

## TRANSACTIONS OF THE OBSTETRICAL SOCIETY OF LONDON.

*Meeting of June 2d, 1897.*

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### PARTURITION DURING PARAPLEGIA, WITH CASES.

DR. AMAND ROUTH.—A multipara, with complete paraplegia below the level of the sixth dorsal vertebra, was admitted into a surgical ward of Charing Cross Hospital under his colleague, Mr. Astley Bloxam, half an hour after the accident which caused the paralysis. She was then nearly seven months pregnant. For eight days uterine intermittent contractions were absent, and then became gradually more and more perceptible. After over two months the patient was transferred to a special ward, and labor came on two hundred and sixty-one days after the last menstruation, without the patient feeling any pain. The first stage lasted ten hours, the second two and a quarter hours. The placenta followed, aided by slight expression, in five minutes. The patient's only sensation during a "pain" was a "tight feeling" at the epigastrium, giving her an inclination to hold her breath, but this tightness was in no sense painful. As the head was passing the vulva the patient cried out, but this also seemed a reflex act and was unaccompanied with sensation of pain. The "pains" were not as well defined as in a normal case, the intermissions being often absent, as judged by the vaginal touch and the hand on the uterus. In fact, the "pains" rather remitted than intermitted. Retraction was not good for some hours, but there was no undue hemorrhage. Uterine involution and lactation were quite normal. Death occurred six months later, and full details of the pelvic organs, the fractured spine, and the cord were given.

The views held at different times as regards the physiology of parturition are discussed, and cases described by Ollivier (1827), Nasse (1835), Benicke (1874), Scanzoni (1848), Paget, and Brachet (1837) are given. Experiments by Sir James Simpson (1849), von Rohrig (1879), Serres (1824), Langley and Anderson (1895-6), Riemann (1871), Goltz (1874 and 1893), Dembo (1884), and others, are briefly summed up. The evidence afforded by cases of post-mortem parturition is also reviewed. Finally, the secondary questions of conception and lactation during paraplegia are mentioned, and the following views are given as being borne out by the facts stated. In pregnant women affected with paraplegia, from injury or disease in the *dorsal* region of the cord, labor may commence at

the normal period of gestation, and progress in an approximately normal manner, but without sensation of pain. Involution and lactation are also normal. It is proved also from both cases and experiments that conception may take place during paraplegia. Further experiments as well as clinical facts are required before the physiology of parturition can be known, and much will be done when it is discovered with certainty what is the force by which the process of labor is initiated at the end of gestation.

Meanwhile the following views seem to be fairly established :

1. The act of parturition is partly automatic and partly reflex, these actions corresponding in the main to the first and second stages of labor respectively.
- 2 Direct communication with the brain is not essential to co-ordinate uterine action, though the brain seems to have a controlling influence upon the "pains," helping to make them regular with well-defined intermissions.
3. Direct communication between the uterus and the lumbar enlargement of the cord, through the medium of the sympathetic ganglia between the first and third lumbar, is probably essential to the regular and co-ordinate contraction and retraction of the uterus, as occurs in normal parturition.
4. It seems also probable that the uterus is able automatically to expel its contents as far as the relaxed part of the genital canal, even when deprived absolutely of spinal influence, spinal reflexes being then necessarily absent. But in the absence of reflex action the entire process of parturition would be irregularly, and probably incompletely, performed, as in Sir James Simpson's experiments and Brachet's case.
5. Lactation is not solely due to nervous influence, but partly to chemical changes in the blood, which affect secondarily the mammary glands and other tissues of the body. This chemical change in the blood is not of ovarian origin, but is probably due to the metabolism of the pregnant uterus.

DR. MOTT, being called upon by the President, remarked that he had examined sections of the spinal cord at the seat of the lesion, and had found that the crush had completely destroyed the nervous structure at the seat of the injury, but that apparently many cells in the anterior horn of the lumbar enlargement were fairly normal in appearance; inasmuch as these were still in connection with the uterus, this case did not prove, like the dog of Goltz, the independence of action of the uterus. He (Dr. Mott) had seen demonstrated at the International Congress at Berne the control of the sphincters in this animal, deprived previously of a great part of its spinal cord. The experiment proved that in the dog the uterus could contract effectually without cerebro-spinal influence and that the sphincters could maintain their tonus—facts which upset all our previous notions. It must be remembered, however, that the sympathetic chain and the posterior spinal ganglia remained. These are connected, and probably formed the reflex arc which maintained the tonus in the sphincters. He ventured to suggest that the physiological stimulus for the onset of labor might

be a biochemical condition of the blood of the fetus at full term—*e.g.*, an increase of carbonic dioxide. That profound biochemical changes take place during pregnancy is highly probable; the enlargement of the mammary glands in this case, after interruption of the spinal connection between these structures and the uterus, suggests this, and the fact that the mammary glands enlarge after all the nerves have been divided, both cerebro-spinal and sympathetic, proves that an altered condition of the blood can be the only means of bringing about disassociated functional activity in two remote structures.

DR. HORROCKS thought that natural labor was not only automatic and reflex but also voluntary. Experiments had shown that after removal of all external nerve influence the uterus was able to expel its contents. This was really only an instance of a general law. Whether, however, it was possible for an organ like the uterus to contract rhythmically without any nerve ganglia in its own walls, was a question.

DR. JOHN PHILLIPS mentioned the case of a woman with syphilitic paraplegia in which labor had been quite normal.

DR. DAKIN asked the author if any reflex contractions of the abdominal muscles had been observed during the second stage of labor; also what connection he thought there was between involution of the uterus and lactation.

DR. BERTRAM ABRAHAMS criticised Dr. McCann's views as to the meaning of Paul Bert's experiments, pointing out that, as the breasts of the goats were removed, the sugar in the urine must have been formed in the blood and not absorbed from the mammary glands, and that the same reasoning applied to the belladonna experiments. Dr. Abrahams wished to emphasize the view that the initiation of the action of smooth muscle and of secreting glands did not necessarily depend on nervous action. With regard to the uterus, it appeared to be conclusively shown that this important mass of smooth muscle continued to contract even when removed from the body; but this case could not be taken as deciding the question as to the causation of parturition, as the so-called lumbar centre was practically intact. Still the speaker held that there was no evidence as to the reflex origin of parturition, while at the same time there could be no doubt, as in the case of the heart beat, of its reflex control.

DR. AMAND ROUTH agreed with Dr. Mott that the crux of the whole question was the difficulty in determining the cause of the onset of the labor at term. The cause was probably a biochemical one, and Dr. Mott's suggestion that this resulted from the accumulation of carbonic acid in the placental circulation was not likely to be rejected, for it was known that asphyxia produced uterine contraction and caused abortion if pregnancy existed. In reply to Dr. Abrahams, he thought there could be no doubt that the second stage in the case recorded was mainly reflex: for though there was no sensation of pain, there was an involuntary holding of the breath, and though there was no action of the abdominal muscles, there

was undoubtedly diaphragmatic contraction and even crying out at the end of the second stage. These were clearly reflex phenomena, and other proofs were adduced in the paper.