

CHAPTER V.

THE INDUCTION OF PREMATURE LABOR.

AT first limited to cases of hemorrhage, later extended to pelvic contraction, and later still to all obstacles which might render labor at term difficult, dangerous, or impossible, for both mother and child, the induction of premature labor may be defined as an operation performed in the interests of the mother or of the child, and aiming at awakening uterine contractions, so as to cause the expulsion of the infant before the natural term of pregnancy, although at a time when this infant is able to live outside of the uterus, that is to say, is viable. Premature labor, then, is included between the seventh month of pregnancy and term.

Although Justin Siegmundin in 1690, Puzos in 1707, and Bohn in 1717, advised rupture of the membranes in case of hemorrhage due to placenta prævia, and so induced premature labor, it was not for some years afterwards that this procedure, in case of deformity of the pelvis too great for the passage of the foetal head at term, was admitted into obstetric practice, and it was in 1756, Denman tells us, that the most distinguished physicians of London gave the method their unanimous sanction, in view of the fact that many women with pelvic contraction had been delivered prematurely and spontaneously of viable children who had lived. It is to England, therefore, that the origin of this operation belongs.

Practised for the first time, some say by a midwife, Mary Dunally, others by Macaulay, or Kelly, the induction of premature labor became the rule in practice, through the efforts of Barlow, Denman, Merriman, Marshall, Clark, Ramsbotham, Burns, and others. From England, the operation passed to Germany, where Mai first advised it in 1799, and he was followed by Weidmann; but it was not till 1804 that Wenzel first performed it. Krauss practised it in 1813, but only on the appearance of the monograph of Reisinger, in 1818, was the operation finally adopted. The greatest partisans of the operation were Osiander, Joerg, Stein the younger, Kluge, Ritgen. In Holland, J. Themmen, Salomon, Vrolik, Wellenbergh performed it. In Italy, Lorati, Billi, Ferrario, reported successes. In France, although proposed, in 1804, by Roussel de Vau-

zesmes, it was still rejected by the Academy of Medicine in 1827, owing to the influence of Baudelocque; it was not till 1831 that Stoltz resorted to it, and so successfully, that he was followed in 1832, 1834, by P. Dubois, and from this time on, thanks to the efforts of Dezeimeris, Lacour, Ferniot, and Lazare Seé, it was performed and written about constantly, until to-day it is the practice of all French accoucheurs.

While the operation was becoming generalized, its indications were widening, and to-day they are almost infinite. The indications, however, are subordinated to a certain number of conditions, which Nægelé and Grenser state as follows:

1. Exact diagnosis of the shape of the pelvis
2. Certainty of foetal life.
3. Determination as far as possible of the date of gestation.
4. Absence of serious disease which might be aggravated by the operation.

INDICATIONS.

The most frequent indication for the induction of premature labor, the one for which it was originally performed, is contraction of the pelvis. Authorities, however, are not in accord in regard to the limits of this contraction, that is to say, as to where the line is to be drawn which justifies resort to the procedure.

Spiegelberg, in 1870, from the study of the results of the operation in case of deformity of the pelvis, constructed the table on the following page, which sets forth the practice of different authorities.

Comparing now these results with those obtained in case of the spontaneous induction of premature labor in case of pelvic deformity, and with labor, under the same condition, terminated by forceps and version, he places the upper limit of justifiability of the operation at 3.12 inches. Whenever the maximum contraction does not reach this figure in the true conjugate, he rejects premature labor, except where from previous labors large children are to be expected with large heads, etc.

In 1871 Litzmann concluded that Spiegelberg had understated the indication. He ranges himself, and we think justly, on the side of the mother's interest mainly. He divides pelves into three classes:

1. Pelvis generally and regularly contracted, diameter 3.9 to 3.5 inches; Pelvis simply flattened, or generally contracted from 3.7 to 3.19 inches. Here premature labor is only justifiable in case of complication.

Induction of Premature Labor in Case of Contracted Pelvis.

Operators.	Number of Cases.	Mothers.		Children.		Dead after Labor.	Total Number of Deaths.
		Living.	Dead.	Living.	Dead-born.		
Michaelis	6	4	2	1	3	2	5
Busch	8	7	1	2	3	4	7
Spaeth	15	10	5	1	5	9	14
Crede	8	6	2	4	1	3	4
Germann	19	17	2	9	2	8	10
Riedel	6	6	0	1	4	1	5
Cohen	3	3	0	1	2	0	3
Birnbaum	6	5	1	3	1	2	3
Franque	12	11	1	1	7	4	11
Grenser	25	19	6	4	13	9	23
Hecker	3	3	0	1	0	2	2
Schroeder	6	5	1	2	0	4	4
Scanzoni	14	14	0	8	7	4	11
Martin	39	34	5	24	13	8	15
Dohrn	9	9	0	4	3	2	5
Isolated Cases	12	10	2	5	4	3	7
Lange	14	13	1	4	6	4	10
Spiegelberg	14	10	4	3	4	7	11
Total	219	186	33	73	77	71	148
		per cent. 84.9	per cent. 15	per cent. 33	per cent. 34.8	per cent. 32.1	per cent. 66.9

2. Pelvis generally and regularly contracted, 3.5 inches at least. Pelvis simply flattened, or generally contracted and flattened, 3.19 to 2.8 inches. Operation is indicated, even in primiparæ.

3. Pelvis simply contracted, or generally contracted and flattened, about .29 of an inch. The operation is only exceptionally admitted.

Presentation and Position of Fœtus.	Spontaneous Labor in contracted Pelvis.				Induced Labor in contracted Pelvis.			
	No. of Cases.	Proportion to Entire No. of Labors	Children dead immediately after or during Labor.		No. of Cases.	Proportion to Entire No. of Labors	Children dead immediately after or during Labor.	
			Per cent.	Per cent.			Per cent.	Per cent.
Vertex	287	84.6	33 or 11.4	14.1	14	41.1	7 or 50	42.1
Prolapse of cord	20	5.8	11 " 55		3	8.8	1 " 33.8	
" of limb	3	.8	0 0	2	5.8	0	73.3	
Face	2	.5	2 or 100	0	0	0		
Pelvic Extremity	22	6.4	7 " 31.8	40.7	9	26.4	7 or 77.7	
Oblique and Transverse Presentations	5	1.4	4 " 80		6	17.6	4 or 66.6	

¹ Including one child whose mother died undelivered.

Next comparing spontaneous premature labor, and induced from the side of the child, Litzmann gives the following table:

	Total.	Dead during or immediately after Labor.	Boys.	Dead during or immediately after Labor.	Girls.	Dead during or immediately after Labor.
		Per cent.		Per cent.		Per cent.
Premature spontaneous Labor, with large Pelvis	118 ¹	9 or 7.6	50	6 or 12	68	8 or 4.4
With small Pelvis	16	5 or 31.2	10	4 or 40	7	1 or 6.2
2. Induced premature Labor in contracted Pelvis	34	19 or 55.8	21	11 or 54.7	13	7 or 53.8
	168	33 or 19.6	81	21 or 25.9.	87	11 or 12.6

¹Including nine street deliveries.

In 1880, Maygrier in turn endeavored to estimate the value of premature labor (induced).

In 37 cases, in pelvis 2.73 inches and below: Mothers saved 23, dead 11, mortality about 33.33 per cent. Infants saved 12, dead 22, mortality about 64.70 per cent.

Further, of these 12 living children eight died within the first week. From the standpoint of the infant, these figures may be arranged:

4 labors at 8 months, pelvis 2.73 inches.	Infants living, 3
6 " " 7½ " " 2.53 "	" " 1
2 " " 7 " "	" " 0
1 " unknown	" " 0

Kunne, at Elberfeld, has induced labor fifteen times. All the mothers recovered, two only being sick; of the 15 infants, 12 were born alive and lived.

Berthold, at Ronsdorf, practised the following operations, from 1870 to 1873:

Induction of premature labor	9	Maternal death, 0
Forceps to head,	30	" " 1
Podalic version and extraction,	17	" " 1
Pelvic extremity,	3	" " 0
Perforation,	3	" " 0
Reposition of the cord,	1	" " 0
Artificial delivery,	6	" " 1
Total	69	3

Nothing is said about the infants.

Naegelé and Grenser place the limits between 2.73 and 3.7 inches. Schroeder gives no upper limit, the inferior limit is 2.63 inches. Jacquemier places it as low as 2.54 inches; Dubois 2.54 inches; Joulin 2.54 inches; Velpeau 2.63 inches; Cazeaux 2.34 inches; Depaul 2.34 inches; Tarnier 2.14 inches. According to the latter, if extraction of a living child is impossible, embryotomy offers a better chance, for the very reason that the fœtus is only partially developed.

Considering now the figures of Rigaud and of Stanesco, we have a total of 810 cases of pelvic contraction, where premature labor was induced.

They may be divided as follows:

Pelvis.	Cases.	Maternal deaths.	Mothers living.	Infants. Living.	Died.
3.51 inches	3	1	2	3	0
3.51 to 3.12 "	17	3	14	6	8
3.12 " 2.73 "	18	5	13	6	12
2.73 " 2.34 "	10	4	6	1	9
2.34 " 1.95 "	5	3	2	0	5
	53	16	37	16	34

We see, then, that underneath 2.34 inches premature labor has always been fatal to the infant. It is apparent that under this figure we must reject the operation, although a personal case, which we have already related, where the pelvis was 2.14 inches, and the child, at seven months, was born alive and lived twenty-four hours, would lead us to place the limit at 2.14 inches. Such cases, however, are very exceptional, and we may say that below 2.34 to 2.14 inches there remains only the Cæsarean section, or cephalotripsy with or without traction. Now, considering the danger to the mother of both these methods, and considering the almost absolute fatality of induced premature labor to the infant in case of such pronounced contraction, it is really to induced miscarriage, that is to say, before viability, that we should have recourse.

From the researches of Burns, Salomon, Dubois, Stoltz, Tarnier, Budin, etc., it is seen that the bi-parietal diameter of the fœtal head measures:

At term,	3.7 inches.
At 9 months,	3.5 "
At 8½ "	3.3 "
At 8 "	3.1 inches.
At 7½ "	2.9 "
At 7 "	2.7 "

These figures, be it remembered, are not at all absolute, being only means. We have seen that the foetal head was compressible to the extent of .39 inches without danger to the life of the child. It is evident, therefore, that below 2.34 inches the head might be delivered by the forceps, but at the expense of injury to it and to the mother. Whence the necessity, in order to obtain a living child, of limiting the induction of premature labor at 2.34 inches; and although we have stated above that the limit might be 2.14 inches, it is because the head is at times more readily moulded, or the infant less developed, and hence may pass. Of course this lesser development means less chance of survival; nevertheless, encouraged by our one success, we would take the chances in analogous cases.

Further indications for premature labor are complications which threaten the life of the mother, whether these complications are determined by pregnancy, or aggravated by the presence of this condition. Such are: Uncontrollable vomiting, eclampsia (according to certain authorities, although we are, as stated under the subject, absolutely opposed to this), hemorrhages, acute or chronic diseases of the respiratory and circulatory organs, hydramnios, ascites, goitre (d'Outrepoint,) prolapsus uteri, pernicious anæmia of the gravida (Gusserow), abdominal tumors, intercurrent or epidemic diseases. (See *The Pathology of Pregnancy*, Vol. II.) Here the question is a delicate one. We must not forget that the induction of labor by determining in the woman what Raymond has called the great puerperal state may aggravate her condition, and thus we may act directly against our aim. The case is somewhat analogous to what happens to a wounded man with a compound fracture requiring amputation. If this operation be done at once, he dies; if we allow him to recover from shock and then operate, his chances of life are greater. The state of affairs is about the same in the pregnant woman suffering from an acute disease. If in her already depressed condition, we add the shock of premature labor, we diminish her chances of recovery. Only as a last hope should we, hence, induce labor in this case, and then in order to diminish the gravity of the disease from which she is suffering.

Finally, the induction of labor has been recommended in certain anomalies of pregnancy, such as the habitual death of the foetus without known cause. In such a case, if the antecedents or the constitution of the woman do not call for special treatment, such as in syphilis, we are justified in inducing labor.

Certain authorities go further still, and have advocated the induction of labor where the foetus has died and remains in the uterus. Here we believe the operation to be absolutely contra-indicated, since the presence of the foetus cannot harm the mother as long as the ovum is intact.

Premature labor being indicated, it remains to study the means at our disposal for induction.

When the indication is a complication or disease threatening the life of the mother, the choice of the time is absolutely subordinated to the gravity of the complication and the state of the mother. In these cases, there being no obstacle to the birth of the foetus, it runs no more risk than in normal labor; we seek simply to put off the time as long as is possible, as near to term as is possible, in order to increase the infant's chances of survival, remembering chiefly always, however, the interests of the mother, since it is for her life that we are going to interfere. Act, then, neither too soon nor too late, being guided purely by the nature of the complication, and its effect on the mother.

The question is more difficult of decision in case of pelvic deformity. Although we may usually reach a fairly exact idea of the form of the pelvis, it is far otherwise as to the period of pregnancy, and the volume of the foetus, two conditions of capital importance.

1. *The State of Pregnancy.*—We have seen already (*vide* Pregnancy, Vol. I.), that it is almost impossible to determine the exact date, and that we are always liable to great error. Of 50 women studied by P. Dubois, in order to find out the possible variations between the supposed date of pregnancy and the real, in 17 cases the difference was 8 days; in 17 others between 8 and 15 days; in 3 between 15 and 20 days; in 13 between 20 to 30 days. The supposed date of pregnancy was placed 8 times before, and 41 times after the real. From these cases, and 100 others, Dubois states that 15 days' error is ordinarily possible.

The gravity of such an error is understood, when we are dealing with a contracted pelvis requiring premature labor between 7 and 7½ months. The data given by the patients in regard to the last menstruation are often very inexact, and the foetus being entirely above the cavity, our error would be great if we based an opinion on the development of the abdomen.

2. *Volume of the Foetus.*—Ahlfeld has endeavored to determine this in order, on the one hand, to find out the period of gestation, and, on the

other, to recognize the disproportion existing between the fœtus and the possible degrees of pelvic contraction. After having shown that the rational history and the main physical signs furnish only illusory data, he concludes that the only absolute is given by the volume of the fœtus. He has endeavored, hence, to measure this, and he has reached the following conclusions: The fœtus being in a state of flexion, it constitutes an ovoid, one pole formed by the lowest part of the head, and the other by the highest of the breech. By measuring the distance between these two poles, that is to say, the intra-uterine longitudinal axis of the fœtus, Ahlfeld has determined that it represents about one-half of the total fœtal length. We may thus obtain quite an exact idea of the true length by measuring the axis. We may measure this axis by means of the pelvimeter, one blade in the vagina to one pole of the ovoid, the other on the abdominal wall over the second pole. Doubling this measurement will give us the true length of the fœtus, and thence the age of the gestation. In the following tables Ahlfeld's experiments are resumed:

Mean Weight and Length of the Fœtus by Weeks.

40th week	Weight 6.97 lbs.	Length 19.6 inches.
39th "	" 7.30 "	" 19.73 "
38th "	" 6.63 "	" 19.46 "
37th "	" 6.32 "	" 18.83 "
36th "	" 6.17 "	" 18.83 "
35th "	" 6.05 "	" 17.44 "
34th "	" 5.33 "	" 17.96 "
33rd "	" 4.58 "	" 17.12 "
32nd "	" 4.63 "	" 16.09 "
31st "	" 4.33 "	" 17.04 "
30th "	" 4.11 "	" 16.38 "
29th "	" 3.46 "	" 15.4 "
28th "	" 3.59 "	" 15.71 "
27th "	" 2.51 "	" 14.15 "

Intra-Uterine Volume of Fœtus.—Mean.

Week of pregnancy.	Mean length.	Number of cases.	Length at same period of infant born.	Week of pregnancy.	Mean length.	Number of cases.	Length at same period of infant born.
40th.	9.98 in.	2	19.6 in.	31st.	8.46 in.	4	17.04 in.
39th.	9.98 "	9	19.73 "	30th.	8.15 "	8	16.38 "
38th.	9.71 "	16	19.46 "	29th.	7.87 "	6	15.4 "
37th.	9.39 "	20	18.83 "	28th.	7.56 "	4	15.7 "
36th.	9.32 "	18	18.83 "	27th.	7.37 "	4	14.15 "
35th.	8.78 "	20	18.44 "	26th.	6.9 "	4	
34th.	8.97 "	11	17.96 "	25th.	7.1 "	1	
33d.	8.66 "	10	17.12 "	24th.	5.07 "	1	
32d.	8.39 "	13	16.09 "				

Proportion Between Height of Uterus, and Length of Intra-Uterine Fœtal Axis, and Length of New-born Infant.

Week of pregnancy.	Height of Uterus.	Length fœtal axis, (intra-uterine.)	Length new-born infant.	Week of pregnancy.	Height of Uterus.	Length fœtal axis, (intra-uterine.)	Length new-born infant.
40th.	10.18 in.	9.98 in.	19.6 in.	31st.	8.42 in.	8.46 in.	17.04 in.
39th.	10.02 "	9.98 "	19.73 "	30th.	8.38 "	8.15 "	16.38 "
38th.	9.7 "	9.71 "	19.46 "	29th.	7.87 "	7.87 "	15.4 "
37th.	9.5 "	9.39 "	18.83 "	28th.	7.91 "	7.56 "	15.7 "
36th.	9.4 "	9.32 "	18.83 "	27th.	7.44 "	7.37 "	14.15 "
35th.	9.16 "	8.78 "	18.44 "	26th.	7.41 "	6.9 "	
34th.	9.12 "	8.97 "	17.96 "	25th.	6.95 "	7.1 "	
33d.	8.7 "	8.86 "	17.12 "	24th.	5.85 "	5.07 "	
32d.	8.5 "	8.89 "	16.09 "				

The importance of these researches is at once appreciated. The age of gestation and the volume of the fœtus being known, there remains simply the other element, the dimension and the form of the pelvis. Let us say here, once for all, that delivery being always more difficult in the generally and regularly contracted pelvis than in the simply flattened or not, it will be necessary to interfere in this case earlier.

1. *Pelvis at least 3.5 inches.*—There is a difference according as we are dealing with a primipara or a multipara. In the latter everything depends on how the previous labors have passed. If, at term, they have been simple, easy, and resulting in living infants, we need not induce labor, but can wait; if the forceps has been required, although easy and with living infants, we must be more reserved. We must never forget what we have already stated, that infants increase in size with the pregnancies, especially boys; and consequently in the fourth and fifth pregnancies we might meet with difficulties which did not exist in the others. We are, therefore, justified in inducing labor a little before term. With all the more reason, of course, if the woman is in the habit of bearing large children, if on palpation and on mensuration we suspect a large child, if the anterior labors have necessitated the forceps, resulting in dead children, or if the forceps has not sufficed, and the fœtus has had to be mutilated.

When the pelvis is at least 3.5 inches, after deduction, and the fœtal head at term will be 3.7, reducible by .39 of an inch, labor should be induced at eight months one week to eight and a half months, according to the obstacles met with in previous labors, and the supposed volume of the fœtus.

If, on the other hand, we are dealing with a primipara, since infants are usually smaller, we may wait till term, or at least not induce labor till eight or ten days before term.

2. *Pelvis of 3.31 inches.*—In this case, whether we are dealing with a primipara or a multipara, premature labor is indicated, and at eight months to eight and a half.

3. *Pelvis of 3.12 inches.*—Premature labor is to be induced between eight and eight and a half months at the latest.

4. *Pelvis of 2.9 inches.*—Premature labor is to be induced between seven and a half and eight months.

5. *Pelvis of 2.73 inches.*—Premature labor is to be induced between seven months and seven months three weeks.

6. *Pelvis of 2.53 to 2.34 inches.*—At seven to seven and a half months at the latest.

Below 2.34 inches, miscarriage should be induced; instances where in pelves of 2.14 inches living children have been obtained are very exceptional, and cephalotripsy and embryotomy are too dangerous for the mother.

Indeed, when we are going to induce premature labor, we must not consider this operation alone, for although in pelves of 3.5 to 3.12 inches we can usually extract living infants with the forceps, this is far from being the case where the contraction is less than 3.12 inches. Here we may be able to bring the foetus down to the pelvic floor, but no further, and be obliged to mutilate it. The greater the contraction of the pelvis, the greater the difficulty of mutilating operations, and hence the less the chances for the mother. It is of advantage to her, therefore, to substitute miscarriage for premature labor.

We see, then, from the above figures, that it is in the most common degrees of deformity, 3.51, 3.31, 3.12, 2.73 inches, that it is, in general, of advantage to induce premature labor, and that the time of election corresponds to about these same figures, since the foetal head is reducible by .39 of an inch. These divisions, however, are not at all absolute, and the accoucheur must carefully study the obtainable data in each case before resorting to the operation. We must further remember that in rickets both the foetus and the uterus develop above the brim, since the head cannot engage; and that, consequently, the size of the abdomen will always indicate a more advanced pregnancy than in reality exists. We must always take into account this exaggerated elevation of the fundus,

particularly in case of contraction between 2.34 and 2.73 inches. Here premature labor should be induced between seven and seven and a half months at the latest, and since an error of 15 days is possible in our estimation, we will often induce miscarriage, that is to say, not obtain a viable child.

Once having determined on the induction of premature labor, another question presents itself—What is the presentation of the fœtus?

Although, prior to the last few years, cephalic presentations were considered most favorable in contracted pelves, latterly, the experiments of Budin, Champetier, Milne and Goodell, tend to show that the balance is in favor of pelvic presentations, certainly before term. We may well ask, therefore, if it would not be advantageous to convert head into breech by external manipulation? We cannot answer this question at present. Facts are not numerous enough, and the future must decide. The good results from the forceps lessen as the degree of contraction increases; cephalotripsy and embryotomy always sacrifice the fœtus, and become the more dangerous for the mother with increase in degree of contraction. We are, therefore, justified in trying the method of Milne and Goodell, which has yielded them such brilliant results. (See subject of Contracted Pelves, *Forceps and Version*.)

We give below the results of Winckel at the Dresden Maternity, in cases of contracted pelvis.

Of 10,679 labors, from October, 1872, to the end of March, 1882, Winckel noted 300 cases of contracted pelvis with 356 labors; 129 of these women had rickets.

Weidling (Halle) divides his cases according to the number of labors thus:

	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
147— I. P. .	1	14	21	8	10	17	10	34	14	15	3
94— II. P. .	2	8	8	5	13	13	6	11	14	11	3
43— III. P. .		2	3	3	4	9	5	3	3	3	2
25— IV. P. .			5		4	6	2	5	1	2	
18— V. P. .	1	1		1	1	5	1	4	2	1	1
13— VI. P. .		3		2	2				3	3	
7— VII. P. .		1			2		1	1	1		1
3— VIII. P. .			1						1	1	
2— IX. P. .					2						
2— X. P. .			1			1					
1— XI. P. .											1
1— XII. P. .										1	
356	4	29	39	19	38	51	25	58	39	37	11

Winckel, comparing his figures with the above, obtains the following percentage:

	I. P.	II. P.	III. P.	IV. P.	V. P.	VI. P.	VII. P.	VIII. P.	IX. P.	X. P.	XI. P.	XII. P.
Labor with pelvic contractions,	44.6	24.8	10.5	6.3	4.7	4.1	1.9	.6	.6	.6	.3	.03
Total number of labors,	51	27.6	10.9	4.	2.3	1.3	.7	.6	.3	.2	.1	.03

As for the influence of pelvic contraction on the presentation of the foetus, Winckel has noted:

Winckel	{	Vertex, anterior parietal,	7 times.
		Vertex extended,	4 "
		Face,	12 "
		Brow,	3 "
		Pelvic extr.	10 "
		Transverse,	6 "
		Brow with prolapse of limbs,	6 "
		Prolapse of cord,	37 "
		Cephalic presentations,	27 "

	Vertex.	Anterior parietal.	Face.	Pelvic extremity.	Trunk.
Winckel,	75.8%	1.9%	1.8%	3.2%	10%
Weidling,	90.6%	.2%	3.4%	2.6%	1.6%

	Weidling.	Winckel.
Prolapse of limbs,	1%	1.7%
" " cord,	5.9%	7.7%

Twists in cord. (Winckel.)	{	Simple,	67 times or 82.7%
		Double,	9 " " 11.1%
		Triple,	5 " " 6.2%

Ordinarily the general percentage is 25 per cent., or taken singly: simple twists 70.4 per cent.; double 10 per cent.; triple 1.6 per cent.

Prolapse of the cord was the cause of death in 33 per cent. of infants, that is, 1.8 per cent. more than in the other cases.

Varieties and Degrees of Contraction. (Winckel and Weidling.)

1. Pelvis with conj. vera 3.7 to 3.5 inches, flattened and rickety,	181
2. " " 3.12 " " " "	87
3. " " less than 3.12 " " " "	18
4. " generally contracted, rickety and not rickety, generally and regularly, generally and irregularly contracted, .	5

5. Pelves obliquely contracted,	6
6. " contracted at inferior strait. Lumbo-sacral kyphosis, .	1
7. " olisthetic,	2
8. Pelvis contracted with conj. vera 3.7 to 3.5 in. flattened and ricketty,	38
9. Pelvis contracted with conj. vera 3.4 to 3.5 in.	44
10. " " " below 3.12 in.	9
11. " " generally,	14
12. " " obliquely,	1
Total.	406

In Winckel's cases, twice the conjugate was but 2.73 in., and once 2.63 inches.

In Weidling's cases, the greatest degree of contraction was 2.73 inches, in two other cases 2.84 inches.

Of Winckel's cases the method of interference in 300, was:

1. Reposition of retroverted uterus, contracted pelvis, pregnancy went to term,	1
2. Induced premature labor, (3 children living, 1 mother dead.)	9
3. Reposition of the cord, (3 children saved.)	9
4. Version, (Ritgen's method.)	5
5. Forceps, (2 mothers dead, 4%. 14 infants dead, 4 by perforation; 5 died during first 8 days; mortality 21.3%. Maternal mortality 4%.)	51
6. Version and extraction, (1 mother dead, 3.1%; dead children 6; born alive, died in 11 first days, 3; perforation after-coming head 7.	31
7. Perforation, (out of 357 labors in contracted pelvis.)	48
8. Cephalotripsy,	3
9. Cranioclasty, (mortality of mothers, 8, reduced to 6, since two mothers were already <i>in extremis</i> . That is, of 32 cranioclasties, maternal mortality 18.7%. 36 women were sick during the puerperium, of which number: recovered 12, died 20.)	32

Therefore: morbidity 10.6%; mortality 6.8%.

Maternal Deaths. (Winckel.)

Uterine rupture at entrance into clinic	2
" " " "	6
Puerperal septicæmia,	9
Other diseases,	3

Of 100 women with contracted pelvis, 8 died. (*Weidling*).

If the head engages badly, or remains movable, resort to version and extraction.

In agreement with Spiegelberg, Winckel holds foetal life cheap compared to the mother's, and with him also agrees that any intervention is dangerous compared to spontaneous labor.

His clinical results accord absolutely with Spiegelberg's:

Breslau clinic, maternal mortality 7.9 per cent, foetal 30 per cent.

Dresden clinic, maternal mortality 6.0 per cent, foetal 29.6 per cent.

The time for induction having been chosen, it remains to choose one from the numerous effective agents. The different agents may be divided as follows:

1. Excitation of uterine contractions by the internal administration of drugs:

2. Excitation of the uterus either directly, or by reflex action:

3. Peripheral irritation of the cervix:

4. Direct dilatation of the cervix:

5. Excitants placed between the ovum and the uterine walls.

6. Separation and perforation of the membranes.

I. *Internal Medicines.*—In this series are found all the drugs reputed to be abortifacient: Rue and sabine, which act only in toxic doses, and should hence be excluded; ergot, used latterly by Bongiovanni, and, although rarely powerful enough, even in large doses, to awaken uterine contractions, acts profoundly on the foetal circulation, often stops it and thus acts contrary to the end we have in view, without speaking of the accidents it may occasion to the mother at the time of delivery. The sulphate of quinine recommended by Sayre. [This drug has absolutely no power of awakening uterine contractions, else how may it be given in large doses to the gravida suffering from intermittent fever with none but good results? When once contractions are in progress, however, there is no question but that a large dose intensifies them.—Ed.]

Recently pilocarpine has been recommended. It has been studied in particular by Müller, Dick, Fehling, Prochownick, Kleinwächter, Bidder, Stroynowski, Mossmann, Schauta, Felsenreich, Welponer, Scotti, Ohms, Marmi, Labarraque, and it has been used to induce labor by Sänger, Parisi, Hyernaux, John Clay, Ercole Pasquali, Chantreuil, Mari-Autet, Kroner. The following are Mari-Autet's conclusions: 1. In a certain number of cases pilocarpine subcutaneously has had no effect (Welponer,

Parisi, Hyernaux and Sanger); 2. The same is true of a number of experiments on animals (Hyernaux, Chantreuil); 3. When, however, the woman is in labor, or has reached term, the subcutaneous injection has an effect, also in animals; 4. In a certain number of cases, the contractions observed after injection have determined labor (Massmann, Schauta, Kleinwachter, Sanger); 5. Usually the action has been insufficient to determine the expulsion of the product of conception; 6. It appears legitimate to conclude, that if at term and during labor pilocarpine seems to have influence over the contractility of the uterus, before term the action is *nil* as regards the induction of premature labor.

Autet, however, fails to mention what others have, that pilocarpine produces symptoms of poisoning, and only acts in the presence of these symptoms, a fact brought out strongly by Sanger, Kroner, and Hyernaux. The last gentleman attributes the oxytocic effect of pilocarpine, not to a special action of the alkaloid, but to its toxic property. It is an epiphenomenon of the great disturbance it causes in the organism. He compares it to the labor which follows on heart disease, profound emotion, or nervous shock, the convulsions of epilepsy and hysteria, (Wasseige.) We must hence absolutely reject pilocarpine.

[The binoxide of manganese, which has of late proved of such great utility in atonic amenorrhœa, would seem to possess marked oxytocic properties, certainly in the early months of pregnancy. We are personally cognizant of three cases, where the drug was administered by others during pregnancy, with resulting miscarriage. Possibly in the later months of gestation, it will not so act, but it is well to bear in mind the fact that it may evoke uterine contractions.—Ed.]

II. *Direct and reflex Excitation of the Uterus.*—D'Outrepoint advised friction and massage of the uterus. Schreiber has used galvanism; Dorrington and Simpson electro-magnetism; Henning faradism; Gardien hot baths frequently repeated; Friedereich blisters to the mammæ; Scanzoni, Langenreich, Germann, rubber suction bulbs on the nipples. Aside from the fact that many of these methods are painful, and even dangerous, they are all untrustworthy, and lead but slowly and rarely to the proposed end.

[The recent contributions of Bayer and Fleischmann, amongst others, would lead us to think that in the electric current we possess a most valuable means of inducing premature labor, and safer than many others in use, for the reason that all possible chance of infection is avoided. In

Fleischmann's cases the effect was most marked when the cathode lay in the posterior *cul-de-sac*, and the anode was placed over the lumbar vertebra. He suggests as possible that the contractions are evoked through irritation of Frankenhauser's ganglion. Personally, we propose to try electricity when occasion offers, and preferably the faradic current, mild of course, and with the precaution of not passing the current through the poles of the foetal ovoid. Our belief in the action of this current is based largely on the results yielded us in two cases of uterine inertia, to which we have already referred. Likely enough the interrupted galvanic current would act as well as the faradic.—Ed.]



FIG. 125.—BRAUN'S COLPEURYNTER.

III. *Excitation of the Periphery of the Cervix.*—Schoeller has proposed the tamponade of the vagina with pieces of charpie, as in case of hemorrhage, and has thus been successful twelve times in twenty. Hüter and Busch, instead of using charpie, tampon with a bladder containing an infusion of ergot, destined to act by exosmosis!!! Braün uses the colpeurynter (Fig. 125), and it has succeeded in a number of instances.

IV. *Douches.*—Kiwisch has advocated hot douches against the cervix, at a temperature of 110° F. continued for twelve to fifteen minutes. Scanzoni has proposed the substitution of intravaginal douches of carbonic acid. Giordano cauterizes the cervix with the stick of nitrate of silver.

V. *Dilatation of the Cervix*.—Busch, Mende, and Krause, have used metallic dilators. Kluge introduces into the cervix a cone of prepared sponge (Fig. 126), and holds it in place by a vaginal tampon. This sponge softens, swells, dilates the cervix, and awakens uterine contractions. Van Leynseele, and Pigeolet, replace the sponge by laminaria tents. [If a tent is to be used, the tupelo should be preferred to the sponge and the laminaria. The danger from septic infection is too great from the sponge, however carefully prepared, and it should never be used in the gravida for this reason. The laminaria wounds the cervix too much, and in this way exposes to septic infection. The tupelo is not open to either of these objections, dilates evenly and just as thoroughly, and is the tent *par excellence*.—Ed.]

Snackenbergh uses an instrument which he calls the *spheno-siphon*. It is composed of a syringe and canula about two inches long, pierced with lateral holes, and covered with prepared skin which will distend to the extent of one to two inches. The syringe is filled with liquid, the canula inserted into the cervix, the piston pushed down, and the skin bladder distended with fluid. A screw holds the piston in place. On the following day more fluid is injected, and similarly on the third day.

Barnes has devised a method which not only allows him to determine labor, but to accelerate it, and to end it, so to speak, at will. His apparatus consists of three rubber bags of different sizes, shaped like a violin, and adapted to each there is a long rubber tube fitted with a stop-cock. The smallest of these bags is .78 to 1.1 of an inch, the largest 2.34 to 2.79 inches. Barnes begins by obtaining a certain amount of dilatation through the douche or by the prepared sponge; then he inserts his smallest bag, and distends it with warm water. When dilatation is sufficient, the bag slips into the vagina, he withdraws it and inserts the next size, and later the largest, and, when dilatation is complete, he ruptures the membranes, and terminates labor by either forceps or version, generally the latter. Barnes has recently modified the procedure. Over night he inserts a bougie, 5.8 inches deep, and leaves it there. In the morning, dilatation having commenced, he inserts the small bag, ruptures the membranes, continues the dilating process with the second and third bag, and ends the labor by version, as soon as the cervix is sufficiently dilated.

Chassagny has devised a double bag, analogous to Barnes's dilator, ex-

cept that each bag is provided with an independent tube, so that one or both may be inflated indifferently.

Deviliers used a double current catheter, the end of which was covered

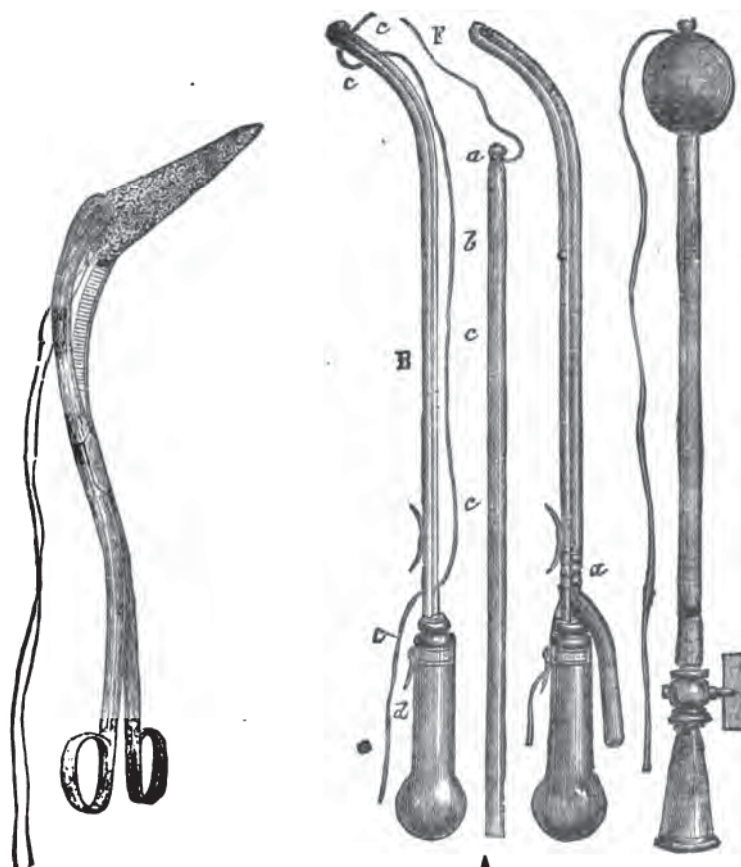


FIG. 126.

FIG. 127.

FIG. 126.—KLUGE'S METHOD. INTRODUCTION OF SPONGE CONE

FIG. 127.—TARNIER'S DILATOR.

with a species of condom which, when in the cervix, is distended with water.

Mattei has devised a similar instrument.

Tarnier, finally, has devised his dilator, which he describes as follows (Fig. 127): "The instrument is composed of two portions—a rubber tube and a conductor. The principle of its action is to insert into the uterus, above the internal os, a rubber tube of the size of a bird's feather, which

swells at its uterine extremity into a bladder the size of an egg when it is distended. It is left *in situ* till expelled by the uterine contractions. The rubber tube is 11.5 inches long, and closed at one end. The walls are thick and resisting, becoming thin at their extremity. When injected, the unequal thinness of the walls causes them to distend at this portion. To the end of this tube is attached a strong thread, 19.5 inches long. The conductor is metallic, tunnelled throughout its length, and curved like the hysterometer. It is pierced by three eyelets, two at the end, .39 inches apart, the third near the handle. To mount the tube on the conductor, I pass the thread through the eyelet nearest the extremity; it is then passed through the next eyelet, and it runs down the gutter to emerge out at the eye near the handle. By making traction on the thread the tube is held on the conductor. The thread is twisted around the screw.

“To use this instrument I proceed as follows: It is guided by two fingers into the cervix between the ovum and the uterine walls, at least one inch above the internal os. Fully an ounce of liquid is injected, and the tube becomes sufficiently distended. The stop-cock is closed, the thread unwound, and the conductor withdrawn. The tube will remain in place, and the woman should move around and attend to her household duties. Labor pains rapidly set in, in three to four hours the cervix opens, and the tube falls into the vagina. This happens in about ten to twelve hours.”

Pajot has modified Tarnier's dilator by replacing the conductor by a small hollow tube ending in a bulb. (Fig. 128).

VI. *Excitants placed between the Uterine Walls and the Ovum.*—Tarnier's apparatus not only acts as a dilator, but also as an excitant. Krause uses a gum-elastic catheter, which he inserts between the membranes and the uterus, and leaves it in place until the uterine contractions have brought about sufficient dilatation of the cervix. Zuidhoeck used a wax bougie. Mampe and Lehmann are satisfied with introducing a bougie several times between the membranes and the uterus, in different directions.

VII. *Separation and Perforation of the Membranes.*—Schweighauser and Cohen have advised inserting between the membranes and the uterus an elastic catheter to which a syringe is fitted. Through this water is injected, which separates the membranes and awakens contractions. Hamilton recommends simply passing the finger above the internal os,

and separating the membranes as high up as possible from the lower uterine segment. This method has been partially practised by Copeman in case of uncontrollable vomiting. Finally Scheel, Hopkins and Meissner, have counselled perforation of the membranes by means of a pointed feather trocar, or the uterine sound. Kluge and Ritgen have devised

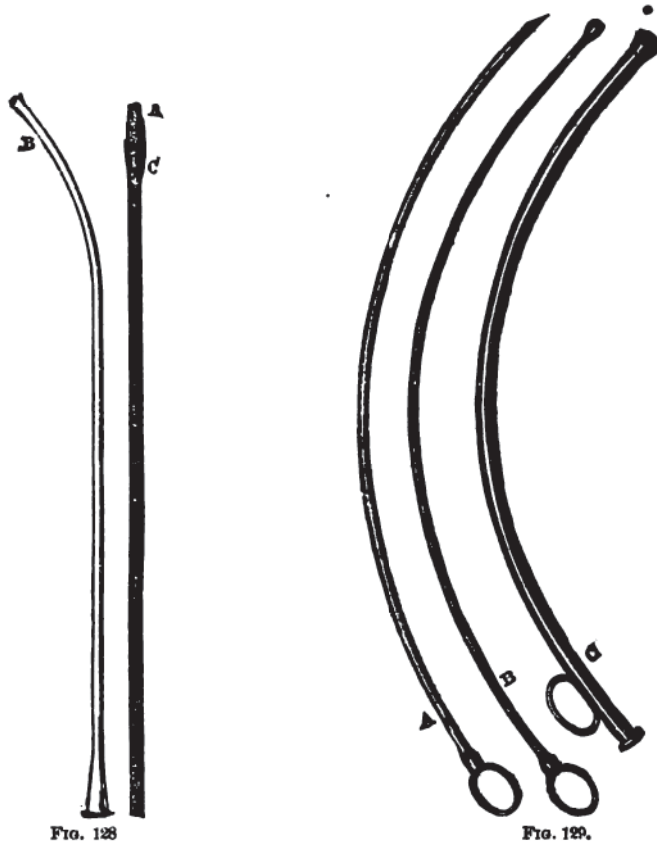


FIG. 128.

FIG. 129.

FIG. 128.—PAJOT'S INSTRUMENT FOR INDUCING LABOR. A, Rubber tube. B, Metal guide. C, Dilatable upper extremity.

FIG. 129.—MEISSNER'S TROCART.

instruments, the aim of which is to suck down the membranes into the opening of the canula, and there perforate them. The advantage of this method is that the *liquor amnii* escapes by drops. (Fig. 129.)

Such are the different methods in use to-day. All have not the same value, and we proceed to point out the advantages of each, and our own preference.

At the outset, we eliminate internal drugs, since their action is untrustworthy or *nil*, and when they do act they compromise the mother's health and the foetal existence. The same remark holds for frictions and massage, the action of which is, at best, but transitory; excitation of the mammæ, which, aside from the fact that they are very painful, often fail; electro-magnetism, galvanism, etc.

[From what we have said before, we take exception to this exclusion of electricity. We believe that this agent will prove the most effective, and the least dangerous, seeing that uterine contractions can with absolute certainty be evoked, and with not the slightest risk of septic infection or damage to the cervix or the uterus.—Ed.]

Amongst the active measures, we mention the tampon. It often succeeds, especially in case of hemorrhage, but its application is painful, slow, and it must be renewed on account of its odor.

[That the action of the tampon is slow we grant, but, when inserted, as only it should be, in Sims' position and through Sims' speculum, it is not at all painful, simply uncomfortable; and, as for its frequent removal, if iodoform gauze is used, it may be left *in situ* for thirty-six hours, in case of necessity. A practical point in connection with the tampon, is not to fill the lower third of the vagina, and thus avoid pressure on the neck of the bladder and the urethra, with the consequent tenesmus.—Ed.]

The measures most frequently resorted to are those of Kluge, Kiwisch, Barnes, Tarnier, Krause, Cohen, Scheel and Meissner.

Kluge's method, that is to say, dilatation of the cervix with prepared sponge, or with laminaria, is certainly an excellent one. First proposed by Brunninghausen, later by Siebold, it was especially practised by Kluge, and is called after him. Dilatation of the cervix is thus accomplished slowly and with certainty, and the sponge acts mechanically as well as dynamically, without risk for the mother or the child. It leaves the membranes intact, and thus the mother and the child remain under normal conditions. The introduction of the tent is, however, often very difficult. In primiparæ, in particular, where the cervix is high up and behind, it is difficult to insert and to retain in place. Often, further, the tent acts so very slowly that we are obliged to perforate the membranes, thus depriving the foetus of a portion of the benefits of the operation. In 70 cases collected by Hofmann it was successful 50 times alone; 7

times other methods had to be joined to it; 7 times it absolutely failed. Let us add, finally, that there is some risk of septic infection following its use, and this is truer still of laminaria. Nevertheless, the method is a good one, especially in multiparæ.

Kiwisch's method, the hot douche, also succeeds well. Used first in Germany by Kiwisch, in 1846, it was imported into France in 1852, by Campbell, who told P. Dubois about it. The method has become classic with us. Dubois used it with an irrigator containing 2½ gallons; Depaul either with the irrigator or the bulb syringe. Blot directed the stream against the os, and even proposed to inject into the canal, when, in the hands of Depaul, of Salmon, of Blot, of Tarnier, of Simpson, of Olshausen, of Lazatti, and of Van Leynseele, there occurred cases where women died during the douche, as the result of the entrance of air into the uterine sinuses. Tarnier showed further that with the powerful syringe of Mattieu the vaginal *culs-de-sac* might be torn. From this time forth Kiwisch's method was abandoned.

Barnes' method is not simply one for the induction of labor, but is a variety of *accouchement forcé*, and should be reserved for exceptional cases.

Tarnier's method is to-day the favorite in France; it has decided advantages over all the others, but it is not, as Tarnier says, proof against objection. As Tarnier himself admits, it is often difficult, if not impossible, to introduce the dilator, and in primiparæ the conductor is too large. The rubber tube may break, "and then involuntarily we inject into the uterus." In multiparæ, especially, we have seen the instrument slip before dilatation was completed, and been obliged to reinsert it as often as four times. Hence loss of valuable time. Nevertheless, the method is a valuable one, not dangerous to mother or child, and usually rapid and successful.

Cohen's method is a good one, but is little used, because, like Kiwisch's, it exposes to the entrance of air into the uterine sinuses, and to sudden death of the mother.

There is one method which we prefer over all, and this is Krause's. It is simple, efficacious, harmless. It consists in inserting a gum-elastic bougie between the membranes and the uterus, and leaving it *in situ* until dilatation is sufficient, and contractions regular enough to warrant the belief that labor has really set in. We have used the method twelve

times without a failure. We take a bougie, 17 to 18 french. The woman is placed across the bed, and two fingers of the left hand are introduced into the vagina to the cervix, and placed underneath the external os. These fingers guide the bougie into the uterus, and it is gently pushed inward, being withdrawn a little in case it meets any obstacle, and then pushed in again. In general, labor sets in at the end of a few hours, and the bougie is left *in situ* until dilatation is completed.

This method, we see, is the simplest of all. Mampe, Lehmann, Earle, have simplified the method by moving the bougie in different directions, and thus separating the membranes, and then withdrawing it. Lehmann has succeeded in a number of instances. Valenta recommends pushing the bougie to the left, and behind, because: 1. The placenta is rarely on this side; the presentation of the occiput to the left being the most frequent of all, the bougie slides readily over the smooth occiput and the back, without risking rupture of the membranes; the uterus being dextro-verted, catheterism is easier on the left. With Hüter we believe that these rules are purely theoretical.

The opponents of Krause's method make the following objections: 1. The insertion of the bougie is difficult, seeing that it bends and stops before penetrating sufficiently into the uterus. Far from finding this an objection, we believe it to be a safeguard. It is impossible with an elastic instrument like the bougie to injure the uterus or the foetus, and admitting that we cannot make it pass to the fundus, we may always, by acting gently and slowly, place it in the lower uterine segment, where it will bend and produce the desired effect. 2. We may rupture the membranes. This objection is not, to us, founded on fact, for the bougie, sliding gently between the membranes and the uterus, simply separates them, and it is later, under the influence not of the bougie, but of the uterine contractions, that the membranes rupture. If the membranes are not ruptured by Tarnier's metallic guide, with greater reason will they not be by the bougie. 3. The bougie does not only excite the uterus, but irritates and inflames it, and further there may adhere to it septic matter, or else it may itself alter and give rise to septic products which will poison the woman.

These objections seem to us more theoretical than practical, and, in not a single one of the twelve cases in which we have used Krause's method, have we seen any accidents. In one case it remained in the

uterus twenty-eight hours, and was withdrawn unaltered. Further we always take the following precautions: We irrigate the vagina with a 1 to 100 phenic acid solution, and wash our hands and the bougie in the same fluid, and we grease it with carbolized vaseline before introduction. Whilst it is in place, the woman injects herself every five to six hours with warm carbolized water.

Certain authorities, nevertheless, with Hegar at their head, fear septic infection so much that they always resort to the next method, that is to say, puncture of the membranes. Whether we rupture them at the internal os, or higher up, the result is the same, labor is induced, for the ovum has been torn. This, it may be said, is the only inevitable means of inducing labor. The method, however, has its disadvantages, and it should be reserved for cases where the bougie fails, and then we would perforate at the internal os, and not higher up.

We may make the following objections to perforation: 1. It acts slowly, the more so the higher up it is done. Indeed labor may not set in for as much as twenty-four to forty-eight hours or longer, when we remember what may happen in case of spontaneous rupture of the membranes. We have just seen a case where labor only set in forty-four days after spontaneous rupture at the seventh month of gestation, and we might mention others. 2. The perforation of the membranes, by evacuating the liquor amnii, places the mother, and above all the fœtus, in less favorable conditions than all the other measures where the liquid is retained. And this is why Meissner and Hopkins advised perforation high up, in order that the *liquor* might escape slowly, and thus preserve as long as possible the cavity of the ovum.

Prognosis.—Considered alone, the induction of premature labor being an operation practised in the interests of the mother and of the child, is inoffensive, and all the more so when performed by an expert. But, in studying the different methods, we have seen that several have caused the death of the mother, and that therefore the choice of the method is not a matter of indifference. The most inoffensive, in our opinion, are those of Kluge, of Tarnier, and of Krause, and then follow the method of Kiwisch, and the perforation of the membranes, the latter compromising especially the life of the fœtus. We must further consider the operation from the standpoint of its results for the mother and the child, particularly in connection with pelvic deformity. In this case, indeed, the

induction of labor is purely preparatory to true labor, so to speak, and the operation does not always save the child from forceps, perforation, or embryotomy, with all the consequences of these operations for the mother and for the child.

Hecker, in giving the results of the labors at the Munich Maternity from June, 1859, to March, 1879, tells us that in 17,220 labors with 17,400 infants, interference was necessary in 1,424 cases, as follows:

Induction of premature labor,	24
Cephalic version,	6
Podalic " (1 foot)	202
Extraction, simple,	210
" after version,	189
" " forceps,	446
" " perforation,	30
" " cephalotripsy and cranioclasty,	26
 Cæsarean section : living women, 2; dead women, 3,	5
Reposition of the cord,	76
Artificial third stage,	210
 Of the 17,220 women, 279 died, or 1.6%:	
During or immediately after labor,	24
" the puerperium,	80
After leaving hospital,	175
 Of the 17,400 infants, 1,715 died, or 9.8%:	
Dead before labor,	407
" during labor, or born in apparent death and not re-animated,	540
" from congenital weakness,	435
" " disease,	333

Certainly the induction of premature labor is an immense progress; for as Naegelé and Grenser say, "the proportion of fatal cases is not great, if compared with the operations which would have been required, other things equal, by the mother at term. As for the children, the prognosis is less favorable, for being born prematurely they are much more difficult to rear than at term."

But we must remember that the induction of premature labor is called for precisely because the woman is in unfavorable circumstances, and we may say then that the prognosis of the operation is always grave, especially

since it may be followed by other operations. The operation, then, will give results the less favorable the greater the degree of pelvic deformity, and the earlier in gestation we are obliged to resort to it.

Spiegelberg and Litzmann, followed by Berthold and Fritsch, have, in particular, endeavored to weigh the results from the induction of premature labor.

“Spiegelberg first establishes the fact that the operation has attained its present high reputation, because: 1. The comparative risks of the operation have never been stated. 2. Those children have been considered definitively saved who were born alive at the end of the operation. He then examines the results of his personal experience and of that of others, and he finds that at Frieberg, between 1865 and 1869, there were 2,264 labors, with 307 cases of pelvic deformity, the contraction varying between 2.34 and 3.75 inches, and including 11 cases of pelvis regularly and generally contracted, 3 obliquely and 1 transversely contracted. The following are the points of interest in connection with these 307 labors:

The presentations were divided into: Vertex 257; face 8; brow 1; breech 11; shoulder 30.

There were 165 spontaneous labors, and 142 induced labors, with the following results as regards maternal and infantile mortality:

By expectant treatment:—Mothers saved, 94.5%; infants saved, 64.8%.

By interference:—Mothers saved, 93.4%; infants saved, 62.8%.

Next, considering the statistics of different German authors, he obtains the following figures:

a. Result in 1,124 labors in contracted pelvis, taken generally:

Mothers saved,	1,143—93.3%
“ dead,	81— 6.6%
Infants saved,	880—71.2%
“ dead,	355—28.7%

b. Results in 271 cases of artificial labor, taken *en masse*:

Mothers saved,	220—81.1%
“ dead,	41—18.8%
Infants saved,	94—33.9%
“ dead,	92—33.2%
“ “ after labor,	91—32.8%

c. Results in 219 cases of induced labor, contracted pelvis:

Mothers saved,	186—84.9%
“ dead,	33—15.0%
Infants saved,	73—33.0%
“ dead,	77—34.8%
“ “ after labor,	71—32.1%

d. Results in 587 cases of spontaneous labor, contracted pelvis:

Mothers saved,	549—95.5%
“ dead,	38— 6.4%
Infants saved,	383—64.9%
“ dead,	207—35.0%

e. Results in 239 cases of very pronounced contraction (1.17 inches and below):

Mothers saved,	205—85.7%
“ dead,	34—14.2%
Infants saved,	100—41.4%
“ dead	141—58.5%

Spiegelberg, therefore, pronounces himself in favor of expectancy as against induction of premature labor.

Gierich, in 110 cases collected from different authorities, gives the following figures:

In 110 cases of induced premature labor:

Mothers saved,	84—76.3 %
“ dead,	26—23.63%
Infants saved,	35—31.8 %
“ dead	29—26.36% } 68.18%
“ “ after labor,	46—41.81% }

The same authority in 793 cases of contraction down to $2\frac{1}{4}$ inches, and where consequently there was no question of premature labor, noted:

Mothers saved,	746—94.07%
“ dead,	47— 5.92%
Infants saved,	402—75.1 %
“ dead,	199—24.8 %

Litzmann, finally, reaches the results found in the subjoined tables:

Table I.—Results in 373 Cases of Labor in Contracted Pelves.

Pelvis regularly and generally contracted, 73, or 19.5%. Pelvis simply flattened, 194, or 52.5%. Pelvis generally contracted and flattened, 104, or 27.8%.

Number of Labors.	Presentation of Fœtus.	Progress of Labor.		Mothers.		Infants.		
		Natural. (1)	Artificial.	Saved.	Dead.	Born Alive.	Dying or Born Dead.	Living.
1. Labor at term.... 323 86.5%	Vertex.....	237	96	303	21	271	53	264
	With Prolapse of Cord.....	70.3%	29.7%	98.4%	6.5%	83.9%	16.1%	81.7%
	With Prolapse of Limbs....							
	Face.....							
2. Labor before term a. Spontaneous	Pelvis.....							
	Shoulder.....							
	Vertex.....	10	6	16	0	11	5	8
	With Prolapse of Cord.....	63.5%	37%	100%	0.0%	68.7%	32.1%	50%
b. Artificial....	With Prolapse of Limbs....							
	Pelvis.....							
	Shoulder.....							
	Vertex.....	12	21 ²	29	5	15	19	7
Total....	With Prolapse of Cord.....	35.3%	61.7%	85.2%	14.7%	44.1%	55.8%	20.5%
	With Prolapse of Limbs....							
	Pelvis.....							
	Shoulder.....							
	Vertex.....	249	123	347	26	279	76	297
	With Prolapse of Cord.....	66.7%	32.9%	98.02%	6.9%	74.7%	20.3%	79.6%
	With Prolapse of Limbs....							
	Face.....							
	Pelvis.....							
	Shoulder.....							

¹ In this number are included, prolapse of cord or limbs, tamponade, episiotomy. ² One labor not completed.

Table II.—Results in 316 Cases.

First degree of contraction :—Pelvis regularly and generally contracted, 3.9 to 3.5 inches=73 or 23.1%. Pelvis simply flattened, 188=59.4%; Pelvis generally flattened and contracted, 55=55.7%—Conjugate of 3.7 to 3.21 inches.

	Number of Labors.	Presentations.	Progress of Labor.		Mothers.		Infants.		
			Natural.	Artificial.	Saved.	Dead.	Born alive.	Dying or Dead.	Saved.
1. Labor at Term...	304 96.1%	{ Vertex.....264 86.8% With Prolapse of Cord, 15 4.9% With Prolapse of Limb, 2 .6% Face..... 2 .6% Pelvic..... 18 5.9% { Shoulder..... 3 .9%	226 74.3%	78 25.6%	289 95.06%	15 4.9%	265 87.1%	39 12.8%	258 84.8%
2. Premature Labor	10	{ Vertex..... 7 70% Prolapse, Cord..... 1 10% " Limb..... 1 10% { Pelvic..... 1 10% { Pelvic..... 1 50% { Oblique..... 1 50%	9 90%	1 10%	10 100%	0 0%	10 100%	0 0%	8 80%
a.—Spontaneous...	3.1%								
b.—Artificially Introduced.....	2 ¹ .6%			1 50%	1 50%	1 50%	1 50%	1 50%	0 0%
Total.....	316		235 74.3%	80 25.3%	300 94.9%	16 5.06%	276 87.3%	40 12.6%	266 84.1%

¹ Mothers not delivered. Dead from entrance of air into veins.

Table III.—Results in Forty-seven Labors. Contraction of Second Degree. Pelvis simply flattened, 5, 10.6%. Contraction, 3.19 to 2.9 inches. Pelvis generally contracted—flattened, 42, 89.3%; Dimensions, 3.51 inches.

	Number of Cases.	Presentation.	Progress.		Mothers.		Children.		
			Natural.	Artificial.	Saved.	Dead.	Born Alive.	Dying or Dead-born.	Saved.
1. Labor at Term....	16 34%	Vertex..... 18=81.2% Prolapse of Cord..... 2=12.5% Shoulder..... 1=6.2%	1 6.2%	15 98.7%	18 81.2%	3 18.7%	4 25%	12 75%	4 25%
2. Premature Labor, a. Spontaneous..	4 2.5%	Vertex..... 1=25% Prolapse of Cord..... 1=25% Shoulder..... 1=25% Pelvic..... 1=25%	1 25%	3 75%	4 100%	10	1 25%	3 75%	0 0.0%
b. Artificially in- duced.....	27 57.4%	Vertex..... 11=40.7% Prolapse of Cord..... 3= 4.1% Prolapse of Limbs..... 2= 7.6% Pelvic..... 7=25.9% Shoulder..... 4=14.8%	11 40.7%	16 59.9%	25 92.5%	2 7.4%	13 48.1%	14 51.8%	7 25.9%
Total.....			13 27.0%	34 72.3%	42 89.3%	5 10.6%	18 88.2%	29 61.7%	11 28.4%

Table IV.—Results in Eight Labors. Third Degree Contraction. Simply Contracted, 2, 25%; Generally flattened—Contracted, 6, 75%. Conjugate, 2.84 to 2.14 inches.

	Number of Cases.	Presentation.	Progress.		Mothers.		Infants.		
			Natural.	Artificial.	Saved.	Dead.	Born Alive.	Dying or dead-born.	Saved.
1. Labor at Term	2 25%	Vertex	0	2 100%	0	2 100%	1 50%	1 50%	1 50%
2. Premature Labor	1 12.5%	Prolapse of Cord	0	1 100%	1 100%	0	1 100%	1 100%	0
a. Spontaneous	5	Pelvic	1	4	8	2	1 20%	4	0
b. Artificial Labor	62.5%	Vertex	20%	80%	60%	40%	20%	80%	0
Total	8	Pelvic	1	7 87.50%	4 50%	4 50%	2 25%	6 75%	1 12.50%
		Shoulder							

Table V.—Results in Two Labors. Fourth Degree Contraction. Generally flattened—Contracted, 2, 100%; Dimensions, 2.14 and under.

	Number of Cases.	Presentation.	Progress.		Mothers.		Infants.		
			Artificial.	Natural.	Saved.	Dead.	Born Alive.	Dying or dead-born.	Saved.
1. Labor at Term	1 50%	Vertex	0	1 100%	0	1 100%	1 100%	0	1 100%
2. Spontaneous Labor	1 50%	Pelvic	0	1 100%	1 100%	0	0	1 100%	0
Total	2		0	2 100%	1 50%	1 50%	1 50%	1 50%	1 50%

Winckel, from 1846 to 1876, induced labor 25 times; one woman was I-para, three II-parae, two III-parae. The ages varied between 21 to 45; seven from 20 to 30 years, fourteen from 30 to 40 years, four over 40.

The operation was done:

2 in the 31st week; 10 in the 32d; 12 in the 33d; 1 in the 34th.

It was called for: in 12 by contraction to 2d degree; in 12 by contraction to 3d degree; and in 1 by contraction to 4th degree.

There were 3 twin labors; 7 presentations of vertex, 12 of pelvic extremity, and 8 of shoulder.

The interval elapsing between induction and birth varied from 12 to 168 hours:

In 3 forceps to before-coming head.
 6 " " after-coming "
 5 external cephalic version.
 6 internal podalic "
 2 placenta praevia.
 3 artificial 3d stage.

Mothers saved, 25; children born alive, 13; 6 dying in first 15 days.

Ultimate results: Children saved, 7; children dead, 14.

Fritsch, comparing the results given by other methods of interference, aside from induction of premature labor, noted:

	Cases.	Children dead.	Mothers dead.
Forceps to head high up,	25	13	1
" " " down,	256	11	3
Podalic version,	144	45	11
<i>Accouchements forcés</i> ,	8	2	2
Pelvic extremity :			
Artificial delivery,	113	8	1
Perforation,	14	14	1
Third stage, artificial delivery,	52		3

It is apparent from this table that out of 551 operations where the aim was to save the mother and the infant, 18 mothers or 3.6% died, and 144 children, or deducting 44 dead and macerated before labor, 100, (20%). In those cases where the infant was sacrificed, and the interests of the mother alone attended to, 66, mortality of 4, 6.4%.

Wiener, of Breslau, has induced labor 16 times. Comparing the re-

From 1862 to 1871.

	Application of Forceps, Head high up.						Forceps, Head Engaged.						Podalic Version.						Labor in Pelvic Extremity, Artificial Termination.						Accouchement Forcé.						Operations in Third Stage.						Perforation.						Total Number of Operations.					
	Primipare.			Multipare.			Living.			Dead.			Primipare.			Multipare.			Living.			Dead.			Primipare.			Multipare.			Living.			Dead.			Living.			Dead.			Living.			Dead.		
	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.	Infants.	Moth-ers.	Oper-ations.									
1862.....	1	1	1	4	6	10	10	10	10	8	5	3	6	2	4	4	2	6	1	1	1	1	1	1	1	1	1	2	2	2	19	6	24	8	8	8												
1863.....	4	2	4	11	5	16	16	16	16	1	8	4	5	8	1	4	2	4	1	1	1	1	1	1	1	1	1	2	2	2	46	24	10	45	1	1												
1864.....	2	1	2	16	7	23	22	22	22	1	9	7	5	10	2	9	5	9	1	1	1	1	1	1	1	1	1	7	6	1	54	36	11	50	4	4												
1865.....	1	1	1	7	2	8	1	9	9	1	14	7	8	14	1	2	10	6	1	1	1	1	1	1	1	1	1	2	1	1	43	22	17	40	3	3												
1866.....	1	1	1	12	14	19	7	26	26	1	16	6	10	16	3	7	3	9	1	1	1	1	1	1	1	1	1	1	1	1	53	83	20	52	1	1												
1867.....	1	1	1	11	3	9	5	13	13	1	11	6	5	10	4	5	8	9	1	1	1	1	1	1	1	1	1	8	7	1	47	25	12	48	4	4												
1868.....	2	2	2	16	9	19	6	25	25	3	11	9	5	13	1	4	2	5	1	1	1	1	1	1	1	1	1	5	7	12	1	1	1	59	81	15	58	1	1									
1869.....	4	3	4	83	24	53	4	57	57	1	11	4	8	12	5	10	13	15	1	1	1	1	1	1	1	1	1	2	2	2	92	74	15	92												
1870.....	1	3	2	85	9	89	5	48	48	1	17	11	7	18	2	17	18	1	19	1	1	4	2	3	1	1	1	12	12	12	108	72	17	101	2	2												
1871.....	1	3	2	18	14	82	82	82	82	1	28	13	16	20	3	22	21	3	24	1	1	1	1	1	1	1	1	2	2	2	93	68	21	90	8	8												
	6	19	12	13	24	1	163	93	228	28	258	3	11	183	72	183	11	21	92	87	26	112	1	1	8	8	5	6	2	6	46	49	8	6	17	407	144	595	23									

sults for the mothers in these cases with those from spontaneous labor, since 1870, in case of pelvic contraction:

Of 203 labors, in contracted pelvis, there were 10 maternal deaths, 5%; and 36 sick women, 17.7%; divided as follows:

Flattened pelves, 132; of which number: 87 were 1st degree, and 45 were 2d degree.

Generally contracted pelves, 67; of which 20 were 1st degree, 46, 2d degree, and 1, 3d degree. Funnel-shaped pelves, 3; oblique 1.

No. of Cases.		Spontaneous Labor.			Artificial Labor.		
		Cases.	Mortality.	Morbidity	Cases.	Mortality.	Morbidity
			Per cent.	Per cent.		Per cent.	Per cent.
87	Pelves flattened, 1st degree,	75	1.3	14.6	12	8.2	16.6
45	Pelves flattened, 2d degree,	26		25	17	11.8	29.4
132	Flattened pelves,	108	1	17.5	29	10.3	24.1
20	Pelves generally contracted, 1st degree,	16			4	50.	
46	Pelves generally contracted, 2d degree,	22		27	24	16.6	20.8
67	Pelves generally contracted,	38		16	29	20.7	20.7

In the contractions to the third degree, labor is always artificial.

If now these cases be compared with the 16 where labor was induced:

Labor induced 16 cases,	{ Spontaneous termination, 9. Artificial termination, 7.	{ Flattened pelves, 2 cases. Generally contracted, 6 cases. Oblique pelvis, 1 case. Flattened pelvis, extraction by trunk, 1 case. Generally contracted, (of which 3 extractions by trunk, 3 by version and extraction), 6 cases.
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Three mothers died, 1 after spontaneous labor, 2 after artificial.

Thus: 16 cases, mortality, 6.25%; morbidity, 25%.

Of the children: 16 cases, 10 dead, 7 during labor; 3 soon after; 62.5%

Of the 6 infants remaining: 2 died 5 weeks after, of marasmus; in 2, result not known; 2 still living.

Wiener's conclusions are as follows: "Artificial labor induced in pelves of 3.3 to 2.7 inches compromises the mother more than spontaneous labor. The same perhaps does not hold true for the foetus, but the advantage to

the latter is more apparent than real, since the majority die rapidly after delivery."

We have already given the results obtained at the Paris Maternité and at the Clinic, as deduced from the records by Rigaud and Stanesco.

The induction of premature labor, then, is most likely to succeed the nearer term it is performed—that is to say, the less the pelvis is contracted, and consequently the less active and necessary secondary intervention, and, on the other hand, the greater the development of the fœtus, and ability to exist outside of the uterus.

As for the prognosis, when the pelvis is normal, and the operation is called for by a complication of pregnancy, or a supervening disease, it should always be guarded; for, although, at times, we may thus save the mother and infant, in other cases it will be impossible to save the infant, endangered as it is already by the disease from which the mother is suffering; and often, by adding to the disease the shock of labor, the operation is simply an additional risk, and not only cannot save the mother, but will diminish her chances of survival. It should never be resorted to, therefore, except as a last resort, when we are deprived of all other therapeutic means.