

SCHOOL-AGE PREGNANCY AND PARENTHOOD**Biosocial Dimensions**

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**ADOLESCENT PREGNANCY AND CHILDBEARING: AN
ANTHROPOLOGICAL PERSPECTIVE**Melvin Konner
Majorie Shostak**INTRODUCTION**

In the minds of some who consider the problem of school-age pregnancy and childbearing, there is an implicit assumption that it is somehow a return to a more primitive form of reproductive life cycle. That is, the basic human condition is viewed as one in which reproductive activity begins early, fertility is poorly controlled, and childbearing, the main business of life, preoccupies young women and girls from the earliest possible age. Only when (so this thinking runs) higher-level civilizations, with their need for prolonged education and maturation, began to impose strictures on adolescent sexual activity, did the teenage years become free from childbearing activity.

Our experience with the !Kung San ("Bushmen") of the Kalahari Desert in Botswana, an African hunting and gathering people, led us to question the validity of this viewpoint. Further, systematic review of the cross-cultural and historical evidence suggested that in fact the opposite might be the case; that is, that the most primitive human condition may be one in which the teenage years are relatively free, and the early and middle teenage years completely free, of pregnancy and childbearing, and that this freedom might be the result of primarily biological rather than primarily cultural causes. While it would be unfortunate to replace one oversimplification with another, our working hypothesis at present is the one just stated, and the purpose of this chapter is to review very briefly the justification for this position.

EPIDEMIOLOGY OF ADOLESCENT PREGNANCY

It is difficult to obtain reliable estimates of the incidence of pregnancy, but the number of reported pregnancies to teenagers (individuals under 20 years of age) has for a decade been increasing from about one million annually to about 10% above that figure. For 1974, or about the time that adolescent pregnancy began to be a matter of widespread public concern, the Alan Guttmacher Institute reported on the characteristics of these pregnancies (Guttmacher Institute, 1976). About 600,000 were completed, the others ending in early termination either spontaneously or therapeutically. About 250,000 were to girls 17 and younger, and about 13,000 to girls 14 and younger. In the early 1970's the birth rate for all women, and for women 20-24 years old, declined markedly, while births for 14-17 year olds stayed at about 30 per thousand. Out of wedlock births, a subcategory of total births, rose in the younger age group during the same period, as they had been doing since 1960.

By 1975 (National Center of Health Statistics, 1977; Klerman and Stokel, 1978), a trend toward stabilization of births to teenagers was noted. However, since this was 2 years after the Supreme Court abortion decision and 2 years before the withdrawal of Medicaid funding for abortions, it was not clear that it reflected a stabilization in pregnancies, or that it could be projected forward. Further, since birth rates for all women were dropping, and since teenagers were not participating in the downward trend but only stabilizing, it seemed that the proportion of all children who would have teenagers as mothers would continue to rise.

By 1978 (Guttmacher Institute, 1981) and certainly by 1979 (Baldwin, 1983), it was clear that the teenage birthrate was declining, and that all ages were now participating in the decline. However, this was due to a marked (approximately two thirds) increase in the number of therapeutic abortions to teenagers, and the overall rate of pregnancy was estimated to have increased by 10-15% since 5 years earlier. Also, it was noted at this time that the percentage of births to teenagers that occurred out of wedlock had continued to rise steadily. Of births to 17 year olds in 1970, 35% were out of wedlock, whereas 53% of births to 17 year olds in 1979 were out of wedlock, and comparable increases were seen for other ages under 20 (Baldwin, 1983). In 1979, 1.3 million children were living with teenage mothers, about one-half of whom were unmarried (Guttmacher Institute, 1981).

It must be noted that aggregating the data for whites and blacks, as is done above (and in many policy statements and news reports) obscures important differences in the trends for the two groups (Baldwin, 1983). In 1979 the black:white ratio of birth rates ranged from 1.8:1

at age 19 to 4.8:1 at age 14, indicating a marked difference in the development of adolescent fertility. Between 1970 and 1979 the number of births per thousand in the 15-19 year age group in blacks changed from high 90's to the low 90's, while the same age group in whites increased its birthrate from 10.9 to 14.9 per thousand, a numerically much more significant change at the national level. Finally, the increase in nonmarital births during this time period was largely accounted for by whites.

In 1981, the last year for which there are national data at this writing, there were 537,024 births to women under 20, 37% of which were to girls or women under 18. Births to teenagers continued to decline both in rates and in absolute numbers, and this decline had occurred for all ages under 20 between 1970 and 1981 (National Center for Health Statistics, 1983, 1984). The proportion of births to teenagers which were nonmarital continued to be high; one-half of all births to teenagers in 1981 were out-of-wedlock. Trends distinguishing blacks and whites, as reported by previous observers, were reconfirmed.

In summary, it can be said that the levels and trends reported in the mid-1970's have improved in some respects but not in others. Births to teenagers, although they continue to represent a significant proportion of all births, have been declining steadily in relative and absolute numbers. However, pregnancies to teenagers appear to have increased, and therapeutic abortions to teenagers have increased even more markedly. Thus the decline in teenage childbearing is owed primarily to an increase in the utilization of therapeutic abortion and not to the comparatively minor increase in the use of effective methods for prevention of conception (Baldwin, 1983). There is no reason to believe that abstinence has played a role in the decline of births during the late 1970's; on the contrary all methods of estimating sexual activity showed it to be increasing among teenagers during this period (Guttmacher, 1981). Finally, the proportion of births to teenage mothers that have occurred nonmaritally has risen steadily.

All these generalizations apply to young teenagers (those under 17) as well as to all teenagers, although there are some age differences in the magnitude of some of the trends. Black-white differences are very marked; although the incidence statistics have always been in conventional terms "worse" for blacks (higher rates of birth, pregnancy, abortion, and nonmarital birth), the trends are "worse" for whites. In all likelihood there are many more ethnic and subcultural variations that are obscured by the lumping of all teenagers into two racial groups. Interestingly, studies in the United Kingdom (Russell, 1982) and various European countries (Deschamps and Valentin, 1978) show that with the exception of France the phenomena of increasing rates of teenage and early teenage pregnancy, and of nonmarital pregnancy in the

same age groups, are cross-national ones, although the proportion of completed pregnancies varies greatly with social context and with the availability of therapeutic abortion.

It is, of course, not possible to project these forward. Even the current situation may be different from that in 1981, the last year for which we have data, because of increasing consciousness of the existence of nationally endemic venereal herpes simplex, or because of decreasing availability of funds for therapeutic abortion for indigent teenagers. Within the next decade there are likely to be marked changes in one direction or another due to improvements in contraceptive technology, favorable or unfavorable changes in contraceptive education, changing venereal disease patterns, and the possible development of vaccines against genital herpes simplex and/or gonorrhea—not to mention unpredictably changing standards of sexual morality. It is further likely that increasing public consciousness about adolescent pregnancy has affected and will continue to affect the situation, through the development of social, educational, medical, and health programs.

CONSEQUENCES OF ADOLESCENT PREGNANCY AND CHILDBEARING

Two opposing kinds of conventional wisdom exist with regard to the consequences of adolescent pregnancy and childbearing. One, associated especially with educators, psychologists, and psychiatrists, although also subscribed to by many pediatricians and obstetricians, holds that the teenage years, particularly the early teenage years, are no time for pregnancy, childbirth, or parenthood (Duenhoelter *et al.*, 1975; Guttmacher Institute, 1976, 1981; Lobl *et al.*, 1971; Russell, 1982). The other, in a sense both older and newer, associated with some pediatric and obstetrical tradition as well as with the folk wisdom of some ethnic groups, holds that the younger a woman is when she bears a child the better off she (and her child) are, youth being synonymous with resilience, health, and strength (Baird, 1967; Morris, 1981; Rothenberg and Varga, 1981).

As with many long-standing controversies, both viewpoints have some validity. Part of the fruit of this controversy has been an increasing consciousness of the need to separate the teenage years into two or even three separate groups for analysis. For example, risk of both fatal and nonfatal pregnancy complications is only slightly higher in 18 and 19 year olds than in 20–24 year olds, but these risks increase steadily as maternal age drops below 18. To girls under 15, the risk of infant mortality and the risk of low birth weight infants is more than twice what it is for women 20–24 years old (Shapiro *et al.*, 1968; Guttmacher Institute, 1976, 1981). The risks to the mother under 20 have been shown

to be higher for—in various studies—toxemia of pregnancy, anemia, hemorrhage, spontaneous abortion, postnatal complications, and maternal death (including suicide), as have the risks to the child for low birth weight, prematurity, congenital anomalies, low postnatal gain in length and weight, impaired cognitive development, and abuse and neglect; most of these risks have also been found in various studies to become significantly higher as maternal age drops through the teenage years (e.g., Battaglia *et al.*, 1963; Lobl *et al.*, 1971; Duenhoelter *et al.*, 1975; Dott and Fort, 1976; see Rothenberg and Varga, 1981; Russell, 1982 for reviews).

However, most such studies, especially those analyzing population statistics, have been justly criticized for failure to control adequately for factors other than maternal age. The younger mothers have tended to have poorer nutrition and poorer health care prenatally, and have differed significantly from older mothers in a variety of socioeconomic background variables relevant to the natal and postnatal outcomes of their children. Studies in which such variables have been well controlled (as well as some studies in which they have not) have failed to confirm many of the above-mentioned disadvantages (e.g., Briggs *et al.*, 1962; Isreal and Wouterz, 1963; Morris, 1981; Rothenberg and Varga, 1981; Osbourne *et al.*, 1981; Horon *et al.*, 1983).

Such studies have led to a newly emerging view—in effect, a new “conventional wisdom”—which holds that adolescent pregnancy is biologically advantageous although socially disadvantageous (Morris, 1981). Three qualifications are helpful with regard to this view. First, while it is now generally agreed that ages 17, 18, and 19 are biologically desirable times for most young women to have pregnancies (whether completed or not) there remains doubt as to the biological suitability of younger teenagers for pregnancy and delivery. Second, research is only in its earliest stages regarding some fundamental biological problems that may be uniquely faced by young teenagers, such as exaggerated maternal-fetal nutrient competition (Naeye, 1981; Frisanchi *et al.*, 1983) and immaturity of the pelvis with size limitation of the birth canal (Moerman, 1982); thus a final conclusion about the biological adequacy (in the sense of “biological” that excludes psychological factors) of young teenage mothers is probably premature. Third, studies that control all background variables other than age (socioeconomic status, prenatal care, education, marital status, nutrition, etc.) may show that in abstract terms there are no basic biological reasons for young teenagers to avoid motherhood. In practical terms, however, young teenagers have a much higher incidence of other risk factors. They seek prenatal care later, have poorer nutrition, stay unmarried at higher rates, and decline in socioeconomic status and education with respect to their age-mates who avoid pregnancy and motherhood.

The fact that these risk factors could theoretically be removed does not change the risk to which adolescent mothers and their children are exposed in the world as it is. Stated another way, maintaining poor standards of nutrition, prenatal care, childbirth preparation, and postnatal care is to some extent inherent in being a teenager. To do research in which the control group of older mothers is equally poor in these areas may be to eliminate the phenomenon we need to be studying, and may be valuable for scientific interpretation but only indirectly relevant to policy. In practical terms, the cost/benefit analysis of counterbalancing these disadvantages of adolescent pregnancy with aggressive policies and programs—as opposed to trying to prevent young adolescents from becoming parents—may not be a favorable one.

That the social and psychological risks incurred by the young teenager who becomes a mother are great is almost generally agreed. Of women who first give birth during their twenties, 96% have high school diplomas, while about one-half of women who first gave birth before age 18 have completed or will complete high school. The mean annual income of white mothers who gave birth before age 16 is slightly more than one-half that of mothers who first gave birth in their late twenties. Marriage disruption, if marriage occurs, is three times more likely for mothers under age 17 than for mothers over age 20 (Guttmacher Institute, 1981). Thus the picture is one of impaired educational, economic, and marital status for women who have become mothers during their early teens, and this impairment exists despite mitigation by Aid to Families with Dependent Children (AFDC) and other social welfare programs.

There is also the question of psychiatric risk, which is more difficult to study. It has been repeatedly shown that for fully adult mothers the postpartum period is one of particular psychiatric vulnerability, when a greatly disproportionate incidence of onset, or exacerbation, of mental illness takes place (Pugh *et al.*, 1963; Paffenbarger, 1964; Hamburg *et al.*, 1968). This vulnerability may result from hormonal, psychological, or social changes that accompany delivery, and most likely results from some combination of those causes. While postpartum psychiatric vulnerability in young teenagers specifically has not been adequately studied, it does not seem likely that their risk would be lower than that for the general population of parturient women. Studies of suicide have shown a high relative risk during pregnancy, and this applies to teenagers as well as to older women (Pretzel and Cline, 1978). Although it is not clear that therapeutic termination of pregnancy resolves the added risk, either abstinence or effective contraception would presumably do so.

Finally, it must be considered that there are individual adolescents, families, and perhaps even subcultures, for whom early pregnancy

and motherhood are not undesirable outcomes, even psychosocially, and even at the younger ages. Some girls correctly perceive early motherhood as a route to social and economic independence. This independence may be meager compared with national standards, but may be markedly superior to the particular adolescent's situation in her family of origin. Or, childbearing may greatly improve her status within that family, which may in turn cheerfully provide adequate psychosocial or even economic support for her and her child. Some young women in their late twenties or early thirties have completed not only the childbearing but the child-rearing phase of their lives and are prepared to enter the labor force or to advance their educations. As in all areas of medical practice and social policy implementation, there is a need for clinical judgment that will take into account individual situation and subcultural variation, and will sometimes depart from generally agreed upon guidelines. This is another lesson of the anthropological perspective on this or indeed almost any social problem.

THE CULTURAL HYPOTHESIS OF INCREASING ADOLESCENT PREGNANCY

Why has this relative increase in adolescent pregnancy occurred? The explanation most frequently advanced relates to the liberalization of sexual mores that has affected American society during the past two decades. It is easy to document that such a change has taken place (Chilman, 1979; see also this volume) and it is obvious to anyone who has lived through that period as an adult. Today's adolescents have been exposed to a much more liberal set of sexual mores than was the case for the adolescents of 20 years ago, whether the measures involve transmission of knowledge, adult models, peer pressure, or rules and restrictions governing their own behavior. It seems logical to account for the increasing proportion of adolescent pregnancies mainly by reference to this cultural change.

But this logic runs aground against at least some ethnological experience, which suggests that liberal premarital sexual mores, however new they may be for us, are not new for a large proportion of the cultures of the ethnological record, and that, contrary to what may seem obvious, liberal sexual mores and even active sexual lives among adolescents are not necessarily associated with pregnancies among young teenagers. Using the Standard Cross-Cultural Sample of 186 societies—chosen for their representativeness of the ethnological universe, their geographic independence of one another, and the quality of the data available for them—Broude and Greene (1976) rated twenty sexual practices and attitudes toward sex, including premarital sex. It was possible to rate 107 societies on frequency of premarital sex for

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males, and, of these, premarital sex was rated as universal or almost universal in 59.8%, moderate or not uncommon in 17.8%, occasional in 10.3%, and uncommon in 12.1%. For females ($n = 114$ societies) the corresponding percentages are 49.1, 16.7, 14.0, and 20.2%.

It was also possible to rate 141 societies on attitudes toward premarital sex, as explicitly expressed in the cultural norms. Premarital sex is rated as "expected, approved; virginity has no value" in 24.1%; "tolerated; accepted if discreet" in 20.6%; and "mildly disapproved; pressure toward chastity but transgressions are not punished and nonvirginity ignored" in 17.0%. The cumulative percentage of these three more lenient categories is 61.7%, with the stricter, more disapproving categories distributed as follows: "moderately disapproved; virginity valued and token or slight punishment for nonvirginity," 8.5%; "premarital sex disallowed except with bridegroom," 4.3%; and "premarital sex strongly disapproved; virginity required or stated as required (virginity tests, severe refusals for nonvirginity, e.g., divorce, loss of bride price)," 25.5% (Broude and Greene, 1976, pp. 414-415).

Since most of these societies do not place much emphasis on chronological age, many not even keeping track of it, it is not possible to separate premarital sex or attitudes toward it with regard to age. However, it is clear from much of the ethnographic material that teenagers are among the main targets of these strictures, or the lack thereof.

It thus appears that our much discussed liberal shift in mores regarding premarital sex during the past 25 years has put the more liberal sector of our population in a category that includes at least 60% of the traditional societies in the ethnological record. Yet there is no widespread occurrence of early teenage pregnancies in these societies, as there is in ours at present. For example, the cultural atmosphere with regard to sex among the traditional !Kung San was at least as open and liberal as that in the United States during the past few years, yet early teenage pregnancy was unknown and at most about one half of all women who had children had their first child before age nineteen. For this and other reasons, it seems worthwhile to summarize briefly this apparently paradoxical case. (For an account of adolescence in another, quite different African society, the Kikuyu, who also have late menarche compared with our own, see Worthman, this volume, Chapter 5.)

THE !KUNG HUNTER-GATHERER MODEL

The !Kung are the most extensively studied hunting-gathering population to date, and are thought to provide evidence regarding human adaptation during the vast majority of the course of human evolution (Lee and DeVore, 1968, 1976). There have been excellent studies of

ogy (Lee, 1979), and demography (Howell, 1979). In addition one of us (Shostak, 1981) has worked extensively on the life cycle of women, while the other (Konner, 1976; Konner and Worthman, 1980) has focused on infant growth and development, infant care, and the relationship between nursing and reproductive function. The following discussion is drawn from these observations, as well as from those of Draper (1975, 1976), Marshall (1976), Lee (1979), and Howell (1979).

The demographic facts are, briefly, as follows (Howell, 1979). Prospective study of the age at menarche, which is easy to determine accurately for reasons of ritual, gives a mean of 16.6 and a median of 17.1 years, respectively, with the majority of girls passing this milestone between age 16 and 18 years (Howell, *ibid.*, p. 178). About one-half of all girls are married by the time they reach menarche. Careful retrospective study of women who were 45 years old or older in 1968 yielded an estimate of the timing of first birth reflected by a mean of 18.8 and a median of 19.2 years, with all but a handful of mothers having had their first births between ages 17 and 22 (*ibid.*, p. 128). Prospective study of women having their first births in the period 1963-1973 yielded higher estimates, with a mean of 21.4 and a median of 19.6 years (*ibid.*, p. 141). Completed fertility determined retrospectively gave an estimate of 4.7 live births per woman, with the average age of last birth being in the middle thirties. Of 179 births occurring in the study population during the decade 1963-1973, only 16 occurred before age 20 (15 of these were first births), and only one occurred before age 17.

These demographic data must be understood in relation to the ethnographic context, which is as follows. Experimentation with sex starts quite early for the !Kung, beginning in early childhood and continuing through middle childhood without the interruption familiar in our society (and in psychoanalytic theory) as the "latency period." Children do not assume responsibility for subsistence until late in their teens, and their play groups are frequently out of sight of adults; sexual awareness and curiosity are allowed to flourish in the unrestricted time that comprises most of their day. Adults do not actually approve of sexual play among children and adolescents, and when it becomes obvious they make some effort to discourage it. But these efforts are half-hearted—of the order of verbal chastisements with no real or threatened consequences—and do little to ensure that the infractions will not recur. Interviews with adults reveal that they consider sexual experimentation in childhood and adolescence to be inevitable and even healthy. Certainly for adults sexual activity is considered essential for mental health, and they often referred to mentally ill people (for example, a woman who ate grass) as having suffered derangement because of sexual deprivation.

For the growing child among the !Kung, as opposed to among our-

selves, the effect seems to be one of making sex seem less taboo, less frightening, and less unknown. It is not likely that a !Kung girl would engage in sex without understanding what is involved or what the consequences can be; she knows too much to allow herself naively to be "taken advantage of."

However, despite childhood sexual experimentation, the transition from the playful sex of childhood to the real sex of adulthood can be difficult, especially for girls. The main explanation for this is the early age at first marriage in the traditional system, in which one half of all girls were married before the time of their first menstruation (age 16+). However, they were typically married to men about 10 years older than themselves. Thus a teenage girl was confronted with the sexual advances of an adult man after having had prior experience only with boys her own age. Although in principle these advances would be delayed until her menarche, the transition from casual sex play with age mates to adult sex with a husband was stressful for many.

Contraception does not play a significant role in !Kung reproductive life. Some individuals claim to be vaguely aware of herbal medicines used by neighboring Bantu cultures, but few women of any age claim to have taken them at any time in their lives, and, in any case, they are of unknown effectiveness. The !Kung carry out their reproductive lives under the misconception that conception results from the mixing of menstrual blood, late in the menstrual flow, with semen; thus nothing resembling a conscious rhythm method could be operating. Children are highly desired by almost all women, regardless of age.

Nisa, a woman from whom an extended life history was collected by one of us (Shostak), described a more or less continual experience with childhood sexuality, all in the course of play with other children. In her early to mid-teens she had two unsuccessful arranged marriages to older men. Both were soon dissolved—the first because her husband had sex with a woman his own age in the marriage hut, while the much younger Nisa was presumed to be sleeping; the second because the younger man proved unlikable to Nisa's father. Dissolution of these relationships was easily achieved. Both involved her in resistance to her husbands' sexual advances; despite extensive sex play in childhood, reportedly including sexual intercourse with penetration, these first experiences with adult men were awkward and essentially unwelcome. She was married for the third time through yet another arrangement by her parents, about 1 year before her first menstruation. She ran away from her husband many times before she settled down to married life with him. She finally agreed to have sex with him once, but subsequently refused due to the pain this had caused her. It took years before their relationship actually assumed an adult cast. As she explained, "We lived and lived, the two of us together, and after a

while I started to really like him, and then to love him, I had finally grown up and learned how to love. I thought, 'A man has sex with you. Yes, that's what a man does. I had thought that perhaps he didn't. . . . I thought that, and gave myself to him, gave and gave. We lay with each other and my breasts were very large, I was becoming a woman.'"

The years from age 16½, when first menstruation occurs, to age 19, the mean age at first birth—a delay due mainly to adolescent subfertility—are important ones for the young !Kung woman. It is as though time were temporarily suspended; she is sexually mature but has no significant responsibility for taking care of a family or for contributing to subsistence. She can ease gradually into adult roles and adult sexuality without having to deal with the consequences of early pregnancy. She has years—some before menarche, some after—to determine whether she is compatible with her husband. As long as she has not yet become pregnant, divorce is possible. Whether she is married or not, the primary responsibility for feeding herself and her husband is deferred, while being borne by her mother and father. Even after her first birth, her need to remain near her mother is recognized, and it is not until the second child that she may be expected to move, with her family, to her husband's parents' village camp. At that time—when she is 23 or 24 years old—she is essentially on her own, with the full psychological and social responsibilities pertaining to motherhood. Still, she is never quite "on her own" in the sense that many young American mothers are; she remains in a social and economic context dense with her own and/or her husband's relatives, and it is very rare for a marriage to be dissolved after it has produced living children.

Thus, this example of a very primitive society that is representative of the basic human social and demographic adaptation presents a picture of adolescent sexuality quite different from conventional assumptions about such societies. They indeed have active sexual lives from an early age, and restrictions on sexual relations are few. However, they have a late age of first menstruation, a presumed period of adolescent subfertility, and some contribution from pregnancy wastage that result in a mean age at first live birth of just under 20. Even then, the context of the kinship system is such as to limit responsibility and provide extensive economic and psychological support, diminishing only gradually as the young woman reaches her mid-20's and her family grows.

THE SECULAR TREND IN GROWTH AND MATURATION

A broader cross-cultural and historical view may now be invoked to present the spectrum of variation against which we must assess the

American and the Kung models. In general it may be summarized as showing that whether compared with current underdeveloped populations or with European and American populations prior to the twentieth century, the ratio of births in the 15- to 19-year-cohort to those in the subsequent 5 year cohort is high in the current American population. Observed from the perspective of the child, the cohort of children born in the United States this year will include a proportion with mothers under age 20 that is higher than the comparable proportion for current populations in the underdeveloped world or for European and American populations at various times in the past, a circumstance due both to the current teenage birthrate and to the limitation of total family size.

Evidence that the age at first menstruation, or menarche, has been dropping in the United States and Europe for more than a century, has been repeatedly summarized (Tanner, 1962, 1968, 1973; Tanner and Eveleth, 1975; Wyshak and Finsch, 1982; Eveleth, see this volume). There is disagreement (e.g., Bullough, 1981) about the magnitude of this phenomenon, about its cross-national variability, and about whether and where it may be continuing, but there is general agreement that the phenomenon is real. A very conservative estimate would be that the age of menarche has declined 2 years since the early nineteenth century, and estimates as high as between 4 and 5 years have been presented.

This secular trend in growth has been well documented not only for age at menarche but for general growth rate (height and weight) as well as for maximum body size attained (Meredith, 1967, 1976). It is noteworthy that such measures lead to an estimate of the rate of acceleration of growth that confirms the estimate derived from studies of menarche. For example, the age of the peak of growth velocity in the pubertal height spurt, as indicated by changing height for age curves, has decreased at about the same rate as the age at menarche, namely 4 months per decade. This is of particular interest since studies of age at menarche are subject to methodological challenges that do not apply to studies of height growth.

The secular trend appears to have stopped in some populations, notably Oslo, Norway, where the earliest historical data come from (Brundland and Walloe, 1973), London, England (Tanner, 1973), Newton, Massachusetts (Zacharias *et al.*, 1976), and among old Americans at Harvard and Eastern women's colleges (Damon, 1974). The trend is reported to be continuing in some other populations (Guarneri *et al.*, 1978), especially in the underdeveloped world (Eveleth and Tanner, 1976). In northern Europe, it appears to have stabilized at just about 13 years (Tanner, 1973) and in New England at a slightly younger age. Zacharias and her colleagues (Zacharias *et al.*, 1970; Zacharias, *et al.*, 1976) found that a large sample of girls in Newton, Massachusetts men-

strated for the first time at 12.65 years, no earlier than the menarcheal age of their mothers. In the wealthiest New England families, the secular acceleration of growth apparently ended early in the twentieth century (Damon, 1974). It now seems possible, despite some exceptions, that the mean age at menarche may not drop much below 12¹/₂ to 13 years anywhere in the world, and that this may be a basic biological lower limit for this milestone in our species. But the youngest estimates for the United States place the mean at about 14 years during the early twentieth century. Norway, Germany, Finland, and Sweden, for which the data are much better, show a steady decline beginning in the middle of the nineteenth century, when the average age at menarche for various populations was 15, 16, or perhaps even 17 years. Conservative estimates thus leave room for a 2- or 3-year decline in northern Europe over a period of 150 years.

There is considerable variation in the age at menarche within populations, with the 95% confidence interval being bracketed by an 8 year period with the mean in the center (Eveleth, this volume, Chapter 3). Thus reports of menarche at age 12 and pregnancy at age 13 in some girls must be expected even with the highest estimated mean menarcheal ages ever presented. In our population menarche at age 8 or 9 and pregnancy at age 10 or 11 can no longer be considered to reflect endocrine pathology, as they certainly would have been at the turn of the century.

As previously noted, one can be skeptical about historical data on age at menarche, but the average age at which a given height is reached has also been dropping at about 4 months per decade (Meredith, 1976); this too has stopped in populations with higher socioeconomic status.

The reasons for the growth acceleration are not agreed upon. Finsch (1984) has accumulated evidence that nutritional improvements have led to increases in fatness at each age, which, in turn, lead to earlier menarche through the production of physiologically potent estrogens in fat cells. An effect of intense and prolonged exercise training is now well demonstrated in studies of young dancers and athletes (e.g., Finsch *et al.*, 1980), and this effect may be obtained through the reduction of body fat or through endocrinological stress responses unfavorable to reproductive function. Other hypotheses of variation in age at menarche have been advanced, including improved public health and medical care in controlling chronic diseases of childhood (Tanner, 1968), changes in environmental lighting (Zacharias and Wartman, 1964, 1969), increased consumption of refined carbohydrates (Schaefer, 1970), increased stimulation during infancy (Whiting, 1965), and genetic changes resulting from outbreeding or natural selection (Cavalli Sforza and Bodmer, 1971). Urban living is definitely associated with earlier

maturation, an effect that has been shown throughout the world (Eveloth and Tanner, 1976), but the meaning of this association is difficult to determine, since urbanization is accompanied by changes in most or all of the other, more specific, proposed causes. It is likely that the specification of determinants of the secular trend will await a better understanding of the neuroendocrine control of the onset of puberty, a rapidly advancing field, but one with many unexpected and puzzling findings (Sizonenko, 1978a,b; Grumbach, 1980; Reiter, Chapter 4, this volume).

It is necessary as well to consider the phenomenon of "adolescent sterility," more properly called adolescent subfertility, which has recently been extensively reviewed (Montagu, 1979). The erratic quality of menstrual cycles during the first year or more after menarche has been repeatedly documented, as has the existence of a high proportion of anovulatory cycles. Thus it is not surprising that first fecundity lags behind menarche by one or more years in many populations, and that this phenomenon is greater in underdeveloped countries. In view of the effect of nutrition and exercise on fecundity it is possible that this infertile period has decreased in length in recent generations, in parallel with the decrease in age at menarche. If so, then the mean age at first fecundity (or first consistent ovulation) would have dropped more markedly and rapidly than the mean age at menarche. However, this notion is at present still in the realm of speculation.

EVIDENCE FROM HISTORICAL DEMOGRAPHY

Historical demographers have provided a body of evidence on adolescent fertility (and, indirectly, fecundity) that is independent of the above mentioned studies, and that also takes into account changing patterns of marriage and mores. Through the study of church, family, and other records, the lateness of first childbearing in Europe, England, and the United States during the sixteenth to nineteenth centuries has been shown (Laslett, 1965, Chapter 4; 1977, Chapter 6). The frequently cited case of Shakespeare's Juliet, whose nurse chides her for not marrying and becoming pregnant by age thirteen (as Juliet's mother allegedly had done) is carefully considered by Laslett. His discussion shows the nurse to have been a poor historical demographer, since such a case would have been exceedingly rare in either Juliet's Italy or Shakespeare's England. (Actually, as Laslett also shows, Juliet's age in Shakespeare's source for the play was eighteen. The change probably gives the play much of its urgency and poignancy, but it makes the nurse's impatience quite unrealistic.)

For the United States, Cutright (1972a,b) has reviewed the history of illegitimacy during the twentieth century, specifically addressing the

relationship of earlier maturation to adolescent childbearing. He shows that there have been increases in the rate of teenage childbearing at least since 1940, and attempts to explain these increases in part by reference to the secular trend toward earlier menarche. He refers specifically to "the myth of an abstinent past," the thrust of which is to assume that because teenagers at the turn of the century had few pregnancies they must have obeyed their society's much greater strictures against sex. He presents the contrasting view that they were in fact more active sexually than we imagine them to have been, but did not become pregnant because they were reproductively immature. Vinovskis (see this volume, Chapter 15) reviews literature that carries this discussion back to the colonial period, arguing that premarital pregnancies not resulting in out of wedlock births have fluctuated rather than steadily increasing, and appear to have declined during the early nineteenth century due to an increasing stringency of sexual mores. However, this discussion does not change the basic assessment of pregnancy and childbearing in the early United States. Pregnancies in the late teens were incorporated decisively into a framework of marriage and family, while pregnancies in the early teens were virtually unknown.

DISCUSSION

A careful consideration of the ethnological literature, and of the experience of the !Kung San, hunter-gatherers of northwestern Botswana, in particular, leads to a revision of the common notion that in primitive societies young people enter the childbearing phase of the reproductive life cycle in the early teenage years. Although this may be true of some primitive societies, the majority appear to avoid this transition until later. Despite commonly nonrestrictive mores with regard to adolescent sexuality, and despite apparent high levels of adolescent sexual activity, pregnancy and childbearing usually do not occur. One explanation for this is probably that most such societies have puberty that is late compared with ours, and have, in addition, a significant period of adolescent infertility and/or subfertility.

It is against this broad ethnographic and evolutionary background that historical patterns of adolescent development in our own society must be seen. One hundred fifty years ago, a young woman menstruating at age 15 and becoming a mother by age 18 could take her place as an adult in a relatively simple society designed to support her in every way through firm institutions of marriage and family. Today, a girl menstruating at age 12 and becoming a mother by age 15, often unmarried and likely to remain so, is only a school child at sea in a grown up world that is much more complex and unforgiving. Even if

all systems of physical maturation have accelerated, so that today's 15-year-old has the body and even the brain of the 18-year-old of the past, there is no way for her to compensate for the three years of lost experience, or to struggle successfully in a complex society in which maturity, education, and experience are increasingly valued.

Whatever the causes, it seems reasonable to judge the secular trend in human maturation to be one of the most profound changes in the biology of the species in recorded history, with what would seem to be important implications for adolescent psychology, education, and law. It is not our intention to argue that recent changes in rates of adolescent pregnancy are the simple result of longer-term changes in rates of human growth. Many other factors have intervened, and in fact the increase in the rate of maturation in the United States may have been largely completed before the beginning of the most recent change in adolescent sexual activity that has brought the current high incidence of pregnancy in this growth phase. However, it is clear that no rise in early teenage pregnancies could have occurred in a historical period when it was physiologically impossible. One does not have to postulate or discover a tight historical coupling between the secular trend and the adolescent pregnancy rate in order for them to have been causally related. The sexual activity of adolescents—and, even more so, our mores with regard to that activity—could be expected to resist change against the background of the long-term biological transformation, and then perhaps to change quite rapidly as the illogic of continued resistance became widely apparent.

Many expect moral restraint from teenagers, reasoning, not illogically, that loose morals explain teenage pregnancy. The expectation of moral restraint, characteristic of Europe and the United States in recent centuries, arose for complex reasons that are poorly understood and that are beyond the scope of this discussion. It must be seen against the background of the ethnological record, which shows that most societies have not traditionally had such expectations. Equally important, it must be seen in the context of a quite different biological reality, one that is now part of the past—a reality in which the late maturation of mature sexual impulses and the lateness of first fertility combined to prevent teenage pregnancy (and certainly early teenage pregnancy) with or without active moral restraint.

We may be tempted to blame changes in adult sexual mores for the rise in teenage pregnancy, imagining that if by legal or religious fiat exposure of teenagers to sexual ideas and stimuli could be drastically reduced, teenage sexual activity would revert to the patterns of 30 years ago. It is likely that this hypothesis has some validity. But the direction of causality may be much more complex, and indeed may be interactive, if not weighted in the other direction. Teenagers, especially the

older ones in college, appear to have actually played a role in *producing* the changing sexual mores of recent decades, rather than being passive recipients of adult liberalization. If so, it is plausible that it is exactly accelerated sexual maturation that has led them to strive for earlier sexual freedom, and that this striving may have affected adult mores as much or more than it was affected by them. In other words, the secular trend seems to us a viable hypothesis for partial explanation of the change in mores itself.

Infancy and adolescence are probably two of the most sensitive periods of human growth. An early teenage pregnancy brought to term thus affects two growing children, one in each of the sensitive periods. Fetuses and infants are resilient, but only within limits, and it is doubtful whether a young teenager could provide the environment necessary for optimal development, even under conditions of optimal support and care for the mother.

Young teenage mothers, for their part, are completing the most rapid period of growth they have experienced since their own infancy, and are in the midst of a hormonal, psychological, and social turmoil centering around their own approach to adulthood. To bring a baby into this turmoil is often to pit two children against each other, children with needs that may be incompatible.

It is doubtful that we can turn back the clock on teenage sexual activity. Although this kind of reversal may have occurred before in our history, we are now in a different circumstance—not merely culturally but also biologically. Current high levels of teenage sexual activity are probably partly the product of television and magazine influences, but against the background of biological changes in the pace of maturation that have been going on for more than a century. To expect today's teenagers to live up to moral standards inherited from centuries past is not only to give them conflicting cultural and ethical messages, but also to fail to recognize that the teenagers themselves are different—psychologically, physiologically, and anatomically.

Under the circumstances it is perhaps not too strong to say that to withhold information about contraception from a young teenager who may be sexually active, and then to deny her the possibility of therapeutic termination of her pregnancy, may in itself be a form of child abuse. Whatever our opinions of the complex moral issues of contraception and therapeutic abortion, our decisions could be made with a larger measure of compassion for the plight of today's teenager, caught between a mature body and immature, inexperienced emotions. The same logic we apply to protect young delinquents from a full punishment in juvenile court would presumably apply a *fortiori* to the protection of young teenagers from the consequences of their own sexual indiscretions. The practice, invoked by some authorities, of referring

to even the youngest teenagers as women and men, rather than as girls and boys, simply because they have managed to achieve sexual intercourse, conception or even parenthood, contributes to the forces tending to rob them of their childhood.

Numerous other changes have taken place in the behavior of young teenagers in parallel with the increase in their sexual activity. These include a rise in school age suicide (Petzel and Cline, 1978), school age alcoholism (Hartford, 1976), and school age substance abuse (Hem *et al.*, 1979). Despite the undoubted great complexity and obscurity of the causation of these trends, they must be understood against the background of the prior secular change in the organization of maturation. The ultimate and perhaps very general implications of this change, for adolescence specifically and for recent changes in our culture more widely, are only beginning to be explored.

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