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The Problem of High Fertility and Scarce Resources

There are many characteristics of contemporary African societies that puzzle demographers and others concerned with economic and social modernization. One of the most prominent is that the birth rate remains in both urban and rural areas of sub-Saharan Africa in spite of the presence of several factors that supposedly promote lowering of fertility (McNicoll 1980). Some of these factors are increased survivorship of children into adulthood, increased availability of education and levels of educational attainment (for both sexes), increased urbanization, and increased monetarization of the economy via migratory wage labor and cash cropping. Each of these is normally thought to promote the freeing of young people from the control of elders and to foster the development of economically independent nuclear families, close conjugal relations between spouses, and parenting practices with more intense investment in smaller numbers of higher quality children (Caldwell 1977a, 1977b, 1982; Caldwell and Okonjo 1968; Anker et al., eds. 1982; Sudarkasa 1977; Page and Lesthaeghe 1981; see Barkow and Burley [1980] and Vining [1986] for further biosocial consideration of demographic transition.)

Instead, in much of Africa, not only among country people but among urban populations as well, there persists high fertility and a pattern of parental investment in which both mothers and fathers invest, by Western standards, relatively little in each offspring and pursue a pattern of delegated parental responsibility (Draper and Harpending 1988). Coupled with low investment parenting is a mating pattern that permits early sexual activity, loose economic and emotional ties

between spouses (Potash 1978), and in many cases the expectation on the part of both spouses that the marriage will end in divorce or separation, followed by the formation of another union (Aldous 1962; Lowy 1977; Oppong 1974; Mair 1953; Gibson 1958; Hunter 1961; Tuupainen 1970).[1] Polygyny, still widespread in Africa, inhibits high male parental investment in children for several reasons, as detailed below.

There is a common practice in which the rearing of children is shared by many kindred of a child and in which the biological parents are not the primary caretakers of each child. This system is referred to as "fostering" or "borrowing" or "lending" of children. It is best described and probably most clearly institutionalized in West African societies, although reference to long-term lending of children is found in the literature in Central and Southern Africa (Schuster 1979; Mair 1953; Gibson 1958; Harpending, personal communication.)[2]

The fundamental bonds associated with this family organization are those between a person and his or her consanguineal kin (Fortes 1978). The mother and father, of course, constitute the link between children and their larger kindred, but two things need to be kept in mind: 1) The parents themselves do not expect to be the major providers for each offspring throughout the children's lives, and 2) husbands and wives do not automatically regard their spouses as predictable and long-term sources of support either for themselves or for their children (Oppong and Bleek 1982). As expected, women invest more heavily and consistently in their offspring than do men. Women try to delegate to others the primary care of children while at the same time maintaining a claim on the loyalty and indebtedness of those same children. In order to remain attractive to future sexual partners, women often foster out children froth previous matings (Burley and Symanski 1981, p. 254). These children usually go to kindred of the mother, but they may also go to the father's kin, especially when biological paternity is not in doubt (Gibson 1958). Indeed, in some parts of Africa it is the rule rather than the exception for children to be reared in a variety of households (often but not necessarily headed by relatives) and to spend only a limited time residing with either or both biological parents. (Bledsoe and Isiugo-Albanihe in press; Isiugo-Abanihe 1985; Goody 1975, 1978; Oppong and Bleek 1982).

These generalizations about African marriage, mating, and family organization should not obscure the variability that exists among ethnic groups in Africa. Indeed, this variability offers an excellent opportunity for testing the hypotheses laid out below regarding the institutional and ecological correlates of the general pattern described in this paper.

1 See Caldwell and Caldwell (1981) for an opposing view.

2 Among the pastoral Herero of the northwestern Kalahari, substantial numbers of children are fostered, usually to relatives. The most common reason given by informants is to provide children for the recipient because she is either childless or has few children. A second commonly stated motivation is to send the child away for months or years for weaning.

Relations between Resource Perception and Institutions

In this paper I suggest that the critical factor affecting reproductive decision making is the individual's perception of resource quantity, rather than absolute resource quantity. Later sections consider the way in which institutional forms in African social systems may influence the assumptions individuals make about the nature of resources.

Below I develop a theory (cf. Draper and Harpending 1982; Draper and Harpending 1987) of how perceptions of resources may influence the manner in which reproductive effort is partitioned between mate competition and parental investment. The extent and manner in which the actual availability of resources influences perception of resources remains unknown, but the topic will be reconsidered in a later section of the paper in the context of African institutions and their relation to mating and parenting behavior. The term "resources" here means goods and services necessary to maintain the individual and his or her offspring and to allow access to mating partners. I am particularly interested in how mating and family relationships become part of the resource base that the individual evaluates in making strategic choices.

Clearly the translation between what an individual's sensory modalities enable him or her to perceive about resources and what he learns about resource availability as a result of experience and influence by other group members is not obvious (Goude 1981; Draper and Harpending 1988). The point about perception of resources is key to the ideas to be developed in this essay. I will argue that in the human case, cultural understandings about the availability and location of resources appear in many cases to be a more powerful predictor than are the "actual" resources themselves.

For example, I will argue that people do not scale down expectations for large numbers of children precisely because their understandings about available resources take into account reservoirs of surrogate care among their kin. Whereas development economists regard certain conditions as indicative of poor resources (limited jobs, land shortage), local people ignore or weight down such factors and attribute more importance to the social supports. African men may see no urgency is reducing the numbers of their progeny precisely because a characteristically African set of socioecological circumstances permit many children to survive despite low father contribution to child support. As another illustration, consider the fertility differences between lower- and middle-socioeconomic groups in modern stratified societies. Objectively, the middle class has access to a subsistence of greater quality, quantity, and predictability than do low-socioeconomic status groups, yet their reproductive performance is quite different. Middle-class parents appear to perceive real scarcity in goods and therefore limit the numbers of their children severely. A discussion in a later part of this paper will specify how these translations between social practice, individual experience, and perception occur.

The experience an individual has will shape his cognitions, and the range of experiences of any kind open to an individual are limited by the social and physical settings common to his or her social field. Yet the small and large details of individual's lives are not the same, even in small-scale, homogeneous societies. Further, some classes of experience may be more significant for the shaping of perceptual style than others, a phenomenon known as "learning bias" (Lorenza 1981; Garcia et al. 1972; Bateson 1966; Boyd and Richardson 1985; Barkow 1973). Draper and Harpending have argued that such social factors as mother's pair bond status (Draper and Harpending 1982) and the provision of care by parents as opposed to peer caretakers (Draper and Harpending 1987) may be examples of variation in early childhood experience that establish learning tracks with consequences for adult sexual behavior and evaluations of resource availability (see also Lancaster and Lancaster 1987).

Obviously, *cognitions about* resources (a culturally encoded representation) and the perception of *actual* resources cannot be totally uncoupled, or at least not for long. However, the capability for "stretch" between resources and their emic representations is greater than may be imagined, particularly when economic change takes place in the particular social context that, I will argue, is fundamental to many African social systems. With this proviso in mind, it is interesting to approach African social systems keeping in mind that human cultures there have evolved in the context of some rather unique circumstances.[3]

Evolutionary Ecology

Recent studies by ecologists of animal mating systems can be useful in the analysis of human mating and kinship behavior. There are no simple correspondences between animal and human models; however, work with nonhuman animals has made intelligible many of the relationships between mating systems, species characteristics, habitat, resource distribution, and the ease with which resources can be stored or defended (Kleiman 1977; Kleiman 1981; Lack 1968; Wittenberger and Tilson 1980; Martin and May 1981). Many of the concepts now used by evolutionary ecologists offer interesting insights when they are applied to human data.

The literature is substantial, only brief examples will be given here.[4] All organisms are designed to reproduce themselves, and, in this sense, all functions of an organism are reproductive. Biologists understand that all organisms must make "decisions" about how to partition effort, measured in time, energy, or exposure to risk, among the various requirements of growth, maintenance, and reproduction. *Reproductive effort* is composed of mating effort and parenting effort (Kurland and Gaulin 1984).

3 Of course, the extent to which patterns in African cultural evolution appear "unique" is attributable primarily to our vantage point in the 20th century.

4 See also Altmann 1980; Dublin 1983; Lack 1968; Omark et al. 1980; Packer and Pusey 1984; Silk 1983; Silk et al. 1981; Silk and Boyd 1983; Vandenberg 1983; Verner 1964; Wrangham 1980.

The key issue in unraveling the associations among these factors is survival of offspring. Among mammals there is a pronounced asymmetry in the reproductive organization of the sexes with high obligate parental investment "built into" the female. This is a consequence of internal gestation and dependence of the young on milk supplied only by the mother. Species vary in the extent to which males (who contribute less of their reproductive effort to parenting, in comparison with females) contribute some parenting effort. For some species, females can rear young without direct provisioning from males, because resources can be harvested by her independently or because pressure from predators can be handled by her alone or by associating with other females in protective herds or burrows. In these situations males may facilitate offspring survival in an indirect manner, as in the case of territorial defense insuring the female and her brood the ability to gather food and or to birth young without intense competition from conspecifics. The males and females do not form permanent mating relationships, and male reproductive work is channeled primarily into competition with other males for access to females.

In other cases, males come close to females in their allocation of reproductive effort to parenting. In such cases the sexes form durable pair bonds, and the male role in protecting offspring is essential for his fitness. High-male-parental investment will not evolve (or be facultatively expressed) except where benefits to males outweigh costs in terms of foregone mating opportunities. In mammals the extreme sexual inequality in parental investment rewards competition by males for access to multiple mates; for this reason, monogamy is rare in mammals. The infrequent occurrences of monogamy among mammals are "explained" on the grounds that under certain conditions of species morphology, characteristics of young, and distribution of resources, the fitness interests of both the male and female are best served by combining efforts. They establish a relatively exclusive mating relationship, cooperate in nest building or home territory defense and jointly rear the young (Kleiman and Malcolm 1981; Wittenberger and Tilson 1980; Trivers 1972; Kurland and Gaulin 1984).

Polygyny can be accounted for in terms of both sex differences in reproductive strategy and characteristics of resource type and distribution. For example, polygyny in birds is associated with both altricial young and habitats such as marsh lands where resources are dense, abundant, and readily harvested by a polygynously mated female who is able to rear her brood without help from the male (Orians 1969; Partridge and Halliday 1978). Some bird populations will change from predominantly monogamous mating under a stable and restricted resource setting to polygynous mating when resources become abundant. In these circumstances, males compete among themselves for rich territories to which many females will be attracted; females apparently are willing to forego male help in rearing offspring in return for access to good feeding ground via access to the territory of a high-ranking male.

It seems reasonable to assume that polygyny is associated with reduced male parental care in comparison with monogamy for two reasons. First, polygynists, whether extant or aspiring, must spend time and energy besting rival males and in keeping rival males away from females. Second, depending on the degree of polygyny, large numbers of males will be unable to find mates and therefore will have no offspring to whom care may be delivered. The outcome is the familiar pattern seen in many ungulates, primates, and polygynous birds in which females give comparatively constant individualized attention to young, and males watch primarily other males and those females who are sexually receptive or who show signs of straying.

The perspectives of evolutionary ecology on mating, parenting, and habitat characteristics can be usefully applied to social processes in humans. In the case of humans, of course, simple knowledge of habitat characteristics does not produce much predictive power, since humans remain morphologically quite generalized and "specialize" behaviorally in a variety of ways (White 1959; Washburn 1978). For humans, technology is one of the most critical variables that must be included in calculating the relationship between human groups and their local environment (Steward 1955).

On grounds of comparative morphology, humans have been classed as a moderately polygynous species (Harcourt et al. 1981), yet the current trend in large parts of the civilized world is in the direction of increasing the probabilities that most adults will have one primary mating partner at a time. In Western Europe the monogamous, nuclear family has been the statistical and normative rule for many centuries. Over large areas of Asia most men have one wife whose offspring are the principal beneficiaries of the husband's labor and wealth.

Although we have reasons to think that polygynous matings were typical of our evolutionary past, we also know that humans are capable of *facultative adjustments in mating behavior.* For humans, as in other mammals, there is high-obligate-female-parental investment. Human-male-parental investment can vary even more widely than female investment. Particularly under circumstances in which direct male provisioning of mate and offspring is not necessary for offspring survival, theory predicts that male reproductive effort will be directed more toward competition with other males for access to females and less toward parental investment and maintenance of a single pair bond. But it will be shown in this paper that women in African societies have at their disposal a wider range of options for delegating their parental responsibility than do Western women.

From a global perspective, it seems that recent mating patterns in densely settled peasant agricultural systems and in industrial and postindustrial societies have moved toward monogamy together with high biparental investment in diminished numbers of offspring. The strong presumption is that the increased level of competition for increasingly scarce resources among peoples of politically

centralized and food-producing cultures has pushed the mating patterns in the direction of increasing monogamy and a pattern of direct male provisioning of their wives and children. Indeed, historically, a prominent part of the response to population pressure has been the adoption of increasingly intensive techniques of food production (Boserup 1965). For example, land extensive slash-and-burn horticulture, dependent primarily upon female labor, gives way to labor intensive farming techniques with characteristics that increase the yield of food per unit area, such as irrigation, manuring, oxen-driven plough techniques, and the development of higher-yielding cultigens. Transition to these more intensive techniques of food production includes the movement of men into direct labor in the subsistence sector (Boserup 1970). Women continue to make a subsistence contribution, but it is increasingly in the area of secondary food processing and household management (Ember 1983).

Semantic issues are a significant obstacle to translation of the ideas from evolutionary ecology to the analysis of human social systems. For example, people familiar with the cross-cultural literature on human variability can easily be misled about the actual workings of an institution such as marriage, because the same term, "marriage," is applied to social arrangements that are in fact extremely diverse (Goodenough 1970; Gough 1959). It is true that normative arrangements in known human societies make a provision for 1) the regulation of sexuality, 2) the attribution of paternity, and 3) the rearing of immature young. It is not the case in all human societies that the biological genitor of the children is himself highly involved in parenting as "father" to offspring and as "husband" to mother. In some cases the father's most significant contribution may be to provide his mate and her children access to support from his consanguineal kin. In societies constituted in this manner (and they are common in large parts of Africa), wives and children are not salient influences on men. This is a critical and often overlooked distinction in discussion of factors influencing human mating and fertility. When men move in a social universe in which the claims of children are not directly felt (as they are felt by women because of their high obligate parentalism), men's cognitions about the environment and resources necessary for sustenance can differ significantly from those of women.

The Institutional Complexes

Polygyny

Africa is distinguished by the continued high prevalence of polygynous marriages (Goody 1973). Polygyny is not only the preserve of elite men but is a status to which many men of moderate means aspire at some point in their life span. (Welch and Glick 1981; Obbo 1980; Arowolo 1981). The persistence of polygyny

among rural people can be explained in part by the female farming system, common throughout much of Africa (due perhaps primarily to the availability of land). Much of rural African subsistence is based on the work of women in their gardens; men make only modest contributions. Typically, rights in land are held by men by virtue of their membership in kinship or village units. A man who wishes to add another wife is under few constraints (provided his kinship group has the land and bridewealth), since women, in effect, pay their own way. They produce food, and they rear children. In rural areas, when a man marries an additional wife, he is awarded additional fields for this woman and her children (Bryson 1981). The importance of male labor to support such households is reduced. In former times, before colonially imposed peace, the male role in defense was important. But since central governments have been present, men who remain in rural villages spend their time in leisure, in management of household labor, or in local political affairs (Potash 1978). More recently, men absent themselves for long periods in migratory labor. They send remittances home that help to pay school and medical fees and to buy clothing. Nevertheless, the work of feeding people remains with women (Hafkin and Bay 1976; Vaughan 1983).

Female Farming

The other side of the African polygynous coin is an economic system in which women and children are largely self-supporting. The association of this economic and mating system is not accidental; without certain environmental conditions (high land availability and low population density) together with the high productivity of female labor, there would be no niche available for the relative "luxury" of male competitive mating systems. Many efforts have been made to induce African men to increase their agricultural labor. The more successful of such ventures have followed the introduction of cash crops and the development of markets. Men are more willing to work at raising cash rather than traditional subsistence crops. However, since most cash crops are not food crops, women continue to do the subsistence farming, for which cash conversion is less possible, and they work even harder, since the men are busy with cash crops and have even less time for periodic help in the family gardens at clearing and harvest time (Obbo 1980; Whiting 1977; Kelley 1981). Characteristically, men do not return their earnings from cash crops to the household economy. This money is held separately and spent by men on their own projects (Vellenga 1983; Abu 1983; Bryson 1981).

Sexual Division of Social and Economic Spheres

Separate bookkeeping by husband and wife is the norm throughout much of Africa (Gugler 1972). Men assume that by providing women with access to land (rights in which remain with the man's kin group), paternity for children, and the

protection their kin confers on women married in, they have discharged a major portion of their obligations to wives and children. The norms regarding male domestic roles do not emphasize conjugal interdependence nor intimate involvement by fathers in the rearing of children. Polygyny, whether a fact of the domestic arrangement or only a prospect, ensures degrees of distance and formality in the relations between husbands and wives. Women realize that one result of their own gardening skill and domestic management may be that the husband can siphon off surpluses and channel them into bridewealth payments for an additional wife. Under these circumstances, women understand that husbands are necessary, but women do not assume that the actions of husbands will be in their interests or those of their children. For their own part, men realize that in order to maintain a harmonious polygynous family, they must maintain distance from each wife and offspring set and attempt to be impartial in their distribution of sexual and economic favors among discrete matrifocal units.

The strength of cultural values regarding the sexual division of labor and women's responsibility for maintaining themselves and their children is demonstrated by the continuation of these practices in cities. Urban women cannot farm, but they find income-producing work as traders, clerks, property managers, prostitutes, and domestics. It appears women realize they cannot expect full support from their mates, and their own values lead them to work for the economic rewards, the autonomy, and the self-esteem that they derive from supporting themselves and their children. Just as values regarding the sexual division of labor have accompanied Africans in their move from rural to urban contexts, so also have values regarding the segregation of the sexes in many spheres of life (Schuster 1979; Harrell-Bond 1976; Little 1965; Nelson 1979, 1981; Little and Price 1967; Oppong 1983; Poewe and Lowell 1980). Urban couples, whether married by civil or customary law or joined in consensual unions, maintain the pattern of sex segregated living. Children born to urban couples are often sent back to their rural kin for their early years, a practice that enables women to devote more time to their cash-earning work in the informal sector of the economy. The pattern of sex segregation and relatively formal relations between husbands and wives applies to skilled white collar workers as well as to unskilled workers. Men and women do not spend their leisure activities together. Men drink in the evening in public bars in the company of other men. Women more typically remain at home or spend time with their women friends and in same-sex social clubs (Little and Price 1967).

This pattern of mating, parenting, kinship utilization, and sexual division of labor is extremely robust and widespread and shows few signs of changing under the influence of modernization. It has its roots in an earlier precolonial period when the availability of land, the farming technology, the sexual division of labor, and polygyny enabled a domestic organization for which the men's contribution as husbands and fathers was not essential to the maintenance of

women and children. Under such circumstances male reproductive effort was not channeled into parenting (meaning direct provisioning of children) but into mating. At present the social and economic contexts in which people live have changed markedly, yet old values persist; multiple contradictions accumulate both at the level of individual experience and at the level of the functioning of institutions.

A good example comes in the case of "outside wives" (Frankel 1964; Parkin 1966; Schuster 1979; Little and Price 1967; Nelson 1979; Hunter 1961, pp. 200–210, 484–486). Many men, of the skilled and educated upper-status groups, report that they are monogamously married, a technically correct response. However, men often maintain other women and make variable contributions to these women as long as the relationship lasts. These outside wives consider that they are not "legally" married, but they and their neighbors recognize the unions as customary. The men, e.g., are treated as affines by the women's relatives. The men recognize paternity of offspring (when appropriate) and may arrange for their children to be fostered to families in their own kin group. The outcome, however, from the point of view of women (regardless of whether they are legally or customarily married) and their children is that the father's resources in the form of time, energy, cash and influence are spread thinly.

In the remaining section of the paper, I propose a closer look at which institutions in a more proximate sense may influence individual evaluations of resources today.

Institutions as Proximate Mechanisms Influencing Cognitions about Resources

In most sub-Saharan African social systems there is a complex of social practices that creates a particular type of environment within which individuals must make decisions about reproductive effort. This environment has different implications for males and females. In general it can be said that parenting effort is shifted from the biological parents and distributed to other individuals. These people, often kin, are typically not in their primary reproductive years. They are either prereproductives (peer caretakers) or they are older individuals, typically women, who act as foster parents to the children of younger kin. The availability of surrogate caretakers relieves both men and women from full and final responsibility for their own offspring. Whether older children absorb the major role as child minders while still remaining in the household of the mother, or whether other adults take the children in as wards, the effect is to inhibit the direct access of children to their parents. This opens the way for both men and women to emphasize mating effort (and to raise fertility) and to reduce the time and energy devoted to parenting. Men and women shift the burden differently.

The presence of polygynous marriage and its effect on husband-wife relations has been discussed earlier. An important point about polygyny is that it

reinforces the separation of mother-offspring units, both from other like units and from the husband/father. Under polygyny, each wife realizes that the husband does not represent a guaranteed source of support since other co-wives represent competitive claims on his finite resources. This reinforces the notion that the family (from the point of view of the women) is herself and her offspring. The husband is in a structurally and psychologically distant position. He is not incorporated into the domestic unit in the way Westerners regard as "natural."

Norms associated with polygyny include an "aloof" role for husbands (Whiting and Whiting 1975), which is reinforced by residence arrangements. In the typical polygynous compound, the husband/father has a separate hut in which he sleeps alone or with adolescent sons. This is the domestic space in which the man eats, sleeps, receives guests, and spends his leisure time. His wives send food to the husband's hut each evening, where he eats with male relatives and guests. The emotional distance kept by African husbands is in fact prescribed by custom and justified on the grounds that in order to perform impartially vis-a-vis multiple wives and sets of offspring, the polygynist must maintain an authoritative and aloof distance from close association with any particular wife or child. Otherwise, jealousy would disrupt the household functioning.

The psychological, social, and spatial distance of husbands/fathers, together with their freedom from direct economic responsibility, relieves them of most aspects of the parental role as Westerners understand the term. They are relieved from investing time and labor in the routine affairs of the domestic unit (Whiting 1977). Men work primarily as managers and supervisors of women and property. They have substantial leisure, and their time and energy is available for political activity with other males and mating effort.

In earlier sections I have concentrated on men's roles in female farming systems. But many African societies are pastoral or mixed pastoral/horticultural. In these the primary work of management of domestic herds is done by men. Do men pursue a pattern of greater male parental investment here? The answer is that although there is much work associated with the management of herds, the work is not managed so that adult men labor for their wives and children. The literature on the Nilotic and Niloticized Bantu-speaking tribes of East Africa and Fulani peoples is fairly consistent (Edgerton 1981; Edgerton and Conant 1964). Domestic arrangements preserve the pattern of sex-segregated social and economic activities, polygyny, and aloof relations between husbands and wives. The work of tending domestic stock is masculine, but it is not equally distributed among men. The usual pattern is for *young, unmarried* men to move the herds in their transhumant rounds. This same group is responsible for defending the herds from attack by competitive cattle-keeping people and for launching offensive raids. Boys from quite young ages are heavily involved in herd management, often working under the direction of older boys and young men. Older men—30

years of age or more—expect to settle into more mature social roles. At this time they can marry, often with the first of several wives, and set about the process of becoming heads of households in which the bulk of the work was performed by young men, women, and children. The work of women remains substantial and time consuming. In addition to child bearing and rearing and household management, women are responsible for agriculture, cooking, milking, making butter and sour milk products, brewing beer, and preparation and storage of cereal grain crops.[5]

Note that I am not arguing that male labor in defense, offense, subsistence, or conflict resolution is unimportant, or that men in such groups are or were expendable. The point is that even in economies in which male labor is crucial for primary production, it is not primarily husbands and fathers laboring to support mother-offspring units. The major labor intensive subsistence has been shifted to males who are socially defined as prereproductive. Husbands and fathers make an indirect contribution to the welfare of wives and children.

Female farming and polygyny combine to relieve men of subsistence responsibility, so that the provisioning of own offspring is not part of what is salient to men. Women shift the burden in somewhat different ways. Like all female mammals, their initial investment (long gestation, risks of child birth, lactation) is high. However, the typical African pattern is to terminate intense care of the child early (by Western standards) in the child's life. Once a child is a year or so old, the mother enlists the help of various surrogate caretakers for her children. By the time the caretaker's infant charge is a toddler, the mother has trained both of them not to solicit her for help or attention. Children learn to look to older children for satisfaction of basic needs during the day.

The rationales and consequences of this pattern of delegated maternal responsibility are many. The mother's work load is part of the conscious rationalization for using surrogate caretakers who are often surprisingly young (Munroe and Munroe 1977; Leidermann and Leidermann 1977; Leidermann et al. 1977; Goldberg 1977; LeVine and LeVine 1981). She is the primary food producer for herself and her children, and she receives little help from her husband. A consequence of the delegated care, early weaning, and supplementary feeding is that demand on the mother's milk supply is reduced, the frequency of suckling is reduced, ovula-

5 Among the pastoral Herero, with whom I am currently living, the pattern is similar. Men typically do not marry until 35 or 40 years of age. However, nearly all will have sired several children by unmarried women. The contribution by these men as genitors is negligible. In a small number of cases, men "buy" outside children (particularly males) when there are few or no sons by legal wives. These boys are brought in, usually at older ages, when they can take care of themselves and do not require intensive care from the wife (wives) of the father/genitor. Outside children suffer no social stigma, although they are economically disadvantaged because there is no paternal inheritance. Mothers and mothers' kin provide nearly all of the rearing of outside children. As adolescents and young adults, they form an important part of the labor pool that enables middle-aged and elderly polygynists to free themselves of hard food-producing work.

tion is restored (Konner and Worthman 1980), and the mother is capable of conceiving again. Large numbers of births per woman at relatively short birth intervals result (Page and Lesthaeghe 1981).

Earlier it was remarked that African conceptions about parenthood do not include the notion that biological parents are exclusively responsible for the rearing of their children. Instead, parents understand that the children they bear also belong to the larger kindred. This leads to the institution of child fostering by which children from one household are assigned, sometimes for several years, to another household, usually under the formal authority of a kinsperson of either the child's mother or father. The fostering of children is typically not precipitated by a crisis in the donor household but is an arrangement made for the purpose of benefiting either the child or the foster parents (Goody 1975). The practice of fostering children is ethnographically well described for West Africa among many different ethnic groups with differing levels of modernization and urbanization, but it occurs also in other parts of the continent.

African parents (who typically spent much of their childhood in other than their natal households) explain fostering on the grounds that it provides the child with many advantages not available at home such as schooling, occupational training, and the opportunities to live in a more urban area and to acquire modern knowledge. Because children often move in and out of various relatives' homes, they acquire widespread connections and affective ties with diverse kin. These relations may continue to be helpful to the child when he/she is an adult (Goody and Groothues 1977). Elder kin can sometimes override a parent's wishes to keep a child at home (Fortes 1978). They cite their own need and point out that biological parents are more likely to "spoil" their own children and not instill proper discipline.

In the context of fostering, parents do not have to reckon carefully the costs represented by each child. Incentives for reducing the numbers of children are quite different than in modern industrialized societies (Oppong and Bleek 1982).

The "trade in children" is also related to the system of female farming and the reduced financial accountability between spouses. The requirements for female labor remain high throughout a woman's life span. As a woman enters her post-reproductive years, she is less and less likely to have a man who is making a regular financial contribution to her support. Though she may remain technically "married," her husband is likely to be living elsewhere with a younger woman to whom he may or may not be legally married. Older women prepare for their later years by maintaining ties with their own children and other young relatives. A woman can demand support from her grown children by reminding them of her sacrifices on their behalf in their younger years. She can also relieve her adult children of their own parental burden by taking in her grandchildren, often at quite young ages and rearing them for prolonged periods. Such wards are simultaneously sources of labor to the grandmother in her own agricultural work and jus-

tifications for her claims to the parents of the children than she needs money and goods to maintain herself while she rears the children (Bledsoe and Isiugo-Abanihe in press). Young adults will have better educations and have better access to modern resources such as cash, medicine, and factory-produced goods.

Note that these practices are part of a system in which wealth (in some sense) flows from youngsters to elders, a system characterizing traditional societies that maintain high levels of fertility (Caldwell 1977a,b). Caldwell has argued that control by powerful elders of important sources of wealth gave them an ability to influence fertility of young adults. Many observers have predicted that in developing Africa the direction of the flow of wealth is changing from one in which youngsters owe labor and goods to elders to one in which elders find that children, instead of conferring benefits as laborers or political allies, represent increased costs. Child costs escalate as production is taken out of the household or family setting and as schooling becomes essential for social and occupational advancement. Urbanization elevates the costs of child caretaking, for children must be housed, fed, and clothed in a setting in which all these goods are more expensive (McNicoll 1980). Further, when children are enrolled in formal schooling, they are no longer available for household and agricultural labor.

Although it is logical to assume that, at some point in the course of economic development, parents will feel these logical constraints in their personal lives, the fact of the matter is that the "pinch" is not felt particularly acutely, precisely because alternative solutions for the disposition of children remain. The alternatives are ecological as well as social (Gugler 1968, 1972). Although many adults are geographically quite mobile, they retain membership in their rural home villages. Men in particular keep their options open in the rural social system by the expedient of marrying a wife and installing her in his home village under the supervision of his kin. The husband, often in his young adulthood, is a migrant laborer. He sends home periodic remittances and visits his wife and children occasionally. Because his rural family can live cheaply and depend on the wife for subsistence, the family is not as great a financial drain as might be imagined. Meanwhile, the elders are satisfied that the migrant son is contributing his wife's labor and his children to their kinship group.

Urban women also benefit from the presence of the relatively unpopulated, rural hinterland that constitutes a "second-tier" in the economy of a developing country (Caldwell 1977b). The children that young women bear can be sent upcountry to live with kin for their early upbringing and primary-school education. This frees the mother to continue her urban occupation, perhaps to advance her training or position without concomitant responsibilities as a parent. From the point of view of the young urban woman the arrangement is desirable. Her sexual relationships with men are less stable than would be likely if she lived in the country. By appearing to be unencumbered by dependent children, she has a better chance of attracting new male partners (Schuster 1979; Oppong and Bleek 1982). This arrangement is also advantageous from the point of view of the rural relatives. The urban mother

is a source of valuable cash transfers (on behalf of her fostered children). As she matures and becomes more securely placed in the modern sector, she (or her husband) will be a source of future services to rural relatives. They can stay with her rent free during extended visits in town, and they can expect her or her husband to provide contacts and jobs in the urban environment.

Both men and women in their young adulthood profit from the practice of shifting the care of children up the generational ladder. In the short run they profit economically and reproductively by the fact that rural (and often older) kin are subsidizing their life style. In the long run, however, the claims that elders can make on the youngsters means that young people find it difficult to amass sufficient savings and property to become economically self-sufficient in the manner of young adults in Western societies. Young Africans continually find that their cash reserves are "bled off" either by the expenses of mating competition or by the expenses of surrogate care.[6] In other words, economic and social forces that in a Western, middle-class context lead to reduced numbers of more intensively nurtured offspring do not have the same outcome in many African societies.

While delegated care influences parental cognitions of the costs of additional children, it also likely influences the world view of children who are products of this type of rearing. Draper and Harpending (1987) argue that a further consequence of peer rearing and foster care is what children learn at early ages about the nature and location of resources. A child's cognitions about the availability of resources are shaped by the nature of agents with whom he/she must bargain in early childhood. One who is reared in the context of a multiaged peer group and at later ages by adult relatives understands that resources are synonymous with the social milieu to which he/she has access. The authors propose that this pattern of delegated parental care fosters cognitions of adequacy or abundance in resources. Such children learn that desirable and necessary goods are held by a changing congregation of people whose goodwill must be maintained by rather constant social attention and manipulation and that resources are available regardless of more objective "evidence." These cognitions may underlie the reluctance of many individuals who are products of this type of rearing to limit fertility for they have learned that as parents they will not necessarily "pay" for children as in Western, postindustrial systems.

The point is that this is a complex which maximizes fertility. Young women of primary reproductive potential are freed from a variety of strictures which are known to reduce fertility (Lee 1979; Blurton Jones and Silby 1978; Konner and Worthman 1980). Surplus young who are still immature enough to require protection and support are absorbed by other members of either the mother's or the father's kin group. In this way the heightened risk of mortality young children would otherwise encounter is staved off. This pattern of delegated parental responsibility is made possible by the relatively efficient food producing system

6 This has important implications for capital accumulation.

that supports moderately dense population and nucleated settlements. Without sedentary residence and large aggregations of kinsmen living in close proximity, the available pool of surrogate caretakers would not be available (Weisner and Gallimore 1977; Weisner 1987).

Resources in Africa: Scarce or Abundant?

Are Resources Abundant? Emic and Etic Assessments

An argument can be made that in much of Africa people behave as if they believed resources are abundant. The following discussion lists ecological and economic conditions which underlie many African social systems.

"Facts" in Support of an Optimistic View about Resources

1. Africans, as individuals, do not act as if land were in short supply. In many areas the system of land tenure remains one of individual use rights (Bryson 1981). This means that an individual (most typically a man) who can demonstrate group membership, by virtue of descent or common residence, can qualify for gardening land and grazing rights by appealing to local authorities, usually village or lineage elders. In other words, real or de facto private ownership of land is not common. In much of Africa, there has not been the development of a landless proletariat, members of which sell their labor for wages. This is because most Africans, despite careers involving considerable geographical and social mobility, retain membership in a rural home village to which they may return and activate use rights to land and reciprocal obligations based on kinship and village co-residence.

2. The prevailing system of land use does not suggest shortage of arable land. The shifting cultivation system that is practiced in most parts of Africa is notoriously land hungry. It requires large land holdings per group, although only a small amount of land will be under cultivation at any time. One argument has been that shifting (slash and burn) cultivation is a "luxury" that can be afforded only by those not under pressure to improve technology and intensify cultivation. Indeed, it is well known that shifting cultivation produces a high yield per unit labor, though in comparison with more intensive cultivation techniques, it produces a low yield per unit of land (Clark and Hasswell 1966).

3. The freedom of most African men from a primary role in subsistence suggests that severe economic competition within and between groups has not yet been felt.[7] Africa is a continent of female farming (Boserup 1970; Bryson 1981).

7 Cases in which land shortage is felt and agricultural practices have moved in the direction of intensification and increased male subsistence work are known for Africa, but they are less common than extensive production (Netting 1968; Hill 1966; Cohen 19770; Reining 1965, 1970).

Over most rural areas, the basic subsistence needs of social groups are met largely (sometimes entirely) by the work of women. This frees men from primary responsibility for productive labor.

In other parts of the world where population pressure on land has far outstripped that seen in Africa, women do not dominate in primary subsistence production (Boserup 1970). As resources (land, or land-unit productivity) become scarce, human groups have responded with varying techniques of agricultural intensification, such as manuring, irrigation, plough cultivation with the help of draught animals, and consolidation of smaller plots into larger fields. Typically, there are also changes in land tenure from usufruct to private ownership. The general pattern is that male labor becomes important under these conditions. Women continue to provide important subsistence work, but it becomes "secondary" in the sense that women assist in some phases of primary cultivation and specialize in secondary food processing such as food drying and/or storage and become absorbed in various "peripheral" household economies such as kitchen gardens, managing small stock, weaving and the like (Ember 1983). The main point is that under conditions of intensification (which in all cases result from competition with others), the labor of men becomes essential for the maintenance of women and their offspring. To Westerners this seems to be an unremarkable assertion. We take this arrangement for granted without acknowledging the centuries of technological development, population density, and intraspecific competition that have brought it about.

One would predict that polygynous options will persist for a substantial portion of men in a society only if there are not high requirements for male parental investment. The continued high evaluation by men and in some cases by women of polygynous marriages in many parts of Africa is itself an indication of the extent to which male labor, in the case of primary production and direct provisioning of women and children, is not yet a requirement for subsistence in most African systems (Goody 1973). Continued high fertility in the face of several decades of sharp reductions in infant and child mortality suggest that real economic constraints are not yet felt by many Africans.

"Facts" in Support of a Pessimistic View

From geographers, economists, and demographers, a completely different analysis of the picture emerges. Only the briefest outline will be provided of an extensive literature. The pessimists recite a lengthy, depressing list of the deficiencies that Africans already face and that accumulate at an alarming rate.

1. The notion that Africa is an under-populated continent is totally mistaken and ignores the fact that rainfall over much of the continent is highly variable. Compared to tropical areas in other parts of the world, the percentage of land that actually realizes an annual high precipitation is small and is itself sparsely

populated (Best and de Blij 1977, p. 37). The shifting cultivation system is an adjustment to unpredictable rainfall and not, in and of itself, an indication of plentiful land.

2. Large areas are not arable due to desertic conditions as in the Kalahari Desert or due to heavy tropical forest cover where human densities are low. Tsetse fly infestation covers enormous areas of the continent. Since cattle and most other domestic stock are not disease resistant, husbandry cannot be introduced into such areas, thus effectively reducing the potential for human exploitation. Other diseases such as malaria, schistosomiasis, yellow fever, and encephalitis contribute to human morbidity and low-population densities.

3. The potential for rural people to support themselves by food production is being eclipsed by a high rate of population increase. Growth rates are around 26 per thousand for the continent. This means that the total population will double in about 27 years. Death rates have fallen markedly, whereas the birth rate shows little slowing. The essentially uncontrolled growth is not accompanied by an increase in food supply or government stimulation of economic expansion, particularly for rural areas that receive less attention than urban areas. World trade patterns further exacerbate this problem. Western nations export subsidized grain, making cash-cropping of subsistence crops uneconomic for Africans.

4. Given the fact that 85% of the African population is rural, the effects of population pressure are most apparent in rural areas. Evidence can be seen in soil degradation as a result of shortened fallow periods, declining crop yields, food shortages, and malnutrition (Best and de Blij 1977, p. 125).

In summary, we have at least two opposed conceptions of how the availability of resources might be perceived. Westerners conclude that disaster is imminent. Many Africans appear to believe otherwise, if certain of their practices with regard to fertility, parenting, subsistence, etc., are to be taken as indicators. Africans are behaving as if resources are not constrained. Who is right? Or perhaps the better question is, if people perceive resources to be abundant, on what basis do they derive these apprehensions? This line of reasoning suggests testable predictions about individual variability in perceptions of resources and fertility behavior.

Historically, of course, Africa has not seen the pressure of large human numbers. In quite recent times (estimated at around the year 0) ancestors of the modern Negro racial majority moved into the subcontinent (the area south, west and east of the tropicala forests) (Lwango-Lunyiigo 1976; Phillipson 1977) (relics of the autochthonous populations are seen in Pygmy, Khoisan, and Hadza/Sandawe groups). Most foraging peoples were easily displaced and absorbed by the intrusive Negroes who were equipped with superior technology (agriculture, animal husbandry, and sometimes knowledge of metallurgy) and more complex forms of social organization, probably featuring unilineal kin groupings and structured political leadership, which gave them an overwhelming edge over the indigenous foragers.

It is likely that a major cause of the failure of contemporary Africans to respond in ways that Western analysts perceive to be rational is that African social systems share a recent historical background of unimpeded expansion into regions well suited for expanding immigrant groups. It would not be surprising to find that many of their social institutions were or are adapted to actual resource abundance.[8]

Conclusion

In this paper several topics have been considered and their interrelationships noted. Organisms generally modulate reproductive behavior in relation to resource availability. The suggestion in this paper is that human beings assess resource availability, and this assessment leads them to partition reproductive effort between mating effort and parenting effort. Humans do not conform to animal models in a simple fashion, in part because as a highly evolved social species, the sociocultural milieu (including technology) is interposed between the individual and his/her perception of environmental resources. However, a trend now worldwide causes most humans to experience increasing competition from other humans and to perceive resource scarcity. In most sectors of the modern, postindustrialized nations, people have responded to the changes by limiting the numbers of offspring and by increasing the levels of parental investment per child.

There are countries in the developing world, particularly in sub-Saharan Africa where many factors associated with increased human competition occur, yet the expected response does not occur. This paper has discussed features of marriage, mating, intergenerational relations, and the sexual division of labor that appear to account for the maintenance among many sub-Saharan peoples of a pattern of high fertility coupled with delegated parental care that relieves biological parents of substantial responsibility for provisioning offspring.

If the hypothesized relationship between reproductive effort and resource availability exists, the question arises as to *what factors shape cognitions about resources* and *how malleable are these cognitions* for individuals who face changing environmental quality. We have reasons to expect that natural selection will not tolerate over many generations individuals who consistently misread signs about availability of critical resources with the result that their fitness is impaired (Barkow 1984). On the other hand, in a slowly maturing species such as ours for whom the social group constitutes a major component of the resource reservoir, we can expect certain delays in the feedback of information about changes in resource availability. For humans, given the importance of postnatal learning and

8 Sahlins has made this a kind of argument with respect to the ability of segmentary unilineages to promote expansion of primarily pastoral peoples in recent centuries in East Africa (Sahlins 1961).

the dependence of the individual on culturally acquired technology and information, the social milieu becomes difficult to distinguish from "objective" assessments of resource availability.

Relation between Resources and Early-sensitive-period Learning

One approach to the problem assumes that early-sensitive-period learning is involved in the translation between perception of resources and reproductive effort. Draper and Harpending (1982, 1988) have argued that early learning experiences informed by mother's pair bond status, peer-rearing, and surrogate rearing may lead the individual into a developmental track in which cognitions are formed that critical resources are abundant but accessible through an extended social network. If this hypothesis is correct, one would look for evidence that adult mating and parenting strategies persist in the face of countervailing environmental cues. A literature on West Africans couples in London offers suggestive findings (Ellis 1977; Goody and Groothues 1977). Young couples who migrate to England for postsecondary education often bring some or all of their children with them. In the new urban setting, with high costs and high demands on their time as a result of schooling or jobs (or both), the parents elect to foster their children to European families in the larger metropolitan region. The African parents fall back on indigenous institution of child fostering, which is only imperfectly realized in Europe in the form of white, usually working-class families who are willing to take in foster children in return for pay.

As might be expected, the outcome for all concerned does not work in the way it is expected to in West Africa. The foster parents interpret the infrequent visiting of their wards' "real" parents as signs of parental neglect and become strongly attached to the foster children. This sometimes results in legal suits for transfer of custody to the foster parents (Ellis 1977). Meanwhile, the African parents make no comparable assumption that the delegation of care means they have surrendered formal rights in children. They consider that by having made safe and reliable arrangements for the care of children and by regular payment of fees, they are dispatching their immediate responsibility.

Direct Perception of Resources

If direct perception of resource availability is crucial, then, in areas of land shortage, fertility should begin to drop. This effect will become apparent most quickly when shortages are felt on a wide regional basis so that parents cannot shift the child-rearing responsibility onto rural kin living in areas of more secure subsistence. Some commentators argue that this trend is apparent in the fact that polygyny and extended family households are disappearing as westernizing forces, cash economy, and individual (private) land holdings appear (Whit-

ing 1977, p. 212). Women, with their high obligate parental effort, should be in the vanguard of those who reject polygyny as not desirable and as economically unsound. However, as we have seen earlier, the reality with which women deal is not necessarily that of the men. It is likely that a faster change in parenting and mating behavior will come about when men feel directly the influence of mates and offspring.

Perception of Resources: Individual Variability

So far the working assumption has been that the average psychology of all individuals is susceptible to cues from the environment. Discussion has revolved around the proximate mechanisms that transfer raw sensory data into cognitions that are themselves the basis for action. However, it is also likely that there is variability among individuals with respect to the processing of information about environmental quality and the availability of resources. Future research on matters discussed in this paper will need to take account of variability at the level of individual psychology as well as variability in individual life histories. The individual's unique make up, his/her unique experience, together with an array of institutional options, open up different micro-niches of adaptation in the form of mating and parenting behaviors.

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