Painless childbirth in twilight sleep : a complete history of twilight sleep from its beginning in 1903 to its present development in 1915, including its successful use in Great Britain to-day / by Hanna Rion.

PAINLESS CHILDBIRTH IN TWILIGHT SLEEP

BY

HANNA RION

A PEASANT MOTHER AND HER TWILIGHT SLEEP BOY.

PAINLESS . .
CHILDBIRTH

PAINLESS CHILDBIRTH
IN
TWILIGHT SLEEP

A COMPLETE HISTORY OF TWILIGHT SLEEP FROM ITS BEGINNING IN 1903 TO ITS PRESENT DEVELOPMENT IN 1915, INCLUDING ITS SUCCESSFUL USE IN GREAT BRITAIN TO-DAY, WITH ALL THE IMPORTANT MEDICAL RECORDS OF THE DOCTORS WHO HAVE EMPLOYED THE METHOD, AS WELL AS THE PERSONAL ACCOUNTS OF MOTHERS WHO HAVE EXPERIENCED PAINLESS CHILDBIRTH

BY
HANNA RION

LONDON
T. WERNER LAURIE, LTD.
8, ESSEX STREET, STRAND
[1915]

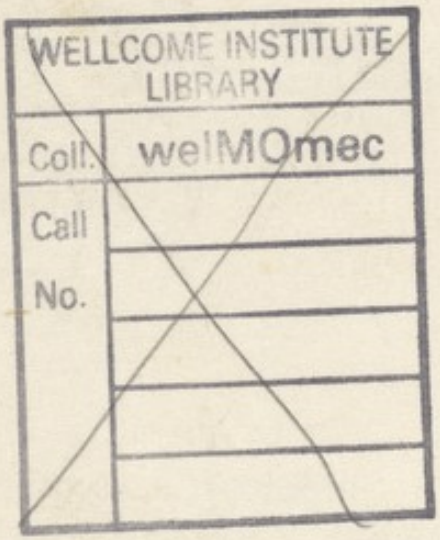
PAINLESS CHILDBIRTH
IN
TWILIGHT SLEEP

A COMPLETE HISTORY OF TWILIGHT SLEEP FROM ITS BEGINNING IN 1903 TO ITS PRESENT DEVELOPMENT IN 1915, INCLUDING ITS SUCCESSFUL USE IN GREAT BRITAIN TO-DAY, WITH ALL THE IMPORTANT MEDICAL RECORDS OF THE DOCTORS WHO HAVE EMPLOYED THE METHOD, AS WELL AS THE PERSONAL ACCOUNTS OF MOTHERS WHO HAVE EXPERIENCED PAINLESS CHILDBIRTH

BY
HANNA RION

LONDON
T. WERNER LAURIE, LTD.
8, ESSEX STREET, STRAND
[1915]

First Impression, April 19, 1915
Second Impression, April 21, 1915



THE LONDON AND NORWICH PRESS, LIMITED, LONDON AND NORWICH

CONTENTS

Contents

LIST OF ILLUSTRATIONS

List of Illustrations

FOREWORD

You have probably heard vague rumours that medical science has at last solved one of the greatest problems of humanity—the agony of women in childbirth, but perhaps you do not realise that this method, popularly known as "Twilight Sleep," is being successfully used in Russia, France, Austria-Hungary, Germany, Finland, Japan, The Argentine and England, Scotland and Ireland to-day, both in maternity hospitals and private practice.

We may safely say that the British success with this method has been the most pronounced of all.

It is in the hope that the spreading of this fact may bring comfort to all mothers that I have written this book.

I am not telling you anything from hearsay. I have spent six months in preparation for this work; during three of those months I was in close contact with a Continental maternity hospital, where over 5,000 women have been painlessly delivered by this method. I have translated almost 200,000 words of foreign medical reports on the use of the two drugs—hyoscine (or scopolamin as it is known on the Continent) and morphine—which produce Twilight Sleep.

While a few of the early Continental reports are antagonistic and record failures, the British Medical Reports from the beginning are practically unanimous records of success.

In the desire to leave no stone unturned whereby I might inform myself, I have visited as many of the British physicians as I could, begging them to further enlighten me on this vastly important subject, and I can assure you that the method of "Painless Childbirth" is now an established institution in Great Britain.

Though thousands of women have already been benefited by this humane treatment, yet there still remain thousands and thousands of other mothers who continue to suffer unrelieved agony at childbirth in utter ignorance that painless delivery is within their reach right here in England, Scotland and Ireland.

How shall we let mothers know this fact?

I know of but one way—for a mother, such as myself, to write to her fellow-mothers, telling them all she knows of the matter.

The professional conservatism of the medical body prohibits it giving general publicity to any scientific development of medicine. The physicians are absolutely in the right when they avoid anything which may seem like advertising, for one cannot but realise the undignified position of a Friedmann in his exploitation of a tuberculosis cure.

The British doctors, for example, have been unostentatiously employing the method of Twilight Sleep since 1907. At various meetings of the Medical Association papers have been read on the subject of painless childbirth, and have afterward been printed in the medical journals, which are the only proper channel through which such facts should be published—according to medical etiquette.

But what mother ever reads a medical journal?—unless, like myself, she is making exhaustive study of some subject which is only dealt with in such journals. The very audience, then, which is in crying need of information on this subject—the mothers themselves—are not reached, and remain in ignorance of the great advance which medicine has made for their relief in their greatest hour of trial.

It is true that the mothers who have been so fortunate as to chance upon physicians employing the method, have done all they could by telling others, thus spreading the blessing by word of mouth propaganda, but this is at best a slow process. Only by a book directly written to women can the great mother-public be reached.

While among the Continental obstetricians a belief still exists that Twilight Sleep is best adapted to the hospital, the British doctors have proven that the method is entirely practical in private practice ; this brings it also within the reach of mothers who prefer to have their babies in their own homes.

Where it is employed in private practice, the doctors inform me it is not at all necessary to keep the patient under constant supervision.

In writing of the simplicity and advantages of the method in private practice, a Scotch physician says : " It is capable of saving the practitioner many a worrying day and weary night and the patient much exhausting restlessness." To quote again : " It is difficult to describe the attractions in private practice of a method which relieves the patient's suffering while it allows labour to progress regularly and which does not require the constant personal presence of the medical practitioner, as the anaesthesia with chloroform does."

The fact that Twilight Sleep has been found practical in private practice by the British doctor proves not only the technical skill of the British practitioner, but it is also a guarantee of the safety of the method.

In one of the largest Scotch maternities, I was told it is now such a daily occurrence to give mothers scopolamin-morphine injections, it is taken as a matter of course, and records are no longer even kept of these births.

So you see I am not heralding a new thing ; I am writing to you of a scientific, medical method of childbirth which has stood all the tests of experimentation, and is now an accepted and perfected institution in many countries.

It matters not that this method originated in Austria, and was developed in Germany ; it is the British medical profession that has used it with the greatest success and proved its safety in private practice.

At the conclusion of this book (page 242) will be found a letter from a member of the British medical profession on the value of Twilight Sleep in both private and hospital practice.

PAINLESS CHILDBIRTH IN TWILIGHT SLEEP

CHAPTER I

THE QUESTION OF REDUCING THE PAIN OF CHILDBIRTH

As far back as 1907 an American physician,[1] in writing of the method of Twilight Sleep, said: "The dread of pain has been the great dread of the coming birth; until this discovery the 'pains of maternity' remained a horrid and incontestable truth, but these have vanished and the exhausting ordeal of motherhood is gone to be seen no more."

That last line is really the most remarkable message of comfort which has ever been sounded to women.

Childbirth is the only physiological event of life which is accompanied by great suffering.

Has the doctor, whose duty it is to mitigate pain, the right to interfere during the natural pangs of delivery? That is the question which has always faced the medical profession, and which has never received from them an unanimous reply in the affirmative.

In the dim past we find that the Hindoos tried to exorcise the pangs of motherhood by the vapour of charcoal, which, when inhaled, caused a stupefaction of the senses. Curiously enough, it has been found by an English doctor that this same primitive method of vapour of charcoal is employed to-day by one of the African tribes, while another tribe soothe the mother's pain by means of intoxicating beverages.

Down through the centuries while all so-called heathen races, inspired by that sympathy which runs like a thread

[1] "The Hyoscine Sleep in Obstetric Practice," by Woodbridge Hall Birchmore, M.D. *Medical Record*, Vol. 71. June, 1907.

of gold through all humanity, tried by sorcery and primitive devices to mitigate the sufferings of maternity, we Christians alone opposed every effort made for a modification of what we called the "normal, physiological pains of birth."

It was not until a certain historical birth took place at Court that the solid wall of opposition was broken through. This event was in 1853, when Queen Victoria was painlessly delivered of a child under chloroform by Sir James Simpson. This royal birth caused this especial form of narcosis to be henceforth known as *chloroform à la Reine.*

To write of chloroform to-day would be archaic—nay, absurd, so well known are its merits and demerits, yet when chloroform was first introduced there was an almost overwhelming prejudice against its use. Aside from the opposition of the clergy to its employment in childbirth (the argument being that women had been condemned by divine command to bring forth in sorrow), it was furthermore opposed by the law, which declared the abrogation of consciousness illegal.

As great a blessing as chloroform has become for the obliteration of consciousness during severe operations, it has not proven the ideal means for the relief of women in childbirth. In fact, none of the usual forms of inhalation narcosis can be used to extend over the entire period of birth without fear of producing serious disorders of the vital organs. If given in small, non-poisonous doses, the effect is insufficient to produce any distinct relief. Moreover, care must be taken that an anaesthetic does not interfere with the functions of the muscles on which everything in birth depends.

Doctors have from time to time made experiments in childbirth with bromathyl, chlorathyl, nitrous oxide (laughing gas), anti-pyrin, cocaine and the medullary narcosis (injections in the spinal cord), but none of these have proved to be entirely effective, and after various trials have generally been abandoned.

In view of the long list of experiments and the doubtful success of various methods it was a scientific event of far-

reaching importance when von Steinbüchel, of Austria, made his first experiments in childbirth with the combination of scopolamin (or hyoscine) and morphine.

In 1905 Dr. Carl J. Gauss, of the Freiburg Frauenklinik, took up the study of scopolamin-morphine, and under the supervision of Dr. Bernhardt Krönig developed the method of painless childbirth, which is now known throughout the Continent as " The Gauss Twilight Sleep."

By slightly increasing von Steinbüchel's dose of the drugs, Gauss found that the patient remained in a state of clouded, but not obliterated, consciousness, and then he observed a most singular affection of the memory: events which had occurred before the patient had entered this state of clouded consciousness were perfectly recalled, while all impressions received while in this condition were entirely forgotten. To express this peculiar state—which more closely resembled a waking than a sleeping one—Gauss coined the word " Dämmerschlaf," which means a *Twilight Sleep.*

It might be asked why morphine was not employed alone to produce painlessness; because when morphine is used alone and in sufficient quantity to become effective, it not only interferes with the natural phenomenon of birth, but it affects the centres of respiration as well. It was found that scopolamin did neither of these things, and when combined with a single small injection of morphine produced remarkable results. This combination of drugs was a most happy one, for while anaesthetic and hypnotic qualities are common to both, their remaining properties are antagonistic, and thereby their narcotic action is accompanied by a decided diminution of danger.

The chief charm of this anaesthetic, from the mother's point of view, is that there is none of that first sense of terror and suffocation which accompanies an inhalation narcosis. No cone is used over the face, the drugs being administered by the hypodermic needle.

The mothers, in describing to me their sensations after the injections, tell of a sense of drowsiness stealing over them, a pleasant feeling of don't-care-ness, which finally

merges into an overpowering sleepiness. There is never a single disagreeable sensation associated in the mother's mind with the experience. There is no subsequent nausea such as follows the use of chloroform. After the birth the patient continues to sleep peacefully for four or five hours, and when she awakes it is difficult to convince her that everything is over.

Scopolamin has a direct effect upon the nervous system and the brain, causing by its action an interruption in the mental associations or memory.

The patient treated by hypodermic injections of scopolamin-morphine remains to all appearances normal; she dozes between pains, and though she may apparently awake during the actual pains and even discuss them with those around her, it will be found after the birth is over that she has retained no memory whatever of the events which have taken place since the injections began to take effect. In other words, the drugs have obliterated memory for the time being, and as an English physician has expressed it: "If there is no memory of pain it is equivalent to having had no pain, and a doctor then certainly has the right to speak of 'painless childbirth.'"

You see the most remarkable quality of this narcotic is that while the mother retains her normal muscular functions, and is in such possession of her mental faculties that she can obey the doctor's or nurse's requests—can, in fact, co-operate in the entire birth process, she afterward retains no memory of what she has done or of what has occurred because of this interruption in her mental associations caused by the peculiar hypnotic quality of scopolamin-morphine. If messages of pain flashed along the nerve wires they were refused admission by her memory.

I think I can best describe the phenomenon by saying: it is just as if a message were sent over the telephone wires to Central, but as the receiver at Central has become disorganised, the message cannot be received and consequently never arrives at its destination.

The mother, having no sense of pain or terror, makes no

resistance to the contractions of the muscles; unimpeded and uninfluenced by mental distress the muscles can perform their intended functions as nature originally intended they should. This fact is pointed out by several doctors, and as one declared after seeing a birth conducted with scopolamin-morphine:

"It is as if I had seen the natural action of a woman for the first time."

An important sequence of the obliteration of all memory of pain in the mind of the mother is the subsequent abolition of the mental and nervous shock usually coincident with childbirth.

The strain of modern life upon the nervous system of women results in what we call "high-strung nervous temperaments"—a condition which causes peculiar sensitiveness to pain and mental shock.

I am told that the rather phlegmatic and muscular Scotch women of the working class suffer comparatively little in childbirth, while the more delicately constituted women of the upper classes are prostrated by the ordeal. It is to sensitive, nervous women that this method has proven an inestimable blessing. I shall quote Dr. Krönig [1] upon this phase of the subject:

"The demand that we obstetricians diminish or abolish suffering during delivery has become of late years more and more emphatic. Quite other demands than those of former times are now made upon the nervous system of the modern woman, and as a consequence she more rapidly shows a nervous exhaustion under the influence of pain. This sensitiveness to pain is greater in those who are engaged in difficult mental work than in those who live by manual labour. As a consequence of this condition of nervous exhaustion in mothers of the better class, we find the doctor often forced to use forceps to terminate the birth where there is no structural condition to necessitate their use.

"At a meeting of the Berlin Obstetrical Society it came

[1] *Painless Delivery in Dämmerschlaf.* By Dr. Bernhardt Krönig, *Deutsche med. Wochenschr*, No. 23. 1908.

to light that obstetricians were obliged to use the forceps in almost 40 per cent. of all cases.

" In the hospitals, unfortunately, the cases available for study consist, for the greater part, of women of no great intelligence, while in private practice we not infrequently have to deal with women of highly nervous temperament—women who declare themselves incapable of enduring the pain of delivery to the end. A doctor, in such cases, often finds himself facing the alternative of either ending the delivery operatively with forceps or of retiring in favour of another physician.

" If we take the trouble to sit at the bedside of women of sensitiveness during the whole course of labour and observe the state of their nervous system, we are compelled to admit that in their case such nervous exhaustion does really set in as a consequence of their suffering, that the will power to hold out to the end is paralysed. No one who takes the opportunity of observing a birth in the case of a highly strung woman from beginning to end, could afterward say that the physiological pain of birth is an advantage to the mother and must not be reduced. Such a statement could only be made by those clinicians who, having such a large number of cases, do not have the time, or take the trouble, to follow the nervous condition of mothers from the beginning to the end of labour ; they merely content themselves by ascertaining occasionally how the case is coming on.

" Any gynaecologist who considers that he ought to be something more than merely an operative manipulator will feel that he should observe the nervous system of the mother ; he will then not infrequently notice that neurasthenic symptoms appear in immediate connection with the delivery. This is not surprising. One would rather feel astonished that long-continued exhaustion does not occur in women of nervous temperament more often than is actually the case, when one realises what a sensitive woman has to endure during birth, aside from the mental impressions.

" Even earlier, during the period before the birth, the

ground is prepared for this by numerous bodily disarrangements, such as nausea, loss of appetite, etc. As is well known, hypochondriacal moods often predominate in women during pregnancy. The woman has also heard from her friends how difficult is the birth of a child, and how eventually the doctor used forceps and then puerperal fever followed the birth for a long time.

"In the case of a first child the blood loss is usually relatively great, and bodily exhaustion is added to the mental.

"It is true that robust women can endure birth without consequent injury to their nervous systems, but it is equally undeniable that if there is the slightest inclination to a neuro-pathic condition, such severe physical and mental injury results in a long period of exhaustion.

"If scopolamin-morphine only *reduced* the perception of pain, the value of the method would still be great, but it goes still further, completely abolishing all perception of the pain in 80 per cent. of the cases.

"The successful development of this method is principally due to the laborious observations and examinations of women in labour under scopolamin-morphine by my assistant, Dr. Gauss.

"In this method we now possess a procedure which, while in no way endangering either mother or child, has attained the end in view, viz.: the complete annihilation of the perception of pain in childbirth in 80 per cent. of the cases, and in the remainder a reduction of pain to its minimum."

In writing of the present-day horror of women of the danger and agony of childbirth the English author, E. Temple Thurston, says:

"It is terrible to think how rapidly this most natural of all functions—since upon it hangs the existence of all the people in the world—it is terrible to think how rapidly it is shaping into the awesome features of a disease. Women speak of it as of some dreadful operation, which indeed it has become. More women die in childbirth now than ever fell its victims when the services of a common mid-

wife were all that were at their disposal. Such indeed is the horror of many mothers of the dread experience, that a fear of the coming ill germinates in the mind as the child germinates."

To those of us who believe in pre-natal influence, it would seem an inevitable result that the child would be blighted by this abnormal horror and fear in the mother's mind during pregnancy.

To women who have once slept the Twilight Sleep there is no dread whatever concerning future births. They know there will be no pain to endure during or after birth; they believe there is no danger for themselves or their children, and they rest assured that forceps will not be used unless complications make their use absolutely imperative.

Those old psychologists, the originators of the Spanish Inquisition, worked out their scientific system from their knowledge of the effect of pain upon the human will.

Torture anybody long enough, they doubtlessly argued, and you will get what you want—retraction, promises, political secrets, lies, truth or even death.

It is just this same chemically deteriorating effect of pain upon the will which is largely responsible for the use of forceps to-day. I doubt if there is a normal woman in the world who would, before birth, entertain the thought of forceps with anything but horror, but that same woman put on the rack and tortured for twenty-four to forty-eight hours will beg the doctor to use the forceps, irrespective of injury to her child or herself—anything to have the agony over with!

The use of forceps has almost entirely been done away with at the Frauenklinik of Freiburg since the development of the Gauss Twilight Sleep.

It is a barbaric idea that women *should* suffer in order to bring forth children. I have even heard the unnatural opinion expressed that the greater the ordeal through which the mother passes the more precious is the child to the mother.

What an inhuman creed! Yet it is evidently held to-day even by some of the medical profession, for I heard an

American physician ask a mother (delivered three days before by the humane method of Twilight Sleep): "Do you take the same joy in this child as you did in the ones you really *had?*"

This poor mother, in three former births had suffered the most terrible and unnecessary agony; the result of the birth of her third child which she "really had" by aid of instruments, were such injuries that she had been confined to bed with blood-poisoning for six months, and her souvenir of this very "real" birth was a stiff leg for four years.

I can assure you that where the mothers have painless childbirth their joy in their babies is tenfold. Many mothers have told me of the delightful surprise they experienced when they awoke to find a nurse standing beside the bed with a baby on a pillow, and in every case they declared that at first they simply could not believe the baby was their own, for they recalled nothing whatever of having given birth to the child.

No mother needs excruciating pain to endear her child; the baby has had nine months in which to become daily, hourly more precious; months of planning for and dreaming of the little new life; months which are the most beautiful and tender in all the history of a woman's inner being.

The woman delivered painlessly, with her physical powers conserved, her nervous system unimpaired, is a far more capable mother. Furthermore it has been declared by several obstetricians of note [1] that the use of scopolamin-morphine, far from reducing the milk secretion, augments it; statistics kept in hospitals of the Twilight Sleep mothers' capacity to nurse, verify this assertion.

If the strength of the mothers of a nation is conserved during childbirth, if the children of a nation are born under normal and safe conditions, the nation will, within twenty years, find itself spending less capital on the general wards of its hospitals.

I have been permitted to see many mothers within twelve to fifteen hours after delivery by this method, and

[1] Drs. Kuenzer, Jusgen, Preller and Lehmann.

I have never failed to feel astonished at their remarkable physical and mental condition. These mothers show no trace of having recently passed through the greatest physical convulsion known to nature. They are entirely free of bodily discomfort; they are amazingly gay, and display none of the exhaustion evidenced by patients who have become mothers in the old-fashioned, ordinary way.

Every mother with whom I have talked has declared that Twilight Sleep has removed all dread of having future children. In fact, many mothers declare they do not care how many children they may have, now that they know the wonders of this method. This is an important factor, for it is well known that the dread of the torture of birth deters many a woman with a mother's heart from bearing children.

One of the leading women doctors of England has said the adoption of this method will " induce a rise in the birth-rate."

With the dread of the pain of birth removed, how much happier are those long months of the mother's waiting for the coming of the baby.

As great a coward as most of us are where pain is concerned, I have never yet met a woman who considered her own relief before the safety of her child. The first question every mother asks when the method of painless childbirth is mentioned is : " But is it safe for the baby ? " It is a great responsibility to take upon one's self to answer this question, and I do not do so without having made every possible investigation of this, the most important phase of the entire subject. At the Continental Maternity, which I have mentioned earlier, where over 5,000 women have been delivered in Twilight Sleep, the statistics kept during the past nine years since the adoption of the method, as compared to those of the preceding nine years, show that the rate of infant mortality has been reduced since the adoption of Twilight Sleep, by a little over 3 per cent. Moreover, the rate of infant mortality in this hospital is markedly less than the figures of the general statistics of the Ducal State in which the hospital is located.

The consensus of opinion of the doctors in sixty-nine medical reports which I have before me is that scopolamin-morphine is without danger to the child.

Among a series of 2,130 Twilight Sleep cases only 1·1 per cent. of the children died up to the third day, while among 500 consecutive cases in another hospital only 7 children (1·4%) died during the first nine days.

An investigation of the amount of scopolamin given the mothers of 318 children, of whom 285 were still living after one year, proved, curiously enough, that the mothers of children still living had received the larger injections of scopolamin[1] which would certainly indicate that the injections had nothing to do with the deaths of the children.

In the early days of experimentation with scopolamin-morphine it was at first difficult to determine the exact dosage which would produce an insensibility to pain without coincident evil effects. In these first tentative experiments the mother was frequently given an injection too early in the first stages of the birth, or the amount injected was too great, or the last injection was administered too late in the final period of birth and as a consequence of faulty technique the child was sometimes born in a sleepy condition which seemed rather alarming until it was found that even if no artificial efforts at resuscitation were made, the infant soon returned to a normal condition and proved none the worse for its temporary condition of intoxication. As experience grew and the number of patients treated by this method reached into the thousands, a perfected system of dosage naturally established itself, and the children then came into the world in an entirely lusty condition of wide-awakeness.

When the correct injections are given the baby is not affected in the slightest.

As one practitioner has said : " If the child is born sleepy it is not the fault of the method but the fault of the manner of dosage."

[1] The mothers of children still living after one year had received at an average ·00131 g. while the other mothers had received at an average ·00126 g.

Dr. Frigyesi[1] says: "The injections of scopolamin-morphine never caused the death of a single child." While Dr. W. A. Brodski,[2] of Moscow, has voiced the general opinion expressed by the British doctors who employ this method: "If correctly administered, scopolamin-morphine is entirely harmless to both mother and child."

I have been asked: "If you were to have another child would you have this method of painless childbirth?" I certainly should, even if I had to cross the world to find a physician who employs it.

The only way in which the general adoption of the method by the entire medical profession can be brought about is by the mothers themselves.

Let every mother take up the fight for herself and her fellow-mothers, and within a few years, as Dr. Birchmore says, "the exhausting ordeal of motherhood" will be "gone to be seen no more."

I want to spare all whom I love needless pain, and I want all mothers, who are personally unknown to me to realise that there is no longer any necessity for them to suffer the "pains of maternity."

All told there are now medical records of over 20,000 births in Twilight Sleep, while doubtlessly there have also occurred many cases of which no records have been kept.

The method has stood the test of experiments since 1903. Many doctors in Great Britain who reported in 1907 and 1908 on their initial cases are to-day using the method with an ever-increasing faith in its effectiveness and safety.

A method which can be proved to ensure painlessness in childbirth, with safety to both mother and child, is of importance to all the women in the world, which is to say, it concerns 811,650,000 women.

[1] *Gesellsch. d. Aerzte.* Budapest. 1909.

[2] At the 11th Piragow Congress of Doctors held at St. Petersburg (Petrograd) in 1910.

CHAPTER II

THE MOTHER'S EXPERIENCES

" I'd much rather have a baby than a bad cold."

The mother who voiced the amazing preference of child-bearing to cold was Mrs. Anna Straub, the wife of a Freiburg-in-Baden schoolmaster.

There is a very old German proverb : " It is easier to bear a child than to have a tooth pulled." In the face of the above remark, this adage would seem to have been nothing less than an inspired prophecy.

I sat beside Mrs. Straub one day last June, on the particular place of honour on the holy German sofa and begged her to tell me all about her experience in child-bearing.

" My brother is a doctor," she said, " and when he found I was to become a mother, he told me to go to our Freiburg Frauenklinik to have a scopolamin birth.

" I had never heard of such a thing, neither had my mother.

" Then my brother told me it was something which the doctors injected with a hypodermic needle to take away all pain in childbirth.

" I listened respectfully, but I thought to myself, I don't know whether I want experiments tried on me or not, I shall probably have the baby just as my mother had me, but I didn't. As the time of birth drew near I made up my mind to go to the Frauenklinik, though I was still a little undecided on the question of having that new thing used, but I changed my mind on the subject with the first pain. I even begged for it.

" Dr. Vogt, who was attending me, said, ' I will give you an injection as soon as the pains begin to come at intervals of ten minutes apart. Don't be afraid, there will be *no*

severe pains to endure at all; just be patient and believe me.'

"But I couldn't.

"I grew so excited and nervous over the unknownness of what was coming I made it more difficult for the scopolamin to take effect when it was eventually given me.

"They made the injection in my hip, and I remember quite distinctly receiving three injections; then I simply grew drowsier and drowsier until I felt as though I were in a 'Dusel'—as the German slang saying is for drunken stupor—and then I was asleep.

"But though I thought I slept soundly and peacefully and knew nothing of what was going on about me, I was, nevertheless, behaving very badly as the result of my great excitement of mind beforehand, for they afterward told me I had had a perfect wrestling-match with the head nurse.

"It was about ten at night when I went to sleep, and the baby was born between five and six in the morning; but I slept on soundly until about nine o'clock, and woke up feeling as one feels after a beautiful night's rest.

"For the moment I had quite forgotten where I was, and that I had, only the night before, been in such a state of nervousness over the expected birth, but as I opened my eyes and saw that I was in the Frauenklinik it all came back to me.

"I then realized, with a sense of terror, that I was there for the purpose of childbirth, which I thought I had yet to go through.

"Then I heard the voice of a nurse, asking if I felt hungry. I said yes, and I saw that she was standing there with a bowl of 'Gerstenschlein' (a thin sort of gruel), and she said: 'It's a girl.' 'What's a girl?' asked I, and she said: 'Your baby, of course.'

"I don't think I ever felt so happy before in my life, for I suddenly realized it was all over, the baby was safe, and I had not suffered at all! In about two hours the nurse said she would like to make the bed and asked me to get up so she could do so. I did, and stood near while she beat and

turned the mattress. I felt perfectly well. At five that afternoon I had my usual cup of afternoon coffee, and at supper that night, I remember I ate *two* boiled eggs.

"The next day I was ravenous and ate everything I wanted, including a fine big piece of beefsteak for dinner.

"On the afternoon of the second day, I held a perfect levée, and all my friends came in to see me and my little girl.

"My mother was really horrified by such revolutionary behaviour. On her asking the doctor if he did not think it unwise for me to be having such excitement, the doctor replied: 'Your daughter is no longer under *treatment*; she is merely *under observation*.'

"On the third day I walked all about the halls of the Klinik, but as it was winter and very cold I did not go outdoors." (Mrs. Straub really said this quite apologetically.)

"The baby," she resumed, "was born on Friday, and on Tuesday we had a fine christening downstairs, which I attended, and we named the baby Marga."

The tone with which she said these final words was the tone with which one should read the closing lines of a fairy story that ends:

"And then they were married and lived happily ever after."

But thanks to the doctors, this was not a fairy tale I was listening to, it was the simple, truthful statement of a mother telling me, as clearly as she could recall, the actual experience of bringing her first child into the world.

I then asked for the still more matter-of-fact details of the expense of such a luxurious and delightful childbirth.

She said there were four classes of childbirth to be had in the Frauenklinik and that she had experienced that of the second class.

For the services of doctor and midwife, if matters took their ordinary course and there were no complications, the charges were 50 marks. (£2 10s.)

For board and bed 5 marks (5s.) a day.

For baby, if suckled by the mother, 50 pfennigs (6d.) per day.

It is preferred, she said, that mothers do not bring infant clothes, the Klinik supplies them, and the linen is the same for all classes. Mrs. Straub's bill for medicine had been 9 marks (9s.) in all.

Of her second child's birth, three months ago, there was practically nothing to tell, for as she felt no fear or excitement beforehand, she had gone to sleep more quickly and had really had no experience at all. The only individual characteristics of the second birth were as follows: Baby born at 2 a.m.; sat up next day at table to eat her mid-day dinner; baby born on Saturday, the mother attended christening downstairs on Tuesday. (Tuesday is evidently christening day at the Frauenklinik.)

"You would like to see her—the little bundle?" she asked.

"Yes indeed—both of them, if I may," I begged.

She returned with the last baby in her arms, the little Marga clinging to the edges of her mother's pretty German apron.

They were a wonderful trio.

Mrs. Straub is a most splendid creature of the Wagnerian type. The soundly sleeping "bundle," wrapped in a blue thing like an Indian papoose, never knew a thing about my extravagant admiration of her. The red-cheeked, plump little Marga in her red pinafore, dodging from one side of her mother's skirts to the other in her embarrassment, was a replica in miniature of her robust mother.

"They don't look as if scopolamin was very injurious, do they?" asked the mother, with a merry smile.

Mrs. Emmet, of New York, was the first American mother who came aboard to have a child in Twilight Sleep. Six years ago she merely chanced to be in Freiburg at the time of her confinement and went to Frauenklinik and so stumbled by accident upon the scopolamin method.

She was so charmed by her first experience that she has since returned to Freiburg for the birth of two other

children. Mrs. Emmet told her friends about painless childbirth and several of them decided to follow her example. They braved Twilight Sleep, found it perfect, and told their friends.

Now a most significant feature of all these American mothers is that in every case but one they were mothers who had been injured in former births; they went to Freiburg because of further dreaded complications and agony.

The exception was an American who found herself at the age of thirty-eight about to become a mother for the first time; having heard the personal experience of a friend who had followed Mrs. Emmet's example, this mother-to-be, realising the danger of a first birth at her age, decided she would stand the best chance of a safe delivery under the scopolamin-morphine method.

In these American mothers Drs. Krönig and Gauss did not have *one* normal case with which to deal. They were mothers on whom forceps had been used in former births, women with tendency to hemorrhage and *placenta praevia* (the presentation of after-birth before the child), one with a four years' disabled leg from blood poisoning resulting from use of forceps, and one who at the age of thirty-eight was to become a mother for the first time.

One might say, surely it would be scarcely fair to judge the method of Twilight Sleep by the cases of these women; in the face of this, how much more emphatic then are the results. We find that in every one of these complicated cases the success of scopolamin-morphine was absolutely perfect. In no case were the forceps used; there were no disagreeable side effects from the drugs; no child was born in an intoxicated condition; the mothers were in every case oblivious of the entire birth process; none of them suffered a pain either during or after birth, they all made immediate recoveries and all were up and about by the fifth day, some earlier.

Strangely enough, of the eight American women who had experienced Twilight Sleep I found seven still remaining in Freiburg. This fact seemed so odd that I asked:

" Haven't any of you people homes ? " They laughed and explained. Two were staying in Freiburg because they had German wet nurses and they did not want to make a change of " cow " until the babies were older.

One had returned to Freiburg to bring her sister-in-law to be operated upon by Dr. Krönig. One was married to a Professor in the University. One had returned to Freiburg to study the method for professional purposes. One had just been delivered of a child at the Frauenklinik. As for the seventh I am sorry to say I can tell you nothing, as she did not care to discuss the birth of her baby. The very different attitude of the other scopolamin American mothers was embodied in a reply made to me by one of them when I asked her if she had any objection to my giving publicity to her experience. " Objection ! " she cried, " why, we are all so anxious to make this thing known to all other women we'd welcome you and tell you everything we know about scopolamin, even if you were going to publish it in the *Police Gazette !* "

It was one afternoon at tea in Freiburg last June, when all my guests were American mothers who had been confined under scopolamin-morphine, Mrs. Sargent, of Nebraska, whose scopolamin baby's second-month birthday party I had attended a few days before, first told her experience.

" I didn't even feel the injection of scopolamin," she said, " for they first used cocaine on the spot before using the hypodermic needle. Very soon after I found myself growing drowsy and in about half an hour I fell asleep just as naturally as I do on any night when going to bed.

" The next thing I knew I was awake and I heard the sympathetic voice of Dr. Krönig saying, ' All ess well,' and then I thought to myself, ' I wonder how long before I shall begin to have the baby,' and while I was still wondering a nurse came in with a pillow and on the pillow was a baby, and they said I had had it—perhaps I had—but I certainly can never prove it in a court room."

" That's the only thing I don't like about it," said another mother ; " there is nothing to talk about afterwards.

MRS. SARGENT, OF NEBRASKA, U.S.A., WITH HER SCOPOLAMIN-MORPHINE BABY.

MRS. CECIL STEWART, OF NEW YORK, AND HER TWILIGHT SLEEP BOY, TOGETHER WITH ANOTHER PAINLESS CHILDBIRTH MOTHER.

You just go to sleep and have a pleasant but vacuous night, and when you awake they present you with a perfectly brand new baby and tell you it is yours, and you have to accept it on faith and feed it and keep it."

"And on the fifth day you get up for good and all," said Mrs. Cecil Steward, of New York. "That's the fashionable day with us, though some were more precocious."

"And on the sixth day you get into a motor," continued another, "and you go about fifty miles somewhere up into the Black Forest and there you have tea and—well, that's about all."

"What I like about Dr. Krönig," said one American, "is he doesn't believe in the goodness of pain. He even thinks pain, and the mental condition resulting from it, a positive hindrance in childbirth."

"This relief of suffering in childbirth," said Mrs. Mary Boyd, "is not only a humane step taken by science to benefit motherhood, but it also promises to raise the function of childbirth from a gross and primitive physical agony to a normal, unimpeded, muscular process which can be entirely directed by the obstetrician."

"I was a bit hysterical," said one mother, "and they just gave me a small whiff of chloratyl which made me unconscious for about five minutes; this caused the very first injection of scopolamin-morphine to take immediate effect."

"The only after-effects of scopolamin," said Mrs. Boyd, "are a slight defect in the eyesight (something like that caused by belladonna), which lasts about forty-eight hours; then for about half a day there is sometimes a trifling numbness in the hands and feet, a disposition to break out in perspiration, and a dry throat which makes you want to drink water, and that is literally all." Comparing this to the after-effects of other anaesthetics one must feel that the aftermath of scopolamin is very insignificant.

I then inquired about the expense of having these American first-class babies.

For room, according to size, 8 marks (8s.) to 15 marks

(15s.) a day. Child-bed supplies, 20 marks (£1); midwife's fees, 15 marks (15s.).

For wet nurse, 3 marks 50 pfennigs (3s. 6d.) per day.

Incidentals from 40 (£2) to 100 marks (£5).

The doctors' fees vary according to doctor and case, but they are always exceedingly reasonable.

I found that the experiences of these American mothers were entirely typical, and that after one has heard the stories of a dozen or more mothers the similarity of detail and a lack of exciting adventure rob the subject of variety.

The experience of a mother of the German nobility, who most courteously and gladly gave me every detail of her second baby's birth, is, as you will see, very similar to the foregoing instances, except in one interesting detail.

"I had had a frightful experience in Berlin," she told me, "with the birth of my first child, so when I found the birth of my second approaching I decided to come to Freiburg to the Frauenklinik, not knowing, however, anything of Twilight Sleep, but merely because of the reputations of Dr. Krönig and Professor Gauss.

"Naturally I was a bit nervous when they suggested the use of the, to me, unknown drug in my delivery, but when they said I would know no pain, the memory of my agony in Berlin decided me.

"The injections of scopolamin were made on either side of my chest above the breasts"—(I presume the location had something to do with her nobility)—"and within twenty minutes I found myself going to sleep.

"I awoke at one time sufficiently to see that there were doctors and nurses around me, but I had no desire to speak to them, and I was unconscious of any pain.

"The Geheimrat (Dr. Krönig) happening to look at me exclaimed, 'Why, she is awake!' and quickly laid a cloth over my face.

"As soon as the visual impressions were removed I immediately fell asleep again, and when I awoke the next morning I was perfectly amazed when the nurse presented me with a little girl. On the fourth day I was walking

about feeling absolutely well. In Berlin I was in bed four weeks and did not recover my health for months."

The one significant detail of this experience to me is that out of all the American and German mothers whom I met in Freiburg, this is the only case of a mother consciously awakening, even momentarily, after the Twilight Sleep was established.

The mothers of the fourth class, delivered in the free ward of the Klinik, are very difficult to get at, but I found one, a poor girl who had deliberately become a mother for the professional purpose of being a wet nurse. In her simple way she put the whole matter in a nutshell: "Why, you don't know a thing about having a baby, do you?" That was all she had to say of Twilight Sleep.

In the case of Mrs. Stammnitz, the wife of the Stadt Architect of Baden, the doctors had an exceedingly difficult case with which to deal. It was the fourth child, and the mother's experiences in childbirth without scopolamin had hitherto been as follows:—The birth process of her first child had continued in unabated suffering from a Sunday until the following Thursday, and then forceps eventually had to be used to terminate the birth; she was badly torn, and the wound not being properly attended, blood poisoning resulted, and it was a question for weeks whether her life could be saved; she was confined to the bed for two months.

Her second childbirth continued over the period of three days; there was a severe hemorrhage from a bursted vein from which she lost over a pint of blood.

The third birth consumed three days and left her with hernia of the navel. After these frightful experiences Mrs. Stammnitz was persuaded to go to the Frauenklinik for the birth of her fourth child under Twilight Sleep.

In all three of the former births without scopolamin there had been a marked weakness of labour, so it is not at all surprising to find that after the first injection of scopolamin-morphine all labour ceased. The doctors had to wait for twelve hours before labour recommenced; the second injection was, therefore, not given until after

the thirteenth hour. This injection did not diminish the action of the labour, but neither did it succeed in reducing the pain. The third injection also failed to produce a condition of Twilight Sleep. It was not until the fourth injection was given that Mrs. Stammnitz became oblivious of the birth-process, but from that time on the drug was effective, and she did not realise the final expulsion of child.

The entire birth consumed forty-eight hours, which we find on comparison with the length of former births was a distinct improvement. No forceps were used, there was no hemorrhage, the birth was entirely spontaneous.

Mrs. Stammnitz continued to sleep for four and a half hours after the birth, and then awoke to find herself not only free from discomfort, but refreshed. The fifth hour after birth she got up and walked about the room.

In the afternoon, she was carried downstairs, and then, on the arm of her husband, walked constantly for one hour about the Frauenklinik garden.

A woman sitting in the garden came up to Mrs. Stammnitz and said: " Excuse me, Madame, but is it possible that you are the lady who could *not* have her baby yesterday ? "

In telling me of her experience Mrs. Stammnitz said : " You will doubtless hear the objection brought by the opponents of the method that scopolamin is not thrown off as quickly as is claimed by Gauss, and that in reality the mother is left in a semi-narcotised, stupid condition for a day afterward. Nothing could be further from the truth in my case ; to refute that claim I would like to tell you of my first day after the birth of my scopolamin child. He was born on July 9, and it so chanced that the ninth is also the birthday of our Grand Duke. This particular birthday was the first that the Duke had celebrated since his accession.

" Six hours after the birth of my boy it occurred to me that I should commemorate the occasion by writing a poem to the Grand Duke. I thereupon consumed the entire forenoon in the composition of a poem of four pages.

This surely would not indicate that my mental faculties were dulled by the drug."

The remarkable activity of Mrs. Stammnitz during this first day after a forty-eight hours' birth was indeed wonderful, embracing as it did not only the hour's walk in the garden during the afternoon but the creation of a long poem in the morning.

Even if it is quite aside from the subject-matter of this chapter I would like to tell you of the poem and its delightful sequel.

The subject of the first verse was the excessive patriotism shown by the boy which had inspired him to prolong his mother's labour for forty-eight hours in order that he might be the first subject born on the first anniversary of the birth of the Grand Duke celebrated by Baden.

Mrs. Stammnitz then recalled to the Duke's memory that at the age of ten she had been appointed to be the deliverer of a bouquet of flowers, on a certain great occasion, to his mother, the Grand Duchess. His mother, when accepting the flowers, had greatly disconcerted the little girl by asking, " Do you like knitting ? " The child was miserably confused, as she did not dare speak the truth of her sentiments in regard to this art so sacred to Baden —in fact, to all Germany. Great was the relief of the little girl when the Queen of Sweden, sitting beside the Grand Duchess, came to the rescue by saying, " If you don't like knitting, say so. I hate it myself."

In reminding the Duke of this incident Mrs. Stammnitz said, " This same little hate-knitting girl is the mother who now, six hours after the birth of her boy, lays at the feet of Your Highness a loyal subject and future soldier of Baden, consoled in that thought that she is not the mother of a much desired girl."

A personal letter of pleased appreciation arrived in a few days, then two months later, when Mrs. Stammnitz had just issued invitations for the baptism next day of her baby, another letter arrived from the ruler of Baden : the Grand Duke wrote to request the privilege of becoming the godfather of the boy.

" You may imagine how quickly I sent word to all my friends cancelling the invitations for the next day," laughed Mrs. Stammnitz.

On the following Sunday the Grand Duke became the godfather of his little scopolamin subject, and a few days later there arrived a most beautiful silver cup, on which was engraved the royal crest, and below that the monogram of the son of Mrs. Stammnitz.

Before Twilight Sleep was developed there were only two sisters (nurses) in the first-class maternity ward of the Frauenklinik, but so interested was the Grand Duke in the development of the method, he made a very handsome gift to the Frauenklinik, which enabled them to increase the maternity force of nurses to five.

This interest in painless childbirth taken by the Grand Duke Frederick II. and the Grand Duchess Hilda, and their generous assistance to the Frauenklinik has a touching pathos for the reason that these much beloved and kindly rulers of Baden are childless.

" It is also claimed," said Mrs. Stammnitz, " that scopolamin affects the mental development of the child. As to that I can only say that in spite of the rule prohibiting the admission of children into our schools before the age of six, such was the precocity of our boy, this rule was set aside in his case, and he was admitted when five and a half."

As for young Stammnitz's physical strength, a little example will suffice. On his first day at school, when questioned about himself by the teacher, child-like he proudly stated that he was the godson of the Grand Duke Frederick. At recess, several older boys came up, and one said, " We don't like liars in this school. When a boy lies he has to fight. Now take back what you said about the Grand Duke."

The Stammnitz boy said: " It's no lie—I'll bring my cup to show you to-morrow, but I'll fight you just the same," which he did with such success, the fights of that day were the last ones he has ever had in that school.

Mrs. Bissinger is the English mother of four scopolamin children.

Her first baby was born far up in the Black Forest mountains, the scopolamin being administered by the village doctor.

" While mitigating the pain," said Mrs. Bissinger, " the injections of scopolamin-morphine were not a complete success. The physician was inexperienced, and knew much more of the theory of Twilight Sleep than of the actual practice.

" I remember how infuriated I was ; this doctor showed me an object for the third time, and I assured him I recalled it perfectly, he replied, ' You only *think* you recollect it ; as a matter of fact you do not.' Then when I told him I was still suffering acutely, he calmly told me I only *thought* I was suffering, and that after the birth I would find I had suffered nothing.

" He was entirely mistaken, I recalled all the pains distinctly up to the latter part of the birth when the injections finally did become effective and obliterated consciousness to the end.

" It was not, however, until I had my second child at the Frauenklinik, under the care of Dr. Krönig and Prof. Gauss, that I realised the tremendous difference made by the personal skill, science and technique of the doctors conducting the Twilight Sleep.

" The Twilight Sleep of Gauss was in no way related to that of the Black Forest doctor.

" I suffered nothing whatever during the birth process of my second child at the Frauenklinik. I merely recall the occasion as one of a delightful night's sleep, followed by a very pleasant day, on which my most intimate friends called to congratulate me on the birth of my first son.

" This birth robbed me forever of fear of future births, for I knew as long as I could reach the Frauenklinik I need never suffer a pang—and I haven't. Of the third and fourth births there is nothing to tell, for I knew nothing whatever of either birth ; I recovered immediately and

my health has seemingly been bettered by every birth until—well, look at me now!"

I looked, and what I saw was a most beautiful woman of apparently about twenty years of age, a picture of perfect health, strength and beauty.

Mrs. Bissinger is a representative scopolamin mother.

On the faces of these mothers are written no lines of pain, their eyes are clear, their flesh is firm, and they have no *nerves*.

As a preserver of youth and beauty alone, painless childbirth should make a wide appeal to all women.

One of the most amazing things of all is that out of dozens of German and American mothers whom I met in Freiburg, I did not find one mother who had felt the slightest pain after birth.

In the cases of German mothers, who have never borne children without scopolamin, I found an evident surprise on their part that I should inquire about pain or soreness after birth.

One of these fortunate mothers replied: "But surely no woman ever suffers anything *after* the birth is over!"

The remarkably quick recovery of all Twilight Sleep patients would seem to prove beyond a doubt that the slow convalescence of the ordinary confinement case is largely due to the nervous and mental shock resulting from prolonged and exhausting agony.

At the Frauenklinik, after birth, they make the mothers perform certain bed-exercises (to be described later) which correct the relaxation of the uterus, and re-establish a normal muscular condition.

The patients do not have to remain in bed in a flat position, and there is no necessity for bandages. As a rule they get up and walk about their room for a short time the first day; the second day they go to one of the sun parlours of the clinic and walk about the halls; on the third day they either go for a walk outside, or a ride in a motor.

In fact the mothers feel so very well it is difficult for the doctors to restrain them from over-exertion and from leaving the clinic too soon.

Judging only by their condition of physical comfort the mothers forget the drain on their systems of the past nine months, the tension of the muscles, the great general bodily strain of birth, all of which should undoubtedly be followed by a reasonable amount of rest and relaxation.

I remember hearing a mother say to Dr. Gauss on the second day after the birth of her baby: "Oh! I feel so well; it's all foolishness keeping me in bed. I want to get up and tango."

"All right," laughed Gauss, "I make the engagement to tango with you to-morrow morning."

This was a woman who had been a helpless invalid for years up to the time of this scopolamin birth!

The Twilight Sleep mothers of my acquaintance in Freiburg were mothers of children ranging in age from one day to seven years, and in every case I found the mothers in a state of remarkably good health.

I was sent to Freiburg in May, 1914, by the *Ladies' Home Journal*, of Philadelphia, to investigate painless childbirth.

After writing my article on the mother's experiences, for this magazine, I decided to remain to investigate the subject from the medical point of view.

The British and American mothers may ask: "If this method has been in use for nine years, how is it that we mothers have heard nothing of it?"

It is a question which we may all well ask.

But for the word of mouth propaganda of mothers who have had Twilight Sleep, and the investigation of the method by lay writers, the lay public would still have no knowledge of scopolamin.

An American mother who had been delivered of a child some years ago under scopolamin-morphine in Freiburg, found herself in New York about to become a mother again. She knew of one American physician who had remained in Freiburg for the unprecedented time of six months studying the method, so she wrote Dr. Krönig asking if he thought it would be safe for her to go to this

American doctor for the birth of her next child. Dr. Krönig replied : " I cannot advise you. I must, however, remind you of the fact that the physician has only had six months' study of scopolamin-morphine."

And yet during my residence in Freiburg I saw doctors of all European nations, England and America, come for a few days' or a week's investigation of births under scopolamin-morphine, and go away with positive opinions on the merits or demerits of the method !

The literature of scopolamin-morphine is as yet largely confined to Germany and is scattered throughout the German medical journals.

It took me three months to collect and translate the reports upon the subject. I was particularly careful to obtain all the reports of Gauss' opponents and the records of the Continental hospitals where the method has failed, for it is only by a conscientious study of both sides that one can arrive at a fair conclusion.

Fortunately I completed my last translation on July 25. Already there were disquieting rumours of war in the air, and Baden was palpitating with unsuppressed excitement.

As my train left on the night of the 26th I departed to the music of " *Deutschland über Alles*," bursting from the throats of hundreds of students on the platform of the Freiburg station.

As I now, three weeks later, write these lines, I am saddened by the thought that Dr. Gauss—the man who has given nine years of his life to the development of this method of Painless Childbirth—is at the front, as a surgeon and a reserve of the German flying corps. It is a shame to use this great, humane doctor as " cannon-fodder."

Whatever our feelings are about the war and the German nation, it should in no way affect our gratitude to the doctor whose efforts have lessened the pain of women in all parts of the world.

It is immaterial whether this method originated in Austria, Chili or China, the vital thing is that it has benefited all the civilised world and especially the mothers of Britain.

If I neglected to give Dr. Gauss full credit for his development of Twilight Sleep, or if I ignored the early German medical experiments with scopolamin, the British doctors, who know the truth of the history of this method, would be the first to criticise me.

When dealing with a scientific subject such as this, one must realise that science and medicine are without nationality—they belong to the whole world.

It was only by a conscientious study of scopolamin-morphine in the German Maternity, where over 5,000 women have been confined in Twilight Sleep, and by investigating the failure of the method in some of the other Continental Hospitals, that I am now able to give you authoritative facts.

Remember this always: where others failed in a few dozen or a few hundred cases, Gauss succeeded in over 5,000!

It is, moreover, especially significant that while Continental doctors have warned against the use of scopolamin-morphine in private practice, the British obstetricians have found it practical and successful in this field. Twilight Sleep is being used in general practice, as well as in many of the large maternity hospitals of England, Scotland and Ireland.

CHAPTER III

MY VISITS TO THE BRITISH DOCTORS

BEING tremendously impressed with the fact that even the earliest British reports on Twilight Sleep were records of success, I decided in October, 1914, to personally visit several of the most prominent doctors whose reports I had read with such interest at the Library of the British Medical Association.

As you know, travel is difficult in Britain during these troublous war times, and no one leaves home unless forced to, but I feel most richly repaid for my trip, for I now realise that Twilight Sleep is not merely being experimented with here and there by British physicians, but I know it to be a permanently established institution in the British Isles.

I am so tempted to tell you of the hundreds of British wounded I saw being brought into the Infirmary at Edinburgh; of the sixteen searchlights playing on the North Sea from the forts under the Forth Bridge as our darkened train sped across; of the hotel full of officers at Dundee (I was the only woman there), of the three car loads of Belgian wounded with whom I travelled from London to Bristol, of seeing the poor survivors of the *Hawke* brought into Aberdeen, but I must rememebr I am not writing of war and disaster, but of life and hope for mothers, and restrain myself.

There is, however, one thing which I *can* tell you. One night I was groping about darkened Edinburgh when I suddenly noticed a dim street light glinting on a brass plate on a house just in front of me; I walked up to read: "Sir James Simpson"—the house of the man who first relieved woman's pain in labour! It was a coincidence of a really thrilling quality.

How curious that I should stumble across the old home of the pioneer of painless childbirth.

I thought of the vast strides which medical science had made since the first delivery of Queen Victoria's, and of how glad Sir James Simpson would have been to know that his dream of woman's relief in childbirth had come true at last. Nowhere is it more of a reality than in Edinburgh itself.

No man in Britain has a more enviable professional standing than Sir John Halliday Croom, Professor of Midwifery in the University of Edinburgh.

The fact that Sir Halliday Croom has employed the scopolamin-morphine method both in the maternity hospital and his private practice in Edinburgh since 1908, is alone sufficient guarantee to all mothers of the safety and efficacy of Twilight Sleep.

Although Sir Halliday Croom has been a lecturer in the University of Edinburgh for over thirty years, he is in the very prime of life, and one feels that the zenith of his power is not yet reached.

With this great obstetrician on our side the mothers may well feel assured that their battle for the general adoption of painless childbirth will eventually be won.

" Am I justified in assuring the mothers that this method is without danger to their babies ? " I asked.

Sir Halliday replied without a moment's hesitation :

" Yes ; when properly used scopolamin-morphine is absolutely without danger to the child. If the child is born sleepy, it is the fault of the manner of dosage not of the method."

He added that when the child is born intoxicated the inexperienced physician often employs violent means of restoration which do far more harm than good.

A good maxim for the treatment of sleepy babies is, " Let them alone and they'll come to."

I was not surprised to find that Sir Halliday Croom welcomes this crusade of mothers for painless childbirth, for he is such a great man in every sense.

He feels that the scopolamin-morphine method should be more known, more generally adopted, and it should be written about so that mothers may have an opportunity of knowing that there is a safe method which can ensure them relief from suffering.

He told me with great delight that only two weeks before my visit he had received a letter from a man in Johannesburg, Africa, who is engaged in writing just such a book as this for mothers, and he said : " I'm glad the matter is being given publicity ; the women should know."

Sir Halliday Croom does not believe in the advantage of pain ; he thinks it is to be deplored that women have had to suffer unrelieved agony in childbirth for so long. He added feelingly : " No *man* wants to suffer if he can help it. It is absurd not to avail ourselves of all the wonderful developments of medical science and use every means to prevent suffering."

He went on to say that of course scopolamin-morphine needs careful handling, just as chloroform or any other anaesthetic does. There is the same general prejudice against scopolamin to-day which originally greeted chloroform.

He told of the first cause of chloroform narcosis in the Edinburgh hospital ; the patient died—might have dropped dead in the street, any way, and probably had a bad heart, but the death was of course attributed solely to chloroform, and the consequent prejudice against its further use was only gradually overcome.

Sir Halliday has long employed scopolamin-morphine with perfect success in private practice, and he finds it entirely unnecessary to keep the mother under constant supervision. He leaves a competent nurse in charge, and is always within reach by telephone.

" The old-fashioned idea that a practitioner must sit beside a woman during the entire period of labour was outrageous—indecent ! "

He finds that the mothers have less exhaustion after the judicious use of scopolamin-morphine than without, but of course much depends on the nature of the labour.

He does not believe in early rising, and cannot see what

object is attained by it. Most women, under the circumstances, are only too grateful and thankful to have a rest. If it be amongst the poor, a rest is the best thing for them; if among the rich, a rest from the rounds of gaiety and pleasure is excellent for them. The plan of early rising has been tried in Edinburgh, but Sir Halliday Croom has never countenanced it in his practice, for he could not bring himself to believe that women wanted it, or that it was of any especial advantage to them.

As I had noticed that he referred, in his report, to a tendency sometimes to after-birth hemorrhage, I inquired if he really considered this a drawback to the method. He replied that he had only had such cases reported to him; personally he had never seen a case of *post partum* (after birth) hemorrhage caused by scopolamin-morphine.

He does not find that these drugs prolong the birth process.

Sir Halliday Croom considers the amnesia (or forgetfulness of pain) the most remarkable feature of Twilight Sleep. He has also observed a curious abstract, extraneous sense of pain in some patients. One of his patients on being asked if she felt any pain replied: "I am perfectly comfortable, but some one in the next room is suffering."

"The secret of success in the use of scopolamin-morphine," said Sir Halliday, "lies in not giving the first injection too early in the first stage of labour or too late in the second period."

"This can easily be learned by experience, I suppose?"

"By common sense," he corrected.

"Do you think the Germans have carried the use of scopolamin-morphine to greater perfection than others?"

"No"—the tone was emphatic. "Nowhere have these drugs been employed with greater skill and success than right here by the British doctors."

"Do you think the method will be still further developed?"

"We can't go very much further, can we? What more do we need?" asked Sir Halliday. Then he added what should go on record as the final word of reassurance as to

the value of Twilight Sleep: "With the proper use of scopolamin-morphine we can ensure painlessness in childbirth without danger to either the mother or her child. A method which does this has, I should say, practically reached perfection."

In Dundee I saw Dr. Robert Cochrane Buist.

Dr. Buist had read a paper before the meeting of the British Medical Association held at Sheffield in 1908.

It was interesting to find that not only was he continuing the use of the method in the Maternity Department of the Dundee Royal Infirmary, but he tells me both he and several other doctors are employing scopolamin-morphine in general practice with success.

Under the conditions of the work at the Dundee Maternity it has not been found possible to continue a systematic record in a manner suitable for detailed report, but as Dr. Buist has, since 1907, employed scopolamin-morphine in all cases where the labour becomes distressing (unless this is within an expected two or three hours of delivery), the accumulated number of cases must now be very great.

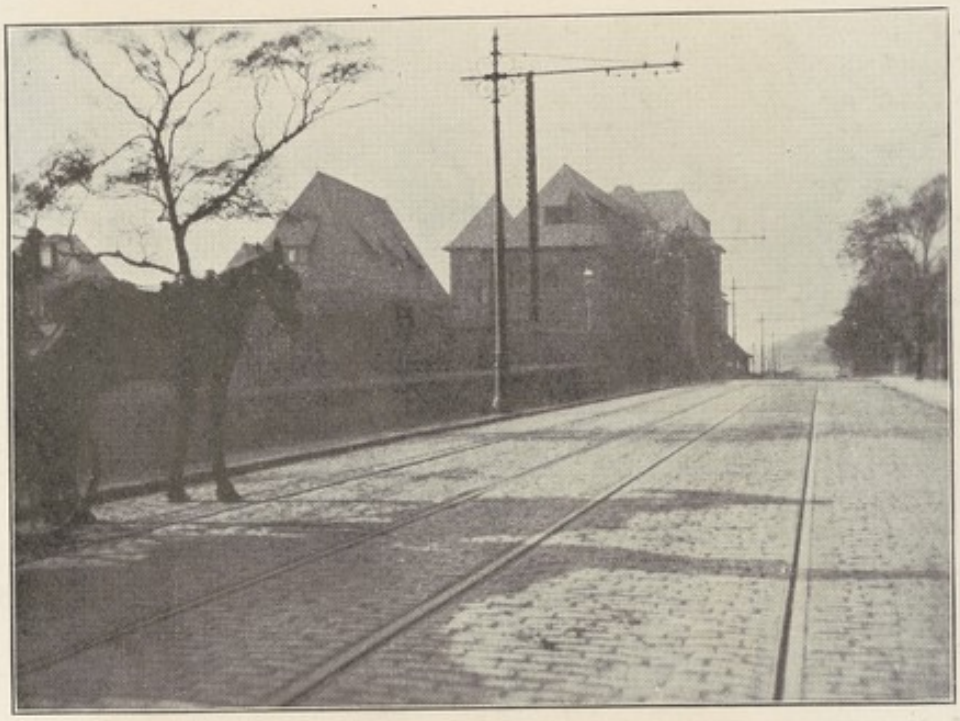
Dr. Buist, I am sorry to say, is not at all in sympathy with the efforts of mothers to bring about the general adoption of this method of painless childbirth. He thinks the mothers should leave this matter entirely to the decision of the medical practitioners.

He says the field of experiments is gradually widening, and sufficient publicity is being given the matter by the doctors themselves. After Dr. Buist read his report at Sheffield, on sixty-five cases, many other doctors present at the meeting made subsequent experiments, and their experiments will naturally lead in turn to others.

In spite of this undoubted gradual growth of the method, I pointed out the still existing general ignorance of mothers on the subject. I have not found one mother in a thousand in either England or Scotland who has ever even heard of this method. Should they not be given a chance to know that they need not continue to suffer in childbirth?

The suffering of women in labour had been greatly over-

A BRITISH TWILIGHT SLEEP BOY AND HIS NURSE.



THE MATERNITY HOSPITAL OF DUNDEE, WHERE THIS METHOD OF PAINLESS CHILDBIRTH HAS BEEN USED FOR SEVEN YEARS.

stated, said Dr. Buist, especially by the Germans. Only hysterical or high strung women needed relief in childbirth, and then, when it came to a question of relieving the pain, "the selection of an anaesthetic should be left entirely to the judgment of the doctor attending."

On this point I must differ with Dr. Buist. In an earlier generation it was the fashion to keep women in total ignorance of all physiological facts; it was even considered indelicate for a woman to make any inquiries about the construction and functions of her body. It is only within the past thirty years that women have been permitted to state openly that they possess *legs*—our poor mothers walked around on two mysterious things known modestly as "limbs."

Left in darkness by our parents about the beautiful truths of our body and the miraculous workings of nature within us whereby creation is continued, the only information which we ever attained was got through vulgar channels, and that false knowledge was so tainted by obscenity that it bore no likeness whatever to the sacred beauty of the truths of life.

In the old-fashioned days when women were merely the blindfolded guardians of the power of child-bearing, they had no choice but to trust themselves without question in the hands of the all-wise physician, but that day is past and will return no more. Women have torn away the bandages of false modesty; they are no longer ashamed of their bodies; they want to know all the wondrous workings of nature, and they demand that they be taught how best to safeguard themselves as wives and mothers.

When it comes to the supreme function of childbearing every woman should certainly have the choice of saying *how* she will have her child.

If chloroform is unsatisfactory and even dangerous in childbirth, a mother should have the privilege of requesting that it is not used.

If scopolamin and morphine are safe and ensure amnesia a mother should have the right to demand that her physician employ these drugs, and if he declines to do so she should feel no hesitation whatever in seeking another doctor who will.

As much as I differ with Dr. Buist on these points of the mother's subjection to the doctor, I can only feel admiration for his splendid contribution to the relief of women by his constant use of scopolamin-morphine during the past seven years.

He finds the only thing necessary to make the method a success in private practice is the employment of capable nurses to carry out instructions.

In general Dr. Buist believes in early rising, and he finds that patients treated with scopolamin-morphine are in a condition where early rising is not injurious.

He has never observed any tendency to after-birth hemorrhage.

As for the children, they are only affected when the first injection is given within four hours of the birth. If the children show any signs of intoxication he employs artificial means of restoration, but he added that he believes that " probably more trouble is taken than is really necessary."

The Royal Infirmary of Dundee is a magnificent building, looking much more like an imagined Castle than the real Castle which lies just below it—now used as a barracks for the soldiers (formerly the headquarters of the suffragettes).

The Maternity—a pleasant red brick building immediately behind the main infirmary—overlooks, from the heights on which it is located, the city of Dundee.

The war has claimed many of the Dundee Maternity's doctors and they are at present rather short handed, but I cannot imagine a more pleasant spot where mothers may go for their lying-in, especially when we realise that the Dundee doctors are not mere experimenters with the method of Twilight Sleep, but are physicians who have already had years' experience with the use of scopolamin-morphine.

Twilight Sleep is now a part of the regular hospital routine in Dundee.

Every woman physician whom I have ever met has been altogether adorable. The very fact that a woman undertakes the study of medicine indicates a great core of

sympathy with suffering and an overwhelming desire to serve humanity. This is more essentially true of a woman doctor than a man, for woman's nature makes her peculiarly sensitive, and one cannot but realise all that a woman must overcome within herself when she takes up the study of medicine.

Dr. Constance Long is one of the most sympathetic doctors I have ever met, and I was not surprised to find that without any actual training in the method of Twilight Sleep, Dr. Long's intense desire to relieve women's agony in childbirth led her to read everything which she could find on the subject, and then she just forged ahead and made her own experiments.

Dr. Long is the President of the British Association of Registered Medical Women, and at a meeting held on the Jan. 7, 1913, she read a most interesting paper on her use of scopolamin-morphine in private practice.

I am filled with gratitude to Dr. Long for her sympathetic willingness to give me any information which would be of service to mothers in their battle for painless childbirth.

She has always believed in diminishing pain where ever it is possible, especially women's pain, and she, like Sir Halliday Croom, thinks all women should be given every chance to know that there is this method of painless childbirth.

As so many Continental obstetricians still lay stress on the fact that Twilight Sleep is *not* practical in private practice I was particularly anxious to find out the secret of Dr. Long's success with it in this field.

"It consists in the employment of reliable nurses with whom one can entrust the patient after the first injection," said Dr. Long.

She employs the memory test and calculates her dosage accordingly.

The constant presence of the doctor is not at all necessary.

The nurses often say they cannot see that the patient is in a condition differing in any way from the ordinary state of women in labour, and they are perfectly amazed

to hear the mothers afterward declare that they recall nothing of the process of birth after a certain period—indicating when the injections began to take effect.

In spite of the normal appearance of the patient, Dr. Long always impresses the nurse with the fact that she must regard the patient-mother as under an anaesthetic and accordingly keep the closest watch upon her.

The patient is made to lie on her side, so there is no danger of the tongue falling backward.

Though under the effect of the drugs the mother is able to get up and attend to her bodily excretions as well as eat her meals regularly during prolonged labour.

I asked Dr. Long if she believed in the custom of early rising, and she replied :

" No ; it is often the only chance in life the poor things have for an absolute rest."

She generally keeps her patients in bed for about two weeks.

All of Dr. Long's Twilight Sleep cases have been primiparae—women bearing their first child—and she has found that these mothers have absolutely no fear of future births, while on the other hand where women have been delivered without Twilight Sleep and have suffered accordingly, she has often heard them say: " Never again."

Dr. Long has had only one case in which the child was born sleepy. She declares she does not feel there is the slightest danger for the child in the method, and she has, never seen a case where she felt any alarm for the mother.

She has known many instances where the mother simply could not have endured the birth without scopolamin-morphine.

In one case of very protracted labour, because of the patient's small, round pelvis, the mother would have suffered unspeakable torture without Twilight Sleep, but as a result of the use of scopolamin-morphine, the woman retained no memory of the fearful ordeal through which she had passed.

Dr. Long's last words to me were memorable and, coming from a doctor, peculiarly impressive:

"Only when women demand and *demand* that the doctors adopt this method will the doctors have to give in and meet the demand."

CHAPTER IV

A PLEA TO MOTHERS

I WAS greatly puzzled to know how to present this subject to the mothers so they might be placed in a position whereby they could make statements based on positive knowledge, instead of having to ask questions of their doctors.

I know men, as a rule, have an idea that women can neither cope with, nor find interest in, technical figures and facts but personally I regard this as a masculine injustice to the feminine mind.

Where a woman is really interested in a subject that is of vital importance to her sex, she will take infinite trouble to gain the necessary information. In every woman lie the latent qualities of the student.

Think of woman's capacity to study the details of housewifery, of domestic economy, of the care of children! Almost every woman in the world is an authority on all that is relative to her daily life.

When it comes to anything as vital as painless childbirth, I do not think I am deluded when I believe that all mothers will be just as keenly interested in the subject from a scientific and medical point of view as the doctors themselves.

Unless we mothers do study Twilight Sleep from the very beginning, following its development, the medical experiments, the failures and the successes, we can be in no position to decide whether we desire this method for ourselves and our fellow-mothers and we shall be unprepared to argue the matter with authority if we wish to urge a general adoption of painless childbirth by the entire medical profession.

Moreover, I have felt the great necessity of making my book technically irreproachable. Should any mother wish to show this volume to her doctor she must feel confident that she is not showing him a book based merely on mothers' experiences and testimony or on the personal and weightless enthusiasm of the author; she must know that this book contains all the voiced and written opinions on Twilight Sleep of the doctors themselves.

Unless we study the records of those physicians who have made experiments with scopolamin-morphine, we shall be neither in a position to make correct statements ourselves nor to refute the false statements of others based on their ignorance of facts.

When I began to study Twilight Sleep I rather dreaded the technical difficulties of the subject, but the longer I have worked over the medical reports the more keenly interested have I become; I am now hoping that my experience may be indicative of the interest which will develop in the minds of other mothers after they have once determined not to be satisfied with superficial information on the subject.

We can't afford to be superficially informed where the bringing of children into the world, and the safety of the mothers and the babies is concerned.

I remember being almost terrified at first by the apparent alarmingness of Dr. Hocheisen's experience with scopolamin-morphine. I then carefully studied Dr. Gauss' directions for producing the Twilight Sleep and re-read the Hocheisen report and soon saw how far afield Hocheisen had gone from the Gauss instructions and realised that the fault of the failure lay entirely with Hocheisen, not with the method at all.

Suppose a doctor should say to you:

"Don't talk to me about Twilight Sleep. Scopolamin is a dangerous poison, and mothers treated with scopolamin-morphine always have hemorrhage, while the children are born intoxicated."

If uninformed you would probably be so terrified you would drop the thought of ever trying Twilight Sleep your-

self and warn all other mothers against it. But suppose you were familiar with the papers of Dr. Gauss, the American report of Dr. Birchmore, the record of Sir Halliday Croom, and all the others contained in this book, you would not be alarmed or influenced in the slightest, for you would instantly realise that the doctor who utters a wholesale rejection and damnation of Twilight Sleep either knows nothing of the method from personal experience or else he speaks from personal failure caused by his own faulty technique.

Every mother should be throughly conversant with all the experiments which have been made with scopolamin-morphine in order to safeguard herself from being misled or alarmed.

Knowledge is not only the most impressive thing in the world, it is the most powerful.

I remember once hearing a Bermudian lady make an incorrect statement about the origin of the sago palm. A dear old gentleman present gently corrected her. The lady disputed him, and with some ire reiterated her first statement, not realising that the man who had corrected her was a great natural scientist. He turned his wonderful, wise old eyes upon her and said :

" Madame, *I know.*"

I have never heard anything in my life that sounded so convincing as those two short words.

What a wonderful it is to really *know !*

If after you have followed the history of painless childbirth from its faulty beginning to its present perfection, the subject of Twilight Sleep is to be considered, you will not be making incorrect statements or asking questions of others ; you will be in a position to say, " I know."

CHAPTER V

THE ORIGIN AND EARLY USE OF SCOPOLAMIN

In pursuing the study of scopolamin one finds that the discovery of its chemical qualities was made in Germany. It has been in that small corner of Germany known as Baden that all the most important investigations of scopolamin have been made, and the final development of its use in obstetrical narcosis was made at the Ludwig University Klinic of Freiburg, in Baden.

To find the actual *débût* of scopolamin we must go back to the year 1880, when Ladenburg found that the seed of a plant called *Hyoscyamus niger*, growing in all the waste places of Europe, Siberia, Caucasus and Judea, contained, besides hyoscyanin, a second alkaloid which he called hyoscin. Ten years later, in 1890, Schmit, experimenting with the roots of *Hyoscyamus niger*, procured the same crystals obtained by Ladenburg, and to these he gave the name of " scopolamin."

The first pharmacological studies of scopolamin were made by Kobert and his disciples, and after many experiments a decision was reached that hyoscin and scopolamin were one and the same chemical.

Since the beginning of the 'nineties, scopolamin has been largely used by the alienists and the eye specialists ; the latter employed it for the same purpose for which atropine had been used. It was found that it could be used for a longer time than atropine, had about five times the strength, and was without disagreeable side effects.

Schneiderlin was the first alienist to experiment with scopolamin ; these experiments were conducted in the insane asylum of Emmendingen, near Freiburg. He

found it of inestimable value on account of its hypnotic quality in calming maniacal patients. Bumke, a later alienist of Freiburg, found that scopolamin had no injurious effect on the spine, its effects being confined largely to the brain; by its use the motor excitability of the insane patients could be diminished because of the drug's weakening effect on the central function of the brain.

Steffen, of the Royal Frauenklinik of Dresden, however, has been a severe critic of the use of scopolamin in insanity, saying: "In the case of incurable insanity it may be administered, but as long as there is any hope of effecting a cure, take care not to spoil the hope."

It is still used in the insane clinic of Freiburg, in both curable and incurable cases, as a sedative for excitability of body, in the small hypodermic injections of ·0001 or 0·05 g.; larger doses are not avoided because of considered danger, but because the smaller dose has been found effective.

Schneiderlin was so encouraged by the use of scopolamin upon the insane that he began experiments in 1900 with its use in surgery, with what he reported as success.

Von Steinbüchel, in 1903, then made the first attempt to use scopolamin for the reduction of pain in childbirth, aiming only to obtain a state of hypalgesia [1] with a hypodermic dose of ·0003 — ·0004 g. [2] scopolamin + ·01 g. morphine. In his twenty cases Steinbüchel found a lessening of pain, no loss of consciousness, no weakening of labour, no intoxication of child.

The next reports were from Wartapetian, who found that in 50 per cent. of new-born infants under scopolamin-morphine there was a state of deep asphyxia, but in the case of mother he found no danger or diminution of labour. His experiments were followed by those of Reining, who had practically the same result, with an added observation of delay in the birth process. Following these were pub-

[1] Dr. Krönig's definition of hypalgesia is: "A state in which the patient is still fully conscious, the events and the sufferings at birth acting upon her with more or less diminished strength."

[2] g. for gram.

lications by Pankart, Zeffer, Weingarten and Pisarzewski, the latter two being very favourable. Weingarten found, besides the lessening of suffering, that scopolamin regulated the labour, and the birth process was accelerated. Newell and Puschnig observed a disposition of the uterus to relax.

While the opinion about the value of scopolamin in therapeutics was decidedly favourable, many critics now arose condemning the drug as extremely dangerous, scopolamin being at that time subject to great variability. To clear up the difference of opinion on the subject of its variability and physiological effect, the Pharmacological Institute at Jena made extended experiments to ascertain the effect of scopolamin on the animal organism. It was found to increase the pulse of cats and dogs. After the heart of a frog had been deadened it was revived by scopolamin. The drug caused at first an increase of the blood pressure which, however, soon subsided, often sinking below the normal. Frogs placed on their backs and given an injection of scopolamin remained in that position with weakened heart. Rabbits were extremely agitated after an injection of only ·01 g. and had slow respiration. Dogs, after an injection of ·05 and ·01 g., showed only a slight increase in the blood-pressure.

Later on (in 1909), C. M. Nicholson, at the American Medical Association at Chicago, made known his results in experiments on various animals with scopolamin. Repeated injections caused no degeneration of heart, liver or kidneys. As long as feeding was not interfered with, repeated injections did not influence the physical condition of animals. When a fatal dose was given, death was found to have been caused by congestion of the intestines.

Sohrt and Bumke (to return to our earlier date) made experiments on themselves in order to ascertain the effect on the human body and the mind, and reported that after ten minutes they entered a state of irresistible drowsiness, with heaviness of eyelids and a sensation of thirst ; this condition was succeeded by quiet, firm sleep. Klinke

gave himself a dose of ¾ mg. scopolamin and enjoyed frightful hallucinations and illusions.

THE FIRST GREAT EXPERIMENTS WITH SCOPOLAMIN IN OBSTETRICS

The interest, however, of all medical faculties was not concentrated on the use of this alkaloid in obstetrics until the experiments of Dr. Krönig and his assistant, Gauss, were in progress in the delivery wards of the Freiburg Frauenklinik. Krönig had earlier begun investigations of the scopolamin-morphine narcosis while at the University of Jena in Saxe-Weimar, but these were taken up on a much larger scale at Freiburg.

When Gauss made his first report on the use of scopolamin-morphine in childbirth, only four other clinics had at that time followed von Steinbüchel's example at his clinic at Graz, in adopting scopolamin-morphine narcosis for diminishing the pain of delivery, viz: Jena, Giessen, Budapest and Klagenfurt, and the results of only 225 cases had been published.

To these Gauss was able to add reports on 500 cases conducted by him in the Freiburg Frauenklinik confinement wards.

WHAT IS NORMAL LABOUR?

In presenting his report, which was entirely unique, Gauss first remarked that it was a most singular fact that the greatest opposition to the use of any narcotic in childbirth had come from the Church. The second and less violent opposition had arisen in the medical profession from men who asked: "Is it justifiable to lessen by narcotics the suffering of a woman in perfectly normal labour?" Others had urged that the labour pains were physiological, and that no one had a right to interfere with the normal course of natural phenomena. Pursuing the subject Gauss asks:[1] "But what is physiological, what is normal? Granted that a physically and psychically

[1] *Childbirths in Artificial Dämmerschlaf.* By Dr. Carl J. Gauss. *Archive for Gynaecology.* Vol. 78.

HILDA, THE CHILDLESS WIFE OF THE GRAND DUKE OF BADEN. HER GENEROSITY HAD MUCH TO DO WITH THE SUCCESSFUL DEVELOPMENT OF TWILIGHT SLEEP.

DR. CARL J. GAUSS, THE MAN WHO DEVELOPED AND NAMED "TWILIGHT SLEEP."

healthy woman of child-bearing age can survive the physiological pain of a normal birth by summoning all her bodily and mental vigour without injury to her body and mind —an older woman, bearing for the first time, whose soft parts offer a many times stronger resistance to an enlargement—a rachitical[1] woman, whose pelvis requires an especial birth process and abnormal labour to render a spontaneous birth possible—a woman in labour with generally narrow pelvis in whom the physiological pain of pressure and contusion is still further increased in addition to the protracted pathological course of the birth—is it correct to talk also in these instances about the physiological pain as a natural phenomenon ? "

THE REQUIREMENTS DEMANDED OF SCOPOLAMIN MORPHINE

Gauss considered that the requirements of a perfectly successful narcotic were : a reduction in the pain of the mother to a degree that should be perceptible to her as well as to the attendant physician ; there should be no disagreeable secondary effects, or, if any, they should not be injurious to the mother, and their strength should not be out of proportion to the degree of alleviation of pain ; there should be no attendant nausea or disturbance of the subjective state of the health of the mother ; the progress of the birth should not be affected by an interference with the muscular action, the bearing down of the after-pain, or the functions when nursing and in puerperal involution (the shrinking of the womb after labour) ;[2] furthermore, the child should not be injured during intra-uterine life, (before birth), or extra-uterine life (after its birth), either at the beginning of its life functions or in the course of its first weeks of life or later development.

With these high requirements in view he began working very cautiously with the, as yet, little understood combination of morphine and scopolamin. At first he only gave

[1] Affected with rickets.

[2] The womb weighs a pound and a half at childbirth, but shrinks within eight weeks to the weight of an ounce and a half.

injections when he deemed that a birth could at any time be terminated by an innocuous operation should either mother or child show injurious effects from the narcosis. In choosing his first cases Gauss did not experiment with any patients showing disposition to complications due to narrow pelvis (the bony basin containing the womb and other organs), *placenta praevia*[1] or habitual disturbance of the placental period.

THE FIRST EFFECT OF THE INJECTIONS

In describing the effect of the injections upon the mothers, Gauss says: "The majority of the patients impress one as being very sleepy, but otherwise quite normal. Every pain is accompanied by clearly perceptible, if often only slight, expressions of suffering. The pains and the accompanying sufferings are referred to and felt clearly as such. Every question is, perhaps sleepily, but nevertheless clearly, answered.

"In this stage nothing beyond the very pronounced weariness of the patient strikes the layman or even the medical man who is unaware that an injection has been given. So much more astonishing is it subsequently to learn that the patient, whom one believed to be completely conscious has, after the birth, not the slightest idea of what she has just gone through, or of the conversation held with her."

ORIGIN OF THE TERM "TWILIGHT SLEEP"

"Taking into consideration the principal symptoms of this intentionally produced and peculiar condition, and also the difference in principle between it and the conditions of semi-narcosis I consider myself entitled to speak of my method as an artificial *Dämmerschlaf* or a condition of *Twilight Sleep*."

In semi-narcosis the perception of pain in the brain is hardly disturbed, but in consequence of scopolamin narcotisation, the centres of perception are so stupefied that

[1] Presentation of the after-birth before the child.

apperception [1] of pain does not take place. In the first state of hypalgesia the patient is still fully conscious; in the later state of apathetic unconsciousness, the patient reacts unwillingly or not at all—there are no sense impressions and the physiological reflexes [2] are extinguished.

Between the capacity to perceive and observe and a complete narcosis, is a half-way house, and it is to this half-way house that Gauss gave the now famous name of Twilight Sleep.

Of this condition he says: "I have often seen the patient, after the last and successful ejection pain, sink back on the pillows with the sigh of relief: 'Thank God, that is over with.' She had undoubtedly at the moment a clear perception of the birth which had taken place, and also took the greatest interest in the child, its sex, state of health and crying. If, however, she were asked about ten or twenty minutes later some such question as, when her child was coming, she would reply that she didn't know, or that it wouldn't be much longer, or some other similar answer, showing that the fact of birth having taken place, although perfectly perceived, had yet not been included in the storehouse of memory. In other words—as the alienists say—it had been perceived but not *apperceived*."

THE NERVOUS SYSTEM AND CHILD-BIRTH

"The fact that there is absolutely no memory of the exertions which, toward the end of the birth, become more and more frequent and intense, does away with that condition of mental exhaustion which we so frequently observe in protracted births.

"It is well known how seriously the nervous system of a woman is, or may be, affected by a difficult birth which demands the exertion of the last remnant of her mental and bodily strength, and that such a birth, if a correspond-

[1] That kind of perception in which the mind is conscious of the act of perceiving.

[2] A reflex action is an involuntary one, such as dodging when threatened.

ing tendency already exists, might possibly give rise to severe nervous exhaustion in which the memory of the terrors of child-bearing, and a fear of a repetition of them, may reduce a woman's capacity and embitter her whole life.

"The army of suffering women who, although exhibiting no sign of definite disease of the organs of generation, yet go to consult the gynaecologist because they attribute their general nervous complaints (caused by the memories of child-bearing) to this region, shows emphatically how extremely injurious to the nervous system a painful birth may be, in an organism disposed to nervous weakness. How many women show an exhaustion and lassitude for days after an ordinary birth. It is, perhaps, due to an avoidance of this state of exhaustion that the women delivered under the influence of scopolamin-morphine almost always pass the first night after birth in a deep, refreshing sleep which many women delivered in the ordinary manner cannot obtain, although greatly in need of it.

"The statement has often been made to me that a patient has never been so comfortable after a birth; I have also repeatedly made the observation that the women, in consequence of their loss of memory, believe they have only been in labour for about a third of the real time; these facts can only confirm me in the belief that in the Twilight Sleep we have efficacious means of doing away with the nervous sequelae of childbirth."

DETERMINING THE DOSE

"The dosage is naturally entirely different from that employed in surgery.

"In the first place, a woman in childbirth is in any case much more susceptible than usual to all narcotics, so that a very small dose will suffice to produce the desired effect. In the second place, it is far from our intention to attain a deep narcosis; we must, on the contrary, avoid this, as we insist on a condition in which the group of muscles which play the most important part in the work of birth—those which

produce the straining action—shall retain their effectiveness not only as regards their voluntary but also their involuntary action.

" The object to be attained by the use of scopolamin-morphine Twilight Sleep in obstetrics is, in fact, nothing beyond a reduction of suffering, and that slight degree of clouding of the consciousness in which impressions are not apperceived by the patient.

" It is obvious that the dosage employed by me for the injections during all the period embraced by these five hundred births, has not remained the same as that at first employed, as I, of course, in the first attempts, went to work very cautiously, and therefore had frequent failures because of the small doses initially employed. Encouraged; however, by my first successes, but not yet satisfied with the results, I then tried larger doses and found that in most cases the stage of Twilight Sleep could be reached, and that in as short a time as one desired. But to produce this condition in a short time we had to pay the price of unpleasant accessory symptoms, and these I wish to avoid.

" The use of scopolamin alone did not appear advisable, since, as has already been observed by alienists and pharmacologists, it occasions in many persons a condition of excitement. It seemed best, therefore, to use in addition to the scopolamin a sufficient but not too large quantity of morphine, so that the unpleasant attendant effects, whether of morphine or scopolamin, could be avoided without a diminution of the narcotic action."

After experimenting with the chemical in varying forms, age, origin and manner of preparation, Gauss found that the powder supplied by Merck, St. Margarethan, and the tabloids from Boroughs Wellcome were the most reliable to be got at that time.[1] After further experimentation he decided it was best to use *separate* solutions prepared by a pharmaceutical chemist, ·3 per cent. solution of crystal scopolamin hydrobromic in sterilised distilled water

[1] The invariable scopolamin of Prof. Straub, known as " Scopolia Haltbar," now used exclusively at the Frauenklinik, will be told of later on.

and 1 per cent. morphine muriaticum solution. As soon as the preparation showed signs of flakiness it was thrown away. The solution was kept in a dark, cool place.

The variability in the effect of the drug he believed at that time to be largely due to the varying susceptibility of different constitutions to scopolamin, and also the varying susceptibility of the same individual at different times to the same amount of injection. He found that the weight of mothers had something to do with the effect of the drug —tall, massively-built women requiring a larger dose than short or slender ones. All organisms which had been deteriorated by illness, exhaustion, or anaemia reacted in a greater extent to scopolamin-morphine. The habitual use of the alkaloid on patients made no difference in the action of the drug.

THE AMOUNT OF SCOPOLAMIN-MORPHINE FOUND TO BE SUFFICIENT

In order to feel his way he preferred to make the initial injection a little too scanty rather than over-generous. Beginning with a dose of ·00045 g. to ·0006 g. scopolamin-hydrobromic + ·01 g. morphine he found that in the case of average constitutions and susceptibility, a good effect was obtained in from three-quarters of an hour to three hours. The scopolamin and morphine were used in separate solutions.[1] If the desired effect was not then reached a second injection of .00015 g. to ·0003 g. scopolamin without morphine was given, which generally took effect in from a quarter of an hour to half an hour. The third injection was suited entirely to the condition of the patient. If the patient had, in the course of from two to four hours, regained entire consciousness, a repetition of the same second small dose with ·005 g. morphine muriatic added was found to be sufficient. With this method of dosing

[1] "The syringe used should be sterilised shortly before use, and be as far as possible freed from the disinfecting liquid, as otherwise contamination of the solution cannot be avoided; during the course of the birth the syringe must be kept in absolute alcohol in a glass vessel."—*Gauss.*

Gauss found it possible to maintain a semi-narcosis extending over several days, if necessary, without injurious consequences. The largest total dose administered (extending over a period of forty-seven hours) was ·00315 g. scopolamin to ·025 g. morphine; in another case extending over thirty-six hours ·0036 g. scopolamin was given alone.

In a later case (which has been severely criticised by several obstetricians) Gauss kept a patient of thirty-six years of age bearing her first child, fifty-seven hours under scopolamin-morphine, and eventually accomplished a spontaneous birth in spite of the soft parts of the mother being rigid; there was a premature bursting of the membrane, and the child was abnormally large. The mother retained no memory of her entire childbed, and the child was born active and lusty. Of this case Steffen says: "To keep a patient fifty-seven hours under narcosis made a total dose of ·00375 g. scopolamin + ·03 g. morphine. We have not the courage."

INDICATIONS OF THE DEPTH OF NARCOSIS

"The problem of maintaining the uninterrupted action of scopolamin-morphine," says Gauss, "is more difficult than that of inducing it. The most obvious way would be to deduce the narcotic action from the signs of pain shown by the patient. But these exhibitions of pain only cease entirely in a very small proportion of the cases, and besides this they also increase physiologically, even in Twilight Sleep, toward the end of the birth, so for these reasons they afford no reliable clues to the extent to which the consciousness is clouded.

"The dilatation of the pupils of the eye in response to bodily pain takes place, and also in response to a birth pain, as I was able to regularly ascertain, and is greater the more acutely the patient is conscious of the sensation of pain. The pupils of some patients become greatly dilated in consequence of the preponderation of the action of the scopolamin." Gauss concludes that the action of the pupillary reflexes cannot be regarded as an absolute indica-

tion of the extent to which consciousness has lapsed. Neither can co-ordination be counted on as a safe test.

" As Twilight Sleep begins, the locomotor co-ordination becomes worse and worse, and when the narcotic action has reached its highest point it is almost entirely absent."

ORIGIN OF THE " MEMORY-TEST "

It is of great importance to follow Gauss carefully on the subject of consciousness and memory, because it is necessary to have a perfect understanding of the basis of his memory test, in order to appreciate his reasons for adopting this test as the guide to dosage. Moreover, the importance of the memory test as a criterion is proven; many of the failures of other obstetricians with Twilight Sleep can be traced to the fact that the memory test was not strictly observed and consequent relative overdosing of patients followed.

" After trying all sorts of things," says Gauss, " I was put on the right track by consideration of the views current amongst alienists. The stage of scopolamin-morphine action which we wish to attain is only a *derangement* of the consciousness.

" What we term consciousness is the sum total of the simultaneous mental processes into which internal and external stimuli are transformed. Derangements of the consciousness are, consequently, pathological deviations from the regular course of these mental processes which can exhibit various degrees of clearness according to the magnitude of the liminal value.

" Weakness of memory consists of a diminution or loss of the capacity for remembering past impressions; derangement of the perception is characterised by limitation of the formation of new memory pictures or images. In the amnesia produced by scopolamin-morphine the retention of already formed memory-pictures and concepts is not affected, but only the formation of new ones. It must consequently be also conversely possible, by testing the capacity of perception, to arrive at conclusions as to

the subsequently appearing forgetfulness, and so as to the intensity of the action of the drug at the moment.

" My expectations of the truth of this theory were confirmed by my experiments.

" Since that time I have guided myself as to the dosing almost altogether according to the variations of the carefully tested capacity of apperception, and have, when these tests have been properly carried out, never been misled."

For the successful attainment and maintenance of Twilight Sleep, Gauss has insisted (from the time of this first published report on 500 cases up to the last published report on 3,000, and now verbally after experience in over 5,000 cases), that there is but *one* guide for the physician—the " memory test." This memory test has also been subjected to much criticism by his opponents, Steffen of Dresden, Bumm and Hocheisen of Berlin, the Gminder of Essen.

HOW TO CONDUCT THE MEMORY TEST

The very simple method of the memory test, to quote Krönig, is as follows: " No testing of the power of perception begins until half an hour after the second administration of scopolamin-morphine by a subcutaneous injection. Some object is then shown the patient, and she is asked to observe it. Some time after it is shown to her again; if she recalls having seen it before, it is considered as an indication that a third dose of the same quantity as second dose is required, as no clouded consciousness has as yet been established. Objects for observation chosen are generally those which have some connection with the process of birth, and are consequently sufficiently well known to patients not to be too striking. Very often a patient is merely catechised on the number of injections which she has had; if she can recall the number it is a proof that no Twilight Sleep as yet exists. It certainly requires practice and experience to decide how best to test the condition of consciousness of particular patients in accordance with their intelligence. After a state of clouded

consciousness has been established no further injection is given until the power of perception in patient recognises an object shown half an hour previously. In the case of all but the first injection scopolamin alone is generally administered."

Steffen remarks, concerning this memory test, that, "the power of observation varies much in the wide-awake state of individuals, and more so in patients under the variable influence of scopolamin. Entirely dominated by their expectation of an event which will mean joy or sorrow for them, they have slight attention to give to objects shown them by physicians, so that their memory of these articles disappears rapidly. Probably every one has had the following experience: he has heard a question and answered it, while he was actively occupied with something else, so that he recalled only indistinctly the question or forgot it entirely. It is equally difficult for a physician to make correct observations of the memory sense in patients without having had experience as an alienist. It is evident that various observers will arrive at varying quantities and conclusions."

Gauss maintains (and has his undoubted success to support him) that the memory test is simple, reliable, and the only guide to the observer, for the reason that the regularly recurring labour pains cannot be used as tests; they always recur and, therefore, make each time a more lasting impression on the memory. The complaints of mothers are even less to be counted on as a guide, as they are solely based on the perception, not apperception, and, after birth, however much complained about at time of occurrence, are not recalled at all. It is also evident that the names of objects shown will accumulate during the course of process and, therefore, it will become gradually more and more difficult for the doctor to keep his bearings.

In order to control all symptoms correctly they have at the Frauenklinik a so-called "Scopolamin Curve," which is filled out from each case by nurse. This is the form of the curve:

Date :
Time :
Injection (place, quantity, manufacturer of scopolamin ; symptoms).
Subjective statements of patients (about fatigue, thirst, pain in small of back ? in the abdomen ? at perineum ?).
Objective observations about sleep (during intervals between pains, or during pains, twitching of hands, colour of face, effect of suffering, consciousness).
Progress of birth : examination, operation, bursting of amnion, the first contraction of abdomen, entering of head, and passing of head).
Pains how often ?
„ how long ?
„ how vigorous ?
Heart sounds :
Pulse :
Breathing :
Temperature :

As will be seen, all factors of importance to birth and Twilight Sleep are considered in this diagram, so that a properly filled-out diagram is the best proof for correctly observed birth and dosage, and in the compilations of statistics.

THE CONSTANT PRESENCE OF THE PHYSICIAN NECESSARY

Gauss insists that an uninterrupted watching of the patient is an unavoidable necessity for the proper maintenance of Twilight Sleep, and a sufficient, yet uninjurious, dosage. " If this is not done,"[1] he says, " the result is either over-dosing, in which case unpleasant side effects occur, or in under-dosing, when, as a consequence, the Twilight Sleep is interrupted, and the patients retain in their memories events and observations made during isolated lucid intervals in the course of a more or less

protracted period of amnesia. The existence of such 'memory islands'—as I term them—is extremely injurious to the total effect; the patient connects them with one another by natural trains of thought, and so form for herself a picture of the birth that, precisely because it is based upon isolated but exact observations, gives her so much more the idea of having a genuine recollection of the course of the birth.

"It is clear that the accurate checking of the intensity of the action of scopolamin-morphine will not be so very easy. Curiously enough, it is most difficult in the case of extremely demented and of highly intellectual women. Unless the doctor and a skilful, well-trained and experienced obstetric nurse keep a close observation on the whole course of the birth, nothing but repeated failures are to be looked for in the general results."

PRESERVING THE PATIENT FROM DISTURBING IMPRESSIONS

"The patient should, as far as possible, be shielded from all stimulation, mental and physical. It is, consequently, best to have her in a room by herself where nothing disturbs the quiet beyond the proceedings necessary for the birth. Loud conversations, penetrating noises, the coming and going of relatives—in short, everything that sets the patient's senses to work should be carefully avoided.

"As we often found that the only thing observed by the mother was the crying of the new-born infant, we have now made it a custom to carry the child out of hearing of the mother as quickly as possible.

"We have reduced the stimulation of the sense of hearing by the use of antiphones or balls of cotton-wool dipped in oil and put into the ears.

"The sudden turning on of the electric arc light in our obstetric operating room often had a disturbing effect, and was sometimes the cause of inopportune awakening, so we now protect the eyes by a dark coloured cloth or coloured spectacles, and have found that this greatly facilitates the maintenance of an uninterrupted Twilight Sleep.

SUBJECTIVE EFFECTS OF SCOPOLAMIN

Among the subjective effects of scopolamin he mentions thirst, which is due to the effect of the drug on the secretions of the mucous membranes.

Gauss says: "I never hesitate to give the patient as much water as she desires, and, in spite of this, I have never seen any injurious results follow. Vomiting is hardly ever observed unless it has already appeared before the injections are begun."

Among other side-effects, derangements of the senses of sight and hearing now and then occur. The patients sometimes answer questions which no one has asked them, and again, they will carry on whole conversations with themselves. Mental hallucinations occasionally occur. "But," says Gauss, "these hallucinations only occur in stages of unintentionally profound derangement of the consciousness, and as the patient cannot afterwards remember them, they cannot be said to affect her subjective comfort."

EFFECT OF SCOPOLAMIN-MORPHINE ON THE LABOUR PAINS[1]

In order to ascertain the effect of scopolamin-morphine on the satisfactory working of the ejecting forces—that is to say, the labour pains and the straining action—Gauss' assistant, Dr. Schlimpert, made what was called a "Birth-pang Curve," based on his exact checking of the pangs by recording and registering them in curves. Schlimpert registered the interval of time between a pang and the previous one, and how long each pang lasted. It was found that the higher the "pang mountains" the less the frequency of the pangs; the broader the "mountains" the more powerful the action of the individual pain.

The pains were never judged by the signs of suffering given by the patient, but by the contractions observed by

[1] There are three stages of labour in the birth of a child: (1) the dilatation of the mouth of the womb; (2) the passage of the unborn through the canal and its birth; (3) from the birth to the coming away of the after-birth.

the hand of an obstetric nurse kept continuously on the uterus.

Schlimpert's laborious work of observation (128 pang curves) were added to by critical notes made by Gauss and entered at the conclusion of every birth.

Poor young Schlimpert gave his life for this work.

For many months he had been suffering from what he recognised as appendicitis, but so interested was he in Twilight Sleep and his especial task of helping to prove by his "curves" that scopolamin-morphine did not affect the labour pains unfavourably, he kept the secret of his suffering from all his associates in the clinic; not until the torture became at last unendurable did he confess the truth to Krönig and Gauss. It was too late. Dr. Schlimpert survived the operation only a few days, but the courage and beauty of his last days will never be forgotten in the Frauenklinik.

In addition to Schlimpert's work, Gauss also had notes of the pang action in 493 cases. In 103 cases the pangs were excellent, in 273 good, in 36 varying, in 39 bad from the beginning. In 451 births no noticeable affection of labour action by the injections could be detected. In 42 cases an alteration in the pang was observed, in 36 cases they were decidedly improved by the injections, in 8 cases they became worse.

How far the alteration in these last nine cases was due to the drug and how far to chance, Gauss found it very difficult to ascertain.

On the whole he felt that the result of the "curves" proved there was practically no question of an unfavourable action by the scopolamin-morphine injections on the labour pangs.

"A bystander often observes what he considers a diminution of the power of the pains after the injection, because there is a diminution or cessation of demonstrations of pain on the part of the patient, but by placing the hand on the uterus it is found that the processes of birth are continuing unchanged, although there may be no outward sign of intense suffering."

According to Schlimpert's calculations there was sometimes an increase of time between the pains, but on these occasions he also observed an increase in the duration of the pangs; furthermore, he found that the injections had a clearly recognisable regulative effect on previously irregular labour action. Schlimpert's tables also proved that the reflex straining action in most cases was good.

Gauss says the lesson to be learned from a study of these "curves" is, "first: not to give too large quantities of scopolamin-morphine at one time. Begin with relatively small doses, then by gradually adding to them you induce the desired action, so to speak, surreptitiously. Large quantities, administered in a limited time, bring about a more rapid effect, but they also often—though not always—have an undesirable effect on the labour action.

"Secondly: the quantity of morphine introduced into the body must be kept as small as the desired narcotic effect permits."

THE AFTER-BIRTH PERIOD

He found that if there was no appreciable diminution of the pang action during Twilight Sleep there would be none in the after-birth period either. "Under all circumstances—hemorrhage, of course, excepted—the spontaneous detachment of the placenta" (after-birth) "is awaited; if the expulsion has not taken place spontaneously, it is left to the straining action of the patient, or facilitated by gentle pressure on the abdomen, *not* on the uterus."

EFFECT OF SCOPOLAMIN-MORPHINE ON THE MILK SECRETION

Although, as Gauss has pointed out, scopolamin affects the glands and mucous membranes, it has not been found to affect the milk secretion.

As a test of this, statistics were kept of 200 mothers delivered without scopolamin-morphine, and like statistics were kept during the same period of 200 Twilight-Sleep mothers. Here is the table:

Without scopolamin.	With scopolamin.
137 = 68.5%	134 = 67% had large milk supply.
8 = 4%	15 = 7.5% had insufficient milk supply.
55 = 27.5%	51 = 25.5% had no milk at all.

TWILIGHT SLEEP AND THE CHILD

As to the effect on the child Gauss says he is absolutely convinced " of the innocuousness of Twilight Sleep. This confidence is shown by the rule now invariably followed of beginning the injections as soon as the pains occur at regular intervals and are found to be unpleasantly painful by the patient, without any regard for the stage which the birth may have reached or the complications that may be present."

Of the 506 children born to these 500 mothers, 500 (98·8%) were born alive and 6 (1·2%) were still-born. Of these 500, 316 (62·2%) were vigorous and lusty. 199 (23·8%) showed on the other hand a condition which denoted that the injections had affected the child's organism.

" OLIGOPNOEA "

Gauss had already added the term " Dämmerschlaf," or Twilight Sleep, to the medical lexicon; he now added another word to describe the above condition of the child affected by scopolamin—that term is " oligopnoea " (which is really untranslatable).

It is a condition of intoxication evidenced by the child. After taking a deep breath at the moment of birth, with a more or less loud cry it relapses into a motionless condition, the heart action, however, continuing. It opens its eyes only to close them again as if tired.

" In my earlier cases," says Gauss, " this condition inspired me with great uneasiness, and I considered myself bound to immediately commence measures for resuscitation. Gradually, however, by cautiously delaying my intervention in suitable cases, I found this anxiety was exaggerated, so I then calmly waited to see whether the child would begin to breathe properly without outside

intervention and I found that various infants left alone from fifteen to twenty minutes established regular breathing, the action of respiration becoming more frequent until normal breathing was established."

In cases where it seemed advisable to give the child assistance it was found that the quickest and surest method of resuscitation was a rhythmic massage of the heart. Often a slight irritation of the child's skin is sufficient to produce regular, deep breathing and loud crying.

The effect of artificial resuscitation upon the child Gauss compares to a fly wheel which, once set in motion, is kept indefinitely in motion by small regularly acting forces which, however, would not have been sufficient to start it.

He says: "While I do not believe this intoxicated condition harbours any serious dangers to the organism I have, nevertheless, tried to avoid it by modifying the dosage. As I applied the first doses of scopolamin-morphine without knowledge of the effect to be expected, over-dosages were unavoidable. Only by degrees I then learnt the objectionable effect of superfluous quantities of morphine, which undoubtedly increased the early number of oligopnoeic children."

Krönig reports that at first they had 20 per cent. oligopnoeic children, a record which by the year 1908 was reduced to 10 per cent. The mortality of children at the Frauenklinik during or soon after birth has been decreased considerably since the inauguration of Twilight Sleep. "We have had, for example," says Krönig, "in the last 500 deliveries under scopolamin, only one child to mourn. For this striking low mortality Professor Aschoff has perhaps offered the right explanation, viz., the slight narcotisation of the respiratory organs during birth, by extremely minute quantities of scopolamin, is advantageous to the child. If the child, in the interruption in the placental supply of oxygen, responds by a premature respiratory movement, permanent obstruction of the air passages by inhalation of amniotic fluid,[1] with epithelium [2] and vaginal

[1] The fluid of the sac directly encircling the unborn child.
[2] The outermost bloodless layer of the mucous membrane.

bacteria, takes place. If, on the other hand, the child is slightly narcotised by scopolamin, it does not immediately respond to the small accumulation of carbonic acid in the blood and the air passages remain free."

LATER STATE OF INFANT'S HEALTH

"From our investigation of the children of private patients, who can easily be kept track of, we have found that within the first year there can be no talk about an injury to the development of the children on account of the employment of scopolamin-morphine."

AFTER-HEALTH OF MOTHER

As for Twilight Sleep affecting the later health of the mother I recall one case of a Freiburg mother, who six months after having had her first child at the Frauenklinik, had an attack of some slight nervous disorder; her condition was immediately attributed to Twilight Sleep by relatives, friends, and a Freiburg general practitioner. The mother, eventually convinced that scopolamin was to blame, went to see Dr. Krönig about the matter, and this is the reply she received from him:

"As well say you have sneezed in June, because you sat in a draught on Christmas day."

CHAPTER VI

THE FAMOUS HOCHEISEN-GAUSS CONTROVERSY

As a result of the sensation produced in the Continental medical world by the publication of this Gauss report, many of the head physicians of the large European hospitals gave orders that the "Gauss Dämmerschlaf" was to be given a trial by their staff. The reports on these experiments published in the German and Austrian medical journals of the following year make very interesting, exciting, amusing and terrifying literature.

The most important experiment was that conducted at the Berlin Charité by order of Dr. Bumm.

As Bumm stood virtually at the head of the entire German medical world, his support or condemnation of Twilight Sleep was a matter of tremendous importance.

The results of the experiments at the Berlin Charité were reported upon by Herr Bumm's assistants—Hocheisen and von Bardeleben—at the meeting of the Society for Obstetrical Practice and Gynaecology at Berlin in 1906. This was an epoch-making meeting, for it was to this meeting that Gauss—then just emerging from his twenties—went to break a lance for his method in the face of an expected tremendous battery of opposition. It was very like a David and Goliath performance—Gauss' David to the triplet Goliath of Bumm, Hocheisen and von Bardeleben.

The discussion at this meeting has been handed down in the German medical world as the "Hocheisen-Gauss Controversy." Because of the importance still given to this discussion in the German medical publications of to-day I shall give a detailed account of the reports of Hocheisen and von Bardeleben.

There is one peculiarly important feature of both these

reports which I would like to draw your especial attention to: neither Hocheisen nor von Bardeleben ever refer in any way, in their reports, to the *memory test.* Yet Gauss had clearly stated it to be the very backbone of his method.

Hocheisen's opening words are: "It is surprising to hear scopolamin praised when it is known to be one of the most dangerous of all poisons—a poison incalculable in its action." As Gauss afterward said: "That theory Hocheisen uses as the motto for his discussion." [1]

"We have treated, all told, from 120 to 130 cases," says Hocheisen.[2] "One half of the births were conducted by von Bardeleben—the other half by me. I will only report on the last continuous series of 100 cases."

After claiming: "We have always observed the instructions of Gauss," immediately after we find Hocheisen saying:

"From the beginning we used smaller doses. We only gave the injection when the head was found to be entering the pelvis. We used little or no morphine." A little further on we find: "The precautionary measure recommended by Gauss of keeping the patients separate could not be followed by us. Patients awaken very easily from the Twilight Sleep, and the slightest noise disturbs them. The seclusion, therefore, is probably recommendable, but in practice, I believe, will be found very difficult to attain."

"On the whole," Hocheisen acknowledges, "we must state that in a large percentage of patients, small doses of scopolamin reduced the suffering.

"In 70 per cent. there were secondary effects. When falling to sleep the patient gets very red in the face, the redness sometimes increasing to purple. There is a pronounced thirst in 45 per cent. We had six cases of vomiting. Four patients were so delirious we had to use morphine. In 46 instances labour was not influenced, it was sometimes even stimulated; 21 times it was considerably weakened; 15 times labour was retarded during period of expulsion;

[1] *Münchener Med. Wehnschr.* 1907.

[2] From *Münchener Medical Wochenschrift*, No. 37, 1908, and Ztschr. *F. Geburtsh u. Gynäk.* Stuttgart, 1907.

3 times it ceased entirely. In 24 per cent. of the cases we observed a decided influence upon the abdominal action."

We find, therefore, by the above Hocheisen figures that in the majority of cases (46) the labour action was bettered by scopolamin; in 39 instances it was affected unfavourably; that leaves 15 cases out of the hundred on which Hocheisen keeps silent, so one must infer that in these 15 cases labour was not affected either one way or the other. If there was a decided effect on the abdominal action in 24 per cent. of cases, that leaves a majority of 76 cases where the action was not affected.

"In the sixty births observed by me," says Hocheisen, "I have not used the forceps in a single case. Among von Bardeleben's cases the forceps were used six times on account of the condition of the child."

It seems surprising and a bit inconsistent after Hocheisen has said he did not have occasion to use the forceps at all, to find him immediately after making this assertion: "But I believe in practical obstetrics—with the use of scopolamin—forceps will have to be employed in from 20 to 25 per cent. of all cases."

From Bumm's data we find him to state that an average birth lasts twelve hours and a half with a period of expulsion of one hour and three-quarters.

Says Hocheisen: "With our scopolamin cases the expulsion period averaged six hours and fifteen minutes against the normal one hour and three-quarters. The shortest length of birth was fifteen minutes, the longest seventy-nine hours. In some cases the placenta expulsion took three hours.

"Under scopolamin we had 15 per cent. where after nine days the uterus was still the size of a child's head. This is probably no accident considering the disturbances arising from scopolamin during the placental period."

Hocheison then gives a very detailed account of the case of a girl of nineteen bearing her first child.

"Before the injections," he says, "I had examined the heart but only superficially, I admit. I gave her injections of ·0005 g. scopolamin and ·01 g. morphine. The patient at

once became very restless at each pain, her restlessness increasing to such an extent that after five hours I gave her another injection of ·005 g. morphine. The birth occurred two hours later without complications. One hour and a half after delivery the patient sat up suddenly in bed and could not get her breath, becoming blue in the face. Her pulse was still 80—good vigorous beats—but it suddenly rose to 120. There was a complete perturbation of heart. After one hour I gave morphine, whereupon her condition improved, but it was not until late that night that the patient was out of danger. The following day she was in a comparatively good condition, the child-bed regular and pulse calm."

In one case of pronounced dyspoea (difficult breathing) and a case of violent breast pang Hocheisen lays the charge to scopolamin, though in the last case two similar attacks had already occurred and an examination disclosed an affection of the mitral valve. [1]

" In 20 per cent. of all cases I observed a slackening of pulse and irregularities.

" Gauss says the only counter indications for the use of scopolamin are primary weakness of labour, feverish condition, anaemia and somnolent condition without eclampsy" (convulsions during childbirth). " I would like to add to those counter indications, diseases of the heart and kidneys and any disarrangement of the respiratory or circulatory system.

" What about the child ? " asks Hocheisen. " We have had one case of oligopnoea which lasted for three-quarters of an hour. Gauss states that this condition passes off spontaneously, only a slight tickling of the skin or heart massage being sufficient for restoration. I do not believe it is correct to think lightly of such a condition. We had 18 per cent. oligopnoeic children, and it cannot be attributed to morphine, as we gave but little morphine. If the condition is due to morphine, the children would not react so quickly upon irritation of the skin as they do. In addi-

[1] The valve of the heart between the left auricle and the left ventricle.

THE BIRTH OF THIS GIRL WAS ATTENDED BY SUCH AGONY HER MOTHER DECIDED TO TRY TWILIGHT SLEEP. THE BOY'S BIRTH IN PAINLESS CHILDBIRTH WAS ENTIRELY SUCCESSFUL.

"WHY, YOU DON'T KNOW A THING ABOUT HAVING A BABY, DO YOU?" WAS THIS MOTHER'S COMMENT ON TWILIGHT SLEEP.

tion to oligopnoea Gauss observed 13 per cent. asphyxiate children. We had 15 per cent. This also has to be put down without further ado to scopolamin. Scopolamin causes protraction of birth and protraction of birth causes asphyxia."

Hocheisen fails to mention that asphixia often occurs without scopolamin because of the entanglement of cord about the child's neck and from the aspiration by child of the amneotic fluid; that the latter was undoubtedly to blame in some cases is proven by the fact that he states, "four of these asphyxiated children had bronchitis"—a most usual result of amniotic fluid in the bronchial tubes.

"One child," he says, "died one hour and a quarter after birth; *post-mortem* showed a disease of the blood. This case cannot be wholly blamed on scopolamin." One wonders in what way it could be blamed at all!

"Another especially oligopnoeic child died after four hours; *post-mortem* showed lungs to have been affected as the child aspired a quantity of amniotic fluid. The child had been delivered by forceps." After this account we are scarcely prepared to find Hocheisen declaring: "Indirectly this death was certainly the effect of scopolamin."

In summing up Hocheisen says: "In our 100 cases of normal uncomplicated births under scopolamin we had 18 downright negative results and 21 cases of mediocre effect."

Hocheisen ends his report by declaiming dramatically: "Away with the Dämmerschlaf"!

Before we proceed with the report of von Bardeleben given at this meeting immediately after Hocheisen's, I would like to give a few quotations from medical men on the Hocheisen report.

R. C. Buist, Gynaecologist of The Royal Infirmary of Dundee, says in the *Scotch and English Medical Journal* of July, 1907: "In their critical papers Hocheisen and Steffen [1] have assembled all the information they could lay hands on as to the deleterious effect and inefficiency of hyoscine (scopolamin); but the stress of their contention must rest on their experiences, and they differ so widely

[1] The Steffen report will be given in a later chapter.

from that of Gauss' that on one side or other a large personal equation must be allowed."

Max Salzberger, of Kulm (in Western Prussia), in his publication, *On Danger to Child from Scopolamin-morphine Administered during Birth*, says:

"Hocheisen, as well as Steffen, mention instances where muscular action was completely stopped. Of course their method of dosage is quite different from Gauss', in spite of their assertions to the contrary."

Preller, of Mannheim, says:[1]

"On the strength of 100 cases observed by him, Hocheisen came to the conclusion that scopolamin should be condemned on account of its dangerousness. I believe such rigorous judgment to be justified."

Wilhelm Tichauer, of Breslau, in *Scopolamin-Morphine in Obstetrical Practice* (published in 1911), in writing of Hocheisen's experiments, says:

"It is clear that the procedure varied considerably and then in the most important points from that described by Gauss. Under such conditions it is not to be wondered at that Hocheisen obtained quite different results. On the strength of his experiments Hocheisen considered it his duty to warn doctors against the use of the method, especially in private practice. It must be borne in mind that in the case of such a difficult procedure as that of producing Twilight Sleep, initial failures are natural, and at first unavoidable, and they must be all the greater when the medical man in question does not utilise the experiences of his predecessors, and does not accurately follow the procedure laid down by them—a procedure based on their experience—but goes his own way. Under the circumstances, Gauss' Twilight Sleep can hardly be debited with Hocheisen's failures."

Now for the von Bardeleben report:

"At first I was extremely in favour of the method," he says, "because of the success of our early experiments.

"One patient, after bearing in Twilight Sleep, declared

[1] *Munch. Med. Wochenschr.* No. 4. 1907.

quite jauntily: 'Having babies at your clinic is so painless, I should not mind looking you up again next year.'

" The subsequent results of our experiments decreased my enthusiasm.

" It became an almost constant occurrence, in our confinement ward, for a woman to remain for two or three days in labour without definite results.

" Recently the midwife asked me whether these injections might not be stopped, so that the torture resulting therefrom to the staff, who had to watch the patient for two or three days, could be put an end to.

" The labour pains, after the scopolamin injections, occur less frequently and after longer intervals.

" The effect on each individual differs in an incalculable manner. The most serious influence is on the abdominal action."

As the following " scopolamin death " of von Bardeleben has been given such notoriety, I shall give a full account of it in his words so you may draw your own conclusions as to how far scopolamin was to blame.

" Four hours after an injection of ·0003 g. scopolamin spontaneous delivery took place without any disturbance. The Twilight Sleep seemed especially successful, the mother perceiving nothing of the birth, but afterwards she complained of a dull feeling in the head, her pupils were enlarged, the heart beats increased and breathing was shallow. About two hours after birth there was a slight hemorrhage which soon ceased. Two hours later there was renewed hemorrhage on the removal of the placenta, this hemorrhage was stopped after rinsing of the uterus; up to now the patient had lost about half a pint of blood. After a further half hour the hemorrhage began again, the patient losing a fourth of a pint of blood. Pulse was unchanged. After another half hour pulse became weaker and the patient collapsed suddenly; the breathing became superficial and weak, and she lost consciousness. I applied at once an injection of two pints of salt water and gave injections of camphor and caffein without avail. Massage of the heart was continued for one hour, but I could not reinstate

spontaneous respiration. There was no suffocation, no gasping, the breath became slower and slower, the pulse ever more rapid and so the woman perished. It seemed to me like an experiment on an animal!

"Scopolamin acts upon the breathing centre and upon the heart, nevertheless I believe it would be too hasty a conclusion to say this was only the effect of scopolamin or a direct case of poisoning.[1] The loss of blood probably played its part in the death. But I feel justified in saying that the patient did not survive the hemorrhages because she was at the same time under the injurious effect of scopolamin. The *post-mortem* bore this out; a greater quantity of blood was found in the lungs and very little in other organs; this can be attributed to asphyxia, but it may also occur in anaemia."

I want to give Gauss' reply almost literally from my translation, for this answer made eight years ago to these, some of his most distinguished and violent opponents (Bumm, Hocheisen and von Bardeleben), still stands to-day as one of the most trenchant and all-embracing replies he has ever made to his critics.

Gauss begins by saying: "I want to ask Herr Hocheisen what preparation has been used?"

Hocheisen. "Merck's."

G. "What initial dose was given?"

H. "·0003 to ·0005 g. scopolamin."

G. "Together with ·01 g. morphine?"

H. "According to the effect. If the effect was quick no morphine was given; if no effect occurred I gave ·01 g."

G. "By what did you judge the effect?"

H.: "I judged the time when I found the sensation of pain was no longer perceived. The second injection was without morphine or again ·01 g. morphine."

[1] Kionka, of Jena, in *Therap. d. Gegenw* (1908), says: "I reject the statement that scopolamin is a cardiac poison and injures the muscles of the heart. The breathing is affected, and the heart action stopped only after quite enormous doses as compared to those which attain a usual narcotic effect."

Gauss. " As the drug cannot have this curious difference in its results and as, furthermore, the drug used appears to be the same, the cause of the varying result can only be ascribed to difference in technique. The reply to my last question confirms this, as I had expected. Your judgment of the effect is absolutely different from the method indicated by me. The second injection is not to be given when it is ascertained that the recurring pain can no more be apperceived, but when certain varying impressions of the senses are no more apperceived. I believe that this elementary difference in our technique is the explanation for the whole series of failures which, to my regret, Herr Hocheisen has reported.

" I may perhaps once more give a brief sketch of my technique used to induce Twilight Sleep. I give a patient with labour pains occurring within from five to ten minutes, ·0003 g. to ·00045 g. scopolamin, together with ·01 g. morphine, and then I await about two hours; if there is still a clear apperception of sense impressions I give her a further but smaller injection of ·00015 g. scopolamin without morphine; the test of apperception of sense impressions is made as follows: I examine a patient and then, about one half hour later, I ask her, ' Have you been already examined to-day ? ' She says ' Yes,' then I know that the sense impression, at the time of examination, was stored in her memory or apperceived. I give her now a second injection of before-mentioned strength, ·00015 g. scopolamin. Then I wait once more half an hour. As a rule after ten minutes perceptible changes in the clinical aspect occur. I ask her now for example, ' How many injections have been made ? ' She says ' Two.' This shows that at the time of second injection she was still clearly conscious. I show her a knife and ask her one half hour later while showing her the knife again, ' Has this instrument been shown you before ? ' Then she may say ' No.' From this moment it is certain that she is in the Twilight Sleep.

" If I have correctly understood Herr Hocheisen he continues to administer scopolamin until the pain, as such,

is no more apperceived.[1] This would be such a tremendous difference of technique that the whole secondary effects, which appear to be very regrettable ones, must be characterised as the consequence of relative over-dosage.

" I may now enter upon the series of reproaches made by Herr Hocheisen against my method. It is rather difficult to answer all his objections, as almost the entire category of disagreeable accidents to women in labour and childbed which could happen have been mentioned by him. It is beyond my ken in what degree the observations were made objectively, and in what degree the proofs of his accusations are irrefutable. With regard to his point that occasionally considerable chloroform had to be used, as there were violent states of agitation, I can only say I have not made any observations of a like character. We suppress any cases of slight agitation by use of chloratyl. If among Hocheisen's 100 cases there were only 6 of complete amnesia at birth this may be only the consequence of incorrect or intermittent control of Twilight Sleep. Among nearly 1000 births treated by me with scopolamin there were at least 70 per cent. with more or less complete amnesia, so that the patient, from the moment of effective injection, did not remember anything about the birth. I have never observed such great subjective and objective disturbances as I have heard reported to-day.

" I believe I have been misunderstood as to my statements about the seclusion of patients. Seclusion is only possible with patients who are delivered in private wards; as at Berlin we also have in our other wards several women in labour together. To separate them entirely from each other is of course not possible, but we try to

[1] Gauss had clearly stated that the patient's complaints about continued suffering could be no criterion by which to judge the effect of drugs, because even after the patient is in the state of Dämmerschlaf she may still cry out loudly at each pain; this apparently perceived pain is not recalled at all after birth. If Hocheisen used the " apperceived pain " as a test, he then undoubtedly, in many cases, must have continued injections upon a patient already completely in a state of Twilight Sleep—the result would be serious overdosing.

seclude them as much as we can. Our best results are obtained by absolute seclusion.[1]

" I begin now on the subjective side-effects. It cannot be denied that vomiting, red face, vertigo, unrest, delirium and twitchings make an ugly impression, but I cannot understand that this bad impression should have a decisive influence upon the use or disuse of a drug. If some of these effects occurred after scopolamin-morphine injections they need not have been caused by the effect of the drug. I believe, at least, that an equal number of such side-effects may and do occur without scopolamin ; vomiting, headache, perspiration, are symptoms which may occur at any birth. I do not deny that thirst, twitching of hands, and red face are the effects of scopolamin, but I do not find in the least that I have ever had the impression of pronounced poisoning in my patients such as has been described by Herr Hocheisen.

" I believe the constant presence of a practitioner to be necessary on account of the calculation of doses.

" Among the objective side-effects there has been mentioned an influence upon the labour. If I have observed an improvement of the labour in 30 cases it means that the labour has been stimulated considerably toward the end of the birth. In 21 cases of Hocheisen's the labour became so weak that sometimes it stopped altogether. Since making use of considerably smaller doses of scopolamin than those used formerly and desisting almost entirely from the use of morphine, I have not observed any weakness of the labour. In those few cases where labour is diminished, so that there is a risk to the process of birth, I have naturally stopped the scopolamin injection.

[1] Krönig in a 1906 publication says :

" When six or seven parturient " (childbearing) " patients lie side by side in one ward, it is obviously impossible to obtain an even fairly effective semi-consciousness. The number of cases in which we obtain loss of memory is far smaller in those deliveries which occur in the general ward than in the case of patients treated in the private wards, where they lie in a separate room, protected, as far as possible, from all impressions of sight and hearing."

" According to Hocheisen abdominal action was diminished in 24 cases, 4 of which required forceps. It is, I believe, an accident that during the last three months of my statistics published, I had a relatively high frequence of forceps, whilst during the following six months I had altogether only 10 forceps cases without having altered the method. In any case, we have at present no more forceps births in Frieburg than we had formerly, although we now give every patient that enters the delivery ward scopolamin injections. The frequence of operative interference is at present even smaller than formerly. Compared with the time of Prof. Hegar's directorate at Freiburg, it is greater, because the life of the child is at present of greater importance than was formerly the case.[1] With regard to the observation that it would be easy to use forceps in 25 per cent. of all scopolamin cases I have nothing to reply, because if that were true then we would have to use forceps continually in Freiburg, and such is not the case.

" As to the duration of the birth, which has been here discussed in detail, I remember that during our first large dosage of morphine a duration of three and a half hours was usual in case of first child and an hour and a half in other cases was the record, so that the duration of births scarcely exceeded the time calculated by Herr Bumm to be the normal. If Prof. Bumm seems to arrive at the low figure of one and three-quarter hours as the length of normal birth, in his publication, this may be explained by his calculating only uncomplicated head presentation, excluding narrow pelvis, *placenta praevia* and other complications. *All* conditions have been included in my statistics.

" The after-birth period in scopolamin-morphine has not only not been retarded, but the after-birth was never before expelled spontaneously within the first half hour until we began our use of scopolamin. Extreme debility or atony " (wanting in tone or vigour) " I have not witnessed

[1] Hegar always insisted on saving the mother irrespective of danger to child, and he was disinclined to use the forceps on account of possible injury to mother.

more frequently among my cases than occur generally, not to mention that among my 1000 scopolamin mothers we have not had a single case of a mother bleeding to death.

" We always await spontaneous course of after-birth. As to the disposition of the uterus to relax, I have not seen it more in scopolamin births than in births without.

" With regard to childbed I can make no comparison with the figures of Hocheisen, as for a considerable time we have let all the patients get up within the first days after birth, thereby, one might think, a good contraction would be rendered impossible, but curiously enough the reproductive organs of patients upon the sixth or seventh day are contracted so much that the uterus is very often already in the small of the pelvis.

" If Herr Hocheisen ascribes the heart attack of the patient with mitral stenosis [1] to scopolamin, I do not know that I care to follow him in his somewhat phantastical conclusion. The alienists, who often give doses up to 4½ mg. per day, have never had such accidents, although these are quite incredible doses. If mitral stenosis is found in a case of heart disease we need not search for other explanations, although I do not wish to deny that scopolamin injections in such a case would more easily have a serious consequence than in the case of a sound heart.

" Twenty per cent. of Hocheisen's cases have shown decrease of pulse. If we have ever observed any change in pulse it has only been an acceleration.

" It has been stated that we treat eclampsy with scopolamin ; we treat such patients invariably by using forceps, and give scopolamin besides, not with the intention of curing the condition, but solely in order to quiet patients and make them less sensitive to exterior impressions.

" Herr Hocheisen mentions disturbances of respiration and heart as being counter-indications. Curiously enough, I must say that we intentionally give scopolamin precisely when patients are labouring under any disturbance of the

[1] Contraction of the mitral valve of the heart.

breathing organism, as, for instance, in cases of pneumonia and bronchitis. We have thereby made the discovery that patients can then more easily stand difficult operations and long narcosis, whereas, formerly, we would not have operated on such cases, considering complications of the lungs.

"The fact that we use scopolamin in case of narrow pelvis shows that we do not find that proper doses of scopolamin protract the birth process.

"With regard to the child: Hocheisen has observed 18 per cent. (as compared to 23 per cent. observed by me) of apnoeic children; I have to say that this 23 per cent., mentioned in my former statistics, has lately been reduced to 7 per cent. in 120 cases. This shows that since the dose has been guided solely by the memory test the effect upon the child has been reduced. Among 120 children born last week at the clinic 103 were lively, 7 asphyxiated—that is to say, 110 were born without intoxication; 7 were partly oligopnoeic, partly apnoeic. I consider these two conditions to be a difference in degree of intoxication—apnoeic being the greater degree. Three children were born dead.

"I think it is a mistake to consider asphyxia as an aspect of scopolamin poisoning. If the child is poisoned by scopolamin it shows unmistakable symptoms, viz., a feeble movement of eyelids and a crippling of the reflexes" (involuntary movements, such as winking the eyelids). "In my statistics only that per cent. of children were stated as asphyxiated who were born without intoxication. I must decline to admit asphyxia to be always a consequence of births protracted by scopolamin, because if all births were protracted in our clinic, in the manner they seem to have been protracted in the cases here stated, we would be unable to accommodate all the patients at the same time, seeing that we give them all scopolamin. I have not seen the proof that asphyxia caused by aspiration could be a result of scopolamin, as both aspiration and asphyxia occur also without scopolamin. The number of children that are still-born is not only as small as

they previously were at our clinic, but they have been reduced.

" I cannot agree with the fear that the apnoeic children would perish if they were not artificially roused. I have waited up to twenty minutes, when I found that they breathed again in normal rhythm. If Hocheisen and von Bardeleben had cases where the children were ologopnoeic up to three-quarters of an hour, and if then, sometimes, assistance was necessary without which the children would have died, this is only, to me, a confirmation of my supposition that their technique and dosage were very different from mine, because among the 1000 children in my statistics some would then have undoubtedly died, because I gave no assistance to them. I may once more point out, that in order to call a scopolamin Twilight Sleep irreproachable a child should be born lively. A birth resulting in protraction and an apnoeic child can always be considered as an indication of miscalculated scopolamin doses."

Dr. Bumm, replying to Gauss, said: " We believe that in questions of mitigating pain we should ask patients whether they still feel any pain. Herr Gauss enlightens us now by explaining that we should, on the contrary, only ask if she ' apperceives ' a knife, for instance, and then calculate our doses accordingly. I cannot believe that the vast difference which has been shown to exist between our observations and those of Gauss are caused by the difference in method or technique, but by the difference of the *manner* of observation. It is possible to look at a thing soberly, and to look at it optimistically; we made our observations soberly."

Hocheisen, then rising, defends his quantity of dosage, pointing out that in 44 cases Gauss' smallest initial dose had not been exceeded. He adds: " I do not care to go into details about the technique of Gauss' Twilight Sleep, as I consider it too hair-splitting and complicated. Our technique was to consider the complaints of the mother as an indication of the scopolamin effect. If the patient still complained of pain, the pain was evidently not diminished, and she was suffering; perhaps she does not ' realise '

the pain, but this is not what we call a 'painless birth,' either from the point of view of the practitioner or the lay public."

In conclusion he says with unconscious prophetic emphasis: "The future will show who is right. If scopolamin remains Herr Gauss will be right; if it disappears I shall be right."

CHAPTER VII

GAUSS' PUBLISHED REPLY TO HOCHEISEN

THE Bumm-Hocheisen denunciation of Twilight Sleep was too serious a matter to be ignored. As a result, Gauss immediately made a public reply.[1]

After only 100 cases Hocheisen felt justified in condemning the method. In Gauss' reply he gives the results of his own first 1000 cases.

"It is important to now discuss this matter on principle," writes Gauss, "for all the late medical literature contain reports on scopolamin-births which, in spite of apparently dealing with the same object, show great difference in method.

"Of all the publications on the subject only that of Preller, of the Mannheim Asylum for Women in Childbed, gives a description of scopolamin-morphine technique similar to our own.

"Hocheisen's technique differs so entirely from that of the Freiburg method, it is impossible to draw a parallel.

"The important question is not *what* is given, but *how* it is given."

Hocheisen rather unfairly used the reports on the employment of scopolamin for sedative and narcotic purposes to deduce opinions as to the harmfulness and incalculability of the drug in obstetrics. As long as he was doing this it seems remarkable, as Gauss points out, that Hocheisen failed to refer to the most important paper on scopolamin, published by any alienist—that of Bumke, of the Freiburg Insane Clinic (Director Dr. Hoche).

[1] *Report on my first* 1000 *Births in Scopolamin-Morphine Dämmerschlaf.* By C. J. Gauss. *Munch. Med. Wehnschr.* 1907. Pp. 157-161.

In this clinic they have made many thousand of scopolamin injections. At an average, sixteen patients daily receive single doses of ·001 or ·0005 g. scopolamin, the maximum dose rarely exceeding ·001 g. In the case of cataleptic women, maximum total doses of 4½ mg. are repeatedly reached in twenty-four hours.

Such symptoms as are cited by Hocheisen have never been observed in Hoche's clinic, and it is there denied that any serious disturbance of the general state of health occurs as a result of the injections.

According to Bumke, breathing, in scopolamin sleep, is somewhat deeper than in ordinary sleep, but it is never irregular or difficult. Bumke cites Edlefsen and Illing, who have employed scopolamin to advantage in asthma; he further cites Korn, who used ·01 g. scopolamin on a patient with heart disease (in spite of emphysema) [1] without causing the slightest symptom of suffocation.

Although scopolamin is excreted through the kidneys, Gauss says no injury to the functions of these organs has ever been proved.

"My first investigations upon 50 cases showed no effect of scopolamin upon the kidneys, and my last investigations in 100 cases attain the same result.[2]

"To further support his warnings against scopolamin Twilight Sleep, Hocheisen cites the records of scopolamin-morphine-narcosis in surgery. Many besides Hocheisen bring up this comparison time and time again, and so mislead the general opinion about the effect of scopolamin, and thereby sustain a fear of the drug.

"One should not lose sight of the vast difference between the surgical dose of ·0036 g. sco. + ·03 g. mor. administered in three hours, and the administration of only a small fraction of this quantity, spread over a manifold longer period, in Twilight Sleep.

[1] A swelling produced by air, as dropsy is caused by liquid.

[2] Statistics of 100 cases:—

80	times	at	birth,	*no.*	albumen.	When leaving clinic, *no.*	albumen.
12	,,	,,			albumen.	,, ,, *no.*	albumen.
3	,,	,,			albumen.	,, ,,	albumen.
1	,,	,,		*no.*	albumen.	,, ,,	albumen.

"As far as I can discover all death cases associated in literature with scopolamin-morphine have occurred during scopolamin-morphine *surgical narcosis.*"

As Bumke has observed, in most of these cases there is no complete record of all the details which alone could furnish proof that scopolamin was the cause of death. There is also a singular absence of statements about the age and condition of the scopolamin employed.

"As a matter of fact," says Gauss, "it is not at all surprising that Roith's dose of ·0036 g. scopolamin to ·03 g. morphine should have proved fatal—it is rather a matter for wonder that anybody should have expected the contrary."

Then, too, we must take into consideration those certain rare instances of a patient's intolerance or idiosyncrasy to the drug, but such cases should not discredit the drug in the face of the many thousand favourable cases. As Tichauer, of Breslau, says: "It would be absolutely unjustifiable to deprive all women of the benefit of scopolamin because of the rare cases of individual idiosyncrasy."

Bumke says: "It would be of great advantage if the harmlessness as well as the positive good results of scopolamin could be more widely known."

To quote Gauss again: "After Hocheisen had claimed to have followed my method, let us look at the actual facts. He says: 'I do not consider Gauss' statements about diminished faculty to remember, summary memory, participation of single sense organs, at all, as the scopolamin sleep of our patients showed such different symptoms that, from our cases, at least, I could not establish a gauge for such fine physiological-psychical observations.' These words contain a clear renunciation of my main guide in scopolamin-morphine Twilight Sleep. I repeat my words, 'Without a continuous, tactful test of the state of consciousness it is impossible to maintain an effective continuity of artificial Twilight Sleep. Hocheisen exposed himself to failure by his disregard of these instructions. He admitted quite frankly that he continued to administer scopolamin until the pain of labour was no longer

apperceived; naturally, then, all the serious side-effects occurring in his cases were certainly the consequences of relative over-dosage.

" It is furthermore really surprising that Bumm's clinic had not more disagreeable incidents, considering the fact that the 100 cases were not treated by one physician, but *two*, for it is natural with so difficult a technique as that required to induce and maintain a Twilight Sleep, that failures must occur until a positive experience with the method has been acquired by the physician."

GAUSS' EXPERIMENTS WITH THE HOCHEISEN SOLUTION

In order to further discover the cause of Hocheisen's failures, Gauss obtained from Hocheisen some of the Berlin Charité solution. In unpacking it he noticed a fine sediment which, upon shaking the vial, caused the whole liquid to be clouded; to conclude that such a condition was merely caused by transportation Gauss considered " far-fetched." He then proceeded to experiment on 10 patients (poor patients!) with the Hocheisen solution. The narcotic effect was so strong and rapid that in 3 out of 7 cases Twilight Sleep occurred within one and a half hours. One sleep was attended by deep coma with great influence upon abdominal and labour action; three times heavy atonic hemorrhages; one deeply apnoeic child; four times great excitement; one case of vertigo; one lasting case of vomiting.

" The cloudiness of this solution," says Gauss, " probably indicated fermentation of apoatropine." [1]

A second unclouded solution sent Gauss by Hocheisen produced almost equally bad results; one deeply apnoeic

[1] Gauss observes that Hocheisen also evidently did not use the test of scopolamin advocated by Otmar G. Kessel, of Jena Pharmacological Institute (at that time used in Freiburg before the Straub investigations were made, on which we will write later), of a drop of thin solution of calcium permanganate. If the solution contains apoatropine this test is so sensitive that in a solution of 1 part apoatropine in 20,000 parts of the 40 per cent. watery scopolamin solution, the solution shows a reaction.

child; one case had to be terminated by forceps because of cessation of labour; three cases of atonic hemorrhages. As Hocheisen apparently did not note form, age, origin or manner of preparation, or storing of drug, Gauss feels justified in ascribing still further the bad side-effects to Hocheisen's use of a drug in spoiled condition.

Gauss proceeds: "As Hocheisen states that the 'scopolamin Twilight Sleep is not in accordance with the duties of a conscientious doctor,' I have felt it necessary to go into a somewhat lengthy reply to his criticisms before reporting on my 1000 births. I shall first consider the disadvantages which, according to Hocheisen, must be ascribed to scopolamin."

MORTALITY OF MOTHERS

"Among my first 500 cases there was not a single death of a mother. Among the last 500 there was one death, but it could not be ascribed to scopolamin. It was a case of kolparporrhexis, on account of very narrow pelvis; even laparotomy" (cutting into the abdomen), "immediately resorted to, could not save the patient from bleeding to death.

"Among these last 500 there were 23 women with pronounced heart disease (cardiac lesions).

"If scopolamin does really endanger the heart, as Hocheisen claims, it seems very curious that we did not have a single attack of heart trouble.

"Since 1905, in addition to my own close control of the patient's heart, Prof. Clemens, and, later, Dr. Link, have examined every patient before childbirth to ascertain the condition of both heart and lungs.

"Hocheisen points out 'the danger of hemorrhage from the use of scopolamin.' I have measured the blood loss in a series of 363 patients during the placental period, so I am in a position to reply to this statement with figures:

337 times (92·8%) lost up to 500 g.=average of 190·4 g.
23 „ (6·3%) hemorrhage from 599 to 1000 g.= average of 654·5 g.

3 times (9·9%) hemorrhage, endangering life, of from 1000 to 1,500 g.=1,255 g.

510 „ =51% the after-birth in 1000 cases was spontaneous.
481 „ =48·1% by slight pressure (Credé).
4 „ =0·4% by manual loosening.
5 „ =0·5% by manual loosening, with Caesarian section.[1]

"By comparing the above figures with others' statistics, the results are bound to be very much in favour of scopolamin."

THE USE OF FORCEPS

"As a test of Hocheisen's statements as to the excessive prolongation of birth, let us glance at the forceps statistics of my 1000 births. Among the first 500 there were 49 forceps=9·68%. Among the last 500 there were 25 forceps, making a total in the 1000 cases of 7·32%.

"Even such an illustrious obstetrician as Bokelmanns confesses to a necessity to apply forceps in 40 per cent. out of 335 private cases reported on in his paper read at Berlin. This report was published without causing criticism or comment from his fellow-physicians."

Among 163 further private Twilight Sleep cases of Gauss', conducted outside of the clinic and not included in his 1000 births, he did not use the forceps in a single instance. As Gauss says: "We are in the agreeable position that we may conduct a birth independent of the complaints of the women in labour, and above the reproaches of the impatient and anxious relatives, as we know that the patient in complete Twilight Sleep has absolute amnesia" (impairment of memory of pain); "'considerations,' to quote Herr Hocheisen, 'for the surrounding lay-public, which is expecting a painless birth in physiological sleep,' which so concerned him, do not concern us or influence us in the slightest."

[1] An abdominal incision for extracting the child from the uterus. This operation was first performed by a Dublin midwife.

Wilhelm Tichauer, commenting in 1911 on the Gauss-Hocheisen controversy, says, in regard to Hocheisen's claim, "a lay-public which is present at a Twilight Sleep birth receives a very bad impression from the side-effects;" "surely," says Tichauer, "such considerations should not induce a doctor to deprive a woman in labour of the benefit of lessened pain. It seems much more simple to keep the lay-public away from such patients, or if such should not be feasible to simply warn them beforehand of what is to be expected."

THE CHILD

As to the new-born, as Gauss clearly pointed out in his first publication, if the memory is carefully tested, over-dosing of the mother is avoided, and the consequent bad effects on the child. In the statistics of his 1000 births, Gauss found the per cent. of oligopnoeic children greatly lessened by a reformation of the early doses of morphine, and an improvement in technique. There were in the last 50 cases only 5 oligopnoeic children, and these were births in which the desired effect had to be attained in the short period of from two to six hours on account of the late arrival of the mothers at the Frauenklinik, which necessitated an injection of ·0012 g. scopolamin, and in one case ·0015 g. scopolamin. In the majority of cases, where there was ample time in which to begin the Twilight Sleep, there were no bad effects on the child. In the later 500 births, the statistics were as follows: Lively, 78·6%; oligopnoeic, 12·7%; asphyxiated, 6·3%.

"In 117 not especially selected cases of more recent date," reports Gauss, "there were only 6% oligopnoeic children.

"Since the adoption of scopolamin at the Frauenklinik, the number of children dying from injuries at birth has been reduced by 3%.

"Among Lehmann's 70 scopolamin births, there was no death of a child. Among Preller's 220 cases, only one child died, and that, he says, could in no way be ascribed to the effect of scopolamin."

As for Hocheisen's concluding remarks in his chapter on the child, viz. : " It remains to be seen whether it is unimportant to the mental and physical development of the tender organisms of the child, that such a dangerous poison should be transmitted to it from the mother, when it is still in the uterus," Hoche [1] replied, in his discussion at the Freiburg Society of Doctors, that such a conclusion was " abstruse," and in the *Munich Medical Weekly*, of 1907, he furthermore added : " This supposition of Hocheisen's belongs to the realm of comic fable."

THE ONLY GUARANTEE OF SUCCESSFUL TWILIGHT SLEEP

To attain the successful Twilight Sleep achieved at the Freiburg Frauenklinik, Gauss reiterates that only the most exact precautionary measures can guarantee success, and every individual woman in labour necessitates such extreme and intensive observation of her individual condition of consciousness that it is difficult for one doctor to watch a number of patients at the same time and in the same room without having to fear over-dosage.

" The extent to which the method can be adopted in clinics and general practice depends entirely upon whether the respective doctor can and will take the trouble to follow out instructions closely. As long as these instructions are disregarded, we absolutely decline responsibility for injuries by scopolamin.

" The security of Twilight Sleep and its particular effect are based solely upon the test of memory. He who believes he can use scopolamin without this continuous test is making a new method of his own, but it is no Twilight Sleep."

The reply which Hocheisen made to this publication of Gauss' holds absolutely no new material, and is not worth reproducing. I shall, however, give you his final words, as they at least show spirit, and a certain sort of picturesque stubbornness :

" If I am right, scopolamin, together with the Gauss cleverly-coined word ' *Dämmerschlaf* ' will disappear from

[1] A nerve specialist of distinction.

the scene after a time, just as many other loudly-praised methods have done. If he is right, within a few years all women will share painless birth without risk, and I shall then have to admit having been wrong. For the present, however, I take the liberty to continue to warn all practitioners, the optimistic reports from Freiburg notwithstanding."

EARLY RISING AFTER CHILDBIRTH

In a short article published in 1907, following the report on his first 1000 births under scopolamin-morphine, Gauss said he had adopted the method recommended by Küstner with regard to the early rising after childbirth. "Anaemia, debility, heart-disease, varicose veins, existing or suspected infection," says Gauss, "are strong indications to make the patient get up as soon as possible. Healthy mothers are permitted to get up when they choose.[1] The state of health of the early risers is decidedly better than that of patients getting up later. The capacity for nursing shown by the patients who have risen early is also far greater than that of patients getting up later, a fact which presents new aspects for increasing the milk secretion. The involution of the abdominal layers of skin, in the case of early-rising mothers, was good when leaving the clinic as well as at a later examination in from six weeks to one year. Those whom I made perform gymnastical exercises showed more firm and rigid abdominal muscles than the others. The involution of the vagina showed similar favourable results. Comparative observation of the pulse showed no injury to the heart action. The sooner the patient gets up, the more rarely fever is observed."

BED EXERCISES

These gymnastic exercises referred to by Gauss I am able to describe from personal observation of mothers

[1] At present it is the custom at the Frauenklinik to encourage all mothers to get up the first day. In the case of any tendency to hemorrhage the mother is made to get up almost immediately after delivery; this is to prevent the formation of blood clots, and because of the benefit to the circulation generally.

performing them. The first exercise consists of lifting the body entirely without assistance of hands, placing all weight of reclining body on the shoulders, elbows and heels, making an upper curve of body at waist to a degree that enables the nurse to place her arm between bed and middle back of patient ; the nurse then assists with arm to further elevate the centre of body to a still higher curve.

The second exercise : The patient lying flat without pillows lifts one leg up perpendicularly, then swings it around in rotary motion ; this exercise is then repeated with the other leg.

The third : The body still lying flat, both legs are then flung upwards towards the head as if to go overhead, and when they have reached their limit the patient then grabs herself, with both hands placed under the knees, and pulls the legs upward as much further as she can get them.

A fourth exercise I saw performed by an American mother a few weeks ago, two days after childbirth. This mother had not been able to sit in an upright position for four years, because of a stiff hip and leg caused by blood-poisoning at her last childbirth, in America, from injuries by forceps.

During this American's first conversation with Dr. Krönig on her arrival at the Frauenklinik, she asked : " Won't scopolamin cure my leg ? " " Oh ! you Americans ! " exclaimed Dr. Krönig, flinging up his hands in despair. " You expect scopolamin to perform the miracles of Lourdes."

Twilight Sleep was induced at 7.30 at night, after this mother had only experienced a slight backache ; the child was born at 1.30 a.m., and the mother awoke at 9 o'clock the following morning, not realising that the birth had taken place. No forceps had been used ; the birth had been perfectly normal, and the child lively.

While I was present the second day after the baby was born, this patient suddenly discovered, while performing some exercises, that she had recovered the use of her four years' disabled leg. Her joy was overwhelming. This discovery was also made in the presence of an Ameri-

can doctor who had come all the way from California to investigate the Gauss method.

The exercise, in which the discovery was made, were those of the leg revolution, and another exercise which I had not before seen ; the mother sat up erectly in bed (a thing she had not been able to do for four years because of rigidity of hip), and slowly let herself back without assistance of hands to the flat, reclining position.

The Californian doctor was amazed at the ease with which this was done, declaring that this ease proved the abdominal muscles to be absolutely restored to normal strength after the incredibly short length of time of fifty-eight hours after childbirth.

The head nurse, summoned to hear the joyful news of the mother's recovery of the use of her limb, acknowledged that she had endeavoured to stretch the muscles of hip during the Twilight Sleep. "But," said she, pointing to the wonderful new infant in the bassinet, "you have *him* to thank for your cure."

The Californian physician then said : "The entire relaxation of the whole muscular system in childbirth has induced the recovery of the use of your leg muscles ; the *perfectly normal birth* of a child produces a most wonderful physiological metamorphosis in women ; a woman is re-made, and her entire health reconstructed and made perfect. All births *should* have this effect, but with the lack of proper care of mothers before birth, the impatience of physicians at birth, and the unnecessary use of forceps, this benefit to mothers is, unfortunately, not the rule nowadays, but the exception."

CHAPTER VIII

DR. PRELLER'S EXPERIENCE WITH TWILIGHT SLEEP

AFTER Hocheisen's report, it is really refreshing to read Preller's account of his experiment, which, as Gauss says, is the only one of this period which shows a close observance of the Freiburg rules.

As the Hocheisen-Gauss controversy was still the absorbing medical topic of the day in Germany we find Preller constantly referring to it throughout his report with much criticism of Hocheisen.

Altogether, out of a total 1000 births from October, 1906, to October, 1907, at the Mannheim Klinik, 220 were treated with scopolamin-morphine.

The first 500 of these cases were treated by Preller's predecessor, Dr. Eckert.

Preller[1] says: "Eckert's small success necessitated great changes in the method followed by him. He used scopolamin and morphine in one solution instead of separate solutions as recommended by Gauss.

"The effect of Eckert's doses [2] was considerable scopolamin intoxication; the patients suffered enormously from heat, restlessness, reddened faces, hallucinations and delirium.

"Like Gauss I have used drugs in separate solutions of ·03 per cent. scopolamin and 1 per cent. morphine. Only by systematically following Gauss' instructions can a correct Twilight Sleep be obtained."

[1] *About the Use of Scopolamin-Morphine in Obstetrics.* By Preller, Assistant at the Mannheim Klinik, *Munch. Med. Woch.* No. 4. 1907.

[2] Eckert's dose was ·009 g. sco + .01 g. or ·02 g. morphine in 20 g. of water; one full needle at first injection and ½ or again a full needle given at one to several hours later.

Preller's extreme clearness of statement as to exact amount of scopolamin and morphine administered by him makes his paper of great value. It is interesting to note that he continued to use morphine in the second and sometimes in the third and fourth injections—unlike Gauss—yet he apparently had no bad effects therefrom.

The first injection of ·000375 to ·00045 g. sco. + ·01 g. mor. was given when the pains occurred at intervals of from five to seven minutes.

I think Preller has given us the keynote of the secret of success in this method in the following words :—

" The results depend entirely on the experience of the physician in cautiously giving the first dose, and in subsequent carefully calculated doses according to the condition of patient."

He continues : " I have had cases where ·000375 g. sco. + ·01 g. mor. produced a Twilight Sleep, lasting two hours without waking, even during vigorous labour, while in other cases ·0006 g. sco. + ·01 g. mor. had but little effect.

" If first injection does not attain the desired effect a second injection of exactly calculated dose, varying between ·00015 to ·0003 g. sco. + ·003 to ·004 g. mor., is then given.

" By this method a too rapid or immediate effect of the drug is avoided, and a progressive calming of the patient is attained without any danger.

" Within about a half hour after the second injection, the patient shows symptoms of being in the Twilight Sleep. In my third and fourth injections I frequently find an addition of ·004 to ·006 g. morphine necessary.

" In rare cases of especially robust women (who would doubtlessly have shown an equally strong resistance to other narcotics), and in cases of vehement labour with narrow pelvis, I have found it necessary to give a first dose of ·0006 g. sco. + ·01 g. mor., following it with a second injection of ·0002 g. sco. with morphine again.

" The total quantities used by us during entire narcosis never exceeded ·0015 g. sco. or ·02 g. mor. even in our longest cases, lasting sixteen hours."

In Preller's 120 cases he attained Twilight Sleep in 70 per cent.

He says: "I use the term 'successful Twilight Sleep' in a somewhat wider sense than others might, or even Gauss himself would, for my principal aim is to attain a quiet sleep during the intervals of labour, the patient waking during pains and becoming momentarily conscious of the suffering. This I consider a sufficient effect, for the patient's suffering leaves little or no trace in the memory afterwards."

Preller was up to this time the only doctor who was content to produce this less than semi-narcosis; the others forced the patient into a state of positive narcosis, in which there was a deadening of the faculties and a paralysis of the muscular action, or else, by a too swift development of Twilight Sleep through miscalculation of the proper time for the second and third injections, produced a condition of poisoning in the patient which evidenced itself in violent side-effect.

"'It is so easy," says Preller, "to go a step further and induce a deep sleep during which the strongest pains are no longer consciously perceived, and in which the patient only groans slightly when labour is at its climax. If this deep sleep passes without resultant poisoning, well and good, but it is certainly taking very great chances, and is entirely unnecessary."

Preller does not agree at all with either Hocheisen or Steffen as to the very bad impression made upon any of the lay public who may be present at a Twilight Sleep birth.

Dr. R. C. Buist, of Dundee, gives a delightful account of what he calls Steffen's "lurid description of the patient in Dämmerschlaf" which may be summarised "as a scene in which the patient, with congested face, talks at large, or insists on getting out of bed, while the bystanders, and especially the nurses, miss the usual pyonsness of the lying-in room, in a sombre anxiety as to whether the mother will live, or the child, whose heart the doctor constantly auscultates, will breathe; and in which, on

the birth of the child, the mother's joy is replaced by a drunken disbelief in her surroundings. This description," says Buist, " does not at all correspond with the impression I have received from the cases I have seen."

In Preller's first-class ward he had many scopolamin-morphine cases, which he conducted in the presence of the relatives of patients.

" These audiences were often composed of the mother and the decidedly critical mother-in-law. Although my Twilight Sleep is not carried to the extent of deep narcosis I have never heard any fears expressed by the witnesses that the thing looked ' risky ' or ' alarming.' On the contrary, I have often heard the mother of a patient regret that Twilight Sleep had not been developed twenty years earlier so that she might have enjoyed its comfort.

" In every instance I have received the grateful thanks of the women who have seen their daughters delivered in Twilight Sleep.

" In the wards where several women are delivered at once, and the scopolamin-morphine births can therefore be watched by women soon to become mothers themselves, these witnesses frequently beg me to promise that they shall, later on, have their ' needle ' too, which certainly proves the evident reduction of pain in the Twilight Sleep patient, observed by the onlookers, while it also must prove that these witnesses received no impression of heavy poisoning by scopolamin."

In 18 per cent. of his cases Preller attained no Dämmer-schlaf, but only a sleepy condition in which there was a considerable reduction of suffering. " In 12 per cent. the results were not satisfactory ; this was (in the majority of cases) due to a too rapid progress of birth, which did not give us time to produce a Twilight Sleep ; in the minority of our failures we desisted from further injections on account of observing symptoms of poisoning in the patient.

" However, from the *patient's* own subjective point of view we only failed in 4 per cent. of all cases.

" Only two mothers expressed dissatisfaction with the method. Both these women complained during and after

birth of a dull feeling in the head, and a paralysing heaviness of the limbs.

" In the rest of our cases total amnesia from the subjective point of view was a complete success."

There were, among his 120 cases, only 2 instances of hallucinations. Excitement and agitation were sometimes observed during the actual pains. The pulse and breathing were regular. After the delivery both mother and child slept soundly and woke up refreshed, and without any after-effects.

Of the concomitant effects of scopolamin noticed by Preller he first mentioned an undoubted effect upon the heart. " In 20 to 25 per cent. of all cases there was a distinct effect, though not always of an unfavourable nature. The injections at first cause a more voluminous and regular pause. Whenever I found the heart-beats increasing to 120 or 130 per minute, with irregularity or inequality, I regarded it as a warning to desist from further injections, or to wait at least for a considerable length of time before proceeding. For this reason I never had any serious consequences.

" I do not, however, believe Hocheisen's case of disturbance of the heart action was due to scopolamin. I have regularly observed that all symptoms of disturbed circulation quickly disappear.

" Respiration was never seriously disturbed, probably because of our cautious calculation of doses. Neither have I ever noticed any effect upon the kidneys. In one case the patient had nephritis gravidarum " (kidney disease) " with albumen in the urine ; during the beginning of birth there were symptoms of uraemia, but these symptoms diminished soon after birth.

" I believe, from my observations, that labour and abdominal action are certainly retarded by scopolamin-morphine. Gauss is of the opinion that any diminution of abdominal action is due to too large a dose of morphine.

" On the whole, we found the birth process uninterrupted by the injections.

" In 30 per cent. a change in the type of labour was

noticed; in 16 per cent. of these cases labour was regulated and bettered; in the remaining 24 per cent. the vigour of labour was diminished, the pains less frequent, and of shorter duration.

"In 18·6 per cent. of all cases the labour pains were unchanged; in 6 per cent. they were increased." Preller thinks it only fair to remember that in births without scopolamin the variations in labour are just as evident, but he feels justified in considering the weakening of labour, in cases where such weakening occurred, due to scopolamin-morphine in 15 to 20 per cent.

"There is, however," he adds, "so much variation in the average duration of birth process, that only by the observation of thousands of cases could a decision be reached. On the whole, my impression is that the protraction of birth by scopolamin-morphine is only slight."

In cases where the deliveries were extremely difficult, Preller says the patients, "after delivery under the narcosis were much stronger and fresher than patients who had ordinary deliveries without injections."

He found that scopolamin-morphine had no effect upon the milk secretion.

THE CHILD

Preller takes the matter of oligopnoea much more lightly than even Gauss does.

His views coincide with the opinion of an American doctor, who said to me the day before I left Freiburg: "I no longer regard the oligopnoeic condition of the child as serious. The fact that the babies are once and a while born in this slightly intoxicated condition, from which they soon emerge uninjured, should not cause a doctor to condemn the method."

Even Steffen, as we will see in the next chapter, believes "anxiety superfluous" in regard to the oligopnoeic condition of the baby.

As a matter of fact in Germany there is only one death of a child in the entire nine years of scopolamin-morphine

records, which is accepted by most of the medical profession as a death due to scopolamin; this is the death of a child reported by Dr. Oscar Bass, of the Chrobak Klinik of Vienna. This child died from heart collapse after bathing. It is always referred to in German medical journals as "the" death.

A very reassuring and significant fact is that the statistics of the death-rate of infants at the Freiburg Frauenklinik (where all mothers have Twilight Sleep) is much lower than the general mortality of infants in Freiburg born outside the Klinik.

Furthermore, the infant mortality in Gauss' 1000 cases was markedly less than the Frauenklinik statistics showed the average of the ten years preceding to have been.

Preller reports his results to have been "very satisfactory" as far as the children were concerned. "To include the statistics of my predecessor, in all our 220 scopolamin births we only lost one child, and that was delivered with forceps, because of its heart sounds and fear for the mother.

"Among my 120 children we had only 6 apnoeic children, and that was in the beginning of experiments. Almost 25 per cent. showed the characteristic symptoms of intoxication described by Gauss as oligopnoea.

"If these children are let alone, they will fall asleep after from five to thirty minutes, and they sleep off the intoxication, awakening fresh and crying lustily. If the condition should, however, get worse, the oligopnoea changing into apnoea, simple tickling of the child is sufficient interference on the part of the doctor.

"One child was born asphyxiated, but scopolamin was not the cause.

"No lasting injuries to the child were observed, and they have always been found to develop well."

As a prelude to Preller's final remarks I should like to again quote Dr. Buist. In reply to the question: "What advantage has the Twilight Sleep method over the old obstetric anaesthesia?" he answered: "It places a much less fatiguing method at the disposal of the obstetrician."

Preller's closing words are : " Scopolamin-morphine will probably find its only sphere of usefulness in the clinic, where there will always be doctors and a trained staff to cope with the dangers of over-dosing and the requirements of the method.

" If a private practitioner wants to try Twilight Sleep among his patients outside the clinic, he may do so only after having closely studied the peculiarities of scopolamin-morphine and its dosage ; such study will only be possible at a clinic.

" Last but not least he will have to give sufficient time to carefully watch the patient's condition after the injections ; on no account should this condition be treated lightly."

CHAPTER IX

SEVERAL CONTINENTAL REPORTS AND A WONDERFUL AMERICAN EXPERIMENT

Of the reports of the opposition which I have translated, in none have I been more impressed with the absolute sincerity of purpose than in Steffen's.[1] He made a conscientious effort to carry out the Gauss instructions as far he could, and only departed therefrom when the condition of mother or child demanded that he, as a responsible physician, should so depart.

Dr. Leopold, Steffen's chief, was so interested in the first Gauss report, and so determined to give the method the largest possible chance to succeed, he continued to urge Steffen to further experiments long after Steffen himself desired to abandon them, because of results. There was no pre-existing prejudice to the method in the mind of either Leopold or Steffen, though Krönig, in his publication of 1908, says: "Steffen, on the occasion of a discussion about the reduction of pain said that he had never felt any necessity for lessening the pain, felt by women in childbirth. This is only to be explained by the fact that he is either quite callous or that when the screams and groans of women became too loud he left the room." If this was Steffen's individual opinion about the unimportance of lessening the pain, it is all the more praiseworthy that he completely put aside his own opinion on physiological pain and made every effort to carry to success the adoption of the Gauss method of "Painless Birth" at the Royal Frauenklinik of Dresden.

[1] *On the Effect of Scopolamin-Morphine in Childbirth.* By Dr. W. Steffen, Assistant of the Royal Frauenklinik of Dresden. Archives for Gynaecology. Berlin, 1907.

He remarks in the beginning that the fact that it was only used in 300 cases is significant, for had it proved the ideal method Gauss described, he would have continued it indefinitely.

" At first we gave every woman in labour the first dose stated by Gauss to be the correct one, except in those cases where the necessity of an operation was evident on receiving the patient. The incalculable side-effects soon forced us to make a selection of patients, excluding all cases of narrow pelvis[1] or cases where protracted and difficult birth was expected ; otherwise the necessity of an operative termination might easily and unjustly have been ascribed to the use of scopolamin and morphine.

" In the normal cases we gave the scopolamin injections at the beginning of labour pains, and often witnessed the quickly slackening labour which did not develop again regularly. In such cases we did not give further doses, as the labour stopped by one injection did not recommence, and the use of forceps became necessary to save the child. Eventually we only used the scopolamin-morphine injections when the child's head, having already arrived at the lower end of pelvis, the labour had almost fulfilled its task, and it was only a question of a few contractions to expel the child. But even then the muscles often refused to act further, and we had to either use forceps or the Kristeller hand method.

" The sensation of pain during labour is generally lessened. During the intervals of pains the mother is slightly asleep, awakening at beginning of pain or when spoken to. During the action of the muscles she is awake, and when told to do so she will co-operate, but she does not obey so readily when told to cease co-operation, rendering it thereby more difficult to protect the skin from tearing than in the case of a mother whose brain function is not disturbed by narcotic effects, and who is therefore able to

[1] The pelvis is that bony basin composed of hips and the lower bones of the spine, which holds the bowels, bladder and organs of generation.

cease assisting, in spite of the stimulus of the pain of birth. When it becomes necessary to assist by hand, the mother resists and strains in the opposite direction, as her mind is not clear enough to accept the explanation that manual assistance by the doctor is necessary. These are conditions in our group of favourable births.

" In the unfavourable cases where there is no muscular action, the variable heart-sounds of the child necessitates speedy termination of the birth ; the child is then born in oligopnoeic condition. Its heart is beating, it gasps once or twice, then lies motionless ; tickling of the skin is without result. The experimenter knows that this apparently serious condition is only temporary ; he puts the child in a bath, and observes that it begins to breathe regularly but superficially. The narcosis wears off after from ten to fifteen minutes, and the child opens its eyes and begins to cry. The inexperienced physician takes great trouble to resuscitate the child, but we believe anxiety is superfluous. For the spectator the appearance of the oligopnoeic child is alarming, and in private practice the midwife would undoubtedly urge the doctor to make hurried efforts at resuscitation.

" Instead of scopolamin-morphine having a quieting effect on the nerves of the mother, the patient often reacts upon the first usual dose very violently, talking confusedly of home and husband, even betraying family secrets. Gauss acknowledges that in seven of his cases the hands of women had to be tied.

" We succeeded sometimes, only after five or six doses, in putting patients to sleep. Considering the dangerous character of this chemical the physician then has the disagreeable sensation of wondering if the patient will ever wake up again or not. Our injections were rarely given at intervals of less than two hours, often from three to six hours, always using the memory test as instructed by Gauss. We were, however, principally guided in our doses by the closest observation of the heart-sounds of the child. To this fact we owe our low number of oligopnoeic children—18·8 per cent., while in Gauss' first 500 cases he had 36·8

per cent., and in his following 500, just reported upon, he still had 19 per cent.

" I am convinced that after a long action of the poison the integrity of the nerve cells is disintegrated, which fact is not unimportant for the later well-being of the mother. Some might object that such injuries are present in every narcosis, and the accumulating dangerous effects are generally well known ; to this we might reply, narcosis in general is only undertaken for absolutely unavoidably necessary reasons.

" We did not use the blue glasses or antiphones for the ears, out of consideration for our assistants because of the repulsiveness of the picture presented."

This seems a rather poor excuse for omitting this precaution urged by Gauss.

" The agitating effect of scopolamin, resulting in slight irritation of sight and hearing, are apt to be magnified phantastically and give rise to illusions. I consider this a great defect of the scopolamin method.

" It was when this present work was in progress that there was published by Gauss in the *Munich Medical Weekly*, his report on his first 1000 births in Twilight Sleep, and in this he now describes the apoatropine test of scopolamin solutions. This test was not known to us in the above 300 cases. The fact that Gauss objected to the freshly-prepared solutions of the apothecary of the Berlin Charité caused me to go personally to various apothecaries giving clear instructions about the importance of the most carefully-prepared solutions. These solutions were then tested daily in the manner prescribed by Gauss with solutions of calcium permanganate. In a further group of 20 cases, in which these solutions were used, we had, however, to desist from further injections when danger to the child appeared to be present. These cases were observed by me as well as by Dr. Richter, Dr. Leisewitz, and three assistants. The careful memory test observations of the state of clouded consciousness and retrograde amnesia were carried out mostly by myself. In no cases were the midwives or students charged with the observations, or the memory

test. At the bedside of every patient, however, there was a student who had to take notes of the duration of each pain and the intensity of same ; the progress of the birth and side-effects being judged by the doctors.

" It is interesting to note that in one case where *no* scopolamin-morphine injections were used on the mother, she became confused in mind, did not observe the birth, and asked if the doctors were going to perform an operation ; apparently her memory had had an interruption *without* the use of scopolamin. It would be an interesting study to find out how often this is the case in entirely spontaneous births.

" To illustrate the hallucinations caused by scopolamin I will give the following answers made by a mother :

Q. " Why do you cry ? "

A. " Because I have no work."

Q. " What is hurting you ? "

A. " The pastry."

Q. " Who am I ? "

A. " The barber."

Q. " Where is my barber shop ? "

A. " In the Zöllnerplats." Afterwards she added : " Frauenklinik."

Q. " What did I show you just now ? "

A. " Hats."

Q. " Have you a child ? "

A. " Yes, the baby should be baptised." Then she complained loudly : " I can't stand it any longer. Is it not over yet ? "

Q. " What is the matter ? "

A. " Income." Then she added : " Dresden Altstadt " (a suburb of Dresden).

Q. " What is hurting you ? "

A. " Down my neck and finger-tips." She complained and cried loudly when the child was born : " Oh, that hurts ! " Afterwards she had no memory of anything !

" To make a *résumé* of the first 300 and the last 20 cases we find that in many cases scopolamin-morphine does not show the desirable effect of obliterating the suffering of

pain at birth, or the facilitation of the act of birth by producing a state of sleep, although it leads to a lessening and dulling of sensitiveness in a minority of the cases; on the other hand, in the majority of the cases, unfavourable effects are produced by diminution of labour action down to entire stoppage, variation of the infant's heart sounds, oligopnoeic or apnoeic condition of child, and often an increase of sensitiveness to pain, unrest and confusion of mother with hallucinations to the point of delirium. We cannot, therefore, recognise the use of scopolamin-morphine in obstetrics as described by Gauss, but we think (1) the effect of scopolamin-morphine does not obtain the object aimed at; (2) it is not without danger to mother and child; (3) it is not to be recommended in private practice, especially because the doctor must be present every moment on account of the incalculable side-effects of the drug."

I have felt it necessary to give extremely exhaustive accounts of the failures of Hocheisen and Steffen, for the reports of these two obstetricians are still to-day the most largely quoted by all authorities who desire to prove a case against Twilight Sleep.

Hocheisen's failure is easily explained by a close study of his careless technique, but Steffen's is not to be dismissed. I have re-read the Steffen report five times since my first translation of it from the German, hoping each time that I might find some explanation of his failure in an oversight somewhere of the Gauss instructions, or in a miscalculation of dose.

Steffen leaves himself open to criticism on this point. He states that eventually he did not give the injections until "it was only a question of a few contractions to expel the child." Under the circumstances it could certainly be argued that he could not possibly then have had time to establish a Twilight Sleep at all, which would easily account for his statement that in many cases "scopolamin-morphine does not show the desirable effect of obliterating pain at birth."

Furthermore, many obstetricians warn against making the injections too soon before the actual birth, as in that case the child is very apt to be impregnated with the drugs transmitted from the mother to child through the placenta, and is more liable to be born in an oligopnoeic condition.

Still another point. Tichauer says: "Gauss has clearly indicated that absolute painlessness is not aimed at, and when it occurs it oversteps the limits of Twilight Sleep and indicates an overdose, yet we find that Steffen obtained painlessness (unconsciousness) in 45·8 per cent. of his cases."

Mansfeld says: "As soon as painlessness is aimed at there is danger of overdosing."

Aside from these few assailable points, after closest study of the Steffen report, I can only say I am still convinced he gave the method a conscientious trial; his failure is therefore to be treated with serious consideration.

The only other important Continental reports of this year are those of Gminder, Bass and Holzbach.

It does not seem necessary to give the report of Dr. Gminder,[1] as all value of his record as a criterion by which to judge the method is nullified by the fact that he in no way adhered to the rules of Gauss, either in regard to the dosage or the memory test.

He says: "Gauss has included a new factor by which to judge the stage of narcosis—the memory test. I may as well underscore right here that by 'sufficient effect of drug' I understand painlessness of labour without interruption of the progress of birth. I did not adhere to the memory test, as I wanted to find the best way in which the best results could be obtained without injury to mother and child."

Small regard for either mother or child was shown by Gminder in the amazing experimental doses indulged in by him. This record is one of the best proofs ever furnished of the comparative harmlessness of scopolamin, for had this drug the deadly qualities ascribed to it by some writers,

[1] *One Hundred Cases of Scopolamin-morphine Narcosis in Obstetrics.* From a speech made by Gminder, of Krupp's Hospital, at Essen, at the Society of Medicine at Essen. 1907.

one cannot but believe Gminder's list of casualties would have been large.

As Tichauer says: "It is a marvel Gminder's results were not worse, and to crown it all, old solutions were often used."

In only twenty cases did he make the slightest pretence of adhering to the Gauss dose; in the other instances he kept varying the dose with and without morphine in groups of three, five, eight or eleven patients, employing in each group an entirely different technique. Yet Gminder has the effrontery to bunch the results of all these dissimilar experiments under one head and give them as the record of *an* experiment with the Gauss Dämmerschlaf.

After such reckless experimentation it is astounding to find that out of his 100 cases he reports 58 satisfactory births. Gminder's report really constitutes a sort of scopolamin-morphine vaudeville.

The use of the term "*semi*-narcosis" in Dr. Bass'[1] title is significant and indicative of his careful observance of rules.

Of the operations necessary in his cases, Bass declares "not one was directly or indirectly connected with the narcosis."

As to the length of birth he says: "Although there was no case where protraction of birth could not otherwise be sufficiently explained, still it seems to me that scopolamin-morphine influenced the process of birth if but only slightly. However, intermission of labour will happen in all protracted births."

Bass' report is particularly just and lacking in prejudice or conclusive opinions, as he says, "the publications on this narcosis vary so greatly as to the value of the method, it is, as yet, impossible to form a definite opinion." His own experience, nevertheless, was decidedly in favour of Twilight Sleep.

[1] *One Hundred and Seven Births under Scopolamin-morphine Semi-narcosis.* By Dr. Oscar Bass, of the Crobak Clinic, Vienna. *Munch. Med. Woch.* 1907.

Holzbach [1] at this time made interesting experiments to answer the following questions :

(1) Is scopolamin excreted or is it still circulating in the body of the child ?

(2) Does it still circulate in the body of the mother ?

(3) Is it introduced into the child through the mother's milk ?

Chemical test was not found to be sufficient, so Holzbach had to make the more sharp physiological experiments.

" After ascertaining the smallest quantity of scopolamin which would dilate the pupil of the eye, I then took milk from the mother, who had received injections at birth, and instilled three drops of this milk into the human eye. These experiments, as well as those made with the urine of the newborn, did not prove the presence of scopolamin."

He then followed with experiments upon the much more sensitive eye of the frog and proved the presence of scopolamin in the mother's milk. Holzbach thereupon comes to the conclusion that scopolamin is still present in the mother during the first few days after birth.

The urine of the child immediately after birth showed the presence of scopolamin, but it was found to have been excreted through the kidneys after one quarter of an hour.

Salzberger,[2] commenting in 1910 on the Holzbach test, says :

" If this small quantity of the drug, proved to be present in the mother's milk up to the third day, were injected hypodermically, it would produce no effect upon the child, how much less effect then could it have when taken internally."

Of all the sixty-nine reports on Twilight Sleep gathered

[1] *About the Relations of Scopolamin to Child During and After Birth.* By E. Holzbach. *Munich Med. Journal.* 1907.

[2] *On Danger to Children from Scopolamin-morphine Administered During Birth.* By Dr. Max Salzberger, of Kulm. Inaugural Dissertation. Published 1910.

from world-wide sources no report has given me quite the thrill of pleasure which that of Dr. Birchmore', of Brooklyn, N.Y., produced.

It is especially significant that this report was published in June, 1907, at a time when it took a brave man to sound the praise of scopolamin-morphine in the States, for it was at a period when only a few other American physicians were making timorous experiments with these drugs with general resultant failures, after which the method was quickly discarded and damned.

In view of all this I think the women of America should feel a vast and deep gratitude to Dr. Birchmore, and his name should be handed down among them as the American pioneer of Painless Childbirth and the first champion of the cause of Twilight Sleep.

My attention was drawn to this report in Germany, where it is a prized contribution to the cause of Twilight Sleep; my first transcription of it was from the excerpts contained in the reviews of the record in the German medical journals, but after my return to England I got the report in its entirety at the Library of the British Medical Association.

Dr. Birchmore's opening words are: [1]

"Since the re-discovery of the condition under which the deep sleep resembling death in its soundness—of which the tradition has come down the ages—could be procured, men in various parts of the world have made use of it to obtain insensibility to pain."

He believes that the great improvement in the obstetric art for which we have long been looking may reasonably be grounded on scopolamin. "The actual results that have been attained may be summarily stated in a few words: the patient slept, labour came on and progressed in accord with usual conditions, normally in relation to the details.

"The labour was not prolonged—far otherwise, and in

[1] *The Hyoscine Sleep in Obstetric Practice.* By Woodbridge Hall Birchmore, M.D., 163, Fulton Street, Brooklyn, N.Y. *Medical Record.* Vol. 71. June, 1907.

no case was it needful to use an anaesthetic, although the forceps was used thrice.

" The only case in which the mother showed any signs of awakening was not one demanding interference."

How delightful to read the following concerning the babies :

" No results influencing the infant unfavourably were observed, although most anxiously looked for."

Dr. Birchmore's dosage was as follows :—

" The hyoscine (or scopolamin) was administered in doses of 1/100th of a grain + ¼ of a grain of morphine, and cactin 1/67th of a grain. This amount was given in solution of 1 c.c. of water and repeated as required."

The quantity most usually employed for the first injection by the British doctors to-day is very nearly that given by Dr. Birchmore, the British doses generally being 1/100th of a grain of scopolamin to ⅙th of a grain of morphine. 1/100th of a grain equalls ·00065 g., and ⅙th of a grain of morphine equals ·01 g. morphine, which you see makes the British doses practically the same as those employed by Gauss.

Dr. Birchmore says much stress should be laid on the purity of the ingredients for obvious reasons, it being of special importance when so small a dose of scopolamin is used that the most absolute purity be attained.

" The first dose was given as soon as the first stage of labour was certainly beginning, and was in most cases sufficient to hold the patient until the so-called impulsive pains were distinctly pronounced."

Dr. Birchmore evidently employs the Gauss memory test, for he says :—

" The instant the patient began to show the least evidence of perception, the second dose was given. In the cases requiring the forceps, a third dose was given in two instances, but not in the third case."

It is interesting to find the uniformity of effect upon the patients noted by Dr. Birchmore, for he says the patients did not show the variation which might in some cases have been expected, the results being the same as far as the depth

of sleep and the continuance of it was concerned, nor did he find that the injections had a cumulative effect upon the mothers.

In one group of cases the average duration of the nap was six hours, while in another group the sleep continued for eight hours, from the time the second injection was given.

He tells an amusing case of one woman on whom the injection had the peculiar apparent effect of causing great activity on the part of the unborn child.

This mother repeatedly declared :

" This child kicks something awful ! "

The child continued to behave in this recalcitrant and impolite manner for four hours after the injection was given.

The mother then slept for five hours, and she said on awakening that the child had ceased to kick, but in a few hours the boy recommenced his exercises and continued to cause his mother discomfort for some time.

The mother humorously remarked to the doctor : " If he is such a kicker all his life, he will make lots of trouble."

The patient, having received a second injection at the beginning of real labour, " slept until after the birth of her child, becoming somewhat restless at the end, but not regaining consciousness until after the baby had been cared for and all provisions made for the comfort of the mother."

In one case the baby was born sleepy, but Dr. Birchmore says proof that the drug caused this condition was not positively established.

" All direct evidence of long-continued interference with the actions of the child after birth is wanting, and in only one instance was an effect upon a child positively affirmed by another doctor attending.

" Apart from the influence upon the direct progress of the labour, the effect upon the mother was most noteworthy, first, as quite hindering the mental disturbance which pain and suffering in all cases produce." This is, indeed, a noteworthy fact, and one on which Dr. Krönig has always laid such stress.

The next sentence of Dr. Birchmore's is of the greatest interest to mothers; he says one physician remarked after using scopolamin-morphine:

"Objectively, as evidenced by the mother's condition, it appeared a preposterous proposition to say that she had given birth to a child."

Another very important point is the lack of resistance in the mother to the efforts of nature to expel the child. Quieted by the narcotic, and mentally without apperception of the agony of the workings of the expulsion muscles, she makes no effort to check the full force of the contractions of those muscles.

To quote Dr. Birchmore: "The mother shows no signs of exhaustion, and although the passive resistance of the tissues must be quite the same, it can be clearly seen that no spasmodic resistance, by inhibition due to pain, in any way interferes. This absence of the active resistance is, perhaps, the most remarkable effect produced."

As an example of the beneficial results of muscles working independently of mental suffering, he tells of one mother, who, after a labour that had been notably tedious, was delivered of her fourth and largest child in less than two-thirds of the time of the *shortest* of her former experiences in childbirth, and in one-third the length of time of her longest. She had always in former births been peculiarly restless and difficult to manage, but with scopolamin-morphine she "simply slept through the whole series of phenomena; she did not awaken until she had been removed to a clean bed and provided all things needful."

Now read with deliberate care the revelations contained in the following: "At the birth of the head, although soundly sleeping, she made certain spasmodic actions and changes of position which caused some surprise to the nurses and attending physician."

Dr. Birchmore's conviction is that the following statements of the physician conducting this birth contain an important truth. They are: "Her actions showed that combined movements should occur which are inhibited" (prevented) "in the large majority of cases. It was as if

I had seen the natural action of a woman for the first time."

Telling of the amazing co-operation of the patient in Twilight Sleep, Dr. Birchmore cites two cases, in which the mother " rolled on to the left side, partially flexed the left leg upon the thigh, and the thigh upon the pelvis, so that the child was or rather would have been supported and guided on to its back by the act of extrusion. The right lower extremity extended to the extreme, the toes pressed against the foot of the bed gave a ' fixed point ' for the muscular leverage."

My only experience in midwifery has been with my goats—I formerly had a flock in Bermuda—and Dr. Birchmore's above description is a perfect description of the phenomena of nature in the second and third deliveries of kids by my goat mothers.

The first time a goat bears kids she suffers too intensely for the normal action of nature, but in the second and third set of kids the leg is flexed just as Dr. Birchmore describes in his human patient under scopolamin-morphine, and the attitude of the mother-goat is precisely that which was evidently originally planned by nature to be the one taken by women in order that the child should be expelled correctly.

Dr. Birchmore says in the majority of cases " the heels were brought against the buttocks, and in these cases the muscles were made tense, lifting the buttocks completely off the mattress at the instant of birth of head, yet there was no sign of awakening.

" The steady, slowly-increasing and tremendous force exerted by the abdominal muscles during the expulsive pains attracted the attention of all observers. One who has seen great numbers of labours said that he never saw anything like it before, and added, in an extended opinion, that the great advantage over chloroform is easily seen, in that with the hyoscine (scopolamin) sleep reflexes are greatly augmented, not suppressed.

" All who have made use of hyoscine a few times appear to regard this restoration of the truly natural conditions

as being of almost as much importance as the unconsciousness from pain.

" If we use hyoscine the mother cannot do mischief by her own excited and voluntary or semi-voluntary actions, is a remark made by every user."

As to rupture of the perineum (the space between the lower termination of the rectum and the vagina) Dr. Birchmore says proof is wanting of this danger. One doctor said :—

" The rupture of the perineum, when not due to the haste of the *accoucheur* " (the obstetrician) " is due to the excitement of the mother."

" From what I have seen I am inclined to regard the dilatation of the perineum much as I regard the dilatation of the uteri " (womb). " It is gradual, and the obstruction, although usually needless now, must have been of importance once. The waking mother (without scopolamin-morphine) makes convulsive efforts to overcome the resistance of the perineum, and when she feels the obstruction, has a titanic, if not tetanic, spasm to force the head by, and then the shoulder (of child) catches. But in hyoscine sleep the first perineal pains are not convulsive, and instead of one or two ineffectual attempts, ending almost in a convulsion, the sleeping woman has a dozen small pains, gradually stretching the sphincter " (the circular muscle which opens and closes) " and besides this the head is not held so firmly against the sphincter, or rather against the fold of sub-mucous tendon, that this cannot roll, and after once or twice trying, the whole apparatus—tendons, muscles and mucous membrane—slips out of the way, and the last expulsive pain comes on.

" For my part I regard this use of hyoscine as important, because it has restored the conditions of normal labour.

" I know my expression is bad," modestly declares Dr. Birchmore, " but somehow hyoscine gives the management of labour back to the reflex ganglia, from which the brain in women had taken it away."

As for the forceps' cases, he says : " Certainly the use had

no connection with the insensibility of the patient. All who have made use of this narcotic, without any exception, insist that exhaustion, even to a small degree, is hardly to be perceived. The absence of excitement, the regularity and, above all, the maturity of the expulsive efforts, the fact that none of the vitality of the mother is expended in useless and exhausting (because ineffectual) and disorderly efforts, promises to lessen greatly surgical interference—the special interference demanded by the mother's state.

"The importance of the hyoscine sleep in obstetric practice is amply demonstrated, and experience shows that it can give us all the aid, in quieting the patient, that a narcotic can give, and in addition it gives us a practical anaesthesia of prolonged duration, and gives this anaesthesia without risk to either mother or child. Furthermore, this; we have the most abundant proof that this practically anaesthetic sleep is quite without danger because the respiratory system is in no way interfered with, nor is the heart action restrained. It is also clear that the reflex actions which find their point of departure peripherally" (from the outer surface) "and return to the periphery again from spinal and sympathetic system ganglia, specifically from the 'pelvic brain'" (so named by Byron Robinson) "are not restrained, but rather they are augmented by the action of this drug. Clearly, then, it is a drug sedative to the cerebro-spinal axis, but not to the ganglia connected with the reflexes of common life. This fact alone is of no trifling importance, but the import grows when we note that in shutting the door, so to say, to the influence of the inhibitory actions, it leaves quite unopposed the influence of the sympathetic system, and the physician using it need have no fear of any accidents to disturb the normal evolution of a birth. It is then for the *accoucheur* the ideal anaesthetic, one which, so far as we yet know, he can use to obtain the desired effect without fear of an overdose. So far as I have been able to learn, no one has yet had any experience with excessive doses."

What must Hocheisen, Gminder and Steffen have thought when they read that!

" We certainly know that all we need to give can be given without risk or danger.

" Finally, and perhaps of all the most important, this use of hyoscine has stripped motherhood of its horror.

" The dread of pain has been the great dread of the coming birth ; until this discovery the ' pains of maternity ' remained a horrid and incontestable truth, but these have vanished and the exhausting ordeal of motherhood is gone to be seen no more."

This is by far the most important document concerning Twilight Sleep which has yet been written.

It is a mystery why its convincing truths did not stir all American physicians to experiment with scopolamin-morphine ; it is, furthermore, amazing, after such successful results as those obtained by Dr. Birchmore, that American mothers, kept utterly in the dark about this important discovery, should have been forced to go abroad to find relief in a German Frauenklinik from the agony of childbirth.

The most salient facts of Dr. Birchmore's papers are :

1. With the entry of scopolamin-morphine " the pains of maternity have vanished to be seen no more."

2. These drugs form " the ideal anaesthetic."

3. " This anaesthetic is without risk to either mother or child."

4. All who have used this method " without any exception, insist that exhaustion, even to a small degree, is hardly to be perceived."

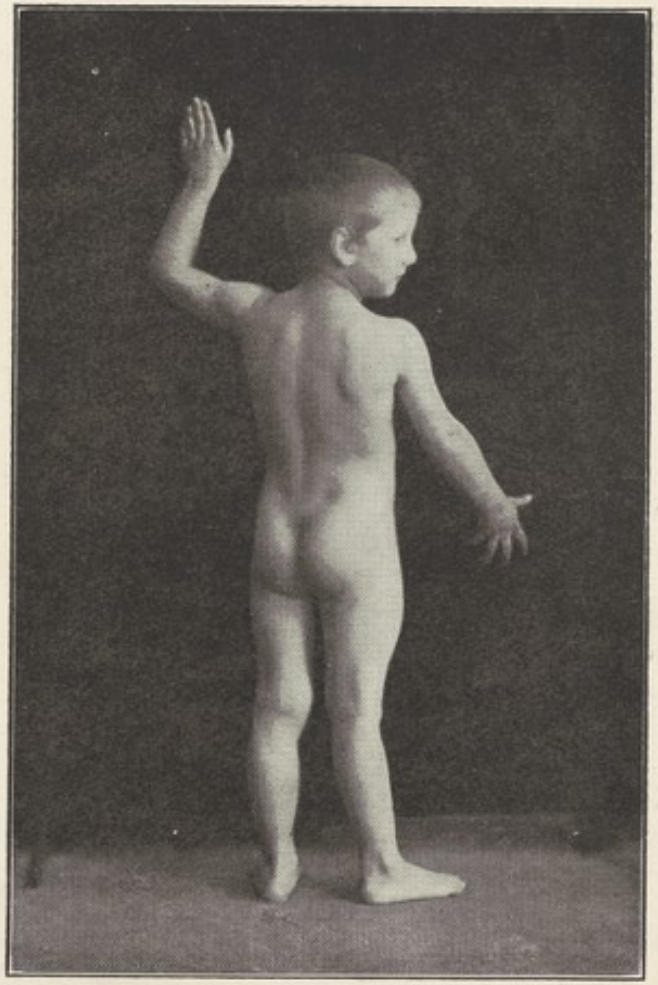
5. The danger of perineal rupture is done away with.

6. Scopolamin does not prolong the birth process—" far otherwise."

7. " No results influencing the infant unfavourably were observed, although most anxiously looked for."

8. That in Twilight Sleep there has been a " restoration of the natural conditions." This last is the most remarkable and important feature of all

A MOTHER WHO KNOWS NOTHING OF CHILDBIRTH PAIN. THIS IS HER SECOND TWILIGHT SLEEP BABY.



A PERFECT SPECIMEN OF A TWILIGHT SLEEP CHILD.

CHAPTER X

THE REMARKABLE REPORTS OF 1908

KRÖNIG

THE most important publication of this year was the report of an address made by Dr. Krönig,[1] director of the Obstetrical Department of the Freiburg Hospital for Diseases of Women.

The entire present scopolamin-morphine method is due to Dr. Krönig's determined efforts—first at Jena and later on at Freiburg, where his assistant, Dr. Gauss, eventually perfected the Twilight Sleep under Krönig's direction.

As Dr. Krönig stands sponsor for Twilight Sleep, many would perhaps like to know something about his history.

He was born on January 27, 1863, at Bielefeld, Germany. After attending the Gymnasiums (classical schools where Latin, Greek, etc., are taught) at Bielefeld and Dessan, he then attended three Universities—Heidelberg, Kiel and Berlin.

His professional career is as follows:—He was first appointed assistant to Prof. Pagenstecher at Elberfeld; his next work was under Prof. Hoffa, at the Private Orthopaedic Clinic at Würtzburg, then in the laboratory of the Berlin Gynaecological Hospital; his fourth position was at the Koch Institute, and from there he went to the Leipsiz Gynaecological Hospital.

At Leipzic, in 1896, he was appointed Private Dozent (authorised lecturer). There is in Germany a half-way stage between lecturer and sure enough professor, which is called "Ausserordentlicher Professor," but in Krönig's

[1] *Painless Delivery in Dämmerschlaf.* By Bernhardt Krönig, Ordentlicher, Professor Geheimrat, M.D. *Deutsche Med. Wochenschr.* No. 23, 1908.

case he was promoted direct from lecturer to " Ordentlicher Professor " (the highest kind of professor), at Jena in 1903, and again at Freiburg, at the Ludwig Albrecht University, in 1904.

Dr. Krönig is the author of many books on gynaecological subjects.

So we see that the man who is responsible for the scopolamin-morphine narcosis, as used to-day, is a man of the most distinguished attainments, and the highest professional standing.

In appearance he is a great, blond giant with an enthusiastic profile. Kindliness radiates from all his great frame. He has not one hardened emotion.

He shed tears of sympathy over a young American girl on whom he had found he must perform one of the most serious operations in the world.

The Steffen report and the violent discussion which followed between Krönig on the one side and Steffen and Leopold, of the Dresden Royal Frauenklinik, on the other, at the 79th meeting of the German Naturalists and Doctors, was so taken to heart by Dr. Krönig that he was actually made ill and was confined to bed for several days.

It is not surprising to find this giant of the tender heart fighting so long and against such perpetual opposition for the relief of women's suffering.

As I sat in his private office I felt that the room was an expression of the man—it is all in grey and gold ; grey walls, floor and doors, curtains of pale gold, table cover of gold ; on the walls are three steel engravings, one small painting and one framed autograph ; two bronze figures—one that of a blacksmith ; a mahogany desk and a couch covered by a beautiful fur skin. This is the room to which women have come from every part of the world to see the man who could promise them relief from the torture of childbirth.

This publication of Krönig's is notable as being his only reply to the opposition.

Krönig points out that scarcely any physician would be able, after only a few trials, to obtain the same results

which have been achieved at the Freiburg Frauenklinik, after long experience. It is therefore unfair to decry the method as a failure, if the Gauss results are not obtained by others in their early attempts; they should on the contrary make further unprejudiced study.

" It must not be forgotten that it was only after a study extending over many years, that we ourselves succeeded in obtaining our present success. The method demands concentrated attention on the part of the obstetric staff.

" Thanks to the generosity of the Grand Duke of Baden, we have now been able to triple the obstetric staff in the delivery ward, and this has enabled us to perfect our method, giving it the widest possible application to all classes of the population.

" I mention this intentionally," says Krönig, " because I am of the opinion that in hospitals with a large number of cases, our procedure can only be employed with any prospect of success when a complete administrative reorganisation in the assignment of duty in the delivery ward has been effected.

" If, as is the case in large hospitals, the doctor on observation duty is relieved every twelve hours, the colleague who follows him will not be sufficiently well informed as to the condition of the various cases in labour, and failure is certain to ensue.

" Consequently, I do not consider it the result of chance that it is precisely in small hospitals that our method has been successfully adopted. It is also significant that in the large hospitals of Berlin and Dresden, where there are many thousand births a year, our procedure has proven a failure.

" This is easy to understand when we remember that the surroundings of the patient have an importance which should not be underrated. Sense impressions, loud noises, bright lights, all disturb the half-consciousness."

At the time Krönig wrote this paper, there had been 1,500 births under scopolamin at the clinic. In all that number only one mother died, and when one reads the circumstances of the death, it would seem as if even the

most biased opponent could scarcely attribute it to the narcosis.

Here are the details: The patient was a woman with narrow, funnel-shaped pelvis. Very soon Krönig saw that Caesarian section was absolutely imperative. The husband of the patient absolutely refused to consent to this operation, and while Krönig was still urging the necessity the uterus ruptured; even then Krönig declared to the husband that his wife might be saved if he would permit an operation, but that permission still being withheld the woman bled to death.[1]

As for the duration of birth Dr. Krönig says: "It is either not increased at all by scopolamin-morphine or else increased to a quite negligible extent. But even if, in a number of cases, the observation should show the birth prolonged by perhaps a half hour, I believe this consideration cannot possibly be seriously allowed to outweigh the great blessing which we confer on the mother by eliminating her pain.

"One can only form an idea of the blessing of the method by hearing the statements of women who have borne children without anaesthesia.

"In the whole course of my career as a physician, never have I harvested such a crop of gratitude as I have since I established Twilight Sleep in deliveries."

Now that many of Krönig's and Gauss' opponents began to acknowledge that the method held safety for the mother, they took refuge in the objection that it was dangerous for the child.

Krönig refers to the tests made by Holzbach (which we have already given), and says that they prove that even though scopolamin is shown to be present in the child in minute quantities, those tests also prove it to be eliminated from the child's organism in a very short time.

When Krönig's paper was written the oligopnoeic condition of children at the Frauenklinik had been reduced

[1] This obdurate husband—an Italian—"emphasised his determination," said Dr. Krönig, "upon the assisting doctor by means of a knife which he held in his hand."

to 10 per cent. " We prefer to quietly wait for the child to breathe naturally of its own accord, but if one desires to rapidly produce regular breathing, nothing beyond simple mechanical stimulus is necessary.

" The fact that the mortality of our children, both during and after birth, has been decidedly diminished since our use of scopolamin-morphine, refutes the prophecy that the mortality of babies would be increased by the oligopnoeic condition leading to asphyxia.

" The last objection brought forward is that the child will, later on, be injured by scopolamin passed to it from the mother. Out of 305 births in our private wards, we have been able to trace the greater number of children, and we can absolutely refute the expectation, expressed in some quarters, that the children would display a higher death-rate during the first year of life. We can also prove their later physical and mental development to be absolutely normal.

" As for the objection now brought forward by our opponents, who find themselves driven into a corner, viz.: that the deleterious effect of scopolamin will only show itself in the mental development at the age between twenty and thirty, we cannot but feel that this shows what unfair standards are applied when it is a question of opposing a new method.

" This is the more salient when we remember that obstetricians practising among the better classes use forceps in almost every other case, and consequently in all these cases must employ anaesthetics—chloroform and ether—the transmission of which, from the mother to child, has been proven.

" In addition to this, take into account the not inconsiderable injuries often inflicted on the brain of the child by the forceps. In hundreds of cases the forceps cause subdural haematomy and a pressure inward on the skull.

" When we consider all this we are compelled to ask in amazement why it occurs to no one to draw attention to the fact that the brain action of the child is injured in these

innumerable forceps' operations, while it is being maintained that extremely minute quantities of scopolamin (which have been proven by Holzbach to disappear shortly after birth) influence the brain action of the child up to an advanced age!

"It is important to here say that even in our private wards we have not used the forceps for the relief of pain on a single occasion since the introduction of the scopolamin-morphine method."

THE KLEINERTZ REPORT

Kleinertz, of Stüttgart, studied the scopolamin-morphine method for one year in Freiburg under Dr. Krönig; the results of his experiments are, therefore, of particular value.

That this method is now (1914) a permanent institution in the Stüttgart hospital is of even stronger significance than this report, which only deals with the first experiments in 280 cases.

Kleinertz says:[1] "As many others have pointed out the harmfulness of scopolamin-morphine, I wish to state that, by strictly observing the Gauss instructions, we did not have any untoward incidents."

In each case, before giving injections, he examined the heart and kidneys of patients, but he does not regard slight heart disturbances as a counter indication.

In some of his earliest cases he used a mixed narcosis, employing chloroform when the head appeared.

He adhered to the Gauss initial dose of ·00045 g. scopolamin but gave ·015 g. morphine. The second injection was made after three-quarters to one hour, "always conscientiously testing the memory of patient."

He found it important not to inject more than prescribed by Gauss in first dose, or else weak labour would be occasioned. "For this reason the first injection requires absolute attention on the part of the obstetrician. The heart sounds of the child during period of expulsion must

[1] *Childbirth in the Scopolamin-morphine Dämmerschlaf.* By F. Kleinertz, of the Stuttgart Hospital. *Zentralbt f. Gynäk.* Liepzig. 1908. XLII. Pp. 1387-1391.

also be watched very closely. For this reason the method is only adapted to the clinic."

Out of 280 mothers he succeeded in putting 213 in Twilight Sleep; 14 times no result on account of too rapid birth; 19 times no Dämmerschlaf was attainable. "There were 29 cases of necessary forceps, caused by conditions which had nothing to do with the use of scopolamin."

Further on Kleinertz says: "There is no doubt that a diminution of labour may occur, especially if injections are given in too quick succession or too early, or when the dose is not properly calculated. If a strong injection is given during the period of expulsion it is often noted that scopolamin acting too violently affects the muscles unfavourably; for this reason the method requires especial care, attention and judgment during the period of expulsion."[1]

With regard to the length of birth, Kleinertz found it averaged, in the case of mothers bearing their first child, nineteen hours and forty-five minutes. In other cases thirteen hours and nineteen minutes.

In the 280 cases there were 282 children. Four babies which were delivered by forceps died; five died after birth "for various reasons not connected with scopolamin." The majority of the children were born in a normal condition, only a few were oligopnoeic and a few asphyxiated.

"Aside from complaints about thirst from dryness of throat and mouth, no harmful influence upon the mothers was noticed. No evil after-effects were observed.

"In one case we desisted from further injections because of pronounced heart disease of patient, yet, nevertheless, we obtained a lessening of the pain. None felt ill afterward."

The average blood loss of mothers was found to be 502 g. Good contraction of the uterus. Scopolamin did not affect the nursing capacity of patients.

"Mothers who had previously had children without

[1] This may explain some of Steffen's failures, for we must remember that he did not begin his injections until this critical period had arrived.

scopolamin were the best test of the beneficent effect of the Twilight Sleep; these declared their after-state of health, after birth under scopolamin-morphine, much better in comparison with former births."

The children's after-health was found in no way to be effected.

Kleinertz rivalled the famous Gauss dose of ·00375 g. sco. + ·03 g. mor. given in fifty-seven hours, by giving one patient twenty-one injections in twenty-nine hours, the total amount reaching ·00585 sco. + ·01 g. mor., and yet had no bad results.

"The only difficulty of the method lies in the chemical instability of scopolamin which makes it sometimes necessary to throw away freshly-made solutions." Of course, this fault has now been practically eliminated by the invariable scopolamin of Prof. Straub.

Kleinertz concludes this report of his entirely satisfactory experiments by saying: "If the obstetrician and his staff will give their time and great pains to strictly follow the rules laid down by Gauss, they will then have a method which obtains its object of decreasing the suffering at birth without danger to mother or injury to child."

H. Kionka, of Jena,[1] now made physiological experiments with scopolamin, with the result—as I have stated earlier—that he declared scopolamin was not injurious to the muscles of the heart.

He feels that he can establish two salient facts, viz.:

(1) Variations in scopolamin's physical action does not mean variation in its effectiveness.

(2) There exists a great difference in the reaction of individuals to the drug.

MAYER [2]

Prof. Stoeckel, head of the University Frauenklinik of Marburg, gave his assistant, Dr. Mayer, a chance to study

[1] *Therap. d. Gegenw.* Berlin. 1908. No. 1. Pages 11-17.

[2] *Scopolamin-morphine at Birth.* By K. Mayer, Assistant at University. Frauenklinik at Marburg, A.L. Published in *Zentralblatt für Gynäk.* 1908. XXXII. Pages 689-699.

the Freiburg method under Gauss, and Mayer reports on fifty cases afterwards conducted by himself.

He waited until the child's head was firmly in the pelvis to avoid too long a duration of Twilight Sleep, and the necessity for giving too large a dose.

Mayer thinks all secondary effects are to be attributed to the decomposition of scopolamin—a disadvantage now done away by the Straub preparation. For this reason Mayer carefully tested all scopolamin before using, by the Kessel test of 1 per cent. kalium permanganate.

His first injection was only ·0003 g. sco. + ·01 g. mor. in separate injections.

" The task of the obstetrician," he says, " is to now calculate the dose in each case so that on the one hand not too little scopolamin is given—as then no hypalgesia can be obtained—and on the other hand to avoid too large a dose which would result in complete narcosis."

In his fifty cases only twice were the labour pains diminished, and " even in those instances it cannot be said that scopolamin caused it."

A nurse measured the duration of all pains by holding one hand over the abdomen, while keeping time by the watch. " Only by such a test can a definite opinion be formed."

He found that when the patient still complained about suffering, in spite of being in a state of Twilight Sleep, the co-operation of the abdominal muscles was considerably greater.

" Toward the end of the birth period the patient often has to be energetically urged to co-operate. It might be supposed, in a case where the head takes long in passage, because of lack of co-operation on the mother's part, that there would be indication for the use of forceps because of danger to the infant's life, yet among our fifty cases we had only *one* such case.

" The violent hemorrhages ascribed by others to scopolamin were not observed by us. In thirty-five instances there was a loss of blood up to 500 g. In no instance did we have to use tampons."

I want to draw your especial attention to the following statement of Mayer, as I believe it to be of great importance.

"We noticed a greater loss of blood in the cases where, because of the rapid expulsion, the first injection had only just been made. Where the scopolamin had been acting for some time the blood loss was less."

Of the side-effects, Mayer says that sometimes the patient became excited by scopolamin, and wrestled with the nurse, who was trying to protect the perineum from tearing, so that it was impossible to guarantee complete asepsis (exemption from blood-poisoning or disease germs).

He had one case where the woman showed strong idiosyncrasy for the drug, and behaved madly after ·0005 g. scopolamin had been injected within three-and-a-half hours—a very small dose. She was in a deep Twilight Sleep, and in spite of having to be held by several persons during birth, half an hour after birth she came to and did not know she had become a mother.

Another disagreeable feature noticed by him was painful thirst. "Often the only word uttered by patients who awaken during pains is 'water,' which they repeat over and over." He had only two cases of moderate vomiting.

No after-effects lasting until the following day were ever observed.

There were three oligopnoeic children, and Mayer describes their condition as follows:—"The children appeared rosy and fresh, their heart beat somewhat slowly, but they did not cry, the breath was so superficial that no respiratory movement could be seen; once in a while they opened their eyes. This condition need not create any anxiety in the spectator, as perhaps a minute or two later normal breathing sets in."

In the case of these children Twilight Sleep had had to be attained in from three-and-a-half to twelve hours.

There was one apnoeic child (that is to say, a deepened state of oligopnoea). In this birth—one of difficult extraction—·0016 g. sco. + ·02 g. mor. had been given within six hours. "This case," says Mayer, "characterises the nar-

cotic effect of large doses of scopolamin upon the child's breathing centre."

As Gauss has pointed out, an oligopnoeic child always indicates a miscalculated overdosing of the mother. As the technique of the doctor improves the per cent. of oligopnoea is correspondingly lowered.

In Mayer's cases 45 children (90%) were lively, and no abnormal behaviour on the part of the babies, during their first days of life, was observed.

To make a *résumé* of Mayer's 50 cases: In 23 he obtained complete Twilight Sleep; in 21 hypalgesia; in 6 cases no effect.

He explains his high per cent. of hypalgesia (partial painlessness), by saying: "In these cases we tried to obtain results with as small doses as possible, also in many instances the period of expulsion was so short it was impossible to make the repeated injections necessary for attaining a state of Twilight Sleep."

Mayer agrees with many others that the use of the drug in obstetrics can only be carried out in clinics when there is continuous superintendence of the patients by doctors.

He ends thus: "We may describe the method as a very remarkable attempt to lessen the suffering of women at birth, and we must fully recognise the merit of those who have taken great pains to develop Twilight Sleep, but we are, however, of the opinion that the scopolamin-morphine method does not quite attain its object, viz.: the reduction or abolition of pain at birth, and that the application of the injections is bound by too narrow time limits."

After having attained complete Twilight Sleep in 23 cases and lessened pain in 21 (making 44 cases of reduced pain in 50 births), it seems rather inconsistent for Mayer to then say the method fails in its object of lessening pain.

"The disagreeable side-effects," of which Mayer had so few to relate, he considers "against the method's unreserved recommendation."

He concludes his report by announcing that he has a new method on which he will report very soon!

In spite of Mayer's final opinion one cannot but feel that his small record must be placed on the credit side of the scopolamin-morphine annals.

MANSFELD [1]

O. Mansfeld, of Budapest, studied the use of scopolamin at the Freiburg Frauenklinik, and it is pleasant to remember that the method of painless childbirth is to-day permanently established in the Budapest hospital.

Mansfeld feels that one cannot gain a clear idea of the technique of this method from Gauss' publications; personal study is necessary.

He gives a very clear and detailed account of his manner of dosage which I will reproduce in the hope that it may be helpful to other experimenters.

"First injection: ·00045 g. sco. + ·01 g. mor. if spontaneous process of birth is to be expected, and vigorous labour occurs every five minutes. Second injection: ·0003 g. scopolamin one hour later, using the memory test after a half hour. If, after a further thirty to sixty minutes, no amnesia has occurred, a third injection is to be given one-and-a-half hours after second injection. The narcotising effect of second injection will not take place for a half hour, and, therefore, cannot be noticed before one hour has passed; the memory test, used before the third injection, gives information as to the patient's condition a half hour previous."

He especially draws attention to the fact that Gauss does not wish to attain painlessness *and* amnesia, but only amnesia. Actual painlessness is only obtained by over-dosing, and must, therefore, be regarded as dangerous.

"Conducting a Twilight Sleep is very difficult, and requires care and constant control, and can, therefore, only be carried out in special wards."

He found the birth process to be protracted by the use of scopolamin-morphine, because of its decreasing the

[1] *Vienna Clinical Weekly.* No. 1, 1908. Pp. 17-19.

abdominal action, " but without, however, necessitating any operative interference.

" The actual value of the method consists in attaining amnesia. The practical value consists in the promise which can be given anxious patients, that they will remember nothing whatever about the birth afterward."

MATWJEJEW [1]

The succinct account of Dr. G. T. Matwjejew's experiments in Moscow makes one wish to know more of this cheerful Russian gentleman.

His results were altogether delightful.

Dr. Matwjejew insists that " scopolamin does not prolong birth; on the contrary, it often stimulates the pains of labour.

" The suffering of mother decreases, often disappearing altogether. No kind of side-effects were ever observed."

He disposes of the question of oligopnoea without waste of words: " Children often born asleep, but pulse and respiration normal. They wake up after a while spontaneously."

Dr. Matwjejew goes into no details as to his technique or dosage, but his results are eloquent of a satisfactory and conscientious method.

I have in this chapter given condensations of all the reports contained in the German medical journals for the year 1908. One cannot but feel that during this year the cause of scopolamin-morphine strode forward with three-league boots.

The mothers owe a vast debt of gratitude to Hocheisen, for his report undoubtedly caused all carelessness of technique to be eliminated from the experiments which followed in other hospitals.

Even Steffen's honest failure had its beneficial effect, for it caused doctors to realise the importance of going to Freiburg for a careful study of the method, before understanding experiments of their own.

[1] From *Zentralblatt.* 1908.

But for the mistakes of 1907 we should not have had the successes of 1908.

The most interesting and convincing thing about the reports of this year is that two of these records came from the hospitals of Stüttgart and Budapest, where now, after six years, the Twilight Sleep is still a treasured institution.

CHAPTER XI

THE SINGULAR METAMORPHOSIS OF SCOPOLAMIN IN SURGERY

I AM sure that all those unfortunates who have had surgical operations retain in their memory the following especially dreadful impressions of the beginning and the end: the horror of the placing of the cone over the face, the sense of suffocation combined with the mental distress of the early stage of an inhalation narcosis, then the coming to after the operation with the extreme pain which so often has to be lessened by morphine, and the wretched nausea which frequently results in racking vomiting.

If these features could be eliminated, I believe many of us would face the operating table with far more courage; that they can be avoided is proven by the following reports, and scopolamin is again the magic.

It is a most singular thing to find here the same loudly-denounced "poison" used in operations in the same manner and the same combination in which it is employed in childbirth, and now find only its praises being sung as a "most humane and valuable drug."

We prepare ourselves to hear all the old familiar list of "side-effects"—red face, increase of pulse, deleterious effect upon the heart and respiration, and vomiting of patient—but instead we suddenly find all these concomitant effects of scopolamin injections vanishing from the scene. We ask ourselves: Is it possible that this is the same evil chemical of which we have heard so much abuse—this benign drug which we now find recommended over and over as a *preventive* of vomiting?"

The question arises in our minds, and will not be laid: "Why is scopolamin such a poison when used for the relief

of women in childbirth, and such a harmless and beneficent drug when employed in surgical operations ? "

The inconsistency must strike the most thoughtless among us.

We who are begging for the adoption of Twilight Sleep for ourselves and all our sister women in childbirth, must arm ourselves with positive knowledge on the subject of this drug on which all our hope of relief depends.

That is the reason I have spent months in collecting for you all the information to be got on the use of scopolamin —information which you might not be able to find yourselves, for I know that not one mother in a thousand ever has an opportunity of seeing a medical journal, and even if she has, she is generally too busy a person to spend time informing herself on questions which she believes belong only to the field of her family doctor.

You may think I am putting you to unnecessary trouble when I place before you the records of scopolamin in surgery, and beg you to read them with the greatest care, but my reason is this : I want to prove to you that scopolamin is *not* the dangerous drug which some of the physicians have recently been declaring it to be—nowhere is that fact so proven as in the history of its use in surgical operations.

It seems especially appropriate to touch on this phase of the subject here, as many of the reports of 1909 deal with the use of scopolamin in mixed narcosis for gynaecological and other operations.

In this chapter I shall gather together the important European reports of the years extending from 1908 to 1914.

We first find Dr. Boesch [1] declaring : " We agree with Dr. Krönig that scopolamin is one of the most humane and valuable drugs."

Dr. Boesch is the assistant at the Woman's Hospital of Basel.

He continues : " The experience of our hospital has made us fast friends of scopolamin-morphine.

[1] *The Value of Scopolamin-morphine in Gynaecology.* By Dr. Eugen Boesch. No. 4. *Zentralblatt.* 1908.

"Aside from our use of it in childbirth, scopolamin-morphine has been employed in 2,000 operations in our clinic without any bad symptoms being evidenced by the patients.

"Before every narcosis—chloroform, ether, oxygen—scopolamin-morphine has been given on principle ever since 1905.

"For the past two years we have also used it alone in minor operations such as enlargements, incisions, and operations under local anaesthesia.

"For one year on the eve of all large operations our patients receive first 1 gram. of veronal, which causes them to fall into deep, invigorating sleep, then with the effects of veronal, the later administered scopolamin-morphine combine in a most favourable manner, causing the narcosis to take better effect.

"One hour before the operation we give a hypodermic injection of ·005 g. sco. + ·015 g. mor., and induce an immediate strong desire to sleep, thus lessening the excitability of the reflexes.

"It is always possible to merge a scopolamin-morphine Dämmerschlaf without interruption—by chloroform, ether, oxygen—to the stage of deep narcosis.

"After the scopolamin-morphine injection the patients sleep quietly, agitation is spared, and they do not realise when the anaesthetic is administered, the general narcosis creeping gradually upon them. With this method we need to employ much less chloroform and ether, which is a very important point.

"The Dämmerschlaf lasts long, extending over a period after the operation. When the patient awakens the first pain of the wound is much less than under ordinary narcosis; they also vomit rarely, but should there be any vomiting it is without effort and evil effect."

There are two very interesting reports from France.

Leon Durand[1] finds scopolamin of the greatest benefit in infantile surgery.

"It here has the same advantage it shows in operations

[1] *Zentralblatt*, 1908.

upon patients of mature age, viz. : suppression of the fear of operation, diminishing of the danger of syncope, reducing the necessary chloroform to very small quantities, inducing quietude, etc."—now read with especial attention—" there is no vomiting, no dilation of the pupils, no contraction of the abdomen, and lessened loss of blood."

These last sentences would seem to explode several well-established prejudices.

As for his dose, Durand gives it as 1·2 mg. sco. + 1·2 cg. mor.

" The most favourable moment for operating is from one to one-and-a-half hours after the injection."

Louis Dumont[1] finds that scopolamin injections render anaesthetising more easy and " ensures absence of complications and vomiting."

The results of this mixed narcosis he found " far superior to those obtained by use of chloroform or ether alone, or in combination with chlorathyl.

" The usual agitation preceding chloroform is suppressed by scopolamin ; it also prevents syncope at the beginning of narcosis."

One of the greatest advantages he states to be " painlessness after the operation ; morphine rarely has to then be used.

" They sleep for five or six hours after operation, and then awake without showing the toxical dyspnoea " (difficult breathing) " of chloroformised patients.

" Vomiting during operation never occurs ; if it happens afterward it is neither violent nor long lasting.

" In over 300 scopolamin-morphine mixed narcoses, only 43 per cent. even showed nausea.

" Artificial emptying of the bladder after operation was never necessary. No albumen was ever shown to be present in the urine. The quantity of urine was always above normal.

" Even after heavy operations patients may be given liquid nourishment on the fourth or fifth day, whereas after

[1] *Zentralblatt.* 1908.

use of chloroform alone, it is generally necessary, in like cases, to wait until the eighth day for fear of vomiting.

" In cases of debility or of aged patients, the scopolamin is by far preferable. In all our cases of scopolamin-morphine narcosis there have been no deaths."

Dr. G. Blisniansky,[1] assistant at the Royal University Frauenklinik, of Tübingen, in Würtemburg, reports on 32 cases in which she employed scopolamin-morphine on patients ranging in age from twenty-five to fifty-two years.

One case was complicated by extreme anæmia, three had heart disease, three tuberculous affection of the lung, and there were two patients with pronounced hysteria. These patients only required minor operations.

" At from one-half to one hour before operation we injected separate solutions of 3 dmg. sco. + 1 cg. mor. In three-fourths of our cases we obtained hypalgesia, in the remainder amnesia. When in rare cases the temperature rose, it was not the fault of scopolamin, as it was afterwards found to denote the beginning of a complication.

" No influence by scopolamin upon the pulse takes place."

The most amazing statement made by Dr. Blisniansky is that nearly all patients got up within twenty-four hours after operations.

From British doctors we have equally good reports.

Leedham Greene[2] says the advantage of scopolamin-morphine injections before inducing general narcosis are :

" Much less chloroform and ether will then be required.

" Patients sleep quietly for several hours after operation.

" Scarcely any vomiting after operation.

" The method is less risky than narcosis without scopolamin-morphine, and superior to analgesia of the spine."

[1] *Zentralbl. f. Gynäk.* Liepzig. 1909. XXXIII. Pp. 301-306.

[2] At the 77th Annual Meeting of the British Med. Asso., Belfast, 1909. *Brit. Med. Journ.* 1909. II.

H. Torrance Thompson and Dennis Cotterill[1] find the advantages of this method to be :

(1) As patients are calmed and have no fear, shock is avoided during operation.

(2) Because of the action of scopolamin upon the salivary glands there is a beneficial lessening of the secretion of saliva during narcosis.

(3) The quantity of chloroform or ether necessary to induce narcosis is very small.

(4) Vomiting during or after operation becomes rare, and is never serious.

(5) After operation the patient usually enjoys a good sleep.

P. Sick,[2] of Leipsic, points out that aside from eliminating the danger of having to use large quantities of chloroform, scopolamin-morphine " secures an unlimited field of usefulness to ether, which can be reduced to one-third its usual quantity ; thus we need not fear the usual irritating effect of ether upon the lungs.

" The amount of scopolamin may be increased—adapting the dose to individual and case—without danger, but the morphine should be limited to its smallest effective quantity, and should only be given with the last injection of scopolamin half an hour before the operation, in quantity of ·01 g.

" If the doses are properly proportioned this combined narcosis takes first place among all methods, not only on account of its harmlessness and its scope of action, but also on account of the humane manner in which it takes effect.

" When given in proper proportions and combinations, these several chemically different narcotics acting upon different systems of the organism, permit narcosis to be obtained with the lowest individual doses, and for that reason the least danger is incurred both during and after operation."

[1] *Edinburgh Medical Journal*, December, 1909. n.s. III. Pp. 548-554.

[2] *German Med. Weekly*, 1910.

Edv. A. Bjorkenheim,[1] of Helsingfors, Finland, finds, when using scopolamin-morphine before chloroform in gynaecological operations that " the course of narcosis is quiet and undisturbed, the sleep begins calmly, and the patient displays no agitation. During narcosis there is never vomiting, and if there is any after operation it is only slight."

Dr. Gauss, in the 1911 address at Karlsruhe,[2] in speaking of the use of scopolamin-morphine in surgery, says: " Since ether was introduced for narcosis by Jackson and Morton in 1864-7, and chloroform by Simpson, the medical body, while conducting a never-ending controversy as to which of these drugs is better, have nevertheless agreed upon one point—that is, that in both methods death, and undesirable accessory effects, occur which cannot always be avoided.

" This fact was the basis of the endeavour to reduce the danger of general narcosis by preliminary injections of scopolamin and morphine. The specific action of scopolamin-morphine as a narcotic was first recognised and tested by Schneiderlin and Korff, in Freiburg, in 1900. They started from the idea that a combination of the two alkaloids must be a particularly happy one, as anaesthetic and hypnotic effects are common to both, while their remaining properties are, almost without exception, antagonistic.

" It was consequently to be expected that a summation of the desired narcotic action would be accompanied by a simultaneous diminution of danger.

" As a matter of fact, recent laboratory researches have made it appear that in scopolamin-morphine we have not, as was formerly believed, two independent substances acting in conjunction, but a new combination which acts in a completely different way from its individual components.

" In addition to the improvement of the narcotic action by this combination, a number of additional advantages are to be observed, these are reduction of secretion of

[1] *Zentralblatt.* 1911.

[2] At Conference of German Naturalists and Doctors.

saliva, diminution of nausea, and the abolition of the subjective unpleasantness which accompany the initial stages of every inhalation narcosis—terror and suffocation.

"Used as a preparatory action to an inhalation narcosis, surgeons soon found a new application for scopolamin-morphine.

"All authors reporting on these experiments unanimously remark that in addition to the advantages of making a humane narcosis possible, one fact was striking—a reduction in the amount of inhalation narcotic used.

"This reduction in the necessary ether or chloroform must simultaneously cause a reduction in the risk."

The latest and most important recommendation which scopolamin in surgery has had is from Rupert Blue, M.D., Ph.D., Surgeon-General of the U.S. Public Health Service.

In a most timely article on "Surgery in Modern Warfare" [1] he says:—

"It is likely that the French and Germans in their field and base hospitals are using, when amputations have to be made, such special pain-deadeners as 'novocaine' and 'scopolamin,' which are injected in the spinal canal. These have the advantage that they do not leave a man helpless for many hours after operation."

It will here be interesting to give the results which I have gathered from an investigation of statistics for deaths under anaesthesia in major operations.

Chloroform 1 in 2,060 cases.
Ether 1 ,, 5,930 ,,
Scopolamin 1 ,, 4,762 ,,

The ether statistics should be corrected by statistics for deaths in ether-pneumonia, for these statistics only deal with deaths during operations. By adding the ether-pneumonia deaths, the ether death-rate would be greatly increased. This would probably then give scopolamin the lowest death-rate.

I now want to introduce this remarkable scopolamin to

[1] Copyright 1914, in U.S.A., by Perry Mason Co.

you in still another guise—as the saviour of patients with the morphine habit.

This report of Fromme's [1] is a particularly interesting contribution to scopolamin's good character, for it goes far to prove the harmlessness of repeated injections, a fact which Gauss has already claimed. Both Gauss and Fromme believe scopolamin to have no degenerating effect upon the organism.

In proving his faith in the safety of a prolonged scopolamin narcosis, Fromme outdoes all the obstetricians and surgeons ; he actually keeps his patients under the influence of scopolamin for *eight* days !

By this method the morphine habit can be cured without the usual accompanying tortures of abstinence.

He first gives from 2 mg. up to 1½ cg. scopolamin through the mouth, gradually afterwards reducing the dose to a minimum. At the same time he gives morphine in combination with stimulants of the nerves and stomach.

While withdrawing the morphine he keeps the patient in a narcotised condition by *injections* of scopolamin given every four or five hours.

The scopolamin then acts in combination with the morphine still stored in the tissues of the patient. When all morphine has eventually been entirely excreted, and the symptoms of abstinence have disappeared, then scopolamin is discontinued without any evil effects.

The narcosis is never so deep that the patient neglects to attend to his bodily functions.

In reviewing these accounts of the use of scopolamin in surgery the strongest impressions left are :

(1) The patient is spared agitation and distress beforehand.
(2) Painlessness after operation.
(3) Avoidance of shock from operation.
(4) The " lessened danger " of narcosis.
(5) The diminished tendency to vomiting.[2]

[1] *Curing the Morphine Habit by Scopolamin.* By Arnold Fromme ; *Berlin Klin. Wochenschrift.* 1912.

[2] Weingarten, in his *Inaugural Dissertation* (1904), in reporting on

The first three are also characteristics claimed by Gauss for his Twilight Sleep, and attested to by every mother with whom I have spoken.

The last two points are interesting, as being in direct opposition to the accounts of the effect of scopolamin in childbirth given by the opposers of the Gauss method.

Keep in mind this important fact, of which Gauss has reminded us, that the surgical dose is often ·0036 g. sco. +·03 g. mor., administered within three hours, and then recall the *small fraction* of this dose spread over a much longer period employed in childbirth. The significance of these surgical reports on the harmlessness and advantages of scopolamin then gain all the greater weight.

"Away with this incalculable, useless and dangerous poison!" exclaims Elek Avarffy,[1] of Budapest, when scopolamin is employed in *childbirth*.

"Scopolamin is one of the most humane and valuable drugs," says Eugen Boesch, when scopolamin is employed in *surgery*.

Is scopolamin, then, the Dr. Jekell and Mr. Hyde of medicine?

his experiments with scopolamin in childbirth at Geissen declares: "Injections never caused vomiting; on the contrary, they stop vomiting."

[1] *Gynaecological Review.* 1909.

CHAPTER XII

HOW DOES TWILIGHT SLEEP AFFECT THE CHILD?

THE first question every mother asked when the scopolamin-morphine method has been mentioned is: "But is it safe for the baby?"

This has conclusively proven to me that no mother thinks first of her own comfort.

A woman may be a coward where pain is concerned; she may be selfish in daily life, but when it comes to the supreme test of relief of suffering at birth she will accept no method of painlessness if she believes it involves injury to her child.

Dr. Max Salzberger, of Kulm, has endeavoured to answer this question by assembling much material gathered from various statistical sources on the subject.

To Dr. Salzberger's paper [1] I shall add the additional evidence of many other physicians' opinions on this most important phase of painless childbirth.

Dr. Salzberger begins by saying: "Now a sufficiently large number of patients have been observed by obstetricians to prove positively that Twilight Sleep, when properly conducted, is without danger to the mother, so there only now remains to deal with the statements of antagonists in regard to the injurious effects of scopolamin upon the child. According to these opponents, the mortality of children during and after birth is increased. Further injurious effects are claimed to be caused by decrease of the milk secretion of mothers, and still furthermore the unfavourably influenced later development of the child."

Before beginning to prove by practical investigation

[1] *On Danger to Child from Scopolamin-morphine.* Published in 1910. (Breslau.)

the harmlessness of scopolamin in relation to the child, Salzberger feels he must first put the question, whether it is theoretically possible to ascertain any influence upon the child by scopolamin administered to the mother?

Holzbach's researches have proven the amount of scopolamin transmitted to the child to be trifling, and these physiological tests have, moreover, proven the drug to be excreted by the child's kidneys within fifteen minutes after birth.

Salzberger lays great stress on the necessity for severely separating asphyxia from oligopnoea, as asphyxia must be ascribed to other causes than scopolamin. "This positive division between oligopnoea and apnoea on the one hand, and asphyxia on the other, is not made by all writers, and thereby comparative statistics of the effect of scopolamin on the child are rendered very difficult.

"This division is urgently necessary, because while the quickly excreted scopolamin may be harmless, asphyxia is always dangerous and threatening to the life of the child.

"Only when the mother has received an overdose of scopolamin can the apnoeic condition of the child be alarming. In that case even the rapid excretion of scopolamin may not prevent the serious intoxication of child. The necessity for physicians to faithfully adhere to the Gauss system of dosage is, therefore, all the greater, and it is especially imperative that they adhere to the memory test, especially as there is as yet no other reliable indication for the guidance of the doctor in calculating the proper doses.

"As an overdosing of the mother can always be avoided by proper care, we need not consider this question.

"If the child is born within two hours of the last injection of mother, it is sometimes born oligopnoeic; if it is born later it is in most cases lively, even although it has received neither more nor less scopolamin than if it had been born earlier; this proves that coincidence and accident create a large margin of possibilities.

"Only could asphyxia ever be proven to be due to scopolamin where it can also be proven that the injections caused

an abnormal lengthening of the birth. For this, statistics would have to be kept of asphyxiated children born both with and without scopolamin injections; only by this method of procedure could it be proven that the number of children born in an asphyxiated condition with scopolamin is superior to those born outside Twilight Sleep."

The reports of Steinbüchel, Wartapetian, Weingarten, Hocheisen and Steffen point out a lengthening of the period of birth, but there are more on the other side who declare scopolamin does not prolong the birth period, some even declaring that the birth process is accelerated, and, as Salzberger says, the variation in the doses employed by almost all physicians shows a new difficulty in the way of obtaining comparative statistics, for the various symptoms caused by scopolamin present entirely different aspects in different doses.

" Puschnig states that he has never observed any such great intoxication of the child as has been observed by Hocheisen. Bass only found some children tired and sleepy. So we see the great difficulty in arriving at any positive opinion on how far even prolongation of birth is responsible for the condition of the child.

" The statistics compiled from scientific literature give us the total percentage of still-born children as 1·3 per cent. Of these still-born infants only one can be ascribed to scopolamin; that is the case described by Hocheisen: ' Fifteen minutes after injection the heart sounds of the child varied and finally stopped.'

" Among 2,130 scopolamin cases only 1·1 per cent. died up to the third day after birth. Two of these were ascribed by the writers to scopolamin. One of these children dying suddenly from heart collapse was reported by Bass; the other is mentioned by Gminder as dying from asphyxiation caused by the narcosis, the reflex movements were lacking, and death occurred within a few hours. This latter was a very protracted birth, and it is difficult for Gminder to prove that scopolamin was even indirectly the cause of death.

" If we assume in these two cases intoxication by sco-

polamin—which, by the way, is not at all definitely proven —it is seen from this part of our statistics that even counting these two deaths scopolamin does not unfavourably influence the percentage in the total mortality of children.

" In 2,081 cases, the number of both oligopnoea and asphyxia is found to be 23·9 per cent., and the data on which these statistics are based is not uniform. The older statements as to the action of scopolamin upon the child deal only with the first groping experiments made under this narcosis—experiments of the most varied and unfavourable character. With the introduction of exact instructions as to the dose by Gauss, the failures in Twilight Sleep became rarer, and the reports subsequently more uniform and, therefore, more easily to be compared with one another.

" Even in the same hospitals statistics were quickly altered in favour of the method. In one clinic, for example, among the first series of births the percentage of oligopnoeic children was 23·5 per cent. in the last series of 120 children only 7 were oligopnoeic."

The Gauss statistics, Salzberger regards as proving conclusively that scopolamin does not affect the milk supply. This is the more remarkable, when we remember that scopolamin is closely related to atropine.

Kuenzer's statistics also coincide with those of Gauss. In 223 cases, which Dr. Kuenzer treated with scopolamin, 77·1 per cent. were able to suckle their children ; in 121, confined without injections, only 66·9 per cent. had milk. Preller and Lehmann both testify that there is no disarrangement of the lactation.

" This surprising effect of scopolamin upon the increase of mothers' milk," says Salzberger, " may be explained by the fact that the condition of the mother after a Twilight Sleep birth is so much better. She is able to get up sooner, and this alone would exercise a very stimulating effect upon the lactation. That there is a stimulation of the milk secretion by scopolamin has been pointed out by both Kuenzer and Jüsgen. Among Kuenzer's 223 scopolamin patients, 47·5 per cent. got up before the third day. Only

Hocheisen and Bass have observed that the children nursed indifferently, showing a disposition to fall asleep before being satisfied, during the first few days. This prolonged toxical effect has never been observed by other writers. Even without scopolamin, mothers often state that their infants are generally drowsy, and fall asleep before they finish suckling.

"Other writers cannot confirm Hocheisen's suspicion that the drug will have an injurious effect upon the child's later mental and bodily development. Gminder found no evidence of disturbance during the ten days the children remained at the hospital. Puschnig also declares there is no effect on the first stages of development.

"Among 500 scopolamin children, born between 1905 and 1907, I have made inquiries among the mothers, and received 318 answers, which show that only 7 children (1·4%) died during the first nine days. Of these 318 children, 285 (89·7%) were still living after one year; 102 had not yet reached a year's age, and of those 92 were still alive. These figures prove that scopolamin administered to the mother has no injurious effect on the health of the child during the first year."

Salzberger even investigated the respective doses given the mothers in those cases where the children died within the first year, and found the injections averaged ·00126 g. scopolamin. The mothers of children still living after one year had received *more* scopolamin—at an average ·00131 g. Therefore, scopolamin cannot be accused. Furthermore, there were no symptoms shown by the children who died which could point to toxic effect of the drugs.

"A *résumé* of these observations and statistics gives the results that scopolamin, when properly administered, harbours no danger to the health and development of the child."

Salzberger's very fair and judicial paper only proves to my mind that as yet nothing has been positively proven one way or the other on this subject, although the preponderance of evidence is in favour of scopolamin.

Final proof must be lacking until statistics are very differently compiled.

First : separate statistics of asphyxia on the one hand, and oligopnoea on the other, must be provided. Second : statistics should be kept of the results of various physicians employing the same dose, as it has been shown that dosage has everything to do with the effect on the mother as well as on the child.

Until such uniform data is forthcoming we have only the personal opinions of doctors based on their individual experiments, variously conducted, on which to depend.

As, however, the consensus of personal opinion, even under such varying technique, is to the credit of scopolamin, and even the unsatisfactory statistics agree with these opinions, it would certainly seem safe to say that as yet it is entirely *unproved* that scopolamin is injurious to the child.

Here are the opinions of many doctors.

Bruno Bosse, of Berlin :

" This method does not cause mental stunting of the children."

J. Fonyo, of Budapest :

" For the child scopolamin is not dangerous if correct technique is observed."

Josué A. Beruti, of Buenos Aires :

" There is no injury to the child's organism from scopolamin."

J. R. Freeland (University of Pennsylvania, L.M.), and Bethel A. H. Solomons, M.B. (University of Dublin, L.M.), in a joint paper, conclude :

" No ill effects to mother or child need be expected to follow the rational administration of scopolamin."

Dietschy, of Bâle :

" Children take the breast after scopolamin like any others."

Mayer, of Marburg :

" No subsequent effect upon the child was observed."

F. N. Iljin, of Petrograd :

" All mothers and children left the clinic absolutely sound."

Preller, of Mannheim :

" If children are left alone they will sleep off intoxication. No lasting injuries to children were observed, and they develop well."

Pisarewsky (Polish *Monthly Journal for Gynaecology and Obstetrics*, 1905) :

" Children are born fresh and lively."

Von Herff, of Bâle :

" Children never exhibited serious symptoms after scopolamin."

Cremer (*Medical Quarterly Review*, 1908) :

" Children are never asphyxiated by scopolamin."

W. A. Brodski, of Moscow :

" If correctly administered scopolamin is entirely harmless to mother and child."

R. C. Buist, of Dundee :

" The description of the attitude and behaviour of the infant with its readiness to sleep, and superficial respiration, does not suggest any marked departure from the normal."

Kleinertz, of Stüttgart :

" Most of the children were vigorous and hearty. No child died as a consequence of the injections. Neither was any deleterious effect on the later development of children observed."

Frigyesi, of Budapest :

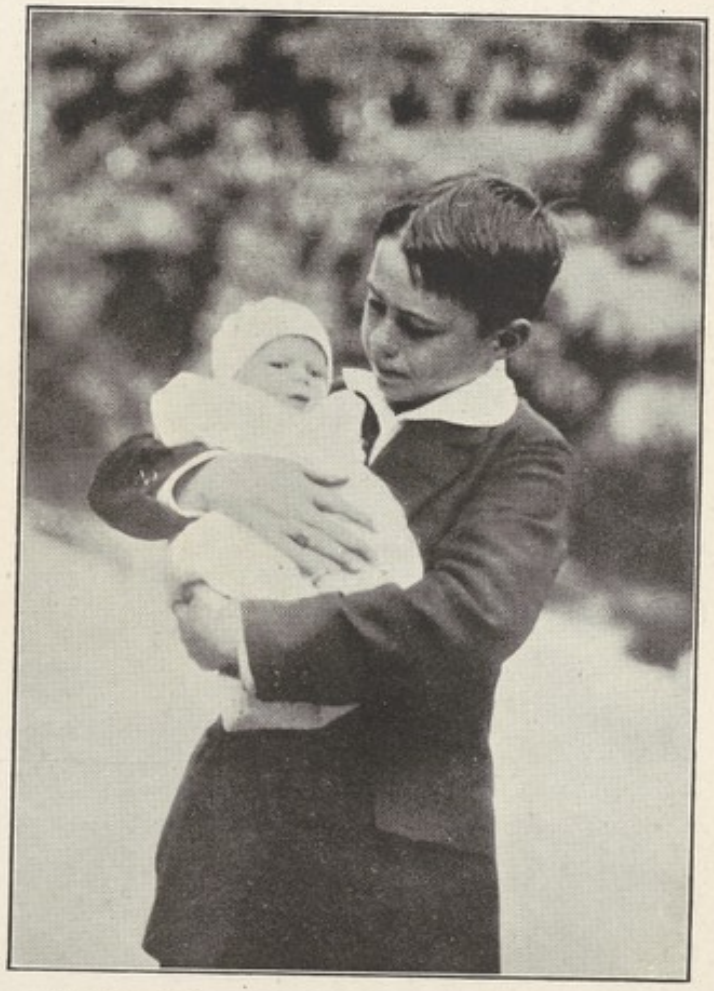
" The injections never caused the death of a single child. Accurate investigations were made on the reduction of milk, the amount of food taken by the children and their weight. These investigations brought to light nothing to the disadvantage of the method."

At a meeting of the British Medical Association, held at Sheffield in 1908, Dr. Bernhardt Krönig[1] explained the strikingly small mortality of children both before and after birth in Twilight Sleep as being due to the fact " that the moderate inactivity which is produced in the respiratory centre during birth, by very small quantities of scopolamin, is of advantage to the child ; the child is made a bit drowsy

[1] *British Med. Journal*, 1908, Vol. II.

and this drowsiness prevents it from premature intra-uterine" (before birth) "respiration. The air passages remain free, and in cases of slight asphyxia, for example, prompter and more certain revival is to be expected."

A PAINLESS CHILDBIRTH BOY BORN IN THE FREE WARD OF A MATERNITY HOSPITAL.



A TWILIGHT SLEEP BABY THAT LIVES IN SPAIN.

CHAPTER XIII

REPORTS FROM HUNGARY, THE ARGENTINE, RUSSIA, ENGLAND AND GERMANY

THE day of violent opposition to Twilight Sleep seems to have ended abruptly.

In the reports of 1909–11 one searches in vain for a repetition of the picturesque fury of Bumm and Hocheisen or the failure of Steffen.

The reports are, nevertheless, full of interest—greater interest, in fact, for they continually add more convincing evidence that even with the greatest variation in its manner of application, Twilight Sleep can positively guarantee to women a sure and safe respite from the agony of child-birth.

" Never before have I seen so many grateful and smiling faces in the lying-in wards as from and after the first day of the introduction of Twilight Sleep. Even the mere explanation of the action of scopolamin-morphine has a most cheering effect upon the mothers-to-be."

With these words Frigyesi,[1] of the Second Budapest Woman's Hospital, opens his report on 200 cases conducted with close observance of the Gauss rules.

In 80·7 per cent. of his cases complete amnesia was attained. In the others there was reduction of pain without amnesia.

" On the whole, no prolongation of the total time of birth was noticeable, in spite of the fact that in 11 per cent. of cases labour became weaker. In only 4 cases was the straining action inhibited.

" Operative frequency was 5½ per cent., and even when

[1] Gynaecological Society of Dresden. May, 1909, and Gesellsch d Aerzte, 1908. Budapest, 1909. 19-22.

taking the severest view of it, only 4 per cent. of these could be attributed to scopolamin.

" The post-natal period was unaffected.

" Fifteen per cent. of the children were oligopnoeic; none of them died. Two per cent. of them were born with asphyxia, but with these cases scopolamin certainly had nothing to do.

" Acceleration of pulse never occurred to such a degree that Twilight Sleep had to be broken off.

" I warn against the employment of scopolamin-morphine in private practice without sufficient experience.

" If the right dose is given there is no injurious effect on either mother or child, and for this reason I believe the Twilight Sleep to be the most valuable of all methods."

High words of praise these, certainly.

From the far Argentine comes a report on 600 scopolamin births conducted by Dr. Josué A. Beruti,[1] of Buenos Aires.

Dr. Beruti attained perfect success in 65 per cent. of his cases; partial success in 21·83 per cent., and no effect in 12·16 per cent.

" I observed no danger or injury to the mother or essential influence upon the process of birth. I furthermore declare there is no injury to the child's organism by scopolamin."

At the 11th Pirogow Congress of Doctors held at St. Petersburg (Petrograd) in 1910, several Russian physicians reported on their experiences with the Twilight Sleep.[2]

F. N. Iljin, of the Imperial Obstetrical and Gynaecological Institute, had observed 67 cases of scopolamin-morphine births.

Dr. Iljin carefully carried out the Gauss memory test, and, according to the results of this, gauged his third injection of scopolamin.

[1] *The Medical Clinic.* 1909.

[2] From *Central Journal for Gynaecology.* Leipsiz, 1910; and the Report from the Obstetrical and Gynaecological Section of the 11th Russian Congress of Doctors.

" My first injection in case of a first child, is given when the os is distended to about three fingers in width. In other cases the injection is given when the opening of os is two fingers and labour well established."

Dr. Iljin's doses are stated to be as follows: First injection ·0003 g. scopolamin and ·01 g. morphine injected separately. After one hour ·00015 g. or ·0003 g. scopolamin is used without morphine. In 38 instances he injected a total of ·00165 g. scopolamin.

In 60 per cent. complete amnesia was attained. " Many mothers knew nothing whatever of the birth process."

In 40 cases he observed a weakening of the labour. One case of delirium and 4 cases of hallucinations. Vomiting in 3 cases and thirst in all cases.

No irregularity or acceleration of the pulse was observed.

In one case twins were born by aid of the forceps. Only 1 case of asphyxiated child.

He reports the after-birth period and childbed to be normal.

" All mothers and children on leaving the clinic were absolutely sound.

" The use of this method necessitates experience, as the narcosis must be *individualised* to a great extent.

" On the base of my observations," says Dr. Iljin, " I have come to favourable conclusions:

" Scopolamin-morphine renders birth painless."

Dr. W. A. Brodski, of Moscow, conducted 200 cases, among which were 28 women of narrow pelvis.

" The narcosis had no influence upon the duration of birth; the strength and frequence of pains were unaltered.

" The duration of after-birth period averaged only twenty-five minutes.

" Only once a slight hemorrhage occurred."

In a few cases acceleration of pulse was observed. Red face and hallucinations in 15 per cent. of cases.

" There were 9 cases of forceps, 4 of these being due to narrow pelvis and 2 to eclampsy."

The children were all born alive; 6 cases of asphyxia, " 2 because of entanglement of cord around the neck."

He concludes: " If correctly administered scopolamin-morphine is entirely harmless to mother and child."

Dr. Abraszanow, of Poltawa, after 100 cases arrives at the decision that the narcosis is uncertain, but his deductions are not injurious to the cause, for he describes this uncertainty as follows:

" Part of the patients slept throughout " (which would indicate too deep a narcosis). " Some do not sleep, but realise no pain " (indicating a proper Twilight Sleep). " Others feel pain but not strongly "—all of which indicates an uncertain technique on the part of Dr. Abraszanow more than an uncertainty in the effect of the drugs themselves.

" The pupils are enlarged, the pulse accelerated and sometimes there is vomiting."

Dr. Abraszanow says in the end:

" My general impression of this narcosis is favourable."

AN ENGLISH REPORT

Dr. P. L. Guiseppi, M.D., F.R.C.S., Late Senior Medical Officer, Queen Charlotte's Lying-in Hospital, reports on 37 cases,[1] 26 of which were *primi parae* (that is, bearing children for the first time) and 11 were *multi parae* (mothers who had already borne other children).

Dr. Guiseppi finds that most of his patients fall asleep after the labour is completed; in many cases the patients forget altogether the little pain they have suffered, and when they awaken deny they have felt any pain whatever.

In regard to the after-effect on the child, he says:

" The child is said to be drowsy some hours after, but as most children sleep after birth, it is rather difficult to know how much truth there is in this assertion."

As an indication that scopolamin has no influence upon the child's development during its first weeks of life, Dr. Guiseppi says:

[1] *The Practitioner*, II. July, 1911.

"As far as this investigation has gone, there has been no effect on the curve of the gain in weight."

Of after-birth hemorrhages and atony (or want of tone and relaxation in the uterus), he remarks that "it is very doubtful if there are any such risks."

Writing of the effect on the labour, Guiseppi quotes Spencer Shell, who thinks labour is unaffected, and Newell (who is an American), who declares labour to be definitely shortened, while Ziffer's statistics are as follows: labour pains normal in 7 cases; increased in 18; excessive in 6 and not diminished in any case.

Dr. Guiseppi's conclusions in regard to Twilight Sleep are as follows:—

"(1) That the object of hyoscine (scopolamin)-morphine anaesthesia is not to produce complete unconsciousness, but to produce Twilight Sleep from which the patient can be roused at any moment without her retaining any recollection of what has happened in the meantime.

"(2) That in hyoscine-morphine anaesthesia we have efficient means of controlling pain and one that is practically safe when ordinary precautions are taken.

"(3) That there is danger to the child unless the foetal heart" (the heart of the yet unborn child) "is carefully auscultated" (listened for) "at frequent intervals.

"(4) That the course of labour is but slightly modified.

"(5) That the administration and repetition of the injections must be gauged by the amount of suffering."

(Dr. Guiseppi evidently omits the memory test.)

"(6) That the morphine should never be repeated but only the hyoscine.

"(7) That the solutions for injections must be freshly prepared for each patient.

"(8) That the best dose is $\frac{1}{100}$th of a grain of hyoscine hydrobromic + $\frac{1}{4}$ of a grain of morphine sulphate."

Dr. Guiseppi regards Twilight Sleep as a reliable method to give relief in labour, and says the amnesia attained through it makes it of especial advantage to exhausted and very sensitive patients.

Bruno Bosse,[1] of the Berliner Klinic, and Wladimir Eliasberg, in reporting on 250 cases, say : " Doctors must not be discouraged at first and should make the necessary preliminary studies. If in some cases there are eventual failures it is either due to the personal idiosyncrasy of patients to the drug, or there has been too long a delay on the part of the physician in giving the first injection."

Dr. Bosse employs scopolamin-morphine with equal success both in surgical operations and confinements.

" Only absolute weakness of labour is considered a counter indication. High fever and hemorrhage would not deter us from use of scopolamin."

Dr. Bosse is the only physician to sound the following warning and it may be well worth heeding :—

" A patient should not be treated with scopolamin-morphine on an empty stomach."

After reading in these reports " Memory test superfluous," we are not surprised to find that " deep sleep was attained in 30 per cent."

If the Twilight Sleep achieved by Drs. Bosse and Eliasberg was of so deep a nature it is all the more impressive to find them stating :

" Abdominal action was not influenced unfavourably, there was no psychalgia " (mental suffering), " no eclampsy ; the average length of birth was not greater, and dangerous side-effects were not observed. Labour remains good as the motor functions are not affected."

Bosse adds a personal statement to the effect : " I have never observed protraction of birth through use of this drug, although in cases of naturally protracted births I have had to employ many injections ; these have, however, never resulted in threatening symptoms."

Drs. Bosse and Eliasberg give a first injection of 3 cmg. sco. + 1 cg. mor. when pains are well established. Second injection after fifty minutes. Third half injection is given at from two and a half to three hours after the second.

[1] From *Collection of Klinical Lectures on Gynaecology*, 1910 ; and Report at Berlin Med. So. 1911.

In these 250 cases, operative interference was necessary in 11·4 per cent.

There was only one case of hallucinations and one case of complete unconsciousness with catatonic rigidity of one arm.

" Of subjective side-effects," says Bosse, " I have observed only thirst to exist.

" After birth hemorrhage was not more frequent than is usual."

Ninety-seven per cent. of the children were born alive. Of these 19 were slightly oligopnoeic; 8 children were born asphyxiated, but " efforts at restoring life were in all cases successful."

Both these physicians agree that " scopolamin does not cause mental stunting of the child," and Dr. Bosse ends by saying: " I conscientiously recommend the use of Twilight Sleep in obstetrical practice."

One of the most exhaustive papers written on scopolamin-morphine is that of Wilhelm Tichauer.[1]

Tichauer reviews, with comments, all the obstetrical reports obtainable on the subject; as all those reports are given in this book it is not worth while to quote this part of his dissertation; I shall only give his *résumé.*

" We must clearly distinguish between the two methods.

" One, that introduced by von Steinbüchel, endeavours to attain reduction or total abolition of suffering. As adherents of this method we must consider all those who simply continue the injections until pain is either reduced or done away with. In doing so, we must, to be sure, admit that many of them far exceed the dose administered by von Steinbüchel.

" The other method, which aims at alleviation of pain and amnesia, is the Twilight Sleep procedure described by Gauss, the principal characteristic of which is the testing of the powers of apperception.

" The records show that both methods attain their

[1] *Scopolamin-morphine in Obstetric Practice.* Inaugural Dissertation. Breslau. 1911.

object. Only a few patients are entirely unaffected by the injections. A large proportion of the negative results are due to the fact that the birth took place before the scopolamin-morphine had time to exert its action.

" The object is attained in the great majority of cases, so much is admitted even by opponents, and is, consequently beyond question. The only further question is what price is paid for it.

" Flushed face, headache, intense perspiration, are symptoms that need hardly be taken into account in comparison with the great alleviation of the suffering. Nausea also occurs at confinements when scopolamin is not used. Surgeons, who on other points are so frequently quoted by opponents of the method, state categorically that scopolamin-morphine does not cause the usual annoying sickness after narcosis.

" Maria Garca and Salvatore Diez, of the Turin Lying-in Hospital, even use the drug for hyperemesis " (extreme vomiting) " and that with invariable success.

" Restlessness, delirium with hallucinations, and twitchings (even on the assumption that these symptoms are really concomitant effects of scopolamin) look much worse than they are. This is the universal opinion, and is shared even by opponents, and in addition, such symptoms occur relatively seldom. To the patient *they do not matter in the least.*

" Only a few observers attribute to the drug an action on the heart and breathing, or the after-birth period, the lactation or the subsequent development of the child. Most of those who have used it deny the existence of such an action provided that correct dosage is conscientiously adhered to. The same is the case with regard to atonic hemorrhage. The investigations have not proved any action of that kind.

" The case of intoxication of the mother, observed by Gminder, can be laid to the charge of his procedure. Whether the case of the death of the mother reported by von Bardeleben should be ascribed to scopolamin is, in view of all the circumstances, extremely questionable.

" According to most of the authors the oligopnoea and asphyxia of the children give no grounds for anxiety.

" If, in the tables, the figures for the reduction of the birth pains and straining action occasionally appear somewhat high, this is due partly to the procedure employed, partly to the very severe standards of individual authors, and partly, also, to accompanying circumstances. Under the headings ' deterioration of the pains,' and ' deterioration of the straining action,' some authors include also those cases which show only very slight effect. Only thus can we explain the fact that in spite of high figures in these reports, the duration of birth is given as normal or only slightly prolonged. From the results given we are certainly entitled to say that at the worst the birth is only retarded to an inappreciable extent.

" Of the six cases in which scopolamin is said to have caused the deaths of children, three are stated to have been the indirect result of scopolamin. That scopolamin was really responsible for the deaths has not been proved beyond contention in any one of the cases. As we have seen from the accounts, another explanation can very well be given.

" Even if, in 3,929 births, scopolamin is accused of being guilty of the death of only one mother and six children (and these cases are open to doubt), scopolamin cannot be proven to be such a terrible poison after all.

" It must not be forgotten that in the use of new methods there are always failures at first, and in this case experimenters kept beginning again without reference to the experience already acquired, the various obstetricians not adhering to the rules which had been arrived at as the result of experience.

" A comparison of the two methods shows at once that Twilight Sleep, carried out in accordance with the rules laid down, gives considerably better results than von Steinbüchel's method ; while the latter method was not in itself injurious, the often extremely arbitrary variations of it which have been employed seem in fact really to have led to very injurious results.

" The Twilight Sleep method has not caused the death of a single child, and not one death of a mother has occurred which can be positively attributed to it.

" If some workers believe on theoretical grounds that they can dispense with the testing of apperception, a comparison of the tables will, for most people, be a proof of the contrary.

" It is clearly shown by them that scopolamin-morphine, as used in the form of Twilight Sleep, with precise observance of the rules laid down, is capable of attaining reduction of pain and amnesia without endangering either mother or child.

" One point, to be sure, must be again and again insisted upon. The medical man must be thoroughly familiar with the method, and must be able to observe the patient continuously, not so much on account of the great danger of scopolamin, as because otherwise the desired effects will not be obtained.

" The continuous observation is a demand which the general practitioner can hardly fulfill, and the introduction of Twilight Sleep into general practice will probably split upon this rock.

" There is the further difficulty in institutions with too large a number of patients. The presence of numerous patients in labour in one ward, and the fact, beyond this, that doctors and nurses are very much occupied, are extremely unfavourable circumstances for the carrying out of the method."

August Johnen,[1] of Mankarthof, in a very able paper covering the entire ground and history of the use of all narcotics and hypnotism in childbirth, sums up by saying :

" At any rate the scopolamin-morphine narcosis is the one which is to-day the best with regard to the lessening of suffering at birth, and it surpasses the semi-narcosis of chloroform and ether, on account of its easier and more convenient application, as well as because of its less dangerous character."

[1] *The History of Narcosis at Spontaneous Birth.* Inaugural-Dissertation, Erfurt, 1911.

CHAPTER XIV

GAUSS' LATEST ADDRESS ON TWILIGHT SLEEP

At Carlsruhe, in 1911, at the Conference of German Naturalists and Doctors, Gauss made his last public address[1] on Twilight Sleep before turning his attention from what he considered a "perfect method of childbirth" to experiments with radium in cancer.

He said: "Since von Steinbüchel's first attempt in 1903 to make scopolamin-morphine of use in obstetrics, between 8,000 and 10,000 births have been observed, in which this combination has been employed. Three thousand of these births have occurred at the Freiburg Fräuenklinik.

"In the six years of the Twilight Sleep in our clinic no material change has been made in the technique, so these 3,000 births furnish homogeneous statistical material as a touchstone on which to test other groups.

"On the basis of our six years' experience, it can be maintained that Twilight Sleep is to be looked upon as devoid of danger, and a great blessing.

"Danger to the mother never occurs if deep narcosis is avoided. The avoidance of unpleasant accessory effects, and the obtaining of a proper and safe Twilight Sleep, is entirely dependent on the strict observance of the rules given for our method. If an experimenter conscientiously follows these rules, success can be guaranteed in the majority of the cases, that is, up to 82 per cent.

"The deaths for which the method has been held responsible cannot be proven to be due to scopolamin-morphine. Under our method the mortality of mothers has shown no increase.

[1] *Further Experiments in Dämmerschlaf.* By Carl J. Gauss. Hitherto unpublished.

" There is likewise no danger to the child if the Freiburg directions are carried out.

" The occasionally observed oligopnoea of the new born is a symptom which every child brought to birth with the forceps also exhibits, without anybody attaching any importance to it.

" Cases of asphyxia do not occur more frequently than in ordinary practice.

" Retardation of the birth and increase in the frequency of operation need only occur if, by a wrong technique, an actual narcosis is produced.

" The results of the various experiments of obstetricians with the method give extremely contradictory results; on the one hand, warm advocacy, on the other, brusque rejection. Closer examination gives a very simple explanation of these contradictions, for different methods, with technique differing in principle, must naturally lead to quite different results.

" Steinbüchel's, Hocheisen's, and our Twilight Sleep are three distinctly different methods."

It may be well to here explain that von Steinbüchel only endeavoured to attain a reduction of pain without amnesia. His doses were consequently very small. The patients received from one to two injections of ·0003 g. scopolamin and morphine. In his first set of 20 cases he only failed to attain the desired reduction of pain in one case. In his second series of 11 births, all took place without a single failure or unfavourable incident.

Hocheisen's experiments, with which we are familiar, were conducted without the memory test, the injections being administered entirely according to the complaints of the women about their suffering, a procedure which all literature on the subject has proven utterly unreliable.

Gauss' method, unlike either of the foregoing, aims at amnesia, or forgetfulness of the birth, and his method is on a decidedly psychological basis, the dosage being regulated entirely by careful tests of the capacity of the patient for storing impressions after the drugs begins to take effect.

We will now resume the quotations from Gauss :

"After the *pros* and *cons* in theory and practice have waged an indecisive struggle all these years, do not expect me on this occasion to describe the advantages of Twilight Sleep. Our patients can describe them much better than we.

"I only desire to here prove that it is Twilight Sleep itself which has refuted the bad reputation given it in some quarters.

"I will begin with the most important point in the hostile criticism, viz., the alleged dangers to the mother.

"It seems to make the obstetrician's hair stand on end to find that child-bearing patients in Twilight Sleep have their respiration reduced by as much as four breaths a minute.

"By a confusion of Twilight Sleep with gynaecological surgical narcosis (in which surgeons do not hesitate to employ as much as ·0036 g. in three hours) it is then reported that the pulse increases in Twilight Sleep to 150 beats with a temperature rising to as much as 39°.

"Obstetrical literature only records one death laid to the charge of scopolamin—that recorded by Bardeleben. This is the case in which he says he administered ·0003 g. It was a spontaneous birth, many hemorrhages, and *post mortem* proved anaemia and heart trouble.

"In accordance with the majority of authors who regard scopolamin as devoid of danger to the mother, in all our cases the injections could not be regarded as the cause of a single mother's death.

"Our maternal mortality in 3,000 cases is 10 deaths, among which there was one with placenta praevia, one with kolpoporexis, with funnel-shaped pelvis; 8 patients died of puerperal fever" (fever following labour due to contagion).

"The point second in importance, the danger to the child, occupies a much larger space in the literature on this subject.

"Twilight Sleep is said to be responsible, by direct poisoning, for seven dead children.

"If we investigate these cases we find among them: one diaphragmal hernia" (rupture of the muscle separating the chest from abdomen) "(Gminder); one necrosis of the roof

of the skull" (dead bone) "due to pressure (Avarffy); one case of lues (Hocheisen); one double pneumonia (Avarffy); and one Thymus death" (the Thymus gland is at the root of the neck) "(Meyer). The cause of death was, in each of these cases, ascertained by *post mortem*. Of the seven, therefore, there only remain two, one of which died after application of the forceps (Hocheisen), whilst the other died with symptoms suspiciously like those of morphine poisoning (Bass).

"Our own statistics show a child mortality of 1·3 per cent., not including premature births, monstrous births, or children already dead. We have never lost a single child with symptoms of scopolamin-morphine intoxication.

"With regard to the children, moreover, one must not forget that a certain death-rate will always remain unavoidable, and that those cases which hitherto (without scopolamin) did not permit of the assignment of a definite cause of death, must not now all of a sudden be attributed to Twilight Sleep.

"This is all the less justifiable as Aschoff's theory actually goes to show a reduction, by use of scopolamin-morphine, of the chances of the child breathing in the amniotic liquid. The following facts support this theory: the statistics of 1·3 per cent. mortality from 1905 to 1911, against 3·4 per cent. from 1895 to 1904.

"Among our children who were born alive, 80 per cent. were brisk and lively, 16 per cent. oligopnoeic, and 5 per cent. asphyxiated.

"I must again insist that oligopnoea may be regarded as entirely devoid of danger if the condition is not caused by too large quantities of morphine; the infant organism is extremely susceptible to morphine.

"Holzbach's investigations have taught us that the child only comes drunk into the world when the scopolamin is injected into the mother shortly before birth, and therefore still remains in the child's circulation. On the other hand, when the scopolamin has been dealt with, having been thrown off by the circulation into the child's urine, the child is subsequently born bright and lively.

"What about asphyxia? It positively *never* occurs as the direct result of scopolamin.

"The frequency of asphyxia where no scopolamin is used is 5 per cent.

"Salzberger's inquiries make it appear that in 421 scopolamin children there were only 11·6 per cent. deaths in the first year, while the general mortality of the children of Baden for this same year was 16 per cent.

"Alienists have reported that they found that 4 per cent. of the children born with asphyxia became idiotic, while $\frac{1}{6}$th of them learn to walk late, and $\frac{1}{5}$th of them to speak late. Henner tested these results on 450 children of the Breslau out-patient department. He found that difficult birth with asphyxia of the child did not dispose to abnormal mental development or idiocy any more than normal birth.

"It is interesting to here remember that, according to Möbius, through the fault of the midwife, Goethe was born asphyxiated.

"Overdosing of the mother may cause injurious effects in the matter of birth pains, straining action, and post-natal hemorrhage. It is beyond all doubt that these deleterious effects may occur if too large doses are given.

"Since an influence on the motor force of the uterus would make itself most clearly apparent in an increase in the necessity for use of the forceps or placental operations, I will bestow some attention on this point. Antagonistic literature states that the frequency with which the forceps are used in Twilight Sleep amounts to 20 per cent., and could easily be raised to 100 per cent.

"The frequency of forceps cases in the Freiburg Frauenklinik has settled down to an average of 6 to 7 per cent. As the subjects for all forceps applications made for demonstration are deliberately sent into Twilight Sleep for this particular purpose, this is a figure that need not fear the light of day.

"The frequency of manual placenta detachment ranges between 2 per cent. and 6 per cent., and has an average of 4 per cent. This is a smaller figure than is to be found in most statistics.

" We come now to the principal factor of Twilight Sleep, the anaesthetising and narcotising action of scopolamin-morphine.

" I should first like to direct your attention to the fact that the expression ' failure,' used in the obstetrical reports, is, as a matter of fact, not at all appropriate.

" Even with the second method, which is essentially not Twilight Sleep, a reduction of the suffering during birth, is, as a matter of fact, *accomplished in every case.*

Twilight Sleep is successful when there is an adequate abolition of the apperception of pain.

" This condition is a kind of sub-consciousness in which the cortex of the cerebrum " (the outer layer of the big brain) " is, according to Finck, completely cut off from the reflex columns of the spinal cord.

" Strassny waves aside the explanation of this peculiar and hitherto unknown state of consciousness with the unmannerly remark that it is a doctoring of facts to speak of ' painless birth,' and is inconsistent with the dignity of scientific investigation.

" Whatever Strassny may say, our patients regard their births as ' painless,' and Twilight Sleep seems to us a condition well worth the trouble of attaining, and to our patients a blessing to experience.

" In our first-class ward we attain perfect Dämmerschlaf in 82 per cent ; in the second, 66 per cent.; in the third, 59 per cent. ; and in the fourth, 56 per cent. In 13 to 15 per cent. there is no effect. This absence of effect may be caused by too long deferred injection or personal refractoriness to anaesthesia on the part of the patient.

" Why does such a vast difference exist between the results of the Freiburg clinic and those of other authorities ? It does not lie in any lack of sober-minded observation, as Herr Bumm thought fit to say five years ago.

" A considerable factor in the explanation is supplied by the prejudice with which various obstetricians, on their own admission, enter upon their investigations.

" Steffen, for example (of the Dresden Clinic), says in his paper that he ' knows of no more pleasing sight than that

of a strongly-built woman giving birth to a first child with strong and painful birth pangs.'"

Because of this acknowledged sentiment, one writer has even gone so far as to accuse Steffen of being a Saddist.

"Avarffy acknowledged openly that he had recourse to Twilight Sleep only under compulsion.

"Hocheisen regretted that he was compelled by the demand of the public to employ a poison that is so terrible and unreliable. With what seems a certain malicious pleasure he records all the injurious effects in a series of 100 births in which there were 134 interferences with the normal course of labour.

"The best method in the world would break down when such a point of view as this is used as the basis for conducting an investigation as to its value.

"This is especially true of Twilight Sleep, which more than any other method requires to be employed with absolute sympathy and an open-minded desire to make the most of it.

"It is not to be wondered at that the reports of Hocheisen, Avarffy and Steffen do not precisely constitute a hymn of praise to Twilight Sleep.

"External circumstances rank only second in importance as obstacles to success. The lack of sufficient obstetrical staff is the first obstacle. Mansfeld is correct when he says we can form no idea of what enormous care, trouble, and continuous watching a well-conducted Twilight Sleep demands.

"Fehling draws attention to the fact that not every young doctor displays capacity for carrying out the method.

"I have also learned from private sources that in several clinics the passive resistance of the midwives has forced the physicians to relinquish the method.

"The final cause of failure is that unfortunately in many hospitals the correct technique has not been employed. It may also be assumed that the assistants in these clinics, who are merely gaining experience in the delivery room, are not given careful instructions about Twilight Sleep, especially the memory test.

" As early as 1907 I wrote an emphatic warning, viz. : ' The special action and safety of Twilight Sleep are based solely upon the testing of the powers of memory, and by this alone our method must stand or fall.' With regard to this passage Mansfeld has said : ' It is really extraordinary that words written in such perfectly clear German can be so misinterpreted.'

" Without paying any attention to this clause, which is the foundation of my method, Hocheisen, Messer and others have come forward as opponents of Painless Childbirth.

" Twilight Sleep is a narcotic condition of extremely limited breadth—like unto a mountain crest. To the left of it lie the dangers of too deep action, with narcosis and weakness of birth pangs ; to the right the dangers of too shallow action with the retention of consciousness and sensibility to pain.

" When the testing of the power of memory keeps the Twilight Sleep within the confines of the mountain crest, then we find this method not only devoid of danger, but the great boon to women it is proved to be by the gratitude of our patients."

CHAPTER XV

HOW THE VARIABILITY OF SCOPOLAMIN WAS OVERCOME

BECAUSE of the complaints made about the unreliability of scopolamin, Prof. Walther Straub,[1] of the Pharmacological Institute of the Freiburg University, began experiments in 1907 to discover the cause of this variability.

These complaints came generally from physicians who used scopolamin to produce Twilight Sleep; exact dosage is here of great importance, as the obstetricians have to work with the smallest effective quantity—·0003 g. to ·00045 g. scopolamin.

Very rarely were any complaints made by surgeons who employed scopolamin for total narcosis, where four times the amount used in Twilight Sleep is generally employed. In the surgical dose the effect of decomposition would naturally be much less noticeable than in the small, exact injections required for childbirth.

Professor Straub did not accept the current opinion that the poisonous products resulting from the decomposition of this alkaloid originated in the scopolamin solution itself. He believed that decomposition was caused by a process of saponification.[2]

"If my supposition was correct, it should be possible to stop this saponification by the addition of conserving substances. As scopolamin is applied hypodermically, prevention of irritation of the tissues must be assured; this caused a limited choice of substances which could be employed for the conservation.

[1] *About Decomposition and Conservation of Scopolamin Solutions.* By Walther Straub. *Munch. Med. Woch.* 1913.

[2] A conversion of fat or oil into a soapy substance by the action of an alkali.

" While testing various substances I found at last the very easily soluble alcohol mannite of six-fold value " (sexatonic alcohol mannite) " to be entirely suitable for the purpose. Solutions of scopolamin preserved with from 5 to 20 per cent. mannite were proved to be reliable."

Straub's first investigations in 1907 were for some reason not resumed until 1912. He had then in his possession some stored solutions of scopolamin treated by mannite, which were five years old; these were given to the Freiburg Frauenkinik for testing experiments. " They were used for Twilight Sleep, and proved to be as effective as freshly-made solutions."

Straub felt that the ever-increasing use of scopolamin-morphine in semi-narcosis required that he lay a theoretically secure foundation for his claims for the preserved scopolamin; with this object in view he not only made biological tests, but he stored for one year scopolamin solutions with and without addition of mannite in open and sealed vessels, in the dark and in the light.

After one year it was found that the resistance of scopolamin, treated by mannite, to the light was considerable. When kept in open vessels in the full light, solutions preserved by mannite, even though *totally mouldy*, were found to be more effective than seven months old, sealed solutions not preserved.

In the case of scopolamin boiled in a water bath, an addition of 10 per cent. mannite proved to have a conserving effect.

For the biological experiments he used the heart of a frog. These experiments were rendered very difficult, as the structure of the frog's heart prevents uniform distribution of a poison. The poison employed by Straub was muscarine—not to be bought in the open market—and he eventually found it necessary to isolate the auricle of the frog's heart for operation; the auricle being composed of a few thin layers of cells, was found to be particularly sensitive to muscarine.

After the action of the auricle had been arrested by the use of poisonous muscarine, scopolamin was employed both

in freshly-made solutions, and in preserved state, with the following results :

The lowest concentration of a freshly-made scopolamin solution which produced an effect upon the auricle of a frog's heart by muscarine, was $\frac{1}{80}$th million.

The contractions of the auricle, resulting from this application, regained $\frac{1}{8}$th of their normal action.

The same result was produced by ·02 per cent. scopolamin solution, which had been stored for seven months, but it was necessary to concentrate the stored scopolamin to eight times the strength of the freshly-made solution.

Straub considers that this proves, not that the preserved scopolamin has only $\frac{1}{8}$th the strength of its original contents, but it shows that stored solutions lose in strength considerably even though remaining perfectly preserved.

Prof. Staub then had the firm of Hoffman La Roche make solutions preserved by mannite in vials of ·0003 g. scopolamin per cubic centimetre, and these are the solutions now used by the Freiburg-Frauenklinik.

Wondering whether the war would make it now impossible for the physicians of Britain and America to procure the " Scopolamin Haltbar " (preserved scopolamin) of Prof. Straub I went to London to see the leading wholesale chemists, and I was delighted to discover that the factory of Hoffman La Roche is situated in Switzerland, and so far the war has in no way affected the shipping of Swiss chemicals to England.

I was also assured by Parke Davis and Co. that even should the war eventually shut off all chemical trade with the Continent, their present supply of scopolamin hydrobromic was sufficient to meet all demands ; moreover, I find that the British chemists are as a rule making their own scopolamin independent of Continental supply.

DR. SIEGEL'S EXPERIMENTS WITH STRAUB'S PRESERVED SCOPOLAMIN [1]

Dr. P. W. Siegel, assistant at Krönig's Frauenklinik,

[1] *Munich Medical Weekly*. 1913. No. 41.

was provided by Prof. Straub with some vials of mannite-scopolamin solution which had been stored for from thirteen to fifteen months.

As there was but a limited quantity of these solutions Dr. Siegel was only able to make a first experiment in twenty-two cases, but as these experiments were not made to prove the value of Twilight Sleep, but only to discover the biological action of the preserved solutions, the number of cases is sufficient for a test.

In his opening remarks Siegel comments on the great disadvantages under which the method of Twilight Sleep has always struggled because of the unreliability of scopolamin, which even when sterilised was apt to decompose.

" As Twilight Sleep is a state fluctuating between waking and sleeping an exact dosage is of the greatest importance, and for this perfect dosage a reliability of the drug is a most important factor. With the scopolamin solutions varying considerably in their effect, according to their age, correct conduct of Twilight Sleep has been rendered most difficult and complicated. Now, at last, Straub has prepared a lasting scopolamin by the addition of soluble alcohol mannite. This preserved solution, when used in pharmacological and biological experiments, exhibits the same qualities as those shown in freshly made solutions."

To make the tests of his experiments more clearly observable Dr. Siegel contrasts the results of his own use of preserved sco.-mannite with the statistics of 500 of Gauss' cases and 600 of Beruti's.

We find in this specified 500 cases of Gauss the following figures :

76·2 per cent.—successful Twilight Sleep.
18·2 per cent.—reduction of suffering.
5·6 per cent.—no effect.

Beruti reports :

65 per cent.—successful Twilight Sleep.
21·83 per cent.—reduction of suffering.
13·6 per cent.—no effect.

By combining the results of both Gauss and Beruti we get the following average :

Gauss and Beruti :

70·6 per cent.—successful Twilight Sleep.
20 per cent.—reduction of suffering.
9·5 per cent.—no effect.

Now compare this average of results from use of freshly made scopolamin solutions with Siegel's results from use of preserved scopolamin which had been stored for over a year.

Siegel :

74 per cent.—successful Twilight Sleep.
26 per cent.—reduction of suffering.
0 per cent.—no effect.

One reaches the conclusion that even after many months of storage, mannite-scopolamin does not lose its effectiveness.

" Fresh solutions," says Siegel, " have been shown to produce but slight side-effects, similarly, with preserved scopolamin, I have observed no subjective side-effects. With an exception of a slight prolongation of the pains there were no objective effects.

" On the basis of my observation of several hundred Dämmerschlaf births with fresh solutions of scopolamin, I am able to state that the side-effects of mannite-scopolamin do not occur more frequently than when using fresh solutions—I have even formed the conclusion that they are less. The duration of birth was normal.

" In the 22 cases, 22 children were born alive. There were 20 spontaneous births. Forceps had to be employed twice ; (1) on account of narrow pelvis of mother and fluctuating heart sounds of child ; (2) on account of prolapsis of the cord. The latter child died after forty-five minutes.

" These complications might easily have happened without scopolamin.

Fifteen children were born lively.

Six oligopnoeic.

One apnoeic (this was the case of prolapsis of cord when the forceps had to be used).

" I wish to here emphatically point out once more that

the condition of oligopnoea is absolutely harmless to the child, and that the children come to without stimulation or assistance."

Siegel then refers to Salzberger's investigations of all the data of scopolamin births up to 1910—including those of the opponents—which proved that only 1.1 per cent. died within the first three days.

Siegel concludes :

" From this report of my experiments it is to be seen that preserved mannite-scopolamin has given complete satisfaction, and is, in its biological effect in obstetrical practice, in no way inferior to the fresh solutions.

" The most valuable fact is that we now have at last a *constant* scopolamin preparation. The direct consequence of this will be that we shall now be in a position to considerably simplify the formerly complicated method of Twilight Sleep.

" For months past we have now been employing the Hoffman La Roche preparation of Straub's mannite-scopolamin, which is to be obtained under the name of ' Scopolia-Haltbar.' "

CHAPTER XVI

THE SIMPLIFIED METHOD WITNESSED BY THE VISITING PHYSICIANS IN THE SUMMER OF 1914

A GREAT many foreign physicians who visited the Freiburg Frauenklinik in the summer of 1914 were puzzled by the births which they witnessed in the fourth-class free ward.

They said: "The method which we have seen is certainly not the one we have been led to expect from all we have heard of the Gauss Dämmerschlaf."

One American doctor complained: "There we stood—six of us—for days and nights with our ears stretched to hear the far famed 'memory test' without ever getting the slightest satisfaction."

The fact of the matter was, these visiting physicians were not witnessing the Gauss Twilight Sleep, as it was still conducted in the first-class ward by Drs. Krönig, Gauss and Schneider with scopolamin-morphine and the memory test, but they were observing the experiments which were in progress in the fourth-class ward with the "Siegel Simplified Method."

In Dr. Siegel's former paper on his experiments with the Straub preserved scopolamin he gave us the first intimation that he believed with this new *constant* mannite-scopolamin it would be possible to greatly simplify the hitherto rather complicated Twilight Sleep; with this theory he immediately went to work to develop a system of set, invariable rules to be conducted with invariable scopolamin.

Formerly, even when every precaution was taken, by having fresh solutions and subjecting every solution to the apoatropine test by using permanganate of kalium, the scopolamin still showed a tendency to eccentricity; this factor consequently added materially to the difficulties of

the physician, who not only had to use the most tactful adaptatation of the method to the individual peculiarities of the patient and her condition, but had furthermore to adapt the dosage to the individual peculiarities of the especial solution being used.

This was the greatest reason for the reiterated insistance of Gauss that only by the memory test could the effect be judged.

It has already been pointed out that in the larger surgical doses variability of scopolamin was not as noticeable as in the small, exact doses required in childbirth.

Now that there was at last at hand a constant scopolamin, whose behaviour could be counted upon with a great degree of certainty, its first effect was to eliminate a large degree of uncertainty in the results which could be expected from its employment.

Of course nothing can ever change the fact that there are rare cases of patients with a peculiar idiosyncrasy to the drug, as well as to other narcotics, but these cases are so unusual they cannot be considered when developing a method for the use of thousands of normal mothers.

Dr. Siegel deserves great credit for trying to formulate a method for the medical masses, a method which requires no peculiar brilliance of technique, psychological discernment, or nerve-racking concentration on the part of the operator. It means that here is a method which can be as easily employed in private practice as in the lying-in wards of hospitals.

As one American doctor said to me in speaking of the Siegel method: "It will do this much without doubt—it will place Twilight Sleep on a simpler footing whereby it will be within the scope of thousands of physicians of ordinary attainments, while the more psychological Gauss method could only be successfully conducted by the gifted and scientific hundreds."

Dr. Siegel[1] says that since Gauss introduced Twilight

[1] *Painless Births in Dämmerschlaf by a Simplified Method.* By Dr. P. W. Siegel, Assistant at the University Clinic of Freiburg. Published in *Deutsche Medizinische Wochenschrift.* No. 21. 1914.

Sleep into practical obstetrical use in 1905 it has stood the test in many thousands of cases, and that the method successfully attains its object of diminishing the suffering of the mother. "All the objections raised by Bumm's clinic against Painless Childbirth may be considered definitely refuted in all points by enormous numbers of cases.

"Gauss' method, as I may be permitted to briefly repeat here, is based on the principle of regulating the scopolamin-morphine dosage by frequent repetitions of the memory test during the time of birth. What Gauss is aiming at is not to induce deep narcosis but a state which he calls Twilight Sleep. Although the woman in labour will utter complaints during pains, she retains no memory of her suffering. When Twilight Sleep is properly carried out the woman will not know anything of the events which have taken place during her Twilight Sleep, and she will therefore not remember any sensation of pain at birth.

"This method has, of course, the disadvantage, as has always been pointed out, that the progress of the birth has to be watched constantly by a trained nurse under the supervision of an experienced doctor. This requirement from the beginning limited the use of scopolamin-morphine to the clinical wards. We have, therefore, never employed it in private practice.

"We have always aimed at simplifying the method. But this was not possible as long as scopolamin was a drug the efficacy of which was subject to great variation. A simplification of the method of Twilight Sleep could, of course, only be obtained after we got a drug of unvarying effectiveness. At the same time the further condition had to be met that the zone between Twilight Sleep and deep narcosis should be wide and of limited variation in individuals."

Siegel believed that once provided with an alkaloid of unvarying efficiency the effect upon individuals would not be subject to any considerable fluctuations, as in Twilight Sleep the physicians have to deal with neither the very young nor the decrepid, but with women in the prime of life.

" Straub's mannite-scopolamin, 'Scopolia-Haltbar,' 'Scopolamin durable' (Hoffman-La Roche) has been found in our experience to meet this requirement in a very large measure. Straub has proved the durability by experiments on animals, and I attained with it the same Twilight Sleep as that induced with fresh solutions.

" As Gauss has already pointed out in his publication, the dosage of morphine had to be most careful, as overdosing with morphine would in Twilight Sleep easily result in inconveniently long lasting, though harmless, apnoea of the child."

Dr. Schlimpert had earlier made experiments with another Straub product, narcophin,[1] which he found affected the centres of respiration much less than morphine.

Dr. Siegel began experiments with this same narcophin when he attempted to simplify Twilight Sleep, and he found that it had no dangerous or menacing effects.

Siegel's procedure in simplifying the method was as follows :

" At first Twilight Sleep was induced in a great number of cases according to the instructions given by Gauss with preserved scopolamin and narcophin, using the memory test. After the birth, records were closely studied, and it was discovered that the doses of scopolamin 'durable' and narcophin necessary to attain a satisfactory Twilight Sleep varied but little in different individuals within a uniform period of time."

With this clue to a uniform result obtained by constant scopolamin, Siegel's next effort was to plan some set rule of dosage which would eliminate the 'individualising' formerly necessary in the handling of every separate case. It is immediately evident what a tremendous factor in the constitution of a simple, practical method this would mean.

With positive regulations for exact dosage at exactly stated intervals, to be administered alike to every patient,

[1] Straub's Narcophin is put on the market by Boringer and Sohne. I made inquiries of the largest wholesale British chemists, and was told that it is not to be obtained in England.

the element of possible failure (because of the lack of judgment or skill of the various operators) would be largely done away with.

It is almost staggering to think of the tireless amount of conscientious experiment it must have taken before Siegel could arrive at a positive dosage. As he says :

" It need scarcely be mentioned that the building up of this method has been preceded by a very large number of experiments.

" On the basis of these experiments, excluding cases of abnormally debilitated women, a table of dosages for the whole duration of the birth has been compiled."

I call your especial attention to the fact that with a worked-out system of set doses of invariable scopolamin, Siegel was now able to omit the memory-test ; this, more than anything else, proves the positive and systematised results which he obtained, and furthermore shows that at last a system of dosage had been found which could be administered to all patients without danger of overdosing. He says :—

" Every case was now treated systematically in accordance with this table, and *without* any control by the memory test."

You will observe in Siegel's method every *third* injection of scopolamin is combined with ·015 g. narcophin. The doses are all given by hypodermic injections. Here is the table of doses to be administered at regular periods.

Technique.—" The dosage that has now been used by me in 220 consecutive cases is as follows :—

Beginning with 1½ ccm. sco. + 1 ccm. narc. = ·00045 g. sco. + ·03 g. narc.

¾ hour after beginning, 1½ ccm. sco. = ·00045 g. sco.

1½ hours after beginning, ½ ccm. sco. + ½ ccm. narc. = ·00015 g. sco. + ·015 narc.

3 hours after beginning, ½ ccm. sco. = ·00015 g. sco.

4½ hours after beginning, ½ ccm. sco. = ·00015 g. sco.

6 hours after beginning, ½ ccm. sco. + ½ ccm. narc. = ·00015 g. sco. + ·015 narc.

7½ hours after beginning, ½ ccm. sco.=·00015 g. sco.
9 hours after beginning, ½ ccm. sco.=·00015 g. sco.
10½ hours after beginning, ½ ccm. sco. + ½ ccm. narc.= ·00015 g. sco. + ·015 narc.
and so on every 1½ hours ½ ccm. scopolamin (·00015 g.)."

The greatest proof of the lack of great depth of this narcosis is shown in the fact that, unlike the Gauss Twilight Sleep, it becomes necessary in the Siegel method to employ a slight chlorethyl narcosis, in addition to the scopolamin and narcophin, at the actual passing of the head of the child.

With the Gauss method there is no necessity for this addition of chlorethyl, as the injections of scopolamin-morphine tide the patient as successfully over the climax of birth as through the ordinary labour pains; moreover, in the Gauss Twilight Sleep the amnesia of the patient, where the passage of the head is concerned, is just as perfect as the obliteration of the memory of the rest of the process of birth.

Of the necessary addition of chlorethyl Siegel says :—

" It should be especially mentioned that when the head is cutting through, a small dose of chlorethyl of about 10 ccm. should be administered with the Herrenknecht mask. This is necessary, as Dämmerschlaf is a condition half-way between waking and sleeping. The Dämmerschlaf is sufficient to obliterate the memory of the usual labour pains, but it is not sufficient to maintain amnesia during the most painful moment in the act of birth, the passing of the head."

Siegel overlooks the fact that the Gauss Twilight Sleep is also " a condition half-way between waking and sleeping," and yet *is* sufficient to " maintain amnesia during the most painful moment in the act of birth."

Siegel continues, as if in answer to expected criticism.

" One might think that for the sake of simplicity the Twilight Sleep ought to be deepened somewhat rather than introduce this new complication. A deeper sleep, however, would necessitate larger quantities of narcotics. A chlorethyl narcosis of 10 ccm., as is well known, has scarcely

any effect on a person, at any rate it never does any harm.[1] With a larger dose of scopolamin and of narcophin, however, the secondary effects might occur in a more pronounced manner. For this reason, we prefer the chlorethyl narcosis."

Granting that chlorethyl is harmless, it is interesting to find him adding: "This chlorethyl narcosis is not *always* necessary. Only experience will enable the physician to decide whether the use of chlorethyl is advisable or not. It is only, so to speak, a safety-valve by means of which Twilight Sleep can be satisfactorily attained in a larger percentage of cases.

"I had set myself the task of rendering the conduct of Twilight Sleep as independent as possible of individual dosage, and this apparently could best be done by supplementing the Dämmerschlaf by chlorethyl."

We cannot lose sight of the great effectiveness achieved by Gauss by his system of tactfully applied individual dosage, yet even though the Gauss method may be the greater, and its results unassailable, yet we must not forget that to get the same results which Gauss obtained, the greatest conscientious care on the part of the operator is necessary, and Siegel is trying to formulate a method devoid of difficulties for the physician.

Where injections of unvariable quantities are injected at stated times, over-dosing (unless the injections are kept to the smallest effective quantity) will be much more apt to occur than where the injections are scientifically administered according to the apperception of the patient as judged by the memory test. Keeping the set doses down to their minimum effectiveness, it is, perhaps,

[1] Chlorethyl was first used as an anaesthetic by Flourens in 1847, but it was almost forgotten until 1894, when it was re-discovered by a Swedish dentist named Carlson. It is closely related to Bromathyl, and produces a narcosis of very limited time. Many obstetricians, including Maurette, Lop and Krönig, recommend it for obstetrical operations as excellent and harmless. It is said to be less dangerous than Bromathyl, and has less after-effect. Its immediate effectiveness makes it very valuable, but Krönig warns against prolonging a chlorethyl narcosis over a few minutes.

unavoidably necessary to deepen the narcosis by the addition of chlorethyl at the passing of the head ; as Siegel says, it would be very discouraging to see result of a Twilight Sleep which had been successfully sustained for hours, rendered doubtful at the end, when by the administration of a small dose of chlorethyl it could be terminated triumphantly.

Of the time limit of this method Siegel says :

" Twilight Sleep may be induced as soon as the obstetrician is satisfied that the birth process has begun, i.e. as soon as regular pains occur at opening of os. It is, as a rule, not necessary to await a definite opening of the os. I have successfully begun the Sleep when the os was only ⅔in. to 1in. in diameter, as well in *primi parae*" (first child), " as also in *multi parae* " (where the mother has had other children), " and I have not observed any protraction of labour. The pains of labour are, as a rule, called regular if in *primi parae* they occur every five minutes, and in *multi parae* in from five to six minutes. It is in this stage generally that the labour also begins to become painful to the woman. It is less a question of labour having reached a certain stage, than that the process of birth is under way at all.

" In my 220 cases I was not obliged in a single instance to interrupt the Twilight Sleep. If once begun, the Sleep could be carried through to the birth. Once, for instance, I maintained Twilight Sleep for thirty-one hours, once for thirty-three, and in another case for thirty-nine hours without any symptoms of danger to mother or child having appeared. With a long duration of the Twilight Sleep, of course, the total dose of scopolamin and narcophin increases. The largest number of injections given by me were 24, 25 and 27 injections. This means a narcophin dose twice of ·15 g., and once of ·165 g., and a scopolamin dose of ·00405 g., ·00435 g. and ·0048 g. As these doses are distributed over a long period of time they are still below the maximum doses. At an average, of course, we use much less narcotics, as the birth will take its course within a much shorter time. At an average we

gave 6 injections with ·06 g. narcophin, and ·0015 scopolamin.

" Besides primary weakness of labour, there is no counter indication against the use of scopolamin-morphine. Even in such cases it is doubtful whether it might not be used, but we have no experience in this respect."

Even in cases of narrow pelvis, Siegel says his method may be carried out with good results.

" Especial preparations for Twilight Sleep are not necessary. We have only to take care that the patient is talked to as little as possible, that there is no noise around her, and that the light does not fall directly on her face. Curiously enough under Twilight Sleep women are remarkably sensitive to light. I therefore cover the woman's face with a handkerchief toward the termination of the birth, as several times the patients stated that they knew nothing of the birth, but they had suddenly realised that many people were standing around them, and that there had been a flood of light. This latter was the searchlight.

" It has to be taken into consideration that 197 cases were treated in the public delivery ward, without the women being isolated."

196 births were spontaneous. Not including two cases of breach presentation, the proportion of operations was 10 per cent.

For comparison Siegel compiled the operative statistics from the records of 1000 consecutive births in which no narcotics had been used, and found that there were 105 operations among this number—10·5 per cent. Comparison of his figures with these, show his results to have been good.

" I must here draw attention to a very interesting fact. Among the 78 spontaneous births there occurred only six slight ruptures of the perineum=7·5 per cent. Among the 49 cases of spontaneous second births, and the 18 spontaneous third births, there was no rupture of the perineum. This great reduction of perineal rupture is very striking."

Having collected the records of 800 consecutive first births without scopolamin, he found the record to be

" percentage of rupture of the perineum 13·5 per cent "—that is almost double the Siegel figures.

In only six cases did Siegel protect the perineum.

" This is proof," says he, " how very quietly the head passes over the perineum, and how little the obstetrician is troubled by the woman in labour.

" A special advantage of the Twilight Sleep is that if minor operations are necessary, they can be carried out successfully in chlorethyl narcosis."

Of the results of his fixed dosage Siegel says :

" Of the 220 mothers 193 had complete amnesia, that is about 88 per cent. These women knew nothing of the birth process passed through. With the exception of 13 cases all had been administered chlorethyl narcosis.

" Of the 193 cases of complete amnesia, only 23, that is 12 per cent., recollected having smelt something or to have had a mask on the face. This recollection corresponds with the administering of chlorethyl. These are the cases then in which we may presume that the birth pangs would have been felt but for the chlorethyl intoxication. In all the other cases, therefore, chlorethyl was superfluous. It is difficult, however, to gauge the necessity for the use of chlorethyl, and as it is really harmless, it may always be used conscientiously.

" In 22 cases (19 per cent.) partial success was obtained, as sometimes the patients stated to have felt the birth, but could not account for long spaces of time during the birth process, or in other instances they spoke subjectively of a quite distinct diminution of pain.

" In 5 cases, 2 per cent., the injections had no effect as they were administered too late. . . .

" Amnesia has been ascertained by me in the following manner : after the birth I asked the mothers whether they had already had their child, whether they had noticed any smell, whether they had had a handkerchief laid on their face, and how many injections they had been given. It was found that amnesia begins between the second and third injection.

" Of the 193 cases of complete amnesia, 128 only remem-

bered two injections, 49 three, 15 four, and 2 more than five injections. If we compare these figures with the table of dosages we see that Twilight Sleep sets in at an average between three-quarters and one-and-a-half hours after the first injection.

" In thirty instances I have asked the women how long they reckoned to have lain from the time of the first injection until waking from the Sleep, and without exception they greatly underestimated the length of time. It is surprising to hear from a patient who has been sleeping from 25 to 30 hours, that she believes the birth only lasted 3 or 4 hours. From this it is evident that we had favourable results, even in those cases where the patient by accident felt the birth, but was otherwise under amnesia during a large part of the time ; in other words, the larger number of cases which I have classified as partial success represent by themselves a satisfactory result. If, for instance, such a mother had been kept in Twilight Sleep for 20 hours, she would have the impression that she perhaps felt the birth, but that it lasted a short time only, say from three to four hours. . . . If the Twilight Sleep has lasted over twenty-four hours it affords a curious spectacle to see how the woman's reckoning of time is displaced by an entire day. She wakes up, for instance, on Tuesday morning, and will not be persuaded that it is not Monday morning.

" Pronounced secondary effects are cited as an argument against this method. Above all stress is laid upon the statement that the births are extraordinarily delayed, and that protraction of labour is caused by it. Pronounced protraction of labour I have observed only in 3 cases. In 28 cases there was moderate or only slight protraction. In 189 cases I did not notice any protraction of labour. I beg to state explicitly that among my cases there were 12 *primi parae* of over 31 years of age. The oldest of these was 39 years of age. . . .

" I have to draw attention to the fact that every doctor when seeing Twilight Sleep births for the first time implicitly gets the impression of a protraction of labour and shortening of pains. This impression is caused by the

woman in Twilight Sleep mostly only feeling the pains when at their height, and uttering only slight complaints or no complaints at all. Whereas a woman in full consciousness utters complaints at the mere approach of pains, and even long afterwards. In my opinion this easily explains the subjective impression of protraction of labour and abbreviation of pains, whilst by laying the hand on the patient's body the frequency and intensity of labour will be noticed to be much more favourable.

" Other side-effects, especially those of scopolamin, are redness of the face, slight agitation and vomiting. But all these states occur far less frequently than is always supposed. In 132 cases I did not notice any side-effects whatever. In 73 cases flushing of the face occurred, in 58 cases agitation, 5 patients vomited. Reddening of the face is purely peripheral hyperaemia [1] without any significance. This is shown by observation of the pulse, for the heart beats in my cases rose above 100 per minute in only 19 instances, and even in these few instances the pulse never presented any threatening symptoms.

" The excitement of the patients is generally slight. I have observed really great excitement in six cases only. Our low number of cases of rupture of the perineum proves that the state of agitation is not so very great. If the patient tossed about, as has often been said, it would not be possible to properly protect the perineum, and there would be very frequent ruptures in consequence. . . .

" I have never been able to observe in any mother that the breathing centre being influenced by narcophin causes a slackening of the breath. In 139 cases the breaths have been counted every three hours, and they were found never to be less than 16 nor more than 30 per minute.

" Further side-effects there are none of any consequence."

AFTER-BIRTH

" After-birth hemorrhages (atonies in connection with scopolamin) such as have been cited over and over again,

[1] Excess of blood only in the outer surface.

have never been observed by me. The losses of blood have been measured by us, and only in sixteen cases we ascertained a loss of blood exceeding 500 g. Only in two cases these heavy hemorrhages had to be ascribed to atony" (want of tone—abnormal relaxation). "Two hundred and nine times it was not necessary for us to take any steps on account of loss of blood. We had to prescribe styptic medicine" (to cause contraction of tissues of the blood vessels) "such as secacornine, only in two cases. . . .

CHILD-BED

"In child-bed also, as a rule, we had no symptoms. Two hundred and five mothers were able to leave the clinic within the first ten days after parturition; the remaining fifteen mothers showed only slight increase of temperature. One hundred and ten patients got up for the first time on the first day, 10 patients on the second day after the birth. With the exception of one woman all patients made gymnastical exercises. One hundred and sixty-one women did not complain about thirst, 44 had moderate and 15 women had a lasting sensation of thirst. But even in these cases the dryness of the mucous membranes is *far less* than that observable in operations. Two hundred and thirteen mothers were able to nurse. The other seven did not nurse on account of the deaths of their children. Only in two cases was the milk secretion not sufficient. There is, therefore, no reason to talk about scopolamin-morphine having a harmful influence upon child-bed or lactation."

THE CHILDREN

"Of the 220 infants, 148 were born absolutely lively; 61 were oligopnoeic, 4 apnoeic, and 4 asphyxtic. Two children were stillborn, and one child had to be perforated on account of fever in the mother. Of the asphyxtic children, two were resuscitated successfully, the other two died after three-quarters of an hour and one-and-a-half hours' of efforts at resuscitation. The condition of the children expressed in per cent. reads as follows:—

148 lively children = 67.6 per cent.
61 oligopnoeic children = 27.7 per cent.
4 apnoeic children = 1.7 per cent.
2 asphyxtic children, lived = 0.85 per cent.
2 asphyxtic children, died = 0.85 per cent.
3 stillborn children = 1.3 per cent.

" The mortality of the children at birth is therefore extraordinarily low—2.15 per cent., including the two asphyxtic children. . . .

" Of the 220 children 213 left the clinic alive and healthy. The total mortality at birth and within the first days of life is only 3 per cent. This is a very good result, and corresponds completely with observations hitherto made on scopolamin children.

" On the basis of this low infant mortality it appears scarcely justified to attribute to Twilight Sleep a harmful influence on the children.

" It is seen also that the often objected to state of oligopnoea is absolutely harmless to the infant's life. Oligopnoea, accord to Gauss, is a state of slight intoxication of the child, a certain percentage of which can, unfortunately, not be avoided. The heart is beating actively, and when blown upon or touched the children made defensive movements. The oligopnoea in 34 cases lasted up to five minutes, in 21 cases up to ten minutes, and in 4 cases up to fifteen minutes, in 1 case twenty, and in another twenty-five minutes.

" In order to see how the oligopnoea children behave without assistance, I have in 22 cases not taken any steps whatever. I laid the children on the table, and did not interfere with them. All these children attained a normal condition unaided by me within the above-mentioned time limits. Among these unassisted children there was also the case of oligopnoea lasting twenty-five minutes. I believe that this is sufficient proof that oligopnoea by itself does not need any treatment, and that an oligopnoeic child will recover a lively condition without assistance. I frankly admit that with insufficient experience it is rather difficult to distinguish between oligopnoeic and apnoeic children. One lacking experience ought to assist such children

with slight mechanical stimulation. This treatment will not do any harm. If the case was oligopnoea the treatment was superfluous, if it was apnoea nothing had been omitted.

" In order to afford a survey of my cases I may mention that in 167 cases no treatment was given to the children. . . .

" The child is harmed by Twilight Sleep as little in its extra-uterine " (after-birth) " life as it is endangered by its intra-uterine " (before birth). " Scopolamin-morphine has no influence upon the foetus's heart sounds. . . .

" When leaving the clinic 36 children had reached or passed their weight at birth. If we consider that only 12 women stayed longer than ten days at the clinic, the variation in the weight of the children may be accepted as absolutely normal. A diminution of the weight of a child by more than one pound has never been observed.

CONCLUSION

" A *résumé* of my experiences shows that we possess in the combined mannite-scopolamin-narcophine treatment, as per my table of dosages, a very handy method of Twilight Sleep. But it is not absolutely ideal. However, with its 88 per cent. of complete success, and the 10 per cent. of partial success, its insignificant side-effects on the mother and child, it represents to-day the best of all known methods for lessening pain at childbirth.

" Its advantage consists in the easy technique. Any individual preparation in each case is superfluous. Every patient is given mechanically at the exact periods stated the prescribed doses of scopolamin and narcophin.

" The rest of the birth process takes place with exactly the same accidents or complications that may occur also in any births without scopolamin-morphine.

" I know very well that with greater experience some cases may be treated more individually, that in many patients a smaller dose, and in others a slightly larger dose would give better results. But I have adhered to the table

of dosages on principle, as I wanted to work out a simplified method.

" The number of 220 cases is still so small that I would not care to recommend this method for general practice, but I believe that it is well worth being tested in other clinics in order to rapidly accumulate more data of observation."

Apropos of the Siegel method I want to tell you of a representative case of an American visiting physician ; this woman doctor came to Freiburg with only ten days left before her return to America ; after witnessing (together with another woman physician from Maine and four male American doctors) five births in the fourth-class ward, she found herself in a fearful state of perplexity, indecision, and even fright.

She had heard much of the " Gauss Dämmerschlaf " in the Berlin, Munich and Vienna clinics, and she had come to Freiburg to study, as far as she could in that length of time, the Gauss method, because she had a friend in Canada of thirty-eight years of age, who was to soon give birth to her first child, and this doctor believed Twilight Sleep would be just the thing for this case.

It occurred to none of the Frauenklinik German doctors in the fourth-class ward to explain to these visiting physicians that the new Siegel method was there being tried out.

The first shock to the Americans was that no memory test was used, then they found morphine supplanted by narcophin, moreover, as accident so decreed, all five of the first children whom they saw born were oligopnoeic, and the inexperienced physicians of the fourth ward hurriedly used artificial means to revive them.

One of the other doctors who witnessed these same five births said : " If I had charge of such births I would be grey in a week."

To further show you to what conclusion even experienced physicians may wrongly arrive, one of these doctors told me, with horrified, frightened face, that the oligopnoeic condition of the children was so dreadful that the German

doctors in the fourth-class ward actually had to run a tube down the children's throat and pump air into them !

Curiously enough the following day at the University library while hunting in the *Munich Medical Weekly* for something else, I came across an article on the use of the " tracheal catheter " for removing the amniotic fluid from the bronchial tubes of the child, and it suddenly occurred to me that *this* was what the visiting physicians had seen at the Frauenklinik.

I hastened to communicate my supposition to the American doctor, but I found that she had already had her mind relieved that very day by being told by one of the Frauenklinik physicians that the use of the tube had nothing whatever to do with oligopnoea, but was only an extra precaution taken to remove any possibly inhaled amniotic fluid from the child's tubes.

To show the great state of general alarm of this physician (who was the most absolutely conscientious doctor I have ever met), she then asked me—knowing of my preparations for this book :

" Do you realise your responsibility ? "

She meant, did I realise that I was recommending all women to urge their physicians to adopt a method which she believed, after witnessing five births, to be dangerous to the child. It will be interesting to see how her opinion was later on changed.

I introduced her to an American mother who had just been delivered a few days before by Drs. Krönig and Gauss. After hearing this mother's experience the physician was in a worse state of puzzlement than ever, for the American mother told of the memory test. Her husband corroborated and enlarged on all her statements from his observa tion of the early stages of the birth—before he was expelled from the room by Dr. Gauss.

The husband assured the doctor that he had heard the memory test applied, and that morphine, not narcophin, was used—here he handed her the Frauenklinik record of his wife's delivery with the quantities of the injections clearly stated, and all other details of the birth. Further-

more, he had seen his son immediately after birth, and he was certainly not oligopnoeic, but crying and kicking lustily while his mother calmly slept on unperturbed.

" Why," exclaimed the American doctor, " I am listening to the description of an entirely different method from the one I have seen in the fourth ward."

Her state of perplexity was so great she felt nothing could clear it but a conversation with Dr. Krönig himself. After telling all her conflicting impressions to Dr. Krönig, he explained to her that the physicians and nurses of the fourth ward were trying out a simplified method of Dr. Siegel's, which was not synonymous with the Gauss Twilight Sleep, as conducted in the first-class ward.

On hearing the American's alarm at the condition of the children at birth Dr. Krönig said that while the Siegel method was as yet only in the experimental stage, " it is at least helping to lower the already low infant mortality statistics of the Frauenklinik."

Krönig was violently upset over hearing of the artificial efforts at resuscitation of the infants resorted to by the fourth-class physicians, excitedly exclaiming: " It is entirely unnecessary—it is all foolishness. It is their inexperience that makes them think it necessary. I will see to it immediately."

With a better understanding of the conditions and the two different methods of Twilight Sleep, the American doctor returned to her investigation of the births under the Siegel method, and in four days her whole attitude of mind had cleared and changed.

" I am thankful that I could be here for the last four days and nights," she declared at leaving, " it has changed my whole opinion of scopolamin-morphine, but alas! several of the other doctors, who witnessed the first series of births, have gone before there was a chance of their understanding and coming to different conclusions.

" During those first five births I felt convinced from the start of the absolute safety and benefit to the *mother*, but I felt alarm for the safety of the child; now I have changed

the latter opinion entirely since a more thorough investigation of the oligopnoeic condition.

"Since my conversation with Dr. Krönig, the babies have been left alone in the fourth ward, and just as he said, they have revived of their own accord within fifteen minutes.

"Moreover, I find that it only so chanced that all the first five children were born oligopnoeic; in the last four days and night, the majority of children have been born in an absolutely normal condition.

"Now, too, that I thoroughly understand the Siegel method of fixed dosage, which can be used without the memory test, I have come to a still more important conclusion, and that is that scopolamin is *not* the dangerous drug it has been supposed to be. I feel that in order to really know anything of Twilight Sleep, a physician should remain at the Frauenklinik for a year, but as that is now impossible for me, I shall have to make the best of my ten days' and nights' investigation; with a full realisation of my inadequate preparation I shall nevertheless try the method as soon as I get home, with a determination to work it out conscientiously for myself in the form of a *combined* Gauss and Siegel Twilight Sleep. I now believe entirely in the use of scopolamin-morphine in childbirth. I believe it is absolutely safe for the mother, that it ensures her painlessness and a quick recovery after birth, and I believe that it is absolutely safe for the child."

This woman physician's opinion is worth listening to, as she has a record of twelve years of maternity cases with only one case of forceps.

CHAPTER XVII

THE AMERICAN PHYSICIANS AND PAINLESS CHILDBIRTH

THROUGHOUT the *American Medical Press* have been published articles severely criticising the publicity given Twilight Sleep.

We are accused of pretending to discover a new method which—to quote the *Journal of American Medical Association*—" while not entirely obsolete, has been practically discarded."

Do the records in this book make it appear that the method is either new or obsolete ?

The *American Journal of Clinical Review* says :

" The procedure is already well known to thousands of physicians in the United States, who have unostentatiously practised it for at least a decade. To suggest that Krönig and Gauss have a monopoly on this painless childbirth business by means of scopolamin-morphine—that is to laugh."

If the American physicians have been " unostentatiously practising " this method for at least a decade, why have American mothers heard nothing of it ?

It is fortunately quite true that Krönig and Gauss no longer have a " monopoly " of the method, as the many records of other obstetricians prove. It is, moreover, being used in Great Britain with especial success.

When my article on Painless Childbirth was published in *The Ladies' Home Journal,* the opinions of " Eminent Obstetricians " were simultaneously published.

They are as follows :

THE OPINIONS OF EMINENT AMERICAN OBSTETRICIANS

" The use of scopolamin-morphine as an anaesthetic in labour is no new thing : introduced by von Steinbüchel in

AN AMERICAN TWILIGHT SLEEP BOY

THE FIRST AMERICAN CHILD BORN IN TWILIGHT SLEEP IN THE FREIBURG FRAUENKLINIC. SHE IS THE DAUGHTER OF MRS. EMMET, OF NEW YORK.

1902, it has been tried in this country, as well as in Europe, by numerous obstetricians. My own observations, published in 1903, led me at the time to favour this therapeutic means of producing the ' Twilight Sleep ' and removing the consciousness of pain, or at least preventing all remembrance of it. I have long since abandoned this agent, however, for two reasons :

" First, because it has apparently been the cause, occasionally, of fetal asphyxia.

" Second, because the effect of the drug on the mother is often uncertain, and unless used with great care, may cause unfavourable or dangerous results.

" Moreover, we have other and safer measures for the relief of pain in labour. So I have given up teaching the use of scopolamin in my lectures.

CHARLES M. GREEN, M.D.,
Professor of Obstetrics and Gynecology in Harvard University."

" We have used the scopolamin treatment of childbirth in two separate series of cases at the Johns Hopkins Hospital. But in neither series were the results satisfactory, nor did they in any way approach the claims made for the treatment. We expect to do more with it next year. In the meantime, my own experiences and conversation with Professor Krönig do not make me feel that the method really constitutes a great advance over those which are in use by American physicians.

" J. WHITRIDGE WILLIAMS,
" Professor of Obstetrics, Johns Hopkins Medical School."

" The mitigation of pains of childbirth has always been the anxious concern of physicians all over the world, but more than ever since the discovery of chloroform and ether and their use for this purpose. In recent years several methods have been proposed that it was hoped might prove superior to the agents formerly used. Among these was the hypodermic injection of morphia and

scopolamin to produce semi-consciousness and indifference to pain, or what the Germans call 'Twilight Sleep.' As long ago as 1903 a monograph appeared in Vienna, advocating this treatment. American physicians, quite as progressive as any others in the world, tried this method in our largest maternities. Among other places it was employed in the Maternity of the University of Pennsylvania, in a series of cases over a period of over two years. My experience with it coincided with that of my colleagues in this and other parts of the world. If enough morphia was given to abolish pain, there is too much danger of hemorrhage in the mother and asphyxia in the child. The scopolamin does not diminish pain, but simply quiets restlessness.

"As a member of the Gynecological Touring Club of America, in the summer of 1912 I had the privilege of observing this method at Freiburg in the clinic under the superintendence of Professors Krönig and Gauss. It was interesting to hear that the morphia was employed in a single moderate dose, followed by small quantities of scopolamin. Evidently the disadvantages of the treatment—hemorrhage and asphyxia—had necessitated this modification. My conclusion from this observation and from my own experience was that the quantity of two drugs being insufficient to abolish pain, the results secured in this clinic were partly psychological—that is, the patients were assured beforehand that there would be no suffering; were delivered in a quiet, dark room; were given one moderate dose of morphia and became temporarily under its effect; and, being told afterwards they had had no pain, probably left the institution impressed with that belief.

"Barton Cooke Hirst, M.D.,
"Professor of Obstetrics, University of Pennsylvania."

"In November, 1913, I spent four weeks in Freiburg, and had the opportunity to observe personally and study critically about ten cases of childbirth conducted in Prof. Krönig's own clinic. The impressions received and

opinions formed were decidedly unfavourable to the method of 'Twilight Sleep.'

"In all ten cases the birth pains were weakened and labour prolonged; in two of the women for almost two days. In three cases pituitrin had to be given to save the child from imminent asphyxia.

"In five cases instruments had to be used. In my opinion two of these were directly rendered necessary by the paralysing effects of the drugs scopolamin and morphine. Expensive lacerations resulted.

"Several of the women became delirious and so unruly that ether had to be administered in addition to the scopolamin and morphine, the result being that the infants were born narcotised and asphyxiated to a degree. One had convulsions for several days.

"All these occurrences confirmed my own experience with the drugs. I had used them when first proposed twelve years ago. At that time they were extensively employed in Europe and America, but were soon discontinued because they were found impracticable and dangerous.

"I visited the famous Maternities of Berlin, Vienna, Munich and Hiedelberg; in all of them upon inquiry I was told that this method had been tried and discarded.

"JOSEPH B. DELEE, A.M., M.D., F.A.C.S.,

"Professor of Obstetrics, North-Western University Medical School; Obstetrician to the Chicago Lying-in Hospital, etc. Author of *Principles and Practice of Obstetrics, Obstetrics for Nurses*, etc."

It does not seem characteristic of American justice to issue such blanket rejections as are contained in the foregoing repudiations of Twilight Sleep.

The most effective surface weapon which can be brought to bear on anything is to say, "I have tried it and it has failed." But we have a right to ask, "*How* did you try it?"

Did these obstetricians observe the carefully worked out regulations of Gauss—the man who, after laborious experi-

mentation, was at last able to formulate rules of procedure by which successful results could be contained ?

How many of the American obstetricians have ever read the Gauss publications ?

If these eminent doctors have failed so signally where so many European obstetricians have succeded, then it is clearly evident that the American methods of Twilight Sleep need entire revolutionising.

The other reports which you have read from many different parts of the world prove that when scopolamin-morphine is properly employed it constitutes a safe, reliable method for the relief of women in childbirth.

Let us take up these condemnations in turn.

Dr. Green, of Harvard, has abandoned Twilight Sleep (1) because of asphyxia of the child.

Let a European obstetrician answer this objection for us.

Dr. Max Salzberger, of Kulm, says :

" Only could asphyxia ever be proved to be due to scopolamin where it can also be proven that the injections caused an abnormal length of birth. For this, statistics would have to be kept of asphyxiated children born both with and without scopolamin injections."

If Dr. Green means by asphyxia that state of intoxication in the child, known in Germany as oligopnoea, then I shall ask you to turn back to Chapter XII.

Asphyxia and oligopnoea are two entirely different conditions. Asphyxia is always extremely dangerous, while oligopnoea is a temporary intoxication of the child which is conceded by general medical opinion to be without danger.

When a child is born in this intoxicated condition it is proof that the mother has been inadvertently overdosed, and overdosing can be avoided if the doctor employs the proper precautions ; therefore a high percentage of oligopnoeic children is an arraignment of the obstetrician and his careless technique, not of the method.

(2) " Because the effect of the drug on the mother is often uncertain and unless used with great care may cause unfavourable or dangerous results."

Regarding the uncertain effect upon the mother, as we know from the doctors' records there are *very* rare instances of patients who show an individual idiosyncrasy to scopolamin, but as Tichauer, Krönig and many other physicians point out, it would be most unfair to deprive thousands of women of the relief of Twilight Sleep, because of the eccentric constitution of one woman in, say, 5,000.

The mothers whose experiences I have transcribed in this book were not selected cases. Certainly none of these women reported uncertain results and their experiences are entirely characteristic.

In sixty-nine medical reports, only one doctor reports that there was any dissatisfaction with the method on the mother's part—two patients of Dr. Preller's expressed dissatisfaction. (See Chapter VIII.)

Any method of narcotisation necessitates "great care." We surely have a right to expect and demand from all physicians great care in the use of any chemical.

Those obstetricians who have followed Gauss' instructions to the letter, and who have conducted Twilight Sleep with "great care" do not report "unfavourable or dangerous results."

If a medical procedure is to be shunned merely because it demands great care on the part of the operator, then all major operations should be avoided for the same reason.

(3) "Moreover, we have other and safer measures for the relief of pain in labour."

Surely the world has a right to share Dr. Green's secret.

Europe would rejoice to hear of these "safer measures," for as August Johnen, of Mankarthof, says:

"At any rate, the scopolamin-morphine narcosis is the one which is to-day *the best* with regard to lessening the suffering at birth, and it surpasses the semi-narcosis of chloroform and ether on account of its easier and more convenient application as well as because of its *less dangerous* character."

Another American, Dr. Birchmore, speaks of scopolamin-morphine as the "ideal anaesthetic," an anaesthetic which is "without risk to either mother or child."

o

Dr. Williams, of Johns Hopkins, says he has employed scopolamin-morphine in two separate series of cases without satisfactory results, nor did they in any way approach the claims made for the method.

Dr. Williams does not state the dose employed. If he did not get the results " claimed for the method," it argues that he did not obey the rules of that method. However, as Dr. Williams says he expects to do more with scopolamin-morphine next year, it shows at least that he is open-minded, and hopes to profit by former mistakes—for such open-mindedness, mothers should be grateful and full of admiration.

Dr. Hirst, of the University of Pennsylvania, says :

" My experience coincided with that of my colleagues in this and other parts of the world. If enough morphia is given to abolish pain, there is too much danger of hemorrhage in the mother and asphyxia in the child. The scopolamin does not diminish pain, but quiets restlessness."

Let us take up his objection backwards :

" Scopolamin does not diminish pain, but simply quiets restlessness."

Dr. Hirst completely ignores the fact that the combination of scopolamin with morphine forms a practically new drug.

To quote Gauss :

" As a matter of fact, recent laboratory researches have made it appear that in scopolamin-morphine we have not, as was formerly believed, two independent substances acting in conjunction, but a new combination which acts in a completely different way from its individual components."

Tichauer says :

" The peculiarity of this anaesthetic consists in the fact that each component assists the narcotic action of the other, whilst in other respects they are mutually antagonistic."

Preller, of Manheim, says :

" The combined drugs act mainly upon the nervous sys tem."

Of the effect of scopolamin, Krönig says :

" Scopolamin brings about a disturbance of the circulation of such a kind that the pain perceived by the nerves is not felt by the woman ; there is a disturbance of association which makes the apperception of pain impossible."

Here are some other professional opinions on the workings of scopolamin :

Ernst :

" Before sleep begins, scopolamin produces a diminution of the reasoning powers of the brain."

Dr. Gertrude Slawyk, of Strassburg :

" The effect of scopolamin upon the human brain constitutes the drug as a much used sedative and hypnotic chemical."

According to the investigations of Finck :

" By scopolamin, the certex of the cerebrum is completely cut off from the reflex columns of the spinal cord."

The alienists agree that scopolamin has a direct effect upon the brain. Sohrt and Bumke (alienists) describe scopolamin as having " the psychical effect of decreasing excitability of the brain." It is the disorganising effect of scopolamin upon the memory which is the foundation upon which Twilight Sleep is based.

" If enough morphia is given to abolish pain, there is much danger of hemorrhage in the mother."

In answer to this statement of Dr. Hirst's, it is well to remember that Gauss' average blood loss in his *first* 500 cases was only 382 g. In the statistics of his first 1000 cases, it is proven that in 92·8 per cent. of the cases the blood loss was normal.

Read on further. Dr. Hirst says :

" It was interesting to hear "—at the Freiburg Clinic—" that the morphia was employed in a single moderate dose followed by small quantities of scopolamin. Evidently the disadvantages of the treatment—hemorrhage and asphyxia—had necessitated this modification."

Dr. Hirst confesses in this remark that he knows absolutely nothing of the Gauss method. Gauss says in his Karlsruhe address of 1911: " In the six years of the Dämmerschlaf there has been no change in the technique."

Only in Gauss' very first experiments was too much morphine ever employed—the dose then being ·015 g. for first injection and ·005 g. for subsequent ones. This dose was quickly reformed to the present single injection of ·01 g. morphine, not because of hemorrhage, but because Gauss considered the morphine responsible for the intoxication of a certain percentage of the children.

That hemorrhage is not a "disadvantage of the treatment" is proven by the following reports of European obstetricians.

Frigyesi:

"No serious cases of atonic hemorrhage."

Mayer:

"No atonic hemorrhage."

Buist, of Dundee:

"Evidence of atonic bleeding is not decisive."

Krönig:

"Loss of blood after birth does not exceed physiological quantity."

Cremer:

"Atonic hemorrhage and other accessory effects cannot, without further definite proof, be laid at the door of scopolamin-morphine."

Ziffer:

"No increase of blood worth mentioning."

Weingarten:

"No severe hemorrhage in the period of after-birth was observed."

Even in Hocheisen's dreadful series of mismanaged cases he only had five cases of atonic hemorrhage!

And here is an American who changed his first opinion on this matter:

Dr. F. S. Newell said at the American Gynecological Society, 1906:

"Scopolamin-morphine does not often give trouble, nor does it interfere with labour, but a tendency to relaxation of uterus and hemorrhage is a danger."

In a report on further experiments in 1907 with 123 cases, he says:

" No hemorrhages. Rarely any relaxation of uterus."

As for Dr. Hirst's statement: " My experience coincided with that of my colleagues in this and other parts of the world," a study of the reports from " other parts of the world " proves that Dr. Hirst and his American colleagues hold a very isolated and lonely position on this question of Twilight Sleep.

The almost theatrical conclusion reached by Dr. Hirst is really the most original one which has been arrived at by any obstetrician.

Here it is:

" My conclusion, from this observation and from my own experience, was that the quantity of the two drugs being insufficient to abolish pain, the results secured in this clinic were partly psychological—that is, the patients were assured beforehand that there would be no suffering, were delivered in a quiet room, were given one moderate dose of morphia, and became temporarily under its effect, and being told afterward that they had had no pain probably left the institution impressed with that belief."

So Dr. Hirst concludes that the Twilight Sleep is entirely a manifestation of Christian Science or New Thought, and that all the European obstetricians are entirely deluded in placing it in the realm of scientific obstetrics. If we must believe Dr. Hirst and conclude all European obstetricians, surgeons and alienists to be entirely wrong in attributing narcotising qualities to this combination of scopolamin and morphine, can we then believe that Krönig and Gauss have been able, by mere mental suggestion, to fool over 5,000 women into believing that they were entirely oblivious of the entire process of birth? Is it credible that these women, after being " temporarily under the effect " of the *very small* injection of ·01 g. morphine, on " being told afterward that they had had no pain left the institution impressed with that belief? "

Really, as Dr. Krönig says, it shows " the desperate corner into which the opponents are driven."

Dr. De Lee, of the North-Western University, spent the extended period of four weeks " personally observing and

critically studying *about*[1] ten cases of childbirth conducted in Prof. Krönig's own clinic."

After this profound and prolonged critical study, Dr. De Lee is able to dispose, in a few words, of a method which Drs. Krönig and Gauss have studied for over nine years.

"The impressions received and opinions formed were decidedly unfavourable to the method of Twilight Sleep. In *all*[1] ten cases pains were prolonged."

Here are the opinions of European doctors on this side of the question :

Brodski, of Moscow (200 births) :

"The narcosis has no unfavourable effect upon duration of birth."

Beruti, of Buenos Aires (600 births) :

"No essential influence upon process of physiological birth."

Bass, of the Chrobek Clinic of Vienna (107 births) :

"The pains were never slackened. Scopolamin-morphine never caused the slightest retardation of birth."

Laurendean :

"No unfavourable influence on the birth pains."

Ziffer :

"Retardation of birth was only observed five times, but this was never due to injections. In general, a regulating action on the birth pains was observed."

Mayer, of Marburg :

"Out of 50 cases only in two instances were the labour pains less, and even in these cases it cannot be said that scopolamin was to blame. Diminution of the labour pains by scopolamin-morphine has never been conclusively proved.

Constance E. Long, of London :

"Protraction of birth beyond the average duration was not observed."

Weingarten, of Giessen :

"A reduction in the strength of labour did not occur in any case. On the contrary, the pains were only influenced favourably. In some cases the intervals were shorter, and in other cases violent pains occurring at too short intervals were made normal."

[1] Italics are mine.

Preller, of Manheim :

" The duration of birth was not appreciably increased."

Frigyesi, of Budapest :

" On the whole no lengthening of the total time of birth was noticeable."

Wartapetian, of Jena :

" The intensity and frequency of the pains was very little affected."

Lehmann, of Karlsruhe, though employing much larger doses than those of Gauss says :

" There is no appreciable deleterious influence upon the course of birth."

Tichauer :

" From the results of all statistics we are certainly entitled to say that at the worst the birth is only retarded to a quite inappreciable extent."

Von Steinbüchel :

" No weakening of labour."

Puschnig :

" The labour is regulated ; the co-operation of mother and the period of after-birth are normal."

Pisarewski :

" The labour and birth process are accelerated."

Tichauer says of Dietschy, Fabre and Bourrett :

" Where effect on labour pains and length of birth are concerned, their results correspond with those of Gauss."

Matwjejew :

" Matwjejew observed acceleration of the birth process."

As far back as Gauss' first report, the duration of his Twilight Sleep births only averaged sixteen hours and eleven minutes.

Even in Hocheisen's 100 mismanaged cases, in 64 instances the birth pangs were not unfavourably influenced, and in some cases even increased in regularity and strength.

Krönig says :

" If the drug is administered in the proper doses no unfavourable influences upon the course of birth can be proved."

To quote Dr. De Lee again :

" In five cases instruments had to be used. In my opinion two of these were directly rendered necessary by the paralysing effects of the drugs scopolamin and morphine."

In Gauss' statistics dealing with his first 1000 births, the total percentage of forceps was 7.32 per cent., while the percentage of forceps in the last 500 of these cases was only 4·95 per cent.

To quote Gauss:

" In 163 private scopolamin births not included in my 1000 clinical cases I did not use the forceps in a *single* instance."

In 1911 in his Karlsruhe address Gauss says: " The frequency of forceps at the Freiburg Frauenklinik has settled down to an average 6 to 7 per cent."

Dr. De Lee says:

" Extensive lacerations resulted."

The fact that almost every mother delivered at the Frauenklinik is able to get up the first day after birth proves it untrue that mothers are frequently lacerated. It is interesting to here recall all that Dr. Birchmore (also an American) has said on the subject of rupture of the perineum, and how especially he pointed out the reasons why there is less danger of lacerations when scopolamin-morphine is employed. (See Chapter IX.)

Dr. De Lee's assertion that several women became delirious and so unruly that ether had to be administered —one having convulsions for days—is in such contradiction to all that Krönig, Gauss and Siegel have reported that it seems unnecessary to add more conclusive testimony. Dr. Siegel's low percentage of rupture of the perineum, 7·5 per cent., proves the great quietude of the patients under scopolamin-morphine.

Dr. De Lee furthermore says:

" All these occurrences confirmed my own experience with the drug." What frightful mistakes in technique and dosage there must have been if Dr. De Lee's patients always suffered from weakened labour, forceps, lacerations, delirium and convulsions.

He goes on to say of his experience with scopolamin-morphine.

"*I* had used them when first proposed twelve years ago. At that time they were extensively employed in Europe and America, but were soon discontinued, because they were found unpractical and dangerous."

Von Steinbüchel made the first experiment with scopolamin-morphine in childbirth in 1903—only eleven years ago. Up to that time this combination had only been employed by Schneiderlin and Korff in surgery.

The next obstetrical experiments following von Steinbüchel's publication of his results were those made by Wartapetian at the Woman Hospital at Jena. Next followed the experiments of Weingarten at Giessen. These were absolutely the *only* early obstetrical experiments with scopolamin-morphine.

So we see that "twelve years ago" no use of scopolamin-morphine in childbirth had ever been made. Dr. De Lee's claim that these drugs were at that time, 1902, "extensively employed in Europe and America" is entirely unsupported by all medical literature.

As for the use of scopolamin-morphine being "soon discontinued, because they were found unpractical and dangerous," I need only refer you to the reports contained in this book, which show to what extent experiments are still being continued throughout Europe and Great Britain with ever-increasing good results.

"I visited the famous maternities of Berlin, Vienna, Munich and Heidelberg, and in all of them upon inquiry I was told that the method had been tried and discarded."

If the method has been abandoned at the Berlin Charité we of course know why—because of Hocheisen's failure and Bumm's opposition, but what about the Berliner Klinic and Dr. Bruno Bosse's great success with Twilight Sleep?

In Vienna, Twilight Sleep is employed at the Chrobac Clinic, the early experiments there being first reported upon by Dr. Oscar Bass.

Should any mother in Munich desire painless childbirth

she may obtain it by applying to Dr. Doderlein, or his assistant Dr. A. Zinsmeister, at the Munich Frauenklinik. They report in 1913 that this "semi-narcosis is a great blessing to the mothers."

As for Heidelberg I have no records from this city so I cannot refute Dr. De Lee's statement that the method has there been tried and discarded. However, Lehmann of Karlsruhe and Krönig and Gauss of Freiburg are to be reached by only a few hours' travel from Heidelberg, so Twilight Sleep is fortunately within the reach of all Heidelberg mothers.

Now I want to say a few words in regard to the " investigations " which were made by visiting physicians—including the Americans—in Freiburg.

Unfortunately, both for Krönig and Gauss as well as the visiting doctors, it is only possible that medical visitors be permitted to witness the births in the fourth-class free wards. The German physicians of this ward are in the earliest process of training; they must in fact remain here for six years before proceeding to higher wards. The fourth-class midwives are also in their initial stage of training. Naturally the cases of these men and these nurses are by no means representative, and Twilight Sleep as here conducted is a very different matter from the Twilight Sleep of Krönig and Gauss in the first-class ward. It is just the difference that is to be expected in any work that is being done on the one side by amateurs and on the other hand by experts.

To show you the difference in the results obtained in the different wards and how much separate rooms, exterior conditions and the personal science of the doctors has to do with successful Dämmerschlaf I want to give you the following statistics of a series of 600 births occurring in the four wards of the Frauenklinik.

In the first ward (where the patients are in separate rooms, and there is no examination by students) amnesia was obtained in 81·81 per cent.

In the second class (where there are a number of patients

at the same time, but no examination by students) amnesia was otained in 70·5 per cent.

In the third class (where there are a larger number of patients together and examination by students) amnesia in 61·10 per cent.

Furthermore, in the yet unpublished record made by Dr. Kurt Hellwig, of the Frauenklinik, on 600 births extending from August, 1911, to December, 1912 (when there had been 3,600 Dämmerschlaf births at the Frauenklinik), Dr. Hellwig draws especial attention to the contrast of the figures of successful Twilight Sleep in the first and second class wards from those of the third and fourth class: 1st class 73·3 per cent.; 2nd class, 70·4 per cent. In the 3rd class 51·6 per cent.; 4th class 53·2 per cent.

Moreover, during the past year, as you have read, the new simplified method of Dr. Siegel was being tried out in the fourth ward of the Frauenklinik.

The visiting physicians, after witnessing a few of these wholly unrepresentative births, arrive at positive conclusions on the merits or demerits of the method of Twilight Sleep. When, as is the case of a body of visiting physicians, Krönig or Gauss make addresses to the physicians, these addresses are delivered in German, and are therefore of little assistance to doctors who do not understand that language.

When Prof. Krönig and Dr. Gauss were planning to deliver addresses at the foreign meetings of Medical Associations (such as Gauss at Chicago and Krönig at Sheffield) they prepared their papers in German, and these were then translated into English by Mr. Hill, of the Berlitz School in Freiburg. The papers were then carefully studied and their English mastered.

With only a limited knowledge of English, when either Krönig or Gauss attempt to make extempore speeches in our language, the result is picturesque but not exactly classic.

(Here is an example of Dr. Gauss' piquant English. Speaking of his handwriting, which is rather bold, he said, "My pen she is large.")

There are no published translations in English of Gauss'

papers on the subject, and doctors came to Freiburg and went away in ignorance of all that he has written upon Twilight Sleep. To one American doctor I loaned my translations, and this doctor afterward told me if the American doctors could only get English translations of Gauss, they would in a few hours be much better able to grasp the idea of the method than they were after witnessing a limited number of births in the fourth-class ward.

We will now consider the charge brought against Krönig and Gauss by the American medical journals, of "instigating or endorsing such sensational puffs for themselves" —this refers to the publicity which has been given the method of Twilight Sleep by other writers and myself in American magazines.

Krönig and Gauss do not need or desire exploitation; in fact, they made it as difficult as possible for a journalist to obtain information at the Frauenklinik, but they could not close the mouths of grateful mothers who had there had their children under Twilight Sleep; they could not prevent one from obtaining and translating Gauss' writings on the subject; they could not close the University Library with its volumes of medical magazines containing the records of the past eleven years' experimentation with scopolamin-morphine on the Continent; they could not prevent a sincere student from collecting data from the rest of the medical world where ever Twilight Sleep has been tried.

The Frauenklinik is not run for money; it is a State institution and is endowed by the Grand Duke of Baden. It is a small hospital and can only accommodate a limited number of first-class patients, therefore American mothers were not particularly welcomed, but they could not with humanity be turned away after they had come from such a distance to beg for painless delivery.

The American mother, however, who occupied a first-class room in the Frauenklinik at an absurdly low cost, could not escape the unpleasant realisation that she was practically accepting the hospitality of the Grand Duke of Baden, for she was occupying a room and being benefitted

by terms planned for the subjects of the Grand Duke only.

Drs. Krönig and Gauss—absorbed as they were, the past year, in their investigations of radium—did not by any means enjoy the vast number of visiting physicians from abroad who, awakening at last to the wonders of Twilight Sleep, came and begged to be shown. One of the doctors of the Frauenklinik naïvely complained: "It makes me so nervous to have eleven strange doctors watching me."

Krönig and Gauss did not want to be interrupted and bothered, and as Dr. Krönig said to one American doctor, who was criticising the method: "Why do you come here? We don't ask you to—we don't want you."

The doctor replied: "What choice have we? We must find out about this thing, and to do so we have to come to the fountain-head."

It is absolutely unfair to the entire staff of the Frauenklinik to insinuate, as *The Journal of the American Medical Association of Chicago* has done, that these doctors have shown "an advertising initiative which bids fair to rival Friedmann."

For the advertisement which Twilight Sleep has had we must blame the thankful mothers—if blame there be—who desire that their sister-mothers may know the wonders of this method. These mothers feel that the opposition of the American physicians is unfair and prejudiced, and furthermore in some cases unreliable, because based on snapshot views of Twilight Sleep.

There is something curiously sardonic in the following fact: After the most bitter opposition to the Freiburg method had come from the American medical profession, Twilight Sleep to-day in the Freiburg Frauenklinik is almost dependent for its continuance upon one American physician.

This doctor came to Freiburg with other Americans to study the Dämmerschlaf, and he was there when war was declared.

Dr. Krönig had to leave immediately to take charge of a large hospital for the wounded near the fighting line in

Alsace-Lorraine outside of Karlsruhe; Dr. Schneider had gone to the front at the outbreak of war; Dr. Gauss went with the forces as surgeon and reserve for the aeroplane service, and all the other German doctors, except one, were with the army, so the poor Frauenklinik was almost depleted.

The head nurse (Oberin), to whose devoted co-operation Krönig and Gauss owe so much of their successful development of Twilight Sleep, is a member of the Red Cross Baden Frauenverein; all her desires naturally led her to want to join the army at the Front, but she soon saw she would be far more needed at the Frauenklinik by the mothers who, war or no war, must continue to bring children into the world; so, unselfishly putting aside her own impulses, she remained in Freiburg at her post.

The head nurse appealed to this visiting American doctor to stay and assist her in conducting the cases of Twilight Sleep; he promised to remain if possible throughout the war. So we have the singular anomaly of an American providing painless childbirth for the German mothers. It seems after all but the just payment of a debt which America owed Freiburg for the relief which the Frauenklinik had brought American mothers.

AN AMERICAN DOCTOR WHO WAS CONVERTED TO TWILIGHT SLEEP.

Here is the experience of W. H. Wellington Knipe, A.M., M.D., Adjunct Professor of Obstetrics, New York Post Graduate Medical School and Hospital; Attending Obstretrician, Gouverneur Hospital.

Dr. Knipe spent a fortnight in Freiburg in July. He came there with almost as much prejudice against the method as has been shown by the other American doctors, whose opinions are quoted in the beginning of this chapter; now hear, in his own words, how Dr. Knipe changed his opinion:

[1] "Having used scopolamin-morphine in my hospital

[1] From *The Modern Hospital.* Vol. III. No. 4. Oct., 1914. Published in St. Louis. Pp. 250-251.

work several years ago and having discarded the method as dangerous, I entered Freiburg a sceptic, and it was only after repeated demonstrations of successful Twilight Sleep that at last I became convert and I was forced to admit the poor results that we had obtained previously with scopolamin-morphine were due to the fact that we did not follow the Freiburg rules."

Dr. Knipe has here voiced the truth about the attitude of all the American doctors who have discarded and then opposed the method; he furthermore honestly confesses that the American failures were " due to the fact that we did not follow the Freiburg rules."

Dr. Knipe's next sentence is important both as a prophecy and an acknowledgment of the importance of Twilight Sleep.

" Inasmuch as the Freiburg treatment is bound to become the method of the future, it will become necessary for the hospital to have proper accommodations for these cases."

The title of Dr. Knipe's paper is " Twilight Sleep from the Hospital Viewpoint."

He continues:

" The one requisite for the proper induction of Twilight Sleep is quiet.

" The proper location of the delivery-room is an inside court where the least possible noise obtains."

In Freiburg, the ward delivery-room opens on to the courtyard in which there are trees and flowers; the only sounds which disturb the quiet of the court are the songs of birds and the occasional rubber-footed entrance of a motor car.

Often the groups of women in this court suggest a scene lifted bodily from light opera—which may seem an incongruous simile considering the portent of these women's presence at the Frauenklinik—these mothers are frequently peasants from the Black Forest who are arrayed in full skirts, and be-ribboned picturesque head-gear—costumes which we foreigners only see upon the stage when at home.

Here the mothers-to-be sit in serene patience in the sunlight and shade awaiting their hour of delivery—serene and

unafraid, for they realize that in Twilight Sleep they will be mercifully oblivious of the trial of childbirth.

To quote Dr. Knipe again :

" All care should be exercised that the noise from the rest of the hospital should not reach the Twilight room. This quiet may be procured by double doors, padded doors, rubber matting, etc. In the private operating-room, where only one patient is at a time, it will be relatively easy to obtain the desired quiet, but in the ward operating-room where there may be two or three patients at one time—which of course is unavoidable in a large service—one patient may disturb another to some degree.

" Besides quiet, means must be used to obtain darkness. It is not necessary that this should be intense but all care should be used to prevent the entrance of bright light.

" During the inducing of Twilight Sleep the patient is kept in the delivery-room and in bed, and inasmuch as the process consumes generally several hours, it is impossible to keep the patient on the hard operating-table all this while. At Freiburg the delivery-room contains three beds, and it is in these beds that the women are delivered, the operating-table being only used for those cases requiring operative interference such as forceps, version " (turning of the child) " etc. Each bed is screened from its neighbour by curtains of muslin, and the rest of the delivery-room is like an ordinary operating-room with the regulation aseptic furniture, sterile receptacles, instruments, trays, etc."

I remember observing once that the only unsanitary, unwashable thing in the room was a calendar.

Dr. Knipe lays great stress on the importance of the proper nursing in Twilight Sleep.

The nurses at the Freiburg Frauenklinik are frequently Black Forest peasants, who are physically strong and mentally intelligent, responding easily to training. Dr. Knipe says these nurses must have had at least four months' experience as assistants in the delivery-room before being placed in charge of a case. The nurse examines the heart of the unborn child every fifteen minutes, tests the patient's various reflexes and gives the injections accordingly,

subject to the instructions of the attending doctor, who comes regularly every hour to examine the Twilight Sleep patient. These nurses become peculiarly expert and, as Dr. Knipe says, "it will become necessary for us in America to take especially intelligent nurses who are interested in this work and train them in this particular method" if we are to have a similar success to that attained in Freiburg.

Dr. Knipe speaks of the Straub Scopolia Haltbar (invariable scopolamin), which is made by the addition of "the sexatonic alcohol mannit to the scopolamin solution;" he is however mistaken in his statement that this preparation is "manufactured by one of the German drug firms"; Hoffman La Roche's factory is situated in Switzerland, and since the war began, the firm have issued a statement declaring they are not German.

Dr. Knipe says, "there seems to be no reason why the chemist should not make up a stable solution for hospital use by the addition of mannit so that 1 c.c. of the solution equals ·0003 g. scopolamin."

The bed exercises of which I have written in a former chapter, from what I have seen in the first-class ward, are described by Dr. Knipe as follows:

"Within twenty-four hours after the birth of the child at Freiburg passive exercises are instituted of the upper extremity, abdomen and back and lower extremities and perineum of the patient, and it will become necessary in hospital work to instruct the nurses in the method of giving these exercises."

In addition to describing one of the exercises which I have already given, Dr. Knipe gives another:

"Separating the knees with the patient resisting, and in approximating" (bringing together again) "the knees against the patient's resistance. The patients take kindly to these exercises and claim they feel very much better after them."

After the exercises have been continued night and morning he says "it is surprising with what rapidity the uterus involutes" (shrinks back to the normal).

"If the patient is running a temperature or if there has

been a bad laceration of the perineum, the patient is kept in bed for a longer period and the exercises are not taken."

Dr. Knipe then writes of the necessity of keeping a chart of accurate notes on the conduct of the birth such as is kept at the Frauenklinik (I have given this chart in Chapter V), and he says that " it is only by keeping strict record of these conditions "—amount of injections, character of pains, voluntary muscular efforts of the patient, after-birth hemorrhage, the condition of the new born, etc.—" that one is able to judge of the value of the method."

HERE IS A STURDY BRITISH TWILIGHT SLEEP BOY.

TWO TWILIGHT SLEEP MOTHERS. THE ONE STANDING BY THE DOOR IS THE AMERICAN WRITER, MRS. MARY BOYD.

CHAPTER XVIII

THE BRITISH SUCCESS WITH TWILIGHT SLEEP

THE most striking feature of the British reports on scopolamin-morphine is the perfectly fair, unprejudiced, open-minded attitude of the British doctor.

As you now know, from Chapter III, Twilight Sleep is no longer a mere experiment in Britain; it is the same settled institution that it is in Germany and many other foreign countries.

There is no doubt that within a few years every doctor in Great Britain will employ scopolamin-morphine in birth just as he now employs chloroform in operations.

From my personal inquiry of the British doctors I find the majority of them employ the scopolamin made by Burroughs Wellcome. Sir Halliday Croom and Dr. Constance Long both spoke particularly of the great purity and dependability of the Burroughs Wellcome drugs.

While these reports which are given in this chapter naturally deal with the early experiments of the British doctors with Twilight Sleep, I am able to assure you that the doctors—except Dr. Corbett, who is no longer attending maternity cases—whose reports I here give, are to-day firm adherents of the method, and as Sir Halliday Croom said: "It is now such an every-day affair to administer scopolamin-morphine to our patients we no longer think of keeping records of these births."

SIR JOHN HALLIDAY CROOM[1]

Sir Halliday Croom's report, made in 1908, deals with his first 62 cases.

[1] *A Short Experience of Scopolamin-morphine Narcosis in Labour;* by Sir J. Halliday Croom, M.D., F.R.C.S.E., Professor of Midwifery, University of Edinburgh. Obstetrical Transactions. Edinburgh. Vol. XXXIV. 1908-1909.

He began his experiments with the small dose of $\frac{1}{400}$th of a grain of scopolamin with $\frac{1}{6}$th of a grain of morphine with uneven results but a diminishing of the painfulness of uterine contractions although consciousness was in no way abrogated.

" Strangely enough," writes Sir Halliday Croom," with this dose the patients all complained of excessive thirst. The effect upon the child was absolutely nil."

He eventually increased the dose to $\frac{1}{100}$th of a grain of scopolamin to $\frac{1}{6}$th of a grain of morphine and found the results much more satisfactory.

" The painfulness of the contractions was in some cases entirely abolished. The patients slept soundly in the intervals between the pains, and in most cases for one or two hours after the completion of labour. It is to be noted that with the larger dose of either $\frac{1}{200}$th or $\frac{1}{100}$th of a grain there was never any complaint of thirst such as was so striking with the smaller dose of $\frac{1}{400}$th of a grain of scopolamin.

" Seventy per cent. of the children in these cases were born vigorous; 27 per cent. required slight reviving, and 3 per cent. required thorough resuscitation. No children were lost.

" In 37 cases one injection of the drugs was sufficient to obtain the desired effect. In the other 25 cases one or other or both drugs were repeated in doses varying in the case of scopolamin from $\frac{1}{400}$th to $\frac{1}{100}$th of a grain.

Sir Halliday Croom found that the repetition of the scopolamin prolonged and slightly deepened the effects upon the mother and child, but the repetition of morphine caused a much more distinct increase in the effects, particularly upon the child. " So much so was this the case that latterly I gave up repeating morphia entirely."

Sir Halliday, after going into details of the effect of different doses on different groups of cases, continues :

" I gave the drug mainly in the second stage of labour, and found that the results were three-fold.

(1) "It acted as a soporific.[1]

(2) "It produced narcosis, and in some cases even complete anaesthesia.

(3) "It appeared to cause amnesia, abolishing remembrance of the suffering during labour.

"The drug was administered once or twice during the second stage, not oftener. The soporific effects were very marked as a rule, sleeping between the pains and only awakening to a certain limited extent during the acme of the pain. The pains themselves were very much modified, the patient complaining only of discomfort not actual pain.

"The sleep after labour lasted for two or three hours in most cases."

In two cases forceps were used and the patients delivered artificially without suffering.

"Perhaps even more striking is the fact that in almost all cases the memory of the pain suffered was either very much blurred, or altogether abolished. In several cases the patients woke up two or three hours after the completion of labour without any recollection whatever of what had taken place and could hardly be persuaded that their labours were over until their children were produced in evidence. In many cases the whole circumstances attending labour were a mere reminiscence, and the patients remembered the pain only in a vague manner as if they had occurred far away."

Where the drug was administered during the first stage of labour, it sometimes hastened the dilation of the cervix (neck of the womb).

"I noted no bad results whether to the heart, respiration or pulse, and even in the minority of patients who did not respond at once to the treatment there were no bad results.

"The only untoward effect, as far as my experience goes, is the fact that the child is often born sleepy and almost comatose, and remains so for some time after birth. The child is not actually still-born but it breathes only slowly,

[1] A medicine which produces sleep as distinguished from a mere anodyne, which only soothes.

does not cry and has all the appearance of being under the influence of the narcotic element. This has never been a serious complication, but one easily dealt with by the ordinary methods of revival, and no children's lives were sacrificed."

It is comforting to realise how much the last six years have changed Sir Halliday Croom's opinion as to the "untoward effect" on the child, for he now considers scopolamin-morphine without danger to the child, and says the child is only born sleepy when there has been faulty dosage of the mother. If the child should be born oligopnoeic Sir Halliday's maxim—as you may remember—is now: "Let them alone and they'll come to."

His many years' experience with Twilight Sleep has also altered the following opinion expressed after the first 62 cases:

"No untoward events occurred in the administration of the drug so far as the mothers were concerned, except, perhaps, a possible tendency to post-partum hemorrhage. In 3 of the 62 cases that was noticeable, though not to any dangerous extent."

These 3 cases must have been the ones which Sir Halliday said had been reported to him by other doctors attending the cases of scopolamin-morphine patients, for, as you may remember, he said to me that personally he had had no experience with a tendency, in his own patients, to after-birth hemorrhages.

"Of the 62 cases none were totally insusceptible to the drug, but it must be admitted that the susceptibility of patients varied very considerably. In one case the result was just the opposite from what was looked for, the patient becoming excited—almost violent—and required the administration of chloroform."

Sir Halliday Croom's long experience with the drugs has now produced such certainty of technique, these uncertain results are no longer experienced.

He finds that this method in private practice "enables one to avoid to a considerable extent the distress and anxiety to the relatives caused by the outcries of the sufferer.

Moreover, the drug can, without bad effect, be administered at a considerably earlier stage in labour than is the case with chloroform."

The method does not delay the early stages of birth. "In some cases it even seems to expedite the dilatation of the os, as I have already pointed out, and it certainly serves to tide the patient in comfort over what is to her so often the most tedious and trying part of labour. . . . As regards its effect on the duration of labour I am not convinced that it in any way hastens the process. At the same time, I do not think that it delays progress, because the scopolamin appears to counteract any influence which morphia might have in stopping or weakening the pains. I am inclined to think that, on the whole, the administration of scopolamin and morphia makes very little difference to the duration of labour."

Sir Halliday Croom considers the only counter indications for the use of Twilight Sleep are feebleness or irregularity of pains, or where the patients are physically weakened.

The best dose he has found to be $\frac{1}{200}$ of a grain scopolamin $+\frac{1}{6}$ of a grain morphine administered when the pains occur regularly at intervals of a few minutes.

"The scopolamin may require to be repeated in the course of one and a half or two hours. As a rule, $\frac{1}{200}$ of a grain scopolamin is sufficient as a second dose.

"But in all cases the dosage—and this particularly refers to a second dose—must be gauged by the patient's state of mind as to wakefulness or excitement, and by her power of perception and memory of what is going on around her."

Sir Halliday Croom employs scopolamin in the tabloid form, as prepared by Burroughs & Wellcome, which is very carefully standardised as to dosage.

The finale of this most valuable paper on Twilight Sleep is:

"On the whole, I am of the opinion that there can be no question that in scopolamin-morphia narcosis we have an efficient means of controlling the pain of labour, and one that is practically safe when ordinary precautions are taken."

DR. CONSTANCE LONG

At a meeting held on January 7, 1913, the President of The Association of Registered Medical Women, Dr. Constance Long, read a paper on "Scopolamin-Morphine in Labour."[1]

She had used these drugs in private practice, and had not found that labour had been protracted beyond the average time, nor had the infant been in any way endangered in spite of a certain amount of cyanosis (a congestion of the venous system so that the blue blood of the veins discolours the skin) at birth. "The dangers to the child have been overstated by British writers.

"Scopolamin is a perfectly safe drug for the mother provided its dosage is understood. For the safety of the child the initial dose of $\frac{1}{6}$ to $\frac{1}{8}$ of a grain of morphine should not be repeated.

"The effect of the drug in modifying labour pains, combined with the amnesia commonly produced, might abolish the dread of parturition" (the bringing forth of children) "and thus induce a rise in the birth-rate.

"The constant attendance of the physician is not essential, provided an intelligent nurse is in charge.

"The patient should be kept on her side until the effects of the drug have passed off, and the same precaution should be observed with regard to the infant."

Dr. Long tells me that her first injection is $\frac{1}{100}$ of a grain scopolamin, to $\frac{1}{6}$ or $\frac{1}{8}$ of a grain morphine; the second injection is again $\frac{1}{100}$ of a grain scopolamin alone, or otherwise $\frac{1}{200}$ of a grain scopolamin.

She employs the memory test, gauging her dosage entirely by the apperception of the patient.

DR. R. C. BUIST[2]

The following paper was read by Dr. Buist at the meeting of the British Medical Association at Sheffield, in 1908.

[1] *British Medical Journal.* January to June. 1913.

[2] *The Use of Hyoscine-morphine Anaesthesia in Natural Labour.* By Robert Cochrane Buist, M.D., C.M., Edinburgh. *British Med. Journal.* July to December, 1908. Vol. II.

Dr. Krönig, who was present, had just presented another paper on "Scopolamin-Morphine Narcosis in Labour" immediately before Dr. Buist. I will not here reproduce Dr. Krönig's paper, as it differs but little from his publication on the subject, which I have already given in Chapters I. and X.

Dr. Buist's address was as follows:

"Soon after the appearance of Gauss' paper I gave my ward sister instructions that in any cases where the labour became distressing, the patient should have an injection of hyoscine and morphine. In the earlier cases I was summoned to each case, and of the later cases I have seen a large proportion at some stage of their progress.

"The practical conclusion is that I use the method freely in private practice, that when I am in charge of the maternity wards it is used as a routine method, and that the house-surgeon uses it when I am in charge of the out-patient department.

"For the best results it requires a little experience in dosage, but properly employed it is capable of saving the practitioner many a worrying day and weary night, and the patient much exhausting restlessness, and some operative deliveries."

Dr. Buist reports on only 65 selected cases—31 were mothers bearing first children—the records of which were made by pupil nurses, whose task was to observe the uterine contractions.

"The uterine contractions seemed essentially to be unaffected. In case after case their interval is the same before and after the injection, and if in some cases the patient goes fully to sleep she is found to have made progress when she is again examined. In many cases the contractions became more regular."

In the hospital Dr. Buist employs ·00065 g. (=$\frac{1}{100}$ of a grain) scopolamin + ·01 g. (= $\frac{1}{6}$ of a grain) morphine, but in private practice he has generally found ·016 g. (= $\frac{1}{4}$ of a grain) morphine to be the more satisfactory dose.

Dr. Buist's rule for procedure is:

"Whenever your patient is distressed by the pains and

you expect the labour to last more than an hour, give an injection of hyoscine and morphine; if you expect it to last a considerable time, return in from three to four hours, and if necessary repeat the injection. The second dose may be of morphine alone, or of hyoscine alone, or of both, as you think necessary to reproduce the mental condition you desire. If you think from the examination that the contractions are really violent, lay stress on the morphine; if you think that the patient is reacting excessively to what contractions she has, emphasise the hyoscine."

In addition to Dr. Buist's experiences at this early time, his house-surgeon used the method in 30 cases with results parallel to Dr. Buist's.

The concluding words of this paper are:

"It is difficult to describe the attractions in private practice of a method which relieves the patient's suffering, while it allows labour to progress regularly, and which does not require the constant personal presence of the medical practitioner, as the obstetric anaesthesia with chloroform does."

In Chapter III I have told of Dr. Buist's continued and successful employment to-day of Twilight Sleep, both in private practice and the Dundee Royal Infirmary.

DR. DUDLEY CORBETT[1]

Dr. Corbett makes the following conclusions on the value of Twilight Sleep:

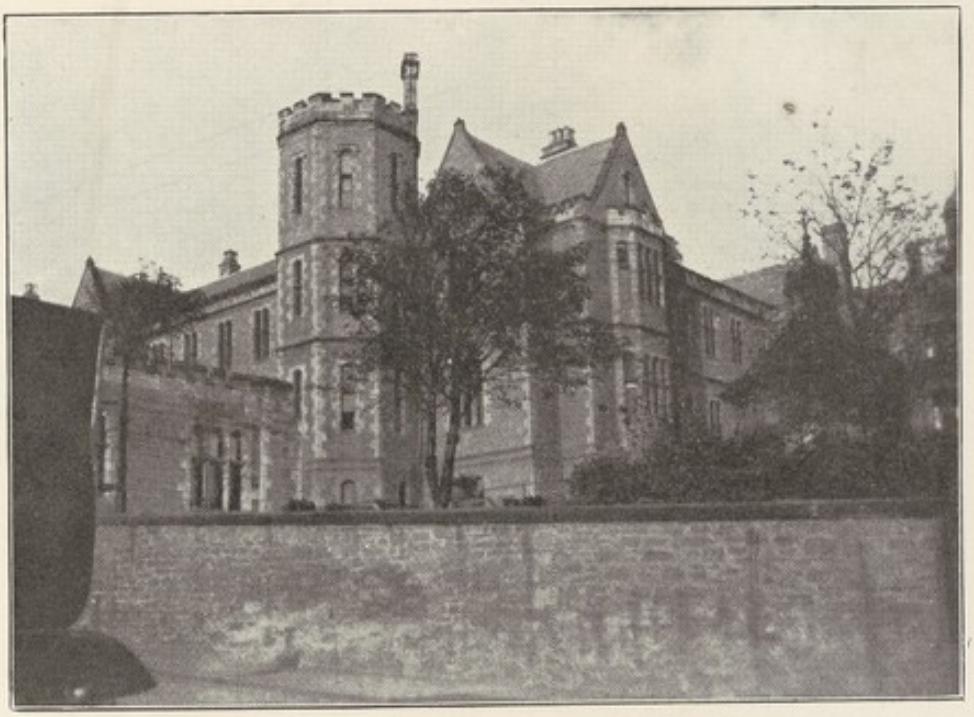
(1). "The scopolamin-morphine combination is of great value where hysteria and distress are manifest during the first stage of labour. If possible it should only be given in the first stage and not repeated.

(2). "No ill effects to the mother need be expected even with full and repeated doses.

(3). "No ill effects need be expected for the child, even where the mother has had full repeated doses, provided

[1] *The Use of Scopolamin-morphine in Labour.* By Dudley Corbett, M.A., M.B., B.Ch., Oxon. Late House Physician, General Lying-in-Hospital, York Road, Lambeth, S.E. *British Med. Journal*, April, 1911.

THE TWILIGHT SLEEP DAUGHTER OF AN ENGLISH MOTHER.



THE DUNDEE ROYAL INFIRMARY. SCOPOLAMIN-MORPHINE HAS HERE BEEN USED, IN THE MATERNITY WARDS, SINCE 1907.

the delivery does not take place at four hours or less from the time of the last dose, otherwise apnoea will ensue. On the other hand, where the drug is without effect on the mother it is not likely to affect the child, even if born within the four hours.

(4). " The cause of apnoea is probably the morphine, and so, where it is necessary to give the drug late in the first stage or early in the second, the morphine should not be given in larger doses than $\frac{1}{3}$ of a grain, or omitted.

(5). " A hot bath is the best treatment for the apnoea.

(6). " Strychnine may prove to be a useful addition to the mixture. It does not diminish the analgesic effect of the combined drugs, and it may help to prevent the apnoea of the child."

Dr. Corbett is now at St. Thomas' Hospital in London, and as he has forsaken this branch of medicine, he was unable to give me any further information on the subject of scopolamin-morphine.

DR. ARTHUR INNES [1]

Dr. Innes says :

" In the majority of cases the baby is born with little knowledge on the part of the mother, and certainly with little remembrance of pain.

" In several cases the freedom from pain has been remarkable. In one case of *primi para*" (first child) " where the os was of the size of a five-shilling piece, the baby was born without the knowledge of the mother, and it was then found that the placenta was adherent. After waiting for three-quarters of an hour it was decided to remove the placenta by separating it from the uterine wall. This proved a rather difficult matter, but in spite of that, the patient required no other anaesthetic, and her only complaint all the time that the manipulations were proceeded with, was that she was thirsty and would like a cup of tea."

There were no cases of anything approaching post-partum hemorrhage, nor did the convalescence seem slower.

[1] *Hyoscine-morphine Anaesthesia in General Practice.* By Arthur Innes, M.B., B.Ch. *The Practitioner.* 1912 I.

Dr. Innes says the pains do come a little more slowly, but that " the lessening of the tension on the nervous system of the patient is a great help.

" It seems to me that in this drug we have a great help to the parturient" (child-bearing) " woman, and that with a minimum of risk to herself or her child."

Dr. Innes' first experiments with Twilight Sleep were made in November, 1909.

DR. J. R. FREELAND AND DR. BETHEL A. H. SOLOMONS [1]

I am deeply indebted to Dr. Solomons for so kindly sending me the valuable pamphlet written by him and Dr. Freeland on scopolamin-morphine.

This pamphlet deals with 100 cases of *primi paræ*; they believed that the test of a comparatively new anaesthetic would be more valuable if cases of women bearing their first babies were selected, because average duration of labour is longer in such cases, and the occurrence of abnormalities, such as after-birth hemorrhage and adherent after-birth, are less common.

The reason their record is confined to 100 cases is that they only administered scopolamin-morphine when the labour ward was quiet and comparatively empty, and therefore stricter attention could be paid to both mother and child.

Drs. Freeland's and Solomons' experiments were the direct result of Dr. Krönig's paper read at Sheffield in 1908, and they followed as closely as they could the Krönig method of administration, with the exception of the fact that they often administered the drugs by mouth instead of by hypodermic injections.

The dosage decided upon after various experiments was $\frac{1}{200}$ of a grain of sco. + $\frac{1}{8}$ grain mor.

The morphine was not repeated in subsequent injections.

[1] *Scopolamin-morphine Anaesthesia in Labour.* By J. R. Freeland, M.D., Univ. Penn., L.M.; and Bethel A. H. Solomons, M.B., Univ. Dublin, L.M., Assistant Masters Rounda Hospital, Dublin. Printed for the authors by John Falconer, Dublin. Also published in *Brit. Med. Journal.* January, 1911.

Drs. Freeland and Solomons carefully avoided producing too deep a narcosis, saying:

"We consider the purpose of the drug fulfilled if the patient sleeps between the pains, waking up with more or less demonstration during the height of the contraction, and again falling to sleep when the pain is over."

This is what Gauss would call an ideal Twilight Sleep.

Drs. Freeland and Solomons selected patients who were particularly noisy and demonstrative in order to be able to say definitely how much effect the drug had on the sensibility of pain.

In 10 cases there was complete analgesia, the women having no knowledge of pain even when the child was born.

In 57 cases there was a marked effect, sleeping between pains and a great decrease of suffering.

In 20 cases the effect was fairly good, as far as relieving the pain to a certain extent, though the patients did not sleep at all.

In 13 cases there was no effect, due in 4 cases to vomiting of drug, and in 8 to their having received too small a dose.

In some of the cases showing prolongation of labour, it was due to the fact that the doctors deliberately chose "patients less capable of bearing pain—in other words those bound in any event to have a more or less protracted labour."

As for the effect on the child, they write:

"Much has been written about the dangers to the foetus" (the unborn child), "but from our cases we concluded that this has been exaggerated."

There was only one child born in a condition of apnoea, and the condition was attributed to morphine.

Drs. Freeland and Solomons say it is unnecessary to continuously watch the patient. They employ the same caution, mentioned by Dr. Long, of keeping the patient on her side to prevent the tongue falling back during the anaesthesia sleep.

They do not believe in keeping the room dark, as they feel it interferes with the nurse's watch for complications.

There were 19 cases of forceps, due in most part " to the selection of the cases, and the inclusion of cases of inertia."

There were two cases of post-partum hemorrhage occurring after the administration of chloroform for the use of forceps.

The conclusions reached by Drs. Freeland and Solomons are :

(1). " Scopolamin need not be given in larger doses than $\frac{1}{120}$ grain.

(2). " In the majority of cases it may be given advantageously by the mouth.

(3). " It is undesirable to keep patients in a darkened room whilst under its influence.

(4). " The patient should be carefully watched. This can be done equally well by the nurse as by the doctors.

(5). " No ill effects to mother or child need be expected to follow the rational administration of scopolamin.

(6). " Whilst its chief indication will be found during the first stage of labour, the fear of rapid delivery following its use is not a contra-indication."

Dr. Solomons informs me that he still uses scopolamin " on the lines set down in this paper."

The British reports form the strongest combined verdict on the merits of Twilight Sleep to be found anywhere.

There is positively no excuse for any woman in Great Britain to longer suffer in childbirth when she can go to British doctors of the highest professional standing and obtain the relief of Twilight Sleep.

CONCLUSION

I NOW make my last appeal to every woman who has read this book to take up the battle for painless childbirth where I have left off.

I have only been able to provide you the arms wherewith to fight; the real battle and its victory lies in your hands now.

Fight not only for yourselves, but fight for your sister-mothers, your sex, the cradle of the human race.

Realise to its fullest the tremendous importance of this relief of women in labour, the positive necessity of removing the dread of birth-pain from the mind of women, a dread which has steadily grown until it has developed into a social menace.

Since it has been known that I am writing a book on this subject, I have been appalled by the confidences of women; I have actually been told by unmarried women that they remained single because of their fear of the tortures of birth; mothers of only children have confessed that the terror of a repetition of the indelibly-impressed agony which they suffered in the birth of their first child has prevented them from ever having a second child; married women who have had no children have told, with the starved eyes of cheated motherhood, of the cowardice which has made them childless—they had heard too much of the agony through which other women had passed.

There are, however, other women to whom motherhood is the crowning glory of life, who say—and believe they mean it—that to have a child is worth going through the tortures of the Inquisition itself; but these women are rare and, in their way, as abnormal as the woman who avoids marriage through a cowardly fear of childbirth.

The normal human feeling is to abhor pain; to want to

banish pain from the world for oneself, and all one's fellow-creatures.

Pain is destructive, disintegrating, inharmonious, undermining, unnatural, unnecessary.

Of course after a woman finds she is to become a mother and feels within her the great mysterious workings of gestation, the growth in her body of a wondrous new life, that little life becomes to her far more important than her own ; as the months pass, verging toward the great climax when the life dependent on her shall assume its independence, the supernal sense of motherhood effaces all human instincts of fear and self-preservation, and the mother is willing to give her life, if need be, in order that her baby may be born safely. No man can ever fully realise the truth of this self-effacement of maternity, for no man has ever carried within his body the burden and the treasure of a child.

If a man loves a woman deeply he then suffers almost as much mentally as she suffers physically when the supreme hours of trial arrive. Men have written eloquently of men's torture at this time.

Twilight Sleep, therefore, concerns the men as vitally as it concerns the women.

I shall never forget the face of a husband banished from his wife's room during her childbirth at the Freiburg Frauenklinik ; his face was distorted with misery, pallid with terror. It was not the first time he had waited and watched through spectre-filled hours while the woman he loved lay behind a door sealed to him, for this was his fourth child.

The birth of the first had almost cost him his wife ; the second had been a repetition of the horrors of the first ; in the birth of the third child the mother had been saved, but the baby had had to be sacrificed, and the doctor attending had solemnly warned against further children. After some years of invalidism it was found that this woman was to become a mother again. Imagine that husband's state of mind, for he believed it to be the death-knell of his wife. Then he heard of Freiburg, of Twilight Sleep,

of a painless and safe method of childbirth. Within three days of having heard of the wonders of the scopolamin-morphine method he began the journey to Freiburg with his wife. Even Prof. Krönig and Dr. Gauss felt alarmed when they heard the shocking details of the former deliveries.

When the Twilight Sleep birth of the fourth child was over, Dr. Krönig said to the husband :

" Why were the forceps ever used on your wife ? There was certainly no structural reason. I never saw a more normal, spontaneous birth."

One week later this mother attended the christening of her boy-baby at the Cathedral !

Not long ago a Japanese doctor was discussing western medical methods with me, especially the wide-spread use of the forceps which he condemned.

He gave the following adage, which they apply in Japan to operative interference in birth :

" When the caterpillar is emerging from the cocoon, do not touch ; if you interfere, you may not only spoil the cocoon but you may kill the caterpillar."

The whole future welfare of the child is dependent on its proper advent into this world, and the entire after health of the mother lies in the balance during child-birth.

Many strong, healthy young girls become physical wrecks after the calamitous birth of a child.

It is not the reasonable sequel to romance that love should have a culminating agony and shattered health.

The kindling of love between a man and a woman is a wonderful thing ; the mating of those who love has a sacred beauty ; the merging of two lives into the life of a third is the holiest, most exquisite mystery in the world. The blossoming of this flower of the love of a man and woman should be a continuation of the beauty of all that has gone to its creation—but is it ? No. The culmination of love —the birth of the child—is surrounded only by thoughts of dread and torture.

As Dr. Birchmore has said : " The pains of maternity have

been a horrid and incontestible truth, but now these have vanished and the exhausting ordeal of motherhood is gone to be seen no more."

Through Twilight Sleep a new era has dawned for woman and through her for the whole human race.

In conclusion I append the following letter of Sir John Halliday Croom, M.D., F.R.C., S.E. Professor of Midwifery, University of Edinburgh, which he has graciously given us permission to here use.

25, Charlotte Square,
Edinburgh,
4th February, 1915.

Dear Mrs. Rion,

Naturally, the question of Twilight Sleep is one of very profound interest to the profession, and not less so to women themselves.

Since I wrote my first paper on the subject I have had an extended experience of scopolamin-morphin, up to the present month. Ever since its first introduction I have used it regularly in every private case under my care, rendering the whole process a dream, and without the slightest bad effects either to the mother or the child. Sometimes the baby has been a little drowsy, but was easily roused. I have used it regularly in the hospital here, but not so systematically as in private practice, because many of our patients are brought to the hospital in the process of labour, and the use of such a drug is contra-indicated. The results here have been likewise satisfactory, although I think hospital patients are not so easily placed under its influence as private ones, for obvious reasons. There have been no untoward events in the Maternity Hospital.

My confidence in its effect has increased year by year. I would like to say that the patients' enthusiasm over the drug is wonderful.

There is nothing more distressing than to observe the falling birth rate practically all over the world. It is due, to many complex causes, but a great many of the voluntarily sterile marriages are due to the fear and dread which women

have of child-bearing. This, so far as my personal experience is concerned, is a growing dread, and I feel sure is one of the many causes giving rise to the falling birth rate. Now, if a knowledge of Twilight Sleep were to become generally known amongst women, it would do a great deal to abrogate the first curse, and so relieve their minds of an overpowering dread.

Ever most faithfully yours,

J. HALLIDAY CROOM.

MEDICAL REFERENCES

AVARFFY, ELEK.—*Munch. Med. Wochenschrift.* 1909. p. 1196.

ABRASZANOW.—*Central Journal for Gynaecology, Leipzig.* 1910.

BIRCHMORE, WOODBRIDGE HALL.—*Medical Record.* Vol. LXXI. June, 1907.

BARDELEBEN, VON.—*Zeitschr. f. Geburtsh. u. Gyn.* No. LVII. p. 144.

BOESCH, EUGEN.—*Zentralbl. f. Gynak.* 1908. IV.

BLISNIANSKY, G.—*Zentralbl. f. Gynak. Liepz.* 1909.

BJORKENHEIM, EDV. A.—*Zentralblatt.* 1911.

BUIST, R. C.—(1) *Scotch Med. and English Jour.* July, 1907. (2) *Brit. Med. Jour.* July–Dec., 1908.

BERUTI, JOSUE A.—*The Medical Klinic.* 1909.

BUMKE.—*Monatsschrift für Psychiatric und Neurologie.* 1903. s. 62 and 124.

BRODSKI, W. A.—*Central Jour. for Gynaecology.* 1910.

BOSSE, BRUNO—(1) *Klinical Lectures on Gynaecology.* 1910. (2) *Report at Berlin Med. So.* 1911.

BUMM.—*Munch. Med. Wochenschr.* 1906.

BASS, OSCAR.—*Munch. Med. Wochenschr.* Vol. XI. 1907.

CROOM, SIR JOHN HALLIDAY.—*Obstetrical Transactions. Edinburgh.* Vol. XXXIV. 1908-09.

CORBETT, DUDLEY.—*Brit. Med. Journ.* April, 1911.

COTTERILL, DENNIS.—*Edinburgh Med. Jour.* Dec., 1909.

DURAND, LEON.—*Zentralblatt.* 1908.

DUMONT, LOUIS.—*Zentralblatt.* 1908.

ERNEST.—*Inaugural Dissertation.* Dorpat. 1893.

FREELAND, J. R.—*Brit. Med. Jour.* 1911.

FONYO, JANOS.—*Budapesti. ow. ujsag.* 1907.

FROMME, ARNOLD.—*Berlin Klinical Weekly.* 1912.
FRIGYESI, J.—(1) *Gesellsch. d. Aertze.* 1908. Budapest 1909. (2) *Gebiete der Gbh. und Gyn.* Berlin, 1909. Bd. I.
GAUSS, CARL J.—(1) *Med. Klin. Berlin.* 1906. II. (2) *Zentralbl. f. Gyn.* No. II, p. 33. (3) *Zentralbl. f. Gyn.* 1905. p. 274. (4) *Med. Klinik.* 1909, p. 722. (5) *Arch. f. Gyn.* LXXXIII, p. 579. (6) *Zeitschrift für Gebh. u. Gyn.* 1907. No. LIX. (7) *Karlsruhe Address* (unpublished). 1911.
GMINDER.—*Hegars Beitr. z Geburtsh. u. Gyn.* Bd. XI. p. 299.
GREEN, C. H. LEEDHAM.—*Brit. Med. Jour.* II. 1909.
GUISEPPI, P. L.—*The Practitioner.* II. July, 1911.
HOLZBACH.—*Munch. Med. Woch.* 1907. No. XXV.
HOCHEISEN.—(1) *Munch. Med. Woch.* No. XXXVII, XXXVIII. 1906. (2) *Munch. Med. Woch.* No. II, 1907.
HOCHE. *Munch. Med. Woch.* No. IX. 1907.
ILLIG, L.—*Munch. Med. Wehnschr.* 1903.
INNES, ARTHUR.—*The Practitioner.* 1912. I.
ILGIN, F. N.—*Central Jour. for Gynaecology.* Liepzig. 1910, and *Report of 11th Russian Congress of Doctors.*
JOHNEN, AUGUST.—*Inaugural Dissertation.* Erfurt. 1911. (George Richters.)
KRÖNIG, BERNHARDT.—(1) *Deutsche Med. Wochenschr.* 1908. No. XXXIII. (2) *Deutsche Med. Wochenschr.* 1906. No. XXVI. (3) *Brit. Med. Jour.* 1908. Vol. II.
KIONKA, H.—*Therap. d. Gegenwart.* No. I, p. 11.
KLEINERTZ, F.—*Zentralbl. f. Gyn. Liepzig.* 1908. p. 1387.
KNIPE, WM. H. WELLINGTON.—*The Modern Hospital.* Vol. III. No. 4. Oct., 1914.
LONG, CONSTANCE.—*Brit. Med. Jour.* January–June, 1913.
LADENBURG.—*Annalen der Chemic.* 1881.
LEHMANN.—*Zeitschrift für Gbh. und Gyn.* Bd. LVIII. 1906.
MANSFIELD, O. P.—*Vienna Clinical Weekly.* No. I. 1908.
MAYER, K.—*Zentralbl. f. Gyn.* 1908. p. 689.
MATWJEJEW, G. TH.—*Zentralbl. für. Gyn.* 1908.

NEWELL, F. S.—*Surg. Gyn. and Obst.* August, 1907.
PRELLER.—*Munch. Med. Wochenschr.* 1907. No. IV, p. 161.
PUSCHNIG, R.—(1) *Weiner Klin. Wochenschr.* No. XVI. (2) *Ginekologia*, p. 242.
STEINBUCHEL, VON.—*Deutike.* 1903.
SCHNEIDERLIN.—*Munch. Med. Wohnschr.* 1903.
SOLOMONS, BETHEL A. H.—*Brit. Med. Journ.* Jan., 1911.
SIEBER.—*Zentralbl. f. Gyn.* 1909. XXXIII.
STEFFEN, W.—*Archiv. für. Gyn. Bd.* LXXXI. 1907. p. 451.
SALZBERGER, MAX.—*Inaugural Dissertation.* Breslau. 1910.
SLAWYK, GERTRUD.—*Inaugural Dissertation* (Freiburg). Speyer & Kaerner. 1912.
SOHRT.—*Inaugural Dissertation.* Dorpat. 1886.
SICK, P.—*German Med. Weekly.* 1910.
STRAUB, WALTHER.—*Munch. Med. Woch.* 1913.
SIEGEL, P. W.—(1) *Munch. Med. Woch.* 1913. No. XLI. (2) *Deutsche Medizinische Wochenschr.* 1914. No. XXI.
TICHAUER, WILHELM.—*Inaugural Dissertation.* Breslau. 1911. (H. Fleishmann.)
THOMPSON, H. TORRENCE.—*Edinburgh Med. Jour.* Dec., 1909.
TRABSCHA.—*Zentralbl. f. Gynak.* 1910.
WARTAPETIAN.—*Inaugural Dissertation Jenenser Klinik.* (Jena.) 1904.
WEINGARTEN, M.—*Inaugural Dissertation.* Giessen. 1904.
ZIFFER, H.—*Monatsschrift für Geburtsh. u. Gyn.* Bd. XXI, and *Szüleszet es nógyógy.* Budapest. 1904.

THE LONDON AND NORWICH PRESS, LIMITED, LONDON AND NORWICH

BOOKS FOR MOTHERS

THE MODERN MOTHER

A Guide to Girlhood, Motherhood, and Infancy.

By Dr. H. LAING GORDON.

Fully Illustrated. Demy 8vo. 6s. net.

The subjects of heredity, environment, education and schools, the home-training of children, the physical development of the body, and the position of woman in modern life, are amongst the topics of the day which are touched upon in a new light in this concisely written book; each of its three sections—Girlhood, Motherhood, and Infancy—provides the mother, the schoolmistress, and the intelligent nurse with a fascinating and easily understood guide and high ideals. The whole subject of the Modern Mother is treated with penetrating observation from the sympathetic standpoint of varied experience rather than from the narrow one of the dogmatic specialist.

Woman in Girlhood, Wifehood, and Motherhood

Her responsibilities and her duties at all periods of life. A guide in the maintenance of her own health and that of her children.

By Dr. M. SOLIS-COHEN.

Profusely Illustrated with Plates, Scientific Drawings, and Half-tone Engravings, and with a Mannikin Chart printed in Colours.

8½ by 6¼. Cloth gilt. 10s. 6d.

The *Westminster Gazette* says: "An admirable and most useful work, and one which should prove of incalculable gain and interest to many women. It can be understood by any woman and would be a help to all."

Modern Medicine for the Home

By ERNEST WALKER, M.R.C.S., L.R.C.P. (Lond.).

Crown 8vo. Cloth. 1s. 6d. net.

This work is scientific and up-to-date; all technical and misleading terms are omitted, and the diseases are classified alphabetically and under their popular names.

The treatment is scientific and simple, and nothing is advised that cannot be carried out at home.

BOOKS ON PSYCHICAL RESEARCH, Etc.

Spirit and Matter Before the Bar of Modern Science

By ISAAC W. HEYSINGER, M.A., M.D.

Demy 8vo. 15s. net.

This book, written at the end of a lifetime of scientific research, proves conclusively the existence of the spiritual world and that spiritualism is the basis of all true religion. As evidence the author brings forward the testimony of all the great scientists and leaders of modern thought, every one of whom, differ as they may on other points, is forced to the conclusion that in the spiritual world only the key to the mystery of the universe is to be found. Instances of extraordinary psychic phenomena have their place in the work, and the intense vigour and lucidity of its style help to make it one of absorbing interest.

Eusapia Palladino and Her Phenomena
By Hereward Carrington. Fully Illustrated. Net 10s. 6d.

Psychical Science and Christianity
By E. Catherine Bates. 6s.

The Coming Science
By Hereward Carrington. Net 7s. 6d.

The Physical Phenomena of Spiritualism
By Hereward Carrington. Net 10s. 6d.

Proofs of Life after Death
By R. J. Thompson. Net 7s. 6d.

Occultism and Common-Sense
By Beckles Willson. Net 6s.

Do the Dead Depart? By Katharine Bates. Net 6s.

Practical Hypnotism
By Comte C. de Saint Germain. Net 6s.

New Ideals in Healing
By Ray Stannard Baker. Net 2s. 6d.

Horoscopes and How to Cast Them: A Book of Practical Astrology
By Comte C. de Saint Germain. Net 6s.

The Education of the Will
By T. Sharper Knowlson. Net 6s.

Dreams: Scientific and Practical Interpretations
By G. H. Miller. 600 pp., crown 8vo. Net 6s.

Religions and Philosophies of the East

By J. M. KENNEDY.

Author of "The Quintessence of Nietzsche."

Crown 8vo. 6s. net.

"All wisdom came from the East," and all the wisdom of the East is bound up in its religions and philosophies, the earliest forms of which can be traced back 3,000 years B.C. Mr J. M. Kennedy has now aimed at giving in a single volume a concise history of the religions and philosophies which have influenced the thought of the great eastern nations, special emphasis, of course, being laid upon the different religions which have swayed the vast empire of India. A feature of the book is a section dealing with the influence of the philosophies of the East upon those of the West, so far as materials are now available for our guidance in this respect. It may be remembered, for example, that Schopenhauer was greatly influenced by Indian thought, and that he exercised much influence on Nietzsche, who, in his turn, as shown in Mr Kennedy's "Quintessence of Nietzsche," has not only swayed modern thought, but is in addition likely to affect the whole trend of philosophy for many generations to come.

Logic for the Million

Edited by T. SHARPER KNOWLSON.

Author of "The Education of the Will."

Crown 8vo. 6s. net.

In the year 1860 Mr J. W. Gilbart, F.R.S., wrote the preface to the sixth edition of his "Logic for the Million." It seems difficult to understand why a book which has proved its worth should not have been reissued from time to time, especially a book on a subject like logic, which is regarded as dry, formal, and uninteresting. Mr Gilbart, however, made the art of reasoning both easy and attractive; and his illustrations were chosen freely from all sources: the Bible, "Punch," and John Stuart Mill, were equally to his taste. It was to be expected that a certain amount of revision work was necessary in bringing "Logic for the Million" up to date, and this has been done by Mr T. Sharper Knowlson, author of the "Art of Thinking," who has added new sections and appendices.

Old English Towns

By WILLIAM ANDREWS

Deals with 28 Towns. 19 Illustrations.

Crown 8vo, cloth gilt. 6s. net.

The Abbeys of Great Britain

By H. CLAIBORNE DIXON

With many Illustrations. 6s. net.

The English Castles

By EDMUND B. D'AUVERGNE

Crown 8vo, cloth gilt. 6s. net. 35 Pictures.

London Churches Ancient and Modern

By T. FRANCIS BUMPUS

With numerous Photographs by W. J. ROBERTS and F. WILTON FEN.

1st and 2nd Series. Crown 8vo. 6s. per vol. net.

Old Continental Towns

By WALTER M. GALLICHAN

Crown 8vo. Illustrated. 6s. net.

In this charming volume are included descriptive and historical accounts of the more important old Continental towns. Sketches of the chief buildings of past ages, remarkable episodes, curious old laws regulating the religious and social life of bygone ages are noticed in scholarly style. It is shown how cities have risen under the protection of castles, how others have grown under the care of religious houses, while some have advanced under the patronage of kings. Old customs linked with the daily life of the people receive consideration. Sports and pastimes which have made the inhabitants famous are not forgotten. This is a volume for the general reader, and also the student who delights in the picturesque past.

A Page of Travel Books

Through the French Provinces

By ERNEST PEIXOTTO.

With 85 Drawings by the Author. 9¼ by 6¾. 10s. 6d. net.

A Spring Fortnight in France

By J. TOZIER.

Frontispiece in Colour, 63 Illustrations and 3 Maps.
10s. 6d. net.

To-day in Palestine

By Dr H. W. DUNNING.

Frontispiece in Colour and 20 Plates. 10s. 6d. net.

Sunny Days in Italy

By ELISE LATHROP.

With 30 Plates and Frontispiece in Colour. 9 by 6½.
Cloth gilt, decorated cover. 10s. 6d. net.

Camp Fires on Desert and Lava

By WILLIAM T. HORNADAY, Sc.D.,
Author of "Camp Fires in the Canadian Rockies."

The story of an expedition made from Tucson, Arizona across the desert to the hitherto unknown region surrounding Pinacate in North-Western Mexico.

Copiously Illustrated from Photographs (8 Illustrations in Colours). With Maps. Large Demy 8vo. 16s. net.

Camp Fires in the Canadian Rockies

Sport and Adventure in the Mountains of British Columbia

By WILLIAM T. HORNADAY.

With 70 Illustrations, from Photographs taken by John M. Phillips, and Two Maps. Demy 8vo. 16s. net.

The Garden Booklets

Size 4¼ by 2½.

1s. 6d. net. In Velvet Calf, with Coloured Frontispiece.
Or in Cloth, 6d. net.

1. **The Rose Garden**
2. **The Rock Garden**
3. **The Bulb Garden**
4. **The Formal Garden**
5. **The Fern Garden**
6. **The Water Garden**

The Old Time Booklets

Exquisitely printed with many illustrations specially prepared for these volumes, gilt top and full leather binding, stamped in gold.

Size 4¾ by 3. 2s. 6d. each net, or in cloth 1s. net.

Old English Inns
By G. T. Burrows. 24 Illustrations

The Castles of England
By E. B. d'Auvergne. 30 Illustrations.

Some Old London Memorials
By W. J. Roberts. With 25 photographs by the Author.

Some Old English Abbeys
By Elsie Lang. 17 Illustrations.

The Pocket Cathedral Guide
By W. J. Roberts. 30 Illustrations.

Canterbury Cathedral
By T. Francis Bumpus.

Cambridge Colleges
By R. Brimley Johnson.

Oxford Colleges
By Elsie Lang. Pictures by W. J. Roberts.

PAINLESS CHILDBIRTH IN TWILIGHT SLEEP

BY

HANNA RION

T. WERNER LAURIE LTD.

ESS
IRTH
SLEEP
NION

SS CHILDBIRTH
LIGHT SLEEP

BY
ANNA RION

ECIMEN OF A TWILIGHT
EEP CHILD.