# ON PREDICTING THE LENGTH OF LABOR*

## I. First Stage

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UNBIASED consideration of the physiologic process known as the first stage of labor would lead one to the conviction that two principal factors should be considered. The motive force is known to be, almost exclusively, uterine contraction. Resistance is provided by the cervix. Very little consideration has been given in obstetric literature to these two major factors in the various discussions of prolonged and difficult labor. Instead, the publications have dealt with age and stature of the mother, size of the pelvis, and size and presentation of the baby. There has been a great tendency to confuse difficult first stage and difficult second stage. We tried to show in our previous publication[1] that there was no correlation between the first stage and second stage and that, therefore, quite different factors must be presumed to govern the second stage from those having to do with the length and relative ease or difficulty of the first stage. We have previously demonstrated with respect to the first stage that such factors as maternal age and stature and pelvic size (within certain limits) do not have a demonstrable bearing on the length of, or difficulty involved in, that process. Infant size has no effect on the duration of the first stage in multiparas and little or no effect on primiparas. Occiput posterior has been said by all observers to result in a somewhat longer first stage than occiput anterior. At the time of our previous publication (1931), it was also our opinion that this was true. More recent information (to be presented in another communication) will prove this view fallacious. Abnormal presentation has been consistently looked upon as one cause of prolonged and difficult labor. Whatever the effect of abnormal presentation on the second stage, there is no particular reason to assume that it would necessarily prolong or otherwise make difficult the first stage of labor. We showed quite conclusively that this was true regarding breech presentation,[1] but the same is not yet settled with reference to bregma, brow, and shoulder presentations. There has been considerable literature with reference to the role of the membranes. Conclusive proof as to the effect of "premature rupture" of the membranes upon the first stage of labor is not yet available.

In a previous publication, we pointed out that variations in consistency of the cervix and variations in frequency and intensity of the labor pains did have an important bearing on the duration of the first stage. It was quite obvious, however, that other factors must also be

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involved. These two variants alone (as analyzed at that time) could not explain either the very short or the very long labors. It gradually became obvious to us that we could not learn what these other factors were without careful examination of a considerable series of patients at the onset of labor and close observation of changing conditions throughout the labor. To see for the first time a patient who has already been in labor several hours does not give us the necessary information as to the conditions present at the time of the onset of the pains and, therefore, leaves us unable to judge what total of work is presented to the uterine forces. In the past few years, we have been making an effort, therefore, to see more patients as their labors begin and to note the relative degree of effacement of the cervix, as well as the dilatation of the external os, the consistency of the cervix, and the station of the presenting point. Balancing this information with the character of the labor pains subsequently observed, we are now able to account for most, if not all, of the variations involved in the first stage. We find ourselves able to predict the duration of the first stage quite accurately. The occasional exceptions can usually be traced to definite pathology.

It should be pointed out that the patient must be seen at the onset of labor. We have found that an examination made the day previous to the onset of labor is not reliable, as in a considerable number of patients quite marked changes take place in the last twenty-four hours before labor begins. We have at present available for study 676 primiparas and 374 multiparas who were seen at the onset of their labors or very shortly thereafter. In a few instances, the primiparas were seen as much as one and one-half (or two) hours after the onset when the uterine contractions had been very weak and infrequent, and it was obvious that no material change had yet taken place. No multipara was included in this group when more than one hour had elapsed since the first discomfort was experienced. These are consecutive cases with no selection or elimination. (A much larger series of patients would have been desirable to prove the thesis to follow, but the conclusions are so clear-cut and the information so readily usable by physicians and students alike that it seemed wise to present the material now.)

## DEFINITIONS

Effacement was said to be present (for purposes of this study) when the cervix was either completely effaced or was three or more centimeters dilated (even though there might still be a considerable thickness to the cervical wall). All lesser degrees of effacement were said to be "not effaced."

If the presenting point was at or below the level of the ischial spines, the head was said to be "engaged;" if the presenting point was at any higher level, it was said to be "not engaged."

If the cervix was of the consistency of one's lip, or softer, we called it a "2" cervix; if of the consistency of the ala of the nose, or firmer, we called it a "3" cervix.

In judging the effectiveness of labor pains, we considered intensity and frequency. We did not consider duration as we had previously

shown[2] that duration of the individual labor pain was not important in affecting the duration of the first stage of labor. There is sufficient variation in labor pains, both with respect to frequency and intensity, as labor progresses that one must select a certain time in the labor on which to base his estimate of effectiveness and then try to apply that judgment to the whole of the labor, or the labor must be considered in several segments according to the type of pain present during each of those segments. The latter method is probably too complicated for practical use: The relative infrequency and lack of intensity of the uterine contractions during the effacement phase of the first stage caused us to think that possibly the labor pains should be judged not during effacement but rather at the beginning of the dilatation phase. We, therefore, took as our standard the frequency and intensity of the pains at the time the cervix was either 2 or 3 cm. dilated. We classified the pains as "good," "fair," or "poor," according to the following plan: Good pains were those which occurred at intervals of three minutes or less and with something more than a very weak intensity. Fair pains were those occurring four or five minutes apart with a fair intensity *or* at intervals of three minutes or less but with a very weak intensity. Poor pains were those occurring at intervals of five or more minutes *and* with a very weak intensity.

## ANALYSIS OF RECORDS

What might be called completely favorable conditions at the onset of labor would be complete effacement, engagement, soft cervix, and good pains. One hundred thirteen primiparas were in this classification (Table I).

TABLE I. LENGTH OF FIRST STAGE (PRIMIPARAS)

No unfavorable factor
Effaced, engaged, soft cervix, good pains

113 patients—Ave. 3 hr. 17 min.
Range—20 min. to 6 hr. 15 min.

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 110 | 3 | 0 | 0 | 0 |

The average length of the first stage in this group was three hours and seventeen minutes. The shortest was twenty minutes and the longest six hours and fifteen minutes. There were included in this group a small number of patients who had considerable dilatation (four or more centimeters) at the onset of labor. These patients accounted for the very short labors. The majority of patients in this group were in the first stage between two and four hours. It should be noted that no instance of anything like a prolongation of the first stage was noted in this group. A period of about three hours then may be taken as the "basic" duration of the first stage in primiparas.*†

*The scientifically accurate time is perhaps three hours and twenty minutes. This figure is a little more difficult to remember and, as will be developed presently, might be a little more difficult to handle in everyday work. The three-hour period is sufficiently close to be satisfactory for practical purposes.

†Eight patients had a "mushy soft" ("1" on our scale) cervix but their first stage of labor averaged two hours thirty-one minutes, not much less than the average for a "2" cervix.

TABLE II. LENGTH OF FIRST STAGE (MULTIPARAS)

No unfavorable factor
Effaced, engaged, "2" cervix, good pains

53 patients—Ave. 1 hr. 43 min.
Range—5 min. to 5 hr. 35 min.

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 0 |

Table II shows the similar data for the 53 multiparas in this classification. The usual duration of the first stage in this group is very close to two hours. The average of one hour and forty-three minutes is slightly less, due to the fact that several of these patients also had considerable dilatation at the onset of labor and the average of the whole group was thereby reduced. The "basic" duration of the first stage in multiparas is then about two hours, and the "basic difference" between a primipara and multipara is about one hour.

In the remaining 563 primiparas (83 per cent) and 321 multiparas (86 per cent), one or more of the above four factors (effacement, engagement, consistency of cervix, character of pains) was found to be unfavorable; and the labor, thereby, prolonged beyond the basic three hours for primiparas and basic two hours for multiparas. If two factors were unfavorable, further lengthening of the first stage was observed; three or more unfavorable factors caused a further increase, etc. Carrying this analysis to the limit of the possibilities involved, we were able to develop a table whereby the length of any labor can be predicted with a considerable degree of accuracy.

Lack of effacement adds three hours in primiparas and two hours in multiparas, the same length of time as the basic figures for these two groups (Table IV).

A slightly firmer ("3") cervix also adds three hours (Table V) for primiparas and two hours for multiparas.

TABLE III. PREDICTING THE LENGTH OF FIRST STAGE

| | | PRIMIPARAS | MULTIPARAS |
|---|---|---|---|
| Effaced, Engaged, "2" Cervix | Good pains | 3 hr. | 2 hr. |
| | Fair pains | 6 hr. | 4 hr. |
| | Poor pains | 12 hr. | 8 hr. |
| Effaced, Engaged, "3" Cervix | Good pains | 6 hr. | 4 hr. |
| | Fair pains | 9 hr. | 6 hr. |
| | Poor pains | 15 hr. | 10 hr. |
| If not effaced add | | 3 hr. | 2 hr. |
| If not engaged add | | 1 hr. | 1 hr. |

TABLE IV. LENGTH OF FIRST STAGE. EFFECT OF NONEFFACEMENT

| | |
|---|---|
| *Primiparas* | |
| Effaced, engaged, "2" cervix, fair pains | 6:56 |
| Not effaced, engaged, "2" cervix, fair pains | 9:33 |
| *Multiparas* | |
| Effaced, engaged, "2" cervix, good pains | 1:43 |
| Not effaced, engaged, "2" cervix, good pains | 3:19 |

TABLE V. LENGTH OF FIRST STAGE. EFFECT OF "3" CERVIX

| | |
|---|---|
| *Primiparas* | |
| Not effaced, not engaged, "2" cervix, good pains | 6:27 |
| Not effaced, not engaged, "3" cervix, good pains | 9:19 |
| *Multiparas* | |
| Not effaced, not engaged, "2" cervix, fair pains | 6:31 |
| Not effaced, not engaged, "3" cervix, fair pains | 8:47 |

Fair pains (Table VI) likewise require three hours more to dilate the cervix in primiparas and two hours more in multiparas.

Poor pains, on the other hand (Table VII), constitute a more potent factor and, instead of adding three hours to the length of labor when the pains are good, we must add three times three for primiparas and three times two for multiparas.*

TABLE VI. LENGTH OF FIRST STAGE. EFFECT OF "FAIR" PAINS

| | |
|---|---|
| *Primiparas* | |
| Not effaced, engaged, "2" cervix, good pains | 6:04 |
| Not effaced, engaged, "2" cervix, fair pains | 9:33 |
| *Multiparas* | |
| Not effaced, engaged, "2" cervix, good pains | 3:19 |
| Not effaced, engaged, "2" cervix, fair pains | 5:19 |

TABLE VII. LENGTH OF FIRST STAGE. EFFECT OF "POOR" PAINS

| | |
|---|---|
| *Primiparas* | |
| Not effaced, engaged, "2" cervix, good pains | 6:04 |
| Not effaced, engaged, "2" cervix, poor pains | 15:08 |
| *Multiparas* | |
| Not effaced, engaged, "2" cervix, good pains | 3:19 |
| Not effaced, engaged, "2" cervix, poor pains | 9:56 |

TABLE VIII. LENGTH OF FIRST STAGE. EFFECT OF HIGH STATION

| | |
|---|---|
| *Primiparas* | |
| Effaced, engaged, "2" cervix, good pains | 3:32 |
| Effaced, not engaged, "2" cervix, good pains | 4:45 |
| *Multiparas* | |
| Effaced, engaged, "2" cervix, good pains | 1:43 |
| Effaced, not engaged, "2" cervix, good pains | 2:34 |

Lack of engagement is a matter of less importance and apparently affects primiparas and multiparas to the same degree, as we need add only one hour in each group (Table VIII).

Those primiparas having one unfavorable factor are summarized in Table IX. There were 59 patients whose cervices were not effaced but in whom engagement was present, cervix soft, and pains good. The average for this group was predicted to be six hours and was computed at

*Further classes of "very poor" and "very, very poor" pains will be possible in a sufficiently large series. A few such patients in this present series materially increased the averages in the "poor pains" groups in Tables XV, XVII, XIX, and XX.

TABLE IX. LENGTH OF FIRST STAGE (PRIMIPARAS)

One unfavorable factor

| | | | (Predicted) |
|---|---|---|---|
| Not effaced | 59 patients | 5:59 | 6 hr. |
| Not engaged | 41 patients | 4:23 | 4 hr. |
| No soft cervix | 17 patients | 5:52 | 6 hr. |
| Fair pains | 30 patients | 6:44 | 6 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 94 | 53 | 0 | 0 | 0 |

five hours and fifty-nine minutes. There were 30 patients whose cervix was effaced and soft and where the head was engaged but who had only fair pains. The predicted duration of the first stage in this group was six hours and the average found to be six hours and forty-four minutes. Seventeen patients had a firmer cervix but all other conditions were favorable. These "six-hour" patients averaged five hours and fifty-two minutes. Forty-one patients entered labor with the fetal head high but all other conditions favorable, including good pains. The predicted duration for this group was four hours and the average was found to be four hours and twenty-three minutes. It should be noted that there was no instance of a first stage of more than twelve hours in any of these four subgroups. About two-thirds of all these patients had labors of less than six hours and one-third between six and twelve hours.

TABLE X. LENGTH OF FIRST STAGE (MULTIPARAS)

One unfavorable factor

| | | | (Predicted) |
|---|---|---|---|
| Not effaced | 16 patients | 3:19 | 4 hr. |
| Not engaged | 49 patients | 2:34 | 3 hr. |
| "3" cervix | 1 patient | 2:40 | 3 hr. |
| "Fair" pains | 11 patients | 3:41 | 4 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 75 | 2 | 0 | 0 | 0 |

Table X shows the similar figures for multiparas.* Only 2 of 77 patients in these four subgroups had a first stage in excess of six hours. The predicted and computed figures are quite close, considering the small number of patients involved.

TABLE XI. LENGTH OF FIRST STAGE (PRIMIPARAS)

Two unfavorable factors

| | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged | 67 patients | 6:27 | 7 hr. |
| Not effaced, "3" cervix | 12 patients | 8:51 | 9 hr. |
| Not effaced, fair pains | 28 patients | 8:49 | 9 hr. |
| Not engaged, "3" cervix | 17 patients | 6:39 | 7 hr. |
| Not engaged, fair pains | 26 patients | 7:41 | 7 hr. |
| "3" cervic, fair pains | 7 patients | 11:56† | 9 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 64 | 79 | 13 | 1 | 0 |

†Two of these patients had an unusually firm cervix, 16 and 17 hours, respectively.

*In multiparas where the cervix is effaced, relative firmness ("3") of the cervix apparently causes only about one hour increase. Where the cervix is not effaced, the difference is the usual "basic" two hours.

Table XI shows primiparas with two unfavorable factors. The computed and predicted figures are again found to check very closely in each subgroup of patients. In this whole group there were 13 patients with labors of between twelve and eighteen hours and one patient in excess of eighteen hours. Multiplication of unfavorable factors may at times prolong the labor beyond the predicted level. Nevertheless, when it is considered that 143 of these 157 patients had short, or relatively short, labors, the reliability of the index is apparent.

The same data for multiparas (Table XII) show 137 of 139 patients under twelve hours and again a very close reliability of prediction for each subgroup.

TABLE XII. LENGTH OF FIRST STAGE (MULTIPARAS)

Two unfavorable factors

| | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged | 81 patients | 4:16 | 5 hr. |
| Not effaced, "3" cervix | 5 patients | 5:28 | 6 hr. |
| Not effaced, fair pains | 17 patients | 5:27 | 6 hr. |
| Not engaged, "3" cervix | 9 patients | 3:15 | 4 hr. |
| Not engaged, fair pains | 26 patients | 5:20 | 5 hr. |
| "3" cervix, fair pains | 1 patient | 4:00 | 5 hr. |

| 0-6 HR | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 107 | 30 | 2 | 0 | 0 |

When three unfavorable factors are present (Table XIII for primiparas and Table XIV for multiparas), the prediction for each individual patient becomes somewhat less exact although for any considerable group of patients the prediction is still very accurate. Sixty-nine patients whose cervices were not effaced and presenting part not engaged and with only fair pains had a predicted duration of ten hours and a computed duration of ten hours and one minute. Two primiparas in this

TABLE XIII. LENGTH OF FIRST STAGE (PRIMIPARAS)

Three unfavorable factors

| | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged, "3" cervix | 33 patients | 9:19 | 10 hr. |
| Not effaced, not engaged, fair pains | 69 patients | 10:01 | 10 hr. |
| Not effaced, "3" cervix, fair pains | 10 patients | 10:52 | 12 hr. |
| Not engaged, "3" cervix, fair pains | 15 patients | 8:30 | 10 hr. |
| Poor pains | 16 patients | 12:29 | 12 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 28 | 81 | 24 | 8 | 2 |

TABLE XIV. LENGTH OF FIRST STAGE (MULTIPARAS)

Three unfavorable factors

| | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged, "3" cervix | 6 patients | 6:12 | 6 hr. |
| Not effaced, not engaged, fair pains | 32 patients | 6:31 | 7 hr. |
| Not effaced, "3" cervix, fair pains | 1 patient | 6:10 | 8 hr. |
| Not engaged, "3" cervix, fair pains | 0 | | 6 hr. |
| Poor pains | 9 patients | 7:24 | 8 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 24 | 21 | 3 | 0 | 0 |

whole group (represented by Table XIII) had a first stage in excess of twenty-four hours, the first instances of what might be called "prolonged labor." Thus, a labor in excess of twenty-four hours may be considered distinctly abnormal unless at least three unfavorable factors are present in the patient.

Four unfavorable factors bring the primiparas' labor up to thirteen to fifteen hours (Table XV) and multiparas' labor to nine to ten hours (Table XVI). Short labors have now become quite uncommon, and there were five primiparas whose labors exceeded twenty-four hours.

TABLE XV. LENGTH OF FIRST STAGE (PRIMIPARAS)

| Four unfavorable factors | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged "3" cervix, fair pains | 26 patients | 15:00 | 13 hr. |
| Not effaced, poor pains | 12 patients | 17:25 | 15 hr. |
| Not engaged, poor pains | 16 patients | 11:31 | 13 hr. |
| "3" cervix, poor pains | 7 patients | 13:49 | 15 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 3 | 19 | 27 | 7 | 5 |

TABLE XVI. LENGTH OF FIRST STAGE (MULTIPARAS)

| Four unfavorable factors | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged, "3" cervix, fair pains | 14 patients | 8:47 | 9 hr. |
| Not effaced, poor pains | 9 patients | 9:56 | 10 hr. |
| Not engaged, poor pains | 12 patients | 9:00 | 9 hr. |
| "3" cervix, poor pains | 0 patients | | 9 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 9 | 18 | 7 | 1 | 0 |

Five unfavorable factors (Tables XVII and XVIII) show a disappearance of the short labors (six hours) for both primiparas and multiparas, and an appearance of an appreciable proportion of primiparas in excess of twenty-four hours.

TABLE XVII. LENGTH OF FIRST STAGE (PRIMIPARAS)

| Five unfavorable factors | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged, poor pains | 25 patients | 23:00 | 16 hr. |
| Not effaced, "3" cervix, poor pains | 7 patients | 24:53 | 18 hr. |
| Not engaged, "3" cervix, poor pains | 7 patients | 17:46 | 16 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 0 | 6 | 12 | 12 | 9 |

TABLE XVIII. LENGTH OF FIRST STAGE (MULTIPARAS)

| Five unfavorable factors | | | (Predicted) |
|---|---|---|---|
| Not effaced, not engaged, poor pains | 12 patients | 11:48 | 11 hr. |
| Not effaced, "3" cervix, poor pains | 0 patients | | 12 hr. |
| Not engaged, "3" cervix, poor pains | 0 patients | | 10 hr. |

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 0 | 4 | 6 | 2 | 0 |

Six unfavorable factors (Tables XIX and XX) show for primiparas a labor in excess of twenty-four hours to be the rule and therefore normal. There were no labors less than twelve hours. The one multipara whose labor was less than six hours probably represents an error in the initial recordings on this patient.

TABLE XIX. LENGTH OF FIRST STAGE (PRIMIPARAS)

Six unfavorable factors

| Not effaced, not engaged, "3" cervix, poor pains | 16 patients | 29:37 | (Predicted) 19 hr. |
|---|---|---|---|

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 0 | 0 | 5 | 2 | 9 |

TABLE XX. LENGTH OF FIRST STAGE (MULTIPARAS)

Six unfavorable factors

| Not effaced, not engaged, "3" cervix, poor pains | 9 patients | 13:57 | (Predicted) 13 hr. |
|---|---|---|---|

| 0-6 HR. | 6-12 HR. | 12-18 HR. | 18-24 HR. | OVER 24 HR. |
|---|---|---|---|---|
| 1 | 2 | 5 | 1 | 0 |

## DISCUSSION

It should be noted that the management of this series of patients did not include heavy sedation for any first stage. Nitrous oxide oxygen with small doses of morphine (on indication only) were the only means of sedation employed. Other patients delivered in the hospital during the same period and to whom heavy sedation was given had much longer labors. One patient only was excluded from this series because of a pathologically hard cervix. In one patient only a small pelvis might have had a deterrent effect on the course of the labor. This patient was a multipara for whom a thirteen-hour labor was predicted, and she was not completely dilated until the end of seventeen hours. Her conjugata vera was estimated at 8.5 cm. Whenever a patient developed a secondary inertia with no pains for a period of several hours, that painless period was not counted in the total duration of her labor. The number of induced labors was too small for us to tell whether the induced labors were either shorter or longer than those occurring spontaneously. The same can be said with respect to premature rupture of the membranes.

## SUMMARY

Table XXI shows in simple form a method for predicting the duration of the first stage of labor with the percentage likelihood of the occurrence of "good," "fair," and "poor" pains so that, with any given patient, the likely duration can be quite readily determined even in advance of any labor pains. As soon as the first dilating pains appear, the patient can be completely catalogued and the time of complete dilatation readily determined.

This knowledge is of importance in several ways. If a long labor can be predicted, the need of maintenance of free food and fluid intake is

TABLE XXI. PREDICTING THE LENGTH OF FIRST STAGE

| | | PRIMIPARAS | MULTIPARAS |
|---|---|---|---|
| Effaced Engaged "2" Cervix | Good pains 63% | 3 hr. | 2 hr. |
| | Fair pains 25% | 6 hr. | 4 hr. |
| | Poor pains 12% | 12 hr. | 8 hr. |
| Effaced Engaged "3" Cervix | Good pains 45% | 6 hr. | 4 hr. |
| | Fair pains 33+ | 9 hr. | 6 hr. |
| | Poor pains 22% | 15 hr. | 10 hr. |
| If not effaced add | | 3 hr. | 2 hr. |
| If not engaged add | | 1 hr. | 1 hr. |

obvious. If a short, easy labor can be predicted, the need for operative intervention in certain types of pathology is obviated. It is high time that labors should be judged on the anatomic and physiologic factors in the genital tract rather than on "manufactured dicta" as age and stature of the whole body. It is also important, if the labor goes definitely beyond the predicted limits, that careful search for unrecognized abnormalities should be instituted without delay.

Finally, it is interesting to speculate on the etiology of the variations in the cervix and in the uterine contractions. The cause is not anatomic; it is almost certainly physiologic. There is some evidence that variation in the cervix may produce variation in the uterine contractions and vice versa. The etiology of the onset of labor is inextricably involved in both. Further research is obviously necessary. Only when we find this physiologic factor can we hope to so "prepare" the least favorable patients in advance that they may enter labor with unresisting cervices and good uterine contractions.

## REFERENCES

(1) *Calkins, L. A., Litzenberg, J. C., and Plass, E. D.:* AM. J. OBST. & GYNEC. **22**: 604, 1931. (2) *Calkins, L. A.:* Ibid. **27**: 349, 1934. (3) *Calkins, L. A., Irvine, J. H., and Horsley, G. W.:* Ibid. **19**: 294, 1930.

1010 MEDICAL ARTS BUILDING

## DISCUSSION

DR. FRANCIS C. GOLDSBOROUGH, BUFFALO, N. Y.—One or two points Dr. Calkins has emphasized are quite important. (1) The position of the child plays very little part in the way in which the cervix dilates. (2) It is important to see the patient as soon as the pain begins. We too frequently see her only after she has been in labor for a few hours and there is some effacement and some dilatation. One of the main points Dr. Calkins brought out is that we should know the condition of the cervix when labor starts in order to gauge progress.

I am a little uncertain as to what is Dr. Calkins' definition of the onset of labor. It seems to me the average duration of his first stage is rather shorter than most of us have been led to accept, and I am wondering whether he sets the onset of labor as the time when the cervix is effaced or when the patient first complains of painful contractions of the uterus?

Dr. Calkins has brought out a very interesting method by which we may predict with some satisfaction the duration of the first stage of labor. As we all know that is the stage during which the family are requesting that something be done for the patient. With too much urging very frequently intervention is undertaken which may be harmful both to the mother and child. With this knowledge we might be more able to pacify them.

DR. GEORGE W. KOSMAK, NEW YORK, N. Y.—After having read the paper and heard it presented this morning I feel that there is considerable practical value in it, and one of the very sensible things is keeping up the spirits of the patient during a period that is not always predictable. If Dr. Calkins has the formula that will give us some information, we may be able to do more for our patients. I hope he will keep on with this study and give us a formula for the second stage so that we may pacify not only the patient but the family as well.

I wonder how much the question of sedation is going to enter into this. Dr. Calkins has plainly indicated he feels that in some patients sedation will prolong the duration of labor. I think there would be great difficulty, however, in convincing the public and the patient sufficiently so that it would lead to an elimination of sedative measures. These academic questions constitute one of the important problems to which the obstetrician should pay attention and attempt to solve.

DR. G. D. ROYSTON, ST. LOUIS, MO.—I would like to ask whether these observations were made personally by Dr. Calkins or by one of his subordinates?

DR. OTTO H. SCHWARZ, ST. LOUIS, MO.—The labor was definitely prolonged where sedatives were used. At what stage was the sedation first begun?

DR. NORMAN R. KRETZSCHMAR, ANN ARBOR, MICH.—I would like to ask Dr. Calkins to explain when and how he evaluates the pains. From the subjective reaction of the patient, one never knows when she is having a good pain nor does palpation seem to give definite evidence of the quality of the pains.

DR. NORMAN HARRIS WILLIAMS, BEVERLY HILLS, CALIF. (by invitation).—What is Dr. Calkins' definition of the termination of the first stage of labor?

DR. J. MALDONADO, SANTE FE, N. M. (by invitation).—I would like to ask what effect the presenting part has on the pains?

DR. WILLIAM J. DIECKMANN, CHICAGO, ILL.—Are the dilatation and the consistency of the cervix based on rectal or vaginal examination?

DR. CALKINS (closing).—Dr. Goldsborough asked at what time we estimated the efficiency of the labor pains. The answer is, just as soon as we know the cervix is beginning to dilate. We have to wait until it is 2 or 3 cm. dilated because we wish to estimate the pains during the dilatation phase and not during the effacement phase. Labor begins whenever the patient experiences her first discomfort.

Dr. Royston asked by whom the observations were made. A small proportion were made by myself, the majority by my resident, and a few by my intern. My senior students can make these observations just as accurately and predict the labors just as satisfactorily as we indicated in this paper.

Dr. Schwarz asked at what time those few patients had received their heavy sedation. In most instances at a dilatation of about 4 to 6 cm.

Dr. Kretzschmar asked about the evaluation of pains with relation to their intensity. Of course, the method we used is very crude but it seems to work. If we can depress the uterine wall very markedly during the contraction, that contraction is very weak. If we can depress it moderately, that is a fair contraction; if not at all, it is a very firm contraction. That is the only method we employ and we think that it is all that is necessary. It must be taken, however, in conjunction with the frequency of the pains. One or the other alone is not sufficient.

Dr. Williams asked when we consider the first stage terminated. When we can no longer feel the cervix. If it is within reach of our rectal examining finger, we feel that it still can be holding the presenting part and the first stage is not over. When it has completely retracted we consider the first stage completed.

Dr. Maldonado asked what effect the presenting part may have on the pain. It was stated in a previous paper to have had no effect whatever in the first stage.

In answer to Dr. Dieckmann, 97 per cent of our examinations were rectal. A vaginal examination is done whenever we feel that the information is incomplete or otherwise unsatisfactory.