"TWILIGHT SLEEP"

REPORT OF ONE THOUSAND CASES.*

BY

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THERE is probably no subject to-day which has demanded so much attention from both the medical profession and the laity as that of the so-called "Twilight Sleep," and my only excuse in bringing it before you is to give you a statistical report of 1000 cases collected in the United States.

Before going into the details of these cases I wish to give you a brief resumé of the technic of the method, its indications and contraindications, as well as advantages and disadvantages.

It is not the purpose of this paper to go into the details of all that is known about *Dämmerschlaf*, as that would consume many hours, but rather to give you a plain statement of facts in a condensed form.

Dr. Polak's definition is undoubtedly the best; "The application of partial narcosis to the most painful ordeal in a woman's life, in such

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a way as to eliminate the memory of subjective pain without interfering with the uterine contractions."

This "twilight sleep" then, is merely an *amnesic state*, in which the patient seems to forget successive events in her labor, a short time, say one-half hour, after they have occurred. She seems to be conscious of events at the time they occur and remembers incidents of the immediately preceding ten or fifteen minutes, but each successive event will, in its turn, be forgotten and the memories are not stored in the higher brain centers. In other words she has perception but not apperception.

"Twilight state," as you all know, is induced by repeated hypodermic injections of morphine and scopolamine, in dosage sufficient to induce an amnesic state but not to interfere with the progress of labor.

Morphine and scopolamine have been used extensively in obstetrics and surgery for the past ten or twelve years in this country as well as abroad, but the bad and indifferent results which were at first obtained by the use of these drugs we now know to have been due entirely to overdosage and the use of impure and unstable preparations.

The combining of morphine and scopolamine each time a dose was given, had the effect in obstetric cases of causing prolonged labors, forceps deliveries, delirium, postportum hemorrhages and asphyxiated babies.

To-day, however, by following the modern technic of Gauss, by giving only *one dose of morphine*, by using a stable preparation of scopolamine and regulating the time and the amount of the dose to each individual patient, we have been able to eliminate most of the above difficulties and produce uniformly good results.

Briefly the technic is as follows. The patient must be definitely in labor, and if a primipara must have regular forcible pains at five-minute intervals with one to two fingers' dilatation, and thinning of the cervix. If a multipara, we may possibly start earlier, being sure, however, that she is actually in labor.

The patient is now isolated in a semidarkened, quiet room and all sources of external irritation removed, loud talking stopped as well as heavy walking about the room. It is advantageous to stuff the patient's ears with cotton and possibly place a towel over the eyes.

Right at this point I wish to emphasize the importance of the proper surroundings in inducing a twilight state. We admit that *Dämmerschlaf* may be induced in the broad daylight if we give enough of the drugs, but we then subject our patients to all the

dangers enumerated above. However, if the surroundings are ideal, we may induce an amnesia with the minimum possible dosage, and we do not materially prolong labor nor cause the birth of asphyxiated babies.

The patient now receives an initial injection of morphine sulphate, gr. $\frac{1}{6}$ to $\frac{1}{8}$ and scopolabromine hydromide, gr. $\frac{1}{130}$. Water should be administered freely at this stage while food is not given at any time during the "twilight." At the end of one hour the patient receives scopolamine hydrobromide, gr. $\frac{1}{200}$. The immediate effect of the first dose is to diminish the subjective sense of pain and to create a partial drowsiness of the patient between the pains. The effect is still more marked after the second dose and the patient sleeps more soundly between the pains, arousing only when the uterine contraction takes place.

The face is always slightly flushed, and the patient may turn or roll in bed and show some external signs of pain. I wish to emphasize at this point the importance of *suggestion* to the patient, while she is going into the "twilight state." If we have an intelligent patient and sit by her bedside continuously for the first hour encouraging her not to cry with the pains but to keep perfectly quiet it is remarkable how quietly and quickly she will go into the "twilight state" and remain so throughout the entire procedure.

I have been particularly impressed with the lack of restlessness and delirium in this type of patient when so handled. The ignorant patient however who goes into the "twilight state," crying and screaming, will probably do this throughout her labor and get worse rather than better.

Going into the "twilight state" seems analogous to me to going under a general anesthesia. Here we talk to and encourage our patients and the same holds good for *Dämmerschlaf*.

The first two doses of the drugs as described above may be said to constitute an average schedule for all patients, but right now begins the task of individualization of each patient, and the memory tests play a leading rôle. One-half hour after the second dose the patient's memory is tested by asking her how many hypos she has had. If she does not remember the second hypo, she was in the "twilight state" at the time she received it and the amnesia is maintained by succeeding doses of scopolamine hydrobromide, gr. $\frac{1}{400}$, given at intervals of about one and one-half hours. If her memory was present at the time of the second injection she was not under and needs more scopolamine, the average dose being perhaps gr. $\frac{1}{300}$ one hour after the second injection.

When the patient is once in the "twilight state" she is kept so with repeated doses of scopolamine gr. $\frac{1}{400}$ at intervals averaging about one and one-half hours. Morphine is only very rarely repeated in a $\frac{1}{12}$-grain dose if the patient becomes restless, and this drug is best not given within two hours of the actual birth.

While the above may be given as a working basis for "twilight" it must be emphatically stated, however, that individualization is the keynote to success and the memory test is after all the *crux of the situation.*

If we do not make these memory tests at intervals, we are not *absolutely certain* that the patient is in an amnesic condition, and if we attempt to hold the patient too lightly under, she will have so-called "isles of memory," and remember certain incidents after the labor is complete.

If our patient has too many of these isles of memory she may be able to practically "frame up," so to speak, her entire labor, and our twilight is not a success. The abolition of all external evidence of pain on the part of the patient, is absolute proof that the patient is too deeply under and when this state is maintained throughout her labor, the result is an asphyxiated baby. If, however, she is kept lightly under and shows some external evidence of pain, the babies are born in normal condition.

We have seen numerous patients who were in the "twilight state," go from three to four hours without an injection and still be perfectly amnesic, while the next patient may need a repetition of medication every hour to hour and a half. This is merely to emphasize the varying susceptibility of different patients to the drugs and any one contemplating the use of "twilight sleep" should see a series of cases before employing it, in order to familiarize himself with its varied phases.

Our patient now progresses in her labor, arousing with and sleeping between her pains until she is delivered. The progress of labor is determined by rectal or infrequent vaginal examinations and the perineum must be watched carefully during the second stage of labor as babies may be born without the knowledge of the accoucher. As soon as the patient is in the second stage of labor a tight abdominal binder is applied and the patient encouraged to bear down, her hands are grasped and she is told to make traction as in the ordinary labor case. If our patient is in a real "twilight state" she will do all of these things, obey all of the doctor's orders, and yet have no recollection of these events afterward.

The actual delivery is best accomplished by having a nurse hold

either thigh flexed upon the abdomen with feet raised from the bed. Most patients are rather restless at this time as in their amnesic state they do not realize what is going on. A small amount of chloroform or ethyl chloride is best given during the actual delivery as the severe pain at this time may bring the patient from her "twilight state."

After the completion of labor the woman should be kept in a darkened room and allowed to sleep as long as possible until she wakens naturally. This sleep is important as it obliterates from her memory the events of the birth of the baby and the third stage, completes the amnesia and allows her to recuperate from the exhaustion of the labor.

The baby's cord is clamped and cut immediately after birth and the child removed to another room. It is peculiar that the cry of the baby may awaken the patient from her amnesia and remain in her memory while the pain of the delivery some two or three minutes previous will not be remembered. The mucus is cleansed from the baby's mouth as soon as possible and the child placed in a warm blanket. A spontaneous or slightly delayed cry within the next few minutes is the rule or a moderate degree of oligopnea may develop. Real asphyxia is no more frequent than after the ordinary labor.

The actual condition of the baby at birth and the spontaneity of its first cry are determined by the skill with which you have produced the "twilight state," using the minimum possible dosage of the drugs, and also the length of time in the second stage. We must not forget that a certain number of all women are destined to need a forceps delivery, "twilight" or no "twilight" and it is poor judgment to wait indefinitely in these cases for a spontaneous labor, to the detriment of the baby. We must control the fetal heart every half hour in the first stage and every fifteen minutes in the second stage of labors and must interfere upon the first signs of danger to the baby as we do in any ordinary labor.

INDICATIONS AND CONTRAINDICATIONS.—Granted then that the production of *Dämmerschlaf* is an actual scientific procedure, what are the indications for its application?

I believe that the method may be used in any case of labor except under the conditions which will be described as contraindications. It is especially suitable in the long painful first-stage labors where the dilatation is progressing slowly in spite of good strong uterine contractions, and in the *neurotic woman* who is *mentally* and *psychically unfit* to go through the ordeal of labor. The physically unfit woman is different from the above class and generally has some degree of uterine inertia and should not be subjected to the method.

As contraindications to the use of "twilight" we may mention the following:

1. *Primary uterine inertia* is an absolute contraindication to beginning "twilight." If the patient is having irregular pains at intervals of ten, fifteen or twenty minutes, these contractions being poor, the method should not be used. We may, however, wait in such a case until the uterine contractions are definitely strong and regular, then use the method.

2. Marked pelvic contractions are a definite contraindication, as some operative procedure will be necessary. Cases of border line pelvic contraction may, however, be given "twilight," to procure dilatation of the cervix and give the patient a test of labor.

3. Hemorrhages either from placenta previa, or accidental hemorrhages are contraindications.

4. A dying or dead baby should be a contraindication, not from a medical standpoint, but because the patient if ignorant, will lay the stillbirth to the method employed.

5. The emergencies of labor such as eclampsia, prolapsed cord, prolapsed arm, transverse presentation with ruptured membranes, etc., are all contraindications, as they are conditions which will demand some operative interference.

ADVANTAGES OF THE METHOD.

The advantages of the method may be briefly stated as follows:

First. The patient has practically a painless labor in about 85 per cent. of all cases. In a certain small percentage of cases there will be no effect from the drugs and in just these cases it is important not to push the dosage to get an effect, as this will result only in asphyxiated babies. Have, what you consider a maximum schedule and do not exceed this.

Second. The patient does not have the subsequent nerve exhaustion that comes after a prolonged labor, she awakens refreshed after the amnesia, and her picture both physical and mental on the second, third or fourth day is entirely different from the ordinary case. She feels better, stronger, wants to get out of bed and does not have any of the so-called shock of the confinement. This seems to me to be one of the great advantages of the "twilight method." The Freiberg statistics show an actual diminution in the occurrence of postpartum psychosis and insanity, and these results must be ascribed to the lack of exhaustion of the patient's higher brain centers.

Third. The milk secretions seem to be better, as we will attempt to show in our statistics.

Fourth. We have fewer cervical lacerations. This is due to three factors, the cervix is softened and its dilatation is aided by the drugs, the delivery of the baby through the cervix in both the normal and the "dry labor" case is not so precipitious, and lastly and most important we are not compelled to use forceps before dilatation is complete. Forceps through an undilatated cervix is fast becoming a thing of the past under the "twilight method."

Fifth. Diminution in the number of high and median forceps operations.

Sixth. Cardiac cases, even those with some break in compensation go through the ordeal of labor with a minimum of nervous apprehension, and with the expenditure of less muscular energy.

Seventh. Toxemic cases, even with increased blood pressure go through labor, with less likelihood of convulsions and the urinary output is not affected.

Eighth. We will have more babies and better babies, as the women of the better class will not fear the ordeal of a painful labor. The ignorant classes are the ones to-day who are raising the large families as they do not understand the prevention of conception.

DIFFICULTIES OF THE METHOD.

The main difficulty of the "*Dämmerschlaf*" as we see it to-day is the moderate prolongation of the second stage of labor in the primipara and it is a question whether this is *always a disadvantage.* Many primiparæ deliver too rapidly, causing submucous lacerations of the levator ani muscles, even before the head is born. Most observers seem to think that lacerations of the pelvic floor are less frequent by the "twilight" method.

Any undue prolongation of the second stage we are minimizing, as we learn more about the method, by attention to the following details. Making the patients bear down, the tight binder, flexion of the thighs on the abdomen and a *minimum dosage under the most ideal surroundings.* Pituitrin may be used if the head is through the pelvic outlet. Expressio fetus in the multipara and the median episiotomy of Pomeroy in the presence of a rigid perineum, are things that should not be forgotten.

Restlessness in the second stage is rather common, more so in the ignorant class where the method is started too late in labor. The intelligent woman who is started early in labor, who understands what we are trying to do and *gives her aid in going into the "twilight state,"* will rarely give you trouble. Delirium necessitating restraint,

occurs but rarely and is generally due to hyoscine or an unstable preparation of scopolamine.

The preparation of "Scopolamine Stable" of La Roche gives the best results, according to reports returned to me.

ADVANTAGES TO THE BABY.

The baby mortality is lessened by the *Dämmerschlaf* as we will show in the statistics. This is probably due to the lack of high and medium forceps, and the close attention to the fetal heart during labor. In other words we are *training ourselves* to observe more closely the details of the labor and becoming better obstetricians.

STATISTICS.

The statistics which I am going to present were collected in the following manner.

About 400 letters were sent to members of the different obstetric societies, throughout the country, asking for details of their cases, drugs used, operative procedures, condition of the baby, etc.

To date I have reports of some 1300 or 1400 cases of *Dämmerschlaf* and have tabulated the first 1000 cases.

For the sake of comparison we have examined the records of 1000 cases of labor at the Jewish Hospital, Brooklyn, just before the use of "twilight."

In compiling the 1000 cases without "twilight" we have read over each history separately and eliminated all such cases as we would not have "twilighted," that is primary uterine inertia, placenta previa, accidental hemorrhage, cesarean section, eclampsia, prolapsed cord, etc., and attempted to make the study as unbiased as possible.

I want here to express my sincere appreciation to Dr. Irving Tran and Dr. Samuel Blum, assistants at the Hospital, for their painstaking and untiring efforts in compiling this latter series of cases, and also to our internes Drs. Kornfeld and Louria for their accurate records of the "twilight" patients. I am also indebted to Drs. Mathews and Mays at the Methodist Hospital, and Drs. Gilles and Bartley at the Long Island College Hospital for their aid in compiling these records.

We must remember that these 1000 cases of "twilight" represent the work of twenty-five different observers and not alone that, but the *first cases of these men with a new method.* With refinements of technic and more complete knowledge of details, their second thousand cases should give even better results.

TABLE I.

1000 *Cases of Labor.*

	Without	With Dämmerschlaf
Primigravidæ	39.2%	69.8%
Multigravidæ	60.8%	30.2%
Spontaneous labors		
Primiparæ	73.9%	78.36%
Multiparæ	86.1%	89.73%
Operative labors		
Primiparæ	26.1%	20.9%
Multiparæ	13.9%	10.27%

The first table represents the total number of cases that were examined. The most striking part of this comparison is the greater number of primiparæ in the "twilight" series. This shows that men throughout the country are using the method mainly with first births, the most difficult ones to begin with.

The number of spontaneous labors was increased both in primiparæ and multiparæ in the "twilight" series, while the operative labors were diminished.

TABLE II.

Forceps.

	Without D.	With D.
High and medium operations		
Primiparæ	11.73%	4.2 %
Multiparæ	4.11%	2.64%
Low operations		
Primiparæ	11.48%	15.18%
Multiparæ	4.11%	5.96%
All cases	14.1 %	16.2 %

This table represents the number of forceps deliveries which were performed, and in attempting to classify these I have divided them into high and median operations as compared with the low operations. High and median forceps are without doubt the most traumatic deliveries, responsible for the severe cervical and vaginal lacerations and the dead and mutilated babies. They are the operations

which cause chronic invalidism in the woman and are responsible for most of the work of the gynecologist.

The most striking feature of this table is the marked diminution in these types of operations, a reduction from 11 per cent. to 4 per cent. in primiparæ and from 4 per cent. to 2 per cent. in multiparæ. In the low forceps we have an increase, and this is undoubtedly due to the fact that the woman under twilight does not bear down as well during the second stage as the woman who is wide awake. The total forceps were increased from 14 per cent. to 16 per cent.

This merely means an increase of 2 per cent., that is, in any given series of fifty cases we would have one more forceps in the "twilight" cases and this generally a nontraumatic low forceps.

TABLE III.

Maternal Statistics.

	Without D.	With D.
Mortality	1 death, suddenly on 10th day, postpartum.	0
Insanity	1 melancholia, 6th day, postpartum.	1 depressive melancholia.
Postpartum hemorrhage	17 cases, 1.7 per cent.	8 cases, 0.8 per cent.
Lacerations	Primiparæ 91.0 per cent. Multiparæ 18.4 per cent. Average 46.9 per cent.	25.1 per cent. 3.28 per cent. 14.2 per cent.
Delirium	+	Stable preparations, 11 cases in 546, 2 per cent. Hyoscine and scopolamine, 12 cases in 248, 4.8 per cent.

This table represents the maternal statistics. We had one death in the non-twilight series and no deaths among the twilight cases.

As Regards Insanity.—In the cases without twilight we had one case of severe melancholia, which developed on the sixth day postpartum. I am certain that we had other minor psychoses which were not noted in the histories. The mental state of our patients was not studied and observed so closely until we started the use of twilight. In the latter series we have report of one case of depressive melancholia.

Postpartum hemorrhage seems to have been diminished. I think the question of hemorrhage after delivery is entirely due to the manner in which the third stage is handled.

Lacerations seem to have been diminished. Postpartum lacerations in our twilight cases were 91 per cent. That seems a very large percentage, but I will say that in our records at the hospital if there is a nicked perineum, even a mucous abrasion necessitating a chromic suture it goes down as a laceration, and this makes a high percentage in primiparæ.

Delirium requiring restraint during the labor, occurred in from 2 per cent. to 4.8 per cent. of the cases, being less frequent if stable preparations of scopolamine were used.

TABLE IV.

Baby at Birth.

	Without D.	With D.
Spontaneous cry	78.6 per cent.	79.9 per cent.
Oligopnea	5.8 per cent.	14.6 per cent.
Induced cry	9.4 per cent.	
Asphyxia	3.6 per cent.	3.6 per cent.
Stillbirth	2.5 per cent.	1.9 per cent.
Babies Died within 15 days.		
	24	20
Stillbirths	25	19
Totals	49	39

This table represents the condition of the baby at birth. It will be noted that there were more cases of oligopnea among the twilight cases, but that, in general, the spontaneous cry was about the same in both series. It is a strange coincidence that the asphyxias were the same in both series.

There were twenty-five stillbirths in the non-twilight series as compared with nineteen in the twilight cases. When we study the number of babies dying during the puerperium we find also a percentage in favor of twilight. If we now total these two series we find that in 1000 cases without twilight forty-nine mothers went home without their babies, while in the twilight series there were only thirty-nine dead babies.

There must be a reason for this and it is certain to be explained in part by a lack of traumatic deliveries under the method of Dämmerschlaf, and also the fact that we are becoming better obstetricians and following the course of these labors more closely. The fact stands out, however, that the baby statistics are really better and this after all is the aim of modern obstetrics.

TABLE V.

Causes of Stillbirths.

Without twilight	25 cases
Dead before labor	5 cases
Craniotomies	6 cases
Cause not stated	14 cases
With twilight	19 cases
Dead before labor	4 cases
Craniotomy	1 case
Prematurity + eclampsia	1 case
Positive Wassermanns	2 cases
Transposition of viscera autopsy	1 case
Prolonged labor—Cerebral congestion autopsy	1 case
Prolonged labor	2 cases
Operative delivery—version	1 case
Cord about the neck	3 cases
Cord about the neck—forceps	2 cases
Lack of vitality	1 case
	19 cases

This table shows the cause of stillbirths as nearly as could be stated. There is a great tendency to-day if any twilight baby dies to ascribe the death to the drugs, and this is true not only among the laity but the profession as well.

This is absolutely wrong and I think these statistics prove my contention. We must make an earnest effort in all of these cases to procure autopsies and Wassermann reactions on the mother to determine the actual cause of death.

TABLE VI.

Babies Died in the Puerperium.

Without twilight	24 cases
Atalectasis (autopsy)	1 case
Polycystic kidneys (autopsy)	2 cases
Visceral hemorrhages (autopsy)	1 case
Myelo-meningocele (autopsy)	1 case
Patent foramen ovale (autopsy.)	1 case
Prematurity	2 cases
Operative delivery	4 cases
After spontaneous labor	12 cases
With twilight	20 cases
Bronchopneumonia	2 cases
One kidney, atalectasis (autopsy)	1 case
Spina bifida	1 case
Melena neonatorum	1 case
Cerebral congestion (autopsy)	1 case
Cerebral hemorrhage (one autopsy)	2 cases
Edema glottis	1 case

TABLE VI (*Continued*).

Patent foramen ovale (three autopsies)	3 cases
Prematurity	3 cases
Prematurity, * * * * * Wassermann	1 case
Syphilis	1 case
Operative delivery (forceps)	1 case
Malnutrition (autopsy)	1 case
Doubtful	1 case

This table represents the causes of fetal death during the puerperium.

Here again we find that there are many other causes of fetal death than twilight alone and we must not condemn the method unless we are sure of the autopsy findings. We had twelve babies die during the puerperium after spontaneous labors without Dämmerschlaf. These babies were unfortunately not autopsied. If there is any one thing which has stimulated us to procure postmortem examinations and determine the cause of death in these babies, it is the use of the Dämmerschlaf.

TABLE VII.

Critique of Twilight.

Amnesia, complete	73.5 per cent.
Amnesia, partial	12.5 per cent.
Analgesia	4.4 per cent.
Failures	9.4 per cent.
Total cases giving detail	876

Causes of Failures.

No effect of the drugs	37
Too rapid labor	42
Too "lightly under"	2
Case stopped due to inertia	1
Poor surroundings	1
	83

Discharge Weight of Baby.

Without Dämmerschlaf.

In 951 cases, 454 gained birth weight by day of discharge..... 47.6 per cent.

With Twilight.

In 47 cases, 30 gained..... 64.0 per cent.

This table represents the results of the twilight as regards amnesia, etc., in 876 cases, giving details.

These results are about what we would expect in such a series of cases. About 90 per cent. of all cases treated show some relief from their labor pains while 75 per cent. have a complete absence of memory of the events of labor. The percentage of failures 9.4 per cent. is too high.

An inspection of the causes of failure, shows that more than half of these cases, forty-two in number, were due to too rapid labor. These cases coming into the hospital, late in labor should not be given twilight as they do not have time to pass into the amnesic state before they are delivered. In my estimate these forty-two cases, the complete failures due to nonaction of the drugs, are reduced to about 5 per cent.

In the first forty-seven cases of twilight at the Jewish Hospital, Brooklyn, we kept an accurate weight chart of the baby and found that thirty out of the series of forty-seven cases had gained their birth weight on the eleventh day a percentage of 64 per cent. In our previous 1000 cases, we found that only 47 per cent. got to their birth weight by the day of discharge.

This would seem to show that the twilight mothers are in better physical and mental condition after delivery and better able to nurse their babies.

CONCLUSIONS.

From this study of the "Dämmerschlaf," I think we may draw the following conclusions:

First. That "twilight sleep" is a reality and not a fad.

Second. That by its application, we may give about 85 per cent. of cases in which it is used, a practically painless labor.

Third. That it is contraindicated in certain definite cases, especially in primary uterine inertia, markedly contracted pelvis and the emergencies of labor which demand operative interference.

Fourth. That it may be used in all other labors and is especially applicable to the nervous woman, the psychically unfit woman, in long painful first-stage labors, in cardiac cases, etc.

Fifth. That the women after twilight labors are in better condition because there are less difficult forceps, less lacerations of the cervix and perineum, better milk secretion and less nerve exhaustion. They recuperate much faster than by the old method.

Sixth. That it does not cause insanity as stated in the lay press but rather tends to diminish its occurrence.

Seventh. That we will have *more* and *better* babies.

Eighth. That its disadvantages are slight and we are learning to overcome them by a further knowledge of the method, a closer attention to detail and perfection of technic.

Lastly. That "twilight sleep" is a method which, to get the best results, must be performed under ideal surroundings, with the mini-

mum possible dosage and by some one who has trained himself to do the work.

We do not claim that "twilight sleep" will be a panacea for all women in labor as the treatment is essentially a hospital one except among the wealthy who can afford the assistants necessary.

The great bulk of people of the middle class, will still be delivered at their homes by the family physician. However, under the proper surroundings and given intelligently, "twilight sleep" is a scientific reality and will become used more and more as a part of the armamentarium of the expert obstetrician.

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