

## THE "SAFE PERIOD" AS A BIRTH CONTROL MEASURE\*

A STUDY AND EVALUATION OF AVAILABLE DATA

BY ROBERT L. DICKINSON, M.D., NEW YORK CITY

A REPORT FROM THE COMMITTEE ON MATERNAL HEALTH

**A**N INQUIRY concerning that part of the menstrual cycle supposed to be free from risk of pregnancy must take up both the search for general rules and for some test or tests that may be applied to the individual woman. At present the second would seem to be the more promising trail to follow. The problem as a whole has three main aspects, statistical, therapeutic, and theological.

An integral part of this research is the attempt to define the day or days of maximum fertility, in order, for example, to furnish exact advice in cases of relative infertility or to so place conception as to avoid the feeding problems of unfavorable birth seasons like July and August or times of travel.

Is there a "safe period"? Yes, for certain women. If we deny this, we must discredit, on our case records, the entries from statements made by a small number of intelligent, seemingly credible patients, who affirm that they have been able to avoid pregnancy through omitting precautions during a given group of interval days and have conceived at will during some other part of the interval. The records are too few, however, and the evidence of the absence of other possible causes of infertility during the sterile days too inexact to label this testimony unimpeachable. To carry full weight each patient should have had a number of children and offer records made throughout their histories rather than mere memory. The assembling of a series of histories of patients with "safe periods" has not been done, as far as we know, nor has this record been coupled with vaginal

\*Read in summary at a meeting of the New York Obstetrical Society, March 8, 1927.

the body, reflex excitability, pulse blood pressure, pulmonary activity, heat radiation, temperature, excretion of urea, and muscular power all indicate increase according to the line in the figure, up to within a day of the menses; on this day there is an abrupt regression, then a

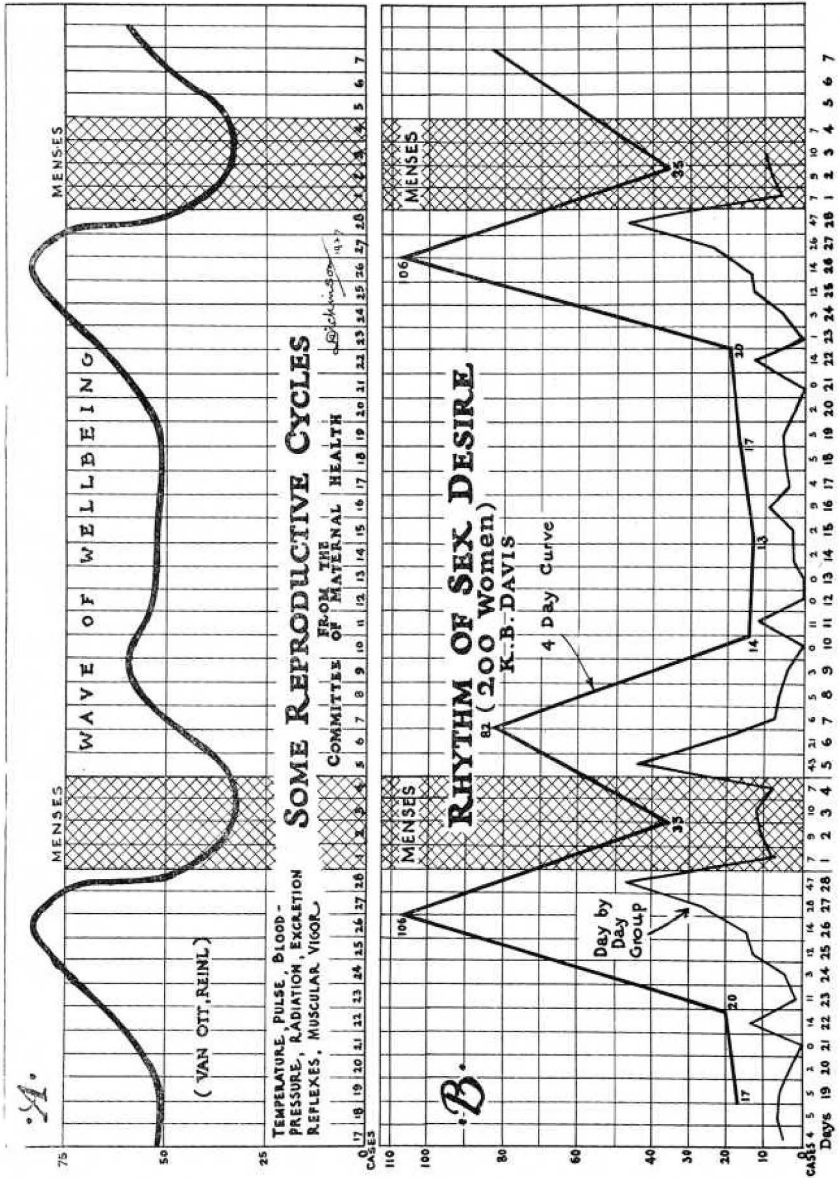


Fig. 1.—The Menstrual Cycle. A, The wave of well-being. B, The rhythm of sex desire.

gradual recovery, which rebounds and drops to normal about the seventh day after menstruation (Reinl). This periodicity is slightly manifest in the male, and recurs in five to six week intervals. Perhaps it is the external evidence of the formation of spermatozoids.” It is



cause of the occurrence of such reports as "a week before," which pile up on given days unduly, the four-day form of graph was selected as likely to show a clearer grouping. It will be noted that the larger, and also the secondary wave of desire, show a general correspondence

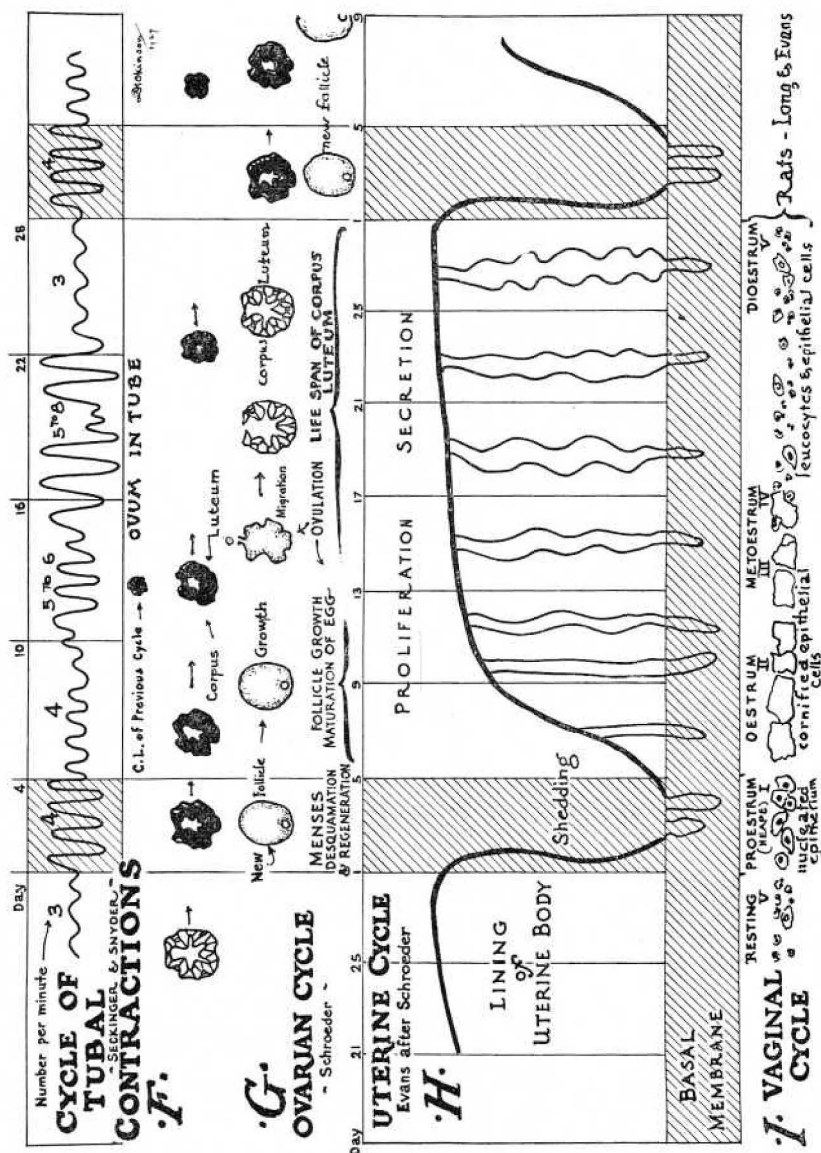


Fig. 3.—The Menstrual Cycle. F, Tubal contractions. G, Ovarian cycle. H, Uterine cycle. I, Vaginal cycle in rats.

with that of well being or physical activities in section A (Fig. 1) and that both of them bear a certain relation to the curve of the development in the lining of the uterus, section G (Fig. 3). It has long been generally accepted as a fact that the time of strongest sex urge in

ready to burst or recently opened." The cherry-sized, prominent, red, easily bleeding corpora he classes as one to three days old and these were seen from the eleventh to the twenty-sixth day, the two twenty-sixth day cases being women with thirty-one day periods. "In four week habits the eighteenth and nineteenth days were most constant." "An exact statement of a definite day as a rule for ovulation is false." While he admits his observations were microscopic only, he avers that many of Schroeder's dates are queered by his cases being pathologic. Schroeder's paper covering 100 operations carries great weight, and his chart is very generally copied, here shown slightly modified in sections *G* and *H* (Fig. 3). Meyer and Ruge, at 106 operations, found a high correlation between the endometrium and the corpus luteum, the recent corpus luteum running with the early premenstrual lining, the mature corpus with the later stages, and retrogression about the onset of the menses. Halban and Koehler, in 40 laparotomies, shelled out the yellow body simply (not with the cautery as in Fraenkel's 9 cases). Uterine bleeding of the type of the patients' regular periods came on two to four days later in 92.7 per cent of the cases, with a regular period four weeks later. If the extirpated corpus was dropped into the peritoneal cavity the prompt bleeding did not follow. Ancel and Villemin, on the basis of 27 cases with healthy ovaries, doubt that one can determine a follicle about to rupture, and declare one can only count on the hole of rupture as actually observed.

In castration by the x-ray, Seitz and Wintz declare that, if done before the fourteenth day, no further period appeared in 95 per cent of the cases, whereas if done after this day the next period occurred in 96 per cent. They therefore argue for a single large dose in the first half of the intermenstrual time.

Because spermatozoa are thought by many authors to have a life not over forty-eight hours, and eggs to be fertilizable only a few hours, and as the gap between fruitful intercourse and ovulation runs up to seven or ten days, as shown in sections *C* and *D* (Fig. 2), attention has been drawn to the possibility of rupture of the follicle by coitus. Coitus has this effect in the domestic rabbit and cat and on the ferret, the interval being about ten hours in the rabbit. Triepel differentiates between ordinary or spontaneous ovulation and artificial or coital, and argues ably for the latter. Grosser would make the group three-fold: (1) spontaneous, (2) missed, and (3) artificial, or what I might call coital. In the rabbit orgasm seems necessary (Hammond and Asdell). Grosser places coital ovulation about the eighth day. His "missed" ovulation provides for those eggs that never ripen and burst, as in Corner's monkeys (1924). There is the further possibility,

mentioned by Stockard, of more than one ovulation in the menstrual cycle. Evans suggests extra-cyclic ovulations.

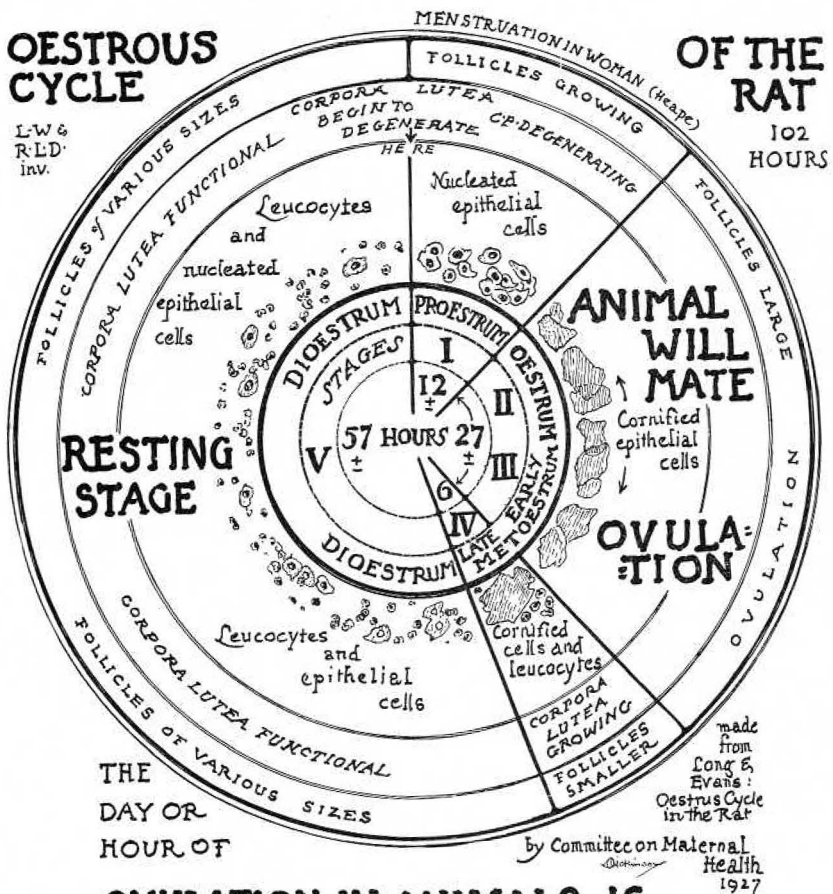
In the matter of late ovulation we may not forget the fertility of the orthodox Jewess who must not have intercourse before the eleventh day from the beginning of the period, though there seems to be some uncertainty about the exact day.

One may modify the words of Hammond and Asdell and say: There is shown (in our charts) "an average probability in the mass, but it is not necessarily true of the individual." Giles shows that the length of the cycle may vary from twenty-one to thirty-five days; therefore the time of ovulation, if all the cases were grouped on the twenty-eighth day cycle, would vary from  $-7$  to  $+7$  from the normal, thereby causing a variation in degree of fertility at different times such as is shown by our chart at sections *C* and *D* (Fig. 2). We shall be obliged to go back to the original records, both of isolated conception and operation-ovulation, and group together, in each, the cases of three- and four- and five-week cycles, to get clearer notions.

*Conception from Isolated Coitus.*—Reports from more than 1000 women are recorded where pregnancies followed single exposures or brief visits of the husband. These have been reviewed and charted by Zangemeister, Pryll and Siegel. The three lists are largely made up from the same material and chiefly from Schlichting, Gossrau, Hecker, and Ahlfeld. Siegel's first paper dealt with some 320 women but his first graph took 125 as being above criticism, while his 800 included all the instances of single or limited coitus he could find in the literature. I have thought best to depict all three main studies, redrawn in section *D* (Fig. 2), in order to show how little they vary in essentials. The Siegel line is much smoother than the other two near it, though constructed partly from the same records, and not exceeding the others enough in numbers to account for some rather marked differences. The height during menstruation should be noted.

Pryll omits Siegel's cases from his chart, and gives graphs of 7 of the 11 authors he draws upon. Four of these 7 resemble the Zangemeister and Pryll lines in our graph and Siegel's chart of his 125 cases, in that there appears a secondary rise between the thirteenth and the eighteenth day, centering on the fifteenth and thus not far from Henson's average of the fourteenth and Jaeger's rise, and the main group of embryo indications. This secondary wave of fruitful cohabitation comes close to the ovulations shown in section *C* (Fig. 2). This group of cohabitations calls only for one to four day life of sperm within the female passages, as against seven to thirteen days with the group represented by the earlier peaks. The striking thing in the *C* and *D* sections (Fig 2), and the chief puzzle in human reproduction thus graphically pictured for the first time, is the gap between the

ities may take notice. Zangemeister's is the fullest statistical study of fruitful intercourse. Several of the papers listed deal largely with considerations of male or female children resulting from coitus at various parts of the cycle, on the length of pregnancies and the weight of babies and the relation between day of fruitful intercourse and day of menstruation and the date of delivery. We are here concerned only with the matters having to do with a "safe period," and take up elsewhere duration of life in sperms and ova.



**OVULATION IN ANIMALS IS ACCURATELY DEMONSTRATED**  
by microscopic examination of vaginal cells on smear  
**CAN THE "SAFE PERIOD" IN A GIVEN WOMAN BE SHOWN IN THIS WAY,**  
and the most favorable time for conception?

Fig. 4.—The Oestrus Cycle of the Rat. (From Long and Evans.)

*Early Embryos.*—Fraenkel has collected, in Liepmann's *Handbuch*, the evidence based on embryos, and lists them between the second and twenty-fourth day, 9 before and 12 after the fifteenth day. Our section *E* (Fig. 2) is made up from Zangemeister. The largest group falls between the fourteenth and sixteenth day as pointing to the day of ovulation. Grosser's studies merit careful consideration.

*Tubal Cycle.*—The lining of the tube is smooth in pigs when the egg is passing. Snyder finds the corresponding state of the epithelium in the human tube at the thirteenth day. As to tubal contractions, the behavior is indicated in section *F* (Fig. 3) of the graph. The tubes are never seen contracting at laparotomies, but found by the fluoroscope, after injection of iodized oil, to be always in regular peristaltic activity. Rubin, when making insufflation tests, now registers the waves graphically on a drum, and recognizes differences at different parts of the interval. When removed at operation, and a section hung in solution, the waves are shown by Seckinger and Snyder to be of differing amplitude, speed and groupings. I have taken these authors' waves and placed them end to end that we may visualize the slow contractions at uniform amplitudes at all times except between the tenth and twenty-second day. Sweep and speed are nearly doubled between the sixteenth and twenty-second days, and the action then falls into groupings. As action of this kind is known to occur in the pig (Seckinger) and the monkey (Corner) where the association of it with the passing of the ovum may be made, it is one more indication of the date of ovulation. Sobotta says the stay of the ovum in the tube is singularly uniform, averaging three days, with no relation to size of animal, length of pregnancy, size of the ovum in mammals, or the development while in the tube. The dog is an exception. "So far as known, fertilization always takes place in the tube," says Corner.

*The Vaginal Cycle.*—In the variety of animals that have been studied since their observations on the guinea pig were brought out by Stockard and Papanicoloau in 1917, the vaginal epithelium is found to undergo alterations which clearly indicate the processes going on in the ovary, and point to the exact time of ovulation. How marked the changes and how great the contrasts may be, as shown by a simple vaginal smear, is to be noted in section *I* (Fig. 3) and in Fig. 4, where we have borrowed from Long and Evans the evidence in the rat. The hope of findings of equal sharpness in the woman has not been borne out by the elaborate (unpublished) studies of Papanicoloau, initiated by our committee, with a considerable number of patients, although he believes he is on the track of important indications. The 11 women recently studied by Jessie King showed no definite cycle. It is evident that many virgins with one-finger, sharp-edged hymens must



take swabbings, and much evidence must accumulate, before any statement can be made. Then we may possibly find indications in the human vagina of a point of high fertility, and one of a nonfertile period, either for laying down general rules or for regulating one individual at a time.

In a personal communication, R. T. Frank, discussing ovarian hormones in the blood, says that the results from the blood of the human female would indicate that throughout sexual life the female sex hormone is circulating in the blood. Approximately ten to twelve days before the next impending menstruation, a sudden rise of the amount of hormone circulating in the blood is noted, this rise persisting until the onset of the flow. We interpret the onset of this increase as corresponding with the rupture of the follicle and the absorption en masse of the follicle fluid, and the continued increase, as the effect of secretion from the corpus luteum. We therefore place the time of ovulation as approximately midway between the onset of two periods which corresponds sufficiently closely with the latest morphologic data.

Correlating these data with the data obtained from animals, it would appear that the most favorable time for conception would follow coitus occurring approximately two weeks before the next expected period. Conversely, the least favorable time for conception should be immediately after menstruation as well as the week preceding the expected menses. Statistic studies, however, would indicate that no "safe period" may occur in the human being. This would signify that either the human spermatozoa survive over a longer period than those of lower animals, or that the human ovum survives longer, or that both of these conditions obtain.

#### SUMMARY

1. There is no time in the month at which conception has not occurred in some women.

2. The premenstrual week constitutes the relatively "safe period," or "low-risk period," when the average chance of pregnancy is less than one in ten.

3. A "safe period" or sterile part of the cycle is present in every woman, but is a matter for individual tests, and such successful tests are not yet effectively transferable from animals. Nor has any series been studied that is made up of adequate case records of women with known "safe periods."

4. The height of fertility belongs to the week or ten days following menstruation.

5. Fertility is relatively high during menstruation. For the four days that make up 14 per cent of the average menstrual cycle, conceptions from isolated coitus have amounted to 13 per cent.

6. Abdominal operations point to ovulation between the fourteenth and nineteenth days from the beginning of the period—rarely thereafter. Coitus may possibly free the ovum earlier.

7. Alterations in rhythm of tubal contractions and in the tube lining point to passage of the ovum subsequent to the above days and up to the twenty-second day.

8. New evidence shows coincidence of maximum sex desire and maximum well-being with minimum chance of conception, in the premenstrual week; also a secondary wave of desire at the time of greatest fertility.

The complete paper, from which this has been condensed, appears in the author's reprints, which may be obtained from the office of the Committee.

## REFERENCES

- Ance and Villemain*: C. R. Soc. biol., Paris, 1907, lxiii, 200. *Blumenfeld, E.*: Monatschr. Geburtsh. und Gynäk., 1925, lxviii, 302. *Chazan*: Zentralbl. f. Gynäk., 1911, p. 648. *Corner*: Oestrus, Ovulation and Menstruation, Physiolog. Rev., 1923, iii, No. 4, p. 470; Contrib. to Embryol. Carnegie Inst., Saunders & Co., 1923, No. 3321, pp. 73-101. *DeLee*: Practice of Obstetrics, 1917, p. 17. *Evans*: Barker, Hoskins and Mosenthal's Endocrinology, 1922, ii, 580. *Frank*: Jour. Am. Med. Assn., 1925, lxxxv, 510. *Fraenkel*: Arch. f. Gynäk., 1903, lxviii, 438, and 1910, xci, 705; Ztschr. f. Geburtsh. u. Gynäk., 1913, lxxiv, 107; Berlin. klin. Wehnschr., 1920, p. 23; Halban-Seitz, Biol. Path. d. Weibes, 1924, i, 577; Liepmann Handb. d. Gesamt. Frauenkr. iii, 71. *Giles*: Menstruation and Its Disorders, London, 1901. *Grosser*: Anat. Anz., 1915, xlviii, 92; 1918, i, 489; Arch. f. Gynäk., 1919, ex, 297-326. Med. Klinik, 1924, xx, No. 2, p. 1466. *Halban u. Kohler*: Arch. f. Gynäk., 1914, ciii, 575. *Hammond, J., and Asdell*: Brit. Jour. Exp. Biol., 1926, iv, 155-185. *Hasler*: Dissert. Zurich, 1876 (quoted Arch. Gynäk., ci, 610). *Hensen, V.*: Ztschr. f. Anat. u. Entwickl., 1876, pp. 213 and 353. *Hoehne*: Verh. d. Deutsch. Ges. für G. and G., 1913, ii, 514; Zentralbl. f. Gyn., 1914, xxxviii, 1. *Issmer*: Arch. f. Gynäk., 1889, xxxv, 344. *Jaeger*: Zentralbl. f. Gynäk., 1917, p. 857. *King*: Pub. Carnegie Instit., 1927, No. 363, pp. 79-94. *Leopold and Ravano*: Arch. f. Gynäk., 1907, lxxxiii, 556. *Long and Evans*: Univ. Calif., 1922, vi, 1-148. *Marcotty*: Arch. f. Gynäk., ciii, p. 63. *Marshall*: Introd. Sex. Phys., p. 57. *Meyer and Ruge II*: Zentralbl. f. Gynäk., 1913, xxxvii, 50. *Nuernberger, L.*: Deutsch. med. Wehnschr., 1919, No. 7, pp. 432, 895. Monatsch. f. Geburtsh. und Gynäk., p. 53. *Pryll, Walter*: Muenchen. med. Wehnschr., 1916, lxxxiii, No. 470, p. 1579; Ztschr. f. Geburtsh. u. Gynäk., 1916, lxxix, 530. *Rensch*: Arch. f. Gynäk., 1916, cv, 262. *Ruge*: Arch. f. Gynäk., 1913, c, 20; Arch. f. Gynäk., 1918, cix, 302. *Schroeder, R.*: Arch. f. Gynäk., 1914, ci, 1; Arch. f. Gynäk., 1915, civ, 27-102. *Schickélé, G.*: Obst. et Gynee., 1922, v, no. 6, p. 590. *Seckinger and F. Snyder*: Johns Hopkins Bull., Dec., 1926, xxxix, No. 6, p. 371. *Seitz und Wintz*: Monatschr. Geburtsh. u. Gynäk., 1919, i. *Siegel, P. W.*: Deutsch. med. Wehnschr., 1915, xlii, 3; Muenchen. med. Wehnschr., lxi, 21; Zentralbl. f. Gynäk., 1921, xxviii, 985; 1924, xlvii. *Snyder, Franklin F.*: Bull. Johns Hopkins 1924, xxxv, 399, 141-146. *Sobotta*: Anat. Anzeig. 1914-15, xlvii, 448; Arch. f. Gynäk., 1918, cix, 302, 602. *Stocard and Papanicolaou*: Biol. Bull., 1917, xxxvii, 222. *Triepel*: Anat. Anz., 1915, xlviii, 133; Lehrbuch d. Entwicklungs gesch., 1917; Anat. Anz., 1919, lii, 225. *Tschirdehahn, F.*: Ztschr. f. Geburtsh., u. Gynäk., 1921, lxxxiii, 80 and 102. *Villemain*: Le Corps Jaune considéré comme glande à sécretion interne de l'ovaire, Paris, Doin, 1908. *Zangemeister*: Arch. f. Gynäk., 1917, cvii, No. 3, pp. 405-469. *Zweifel, E.*: Arch. f. Gynäk., 1922, cxvi, No. 1, 141.

(For discussion see page 836.)

COMMITTEE ON MATERNAL HEALTH,  
370 SEVENTH AVENUE, NEW YORK.

DR. ROBERT L. DICKINSON read a paper entitled **The "Safe Period" as a Birth Control Measure.** (For original article see page 718.)

#### DISCUSSION

DR. R. T. FRANK said that these studies will enlighten and perhaps show us that there is really a safe period and it must be seriously considered. In analyzing human material we meet with extremely many difficulties.

Dr. Frank felt inclined to venture the opinion that the acme of sex desire in the human female corresponds to the time when most of the hormone is circulating in the blood just before the onset of menstruation. Possibly within a short time we may be able to show more positive evidence by injecting an active hormone into frigid women and seeing whether any corresponding stimulation of the sex desire occurs. In further analysis we must remember that while the ovum is going down in the tube the spermatozoon must be ascending, and we have to keep in mind, then, the time of viability of these two structures. The evidence is somewhat conflicting. Dr. Frank believed that in the closed follicle before its rupture, the female sex hormone is enclosed in the follicular sheath. With the rupture of the follicle this concentrated hormone is poured out into the peritoneal cavity and is rapidly absorbed. Furthermore the corpus luteum continues to secrete the hormone, and pours it out into the blood-stream. Bearing this in mind, it would appear that ovulation occurs about as follows: Four days for menstruation in a 28-day cycle; that leaves 24 days. The hormone is demonstrated in the blood, as a rule, about 10 days before the expected period, and that comes very closely, then, in correspondence with the anatomic findings that ovulation (rupture) occurs about two weeks after the completion of the preceding period.

However, although our increase in knowledge in the last few years has been very rapid, Dr. Frank did not believe that we would settle the question in the human female definitely, especially for each given case (because each woman is a law unto herself) until we get the vaginal spread method to the point that it applies to the human female. If the epithelial lining of the vagina and consequently the spreads we obtain in the vagina, can be formulated to give us an idea of what is going on in the ovary, then we will be in position to do so; but the fact that in a large series of cases (from 7 to 10 per cent) impregnations took place in the least fertile period makes it very likely that there is no real safe period in the human female, and that if the very necessary birth control is to be established on a firm and workable basis it will depend upon the elaboration of some mechanical or chemical means of preventing conception.