

## CORRESPONDENCE

### Menstrual and lunar cycles

To the Editors:

I was gratified and excited to see Dr. Cutler's elegant clarification of the relationship of the menstrual cycle to the lunar cycle (*AM. J. OBSTET. GYNECOL.* 137:834, 1980). Too often, studies on the menstrual cycle are hampered by use of retrospective data or an inability to quantify independent relationships statistically. In light of the publication of Dr. Cutler's report, I feel that readers also may be interested in the analysis of data collected for another purpose which replicated Dr. Cutler's finding of a relationship between menstrual and lunar cycles. The women in this study were less homogenous than those in Dr. Cutler's population. Several racial groups were represented, the subjects were not all students, and the age range was much greater than in Dr. Cutler's study.

In a 14-week, double-blind, prospective study during the fall of 1979, 305 Brooklyn College undergraduate students and their associates kept records of their menses on preprinted calendars. Subjects were 19 to 35 years old and were not using either the intrauterine contraceptive device or oral contraceptives. Subjects were contacted monthly to collect other data and to ensure continued record keeping. At the end of the study, each subject submitted a calendar in a sealed envelope. Data were analyzed according to Dr. Cutler's circular lunar cycle chart appropriately dated for this year's lunar phases.

Of the 305 subjects, 97 (32%) had lunar period cycles ( $29.5 \pm 1$  day mean cycle length). The first day of the October menses was charted for each woman. Sixty-three of the 97 (65%) began menstruation in the light half and 34 began menstruation in the dark half of the lunar cycle. The split was optimized with a 3-day lag period after the quarter. Significantly more menses onsets occurred in the light half (with a 3-day lag) than would be expected from a random distribution ( $z = 2.86$ ,  $p < 0.01$ ). When all cycles of all subjects and all cycles of irregular cyclers (standard deviation greater than 6.0) were charted, the distribution throughout the lunar cycle was random. This random lunar distribution of all cyclers was found in the Cutler report as well.

Analysis of these data according to Cutler's insightful method confirms the lunar cyclicity of women with ovulatory menstrual cycles. These data differ from those published by Dr. Cutler in the exact split of the lunar cycle: however, if her data for lunar period cy-

clers are reanalyzed with the same 3-day lag apparent in the Brooklyn College data, the nonrandom distribution of her data remains apparent (45 versus 23,  $z = 2.67$ ,  $p < 0.01$ ).

A series of studies has indicated that the average length of the luteal phase of the menstrual cycle is 16 days.<sup>1</sup> Thus, the lag is apparently an expression of the influence of the moon on ovulation. Further support for this hypothesis may be gleaned from Slob's<sup>2</sup> work. In a study of 9,049 spontaneous live births in which the day of onset of the mother's last menses was recorded, he concluded that while births are randomly distributed throughout the lunar cycle, conceptions occur significantly more frequently during the first and second quarters (waxing moon) than during the other half of the lunar cycle. Thus, a lunar influence on ovulation is implicit.

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### REFERENCES

1. Cutler, W. B., and Garcia, C. G.: The psychoneuroendocrinology of the ovulatory cycle of women, *Psychoneuroendocrinology* 5:89, 1979.
2. Slob, A. K.: Lunar Periodicity, Time of Birth, and Time of Conception, unpublished manuscript, Rotterdam Med. Faculty, Holland.

### Safety of intra-amniotic injection of indigo carmine

To the Editors:

Unquestionably, Dr. Sherman Elias and colleagues are quite right to point out the potential hazard of hemolytic anemia in the fetus from the intra-amniotic injection of methylene blue in their report, "Genetic amniocentesis in twin gestations," (*AM. J. OBSTET. GYNECOL.* 138:169, 1980). However, it would seem to be implied that the dye used by the authors, indigo carmine (sodium indigotindisulfonate), is without hazard. I am not familiar with any reported hazards from the intra-amniotic injection of indigo carmine, but having used it intravenously for the testing of ureteral integrity, I am familiar with its hazards when given intravenously. The potential hazards of indigo carmine are