the "tebra occulta") for perforating the child's head, and stigmatized Caesarean section as "a detestable, barbarous, illegal piece of inhumanity." At this time, too, there was a great movement in the world towards the development of the special study of obstetrics. Lying-in hospitals and chairs of obstetric medicine were being founded, particularly in Italy. At Padua, where Harvey had studied, a chair of obstetrics was instituted in 1769. In Vienna extensive lying-in wards were being built in the Allgemeine Krankenhaus and were opened in 1784.

In 1786 Lucas Johann Boër (1751-1835) went to study in Paris under Baudelocque, Lauverjat, and others. After spending fifteen months in Paris he came in 1787 to England, where he studied under Denman, Osborn, Clarke, and Lowder. His travels in Great Britain, where midwifery was conducted on conservative, or at least expectant, lines—following the teaching of Harvey, Smellie, and W. Hunter—made a great impression on Boër: "he had learnt in France what art, in England what Nature, could do." He carried out his conservative principles while professor of the lying-in wards of the great General Infirmary in Vienna, which he raised to the first position in Europe. Boër held the chair of obstetrics in Vienna for thirty-three years. In 2,926 labours he only employed the forceps 19 times and perforated the head 8 times. He laid down very strict rules for the artificial interference with labour, insisting that this should only be resorted to in cases of neces-

sity, and then in the gentlest and most suitable manner; "all artificial means apart from strict necessity are mere bungling, involving the risk of torturing and destroying mother and child." While Boër was in Paris he saw the patient Souchot, on whom Sigault had performed symphyseotomy: she was suffering many discomforts as a result of the operation—the uterus was prolapsed, the pubic joint was ununited, and there was incontinence of urine from a fistula.

On the Continent other attempts were made to solve the difficulty of the contracted pelvis by symphyseotomy and by Caesarean section, but the results of these operations were not such as to commend them to the British obstetricians.

LUCAS'S RESTRICTED DIET.

Measures directed towards the mother having proved unsatisfactory, an ingenious attempt to overcome the difficulty of labour in contracted pelvis by procuring a small child by restricting the diet of the mother was made by James Lucas, surgeon at the Leeds General Infirmary. His paper was read before the Medical Society of London on

FIG. 1.—Jean René Sigault, who performed the first symphyseotomy (October 1st, 1777). (From a print in the library of the Royal College of Physicians.)

September 8th, 1788, was communicated by our founder, J. C. Lettsom, and is printed in the second volume of the *Memoirs of the Medical Society of London* (1794). The treatment consisted in "temperance in diet, a diminution in the usual quantity and a change in the quality of the food, an increase in exercise, the occasional loss of a few ounces of blood, and the moderate use of cooling aperients. This regimen was more strictly enjoined in the last months of pregnancy from a persuasion that an observance of it in the former months would avail little if neglected in the latter."

Lucas mentions a case of contracted pelvis where embryotomy had been performed in the two previous labours; under his treatment the next labour was remarkably less tedious and the child was delivered without difficulty. He gives other instances of the benefit of this treatment. This method of starving the mother to diminish the size of the child is usually attributed to Prochownick, who published a paper on the subject in 1901. It is interesting to find that it was first published by the Medical Society of London more than a century before. The method, of course, has its limitations and is very rarely employed at the present day; but I have recently seen a patient who was successfully delivered in America of a small child after adopting the treatment recommended by Lucas.

SYMPHYSEOTOMY AND PUBIOTOMY.

In the year 1772 Jean René Sigault published a paper, "An in partu contra naturam sectio symphysis ossium pubis sectione caesarea promptior et tutior?" Five years later, on October 1st, 1777, he first performed the operation on a patient named Souchot, delivering her of a living child, the mother recovering with the discomforts and inconveniences already mentioned. The Faculty of Medicine of Paris had a medal struck in Sigault's honour and in many directions there was great enthusiasm over the operation. But next year, in 1778, Piet reported that he had previously delivered the patient Souchot of a large child with prolapse of the cord without much difficulty, and thus took away a little of the credit of Sigault's achievement. Gradually the enthusiasm died down on the Continent and in England the operation was looked on with disfavour, mainly owing to the researches and writings of the Hunters and Denman. The first time this operation was performed in England was in 1782 by Welchman.¹ The child was dead and the mother succumbed.

It was only in Italy that the operation continued to be performed, though sporadically, till it was revived by Morisani in 1881 and by Pinard in 1900; the latter in 100 operations had a mortality of 12 per cent. for the mothers and 13 per cent. for the children. Since that date the division of the symphysis and its modification pubiotomy have been extensively practised on the Continent and to a less extent in this country, with a gradually diminishing rate of mortality. The reason why it has not been more in favour is that it inflicts considerable injuries on the mother and has a higher rate of mortality for the child than Caesarean section. It has the advantage that in a doubtful case it permits a trial of the effects of labour without increasing the risk of the operation and may be employed in a limited class of cases of slight pelvic contraction. In this country, however, the enthusiasm of some of its advocates appears to have evaporated. I have never performed the operation, and am of opinion that it is very rarely indicated if the cases of contracted pelvis are properly investigated during pregnancy. The disadvantages of symphyseotomy and pubiotomy have led to other operations for enlarging the pelvic cavity, such as excision of the pubic bones and of the sacral promontory; but these operations have not led to any practical results.

THE INDUCTION OF PREMATURE LABOUR.

Of this life-saving operation, purely English in origin, we have the first account in Denman's *Introduction to the Practice of Midwifery* (third edition, 1801, p. 394). It was given to Denman by Dr. C. Kelly, who informed him that

"about the year 1756 there was a consultation of the most eminent men in London at that time, to consider the moral rectitude of, and advantages which might be expected from the practice, which

met with their general approbation. The first case in which it was deemed necessary and proper fell under the care of Dr. Macaulay and it terminated successfully. The patient was the wife of a linen draper in the Strand. Dr. Kelly had himself performed the operation three times on the same woman and twice the children had been born living."

Denman defines the limitation of the operation in these words: "It is in those cases only in which there is a reduction of the pelvis to a certain degree and not beyond that degree that this operation ought to be proposed or can succeed." He mentions the case of a lady of title who had had four dead children at term. Labour was induced early in the eighth month of her pregnancy and the child was born alive and survived.

Denman induced premature labour by puncturing the membranes, and stated his opinion that the operation is perfectly safe to the person on whom it may be performed. Puncture of the membranes is still used by some obstetricians (for example, v. Herff) as a means of inducing labour; but the favourite method is the bougie method, first employed by Sir J. Simpson in 1854. It is usually described as Krause's method, whose publication, like Simpson's, is dated 1855.

The induction of premature labour has always remained an essentially British and mainly English operation. In France it was opposed by the great authorities Baudelocque and Capuron, and not till 1830 was it favoured by Stolz. In Paris it was first performed by P. Dubois in 1840, but was condemned on insufficient grounds by Pinard in 1900. In Germany Wiedmann wrote in its favour in 1779; his pupil Wenzel was the first to perform it in 1804, and his paper with Froriep's commendation led to its adoption in Germany, where it is still practised, but is by no means a favourite operation. In Berlin it was first employed by v. Siebold in 1819. In the Scandinavian countries it was not performed till the year 1827. In America Whitridge Williams, of Johns Hopkins Hospital, Baltimore, states that he has never found it necessary to resort to the induction of premature labour in contracted pelvis. His erroneous reasoning in adopting this attitude has been pointed out by Dr. Herbert Williamson in an excellent article.² I will only add here that in his alternative treatment by Caesarean section Dr. Whitridge Williams finds it necessary to resort to the mutilation of the mother by hysterectomy with remarkable frequency.

From this brief historical review of the induction of premature labour it will be seen that the operation has met with little favour on the Continent of Europe and in America. If one inquires into the cause it is found in three factors—that the operation has been performed in unsuitable cases, at unsuitable times, and by unsuitable means.

The cases of contracted pelvis suitable for the induction of premature labour are those with a true conjugate diameter of not less than $3\frac{1}{4}$ inches; the operation should not be undertaken before the thirty-fifth week from the last day of the last menstruation, and the bougie method of Simpson or rupture of the membranes is the best method for ordinary cases. Champetier de Ribes's bag may be required in special cases, though it has the great disadvantage (amongst others) that it displaces the presenting part. For a pelvis with a conjugate diameter less than $3\frac{1}{4}$ inches in length Caesarean section is more suitable, though I have delivered by induction at the thirty-fifth week through a pelvis with a 3-inch conjugate a child who grew up to womanhood. The mother died some years later after an operation for cancer and the pelvis is exhibited to-night.

Carried out in the manner indicated induction of premature labour is an excellent operation, giving results to the child less favourable indeed than Caesarean section, but to the mother even better than those of natural labour at term. The operation has been repeated in one of my cases twelve times with the result of twelve living children. The larger the pelvis over the $3\frac{1}{4}$ -inch minimum the later the induction should be deferred, but for pelves with a $3\frac{1}{2}$ -inch true conjugate it is better generally to let the patient go to term unless the head is unusually large. It is important that the delivery of the premature child be left to the natural powers, forceps and version being particularly injurious to these infants.

Having had a large experience of this beneficial operation, having watched the upgrowing of some of these premature

girls to normal womanhood and motherhood, it is more in sorrow than in anger that I see the unpopularity of the operation with many foreign obstetricians and their failure to follow the three simple rules above enumerated, which are essential for success.

ANTISEPSIS AND ANAESTHESIA.

Before I proceed to consider Caesarean section for contracted pelvis it may be well to review the development of the antiseptic treatment which has revolutionized this and other operations.

In 1772 Charles White of Manchester published a *Treatise on the Management of Pregnant and Lying-in Women*. In this work White speaks of puerperal fever as a putrid fever which is contagious and arises from putrefaction of retained products or from the air of lying-in wards. White's contribution to the study and treatment of puerperal fever was an important one and has been dealt with very fully by Professor Adam in his Lloyd Roberts Lecture.

In 1843 Oliver Wendell Holmes published in the *Quarterly Journal of Medicine and Surgery* a paper on "The contagiousness of puerperal fever," in which he adduces strong evidence of the contagiousness of the disease and points out effective means of preventing it. He specially mentions changing the clothes and washing the hands with chloride of lime after visiting cases of puerperal fever; he reports that by adopting these precautions a doctor was able to attend other cases of labour which ran a perfectly normal course.

In 1846 Ignaz P. Semmelweis became assistant in the lying-in wards of the General Hospital in Vienna. From 1784 to 1822 these wards had been under the care of Zeller (1784-89) and Boër (1789-1822) and the mortality from puerperal fever had been 1.25 per cent. over the whole period. Under Boër's successor Klein medical students were allowed to practise anatomy and to dress suppurating wounds while attending cases of labour, and Semmelweis noticed that the mortality was much higher in the wards attended by the medical students than in those attended by the midwives. In the five years before Semmelweis's appointment the mortality in the students' wards had risen from 6.56 to 9.92 per cent., while that in the midwives' wards had fallen from 5.58 to 3.38 per cent. Semmelweis adopted the method of washing the hands with chloride of lime, with the result that the rate of mortality fell from 8.3 to 2.3 per cent.

It is the undying merit of Semmelweis to have pointed out that puerperal fever arose not only from infection from corpses, but from any putrefying organic substances. What putrefaction was due to was shown by the researches of Pasteur in 1860, and Lister in 1867 gave to the world his antiseptic treatment, which laid the foundations of the modern aseptic surgery, by which the danger has been almost completely removed from operations which a few years ago were uniformly fatal.

The introduction of anaesthesia by means of ether (Morton, 1846) and chloroform (Sir James Simpson, 1847)

was one of the greatest advances ever made in medicine. For prolonged operations I think there can be no doubt that ether is preferable; but in ordinary midwifery cases chloroform, administered *à la reine*, is still the best and safest means of alleviating the pains of labour, and it is excellent, administered until the child is delivered, in cases of the classical Caesarean section. The attempt to produce painless labour by the injection of scopolamine and morphine has not proved successful and is not free from danger to mother and child.

FIG. 2.—Headpiece of Sacombe's *Éléments des accouchemens* (1802) depicting Hercules destroying the Caesarean hydra.

CAESAREAN SECTION.

Caesarean section has always been interesting, and never more so than at the present day. The origin of the word "Caesarean" is unknown. On the supposed birth of Julius Caesar by means of this operation, based on an error in the translation of a passage in Pliny, Sacombe has given his opinion in the following terms: "Pliny was a lying historian whom it would have cost no more to split the belly of Aurelia with his pen in order to deliver Caesar than to split the rocks with vinegar to open up a way across the Alps for the troops of Hannibal."

The first volume of the *Memoirs* of the Medical Society of London contains a most learned paper in the form of a letter addressed to Lettson on the character of Aesculapius. The writer of the letter describes the birth of Aesculapius by Caesarean section as mentioned in Ovid's *Metamorphoses*,

natum flammis uteroque parentis
Eripuit geminique tulit Chironis in antrum.

Despite these illustrious examples, Caesarean section attained but little popularity until the end of the eighteenth century, although it had been practised on the Continent, with only occasional success.

In England it was twenty years after the foundation of our Society—in 1793—that the first successful operation was

performed on a living woman by Barlow of Bolton; the child did not survive.

Ambroise Paré (1510-1590), having seen two Caesarean sections performed by his pupil Guillemeau, with fatal results to the mothers, was opposed to the operation: "Je ne conseillerai jamais de faire tel œuvre où il y a si grand péril sans nul espoir."

In 1581 Rousset had published the first work on the

subject under the title *Hysterotomotokie*.

In 1595 Scipione Mercurio had recommended the operation. He had seen patients on whom it had been performed in Toulouse, where he said it was as well known as bleeding for headache. He gave an illustration of the operation and recommended that the incision should be made to the right of the middle line in order to avoid the spleen.

At the time our Society was founded there was a widespread desire amongst obstetricians to avoid the horrible craniotomy which at the end of the eighteenth century was performed frequently, especially in England. The most eminent of these obstetricians was Jean Louis Baudelocque. On the "17 ventôse de l'an iv" (1796) Baudelocque performed Caesarean section on a patient who had previously had a living child at term; the patient died three days after

FIG. 3.—Medal struck in honour of Edoardo Porro to commemorate the twenty-fifth anniversary of the performance of the first amputation of the uterus after Caesarean section (1876).

the operation. As a result of this unfortunate experience Baudelocque was assailed with the most violent obloquy by Jean François Sacombe, an eloquent, witty, and scurrilous charlatan, who occupies such a remarkable position in the history of Caesarean section that a few particulars of his career may be worth mentioning.

J. F. Sacombe.

Sacombe was born about the year 1750 at Carcassonne. After studying obstetrics at Montpellier and in England under Osborn and W. Hunter he went to Paris to practise as an accoucheur. He gave out that he could deliver any patient with his hand alone, without the use of any instrument. He was especially bitter against those who performed Caesarean section, and from the year 1790 onwards he disseminated his views by lectures, pamphlets, and posters. In one of the pamphlets he pilloried Baudelocque as a "murderer," for which libel he was condemned to pay a fine of 3,000 francs. Unable to pay the fine, he fled from Paris, but returned under the altered name of Lacombe in 1813. Having lost his obstetric practice he gained a living by selling secret remedies. "Deserted by Lucina, he paid attention to Venus," wrote a work entitled *Venusalgia*, and died discredited and neglected in 1822.

In order to carry on his campaign against Caesarean section, Sacombe founded his "Ecole anti-Caesarienne" in 1798. Here lectures were given and an annual festival was held at which a silver medal was awarded to one of the pupils; on one side of the medal was the figure of Hercules slaying the hydra, with the inscription "No more Caesarean section"; on the other side a beehive and flying bees, and the inscription "Sacombe's anti-Caesarean School." The recipient of the medal had the privilege of embracing Madame Sacombe.

A statue of Bonaparte was set up in the school and Sacombe dedicated one of his works to him, and at one time praised the Consul for "muzzling the Caesarean tigers." In 1815, however, he was imprisoned for writing against the Emperor. Sacombe was a prolific writer, both in prose and verse. In his *Lucine Française* (1803) he gives an account of François Rousset, whose work on Caesarean section had been highly praised by Haller and Portal. Several faculties of medicine had disputed the glory of conferring a degree on Rousset, and Catherine de Médicis had appointed him her physician.

"However, I resolved," says Sacombe, "to overturn this colossal statue, to break it and to prove to my pupils that celebrity in medicine can only be desirable when based on talents and virtue. I will demonstrate that Rousset was neither a physician nor a surgeon, but a fanatic and ignorant criminal, and the vile instrument of depopulation of which the infamous Catherine de Médicis made use against the Protestants."

In his *Elémens de la science des accouchemens* (1802) he styles himself "Professeur de médecine et de chirurgie des accouchemens," yet he speaks contemptuously of accoucheurs as "hermaphrodites of the art" and "midwives in breeches." Of Clément, the first "accoucheur," he writes:

Clément dut au hazard sa vogue et son crédit
Il enrichit moins l'art que l'art ne l'enrichit.
Accoucheur des Lais, en dépit de Lucine
Clément fit fortune où maint amant se ruine.

Sacombe's *Elémens* contains a portrait of the author and a plate of the Ecole anti-Caesarienne, with a figure of the Caesarean hydra struck down "30 brumaire, an vii" (Fig. 2). Of this monster he writes:

"Born in the midst of the civil wars which desolated France towards the middle of the sixteenth century the Caesarean hydra, attracted by the odour of human blood, has raised again its hideous head amidst the scaffolds which crowned the soil of France at the end of the eighteenth century."

He ends his work:

"My task is complete; I have avenged Nature and consoled humanity in giving the death blow to the Caesarean hydra."

It was, however, not by the Ecole anti-Caesarienne nor its discredited founder that the performance of Caesarean section was rendered infrequent, but by the almost uniformly

fatal results of the operation at the end of the eighteenth century.

In 1866 Murphy found that of 56 operations in Great Britain 46 had terminated fatally (82 per cent.). Even as late as 1874 the maternal mortality was 54 per cent. in Europe and America.

Porro and Säger.

In 1876 Porro (Fig. 3) introduced his method of amputating the uterus after the section. The effect of this, combined with Lister's antiseptic method, was to lower the death rate considerably, so that in Truzzi's great collection of all the "Porro" operations published up to 1901 the death rate was reduced to 24.8 per cent.

In 1882 Säger introduced his method of suture, which still remains the favourite, and though various modifications have since been recommended, such as the incision into the lower segment and the subperitoneal and transperitoneal incisions, the Säger conservative method with silk sutures carefully buried by a continuous peritoneal stitch has advantages over other methods in uninfected cases. The advantages of the Säger incision and suture are (1) the rapid delivery of the child in an unasphyxiated condition; (2) the operation can be repeated with safety; (3) adhesions and rupture are rare if the wound be properly sutured with silk.

Results of Modern Caesarean Section.

The results of the modern Caesarean section in non-infected cases are highly satisfactory. Thus Routh in 1910 found a maternal mortality of 2.9 per cent. in "clean" cases, of 10.8 per cent. in cases with ruptured membranes, and of 34.3 per cent. in cases where frequent examinations or attempts at delivery had been made. From those and from figures collected by Holland (who dealt with hospital cases only) it is seen that to obtain a low mortality rate it is necessary that the mothers should not be infected when operated on. In such cases the operation should be free from mortality, and in my personal practice has been so.

Abuse of Caesarean Section.

The safety of the operation in skilled hands has led to a great abuse of the operation by its performance in cases in which it is quite unnecessary and often quite unsuitable. I have known it proposed for a patient with a large pelvis solely because she was 38 years of age; she was easily delivered by Nature of a 9 lb. child. When we read of hospital staffs and even individuals performing a hundred Caesarean sections in a year, it is time to make a protest against unnecessary operative interference. The most marked instance of "meddlesome midwifery" is contained in a work by I. W. Potter entitled *The Place of Version in Obstetrics* (1922). This author delivered 1,130 women in the year ending August 31st, 1921; of these, 100 were delivered by Caesarean section and 938 were delivered by version. It is to be regretted that such a line of practice should be advocated, as it will inevitably be attended with disaster in the hands of less skilful imitators.

Francis Bacon commends as excellent for the advancement of learning the keeping of Registers of Doubts, with the caution that "when the doubts be thoroughly sifted and brought to resolution, they be from henceforth omitted, discarded, and not continued to cherish and encourage men in doubting."

In obstetrics there have been many doubts. But doubt that natural labour is in ordinary cases preferable to operative labour should have been discarded long ago.

In the *Boston Medical and Surgical Journal* of June 14th, 1923, there is a thoughtful and remarkable article on Caesarean section, in which the author says:

"In the minds of certain obstetricians or surgeons Caesarean section is the only method by which a self-respecting patient can be delivered and maintain her standing in the community."

He also states—

"that the mortality statistics of Massachusetts show that of the women dying during pregnancy and labour in a given period approximately one-third die of complications which have been treated by Caesarean section."

Finally, the writer of the article appeals for protection for women in childbirth against the ill judged enthusiasm of the untrained obstetrician.

It is evident that Caesarean section, which Sacombe thought he had put an end to in 1798, has shown marked evidence of revival, and his hydra has developed "heads" which were non-existent in his day. The performance of Caesarean section for cases of placenta praevia, accidental haemorrhage, malpresentations, and eclampsia is being overdone, though not to the same extent as for "contracted pelvis."

It is sad that such a beneficial operation as Caesarean section, which has been developed to such a pitch of perfection that a woman, however deformed, can be delivered with safety to herself and child, should be brought into discredit by being performed in cases for which it is unnecessary.

Antenatal Diagnosis.

I have endeavoured to show some of the changes which have occurred in the treatment of contracted pelvis in the lifetime of the Medical Society of London. Further improvement of the treatment depends on more accurate measurement of the pelvis and foetal head, probably by means of *x* rays. Every woman should have her pelvis measured to see if she is fitted for child-bearing. During pregnancy she should be examined at the thirty-fourth week to ascertain the presentation of the child and its size relative to that of the pelvis. If the pelvis is contracted, it should be treated by one of the methods suitable for the particular case. Of these methods at the present time, in my opinion, induction of premature labour is employed too little and Caesarean section too much. As opinions are of less value than facts I give the results of three years' practice at University College Hospital, where the routine mentioned above has been adopted.

In the three years (1920, 1921, and 1922) 5,647 women were delivered. Of these, premature labour was induced for contracted pelvis 113 times, all the mothers and 101 of the children surviving. Caesarean section for contracted pelvis was performed 32 times, all the mothers and 30 children surviving. Craniotomy was performed 4 times (twice for dead children and twice for hydrocephalus); the four mothers recovered. Forceps were used (for various reasons) 168 times (that is, in less than 3 per cent. of the cases), all the mothers recovering. I am indebted to the obstetric registrar, Mr. Leslie Williams, for these figures.

Remaining Risks of Caesarean Section.

Caesarean section entails risk of hernia, of adhesions, and rupture in subsequent pregnancy. These risks are probably avoidable in aseptic cases by proper suturing and sutures. How great these risks are can only be ascertained when obstetricians publish all their cases instead of a selection of cases done in favourable conditions before or in the early stages of labour, other cases being treated by craniotomy or hysterectomy. The sterilization of a woman after Caesarean section in an uncomplicated aseptic case is, in my opinion, not justifiable; in complicated cases hysterectomy is sometimes required.

CONCLUSION.

In conclusion, I hope I may be pardoned for bringing a somewhat technical subject before the Medical Society of London. In the past some hard things have been said of obstetricians; in recent days, however, they have been commended as integrators of medicine. Agreeing with Sir Clifford Allbutt as to the importance of that integration, I have placed my views before a Society which by its constitution and practice is the best example of the advantage to be derived from discussion of medical subjects by physicians, surgeons, and general practitioners. With the assistance of the medical and surgical secretaries, of whose devotion to the interests of the Society I have already evidence, I hope to be kept mindful of that integration at the meetings over which it will be my privilege to preside.

REFERENCES.

¹ *London Medical Journal*, March, 1790. ² *Journ. Obstet. and Gyn. of the British Empire*. 1906.

THE REGULATING AND REFLEX PROCESS.*

BY

P. T. HERRING, M.D.,

PROFESSOR OF PHYSIOLOGY, ST. ANDREWS UNIVERSITY, AND
PHYSIOLOGIST TO THE ST. ANDREWS INSTITUTE FOR
CLINICAL RESEARCH.

PART II.—THE NERVE IMPULSE: THE IMPORTANCE OF THE RECEPTORS: AND THE PRODUCTION OF PAIN.

THE anatomical unit of the nervous system, the neurone, consists of a nucleated cell body and one or more processes, one of which is always an axis cylinder. The other processes, when present, are dendrons, and frequently break up into numerous small branches known as dendrites. The function of the whole unit—dendrons, cell body, and axis cylinder—is to conduct the nerve impulse. The conducting element is a watery fluid containing protein and lipoids in the colloidal state, and possessing the physico-chemical attributes of living matter in this condition. No fibrils can be seen in the living neurone, though they appear in the dead nerve after certain methods of fixation and staining have been employed. The cell body and dendrons frequently contain a store of reserve energy in the form of nucleo-protein, which, when coagulated by certain fixatives and suitably stained, gives rise to the so-called Nissl bodies. The nucleus presides over the nutrition of the whole neurone and maintains it in a condition suitable for carrying the nerve impulses. But the presence of the nucleus and cell body is not essential for the passage of the nerve impulse, for, if cut off, the remainder of the neurone can still conduct for a limited time before it dies.

The nerve impulse, when excited by artificial means in an isolated nerve fibre, travels in both directions from the point of stimulation, but in the intact nervous system the nerve impulse travels normally in one direction only. The synapses between the neurones are irreciprocal, possessing a valve-like action which prevents any accidental impulse that may have been carried in the wrong direction from passing into the next neurone. The synapse only allows a nerve impulse to pass from the endings of the axis cylinder of one neurone to a dendron or cell body of the next neurone. Consequently the nerve impulse can only take the one direction through a physiological unit, and the neurone, when in a state of activity, only transmits its impulses in a forward direction.

The cell bodies of the peripheral afferent neurones are found in the ganglia on the posterior roots of the spinal cord, and in the corresponding ganglia on the cranial sensory nerves. The peripheral nerve fibre of each cell, though it possesses an axis cylinder, is morphologically the dendron of what was originally a bipolar cell. This dendron runs directly into an axon at the T-shaped junction near the body of the nerve cell in the ganglion, and there is evidence that the nerve impulse passes directly over this junction. Some of the spinal ganglion cells have small intracapsular dendrons, and consequently nerve impulses can reach the neurone through them, in which case the cell body must also be concerned in conduction. But little is known about the function of the intracapsular dendrons of the spinal ganglia. Their presence, however, indicates that a certain amount of analysis and redistribution of nerve impulses may take place in these ganglia.

In the olfactory nerve the cell body of the first afferent neurone lies in the olfactory membrane itself, and its dendron is a specialized portion of the cell which forms a tiny projection on the surface of the membrane. In the auditory and vestibular nerves the cell bodies are bipolar, and the peripheral process of each cell, though really a dendron, forms arborizations among the cells of the sense organs which are developed as special receptors. Little is known about the afferent neurones of the viscera, but there

* The expense of this research was in part met by a contribution from the Medical Research Council.