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OBSTETRICAL ANESTHESIA AND ANALGESIA

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God uttered the curse on woman: "I will greatly multiply thy pain and thy travail; in pain shalt thou bring forth children" in the Biblical story of the temptation of Eve and her partaking of the forbidden fruit. This explanation of woman's sufferings in childbirth dates back to the earliest stages of history. Early in the dawn of mankind's existence on earth, primitive woman was familiar with the agonies of labor. How she provided for them, how she went about the procedure of delivering a living being from her own living body presents a fascinating view of mankind's resourcefulness and intrepidity.

We know now how childbirth among the primitives proceeded; both by fragmentary records, inscriptions, and drawings of those times; and even more by our knowledge of the recent and present day habits of primitive peoples. Unaffected by science and modern civilization, the woman of these times continues to give birth just as their ancestors before them did, hundreds and thousands of years ago. Different tribes and religious beliefs formed their own customs.

The childbirth of the primitive was generally easy because of her healthy and natural mode of life. Her diet was vigorous and unadulterated, and she did not shut herself from the radiations of sunlight by glass and clothing. She was likely to have a strong and capacious pelvic basin. The

primitive was not a neurotic; neurosis being a characteristic of a more advanced stage in civilization. The woman worked umtil just before her delivery and returned to her household tasks immediately afterwards. It has been accepted among the primitive people as a natural process, and as such, treated with indifference and brutality. Pearl Buck's novel of Chinese life, "The Good Earth," records a similar episode of a birth following the usual daily work in the fields.

All the primitive men knew about the pregnancy was the cessation of the menses. The North American Indians carefully looked after their pregnant women after this time. In Japan the abdomen was kneeded regularly to correct malposition. When the Palintes recognized the onset of labour they starved the mother for days, thinking that the child remained inside the mother voluntarily until it was starved out.

Most of the savages prepared a retreat for the expectant mothers. The mother was accompanied by a female relative, usually to a river bank, where, after delivery, the child and mother could be cleansed and purified when it was all over. But in general, the primitive mothers had an easy time of labour, and due to the heavy work and out-of-doors activities, the child was small.

The observations of the processes of birth led to efforts to quicken the period of its duration. Sometimes these efforts were undertaken a month or more before the expected delivery. An attempt was made to spread the mouth of the uterus,

beginning a month before the delivery. The moistened leaves of a plant were rolled together tightly into a cone and inserted into the "os uterus" for the purpose of distending it. Loud shouting and drum-beating were engaged in as a safeguard against hostile spirits. And as a further assurance, cooking vessels were left open as an example of the birth canal.

Manipulations and massagings were used to force the child down and to correct any slight abnormalities of position. The two great dangers of the savage women were the transverse position of the child and the lack of strength. The treatment for these two dangers was to suspend the woman by the wrists, clasp her around the abdomen, and push downward on the mass inside. Other rational means was to be attended by a few female relatives who busied themselves chanting encouragement and incantations or feeding the patient an assortment of brews and herbs. Another maneuver consisted of putting the hand in the womb and catching the child by the feet when it was in a transverse or difficult presentation. The feet were drawn down out of the cervix,and the delivery was made possible.

Medicines were frequently given with a mixed purpose. Often they were intended to test the vigor of the child; if it was a weakling, it would not survive the strong doses given to the mother, and its death would, therefore, be a boon to the tribe.

Medicines were also used to increase the parturient's pains and exertions to speed delivery of the child. Grecian literature gives us Homer's "Odyssey" in which Helen of Troy put some drug, which some believed to be Mandrogara or opium, into wine to "lull all pain and anger and bring forgetfulness of every sorrow." Scythians, some 500 years later, inhaled the fumes of various hemp which produced an exalted mental state followed by sleep. The chronicler of Ancient Rome furnished similar evidence.

Mandrogara was well known at the beginning of the Christain Era. Dioscarides, a Greek physician, was probably the first to make its earliest allusion to its use. Galen, mentions the power of it to paralyze sensation and power. Preparation of different drugs were made by Jews and Chinese, and given to criminals to produce such a mental state that they would confess their crimes. Undoubtedly, the Chinese were the first to use Indian hemp as a means of dulling pain.

The Egyptians used a herb under the name "hashish." The fumes of this, when inhaled, induced intoxication and mental exaltation. Other medications were employed, but no pain was completely alleviated.

The savage woman availed herself of a wide variety of postures for delivery. The pregnant woman either stood up in delivery; or knelt or squatted; or lay sideways in a resting position; or squatted over a stool; sat on the lap of her husband

or a friend; stood erect or forced backward; clung, standing, to the neck of an assistant; knelt, head in lap; suspended herself from the limb of a tree; was tied to a log; or placed in a specially contrived obstetrical chair. The positions varied with each tribe and each locality. The obstetrical chair was an arm chair with the seat cut out in a semi-circular manner so that the child could be extracted through the opening. This type of labor and position was used for many years. But after the establishment of a scientific anatomy of Vesalises, and the beginning of a physiology by Harvey, the practice of obstetrics could no longer remain a separate "trade" practiced by apprentices. Men with more alert minds than women became interested in this field, and through their studies, the first real advancement in the practice was made. The men who did obstetrical work were ridiculed and called "men mid-wives" and"mid-men". But during the whole period of the dominance of the "mid-men" over obstetrics, it, as a science, made little progress than just a shrewd assistance to nature.

The theory still holds true that the position of women in any civilization is an index of the advancement of that civilization; the position of women is gauged best by the care given her with the birth of her child. Due to all the demance theories and the like, progress was very slow until the fifteenth and sixteenth centuries. At the height of the

Egyptian civilization, and again at the height of the Greek and Roman civilization; the art of caring for the child-bearing women was well developed. Whatever progress there was made in the field of obstetrics, as in all medicine, was the result, chiefly, of the Arab and Jewish doctors. Their learning, to a large degree, was derived from the classic Greek sources, Hippocrates and Galia. From the 11th to 13th centuries, the Moors of Spain and of the African coast attained an unusually high level of civilization. During the 13th century Hugade Lucas put a patient to sleep with an oil. It consisted of opium, of the juice of the unripe mulberry, juice of the hemlock, juice of the leaves of wood ivy, lettuce, and water hemlock, boiled with a sponge, which, for use, was soaked in hot water and applied to the nostril. To awaken the patient, another sponge soaked in vinegar was applied to the nostrils.

In late 1534, Pari referred to it as a practice "used formerly by operators." But, from the ignorance of the strength of various ingredients led to its temporary abandonment. It is difficult to imagine why the preparation of anesthetics was neglected when medicine was making the rapid which marked its development during the 15th and 16th centuries.

With the decline of the Greek and Roman civilization, care of women deteriorated; for 13 centuries the practice developed by the Greeks was lost or disregarded in Europe.

The art of caring for the child-bearing woman was not brought back to its former development until the 16th and 17th centuries.

Pari was very interested in surgery and its advancements, but he did contribute to obstetrics, the revival of the use of podalic version, which was one of Hippocrates methods. He introduced to the world the accurate knowledge of the anatomy of the female reproductive organs.

About the same time, a second operative device was introduced, which was the Caesarean section. Formerly, this had been used to rescue a still living child from a mother who died in the exertions of labor.

The mortality rate of this operation was very high because of unsterile technique and lack of knowledge. This, of course, held true during the medieval times, for both child and mother had reached a point never reached before because of the indifference to the suffering of women, also to the cultural backwardness of the civilization and low value placed on life. These were called the "ages of faith," so consequently nothing was done to overcome the enormous mortality. No greater crimes were ever committed in the name of civilization, religious faith and smug ignorance than the sacrifice of the lifes of countless mothers and children in the first 16 centuries after Christ among civilized mankind.

Obstetrical knowledge developed most rapidly in France because they had famous hospitals like the Hotel Dieu. Pari and other eminent surgeons received their early training there. During this time, a school for mid-wives was opened at the Hotel Dieu. The women graduated from the school were of a type vastly superior to the bedraggled ones who had formerly trundled their obstetrical charis from house to house. The customs of the time were changing; trained and supervised mid-wives were a step toward the betterment of the child-bearing woman, and the next step was the participation of the physician himself in midwifery.

It was in England that a family of obstetricians practiced by the name of Chamberlen. Dr. Hugh Chamberlen, a son, intoduced to the world the obstetrical forceps, the instruments of mercy. They consisted of two curved blades. The curved ends fit the child's head, at the other end they locked at the handles. Their purpose was to extract the fetus from the pelvis of the mother. For decades they guarded the device as a family possession. Due to this instrument, they were doing all the deliveries, and the other men interested in the field were being ridiculed and were gaining no experience in obstetrics at all. Through their power, the Dr. Chamberlins' were exiled from England. It was not until 1753 or 54 that their secret was revealed by a friend of the Chamberlens' who lived in Amsterdam. The success of this family and the growing

popularity of obstetrical surgeons in England revived the rivalry between mid-wives and surgeons.

During the entire 18th century the midwives openly wrote pamphlets protesting against the use of male obstetricians. The physician, chiefly the surgeon, was the constant butt of humor for the writers of the period. The growing challenge to the mid-wives brought about a progressive activity to raise their standards and improve their methods. Lying in hospitals sprang up; the sufferings of woman, as a result of her biological process was accepted as part of the burden of medicine, and gynecology and obstetrics advanced rapidly.

By the 19th century, obstetrics was well developed from the mechanical side. Great progress had been made in the art of assisting the child-bearing woman during the 300 years which had passed since Pari had opened the way for the return of the physician.

The lying-in hospitals were a progressive step ahead and were of great assistance and relief to both mother and child. After this type of hospital became popularly established, an extraordinary fatality made its appearance among the patients, and for a long time blackened its reputation. The blight was in the form of puerperal disease, or childbed fever, a disease about which little was known but which had fatal consequences to women in their lying-in condition. This disease, which

struck only at women who bore children, became a pestilence during the late 18th century and first half of the 19th century. In 1773,a great epidemic of puerperal fever more than decimated the lying-in hospitals in Europe, and after raging for three years, culminated in Lombardy, when it is said that for a year not one woman lived after bearing child. From the 17th to nearly the 20th century the lying-in hospitals in Europe, which had been built for and dedicated to the care of child-bearing women, were humane in spirit only. In reality, most of them were deadly for the women who entered them. A means of controlling the infection was developed in the 19th century; before that time childbirth ranked in mortality with some of the serious infectious diseases.

Puerperal fever starts within a few hours to a few days after the birth of a child. There is a high fever and all the symptoms which are known today to accompany infection of the kind popularly called "blood-poisoning." But such things as blood poisoning or wound infections were unrecognized until half of the 19th century had passed,and Lister had applied to surgery the work of Pasteur. Any treatment was unknown. According to a regular custom in the country, the women came from all parts to see the patient and to offer their advice. Some said it was wrong to bleed, others said it was improper to purge a patient in such a situation, some prescribed beating, and astringent medicines, but all were in vain.

The first definite statement, although unheeded, as to the cause of childbed fever, came from the United States.

In Colonial days one did not receive the attention in this country that it did abroad. Childbirth in those early days of American civilization was considered a simple physiological function to be carried out in secrecy with a friend or mid-wife. The wife of Dr. Samuel Queen, who landed from the Mayflower, was the first mid-wife. There were a few other women who practiced mid-wifery, but they were all banished for political heresy. Miss Margaret Jones of Massachussetts was executed in the Colony and was also accused of witchcraft.

Syphillis entered Boston in 1646, ten years after Harvard College was founded. While Hugh Chamberlen was trying to sell his obstetric forceps in Paris, New York was busy fighting yellow fever epidemic, and Boston soon after had one of its numerous epidemics of small pox. Not until 46 years later did New York City pass the first ordinance in America to control the activities of the mid-wives. In 1716 the professional ability of anyone in the country to officiate a childbirth was taken for granted, but apparently the civil activities of those participating in this art needed some regulation, for the ordinance reads:

"It is ordained that no woman within this corporation shall exercise the employment of mid-wifery until she has taken the oath before the mayor or recorder....."

to the following effect: "That she will be diligent and ready to help any woman in labor, whether rich or poor; that in time of necessity she will not foresake the poor woman and go to the rich; that she will not cause or suffer any woman to name or put any other father to the child, but only him which is the very true father thereof; indeed, according to the upmost powers, that she will not suffer any woman's child to be murdered or hurt; and as often as she shall see any peril or jeopardy, either in the mother or child, she will call in other mid-wives for counsel; that she will not induce any medicine to produce miscarriage; that she will not enforce a woman to give more for her service than is right; that she will not callude to keep secret the birth of a child; will be of good behavior; will not conceal the birth of any....."

In 1739 a special department for instruction in obstetrics was organized in the University of Glasgow, while in America it was six years later that there was the first record of a "man mid-wife."

In 1762 a Dr. William Shippen Jr., opened a school for mid-wifery in Philadelphia. Dr. Shippen had just completed his medical studies at the University of Glasgow. He brought back with him the advance ideas of European obstetrics. His class started with the enrollment of 12 students, and this may be said to have established the first ly-ing-in hospital in America. Shippen's school may have been for instruction only,

but, nevertheless, he called his art a "branch of surgery." Three years later he joined with Dr. John Morgan of Philadelphia in organizing the medical department of the College of Philadelphia, later the University of Pennsylvania, and there taught anatomy, surgery, and obstetrics.

The American Revolution interrupted the teaching of obstetrics in this newly founded school. Dr. Shippen was later appointed by Congress to be "director-general and physician-in-chief" of the army.

It was not until 1843 that Oliver Wendell Holmes, a professor in Harvard Medical School,as well as an author, read before the Baston Society for Medical Improvement a paper entitled "The Contagiousness of Puerperal Fever." In this paper he showed clearly that the disease,which ravaged the women in lying-in hospitals in Europe and which in America also took its toll of lives, was an infectious disease, and that the infection was carried by the physician or mid-wife from one patient to another through lack of cleanliness. This paper, setting forth the essentials of the greatest discovery ever made in the care of the child-bearing woman, was received with indifference in Boston and with heated condemnation in Philadelphia by Dr. Meigs, who had succeeded Dr. Shippen in the chair of obstetrics at the University. Dr. Holmes replied to the attack with a paper, "Puerperal Fever as a Private Pestilence," and in it stated that one "Senderein" had lessened the mortality from the disease by scrubbing his

hands with chloride of lime. The "Senderein" was Semmelweis, to whom goes the credit of one of the greatest boons that medicine has given to humanity.

The most virulent opposition of Holmes' theory of the transmission of the disease through the agency of the physician's hands came from Dr. Meigs. According to Dr. Meigs, A Dr. Simpson of Edinburgh was an "eminent gentleman," and still a number of his cases contracted the infection. Holmes goes on to say, "Dr. Simpson attended the dissection of two of Dr. Sidney's cases (peurperal fever), and freely handled the diseased parts. From that autopsy he went to a delivery, and later the patient was stricken with child-bed fever. As Dr. Simpson is "a gentleman," and as a gentleman's hands are clean, it follows that a gentleman with clean hands may carry the disease."

Carlyle has said: "Consider how the beginning of all Thought worth the name is Love, and the wise head never yet was without first the generous heart." How well this describes Soraner, Pari, and Holmes; each championed the cause of the child-bearing woman. In the character of each there must have been much of the generous heart and humility which, though centuries apart, made them giants in the world. To these must be added, the greatest of them all, Ludwig Semmelweis.

Semmelweis was a tragic and in some ways a deplorable

man, but among all death fighters certainly one of the most profoundly original. He was only a plain doctor afire to find a safe way to help mothers have their babies. He proved ---long before Pasteur, and way ahead of Lister--that death is not generated always inside our bodies, but can sneak into us from without.

Semmelweis was born in 1818 in Budapist, Hungary, and was the fourth son of eight children. When 19 years old he attended law school, but disappointed with that, he turned to medicine. In 1844 he received his doctor's degree, and later the same year, the degree of master of mid-wifery. He at once put in his application for a position as assistant in the lying-in hospital in Vienna. His application was accepted, and he began to study the cause of the death of child-bearing women. The mortality rate at the time of his entrance as assistant was 36 out of 208 mothers died of child-bed fever.

Among co-workers, Semmelweis was considered unique. They all thought he was peculiar because he couldn't get used to these young women dying. It kept gnawing him. Hopefully he helped them through their hours of labor, but he would leave them flushed and happy cuddling their own babies.

Two days....., and here and there in the ward, the flush of happiness deepened to the sinister rouge of raging fever. Three days....., and he shuddered hearing their moans at a new pain deep in them. Dry-tongued, they would look up at him and

beg for water and more water. He tried to smile their worry away while he felt of their pulse, which became faster, faster, threadier, and at last, uncountable....

Four days.....blue-violet spots beginning to show on their feet and hands, their lips become paler, and finally no life was left.

During 1844-1846, Semmelweis watched them die in rows and bunches at a time. He came to the conclusion that the infection was in the hospital some place, but where? Semmelweis goes on step by step to eliminate ventilation, dirty laundry, and improper diet on the grounds, hoping that these things were the organic cause, but no relief came. One day in the autopsy room, one of the doctors received a puncture wound on the finger from the knife of one of his pupils. In consequence of this slight wound he sickened and died. All of his general symptoms were the same as those of child-bed fever. It was due to this one death out of thousands that Semmelweis came upon the great discovery of how to prevent the poor mothers from dying.

In 1847--less than two months later, Semmelweis religiously washed his hands thoroughly with soap and water, then in chlorine water until his hands felt slick before he ever made an examination of a patient. He not only did this, but he made his students follow the same procedure while he watched over them. At that time the mortality rate was 120

deaths in every 1000 births; in the next seven months the deaths fell to 12 in 1000.

At this point in his career Semmelweis became distracted by the petty acts of official injustice. He left Vienna abruptly and returned to his native town, where he fought with his pea for truth of his new doctrine, which was : "My doctrine is based on my experience, your teaching is based on the dead bodies of women slaughtered through ignorance, and I have formed the unshaken resolution to put an end to this murderous work. If you continue to teach your students that peurperal fever is an epidemic disease, I denounce you before God, and the world is a murderer, and history, since you have been the first to oppose my doctrine, will perpetuate your name as a medical Nero."

A short time after this, he became insane and was confined to an asylum. Upon examination of Semmelweis it was disclosed that he was suffering from a wound on the finger which probably occurred during an operation. He died August 13, 1865, a victim of the infection which he had devoted a lifetime to eradicate from the wards of the maternity hospitals.

The discovery of anesthesia for surgical operations was first demonstrated with the use of ether in 1846 by William Morton. It depended not so much upon the employment of a new drug as upon a new method of administration. The anesthetics are inhaled, and therein lies their special feature. The action of a drug which is swallowed cannot be controlled once the drug has passed into the body; its effects diminish only as the drug is slowly eliminated during hours or even days. When the inhalation closes they are are rapidly exhaled, and their action can thus be accurately controlled. The narcotic action of such drugs as opium, hemp, and mandrake has been known from antiquity, but these drugs cannot be used as satisfactorily as anesthetics. They deaden pain, but they exert a depressing influence upon the action of the heart and upon respiration; which, if the dose is large, may result fatally. In the past such drugs were sometimes administered for surgical operations, but in amounts that could be given safely, they served merely to alloy the sharpest agonies of the operation. The narcotic drugs did not furnish true anesthesia, and they were used in the past as they are used today--to relieve, in part, the suffering from wounds or painful diseases and thus to allow the sufferer to rest.

This deadening of pain by soporific potions was known even to some primitive peoples as well as those of the earliest civilizations. Mandrake, a narcotic, was the most popular substitute for an anesthetic during the Middle Ages. It

held its vogue up to the 16th century.

In all of this, nothing is said of child-bearing woman. Soporific potions may have been used in ancient times, but no one then troubled about the pains of women. There are, however, some recorded instances of painless child-birth during profound intoxication which was not induced for this purpose. One such case occurred in a woman brought into the Hotel Dieu of Paris in 1818.

The pain of child-bearing has always been woman's heritage. The introduction of anesthesia to alleviate the pains of child-bearing and surgical operations aroused a violent controversy. It was science versus theology, and progress versus stagnation, and would seem amusing now if it were not for the human suffering involved. Anesthesis or narcosis is a condition in which the normal responsivness or automatic cavity of the living system--organism, tissue, or cell--is temporarily decreased or abolished. The term anesthesia refers more directly to a subjective connotation, which is a more or less complete suppression of consciousness, with consequent insensibility of pain. On the other hand, narcosis usually has a more objective connotation which gives a more temporary paralysis or anesthesia which is produced by chemical substances. From the earliest times, man has sought to assuage grief and pain by some means of dulling consciousness.

It was not until the close of the 18th century that modern surgical anesthesia was foreshadowed, with the discovery of hydrogen in 1766, nitrogen in 1772, and oxygen and nitrous oxide in 1774. Soon after the discovery of these gases, attempts were made to put them into practice. In 1785 Pierson of England used ether inhalation for asthma, and numerous other experiments were made, but no outstanding ones.

The first successful experiments upon lower animals, for the purpose of rendering them insensible of pain by means of the inhalation of gases, were made by Dr. Hickman between 1820 and 1828. After numerous experiments with animals he at last met with considerable success. This convinced him that his methods could be of value to mankind in making painless the performance of major surgical operations. Other members of the school sneered at the idea proposed by him. So the young surgeon, disappointed and hopeless, returned to his home, where he died a few months later.

From that time until 1842 no advancement was made. Medical students experimented with ether and gases. At numerous times "ether frolics " went on. They inhaled the ether to the point of intoxication. During the intoxication the pupils would be badly bruised, but were unconscious of pain. It is thought that through these lectures and "ether frolics" that they were directly responsible for the discovery of surgical anesthesia.

In 1842 Dr. Crawford Long removed a small tumor from the neck of one of his patients. At the close of the operation the patient assured Long that he was completely insensible of pain. This experiment was so successful that Long continued to administer ether in surgical cases, recording about eight between 1842 and 1845.

Dr. Horace Wells, a dentist, was the first to experiment on nitrous oxide. He had one of his teeth extracted while under the influence of this so-called "laughing gas," and it was so successful that he daily extracted teeth under its influence.

He gave a public demonstration of his discovery, and due to the insufficient volume of gas he used, he failed. Wells, being a sensitive man, his failure overwhelmed him and he felt disgraced. Wells eventually gave up his practice altogether and died by his own hand at an early age.

Wells and Morton both practiced dentistry. They both realized that the introduction of their method necessitated an anesthetic of some kind, and, after the failure of Wells with nitrous oxide, Morton was on the lookout for some substance which would be safe and reliable.

Morton was a great experimentor, and used "chloric ether" and "sulphuric ether" to experiment on animals. At this time he used to bottle up all sorts of bugs and insects until the house was full of crawling things. He would ad-

minister ether to all of these little creatures, and especially to the big green worms he found on grape vines. His friends laughed at these experiments, but Morton replied, "I shall succeed. There must be some way of deadening pain." It was after this that he started experimenting on himself.

Morton's first public demonstration of surgery without pain was given in Massachussetts General Hospital in the presence of the surgical and medical staff in the crowded amphitheater on October 16, 1846. "Sulphuric-ether" was used on this occasion, and Dr. Warren was performing the operation.

It was a trying moment to this medical student when he determined to exhibit his discovery of practical ether anesthesia before his classmates, professor, and the public.But so convinced was he by his experience gained in private practice that he was willing to face the ordeal. Morton came into the amphitheater late, delayed by waiting for the completion of a new inhaler. Just a few minutes before, Dr. Warren had remarked, "As Dr. Morton has not arrived, I presume he is otherwise engaged." apparently conveying the idea that Dr. Morton was not likely to appear. As he was about to proceed with his operation, Morton appeared. Amidst that sea of faces he saw not one which was sympathizing. Blank incredulity, or at least curiosity, alone was to be seen. Warren, turning to him, remarked, "Well, sir, your patient is ready." Adjusting his apparatus, Morton calmly administered the anesthetic and,

turning to Dr. Warren, said: "Your patient is ready." The silence of the tomb reigned in the large amphitheater while Dr. Warren made his first incision through the skin and dissected out a large tumor, while the patient made no sign nor moved a muscle of his body. When the operation was completed, Dr. Warren turned to audience and said slowly and emphatically: "Gentlemen, this is no humbug." and it was remarked: "I have seen something today that will go around the world."

Operations under ether followed quickly, and from that time, its use as an anesthetic spread rapidly throughout the world.

The word "anesthesia" is used here in describing Morton's work, but the word was not in use in the language when Morton performed the demonstration at the hospital. The fact that a word to define the condition was not in use is striking evidence that a state of insensibility to pain was something wholly new. The demonstration was hardly over before the scholar and physician, Oliver Wendell Holmes, was asked to suggest a name. He replied with the word "anesthetic" to define the substance used to produce insensibility, and the word "anesthesia" for the state of insensibility.

Twenty-one years after his demonstration at the Massachussetts General Hospital, Morton, at the age of forty-nine, died of apoplexy while driving with his wife through Central Park, New York City.

Dr. Warren, who had performed the operation on the day

of Morton's demonstration at the hospital, was a man of high standing in his profession. He was favorably impressed by the use of ether, and his opinion did much to bring about its general acceptance.

Among the first in Europe to use ether was Dr. James Y. Simpson, professor of obstetrics at the University of Glasgow. He administered it to a few of his patients to alleviate the pain of childbirth, but he found difficulties in its use, particularly on account of its odor and irritating action.

James Simpson was the son of a simple Scottish baker. He was one of seven children, and being youngest, it was decided that he should have an education, and all the Simpsons decided to save and sacrifice so that James could go to the University. At fourteen he went to Edinborough, where he studied and graduated at twenty-one a doctor of medicine. He spent the rest of his life in Edinborough, where he rapidly became one of the most promising and forceful young physicians in that celebrated medical center.

Simpson in a short time heard of the employment of ether as an anesthetic, and on January 19, 1847, about three months after Morton's demonstration in Boston, used ether in an obstetrical case. He was not entirely satisfied with the results obtained and began to search for a more effective anesthetic. He tried many different things, but was unsuccessful. Finally he tried chloroform, and this heavy oily liquid seemed to be just what he was looking for. Unlike ether, it was pleasant

to smell, pleasant to inhale, and small quantities were effective. Simpson cried, "Eureka!" and used it in his obstetrical cases.

Many of the leading obstetricians of the time pronounced the discovery as dangerous and a fool-hardy innovation. But Simpson, like others, was not cowed. He was hard-headed, clear thinking, and a fearless champion. He fought with both fists for his new discovery. His whole career had been a long struggle against great odds, and he was not to be swerved by the criticism of his medical rivals who had no experience with the new method, and did not know what they were talking about. He was a reformer with a sense of humor. Dr. Simpson's first experiment in which chloroform was used was made in 1847, on a woman in labor. After the first stage of labor, Dr. Simpson placed her under the influence of chloroform, and she remained under the anesthetic until the child was delivered. Upon awakening, the mother remarked that she thought her sleep had stopped the pains. When her infant was presented to her, it was very difficult to convince her that it was her child.

Simpson was a prominent doctor and professor of mid-wifery in the University of Edinborough. He was accustomed to speak with authority, and his words were listened to with attention and respect. He read a paper before the Medico-Society of Edinborough in which he asserted the superiority of chloroform in child-birth. One might think that such an announcement would be greeted with the applause and enthusiasm

of a grateful public. But it was not. Simpson had more to contend with, however, than the hostility of his medical brethren. He had to overcome the blind prejudice of an unthinking and unreasoning public. Some of his critics argued that he was trying to abolish maternal instincts, since a mother could not love children that she had brought into the world without sufferings.

The greatest opposition came from the clergy. A prominent clergyman wrote that chloroform was "a decay of Satan, apparently offering itself to bless woman; but in the end it will harden society, and rob God of the deep earnest cries which arise in time of trouble for help."

But the staunch Scotchman replied to these accusations in a series of papers, which, for their theological skill and sound logic, left little to be said against the use of chloroform. Simpson's papers, a masterpiece of its kind, appeared in 1847 under the heading of, "Answers to the Religious Objection Against the Employment of Anesthetic Agents in Mid-Wifery and Surgery." In these papers, he pointed out to the doctors that when Jenner introduced vaccination against small pox, Dr. Rawley argued that "small pox is a visitation from God and originates in man, but the cow pox is produced by presumptions, impious men, and that anesthesia could not be impious, since the Lord Himself had employed it."

Within two years after his paper describing his first use of chloroform at child birth, Simpson was able to report that it had been administered to from 40,000 to 50,000 persons in

Edinborough, both for child-birth and for surgical operations. Simpson established this advance toward the conquest of death and suffering at birth, and, unlike the unfortunate Semmelweis, lived to see the success of his efforts.

In the middle of April, 1853, an event occurred which exerted a greater influence on popular acceptance of anesthesia at child-birth, not only in Great Britain, but in America as well, than all the efforts of Simpson. Queen Victoria accepted for the delivery of her seventh child, Prince Leopold. That settled things forever so far as patriotic Britons were concerned. Simpson was no longer a sinner, but a saint. And, further, Queen Victoria, soon afterward, in gratitude to the man who had eased her pains, made Simpson, Sir James Simpson, and the doctor received his title of Knighthood. He was honored locally, and at his death in 1870, the city closed their shops to view the enormous procession of those who attended his funeral.

Simpson not only introduced Chloroform into the history of science in 1847 to 1864, but also the iron wire sutures, the long obstetric forceps, the uterine sound, the sponge tent, dilation of the cervix and also valuable contributions to archeology and medical history, particularly on leprosy in Scotland.

During the same time, Carl Franz Credé, of Berlin, director of obstetrics in gynecology wards of the Charité, and pro-

fessor of obstetrics in Leipzig, introduced the method of removing the placenta by external manual expression, and the prevention of infantile (gonorrheal) conjunctivitis by installation of silver nitrate solution into the eyes of the new-born. These two innovations associated with his name entitled him to the permanent gratitude of mankind.

John Braxton Hicks, of London, a famous teacher who held many honorable places, made an epoch in the history of obstetric procedure by the introduction of podalic version by combined external and internal manipulation, which forms a connecting link across the ages with Ambroise Pare's famous works.

Simpson's work in introducing anesthesia for labor was a success, but it did not render child-bearing painless. The first optimistic believe that chloroform might safely accomplish this end was soon shattered. Occasional deaths of the mother resulted from chloroform, in cases where it was administered for too long a time or to a particularly susceptible patient. It does have its advantages. Chloroform is more pleasant to take, produces less disagreeable after-effects; and a much smaller quantity suffices to produce anesthesia. It is, however, dangerous, unless very carefully administered, for it may produce sudden paralysis of the heart and sever damage to the liver. So ether has, to a great extent, replaced chloroform as a general anesthetic, although larger quantities are required, and it is more unpleasant to inhale. Painless child-birth had not, as Simpson hoped, been achieved. But, if the anesthetics have not robbed child-birth of all

pain, they have robbed it of its most intense agony.

Although ether and chloroform are still the anesthetics most extensively used in child-bearing, nitrous oxide, and the other gaseous anesthetics have replaced them to some extent. Nitrous oxide, in particular, has the advantage that it can be given for a long time with much less danger to the mother and the child than is the case with chloroform or even ether. Nitrous oxide was recommended for child-birth by Klekovitch of St. Petersburg in 1880. It is unquestionable safer than chloroform and much more rapid in action and has less irritation than ether; it has the practical disadvantage of requiring special apparatus for its administration. It is used to some extent in lying-in hospitals and to a much less extent for deliveries in homes.

Ninety years have passed since Simpson used the first ether in obstetrics. Due to his progressive mind and always looking for the better, he changed to chloroform.

In 1870, his nephew, Alexander Simpson, reported analgesia in the first stages of labor, having stumbled upon it by chance. He gave one of his patients with insufficient pains some pills presumably to be ergot. On returning to his home to await a call when her pains should become more active, he found he had given her opium by error. When he returned to the patient's home, he found her sleeping. When she awakened, she was much refreshed, and the labor pains recurred with normal vigor and satisfactory results. This was the real beginning of analgesia and anesthesia in obstetrics.

For sixty years after this, progress was slow. Opium and chloral were administered during a long first stage, inhalation of chloroform or ether with pains was used for all operative deliveries. All this was done rarely. Woman after the Victorian era of resignation to the duties of child-bearing began either to complain of their many, or to look for avoidance of child-bearing by amateurish contraception.

In America today, as in the rest of the civilized world, giving pain relief when babies are being born is no longer a debatable practice. It is a mistake to call it "painless childbirth," because although it is at times literally painless, no doctor who is both wise and honest will guarantee a miracle. The medical profession has, however, mastered methods which are safe and effective, whereby the ordeal of our

mothers and grandmothers--the long hours of agony followed by prostration which they regarded as inescapable, is changed into a period of semi-consciousness. A continuous condition of anesthesia cannot be maintained throughout labor, for the patient must have a certain control over her mental facilities in order to obey the doctor and control over her muscles in order to push the baby into the world. Analgesia is the term applied to that condition lying between consciousness and unconsciousness, produced by the sparing use of certain anesthetic agents. It removes consciousness of pain without depriving the subject of consciousness or of muscular control. The patient may say she knew nothing that was going on, feeling the contractions, but feeling no pain; or she may say that she was sleepy and knew nothing about the baby's birth, although the doctor and nurse may testify that she talked or moaned throughout as she took her orders. Hours of complete oblivion are followed by an awakening--refreshed, joyous, incredible to the sound of a feeble little cry. Modern methods can transform normal labor into an entirely endurable experience, free from depleting exhaustion when all is over, exempt in after years from the mental scar of remembered pain. Of the expectant mothers in America, who will go through the crucial experience of motherhood, scarcely one in ten will know the facts, and less than one in ten will reap the benefits of this well-developed medical knowledge and skill. Analgesia will continually improve, for it is here to stay. Intelligent women of character demand it.

Medical men answer the demand, not only in the name of humanity, but in the interest of the race, for those are the women who should become multiparal and bring into the world a reasonable number of fine offspring to offset those of the lower stratum of intelligence and character.

Several methods of pain relief that are safe for mother and child have been developed by the combined efforts of anesthetists and obstetricians of recent years, some more, some less available for general use because of the varying degree of skill and training and the expense involved to administer them.

Anesthesia in obstetrics is a simpler, though not a simple problem. The changed blood chemistry of a pregnant and parturient woman immediately separates obstetrical anesthesia from surgical. Whatever type of anesthesia has been elected, the administrator of it must become acquainted with the condition of the patient as to preliminary drugs; the duration and stages of labor; her previous fluid intake; and the possible amount of stomach contents; her state of fatigue; the condition of the respiratory and circulatory systems; and also the intended type of delivery. It has been concluded that anesthesia, like analgesia has a permanent place in obstetrics, as it has in surgery. However, it would seem that it must be given with even greater thought to the past and present condition of the patient, as well as her immediate and more distant futurities.

Everyone knows the hue and cry that developed from laity, clerics, and physicians. History has repeated itself, for in 1936 at the Annual Meeting of the American Medical Association

in discussion of three well developed papers on analgesia, the lay press printed some startling comments. One woman physician, who had borne three children, denied the right of woman to have medicinal relief from the pains of child-birth. Eastern newspapers reported an eminent obstetrician as saying that he had seen hundreds of women die in the delivery tables from all causes put together, but he never stated whether these deaths were due to scapolamine or any other analgesia. Just as the laity has come to lose its fears of the pains of child-birth because it hears of analgesia, the lay press publishes poor conclusions from maternity mortality studies and erroneous statements attributed to the leaders.

Several methods.....

In formulating an opinion as to the acceptability of an anesthetic or analgesic method, the physician must have in mind the following points: first, safety; second, the amnesia, analgesic, or anesthetic properties; third, effect on contractions of the uterus; fourth, advantages or disadvantages in special cases; fifth, untoward reactions and idiosyncrasys; sixth, constitutional effects; seventh, effect on the fetal respiration at birth.

Twenty-five years ago the first authentic information on pain relief in child birth came to the doctors of America from Germany. This was a result of Steinbuchel's discovery in 1902 of the effect of the drug scapolamine in mid-wifery. Afterwards cautious series of experiments were made by Dr. Carl

Gauss and the late Dr. Bernhardt Krönig. These two specialists, young, but already famous, reported in 1912 to the gynecological surgeons of America assembled in Chicago, on 3,000 successful cases of what they called "twilight sleep" or "dammerschlof," induced with the aid of a drug called scopolamine. This drug induced amnesia, or forgetfulness of pain, through hypodermic injections of morphine and scopolamine. The use of these drugs to bring about amnesia as developed and still used at the Freiburg depends for its success and safety upon a memory test which is difficult to master and time consuming to administer. For this reason it has never become popular in the United States or even in Europe; although in the hands of thoroughly competent and trained obstetricians it is an excellent method, more widely used and taught by a few obstetricians in this country today than is generally recognized.

Much depends on the way in which scopolamine and morphine is administered. Many different methods have been used; so many modifications adopted that it is no wonder that the reports of success or failure are so varied.

It is an exacting technique requiring a quiet, darkened room, a meticulously trained staff of nurses, and skillful and patient specialists.

Dr. Gauss believes that the initial dose should be morphine grains, 1/4---scopolamine grains, 1/100, and the other doses formed according to the body weight or the rapidity of the course of labor. After several injections and partial amnesia has occurred, the patient does not remember much, and is not conscious

of her pains. The patients can be roused quite easily, and they will carry on a perfectly rational conversation. If this done quietly, the whole incident is forgotten in a few minutes. These patients are very sensitive to light and noise; so it should be insisted upon that the nurses must be absolutely quiet.

The most obvious effects of scopolamine-morphine in its use in mid-wifery are:

1--It may be used through the whole process of labor.

2--Used in obstetrical doses, it does not produce atony in either voluntary or involuntary muscles.

3--Atony being absent, there is no increased tendency to post-partum hemorrhage in the least degree in case hypodermic injections of pituitrin controlled it.

4--Pain ceases or is greatly diminished.

The most obvious effect of scopolamine-morphine, and one seen early, is sleep. Within an hour there is distinct drowsiness and lethargy, soon merging into an apparently natural and refreshing sleep between pains. Later, this rousing is not so pronounced and the patient clearly experiences a more restful sleep and the condition is more of an amnesia state.

Morphine is accused of depressing the baby's respiration. Through both clinical and experimental studies in Chicago in babies during and after labor, it is felt that no baby has been lost as a result of morphine narcosis. Scopolamine requires careful nursing and frequent review during labor as to dosage. It is no more likely to cause a puerperal psychosis

than a single intoxication with alcohol.

Twilight sleep is, however, and ever will remain, a matter of hospital conditions and for experts' hands; and therefore, we may assume that it will never be adopted into general use. Nevertheless, it had its brief vogue in this country and is still used in many parts of the country. It was recently reported that the late chief of obstetrics at the Washington Medical School, Washington, D.C. gave it a thorough and fair test by administering it to five thousand cases in the new hospital there.

There is not yet the perfect analgesia discovered. Many combinations are being used, sometimes four or five drugs at a time. It would not seem fair to say that morphine best relieves pain; scopolamine produces amnesia even if not asleep; the barbiturates produce sleep as do poraldehyde and overtin; andethylane, nitrous oxide, ether, and vinyl ether will produce partial or complete anesthesia. Ether, quinine, and oil by rectum seem to hasten labor when well started, both by the stimulating effect of quinine on the uterine musculature and the relaxing effect of ether on the cervix.

In the years following 1913, announcements of a number of

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It is the practitioners under forty years of age rather than those over forty who have been the more aggressive and painstaking in the new development--who reckon not only with pain, but with the mental scar of remembered pain as well. Today, any well-trained obstetrician has a series of drugs and

methods of administration from which to choose if his patient is delivered in a well-equipped hospital. One of these methods first reported in 1923, is also appropriate for the use of competent general practitioners in home deliveries.

What is most appropriate in any specific given case is a matter for the attending physician to decide since no two cases are alike and patients and methods cannot be standardized. The one method which is manifestly most generally acceptable by the physicians is the Gwathmey technique or colonic analgesia. It was first announced by the New York Lying-in Hospital in 1923. It is far from perfect. Yet, so long as no perfect method of pain relief has yet been developed, child-bearing women are manifestly entitled to what there is today so long as it is safe. Actuated by some motive other than that of competitive necessity, a relatively small number of obstetricians and anesthetists acting together have worked out methods of alleviating the rigors of child-birth which, while they do not abolish pain entirely, deprive the ordeal of its terror.

The Gwathmey technique is induced by hypodermic injections of morphine and magnesium sulphate, followed by a mixture of ether oil, and other drugs given by rectum. Many doctors who are successfully using it today modify or amplify it with inhaled gas, nitrous oxide, or ethylene, at the end. Every obstetrician who is giving his patients immunity from pain, of a kind which is safe for her baby, deserves popular understanding

and support. Each obstetrician must be his own judge of what method he finds best suited to his hand.

How this experiment happened is told in part by an obstetrician in New York, an old personal friend and professional colleague of Dr. Gwathmey's:

"I was in my office when there came a ring at the bell. It was Gwathmey sunk in one of those profound studies of his. 'I have been thinking,' he said, 'that there is one kind of pain that is eternal that nobody seems to think much about. That is the pain of child-birth; we just take it for granted. I wonder if it really is necessary? Why have obstetricians done so little to obliviate pain? Tell me exactly--I don't remember much about obstetrics from the medical school--just what the problem is--why you can't use anesthesia.'

"So I explained to him what the birth process was like mechanically. Many anesthetics inhibited the pains and only delayed the processes of nature, and jeopardized the baby's life. There was danger to the baby from any delay,and danger, also, of the baby being too deeply anesthetized or narcotized at birth. I also said that many drugs increased the danger of post-partum hemorrhage in the mother.

"Gwathmey listened, then he unfolded his theory. He explained that since anesthesia was divided into stages, which affected the nerve centers progressively, it might be possible with the proper dosage to suspend

the patient to the point where she would lose the sensation of pain although she would remain still conscious. This, he said, is analgesia, in which condition the patient may use her muscles and follow orders, but in which there is a brain block that makes her immune to pain. Would it therefore not be possible,-since the ether-oil gave a uniform, not a fluctuating condition of consciousness as it was absorbed from the color since the magnesium sulphate made it possible to use a small amount of both opiate and anesthetic effectually--to devise a dosage by beginning with one so small, it would have no effect and gradually increasing,to find the point where the patient would lose the sensation of pain while retaining control of muscles and mental processes?"

Dr. Gwathmey, after a time received consent from the New York Lying-in Hospital to proceed with his experiment.

The work began February 10, 1923. Only suitable cases were demonstrated on. There was constant change in dosages and various ways of cheministration.

In a year's time this technique proved satisfactorily. There were over three hundred cases now, and other staff doctors began to use the method.

Exhilarated by the success of the work and the support he was receiving at the hospital, Dr. Gwathmey used a fatal phrase in making his report at Chicago. Though a good anesthetist, he was a poor psychologist, and he called the new method "painless child-birth." Greatly as it relieved pain, much as it promised

for the future, the method was not painless.

So the Gwathmey technique of colanice analgesia was worked out in 1923 and 1924 in the New York Lying-in Hospital. It was taken up by a dozen other hospitals all over Greater New York with a varying degree of enthusiasm at different dates in the following months and years. Doctors in other cities here and there began to adopt the method in their private practices in homes as soon it was reported.

Many obstetricians in cities outside of New York adopted the Gwathmey technique at various dates in the following years. Of the leading obstetricians of the country, one in Pittsburgh and one in Philadelphia, were among the first to do so. This technique was finally used throughout the United States and proved the most satisfactory of any that had so far been discovered.

Before 1930 this method had rolled up an imposing total of 20,000 cases with a high per cent of very satisfactory results from four New York hospitals alone. This was used until the analgesics were found to be as satisfactory and perhaps more so. Now some of the elder obstetricians still use the same technique.

This method of anesthesia, while not so popular as it was five years ago, still occupies a place of importance in obstetrics. It, like ether anesthesia, has a wide margin of safety if the patient is watched carefully. Its orginator intended it as a method of analgesia for use in the first and second stages of labor. For this purpose it is comparatively successful.

The ether in the rectal mixture, like ether by inhalation, has a tendency to lessen the frequency and force of the uterine contractions. An effort has been made to offset this by the addition of quinine; but even so labor is sometimes prolonged.

There are at the disposal of the anesthetists who wish to alleviate the pains of the parturient woman, several inhalation agents; capable, when properly administered of relieving the pains, either completely or to a large extent without appreciably slowing the progress of labor. These agents are called analgesics, which means that stage of anesthesia just before consciousness is lost, but the pains are dulled and the progress of labor is not appreciably slowed.

They are of two classes:

(1) those normally liquid and not bulky, and

(2) those normally gaseous, coming to us in more or less bulky containers.

Of the former, there are two in common use: ether and chloroform; of the latter, there are three that are well known, and two in common use. The ones in common use as analgesics are nitrous oxide and ethylene. The third, cyclopropone, has not as yet, been used to any great extent in obstetrics. Choosing the analgesid for any given case is both positive and negative: The choice is influenced by available agents at the time; by knowledge of how to use them and what to expect from them; by climatic conditions; by proper apparatus at hand; by the condition of the patient; by the opinion of the obstetrician; and by the prescence of a skilled anesthetist. In some localities the

matter of whether the gas is explosive or not is of great importance. This is especially true where the normal humidity is low, or where it is low because of low temperature. Static abounds where it is cold and dry, a static spark is very common. Under proper conditions this spark is sufficient to ignite the gas and cause loss of life or great damage. So when this has not been thoroughly guarded against either by raising the humidity, which is the most efficient and cheapest way to cut down this hazard and least subject to error in technique; or by thorough grounding, which is more or less complicated and more subject to error in technique, it is wise to choose the non-explosive gas, nitrous oxide.

The physical condition of the patient will influence the choice of the agent. It is not wise to suboxygenate a diabetic. Ethylene or cyclopropane would be the choice in such cases, preferably the latter. Toxic cases do better with a high percentage of oxygen, also.

Inhalation analgesia may be begun after three finger dilatation when pains are good, but when begun this early, it is often quite protracted. From an economic standpoint, it is better to wait to near complete dilatation, depending on barbiturates to secure analgesia in the first stage. However, if deemed wise by the obstetrician and anesthetist in certain cases to start gas this early, no harm will result to mother or child. Analgesia is started earlier in multipara's than in primipara's.

These gases are administered in two different ways, interrupted and continuous.

Interrupted analgesia is best secured when used with ethylene and nitrous oxide gases. Either gas is given at the onset of a pain and carried through until the pain is over, and then the mask is removed.

Continuous analgesia is secured when the mask is applied snugly and strapped on comfortably, and the patient allowed to breathe an analgesic mixture of the gas and oxygen continuously, re-breathing through soda lime, and adding a continuous flow of oxygen sufficient to meet her metabolic requirements just as in anesthesia.

Ether and chloroform being the oldest gases, are still used among the first. Ether appears to be still the most widely used and possibly the safest of anesthetic agents in obstetrical practice. It may be employed for analgesic effect in early labor in the Gwathmey technique; as "whiffs" during the second stage; or pushed to complete anesthesia by deep inhalation. It does inhibit the activity of the uterine musculature; its free administration may stop labor pains; and its long continuance predisposes to relaxation and postpartum hemorrhage. It has the advantage of simplicity of technique; ease of administration; and wide margin of anesthetic safety. It is of essential value for types of deliveries that require relaxation of the uterus; namely, decomposition of the breech and internal podalic version and extraction. It can produce greater relaxation than is necessary for low forceps. Its administration

is singularly free of untoward reaction and idiosyncracy, although patients vary decidedly as to the degree of post anesthetic nausea, vomitting, and prostration. Its use for inhalation is to be avoided in instances of pulmonary disease. Administration by the open-drop method, ether does not interfere with oxygneation of the fetal blood, and only in prolonged and deep anesthesia does anesthelization of the fetal respiratory center occur up-to-date ether is used in combination with the barbiturate group of drugs and has proven quite satisfactory during the second stage of labor.

Chloroform is not used to a great extent in this country. The English still use it, either for momentary analgesia, or more deeply for obstetric anesthesia. Ethylene has taken its place and has proven more satisfactory. One fact is known--- the long administration of chloroform will cause degeneration of the kidney and liver. But probably normal patients who receive it for analgesic purposes only, rarely suffer irreparable damage.

The war gave an impetus to the development of a new anesthetic and to the use of nitrous oxide. Obstetricians began to experiment with it with other anesthetics and with opiates until the use of pain-relief methods lasting throughout many hours in obstetrical cases has quietly increased and stands today well beyond the point of controversy. Given by a trained anesthetist, the margin of anesthesia safety, which not as great as in the case of ether, is nevertheless ample.

In administration of the first few minutes the anesthetist talks to the patient in order to estimate the correct amount of nitrous oxide-oxygen, and the number of parts which should be left open to prevent the patient from going to sleep. During the second stage of labor, it may be given for short periods with each labor pain, and finally pushed to deep anesthesia for delivery. The duration of the average analgesia is from forty-five minutes to one and one-half hours. During this time the anesthetist watches for any evidence of first stage anesthesia. If this develops, oxygen is increased and the patient brought back to the desired level, namely for cooperation, response to command, and to remaining quiet in order to maintain a sterile field. If no episiotomy or tears are present, the anesthesia is discontinued before the placenta is expelled.

This anesthesia has some outstanding points to be considered. Continuous nitrous-oxide-oxygen air offers the expectant mother much greater opportunity to take the fullest advantage of each uterine contraction after complete cervical dilatation. It enables some patients to bring the presenting part down without the aid of the obstetrician.. No delayed still-births or delayed respirations of the fetus back occurred which might be attritubed to anesthesia. There are apparently no objectionable results to the mother.

It has little effect upon the contractability of the uterus and predisposes to post-partum hemorrhage only when insufficient oxygen is administered. The rhythm of labor continues throughout, the patient regaining consciousness quickly between pains. As an agent of anesthesia it is of particular value in the types of delivery in which relaxation of the uterus is neither essential nor desired------ Caesarean section, forceps, and spontaneous delivery. Its use is to be avoided when relaxation of the uterus is essential for safe manipulation; such as in decomposition of the breech and internal podalic version.. It was in disregard to this rule that bad judgment was shown in the selection of gas. There appears to be very little idiosyncrasy to gas, although some patients take it much better than others. Since it is necessary in obstetrical anesthesia to keep the patient "pink," ether has to be given as a complemental agent more often than in other fields of surgery. It is of great importance that sufficient oxygen (at least twenty per cent in long anesthesia) be administered with nitrous oxide; otherwise, the fetus in utero may suffer from anoxemia during the administration and be born in a state of ajanea. Resuscitation in such cases is difficult.

Nitrous oxide and oxygen anesthesia is expensive. Since the apparatus for its administration is rather cumbersome and the services of a trained anesthetist are essential, the method is confined largely to hospital practice where it occup-

ies an important position.

Another one of our new gases which is deemed very highly in the practice of obstetrics is cycloprapone. It is an extremely patent drug producing anesthesia so rapidly that it is very difficult to recognize the stages of this condition. It is believed that the solutary feature about the use of cycloprapone is that an excess of oxygen is given with it. This is one reason why anoxemia is entirely out of the question. Furthermore, it is shown that this anesthetic does not damage the normal liver, even after repeated administrations, nor after long periods of use.

Through recent discoveries it is believed that a substance has been found which is safe for common use; this substance is vinyl ether. It is found that vinyl ether is preferable to chloroform and ethyl ether. Upon the first administration of vinyl ether to the parturient woman, it was shown that it was easy to give and practically harmless. Since additional studies have been made, and it has been reported that is "partilarly suitable for obstetrical analgesia and anesthesia in general practice on account of its safety for mother and child, its ease of administration, the rapidity of its action, the satisfactory maintenance of any desired degree of narcosis, practically no damage to the liver functions, and the early uneventful recovery."

During administration, it is noted that it is infinitely better to use oxygen with it. It cannot be emphasized too much the advantages of giving oxygen with anesthetics, es-

pecially in obstetrics. For those who are less experienced, and for the general practitioner, vinyl ether is lightly recommended to produce analalgesia and anesthesia following the use of pentathal.

It is the consensus of enlightened medical opinion that spinal anesthesia is a dangerous anesthetic in obstetrical practice. It depresses blood pressure which is already low, it relaxes the vascular tree when the latter is already relaxed, it impairs respiration when a normal respiratory excursion and complete oxygenation of the blood are essential, it necessitates placing the woman in the recumbent position with the head dependent when already the flat level position may be productive of syncope, and it trebles the liklihood of shock when intra-abdominal tension falls with delivery of the fetus.

Contractions of the uterus contine normally under spinal anesthesia and retraction of the uterus follows the expulsion of the fetus and placenta promptly and firmly. The anesthetic, however, intereferes with the expulsive action of the abdominal muscles; under its influence the patient never advances spontaneously beyond the first stage of labor. The drug has no effect on the respiratory center of the fetus.

Local anesthesia has no determined effect on the constitution of the patient or the mechanism of labor. It is the least depressing of all methods and should occupy a more extensive place in obstetrical practice than it does at present.

Its action is confined to the tissue in which it is injected. It does not weaken the contraction of the uterus, delay labor or predispose to post-partum hemorrhage. Retraction of the uterus after the third stage and involution during the puerperium approach more nearly to the natural state than under any other form of anesthetic.

Through clinical experiments it has been proven that the lessening of blood loss in the local anesthesia group was amazing, and the rapidity of delivery of the placenta, the quickness of the baby's cry, and the smoothness of convalescence were most gratifying.

Because of these advantages, local anesthesia is a method peculiarly well adapted to the situation in which loss of blood, relaxation of the uterus, fall in blood pressure, irritation of the lungs or burden on the heart would be fatal. The surgeon has the pleasure generally of seeing his patient leave the delivery or operating room in as good condition as she enters it.

The various methods employed today for providing analgesia and amnesia are so well known to obstetricians that it is felt that even an enumeration of them to be unnecessary here. Suffice it to say that thus far, no one method has been found to be applicable to all cases. For effectiveness in labor, the barbiturates depend on the capacity to produce amnesia and very little analgesia effect. In many cases the term analgesia has been condemned for unsuspected susceptibility and for producing too great restlessness with its in-

creasing nursing burden, perhaps due to too great timidity in the size of the initial dosage. The patient may scream as if in agony during the course of her labor pains, but awaken the morning after with no clear recollection of what had taken place. The drugs apparently do not inhibit uterine contractions. Labor continues after the administration of the capsules and seems undelayed. The advocators of this method assert that this drug supplants morphine, having none of its disadvantages and many advantages. It is stated that it does not delay labor, does not narcotize the baby, and it makes the patient forget the unpleasant experience of child-bearing. Several obstetricians maintain that morphine has no further place in obstetric practice because of its ill effect on fetal respiration. It is doubtful whether the barbiturate derivatives will replace morphine, for there is no drug that is more quieting, more restful, and more efficacious than the latter in long labor. It is also emphasized that patients under the influence of barbiturates must be watched with the closest attention and with care and precautions taken that no injuries occur. For this reason the method is available for use only in the hospital, and can only be a source of grief if undertaken in the home.

Due to all the disadvantages, the barbiturates now still form the basis of most of the present day procedures. Sodium amytal and pentobarbital are being used, either alone or in combination with such drugs as morphine, pantapon, scopolamine, or rectal ether. The results measured in terms of amnesia

have been satisfactory with most combinations. Through clinical research it has been discovered which drug, when used in combination with the barbiturates, would eliminate both the danger of excitation to the mother and the risk of asphyxiation to the fetus.

Paraldehyde is thought to be the safest hypnotic and will, therefore, have increasing vogue expecially in combinations. Gas inhalation analgesia, starting as good dilatation of the cervix and sliding into anesthesia for delivery, seems as nearly perfect as possible in the rapid labors we expect of many multipara's, especially when it is preceded by a basal dose of morphine. Obviously all these cases require hospitalization, with almost constant attendance and attention.

Paraldehyde is a more powerful narcotic than chloral. It resembles the latter in its effects, but produces only rarely any symptoms of excitement. Even in large doses, it does not affect the heart directly, on important consideration in cases of cardiac disease, and it produces no such effects on the protein metabolism as in accompanied with the prolonged administration of chloral. It is observed that pulse is slower and the carbonic acid exhaled is less than normal. Substantial quantities of paraldehyde have been taken without fatal results, or with any more serious consequences than prolonged unconsciousness. It remains to be stated that paraldehyde when used alone during labor even in very large doses, produces neither analgesia nor amnesia, but when applied in combinations with the barbiturate group, particularly nembutal,

it leads to satisfactory amnesia and analgesia. Sodium amytal has not proven as satisfactory as nembutal has been used entirely because evidence has been found, when given early, will not stop labor. As soon as labor is definitely established following the routine preparation and enema, the patient is given four-half grains of nembutal by mouth. This is followed in fifteen minutes by three grains more. Now, within fifteen to twenty minutes of the second administration of nembutal, the patient is turned on her side and is given a rectal instillation of six drams of paraldehyde in one and one-half ounces of olive oil. This mixture must be instilled high in the rectum, past the presenting part, in order to avoid expulsion during a contraction. If the patient is in hard labor, the injection is further facilliated by allowing the patient to inhale nitrous oxide and oxygen until asleep. Within three to four minutes the paraldehyde is perceptible on the patient's breath and she falls into a deep sleep, moving or turning from side to side only during contractions and sleeping soundly at intervals. The duration of sleep lasts from three to twelve hours depending on the patient, but following this period, progress appears to be more rapid than when no medication is given. When full dilatation is reached, gas and oxygen are administered and delivery is completed. If patient awakens before and she has several hours of labor, another one and one-half to three grains of nembutal are given by mouth or rectum. If a low presenting part is revealed, then instead of further medication, the patient is carried

to completion by gas and oxygen inhalation. It has been found with the barbiturate group, greater qualities of oxygen are required in combination with nitrous oxide than usually the case with nitrous oxide and oxygen administration. The duration of gas and oxygen is much less than with the barbiturate combination group or with straight barbiturates. Furthermore, the most restless of them are rarely noisy, and in most of the cases the patient sleeps soundly and arouses only during pains. In discussing the dangers of anesthesia during childbirth, one must differentiate between anesthesia used during actual delivery and drugs given to produce amnesia during labor. It is conceivable that a patient may die as a result of inhalation anesthesia during delivery when no medication was given to produce amnesia during her entire labor.

The question of dosage both of paraldehyde and of nembutal is of importance. The dosage of nembutal used varied from six to thirteen grains,and that of paraldehyde is six to twelve drams. The dosages must be varied according to individual cases. Failure to repat medication when indicated in a given case, regardless of the time element, will give rise to unsatisfactory results, such as increased restlesness and diminished amnesia.

Due to these experimentations, it has been found due to the fact that patiens can be allowed to remain in labor without suffering, and with diminiation of shock for longer periods than is ordinarily the case, there is less occasion for instrumentation, and a possibility for a greater percentage of

normal births. This tends to lower morbidity and mortality.

Having commented upon sodium amytal in numerous cases throughout this paper, I will try to place more emphasis on it now.

Sodium amytal has been administered in all stages of labor orally, intramuscularly, intravenously, and rectally. It was found there was very little slowing, if any, in the progress of labor. Uterine powers were impaired little, if any, however, voluntary powers in the first stage of labor were markedly diminished and the patient, at times, was unresponsive to uterine contractions. Voluntary powers in the second stage may be affected, but not to any marked degree, and not over thirty minutes. Fetal heart rates showed an average change of ten, the greatest variation being thirty, and the least being five per minute. The fetal heart rate varied widely during labor over very short periods of time so that these variations were all within normal limits. The following justifiable statements were drawn to a conclusion:

(1) The most serious objection to the use of sodium amytal as an analgesia was the difficulty in controlling the patients who become very restless.

(2) This drug has the advantage of being rapid in its action and of having a wide range of safe dosage.

(3) There has been no evidence of harm to the mother.

(4) Labor is not probably delayed.

(5) Labor may be rendered practically painless.

(6) Obstetric operative procedures are much more easily carried out under ordinary anesthesia when the operation is preceded by sodium amytal.

(7) Danger to the baby has not been proved.

(8) Prompt and complete control of eclamptic convulsions is possible.

(9) As a general anesthetic agent for Caesarean sections and other obstetric operations and especially for patients having tuberculosis or toxemia of pregnancy, sodium amytal bids fair to supplant the inhalation anesthetics

Through experience of pentathal sodium, or this barbiturate, by three outstanding obstetricians, it was found to be very successful in the early stages of labor. In the 116 cases they found that there were no noticeable toxic effects in either the mother or fetus, that the maternal heart rate is invariably slowed, seemingly due to the lessened excitability, and that when the fetal heart rate is within normal limits, it is not changed by pentathal, but showed it to be unusually rapid, it becomes somewhat reduced by this drug. All the infants of this series breathed spontaneously. The influence of pentathal on uterine contractions the duration of labor was shortened, an average of nine hours for primiparal and of four and one-half

hours for multiparal. The patient is quiet, cooperative, easy to handle, and does not need special attention throughout labor. This drug does not produce a very pronounced degree of amnesia, it is often administered with a small dose of scapolamine (grains 1/150 to 1/100) at the time of the first portion of pentathal. As soon as the pains are definitely established, four grains of pentathal in capsule form are given by mouth. One-half hour later, three grains more are given,and this amount is repeated at the end of one hour. Usually the patient becomes quiet, sleeps in between the contractions, and does as she is told willingly. Every half to one hour, two or three grains more may be given if the effects seem to be wearing off. Regardless of all this, no one should overestimate the usefulness of any one drug especially among those which have for their chief action depression of the cerebral cortex, as at its best, this structure possess some functions with characteristics which easily become quite protean. At the present time pentathal sodium is recommended for the early part of labor; then nitrous oxide and oxygen for intermittent analgesia should the pains become severe, cycloprapone anesthesia is used for the final stages.

Two of the latest methods which have acquired great vogue and repute in today's obstetrical practice are "pento-sco" and paraldehye and benze alcohol. "Pento-sco" bears the sanction of the Harvard Medical School, where some five years ago it was found to produce more satisfactory results than the other accredited methods which were tested in comparison.

This method is induced by one of the newly developed barbiturates called pentobarbital (nembutal) used with scopolamine. It is easy to administer and in a certain proportion of cases, it produces ideal results. It produces the most complete amnesia, the greatest percentage of infants breathe immediately after, and the patients require less post-partum watching. One of its marked disadvantages is that is very often the cause of excitation instead of quieting. A recent report from the Philadelphia County Medical Society shows that it can do damage in anything but the most skilled and careful hands. There is already a feeling among certain specialists that it will be used less rather than more as time passes.

The other method, which is the latest development and the most promising, is the use of paraldehyde with benze alcohol, on which sixteen hundred cases were reported in 1936 from the George Washington Hospital, Washington, D.C. The dosage is gauged according to the patient's weight and it is administered by rectum. Its great merit is its wide factor of safety, paraldehyde being a well-known and long-used sedative which in combination with other drugs, proves to have a surprisingly analgesic action. Its use is preceded by much animal experimentation by a labratory expert and an obstetrician who recognizes that there is no legitimate place in medicine for the human guinea pig. Rectal administration is fussy and time consuming, and to be successful, it requires very exacting preparation of the patient in advance. There is, therefore, much interest in recent experiments in Balti-

more with the giving of paraldehyde by mouth, which may prove to be practical, not withstanding the unpleasant taste and odor of the drug.

All the cases that I have been dealing with are cared for in the hospitals under both doctors and nurses supervision. Recently there was a report made by a mid-western doctor on how he cared for his patients that live in the rural districts miles from any hospital. We probably cannot image such cases, and uncivilized country, until the actual facts are placed before us.

As soon as the woman consults a doctor on whether she is going to have a baby or not, prenatal care is started immediately and is carried out the same as in any city case. The patients have check-up from one to three weeks. In most cases these patients are from twenty to sixty miles from the nearest doctor or hospital. As soon as the pains occur, the patient calls the doctor. He goes to the patient and gives six grains of nembutal. In case of multiparas, labor is progressing rapidly, and there is full dilatation. Chloroform is administered. If there is not complete dilatation in forty-five minutes, another one and one-half grains of nembutal are given. Primiparas are given two or more capsules in about one or two hours, depending on the severity of the pains. In most cases this is the total amount given. When the nembutal reacts on the patient in such a degree to cause semi-narcosis and restlessness, chloroform is given with every grain to relieve it completely. After the patient

has quieted down, the chloroform is stopped until the perincal stage. If labor lasts more than six hours after the second dose of nembutal, two more capsules are given, if pains are not strong enough, five to ten grains of quinine are given.

In most cases there is never a trained nurse in attendance. Most of the deliveries made in the beds. The beds being low there is less danger of the patient's falling out. Chloroform is used in all normal cases during the second stage. Ether is not safe because of the stoves and lamps burning . The rural physician gets twenty-five dollars for the average delivery, including anti-partum care. Nitrous oxide is too expensive and cumbersome to use. The chloroform is given by the husband or neighbor, and at the time for delivery the patient is given a little extra chloroform and the baby is delivered.

With breech and forcep deliveries, the patient is kept in semi-narcosis with nembutal until ready for delivery. The baby is always in a better condition than when scopolamine is used. For breech or forcep delivery, the patient is put crosswise in the bed, or on a table and ether is always used. A flashlight is used for repair work if necessary.

In two years with over two hundred cases of home deliveries, there were no maternal deaths, and there were four infant deaths, which could not be laid to the nembutal, but to other intra-uterine complications. So through this clinical experimentation, it has been proven to us that our present

day home deliveries are just as safe as our hospital deliveries, under the supervision of a competent and reliable physician.

This type of procedure with nembutal has in the past been used at the DeLee Lying-in Hospital, Chicago, Illinois, with very satisfactory results and low mortality rate. The hospital in which I trained, used almost completely the nembutal analgesia combined with nitrous oxide-oxygen inhalation anesthesia. Our mortality rate was very low, with the mother and baby both recovering very nicely. At times during labor the patients showed marked restlessness, but with close watching, there never was an accident. Due to the very understanding and reliable nurses, they talked to the patients and made them understand what their treatments consisted of, and how they would probably react to the drug. This left the patient with a relaxed mind, and their confidence placed in the nurse. With both cooperative patients and reliable nurses, this treatment has proven very satisfactory to me. Some of the older used the older methods, which were in turn as satisfactory, but did not give me the confidence and security that the nembutal analgesia did.

Today there is no perfectly satisfactory method of dealing with the pain of child-birth, either to lessen or to grant immunity. Such methods will come, many obstetricians believe; what we have today is infinitely better than the old

shrieking horror of yesterday, and it carries the sanction of most of the best medical opinion in the country. Obviously better methods will be worked out if at all, by those who use what we now have.

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