"Tell me what you eat, and I will tell you what you are." Brillat-Savarin's aphorism (1) can be expanded to: "Tell me what you eat, and I will also tell you how well you reproduce." Recent findings that the onset and maintenance of regular menstrual function in the human female are each dependent on the maintenance of a minimum weight for height, apparently representing a critical fat storage (2), imply that a particular body composition of relative fatness, (fat/lean ratio, or fat/body weight) may be an important determinant for human female reproductive ability (3-6).

A woman who loses about 10 to 15 percent of her body weight loses about a third of her body fat and becomes amenorrheic (2,3). An excess of body fat also affects menstrual function, since very obese women are amenorrheic or have irregular cycles (3). Too little fat, or too much fat therefore is associated with a disruption of female reproductive ability (3,6). This paper will discuss the limiting effects of undernutrition and high energy requiring activities, such as hard physical work and lactation on reproductive ability (2,7,8).

Charles Darwin described this common sense relationship between food supplies and fertility, observing that: 1) domestic animals, which have regular, plentiful food without working to get it are more fertile than the corresponding wild animals; 2) "Hard living retards the period at which animals conceive;" 3) the amount of food affects the fertility of the same individual (9); and 4) It is difficult to fatten a cow which is lactating (10). All of Darwin's dicta apply to human beings, as I will show.
In many historical populations, poor couples living together to the end of their reproductive lives had only 6 to 7 living births (11,12). Most poor couples in many developing countries today also only have 6 to 7 living births during their reproductive lifespan (13,14). Six children per couple today results in a very rapid rate of population growth because of decreased mortality rates, resulting from the introduction of modern public health procedures. However, 6 or 7 births is far below the human maximum of 11 or 12 children found among non-contracepting, well nourished peoples such as the Hutterites (15,16).

The usual explanation of the lower than maximum fertility observed in both historical and contemporary societies is that it is due to the use of "folk" methods of contraception, abortion, or venereal disease, in combination with social customs which can affect fertility, such as late age of marriage, or a taboo on intercourse during lactation (11,15,17). Because food intake can directly affect fecundity, undernutrition is an alternate explanation of the observed sub-maximum fertility (8). Undernutrition, of course, may also interact with social customs which affect the degree of exposure to risk of pregnancy in a particular society.

Differences in natural fertility have been recognized and explained by differences in length of birth intervals (18) or by variation in general health and food intake without specification of the mechanism. Carr-Saunders (20) gives many examples from hunting and fishing societies to show that poor living conditions limit human fecundity and better conditions increase human fecundity. Recognizing the general principle for all species, he states:

"... fecundity has been spoken of as if it was fixed at a certain strength for each species. As a matter of fact, it varies within fairly wide limits - increasing with better conditions. In this fact lies the explanation of the increase of species under favorable conditions which has often been observed, although when conditions are less favourable, there is little or no evidence of starvation among such species."

Mauldin (21) cites data of Mahalanobis and others which suggest that low levels of fertility at certain periods of Indian history may have been due to impaired fecundity because of low levels of consumption. Gopalan and Naidu (22) relate malnutrition and relatively low fertility in India. Chen et al. (14) show from a prospective study that fertility in Bangladesh varied in correlation with the food supply in an essentially non-contracepting population. Finally, there is evidence that the fertility of the