DISCUSSION

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My comments will be confined to two of the three papers: That of Professor Fredrickson and of Professor Masnick, et al. The paper by Professor Li is as new to you as to me.

Fredrickson's paper, in my view, may well prove to be of fundamental importance to mathematical demography. First, a few notational and semantic issues:

1) The standard notation for distribution and density function has been reversed.

2) The term "rate" is used synonymously with total frequency (for example, B(t) in (F) and $\rho(a, a', t)$ in (G)).

3) The phrase "random mating" may be ill advised in the present context. As employed by geneticists, panmixia has a specific probabilistic interpretation, viz, that with respect to a specific locus, the relative frequencies of mating types are determined by the product of the probabilities of independent events. It appears in his presentation that Fredrickson uses "random mating" as a euphemism for "complete sexual promiscuity" (to use Karmel's phrase). Actually, in a more detailed version of his work, to be published in the Winter 1971 issue of the journal Mathematical Biosciences, Professor Fredrickson does introduce a random mating mechanism. How critical this may be to his model remains problematic.

More fundamental matters:

1) How would appreciable illegitimacy affect the Fredrickson approach?

2) As Fredrickson points out, the basic issue in the "Random Mating Model" is the choice of the Birth Rate, and in the "Monogamous Model" the choice of the Marriage Rate. However, these may not be unique to the present approach, which employs the Kendall-Von Foerster equations to incorporate age into a two sex model. It may be that a "Lotka-like" extension is also possible.

Finally, it should be remarked that

1) The present model is concerned only with the first moments of the frequencies. A stochastic approach might be tried in the Goodman-Kendall manner;

2) The present model deals with a continuous scale for time and age. A corresponding study might be formulated in which these scales are discrete--the Bernardelli, Lewis, Leslie approach. This in turn suggests a "reconciliation" of discrete and continuous approaches, ala Goodman and Keyfitz.

In Professor Masnick's interesting paper, a number of questions arise:

1) Why are the quantities α and β taken as constant? This question intrudes because the exponential distribution implies that, for example, α is the probability at a point in time that a woman will pass from FN to PN, so that constancy of α assumes the probability is the same for the first month as for the twelfth which may be doubtful.

2) Similarly, β may be length dependent, i.e., how long a woman is in PN may depend on how long she was in FN.

3) Infant mortality in the model may be a problem. What if the child survives until ovulation?

4) The technical problem of actually completing the estimation of the parameters λ_1, λ_2, λ_3, α, β by the Method of Moments appears formidable. A less efficient method may prove necessary.

(The papers by Frederickson and Masnick, discussed above by Mr. McHugh, were not sent for inclusion in this Proceedings volume.)