Chapter 13

Marriage, Family, and Kinship

The family is based on the supremacy of the men, the express purpose being to produce children of undisputed paternity. Such paternity is demanded because these children are later to come into their father's property as his natural heirs.

Friedrich Engels

Happy marriages are well known to be rare; just because it lies in the nature of marriage that its chief end is not the present but the coming generation.

Arthur Schopenhaur

INCEST AVOIDANCE AND THE INCEST TABOO

Let us begin with what is perhaps the most fundamental fact pertaining to the family: incest avoidance. Incest avoidance, a cultural universal or near universal, involves the renunciation of sexual relations among individuals who are related by one-half of their genes, that is, parents and offspring and brothers and sisters. Incest does occur to some extent in many societies, most commonly between fathers and daughters; brother-sister incest is much less common, and mother-son incest is virtually unheard of (Fox, 1967; Shepher, 1983). In the early centuries of the first millennium AD, urban Greek settlers in Roman Egypt permitted - actually, encouraged - brother-sister marriage, and on the order of one in six marriages within this population took place between siblings (Hopkins, 1980; Shaw, 1992). There is also evidence of nuclear family incest (both brother-sister and father-daughter, and possibly even mother-son) in Zoroastrian Iran, although less is known about it than about brother-sister marriage in Roman Egypt, and no quantitative data on the frequency of nuclear family marriage are available (Scheidel, 1996). Moreover, some societies have followed a practice known as *royal incest*, which involves institutionalized incestuous marriage within ruling classes. The ancient Egyptians, Hawaiians, and Incas, several African kingdoms, as well as a number of other state-level societies, have practiced royal incest (van den Berghe and Mesher, 1980). However, these instances of royal incest do not constitute genuine exceptions to the generalization that incest avoidance is a human universal. No one has yet discovered a society in which all or even a majority of the population mated incestuously.

Most sociologists explain incest avoidance by means of one or another type of functionalist argument, such as the so-called family disruption theory (K. Davis, 1949), an argument that goes back to the nineteenth century. This theory holds that the incest taboo was a cultural invention necessary for the stability of the family, and for at least two reasons. If the members of nuclear families mated with each other the result would be sexual rivalry, which would introduce dangerous tensions and conflicts of interest into the family. Moreover, if children were born from these unions there would emerge a serious confusion of family statuses and roles. As Kingsley Davis comments (1949:403):

> If sexual relations between parent and child were permitted, sexual rivalry between mother and daughter and between father and son would almost surely arise, and this rivalry would be incompatible with the sentiments necessary between the two. Should children be born the confusion of statuses would be phenomenal. The incestuous child of a father-daughter union, for example, would be a brother of his own mother, i.e., the son of his own sister; a stepson of his own grandmother; possibly a brother of his own uncle; and certainly a grandson of his own father. This confusion of generations would be contrary to the authoritarian relations so essential to the fulfillment of parental duties.[1]

Davis also notes that the absence of an incest taboo would lead to "an extreme concentration of each family within itself." This would inhibit relations between families, since they would no longer be dependent on one another for mates, and thus weaken the cohesion of the wider society.

The role confusion element of Davis's argument does have a superficial plausibility, at least if one thinks like a typical sociologist, but there seems to be very little evidence available to test it. What evidence there is - the instances of incestuous marriage mentioned above - is not accompanied by additional evidence showing that role confusion resulted, at least as far as I know. It is likely that in these instances people were able to work out special arrangements so that role confusion did not occur or was at least minimized. Long ago Durkheim (1964[1898]) argued that, in a society in which it was typical for a man's sister to become his wife, the parties could be socially conditioned to perceive no role incompatibility or conflict. (I would agree so long as the discussion is confined to *roles*. Whether the parties would feel comfortable with each other at a psychological level is another matter, as we see below.) As for the sexual rivalry element of the theory, although nuclear family incest could certainly produce strong sexual jealousy, this argument rests (as does the role confusion argument) on the Freudian assumption that there are strong sexual attractions within the family (as Davis has put it, "Only the most stringent of taboos can restrain the parent from the thought and the deed"). However, this is extremely dubious. Contrary to Freud, one of the most striking things about the nuclear family is the overwhelming absence of sexual attraction between its members.

A biomaterialist theory of incest avoidance was developed over a century ago by Edward Westermarck (1891), the so-called familiarity breeds indifference theory. Westermarck's argument was that a sexual indifference or aversion emerged between individuals who were close childhood associates. He held that such indifference did not depend on the individuals being genetically related. Genetically unrelated persons who were close childhood associates would develop this indifference, whereas brothers and sisters reared apart would not develop feelings of sexual disinterest. Westermarck was a Darwinian. He theorized that the emergence of sexual disinterest among childhood associates was an adaptation that had evolved because it eliminated the negative effects of close inbreeding. Although Westermarck's theory has been much maligned, it was revived in the 1960s and 1970s in connection with the discovery of some highly provocative data. Joseph Shepher (1971) examined 2,769 marriages undertaken between members of several Israeli kibbutzim. Incredibly, he found that only 13 of these marriages were undertaken between children who had grown up in the same communal nursery. This overwhelming preference of young kibbutzniks to marry outside of their own childhood groups occurred despite the absence of any norm against marrying nursery mates; indeed, kibbutzniks were generally encouraged to marry their nursery mates. When Shepher asked these kibbutz youth about their failure to marry childhood associates, they often said such things as "we feel like siblings" or "we have no attraction to each other."

Research by Arthur Wolf (1970, 1995) on Taiwanese marriage practices is also highly consistent with Westermarck's theory. In the early twentieth century two contrasting marriage patterns were found in Taiwan, which Wolf called "major marriages" and "minor marriages," the latter known locally as *sim-pua* marriage. In a major marriage, the bride and groom were individuals who did not know each other in childhood. Often they did even meet until the day of the wedding. In the *sim-pua* marriages, the bride was a woman who had been adopted into her future husband's household as an infant or young child and brought up in close association with this boy. Wolf predicted that persons who married in *sim-pua* fashion would show much higher levels of marital dissatisfaction than persons who were involved in major marriages, and this is precisely what he found. He determined that 24 percent of the *sim-pua* marriages

ended in divorce or separation compared to only 1 percent of the major marriages. Moreover, 33 percent of the women engaged in *sim-pua* marriages had committed adultery compared to only 11 percent of the women in the major marriages. Wolf also found that *sim-pua* marriages produced fewer offspring than did major marriages, which he interpreted to mean that intercourse was considerably less frequent in the *sim-pua* marriages. In his most recent research, Wolf (1995) has tried to determine whether the age at which children associated with each other contributed to the strength of their sexual indifference or aversion. His data show that the first 3 years are crucial. Taiwanese couples who associated with each other from birth to age 3 exhibited much higher rates of adultery and divorce and lower rates of fertility than couples whose association began in later years. Wolf also examined Shepher's 13 kibbutz couples who married despite coming from the same communal nursery. In all but 2 cases, these couples did not associate with each other until age 4 or older, and in only one case was there association beginning at birth. Wolf concludes that there is a "critical period" for the acquisition of incest aversions among childhood associates, and that this period ranges from birth until the age of 3.

Results similar to Wolf's have been obtained for Lebanese marriage practices (McCabe, 1983). Some Lebanese groups have practiced what is known as patrilateral parallel-cousin marriage, which involves the marriage of cousins who belong to the same descent group and who grew up together. In most societies this practice has been regarded as incestuous; it is found almost exclusively in Arab societies in the Middle East and North Africa. McCabe found that patrilateral parallel-cousin marriages had the same consequences that Wolf discovered in the Taiwanese *sim-pua* marriages. Compared to all other marriages, parallel-cousin marriages were more than four times as likely to end in divorce and produced about 23 percent fewer children.

Some years ago I undertook a survey of college students in several of my own classes, asking them a simple question: "Have you ever received, from a parent or a parent surrogate, any instruction whatsoever in regard to the necessity of avoiding incest?" I told the students that even if this instruction was extremely slight, they were to count it as a yes. My results confirmed exactly what I predicted: that the vast majority of the students had never been given any such instruction. (Between 90 and 100 percent of the students reported no instruction whatsoever.) I myself had never been given such instruction, even though I had been given considerable instruction on many other aspects of sexual behavior. I reasoned that my experiences were probably typical, and this is what I found. What this means is that the incest taboo can hardly be simply a cultural norm if it is seldom taught, and if the vast majority of people avoid incest even though they are never taught to do so then the behavior must be springing from natural tendencies.

A biomaterialist interpretation is also strongly suggested by evidence of patterns of inbreeding avoidance among other animals (Bischof, 1975). Incest avoidance is widespread (though not universal) among primates and other mammals, and also common in birds. Chimpanzees for example, avoid close inbreeding by virtue of the fact that females from one community transfer to another community after sexual maturity and mate only with that community's males. Another very strong line of evidence supporting the biomaterialist interpretation is the results of studies of inbreeding depression. Inbreeding depression consists of the genetic defects and premature deaths that occur in the offspring of closely related individuals. In a study by Seemenova (1971), 42 percent of the children born from incestuous matings suffered either severe disability or early mortality, but the rate of disability or mortality in children of nonincestuous matings was only 7 percent. Seemanova's study also shows that the probability of the production of genetically defective offspring increases in direct proportion to the mating couple's degree of genetic relatedness. Other studies of inbreeding depression (reviewed in M. Ember, 1983; Shepher, 1983; Scheidel, 1996; and Durham, 1991) show similar results. The logical conclusion seems to be that incestous mating is fitness reducing and has been strongly selected against in the evolutionary process.

Finally, there have been many cases of incest in which the partners were siblings who had been separated in infancy or early childhood and then were reunited in adulthood. S. Kirson Weinberg (1955) studied incest in six pairs of siblings who met as adults after having been separated in infancy. These individuals had a cognitive awareness of an incest taboo, but they felt no sexual indifference or aversion to each other because they considered each other strangers (Erickson, 1989). Similarly, there are works of fiction that deal with incest in which the partners are relatives who had been separated early in life and

reunited much later. A well-known example is Herman Melville's *Pierre, or the Ambiguities*. In this work, the main characters, Pierre and Isabel, are separated siblings reunited in adulthood and the relationship is charged with sexual passion from the very start. This passion triumphs despite Pierre's knowledge of an incest taboo and his resulting internal conflicts (Cory and Masters, 1963; Erickson, 1989).

Despite the large amount of evidence supporting Westermarck's theory,[2] it is probably not the whole answer. Melvin Ember (1983) and William Durham (1991) point out that much evidence shows that people in many preindustrial societies seem to have a good understanding of the relationship between incestuous matings, even of cousins, and inbreeding depression. This conscious recognition that incestuous marriage often produces genetically defective offspring has probably served both to reinforce the natural tendencies toward incest avoidance among childhood associates and to extend incest prohibitions to apply to related individuals who were not childhood associates.

There are three lines of evidence that on the surface seem to refute a biomaterialist interpretation of incest avoidance: royal incest, brother-sister marriage in Roman Egypt and Zoroastrian Iran, and the occurrence of incest in modern societies. On closer inspection, however, the biomaterialist interpretation can withstand this evidence. Royal incest, as the name implies, is limited to the royal families or aristocratic classes of highly stratified societies. This incestuous practice is often explained as a mechanism for keeping wealth and power concentrated within a select circle of ruling kinspeople. This may be one of the conscious motives of the participants, but there is a biomaterialist side to the story that should not be overlooked. Since women all over the world strongly prefer to marry at or above their own social class level and never below it (because women seek men with status and resources), women in royal families actually have very few marital options (van den Berghe and Mesher, 1980; van den Berghe, 1983). They may be forced to marry a brother if they are to marry at all or avoid marrying down. As van den Berghe (1983:100) notes, "What is a poor princess to do? She has almost no way to go but down, unless she is lucky enough to find a king for a husband. Her brother happens to be the nearest kin, and perhaps the only one worthy of her if she was born in the monarchy at the apex of an imperial system (as was the case for both Inca Peru and ancient Egypt)." But royal incest might also be a fitness-maximizing strategy for a king or queen, as van den Berghe (1983:100) explains:

> For the king, incest is a low-risk, moderate-gain strategy. If the king succeeds in producing a fit incestuous heir with an r = .75, that person will in turn become highly polygynous and produce many grandchildren with an r = .375. If the incestuous strategy is successfully repeated over several generations, the king comes close to cloning himself. For commoners who are monogamous or small-scale polygynists, the risk of inbreeding depression militates against the incestuous strategy. For a large-scale polygynist, however, the risk is low [because many more offspring are being produced]. Should the strategy fail, the king's fitness loss is minimal (being largely limited to his sister's wasted effort), and he still has the option of producing an outbred heir with any of his many other wives.
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> For the queen, the incestuous strategy is far riskier, since failure seriously reduces her reproductive success, but she also stands to gain much more than the king. In short, for her, incest is a high-risk, high-stakes strategy. If she succeeds, she hits the fitness jackpot by putting on the throne a son with an r = .75 who will in turn be highly successful reproductively through large-scale polygyny.

As for the urban Greek settlers in Roman Egypt, Brent Shaw (1992) has shown that they were a conquering elite that despised the larger Egyptian society. In order to maintain their ethnic identity, marriages with native Egyptians were prohibited, which led to a severe limitation of the supply of marriage partners. In consequence, some of the Greek settlers were forced to marry a sibling unless they were willing to remain unmarried. The logic of this situation is therefore similar to that of royal incest. Too little is known at present about incestuous marriage in Zoroastrian Iran to be able to account for it, but it is likely that incestuous marriage was an alternative to no marriage at all.

Incest occurs to some extent in modern industrial societies, although exactly how frequently is unclear. In all likelihood no more than one or two percent of the population is involved. Why does it occur? In an extension of Westermarck, Mark Erickson (1989) has argued that incest avoidance results from the failure of what he calls *familial bonding*. Under normal conditions parents and children and brothers and sisters develop strong bonds with one another, and this familial bonding inhibits another form

of bonding that Erickson calls *sexual bonding,* or the emergence of sexual desire. But when familial bonding fails to develop, the door is left open to sexual bonding. In his psychiatric practice, Erickson has treated many victims of incest and found that both the victims and the perpetrators typically came from families characterized by an extreme absence of nurturance. If Erickson is right, his argument is a major theoretical achievement in that it allows us to explain at one and the same time both the avoidance of incest by the vast majority of the population and the fact that at least some incest probably occurs in every society.

KIN SELECTION IN HUMAN SOCIETIES

One of the most important features of kinship in human societies is its extraordinary pervasiveness. Not only are family and kinship ties universal, but they are fundamental in every known society. The old expression that "blood is thicker than water" is extremely apt. In all societies relations between kin are given priority over relations with nonkin. This is especially so in preindustrial societies, which anthropologists have documented in great detail. Kinship is so important in these societies that at one time anthropologists virtually equated social structure with the web of kinship (Murdock, 1949), and it is well known that in studying a preindustrial society, especially a preliterate one, anthropologists spend an inordinate amount of time establishing genealogies.

Sociologists have claimed for many decades that family and kinship have "shrunk" in modern industrial societies - that they are not as important in these societies as they are in preindustrial societies. In the 1940s Talcott Parsons (1943) put forth his famous thesis of the "isolated nuclear family" as the most fundamental feature of the American family system. According to Parsons, the nuclear family neither lived with nor pooled its money with the extended kin group of either husband or wife. The nuclear family was economically independent, and many nuclear families were substantially isolated from their extended kin. However, no sooner was this thesis stated than it was challenged. Edward Shorter (1975) looked at working-class families in a section of London and found what he called a "stunning intensity of kin contacts." Sussman and Burchinal (1962) summarized the results of several studies. They found that the disintegration of extended kin networks in urban areas was not a common occurrence; that the leisure-time pursuits of urban working-class couples was dominated by extended family activities; that urban dwellers ranked visiting with kin ahead of visiting with friends, neighbors, and co-workers; and that the urban middle classes expressed nearly a universal desire to interact with extended kin. Winch and Kitson (1977) conducted a more recent study and found that the great majority of the individuals they studied were significantly involved in larger kin networks. They posited the existence of two somewhat different types of American family structure: isolated nuclear families, or nuclear families lacking extended kin in their own local community; and embedded nuclear families, which were nuclear families highly involved in a network of extended kin. They found that only about 13 percent of all nuclear families were isolated nuclear families but that approximately 75 percent were embedded nuclear families. Based on these studies, it would appear that kin selection is still a fundamental feature of life in modern industrial societies.

It also appears that kin selection reared its head in the Israeli kibbutzim shortly after efforts were made to abolish the traditional family. The desire to abolish the family was based on the kibbutzniks' fervent conviction that the modern "bourgeois" family was a decadent institution that was the source of the domination of women by men and children by parents. As noted earlier, children were removed from their parents and placed in communal nurseries, where they were reared by professional nurses. This system worked for awhile, but in time it broke down as parents, particularly mothers, requested more time with their children. Not only was the nuclear family reestablished, but the extended family was as well (Tiger and Shepher, 1975; van den Berghe, 1979).

CROSS-CULTURAL PATTERNS OF RESIDENCE AND DESCENT

Three basic types of kinship groups are found in the world's societies. The *nuclear family*, which consists of two parents and their offspring maintaining a common household, is the basic family pattern in all modern industrial societies and in many hunter-gatherer societies. *Extended families* are networks of nuclear families that reside together and carry out a variety of joint activities. Extended families are the dominant type of kinship unit in most preindustrial societies. In a great many preindustrial societies, horticultural societies in particular, large-scale extended families known as *corporate descent groups* are dominant. These groups are called corporate because they have a status as a single body that acts in behalf of its members. The corporateness of these groups is signified by some of their most important characteristics: they have a name, collectively own land or other property, forbid marriage within the group, perform common religious and other ritual observances, and are bound by obligations of mutual aid and hospitality (Stephens, 1963).

Since all societies have family units, all must organize households and thus determine where newly married couples will live after marriage. Five basic forms of postmarital residence stand out. *Patrilocality* involves the movement of a wife to the extended household of her husband's father (this is called *virilocality* if the wife moves in with her husband but the society is not organized into extended family households). *Matrilocality* involves the movement of a husband into the household of his wife's mother (this is called *uxorilocality* if the husband moves in with his wife but there are no extended family households). It is, in essence, the direct opposite of patrilocality. *Avunculocality* is a variant of patrilocality in which a wife accompanies her husband to the household of his mother's brother. This kind of residence is found almost exclusively in matrilineal societies (see below), and is actually somewhat more common in those societies than matrilocality (38 percent of matrilineal societies are avunculocal compared to 30 percent that are matrilocal). *Ambilocality* gives people a choice of living either with the wife's group or the husband's. *Natolocality* (Fox, 1967) is a rare practice, occurring most often in matrilineal societies, in which husbands and wives remain in the extended households of their birth. Here the marriage tie is weak or brittle, and married couples ordinarily spend little time together. Finally, *neolocality* involves the establishment of a new household, and is found where the nuclear family rather than the extended family is the basic kinship unit. Of the societies in the *Ethnographic Atlas* (Murdock, 1967), a large data bank of 1,267 preindustrial societies, 68.4 percent are patrilocal or virilocal, 13.1 percent are matrilocal or uxorilocal, 7.4 percent are ambilocal, 4.6 percent are neolocal, 4.4 percent are avunculocal, and 0.9 percent are natolocal. Clearly, patrilocality or virilocality are the overwhelming preference.

Distinct from a society's household structure but closely related to it nonetheless is its descent pattern. Descent is a matter of how genealogical ties are established, regardless of who lives together. Descent groups are networks of kinspeople who have certain obligations and rights with respect to each other, such as the passing of inheritance or the socialization of children. *Unilineal* descent is the most common pattern in the world's societies. This involves the establishment of descent groups that trace connections through either the father's line or the mother's line, but not both. In *patrilineal* descent a network of kin traces their relationships through a father's line. The most important genealogical relationships are those between father and son and brother and brother. Patrilineal societies are nearly always patrilocal, so the males of a patrilineage remain together, where they carry out various economic activities and exercise authority over the other affairs of their kin group. Since marriage is generally prohibited within the group, a major problem for a patrilineage is to acquire women from other patrilineages so it can obtain children (Fox, 1967). Women are imported from other patrilineages, and the patrilineage exports its own women to some of these groups. Like patrilocality, patrilineality is by far the most common practice in the world's societies, with approximately half of the societies in the *Ethnographic Atlas* being patrilineal.

Matrilineal descent involves the tracing of genealogical connections through one's mother's descent line. It is much less common than patrilineal descent, accounting for only about nine percent of the world's

societies. In a matrilineal society, every person belongs to a descent group organized through his or her mother, and father and all of his relatives belong to other groups. Because of universal male political dominance, matrilineal descent groups run into a special problem not encountered in patrilineality. Although females are the focus of descent, it is the males of the group who exercise authority. This leads to what has been called the *avunculate*, which is the tie between a boy and his mother's brother. In matrilineal systems, there are what Malinowski (1929) identified as two types of fatherhood, which he called biological and sociological fatherhood. In these systems it is the boy's maternal uncle who serves as his sociological father, and this relationship generally overrides the relationship between the boy and his biological father. The core of a matrilineal group is thus a network of matrilineally related men.

In matrilineal societies that are matrilocal, the women of a matrilineal group remain together and the men disperse. One possible source of conflict in this system is the "intrusion of the husband" (Fox, 1967). The maternal uncle may find that his authority over his nephew is being undermined by the boy's biological father, who remains in close daily contact with him. In matrilineal societies that are avunculocal, the men of a matrilineage stay together and the women go to live with their husbands. At puberty or marriage the children born of these unions will leave their natal households and go to live with their own mother's brothers. In the handful of matrilineal societies that are natolocal, the main (and virtually the only) role of the husband is to impregnate his wife on behalf of her matrilineal kin.

A few societies have combined patrilineal and matrilineal descent by having both types of groups, a practice known as *double descent.* In such societies everyone belongs to a patrilineal and a matrilineal group, and each kind of group is given different work to do so that the groups do not interfere with each other. If one group arranges marriages, the other will not; or a person might inherit movable property from one group but fixed property from the other (Fox, 1967). Some societies have corporate descent groups but do not restrict them by sex, thus possessing what have often been called *cognatic descent groups* (Fox, 1967). This system is radically different from a unilineal system in that the descent groups are not mutually exclusive. Indeed, cognatic descent groups extensively overlap and thus cannot ever be residential groups or vengeance groups. For cognatic descent to work, there has to be some type of restriction on their composition. Fox notes that a person may have rights to several different groups, but he or she has to decide at some point which rights to exercise. The key to cognatic descent seems to be flexibility, and as a result it is sometimes called *ambilineal* descent because of the element of choice involved.

All of the groups we have been discussing are based on *ancestor focus* (Fox, 1967), which means that people trace their genealogical relations by beginning with some distant ancestor. In modern industrial societies, however, and in many preindustrial societies, there are no such groups. Instead, the descent system rests on *ego focus* (Fox, 1967), which means that small-scale groups are formed by tracing descent from a given living individual to his or her nearest living relatives. Groups called *kindreds* are formed, and these are usually bilateral, i.e., they involve tracing descent through both "sides" of one's family. Bilateral kindreds are the basic kind of non-nuclear family groups found in modern industrial societies.

Descent and residence patterns are closely related. Ninety-six percent of patrilineal societies in the *Ethnographic Atlas* are patrilocal or virilocal, compared to only 16 percent of matrilineal societies. Sixty-seven percent of patrilocal/virilocal societies are patrilineal. Matrilineal societies are associated with a variety of residence systems, but matrilocality/uxorilocality and avunculocality are by far the most common. Thirty percent of matrilineal societies are matrilocal or uxorilocal, and 38 percent are avunculocal. Ninety-seven percent of avunculocal societies are matrilineal. Ambilocality goes with bilateral descent, as does neolocality. Seventy-one percent of ambilocal societies are bilateral, as are 59 percent of neolocal societies.

What are some of the correlates of descent patterns? In terms of subsistence patterns, 64 percent of hunter-gatherer societies in the *Ethnographic Atlas* are bilateral, compared to 24 percent of societies with a mixture of foraging and horticulture, 13 percent of intensive agriculturalists, and only 5 percent of horticulturalists and pastoralists. Beyond the hunter-gatherer level, patrilineality is clearly the norm. Sixty-five percent of horticulturalists are patrilineal, as are 68 percent of intensive agriculturalists and 82 percent of pastoralists. Matrilineal societies are most likely to have horticulture (33 percent) or to combine horticulture with hunting and gathering (32 percent).

There is a connection between the nuclear family and bilateral descent. Forty-two percent of societies with the nuclear family as the modal type have bilateral descent, but only 27 percent of societies with small extended families, 14 percent of societies with large extended families, and 5 percent of societies with the stem family have bilateral descent. Bilateral descent is most common in hunter-gatherer and modern industrial societies, being universal in the latter.

How can these various types of residence and descent patterns be explained? A number of anthropologists have argued for an ecomaterialist interpretation (Keesing, 1975; M. Harris, 1979; Goody, 1976). For the most part, residence patterns seem to logically precede descent patterns. People must first organize themselves into adaptive household arrangements because it is through these arrangements that they carry out essential economic activities. Descent patterns emerge as means of conceptualizing and validating what is going on at the ground level. However, as we shall see below, there may be instances in which certain kinds of residential arrangements emerge from descent patterns.

If, then, patrilineality springs from patrilocality and matrilineality springs from matrilocality, what accounts for the far greater prevalence of patrilocality and patrilineality? One common ecomaterialist explanation relates these to population pressure, limited land and resources, and the presence of concentrated forms of wealth (M. Harris, 1975; Martin and Voorhies, 1975). The argument seems to be that keeping fathers, sons, and brothers physically together so they can pursue their common interests in land and people is a highly adaptive arrangement. This may well be so, but from the perspective of Darwinian conflict theory what is adaptive at the economic level is also likely to be adaptive genetically. John Hartung (1976, 1982) argues that, since (*ceteris paribus*) the reproductive possibilities of men are usually much greater than the reproductive possibilities of women, it makes sense for people to pass along wealth in the male line and thus organize themselves into patrilocal households and patrilineal kin groups. He notes that "it can be seen that sons represent a higher-risk, higher-profit-potential investment than do daughters (since males have potentially higher reproductive variance). Accordingly, if wealth is viewed as an arbitrarily bestowable reproductive advantage, it follows that this wealth will most benefit the benefactor if it is given to male descendants" (1976:608). Hartung shows that polygyny is associated with a strong male bias in inheritance. He examined 411 societies from the *Ethnographic Atlas* for which data on both marriage type and inheritance pattern were available. Among monogamous societies, 58 percent passed wealth primarily or only to men. On the other hand, among societies with limited polygyny 80 percent had a strong or exclusive male inheritance bias, and fully 97 percent of societies with general polygyny had a strong or exclusive male bias. These patterns are exactly what should be found if patrilineality is driven by the greater reproductive potential of males. Cowlishaw and Mace (1996) have extended Hartung's analysis by looking at actual changes over time in both marriage practices and inheritance rules. They note that "marriage patterns and inheritance rules are evolving together in a way that is adaptive. Where general polygyny evolves, strongly male-biased inheritance almost always evolves. In contrast, the evolution of monogamy is strongly associated with an absence of sex-biased inheritance. Transitions to limited polygyny are equally associated with both inheritance systems" (1996:93).

If patrilocality and patrilineality are so common because of the greater reproductive potential of males, then why do matrilocality and matrilineality occur at all? There have been two different explanations proposed, one ecomaterialist and the other biomaterialist. The ecomaterialist explanation has been offered by Carol Ember and Melvin Ember (1971; cf. C. Ember, 1974). They relate matrilocality to the long-term absence of men from their home villages, usually as a result of external war. When people fight internal wars, or wars close to home, men are around most or all of the time and patrilocality is the norm. External wars, however, or those fought at long distances from home, often keep men away from their villages for long periods of time, and as a result women must often take control of economic production. If all these things occur, according to the Embers, it makes sense to keep the women together and disperse the men. Marvin Harris (1975, 1979) has given this argument a somewhat different twist. The issue, he says, is one of "who's minding the store." He argues that any situation that requires men to be gone from home for long periods puts pressure on a society to become matrilocal. If societies with long-term male absence were patrilocal and patrilineal, women (or at least married women) would be left in charge of the affairs of their husbands' groups, obviously an undesirable situation from the husbands' point of view. Under such

circumstances, Harris argues, it would make more sense to keep women together and build matrilocal and matrilineal institutions. Under these circumstances, while men were away women would be left in charge of their own groups, which would make much more sense than leaving them in charge of the groups into which they had married.

Ember and Ember provide data that are supportive of their theory, but I conducted my own independent test as well. I located 19 societies in the SCCS with frequent external war and a female contribution to agriculture of 60 percent or greater. Of these societies, 37 percent are matrilocal or uxorilocal compared to 20 percent of the total SCCS societies that are matrilocal or uxorilocal. This is moderately supportive of Ember and Ember. Moreover, another 11 percent were avunculocal, which suggests that they were matrilocal or uxorilocal sometime in the past. This gives a possible total of 48 percent of the societies that are, or may have been in the past, matrilocal or uxorilocal. Still, given that 47 percent of the societies were patrilocal or virilocal, the support for Ember and Ember is modest at best. What then of Harris's version of the male absence hypothesis? Using the SCCS and cross-tabulating absences of married males against postmarital residence, I found that 24 percent of the societies in which males are not absent have matrilocal or uxorilocal residence, compared to 23 percent of societies in which males are, at present, frequently absent. Moreover, 60 percent of societies with men frequently absent in the present have patrilocal or virilocal residence. These results are not at all supportive of Harris.

Additional correlational analyses show that matrilocal or uxorilocal residence is not closely related to any independent variables. It correlates only -.005 (Pearson r) with absences of married males and only -.081 with external warfare. It correlates more strongly with class stratification (-.221) and internal warfare (.202) than with the predictors argued for by Ember and Ember. Social stratification and subsistence type are two of the best predictors of residence. Sixty-one percent of matrilocal/uxorilocal societies are egalitarian compared to only 33 percent of patrilocal/virilocal societies. Forty-two percent of patrilocal/virilocal societies have dual or complex stratification, compared to only 16 percent of matrilocal/uxorilocal societies. In terms of subsistence, 67 percent of matrilocal/uxorilocal societies are foragers or simple horticulturalists, compared to only 37 percent of patrilocal/virilocal societies; and 47 percent of patrilocal/virilocal societies are intensive agriculturalists compared to only 24 percent of matrilocal/uxorilocal societies. Still, the overall correlations are low, and we appear to be a long way from a good understanding of why societies adopt female-centered rather than male-centered residence patterns.

A biomaterialist explanation of matrilineality has been offered by Richard Alexander (1974) and Jeffrey Kurland (1979) (cf. Gaulin and Schlegel, 1980). They argue that there are many societies in which, for a variety of reasons, males have little confidence of paternity. Under such circumstances, men will tend to invest in their sisters' offspring, to whom they know they are related, usually by one-fourth of their genes. This is an ingenious argument, and it does seem to be the case that matrilineal societies are often ones in which men have low paternity certainty (Hartung, 1985). However, as Kurland himself realizes, it is not possible thus far to tell whether or not low paternity certainty is the actual causal variable. It could be that low paternity certainty is just an incidental effect of the unique features of matrilineal societies. (For an extension and modification of the paternity uncertainty argument, see Hartung, 1985.)

The jury is still out on which of these theories works better, but even if we can come to some sort of resolution of that issue there is still the problem of explaining why matrilineal societies are more likely to be avunculocal than matrilocal. It can be suggested that avunculocal societies were originally matrilocal and that that is how they became matrilineal. Then changes occurred which made matrilocality less adaptive and avunculocality more adaptive. As Robin Fox (1967) has noted, matrilocal residence works well when societies are small in scale and egalitarian or only mildly stratified. Although men are dispersed from their matrilineal households, they are not very far away and can still manage their groups' affairs. However, with evolutionary changes in the scale of society and the increasing development of wealth and social stratification, dispersed men are farther away from each other and have more difficulty managing their matrilineages' affairs. The solution to this new problem may be a shift in the residence pattern from matrilocal to avunculocal because this would bring the matrilineally related men back together in the same household. Evidence to support this argument comes from the *Ethnographic Atlas*. Seventy-two percent of matrilocal or uxorilocal societies, but only 24 percent of avunculocal societies, are egalitarian. At the

other end of the spectrum, 56 percent of avunculocal societies are stratified compared to only 15 percent of matrilocal or uxorilocal societies. (See M. Ember, 1974, for an alternative interpretation of avunculocality.)

Neolocal residence is the most common pattern in societies in which the nuclear family rather than the extended family is the basic familial unit, i.e., in all industrial and many hunter-gatherer societies. As for cognatic or ambilineal descent (and the ambilocal residence that usually accompanies it), this is often found in island societies in which people and land have to be constantly readjusted to each other. Needed flexibility in people-land arrangements may be well served by flexibility in household and descent organization, which is what cognatic descent provides. Double descent is found in only a small number of societies and may be the result of societies' shifting from matrilocal and matrilineal institutions to patrilocal and patrilineal ones, or vice versa (Fox, 1967). Double descent may be a transitional stage through which some societies pass as they undergo other changes.

MARRIAGE IN COMPARATIVE PERSPECTIVE

Love has been in perpetual strife with monogamy.
Ellen Key

The three basic forms of marriage in the world's societies are monogamy, polygyny, and polyandry. Monogamy, the marriage of one man to one woman, is the legally mandated marriage form in all modern industrial societies, and is the institutionally accepted form in a number of other societies. In agrarian societies monogamy has been virtually the only type of marriage found among nonelite classes. Although agrarian elite males have often preferred polygyny and frequently had large harems of nubile women under their control, many agrarian societies have been prescriptively monogamous. The ancient Greeks and Romans, for example, imposed monogamy on everyone, although concubinage was allowed and practiced by many elite men. With the emergence of Christianity, medieval Christian Europe became monogamous. (Actually, because the Germanic tribes that overran the Roman Empire were polygynous, polygyny was still practiced in the early Middle Ages, usually being limited to men of wealth and power. Four Merovingian kings, for example, took multiple wives. Christianity, of course, opposed polygyny, and by about the twelfth century it had won and polygyny was essentially eliminated; see Wemple, 1981, and Brundage, 1987). Only some 15 percent of the societies in the *Ethnographic Atlas* are prescriptively monogamous.

The preferred form of marriage throughout the world has clearly been polygyny, the marriage of one man to two or more women. About 85 percent of the societies in the *Ethnographic Atlas* have adopted this as the ideal or at least allow it. There is a great deal of variation among societies in terms of what proportion of the male population is polygynously married at any given time. Douglas White (1988) has provided data in this regard for the societies of the SCCS. In 58 percent of these societies, fewer than 20 percent of the male population is polygynously married. In another 32 percent of the societies, between 20 and 49 percent of males are polygynously married, and in about 9 percent of the societies half or more of the male population is involved in polygynous marriages. There are some strong regional variations as well. In African societies, an average of 31 percent of the men are polygynously married, and virtually all African societies permit polygyny. This region is far and away the most polygynous. At the other extreme, European and Asian societies have typically been ones in which only 3 or 4 percent of men are polygynists.

In most polygynous societies only a small segment of the male population is able to marry polygynously because of the simple fact that there are only so many women to go around. The polygynists in these societies are almost invariably men of high social rank. Laura Betzig (1986) has documented the extremely close relationship between a man's political status and the number of wives he has (see Chapter 10). Betzig is speaking only of highly stratified societies (what she calls "despotic" societies), but the pattern holds for more egalitarian societies as well. In these societies, it is usually the headmen or the big men who have multiple wives. Polygyny has occurred most often in horticultural societies. It is still found today in parts of the Middle East and throughout Africa, and in these regions occurs much more frequently in the

more traditional sectors of society that have been least influenced by the forces of modernization (Ware, 1979; Armstrong et al., 1993)

The explanation most commonly offered for polygyny is that it enhances wealth and is therefore desired for economic reasons (Boserup, 1970; Grossbard, 1976, 1980, 1984; Becker, 1991; White, 1988; cf. White and Burton, 1988). Polygyny is most common in horticultural societies that give women a major role in cultivation of the soil, and in such societies women become important economic assets. The more wives a man has, the more he can enhance the wealth under his control. Likewise, it can be argued that polygyny is generally absent from the nonelite sectors of agrarian societies because in these societies women take little role in cultivation and thus are not economic assets. In fact, the conditions of agrarian societies seem to make wives expensive, and few men can afford to have more than one wife (some cannot afford even one). Betzig is highly critical of the economic argument. As she remarks, "that inability to reproduce and adultery on the part of the wife are significant causes of conjugal dissolution, and that wives frequently are cloistered against the possibility of infidelity, perhaps even to the detriment of their ability to carry on economic activity, remain unaccounted for in the theory that the economic value of women motivates polygyny" (1986:84). Betzig also points out that the economic theory cannot explain why wealthy men take prepubescent girls as wives.

A number of studies have shown a correlation between women's contribution to subsistence and the degree of polygyny (Heath, 1958; Goody, 1976; White, Burton, and Dow, 1981; cf. Betzig, 1986). To explore the matter myself using the SCCS, I examined the relationship between a 5-point scale of marriage type (monogamy prescribed, monogamy preferred but some polygyny, polygyny preferred by leaders, polygyny preferred by men of wealth and rank, and polygyny preferred and attained by most men) and a variety of variables thought to be possible predictors of marriage type. The only variable that was more than weakly correlated with marriage type was the contribution of women to agriculture ($r = .385$). Where women did 70 percent or more of the agricultural work, 65 percent of SCCS societies were ones in which most men are polygynously married. But where women did only 10 percent of the agricultural work or less, only 13 percent of the societies were ones in which most men marry polygynously. It seems clear that men are more motivated to marry polygynously in societies where women's economic value is high. However, this can only be part of the story, and a modest part at that. The vast majority of societies permit polygyny, and most of those strongly encourage it. Polygyny exists and is often common even in societies where women do very little agricultural work. The pervasiveness of polygyny pushes us in the biomaterialist direction.

The biomaterialist explanation (van den Berghe, 1979; Symons, 1979; Hartung, 1982) holds that the widespread preference for polygyny is a natural result of the differences between male and female reproductive strategies. Men have a natural desire for sexual variety because this promotes their inclusive fitness. As Donald Symons (1979) has pointed out, this male desire for multiple sexual partners is extremely widespread and is probably a true cultural universal (cf. Betzig, 1992a, 1992b). However, it does not seem necessary to construe the biomaterialist and ecomaterialist explanations as mutually exclusive (van den Berghe, 1979). The enhancement of wealth obviously helps promote a man's inclusive fitness, since greater wealth helps him provide better for his offspring. Thus, a man's desire to increase his wealth may be located in the same part of the biogram that governs his desire for sexual variety. A reasonable conclusion would be that men in all societies desire sexual variety and will take advantage of opportunities for it whenever possible. These opportunities are enhanced or limited by underlying material conditions, especially the extent to which women are available and whether they are expensive or inexpensive as wives. It is surely no accident that it is mostly the high-status men in many polygynous societies who have multiple wives. They have both the means to acquire them and the personality traits (i.e., competitiveness, aggressiveness, dominance orientation) that incline them toward the pursuit of females. High-status males mate more often and leave more offspring, a pattern that is commonly found among other mammals. Polygyny is rooted in humankind's primate and mammalian heritage.

What then of polyandry, the marriage of one woman to two or more men? This marriage practice is rare, being found in less than one percent of the world's societies (Murdock, 1967). Sociobiologically it seems to make little sense, because, other things being equal, it would seem to decrease rather than increase

a man's inclusive fitness. It is certainly inconsistent with the male desire for sexual variety and the logic of the male reproductive strategy. Various interpretations of polyandry have been given. Drawing on the work of Melvyn Goldstein (1976; Beall and Goldstein, 1981; cf. Crook and Crook, 1988), William Durham (1991) has offered an explanation that is both eco- and biomaterialist. A peasant population in Tibet originally studied by Goldstein most commonly practiced polyandry, and it was fraternal (a woman married several brothers). However, other forms of marriage also existed. Some marriages were monogamous, others polygynous. And in some cases a group of brothers married to one woman took on a second wife, resulting in what has been called polygynandry. According to Goldstein and Durham, polyandry among these people was motivated by extreme land scarcity. The Tibetans lived at a very high altitude and their land was extremely dry, making agricultural productivity very low. Had men inherited land individually, no one would have had enough to make a decent living. Thus, a group of brothers would inherit collective rights to the same plot of land and would bring in a woman to serve as their wife. In addition, the brothers could combine to work the land, creating a more favorable labor situation. The existence of both monogamous and polygynous marriages alongside polyandry seemed to result from the specifics of family composition. If a man had no brothers he would inherit land and take on a wife all by himself. If a man in a monogamous marriage deemed his wife to be infertile, he could take on another, thus creating a polygynous marriage. Or, if a family had daughters but no sons, they could arrange for a polygynous marriage between their daughters and a man who had no brothers. Polygynandry could result when polyandrous brothers married a second woman because they deemed the first infertile.

Durham has stressed that polyandry in Tibet is both economically and reproductively adaptive, even though earlier studies have suggested otherwise. One study (Beall and Goldstein, 1981) concluded that polyandry, though economically adaptive, was reproductively maladaptive, at least for men. Men marrying polyandrously left fewer offspring than men marrying monogamously. However, a serious defect of this study was that it looked at reproductive success in only one generation. Another study (Crook and Crook, 1988) looked at reproductive success over two generations. The investigators found that polyandry was highly reproductively advantageous for women. For men the results were more ambiguous. Brothers with equal sexual access to a wife did not necessarily show lower fitness compared to brothers who married monogamously. However, there was usually differential access to a wife in polyandrous marriages, and this tended to depress the inclusive fitness of polyandrous junior brothers compared to brothers marrying monogamously. Durham has looked at the reproductive results over three or more generations. He has performed computer simulations which show that polyandry was indeed reproductively disadvantageous after only one or two generations; however, after three or more generations fraternal polyandry led to higher levels of reproductive success than would have occurred had family plots been split up and marriage been monogamous. Durham's explanation is thus a true Darwinian conflict explanation in that it is simultaneously biomaterialist and ecomaterialist.[3]

As for monogamy, it is easy to understand why virtually all agrarian peasants adopted it. It was simply too costly for them to have more than one wife, and many could not afford any wife at all. However, this will not explain the imposition of monogamy on elites among the ancient Greeks and Romans and the elite members of other agrarian societies, nor will it explain why monogamy has become the rule of law in all modern industrial societies. Richard Alexander (1987; Alexander et al., 1979) has proposed a biomaterialist explanation that relies on the idea of *reproductive opportunity leveling*. Male competition for wives produces conflict, and societies that recruit large pools of young men for purposes of fighting wars with other societies will need to keep this male-male conflict to a minimum. This can be done, Alexander says, by legally prohibiting polygyny, thus giving all males equal access to wives. Alexander refers to this as *socially imposed monogamy* and claims that it is the product of the large nation-state. The data are reasonably consistent with Alexander's theory. In the SCCS, 46 percent of larger states have socially imposed monogamy, compared to 26 percent of smaller states, 10 percent of chiefdoms, and 11 percent of bands and tribes. In the full *Ethnographic Atlas*, 46 percent of larger states have monogamy and another 39 percent have only occasional polygyny. Monogamy clearly is much more common at the most advanced stages of political evolution.

The only systematic empirical test of Alexander's theory has been undertaken by Michael Price (1999) in a paper that is as yet unpublished. Price actually tests a somewhat expanded version of Alexander's theory. He argues that monogamous societies have been much more successful than polygynous societies because of the greater cooperation promoted by the former, and monogamy has spread from the Western world to other parts of the world because it has led to greater success. Price tests this argument by using five measures of societal success: population size, use of the death penalty, the level of democratization, the level of corruption, and the level of economic development. Price classifies 84 contemporary nation-states as monogamous and 72 as polygynous. His results are quite consistent with the overall theory. The mean population size of the monogamous societies was 52.15 million, whereas the mean size of the polygynous societies was only 19.93 million. As for the death penalty, monogamous societies were nearly 7 times as likely to have abolished it as polygynous societies, which Price interprets as evidence of greater cooperation and less conflict in monogamous societies. In terms of the mode of government, Price found that 64 percent of monogamous societies but only 25 percent of polygynous societies had liberal democracies. Only 11 percent of monogamous societies but 45 percent of polygynous societies had highly authoritarian modes of government. Price also found that monogamous societies were much less corrupt. Specifically, monogamous societies were more than 8 times as likely as polygynous societies to be ranked in the least corrupt third of contemporary societies (42 percent vs. 5 percent). Finally, the monogamous societies had a per capita gross domestic product in 1996 of $9,710 whereas the polygynous societies had a per capita GDP of only $2,235. Price also notes that monogamous societies have much greater military strength, which supports Alexander's original point.

Betzig (1986, 1992a) adds her own twist to Alexander's theory. She notes that reproductive inequality (polygyny) goes with economic and political inequality, whereas reproductive equality (monogamy) goes with economic and political equality. Powerful men may give up polygyny and impose monogamy on everyone in order to enlist the cooperation of the masses, or at least large segments of society. Betzig claims that it was not until the industrialization of the past two centuries that monogamy became the general rule. (She denies that the Romans were really monogamous; while this is true legally, she says, in actuality they had de facto polygyny; see Betzig, 1992a, 1992b.) But, as we have seen, monogamy was overwhelmingly the general rule in Europe for many centuries prior to the onset of industrialization. This part of Betzig's theory clearly will not work. However, she may be onto something with her notion that monogamy goes with greater economic and political equality. Think of Betzig's (1986) work on despotism and polygyny discussed in Chapter 10; these clearly go together. I have difficulty getting out of my mind Karl Wittfogel's (1957) famous concept of Oriental despotism, for it does appear that the most despotic states have appeared in this part of the world. By contrast, early forms of democracy (nowhere near our modern systems of parliamentary democracy, but forms of democracy nonetheless) emerged in the West, more specifically in ancient Greece and Rome. Not only were these societies monogamous (at least legally), but the whole monogamous tradition of modern Western civilization is rooted in Greek and Roman monogamy.

One alternative to the reproductive opportunity leveling theory is the ecomaterialist theory of Richard Posner (1992). Posner argues that monogamy has been socially imposed in societies where companionate marriage is the norm. Companionate marriage involves, ideally at least, an intimate and lifelong relationship between a man and a woman, and a crucial element of this form of marriage is sexual exclusivity and fidelity. Polygyny, virtually by definition, is radically incompatible with companionate marriage. Companionate marriage emerged in Western industrial societies in the eighteenth and nineteenth centuries and in Japan in the twentieth. However, as we have just seen, monogamy was introduced into the Western tradition by the ancient Greeks and Romans and by Christianity long before this. Monogamy was already well established before companionate marriage evolved and was obviously a major part of Christianity's whole conception of human sexuality. Although I would predict that companionate marriage would have led to the extinction of polygyny had polygyny still existed at the beginning of the eighteenth century, that prediction can never be tested, and thus a decisive evaluation of Posner's theory cannot be made. However, some empirical evidence is available to shed light on the matter. Japan, a non-Christian society with a tradition of polygyny and concubinage, abolished these

practices in the late nineteenth century (Murstein, 1974), which was the time at which it was beginning to modernize and develop companionate marriage. Moreover, polygyny is still permitted throughout much of the Third World today, especially in Africa and the Islamic world, even though certain restrictions have been placed on it (Welch and Glick, 1981; Nasir, 1994; Pitshandenge, 1994). Who still practices polygyny in these regions, and who has given it up for monogamy? The general answer is that polygyny is concentrated mainly in the most traditional sectors of these societies. Poorly educated women from rural areas and with low socioeconomic status are much more likely to be in a polygynous marriage (Ware, 1979; Armstrong et al., 1993). That it is the best-educated women who shun polygyny is strong support for Posner's theory, because it is among these women that the ideal of companionate marriage has most thoroughly taken hold.

Nevertheless, it is doubtful that the incompatibility of polygyny with companionate marriage can explain monogamy in most societies throughout history or monogamy in band and tribal societies, since none of these societies have had companionate marriage. Kevin MacDonald (1990, 1995) holds that there may be several different mechanisms that have produced socially imposed monogamy, including the influence of Christianity on the adoption of monogamy throughout the history of Europe during the past two millennia. Socially imposed monogamy in western Europe, he claims, "originated as a result of conflict in which ecclestiastical authorities attempted to combat the power of the aristocracy" (MacDonald, 1995:8). Socially imposed monogamy may also arise, MacDonald asserts, by way of political activity on the part of lower-status or middle-status males, whose goal is the leveling of reproductive opportunities, or by way of political activity on the part of females or their relatives. Women may support monogamy because of their perception that their status is lowered by polygyny, and, indeed, this is what we see throughout the contemporary Third World where polygyny is still legal.

At this point it seems a bit difficult to avoid MacDonald's somewhat eclectic conclusion, unsatisfying though it is. However, a reconnection with the biomaterialist argument can be made. Alexander has also proposed another type of monogamy that he calls *ecologically imposed monogamy* (Alexander et al., 1979; Flinn and Low, 1986). In this case monogamy is not imposed politically by a powerful nation-state but arises because of the lack of resources available to men to support more than one wife. As Flinn and Low (1986) suggest, this type of monogamy might also be called *resource-limited monogamy*. It is clear that this is a major reason why peasants in agrarian societies almost always marry monogamously, but it could apply to many band and tribal societies as well. Alexander suggests that ecologically imposed monogamy should be found in extreme or marginal habitats, such as the Arctic or deserts, and that it should be found in association with high rates of abortion or infanticide, wide spacing of offspring, long periods of nursing of infants, and extended postpartum taboos on sexual intercourse. There are 186 prescriptively monogamous societies in the 1,267 societies of the *Ethnographic Atlas*. A valuable project for future research would be to analyze these societies in detail, looking for evidence of either socially imposed or ecologically imposed monogamy. Until such a time-consuming project is undertaken, however – and to my knowledge no one has ever done this in any sort of systematic way – we must pronounce our understanding of monogamy limited and inconclusive.

Before closing our discussion of monogamy, however, we should take note of the most recent theory of this puzzling phenomenon, that of Kanazawa and Still (1999). They test empirically two theories of monogamy. The first, which they call the *male compromise theory*, is a distillation of the ideas of Alexander, Betzig, and MacDonald discussed above. The basic idea is that reproductive egalitarianism will prevail where societies are highly democratic: political equality promotes reproductive equality. I am not sure that this theory is exactly what Alexander and MacDonald had in mind, but it is reasonably close, and let us not quibble unnecessarily. The authors do not agree with the male compromise theory, favoring instead what they call the *female choice theory*. This theory assumes that it is females rather than males who determine who mates with whom, and therefore whether monogamy or polygyny prevails in a society depends on what women want. Kanazawa and Still argue that women will choose polygyny when the resource inequalities among men are great, because it is better to be, say, the tenth wife of a wealthy man than the only wife of a man of modest means. But when resource inequality among men is relatively low, then women will choose monogamy because there is no advantage to be gained from polygyny. In addition

to testing this theory, Kanazawa and Still test a deduction from it, which they call the *female power hypothesis*: the greater the level of women's power in societies with extreme resource inequality among men, the greater the extent of polygyny.

The first part of Kanazawa and Still's analysis involved performing computer simulations. These showed that there is a strong positive relationship between economic inequality and the degree of polygyny in a society. They performed their actual empirical tests by compiling data from 127 contemporary countries. The male compromise theory was not supported, but the female choice theory was. Moreover, they also found that as women's power increased in societies with sharp resource inequality among men, the level of polygyny increased. On the other hand, in societies where there was greater resource equality among men, the level of women's power was associated with an actual decline in the level of polygyny.

Kanazawa and Still's study is extremely interesting, and they could be right, but I am skeptical for several reasons. They say that marriage practices emerge from the bottom up rather than being imposed by political leaders, but in all modern industrial societies monogamy is the law and law is made by political leaders. If it is simply a matter of what individuals choose, then why is it enshrined in law? Why not let those women who want to be monogamous be monogamous, and those women who want to be polygynous be polygynous? Why forbid by law more than one woman at a time from marrying Donald Trump, Bill Gates, or Michael Jordan? Explaining why monogamy is enshrined in law in so many countries (and why it was enshrined in law in such ancient societies as Greece and Rome) is one of the main things we have to explain. There appears to be more going on than the strategic choices made by millions of individuals.

Kanazawa and Still's claim that polygyny benefits women and hurts men is dubious, or at least a considerable overstatement. It is true that polygyny hurts those men who lose out in the competition for mates, but it clearly benefits those who win, and there are many societies with a lot of polygynous men. And clearly women in many societies see polygyny as harmful rather than beneficial. As Bobbi Low (2000:74) has commented, "Women often suffer costs in polygynous systems: in a number of societies, second and subsequent polygynous wives have lower fertility than monogamous wives, or than first wives in polygynous households. Children are likely to survive less well in polygynous households, and a major cause of divorce in polygynous societies is conflict among co-wives." This problem is closely related to another, which is that Kanazawa and Still focus on female choice to the exclusion of male choice. Male choice has to be at least as important as, and possibly even more important than, female choice. Otherwise, what sense are we to make out of all the evidence reviewed earlier that men desire young women, attractive women, women with low waist-to-hip ratios, many different women, etc.? I also wonder whether or not Kanazawa and Still's data are adequate to the task of testing these theories. A better test would come from cross-cultural data - the *Ethnographic Atlas* or the SCCS. I looked at the relationship between resource inequality and polygyny in the SCCS and it was in the opposite direction from what their theory predicts. Inequality actually *reduced* the frequency of polygyny ($r = -.132$), although the relationship was weak.

My conclusion, as stated earlier, is that polygyny springs largely from the male desire for sexual variety, and that men will choose polygyny when it is possible, i.e., when they have the resources to support more than one wife and when they are not prevented by law from doing so. Thus, to explain monogamy I believe we are led back to Alexander's notions of socially imposed and ecologically imposed monogamy. I am ambivalent about these ideas, for which there is thus far only limited empirical support, but they are more plausible and better empirically supported than anything else I have seen, and I will stick with them until something better comes along.

BRIDEWEALTH AND DOWRY

In many societies, when a woman marries her kin group receives one or another form of wealth from the kin group of her husband. This transfer of wealth is known as *bridewealth* or *brideprice*. Bridewealth is most characteristic of patrilineal societies, being much less frequently found in societies having other forms of descent. It is also much more common in polygynous than in monogamous societies. Of the societies in the *Ethnographic Atlas* with general polygyny, 91 percent have bridewealth; this compares to 53 percent

of societies with limited polygyny and only 38 percent of monogamous societies that have bridewealth (Hartung, 1982). Bridewealth is highly correlated with polygyny because bridewealth expresses the tremendous sexual and reproductive (and to some extent economic) value of women in these societies. Where women have such value, men are willing to pay out sums of valuables to obtain them. The actual size of bridewealth payments in a particular society is determined by marketlike conditions, and often there is intense bargaining among men over the size of bridewealth (Borgerhoff Mulder, 1988). As Monique Borgerhoff Mulder (1988:65-66) notes, "where the groom enters into a marriage that, for some material or social reason, is advantageous to him and his family a high bridewealth is paid, and where the bride enters a marriage that benefits herself or her family a low bridewealth is demanded." Borgerhoff Mulder goes on to note that for the Kipsigis, a tribal society in Kenya, men were willing to pay more bridewealth for women considered to have high reproductive value, such as early maturing or plump brides. Lower bridewealth was paid for women deemed to have lower reproductive value, such as women who had already given birth to the child of another man.

Much less common than bridewealth is *dowry*. Here a woman, with the help of her parents and perhaps other kin, accumulates property that she takes with her into a marriage. Dowry is in essence a type of early inheritance that a woman uses in order to contract a favorable marriage (van den Berghe, 1979; Goody, 1976). This practice is almost exclusively restricted to complex agrarian societies that are highly stratified. In the *Ethnographic Atlas*, 86 percent of societies with dowry are agrarian societies. And whereas bridewealth correlates highly with polygyny, dowry correlates strongly with monogamy; 74 percent of the *Ethnographic Atlas* societies that have dowry are monogamous.

Important research on bridewealth and dowry has been conducted by Jack Goody (1976) and by Alice Schlegel and Rohn Eloul (1988). Goody's investigations have shown that bridewealth was widespread throughout Africa, whereas dowry was much more common in Europe and Asia. In explaining these observations, Goody relied heavily on the fact that the African societies practiced horticulture, were less stratified, and had lower population densities and more available land. The Eurasian societies, on the other hand, had plow agriculture, social stratification, high population densities, and land was relatively scarce. In Goody's view, these contrasting characteristics of the two regions have made bridewealth adaptive in the one region but dowry more adaptive in the other. Bridewealth is paid when women have economic value, and thus when kinship groups relinquish them they must be compensated for their loss. Dowry, by contrast, occurs under economic conditions in which women are much more costly, and so husbands or husbands' families must be compensated for the high cost of marrying and supporting them. As Marvin Harris (1979:107) has suggested, "Dowry is unintelligible unless it is seen as an attempt to compensate husbands for the responsibility of supporting women whose productive and reproductive potentials are held in small esteem." Schlegel and Eloul (1988) have come to similar conclusions on the basis of detailed cross-cultural research.

Steven Gaulin and James Boster (1990) offer a biomaterialist alternative to this ecomaterialist explanation of dowry (cf. Dickemann, 1979b). Gaulin and Boster attempt to test a version of the ecomaterialist explanation they attribute to Ester Boserup (1970), which they call the *labor value theory*, and their own biomaterialist argument, which they refer to as the *female competition theory*. Gaulin and Boster show that dowry is most common in stratified societies that have prescriptive monogamy. They reason that where polygyny is found some men can achieve much greater reproductive success than any woman because they can father children by several wives. Under these circumstances it makes sense for parents to invest in the reproductive opportunities of their sons, and thus be willing to pay out bridewealth to attract wives. This way parents can help insure many grandchildren. However, in monogamous societies the levels of reproductive success for men and women will be more nearly the same. In monogamous societies that are highly stratified, wealthy men will naturally be more desired by women and their parents because those men can provide the best for the wife's children (her parents' grandchildren). Under these circumstances, it makes sense for parents to invest in daughters by providing them with dowries because

women are competing more severely for husbands than they are in polygynous societies. Gaulin and Boster (1990:997) explain:

> In stratified, monogamous societies, large differences in wealth exist among men that are not diluted by their acquisition of additional wives, as in polygynous societies. Any female who marries such a wealthy male monogamously can expect to have the bulk of his resources for her offspring and thereby enjoy greater reproductive success than females who are not so well mated. Thus, we interpret dowry as a means of female competition for desirable (that is, wealthy) husbands in monogamous societies. Parents (and other kin) should be expected to collaborate in such competition whenever a well-married daughter will gain more or less exclusive access to (although not necessarily control over) her husband's resources.

Gaulin and Boster tested the models against each other by discriminant analysis and found that the female competition model was better supported by the data. However, the labor value model also fit the data fairly well, so it could be that both biostructural and ecostructural factors are operative in determining dowry.

MODES OF CROSS-COUSIN MARRIAGE

In numerous band and tribal societies women are often exchanged in marriage between and among exogamous (outmarrying) descent groups according to specific rules and preferences. By far the most famous analysis of the various forms of marital exchange is that developed by Claude Lévi-Strauss (1969a) in his celebrated book *The Elementary Structures of Kinship*. In many societies the form of marital exchange is what Lévi-Strauss has called *restricted exchange*, more commonly known as *bilateral cross-cousin marriage* (Fox, 1967). This practice involves the mutual exchange of women by descent groups in every generation. For example, if the women of the Wolf Clan marry into the Fox Clan, then the women of the Fox Clan will marry into the Wolf Clan generation after generation. The Wolf Clan may also have a marriage agreement with the Beaver Clan, in which case Wolves and Beavers exchange women as marriage partners generation after generation. Restricted exchange in essence involves an agreement among the men of various descent groups to exchange women reciprocally as marriage partners in each generation. A cross-cousin is the offspring of a person's father's sister or mother's brother (offspring of the father's brother or mother's sister are known as parallel cousins). In restricted exchange the marital exchange process works in such a way that a young boy will marry a girl who is both his father's sister's daughter and his mother's brother's daughter. His future wife is thus a double, or bilateral, cross-cousin, which is why this form of exchange is called bilateral cross-cousin marriage.

The other principal form of marital exchange identified by Lévi-Strauss is what he calls *generalized exchange*. This has two subtypes. *Short-cycle generalized exchange*, also known as *patrilateral cross-cousin marriage* (Fox, 1967), involves the mutual exchange of women between descent groups, except in this case the descent groups skip a generation in the return of women. Thus if the Crocodile Clan gave women to the Alligator Clan in one generation, then the Alligator Clan would not give women back to the Crocodile Clan until the next generation. The reason this form of marital exchange is also called patrilateral cross-cousin marriage is because a young boy is likely to marry his father's sister's daughter. *Long-cycle generalized exchange* (Fox, 1967) is characterized by asymmetrical exchange relations between descent groups. This form of marital exchange involves groups standing in permanent wife-giving or wife-taking relations with other groups. Thus if the Bear Clan gives women to the Skunk clan, it never takes women from that clan. Likewise, the Skunk clan may give wives to the Muskrat Clan, but if it does it will never obtain wives from that clan. This marriage arrangement results in a preference for marriage with a young boy's mother's brother's daughter, and for this reason is also known as *matrilateral cross-cousin marriage*.

Of the 752 societies in the *Ethnographic Atlas* for which data are available, 188 practice cross-cousin marriage. Most of these (154, or 82 percent) practice bilateral cross-cousin marriage, 30 (16 percent) practice matrilateral cross-cousin marriage, and only 4 (2 percent) practice patrilateral cross-cousin marriage.

Lévi-Strauss's theory of marital exchange is at once structuralist and functionalist. On the one hand, marital exchange is predicated on the dichotomization of the social world into "us" and "them," which derives from the tendency of the human mind to think in terms of binary oppositions. On the other hand, exchange results from the attempt of kinship groups to form alliances with one another in order to prevent or minimize destructive social conflict and thus achieve a higher level of social integration than would otherwise be possible. Lévi-Strauss holds that this is true in all three types of exchange. However, he notes that the matrilateral version of generalized exchange is much more common than the patrilateral variety (in fact, as we just saw, it is about 8 times as common). This is the case, he claims, because matrilateral marriage binds more groups together and thus is able to produce a higher level of social cohesion than is possible with the other two types.

Although Lévi-Strauss's theory has been widely endorsed by anthropologists, there are some very good reasons for being highly skeptical of it. Melvin Ember (1983:72-73) questions the theory on logical grounds:

> Although there may very well be advantages to marrying outside the family, we need to ask ourselves whether the incest taboo [Ember does not distinguish between exogamy and the incest taboo] is necessary to promote cooperation within and between communities. Is it not possible, for example, that families could have required some of their members to marry with outside groups if they thought it necessary for survival and could have permitted incestuous marriages when such alliances were not needed? A more serious logical problem is that cooperation theory [Ember's name for alliance theory] does not distinguish between marriage and sex. Why not marry outside the family and make love within it? Thus, while the incest taboo might enhance cooperation between families, the need for cooperation does not adequately account for the existence of the incest taboo in all societies, because other marriage and sex rules might also promote alliances between families.

Moreover, not only is outmarriage inessential to promoting alliances, it does not even appear that it actually promotes such alliances. Gay Elizabeth Kang (1979) extracted a sample of 50 societies from the Human Relations Area Files, the largest compilation of ethnographic data in existence, in order to study the problem. Her overall finding was that there was no relationship between the practice of exogamy and the establishment of intergroup alliances. The extent to which alliances were formed correlated only -.03 (gamma) with lineage exogamy and only .10 with local group exogamy; moreover, alliance formation correlated -.47 with clan exogamy, which is a substantial correlation but in the wrong direction from that predicted! Kang went on to reanalyze the data while controlling for the level of societal complexity and region of the world, but these factors made no difference. In agreeing with Kang's analysis, Ember (1983) notes that marriage alliances between the royal houses of Europe did not prevent warfare between their respective countries, and that in-laws in our own society are not especially noted for their cooperation with each other.

If Lévi-Strauss's theory does not hold up to empirical scrutiny, then what alternatives are available? Ember (1983) adopts the view, once extremely widespread and still fairly common, that exogamy rules are simply the extension of nuclear family incest taboos to larger categories of kin. Some social scientists, such as Pierre van den Berghe (1979, 1980), have argued by contrast that exogamy is something distinct from the incest taboo and that it must be explained differently. Van den Berghe argues that incest avoidance concerns sex, whereas exogamy concerns marriage. He also argues that exogamy rules, although they prohibit the marriage of certain kinds of cousins, commonly encourage people to marry other kinds of cousins. Van den Berghe accepts the Westermarck theory as an explanation for incest avoidance, but (despite disconfirming evidence) Lévi-Strauss's alliance theory as an explanation of exogamy rules. Although for many years I agreed with van den Berghe, I now disagree with him because I have become aware of some crucial evidence: the widespread prohibition in human societies of sexual relations and marriage among *all* first cousins, not just cousins in one's own lineage or clan. Many societies, in fact, go

even further and prohibit such relations among all *second* cousins. Of 752 societies in the *Ethnographic Atlas* for which there are data, 469 (62 percent) prohibit marriage between all first cousins. Another 46 percent of these go further and extend the prohibition to all second cousins, and another 42 percent of these may prohibit at least *some* second cousins (the data are ambiguous). Only a minority of societies permit the marriage of cousins (mostly cross-cousins). These data not only provide further evidence against the alliance theory (cf. Pasternak, Ember, and Ember, 1997), but they look strikingly like what one would expect to see if people were being motivated by the desire to avoid certain types of incestuous relations. My conclusion is that exogamy rules are just what many anthropologists have been saying throughout the entire twentieth century - an extension of nuclear family incest regulations.

To explore this idea further, I rated the societies in the *Ethnographic Atlas* on a six-point scale of the degree of restrictiveness or permissiveness of cousin marriage, ranging from societies that prohibit the marriage of all first and second cousins to those that allow the marriage of any cousin. The degree of restrictiveness of cousin marriage turns out to be unrelated to the majority of the independent variables against which it was run. It is not significantly related to class stratification, the intensity of cultivation, the mode of marital residence, the descent mode, the type of marriage payment, or the form of marriage. Stage of political evolution, mode of subsistence, and community size, however, do make some difference. Thirty-four percent of bands and tribes prohibit all first and second cousins and only 5 percent allow all cousins. By contrast, only 7 percent of large states prohibit all first and second cousins and 34 percent allow all cousins. The same pattern is evident for subsistence mode and community size: Hunter-gatherers are more restrictive than intensive agriculturalists, and societies with communities larger than 5,000 inhabitants are more permissive than societies with smaller communities. These results are moderately supportive of the Westermarck hypothesis: It is the smaller-scale societies, those in which people have more frequent contact with each other, that are more likely to prohibit the marriage of cousins, and prohibiting cousin marriage is just incest avoidance carried beyond the nuclear family.

Two questions remain to be answered: Why do societies often allow the marriage of cross-cousins while prohibiting the marriage of parallel cousins, and what accounts for the different varieties of cross-cousin marriage? The answer to the first question is relatively straightforward. Parallel cousins will be members of a person's own descent group, and thus in a large number of cases these will be people that he or she has grown up around and has had a great deal of contact with during early childhood. Prohibiting the marriage of parallel cousins can thus be explained in terms of a Westermarck effect. Cross-cousins, on the other hand, will in many cases be individuals with whom a person has had less contact (or even none at all), and thus they are more likely to be considered eligible mates. Parallel cousin marriage does exist, but only in its patrilateral form. It is very uncommon, being confined mostly to Arab societies in North Africa and the Middle East, and it seems to be associated with an unusually high level of male domination (R. Alexander, 1979)

The second question is much more difficult to answer, and there is no consensus at all on what the answer is. Most attention has been given to why more societies have adopted matrilateral cross-cousin marriage than the patrilateral variety. Lévi-Strauss's answer is probably the best known. As noted earlier, he argues that the matrilateral variety, because it links every descent group with every other in a kind of chain or circle that curves back on itself, is more common because it leads to a higher level of social integration. This argument, which is quintessentially functionalist and Durkheimian, was challenged fairly early on by George Homans and David Schneider (1955). On the basis of cross-cultural research, Homans and Schneider discovered that matrilateral marriage is generally found in societies with patrilineality, whereas patrilateral marriage is more commonly found in societies with matrilineality. Their explanation for this is that in patrilineal societies there is a particular kind of tie between a boy and his mother's brother. His relationship with his father is likely to be stern (perhaps even cold and distant), but his relationship with his mother's brother is more relaxed and easygoing. As a result he will become fond of his mother's brother, and more than likely fond of his mother's brother's daughter as well. Marriage between them is therefore sentimentally appropriate. In matrilineal societies the opposite situation is found. Here the

relationship between a boy and his mother's brother is stern and formal, but his relationship with his father's sister is relaxed and easygoing. A boy will become fond of his father's sister, and thus very likely of her daughter too, and thus marriage to this daughter (patrilateral marriage) will be sentimentally appropriate. Why then is matrilateral marriage much more common than patrilateral marriage? Simply because there are many more patrilineal than matrilineal societies.

Marvin Harris (1979) has provided an alternative to both Lévi-Strauss and Homans and Schneider. Harris concedes that bilateral cross-cousin marriage can be explained, as Lévi-Strauss argues, as an effort to generate social integration. However, bilateral marriage, he claims, is characteristic of highly egalitarian societies while matrilateral marriage tends to be found in societies that are at least incipiently stratified. He suggests that matrilateral marriage is intertwined with the stratification systems of these societies. Where matrilateral marriage prevails, he argues, the wife-giving groups are superordinate; they establish and maintain their dominant position primarily by giving wives to subordinate groups, because in return for wives they obtain various forms of wealth and other compensation. Among the Kachin of Burma, for example, a tribal society with a carefully studied system of matrilateral marriage (Leach, 1954), the dominant descent groups give women to subordinate groups and obtain in return cattle and labor services. Thus, for Harris matrilateral marriage is a tool of political economy rather than social integration. His explanation is therefore ecomaterialist rather than structuralist or functionalist.

Unfortunately for Harris, *Ethnographic Atlas* data flatly contradict the argument that bilateral marriage is a more "primitive" form and that the matrilateral version is usually found in stratified societies. Forty percent of matrilateral societies are egalitarian, and another 33 percent have wealth distinctions only. A mere 27 percent have any type of stratification, which is actually less than the figure for bilateral societies (41 percent). Moreover, all of the 14 societies with both complex stratification and cross-cousin marriage have the bilateral form, and 83 percent of the societies with dual or elite stratification are bilateral.

Richard Alexander (1979) has proposed a biomaterialist interpretation of cross-cousin marriage patterns. He points out that, because there is always less certainty of paternity than of maternity, men will be on average more closely related to their daughters' children than to their sons' children; as a result they are more likely to invest in their grandchildren through their daughters than in their grandchildren through their sons. This leads Alexander (1979:190-91) to suggest

> that men would be expected to prefer matrilateral cross-cousin marriages because they are slightly more closely related to daughter's children, because they are less able to influence the success of a son's children by helping a daughter-in-law, and if they are able to assist grandchildren through a daughter married to a nephew by assisting, guiding, and controlling the nephew (who may also be relatively closely related if confidence of paternity is low). In this system each young male will tend to be guided, controlled, and helped by both his father and his maternal uncle. Females will tend to be helped by their fathers and their husbands. In patrilateral cross-cousin marriages, on the other hand, males would tend to be helped by their fathers alone, females by their maternal uncles. Thus, it would appear that men have more balanced and extensive ways of assisting grandchildren under matrilateral as opposed to patrilateral cross-cousin marriage.

Frankly, although I do not accept Lévi-Strauss's theory, I am not sure what to conclude regarding the other theories. I am slightly inclined to favor Alexander's interpretation, if only because of the rapidly growing success of biomaterialist arguments with respect to so many aspects of kinship and family organization. The track record of these arguments is good and getting steadily better. Moreover, there is still the problem of how to explain why bilateral marriage is far more common than either matrilateral or patrilateral marriage. One possibility is that it is the simplest and easiest method of exchange - that the brain has evolved an "exchange organ" that is biased toward simplicity. Another possibility is that, since a person is (at least much of the time) marrying a double cross-cousin, and since that person is more closely related on average to a double cross-cousin than to a patrilateral or matrilateral cross-cousin, bilateral marriage is the form of marriage that would maximize inclusive fitness. It might be the ideal form of

marriage if people are seeking an optimal balance between too much inbreeding and too little. This may be an idea worth pursuing in future research.

THE DEVELOPMENT OF THE MODERN WESTERN FAMILY

Industrialism, Capitalism, and the Family

For many years sociological orthodoxy held that prior to industrialization the extended family was the norm, and that it was industrialization itself that brought the modern nuclear family into existence. Early challenges to this position were made by Sidney Greenfield (1961) and Frank Furstenburg (1966), who argued that the nuclear family was widespread in Western Europe and North America long before the beginnings of industrialization. A more serious indictment came from the work of Peter Laslett and his colleagues (Laslett, 1972a, 1972b, 1977). These researchers found that the small nuclear family was the basic family unit in England, northern France, and the Netherlands as early as the sixteenth century.

These findings led Alderson and Sanderson (1991) to argue that the crucial factor in the rise of the nuclear family in the West was the rise of European capitalism sometime after about AD 1500. Alderson and Sanderson reorganized the data used in 12 studies of family structure in historical Europe and discovered that family structure was closely tied to the level and type of economic development. In North America and the most capitalistically advanced parts of Europe (Belgium, northern France, and England), the small nuclear family had emerged as the norm. In the least developed parts of Europe - Russia, Serbia, Estonia, and Hungary - the nuclear family was much less common and large extended families were more commonly found. And finally, in areas of Europe that were moderately developed - Italy, southern France, Austria, and Germany - there was an intermediate level of development of the nuclear family. The three regions investigated corresponded closely to what Immanuel Wallerstein has called the capitalist core, periphery, and semiperiphery. The relationship between economic structure and family pattern can be visualized more clearly by comparing the ratio of nuclear to extended families within each economic region. The ratio in the core was 5.9:1, in the periphery 1.1:1, and in the semiperiphery 1.6:1.

Alderson and Sanderson provide an ecomaterialist interpretation of these findings. In their view, the critical factor in each economic region was the *mode of labor control.* In the core zones systems of forced labor had increasingly given way to wage labor, and labor was thus "freer." Why does freer wage labor go together with the nuclear family? According to Alderson and Sanderson (1991:425), "It makes no sense for farm laborers who are working for wages to have large families for the simple reason that, under conditions of landlessness, family members become economic liabilities rather than assets (or at least are more of a liability than an asset). And because of the existence of an extensive capitalist labor market, it is more economically efficient for farmers to hire agricultural workers than to produce them themselves." Conversely, large extended families were much more adaptive in peripheral and semiperipheral regions. For peasants in Eastern Europe, large extended households made sense in the context of the economic system they were caught up in. Eastern Europe had experienced the "second serfdom" at about the same time that Western Europe was beginning to move in the direction of wage labor. Eastern European peasants were producing for overlords as well as for their own subsistence. A strong need for household labor was established, and this could be provided most efficiently by increasing the size of the household, especially when there was little or no capitalist labor market from which labor could be hired. In the semiperiphery a prominent economic activity was sharecropping, and sharecroppers were freer than peasants in the periphery and could hire some of the labor they needed. It is this that seems to account for the "in-between" nature of semiperipheral family patterns.

Even though we have to conclude that the small nuclear family arose with the beginnings of modern capitalism rather than with the Industrial Revolution, industrialization may still have had an impact elsewhere. In Japan, for example, from the seventeenth to the nineteenth centuries the extended family was widespread despite extensive capitalist development, yet in modern Japan the small nuclear family has

clearly become the norm. The nuclear family is really the only type of family well suited to modern, urban-industrial settings, with their patterns of work organization and the tremendous geographical mobility of the population.

From the Premodern to the Modern Family

Sometime between the seventeenth and nineteenth centuries family patterns in the most economically advanced Western societies underwent dramatic changes, many of which have been carefully studied by such historians as Edward Shorter (1975) and Lawrence Stone (1979). They characterize what they call the premodern family in the following terms:

1. There is little evidence that the relationship between husband and wife was one of strong affection and companionship.
2. Romantic love existed, as it does in all societies, but it played little role in the selection of marriage partners. Most marriages were arranged, and economic considerations were the basis for the arrangement. A wife's primary value was economic.
3. The parent-child relationship had little sentimentality. Mothers seldom nursed their own children, usually sending them out to wet nurses, and children were frequently treated in ways that would be considered extreme forms of child abuse and neglect by today's standards. Children were often given the name of a sibling who had died, which suggests no conception of the child as a unique individual with a distinct personality.
4. The premodern family had a striking lack of separateness or privacy from the rest of society. Outsiders interacted frequently with family members, and the social relations between family members and outsiders were often as close as the social relations within the family.

In sum, the premodern family was much more an economic than a sentimental or emotional unit. It was preoccupied with reproduction and the intergenerational transmission of property.

In the seventeenth and eighteenth centuries this mode of family life began to give way to another. The modern family was in the process of being born. Stone (1979) has suggested four fundamental changes that the family underwent in this process of modernization:

1. Increasing ties of affection developed between family members. Romantic love blossomed and gradually became the basis for marriage. Increasingly, young people rejected the interference of their families in their choice of a spouse, and marriage came to be seen more and more as a relationship of companionship, intimacy, and exclusivity - as companionate marriage. The revolution in sentiment also characterized relations between parents and children. Child neglect and abuse declined markedly and there was a growing concern for the well-being of children, both physically and psychologically.
2. Individuals increasingly began to feel that they had a right to individual freedom and happiness in marriage.
3. Concern for sexual pleasure grew and there was an increasing tendency to separate sex from sin and guilt. The frequency of premarital sex increased, and marital sex was given more erotic significance.
4. There were increasing demands for a private family life. The family became an increasingly privatized social unit in which the boundaries between it and the surrounding society became much more sharply drawn. Shorter (1975) has called this the "rise of domesticity."

These dramatic family changes have been linked by Shorter to the rise of capitalism, in particular to the rising standards of living and the economic individualism produced by it. In premodern times infant and child mortality rates were extremely high, and parents knew that many of their children, perhaps half or more, would not survive past their first few years of life. Under these circumstances, parents would have restricted their emotional investment in children in order to reduce the pain that they would feel at the death of a child. These emotions need to be seen in the context of parenting strategies in different kinds of environments. In biomaterialist terms, low emotional investment in children was part of a more r-selected rather than K-selected strategy of parental care, i.e., having many offspring but investing minimally in each. As Andrea Wiley and Leslie Carlin (1999) have shown, strong emotional attachment to infants and children

and intensive parental investment are parental behaviors that are mainly limited to societies with both low mortality and low fertility, i.e., today's post-demographic transition societies. In premodern Europe, with its high rates of both mortality and fertility, strong attachment to any given infant or young child was unlikely.

Whereas changes in parent-child relations can be linked to standards of living, the increasing sentimentality of husband-wife relations is more likely to be associated with the economic and moral individualism so characteristic of capitalism. As Shorter (1975:259) has argued, "capitalism exerted its impact on romantic love through involvement in the market labor force: economic individualism leads to cultural egoism; private gratification becomes more important than fitting into the common weal; the wish to be free produces the illegitimacy explosion."

As for the rise of domesticity - the family's increasing separation from the rest of society - Christopher Lasch (1977) emphasizes the family's becoming what he has called a "haven in a heartless world." Capitalism became increasingly ruthless as it evolved, and individuals who were in the center of the maelstrom felt a need for a refuge from all that. They needed to escape, if only temporarily, from the slings and arrows of business competition. As Lasch has said, in the nineteenth century in particular the family increasingly became a last refuge of love and human decency in a world that had grown more savage and warlike.

ADDITIONAL EVIDENCE

Sarah Blaffer Hrdy's recent *Mother Nature: A History of Mothers, Infants, and Natural Selection* (1999) is a brilliant and almost encyclopedic biosocial analysis of motherhood throughout history and across societies. Hrdy shows in great detail just how maternal behavior is the result of the complex interaction between biostructural and ecostructural factors. Although sensitive to the concerns of many feminists (and a feminist herself), Hrdy bursts the balloon of those who claim that motherhood has to be a social construction since mothers often mistreat and abandon their babies and allow them to die. Although there is no such thing as a "maternal instinct," she asserts, motherhood nonetheless rests on a strong biological foundation. The average human female is primed to bond to her infant and to nurture it, but for such behavior to be elicited the conditions for rearing must be adequate. See, in particular, pp. 308-16.

A major social issue and a major topic of social science discussion in the past two decades has been domestic violence. A biomaterialist perspective has a great deal to contribute here. David Buss (2000) reviews a considerable amount of research showing that sexual jealousy is one of the major causes of wife beating, possibly a cultural universal, in all societies (often it is *the* major cause). With respect to child abuse, Korbin (1987) and Gelles (1987) show that children in poor health and thus with poor future reproductive prospects are much more likely to be mistreated than healthy children. Malnourished, apathetic, anorexic, and unresponsive children, as well as children who are physically handicapped and developmentally delayed, are at substantially greater risk for mistreatment. Children are also more likely to be abused if they tax family resources too much, especially when younger children take away resources from older children in whom a great deal has already been invested. Daly and Wilson (1998) show that stepchildren are at much greater risk for abuse than children living with their biological parents, especially for the more severe forms of abuse (such as lethal or near-lethal assault). The story of Cinderella and her evil stepmother and stepsisters is no myth, Daly and Wilson say, and similar stories can be found all over the world. Moreover, the sexual abuse of young girls is much more frequently committed by stepfathers and foster fathers than by natural fathers. The greater abuse of children by steprelatives is perfectly consistent with inclusive fitness theory, and is in fact predicted by it.

In a fascinating article, Low (1990) shows why polygyny and pathogen stress are highly correlated in human societies. Hrdy and Judge (1993) look at the important issue of primogeniture from both biomaterialist and ecomaterialist perspectives. Jankowiak and Fischer (1992), by means of an analysis of cross-cultural data, debunk the idea that romantic love is an invention of the modern world. It is true that it is only with the modernization of the past two or three centuries that romantic love has evolved as the principal basis for marriage, but romantic love has existed in the vast majority of all societies everywhere, and the free choice of marriage partners is surprisingly common. Fifty percent of the societies in the SCCS

allow individuals to choose a spouse freely, compared to only 33 percent that permit the individual little or no choice. Freedom of choice is most common in small-scale hunter-gatherer and horticultural societies, with approximately 64 percent of these societies allowing the free choice of mates. By contrast, intensive agricultural societies with the plow are least likely to permit a free choice, with only 25 percent doing so. Freedom of choice of a marriage partner has thus declined throughout preindustrial social evolution, only to reverse direction with industrialization and modernization. Little research has explored the reasons for arranged marriages vs. individual choice, but the logical starting point from a Darwinian conflict perspective, I think, would be the extent to which the arrangers (the parents) can realize their genetic interests by choosing their offspring's mates, and also the degree of power that parents have over children. The extent of inequality in societies is likely a crucial factor in both. In the SCCS, only 15 percent of egalitarian societies deprive a son or daughter of the free choice of a mate, whereas 65 percent of highly stratified societies do so. Where there is no resource inequality among men, as in egalitarian societies, it matters little to her parents whom a girl marries, and thus they are not apt to interfere with her choice of a mate. But in highly stratified societies parents will perceive some men – i.e., men of high status and wealth – as much more valuable marriage partners than other men. It is therefore in the parents' economic and genetic interests to try to arrange a marriage with such men, because by doing so they are maximizing the benefits that flow to their grandchildren. This is where dowry comes into the picture. As noted earlier, it seems to be a strategy used by parents to arrange the best marriage for a daughter in monogamous but highly stratified societies. But even (perhaps especially?) in highly stratified polygynous societies parents can benefit enormously from arranging their daughters' marriages. The same logic should also apply to sons, although perhaps in a slightly different way.

A NOTE ON PARENTAL INVESTMENT

In a recent article, Jeremy Freese and Brian Powell (1999) attempt to test the well-known hypothesis of Robert Trivers and Dan Willard (1973) that parental investment in children of a particular sex varies by social status. Parents of high social status will tend to invest more in sons than in daughters, whereas parents of low social status will tend to invest more in daughters than in sons. Although much research on a variety of preindustrial societies shows considerable support for the Trivers-Willard hypothesis (e.g., Dickemann, 1979a; Cronk, 1989; Irons, 2000), Freese and Powell are interested in determining whether it will apply to a modern industrial society, specifically the United States. This is partly because Trivers and Willard themselves suggest that the hypothesis should apply to the contemporary United States, but also because Freese and Powell claim (quite dubiously, as we will see below) that "to expect the Trivers-Willard hypothesis to hold under contemporary conditions is consistent with the prevailing theoretical logic of sociobiology" (1999:1713). Freese and Powell's test of the applicability of the Trivers-Willard hypothesis to the United States makes use of the National Educational Longitudinal Study, which surveyed nearly 25,000 eighth-graders in 1988. They supplemented their analysis of this data set with data from the 1980 High School and Beyond study. Their results show that high-status and low-status parents invested about equally in both sons and daughters. When there was a difference in the nature of parental investment by social status, it usually went in the opposite direction: High-status parents invested more in daughters than in sons (although the degree of differential investment was not large).

Freese and Powell's assertion to the contrary, the contemporary United States is not an appropriate society for testing the Trivers-Willard hypothesis. Even if Trivers and Willard believe that their hypothesis should apply universally, there are very good reasons to doubt this. What needs to be shown is the conditions under which it should be expected to hold and the contrasting conditions under which it should be assumed not to hold.

The Trivers-Willard hypothesis is actually a special case of a more general sociobiological hypothesis: Parents will invest more in those offspring with the greatest potential reproductive success. The classic test of Trivers and Willard was carried out by Mildred Dickemann (1979a) in a study referred to in another context in Chapter 10. Dickemann looked at parental investment in three different societies:

nineteenth-century British India, China between the seventeenth and nineteenth centuries, and medieval Europe. All three of these societies were highly stratified societies in which there was extreme competition for resources and for mates, and in all of them hypergyny was a common practice. Polygyny was practiced in India and China, and in Europe as well until after about the tenth or eleventh century, when polygyny was outlawed and monogamy was imposed by the Church and by law. Dickemann found much greater investment in daughters among lower-status groups and much greater investment in sons in higher-status groups in all three societies. This was indicated by much higher rates of female infanticide among higher-status groups and by the strong efforts made by lower-status parents to provide dowries for their daughters so they could compete for high-status husbands. In Europe female infanticide occurred less frequently among the middle and upper classes than it did in India or China, but female celibacy was common in Europe. Differential investment in sons and daughters by social status was especially great in India and China because of polygyny. In highly stratified, polygynous societies, as we have seen, there can be extreme variance in male wealth and male reproductive success; hence the desire of high-status parents to favor sons and lower-status parents to favor daughters. Because it is generally the higher-status males who are polygynous, investment in sons by higher-status parents is the best route to the maximization of the number of grandoffspring, great-grandoffspring, etc. Within such a system, the sons of lower-status parents have less reproductive potential than daughters, and thus arises the practice of lower-status parents providing dowries for their daughters to help them attract high-status, wealthy males who can contribute heavily to the cultural and economic success of their grandoffspring, great-grandoffspring etc.

Dickemann's research helps us to see why the contemporary United States is not an appropriate society for testing the Trivers-Willard hypothesis. Although it is highly stratified, it has socially imposed monogamy, which greatly reduces the variance in male reproductive success. Moreover, the marriage system contains much less hypergyny than in preindustrial agrarian societies, with class endogamy being the general practice. Under such conditions, it is unreasonable to expect that there should be differential investment in sons and daughters by social status. For both lower-status and higher-status parents, the reproductive success of their sons and daughters will in most cases end up being approximately the same, and thus we should expect more or less equal investment in children of both sexes by parents of a wide range of statuses. Given the rapid entry of women into the full-time labor force in the last fifty years, equal investment in daughters and sons makes even more sense.

As noted earlier in this chapter, the importance of the type of marriage system (polygyny vs. monogamy) to parental investment has been shown for preindustrial societies by John Hartung (1976). Recall that in his analysis of *Ethnographic Atlas* societies, Hartung found that polygyny was very strongly associated with a male bias in inheritance. Of the 411 societies he examined, nearly all of those that practiced general polygyny had a strong or exclusive male bias. Where more limited polygyny prevailed, 80 percent of the societies had a strong or exclusive male bias, and where monogamy was the marriage practice only slightly more than half of the societies had a strong or exclusive male bias.

Freese and Powell are much too quick to dismiss a well-known sociobiological hypothesis because of results obtained from a single society at a single point in time. Even if the Trivers-Willard hypothesis applied to contemporary industrial societies, Freese and Powell's failure to find support for it would still not falsify the hypothesis. So long as the hypothesis found widespread support in other societies, and it clearly has, Freese and Powell would only have shown how the hypothesis had to be qualified. Monogamy is imposed by law in all industrial societies, but this fact does not falsify the hypothesis that human males are by nature polygynous, since polygyny is extremely common in preindustrial societies.

NOTES

1. I have sometimes called this theory the "I'm my own grandpa" theory, in reference to the catchy little song that contains those words.
2. Westermarck never was able to specify the proximate mechanism whereby close association in early childhood produced an aversion to mating. This problem has been taken up, for the first time as far as I know, by Schneider

and Hendrix (2000). On the basis of animal studies, they suggest that the mechanism is olfactory. Family members occupying the same household become familiar with each other's odors, and these odors trigger something in the brain that leads to sexual disinterest or aversion. Schneider and Hendrix's argument needs much more careful testing before it can be confirmed, but they do cite both animal and human evidence that is consistent with their explanation, and thus they are not simply speculating.

3. See Eric Alden Smith (1998) for further commentary on this complex issue. Smith notes that "ethnographic evidence . . . indicates that polyandry occurs in a number of widely separated human populations, including some foragers (e.g., Eskimo, Paiute, and Shoshone). The general context is often the same: shortage of long-term mating opportunities for males, as defined by local social and economic constraints on marriage and resource control, coupled with some significant advantage to (generally fraternal) male cooperation."

Chapter 14

Economic Behavior and Economic Systems

It is not from the benevolence of the butcher, or the baker, that we expect our dinner, but from their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our necessities but of their advantages.

Adam Smith

Economic systems involve the production, distribution, and exchange of goods and services that people want and find valuable. This chapter explores many of the most important dimensions of economic activity and shows how Darwinian conflict theory can explain a great deal of this activity.

THE SUBSTANTIVISM-FORMALISM CONTROVERSY

In the 1960s and 1970s a debate raged among economic anthropologists that was known as the substantivism-formalism debate. The debate was never really settled, although most anthropologists apparently did come down on the substantivist side (Wilk, 1996). The substantivists (e.g., Polanyi, 1957; Dalton, 1967, 1968, 1969; Sahlins, 1972) aimed their sights at modern economists. Modern Western economic theory, they claimed, is useful for the analysis of modern economic systems, but its assumptions are of no use in analyzing preindustrial and precapitalist economies. Indeed, employment of these assumptions can only distort the understanding of precapitalist economic life. Modern economic theory teaches that individuals everywhere are self-interested and are devoted to "maximizing" or "economizing" under conditions of scarcity. Individuals rationally calculate how to achieve their own individual economic ends. The substantivists held that these motives are absent in precapitalist societies. In these societies individuals base economic decisions not on the rational pursuit of selfish ends, but on such things as kinship group affiliation, religious beliefs, or political or other group loyalties. Economic behavior in these societies is not determined by economic decision-making at all, but rather is "embedded" (a favorite substantivist word) in the other institutions of society. Scott Cook (1969:397) summarized the substantivist position in terms of the following postulates:

1. The motive of economic gain is not natural to humans.
2. The expectation of payment for labor is not natural to humans.
3. It is not natural for humans to want to restrict their labor to the unavoidable minimum.
4. In precapitalist societies people labor not for economic reasons but for reasons of reciprocity, competition, joy of work, and social approval.
5. In precapitalist societies, economic behavior is embedded in social relations, and it is noneconomic motives that determine the distribution of material goods.

6. The social life of humans in precapitalist societies is not based on individual food collection solely for the use of self and family.
7. Individual acts of "truck, barter, and exchange" are very seldom found in precapitalist societies.

The formalists responded to these claims by acknowledging that capitalist and precapitalist economic behavior certainly differ in important respects, but they insisted that "economizing" and "maximizing" are universal human motives. In all societies, they claimed, resources are scarce and humans are self-interested actors who deliberate and rationally make decisions regarding how to use these resources for their own individual benefit. The formalists were, in essence, using the basic principles of what later came to be known as rational choice theory to study economic behavior in precapitalist societies.

Although I do not cast my lot with the substantivists, there are some respects in which they are correct, at least in a very general sense. For example, the profit motive is clearly not present in all societies (Dowling, 1979), and many societies do not have money. Even those societies that do have a type of money often use it in ways that are very different from its use in modern Western societies. Failure to recognize this has gotten economists into serious trouble. Early in the twentieth century, for example, the economist W.E. Armstrong (1924, 1928) studied the monetary system of the Rossel Islanders, a tribal society located in the southern Pacific. The Rossel Islanders had a kind of money known as shell money, which Armstrong believed was essentially equivalent to Western money. According to George Dalton (1965), Armstrong came to all kinds of erroneous conclusions about Rossel Island shell money because he could only think of it in terms of what Western money was like, i.e., as a medium of commercial exchange, a standard of value, and a standard of payment. In many ways shell money did not have these characteristics.

Yet by and large it is my contention that the formalists are right, at least in terms of what John Dowling (1979) calls their primary or universal assumptions, viz., that people's wants are infinitely expandable and that people everywhere behave rationally and are driven by self-interest. Dowling provides a good deal of evidence to suggest that these assumptions are correct, citing Malinowski to the effect that "whenever the native can evade his obligations without the loss of prestige, or without the prospective loss of gain, he does so, exactly as a civilized business man would do" (quoted in Dowling, 1979:297).

Morris Silver (1995) has scrutinized some of the arguments of Karl Polanyi, the founder of the substantivist approach. He has studied ancient economies in light of Polanyi's assertions about them and has found that these assertions are false. Polanyi's perspective on the ancient economies was that they lacked most of the features of modern capitalism. Polanyi asserted that the ancient world did not contain price-setting markets that worked according to the laws of supply and demand, but Silver finds overwhelming evidence to the contrary. In the ancient Near East there is evidence for the existence of a grain market, with documents showing, for example, sharp variations in barley prices and transactions referring to barley prices in terms of copper or silver. There are many documents that make reference again and again to the fluctuation of prices, suggesting the clear operation of market mechanisms. In Silver's words (1995:105), "The evidence indicates that the ancient economy responded in the usual way to the usual economic forces of supply and demand." There is evidence for private ownership of land and for land markets in ancient Mesopotamia, as well as for the selling and leasing of land throughout Egyptian history. Professional money lenders apparently operated in Mesopotamia, giving interest-bearing loans to merchants for the conduct of business. Sophisticated credit systems also existed. Silver has also uncovered evidence for slave markets and markets for wage laborers, as well as for the extensive use of money as a medium of exchange. Some cities in the ancient world had large spinning and weaving workshops that employed hundreds of people, and their specialization in textiles apparently was rooted in a knowledge of comparative advantage. Most interestingly, Silver shows that the ancient world was familiar with opportunity costs. This familiarity, Silver asserts, "is manifested in a provision of an old Babylonian lease calling for the renter to pay the owner of an ox a sum equal to the value of the services or income forgone" (1995:125).

The substantivists have portrayed peasant economic behavior as guided by nonrational considerations unrelated (or even antagonistic) to a motive of individual gain, but here again the evidence suggests otherwise. Samuel Popkin (1979, 1980) points out that substantivist analyses of peasants focus on peasant economies as "moral economies," i.e., economies driven by norms that are culturally rather than economically determined. Popkin shows that, on the contrary, the norms of peasant life are highly flexible

and shift in accordance with individual calculation of personal gain. Peasants, like people everywhere, are self-interested actors. "Ironically," Popkin says, "scattered fields, frequently cited as an example of a conservative, 'safety-first' strategy followed by peasants, constitutes an individual-level strategy for avoiding risk which suggests that village-wide insurance schemes are not very comprehensive. It is a clear example of a conflict between individual and group rationality" (1980:443). Popkin also shows that the extensive use of interest and credit in peasant villages contradicts the moral economic (substantivist) approach. The fact that individual peasants bid for credit indicates that they are concerned with maximizing their resources and contradicts the notion that they are acting in terms of the welfare of the entire village. The existence of social stratification in peasant villages also demonstrates that peasants are acting largely out of concern for their own well-being and that of their families.

To my mind, what really confirms the formalist view is the behavior of hunter-gatherers. Here we have people living in the closest thing possible to the ancestral environment. Do they behave according to the rational calculation of self-interest? Indeed, the evidence is overwhelming that they do. Sharing and reciprocity, patterns of land tenure, hunting strategies, and many other features of hunter-gatherer life can only be understood from this perspective. In a later section we shall examine hunter-gatherer behavior in terms of the pursuit of individual self-interest. (For an excellent general discussion of how well hunter-gatherer societies conform to the formalist model, see Winterhalder, 1993, who places his discussion within the context of a critique of the substantivism of Marshall Sahlins, 1972.) In addition, the discussion in a later section of economic distribution and exchange in the full range of precapitalist societies will solidify this argument.

FOOD: PREFERENCES AND AVOIDANCES

Innate Tastes

Enough evidence has by now accumulated to sustain the argument that humans have a number of innate tastes and preferences. Newborn babies exhibit a clear liking for sweet substances and a clear dislike of bitter ones (Harris, 1987b; Rozin, 1987). Humans acquired their "sweet tooth" in the ancestral environment, or perhaps even inherited it from their primate ancestors, since the highly nutritive fruits that they ate in large quantity contained considerable amounts of sugar. The innate desire for sweet substances is also suggested by the fact that sweet foods seem to be universally liked. Some societies have had a nonsugar tradition, but no society has rejected sweet-tasting beverages and foods when they have been introduced from the outside (Mintz, 1985; cited in Harris, 1989). The innate aversion to bitter substances seems to be an evolved adaptation that has protected humans against ingesting poisonous or at least dangerous substances (Harris, 1989).

Perhaps the most important innate human preference is for meat (Rozin, 1987). As Harris (1987b:80) has pointed out, "It cannot be mere coincidence that meat and other animal products . . . play a special role in the foodways of most human populations, particularly as a focus of exchange, redistribution, and social cohesion." In the vast majority of societies, a meal is not considered complete without meat. Many societies distinguish between hunger in general and "meat hunger," often having a special word for the latter (Harris, 1985). In highly stratified societies, it is common for people of high social status and wealth to eat much more meat than people farther down the class structure and meat is also a major focus of the feasts that are such a prominent part of the lives of preindustrial peoples (Harris, 1985). Throughout the last 10,000 years of preindustrial social evolution, meat has declined in the diet in favor of grains and other plant foods, but this is the result of growing population pressure and the increased difficulty of raising animals for food. It is certainly not the result of changing human preferences.

H. Leon Abrams (1987) has shown that all human societies include at least some animal proteins and fats in their diets and place a very high value on these substances. Although some individuals and groups throughout history have been vegetarian, vegetarianism has never existed at the level of an entire society. Meat has also played a very important role in the diet throughout hominid evolution, and meat was "the mainstay for paleolithic humankind" (Abrams, 1987:209). The most commonly consumed animals

and animal products throughout the world's societies have been, in rank order, chicken (flesh and eggs), cattle (flesh and milk), pigs, goats, fish, and sheep. Fewer societies, but still a sizable number, have consumed ducks, turtles, dogs, and rats (Abrams, 1987). Many societies have also consumed insects in large numbers, as we shall see below.

What explains the universal desire for meat? The answer is that humans have an innate preference for it, or at the very least an innate tendency to learn to prefer animal foods, and they have this desire or tendency because of the special nutritional qualities that meat provides (Harris, 1985). Animal flesh is a much better source of protein than plant foods in that important amino acids can be obtained far more efficiently from meat than from plants. But meat also has other nutritional advantages over plant foods, as Leslie Lieberman explains (1987:231):

> Meat provides . . . essential minerals (e.g., iron and zinc); vitamins that are often difficult to obtain elsewhere (e.g., B_{12}); fat (although meat is relatively low in the essential fat linoleic acid); and some glucose, especially in raw muscle meat and liver. Moreover, meat provides these nutrients in an easily digested form and is nutrient-dense. That is, meat is a concentrated form of macro- and micro-nutrients; and therefore much smaller quantities of meat and other animal foods than of vegetables are needed to fulfill the RDAs for protein, fat, iron, zinc, and other nutrients. For example, to obtain eight grams of protein you could eat as little as one ounce of cooked lean meat or one extra large egg but you would need to eat four slices of enriched bread or four medium-sized potatoes for the same protein intake.

A Ecomaterialist Perspective on Food Preferences and Food Taboos

This biomaterialist perspective on food must be complemented with an ecomaterialist perspective in order to explain very much about human dietary preferences. No one has done more to develop an ecomaterialist perspective on food than Marvin Harris (1974, 1977, 1985). Harris's overall theory is that humans build their diets around the costs and benefits of various types of food sources relevant to the ecological, demographic, technological, and economic conditions within which they live. Harris has tried to provide an explicit and stark alternative to structuralist theories of food; food is not "good to think," Harris says, but rather is "good to eat."

Harris's most famous theories have concerned the Hindu sanctification of the cow and the Jewish-Moslem abomination of the pig (1966, 1974, 1977, 1985). Although the refusal of Hindus to eat the cow has usually been attributed to irrational religious beliefs, Harris argues that the cow is not eaten because it is much more valuable alive than dead. The cow is critical as a traction animal to plow the fields, and it is also valuable as a source of manure for fertilizer. Its manure is also used as a material for making floors - it dries into a hard substance that is easy to keep clean - and plastering walls, and it is used as well as a cooking fuel. Harris points out that Hindu farmers who yielded to temptation during times of famine or drought to slaughter their cattle could never plow again and thus had to relinquish their farms and move into the overcrowded cities to scratch out a living as best they could. Since keeping the cow alive was so important, and since temptation to slaughter it occurred often, it was necessary to provide a mechanism to overcome this temptation. A religious taboo making it a sacrilegious act to kill and consume the cow arose as the best way of achieving this aim.

Harris notes that there was a time - probably sometime before about AD 700 - in Hindu history when there was no taboo on killing and eating cattle. During this time Brahmin priests were ritual slaughterers and consumers of cattle rather than ritual protectors of them. What caused the transformation? Harris's answer focuses on population pressure and resource scarcity. As population grew over time - and India has had one of the densest populations in the world for several millennia - farms became smaller and smaller and eventually a point was reached whereby animals could no longer be raised for food because they competed directly with humans. All animals except the cow, that is. It could not be eliminated because of its critical role as a traction animal, and so it gradually became the subject of divine interdiction.

The Hindu taboo on cattle is what we might call a "positive taboo," by which I mean that the animal is tabooed as a food source because it is seen in such a favorable way. The majority of food taboos have been "negative taboos," i.e., taboos in which animals are forbidden as food sources because they are perceived to have unfavorable and undesirable qualities. The pig, first tabooed by the ancient Israelities and then later by Islam, is such a taboo. The ancient Israelites' own rationale for tabooing the pig was that it was a dirty animal that carried disease, thus making it unfit for human consumption. The later Moslem taboo on the pig was framed in similar terms. But, as Harris explains, the pig is no more a carrier of disease than many other farm animals, and it is not especially dirty when it is found in the type of environment for which it is best suited. Pigs are best suited to cool, forested environments and do poorly in hot environments with little shade. This is because they cannot sweat. In hot, dry environments, they wallow in mud, garbage, and their own feces and urine in order to keep cool, behavior that is no doubt responsible for the origin of the belief that they are inherently dirty.

Harris explains that the ancestors of the ancient Israelites once raised pigs for food, but during these times the environment they inhabited was suitable for pigs. Eventually, however, with population growth and geographical expansion much woodland was cut down and the environment became less and less adequate for raising pigs. They became increasingly costly because they had to be provided artificial sources of shade and moisture, and thus to raise pigs for food was to forgo something else. As a result, they gradually came to be redefined in negative terms, a definition that was encoded in religion, in order to overcome the temptation to raise and eat them. Harris points out that the pig is highly regarded throughout the world and widely used as a food source (this is confirmed by Abrams, 1987, who shows them to be the third most widely consumed animal worldwide), and thus one must explain why only the Jews and the Moslems have abominated them. The answer, we see, is that the members of these religions lived originally in environments in which the costs of raising pigs exceeded their benefits. Harris's argument is reinforced by evidence that pigs were once widely consumed in Scotland, but with the spread of agriculture and the erosion of forests in the Scottish highlands pig raising had virtually ceased by the seventeenth century and pigs came to be regarded with considerable disdain (Ross, 1987). Eric Ross quotes an English officer who wrote in the 1730s: "I own I never saw any swine among the mountains, and there is good reason for it; those people have no offal wherewith to feed them; and were they to give them other food, one single sow would devour all the provisions of a family" (1987:26-27).

The patterns of milk consumption and milk aversion throughout the world, and the reasons for each, have been closely analyzed by Harris (1985) and William Durham (1991). The biggest milk drinkers in the world are located in northern Europe, especially in the British Isles, Scandinavia, Germany, and the Netherlands. The continent of Africa is divided, with some milk drinkers and some milk avoiders. It is in Asia, especially in East and Southeast Asia, that the majority of the world's milk avoiders are located. It turns out that there is a very high correlation between the degree to which the members of a society drink milk and their physiological capacity to digest it. In order to digest the milk sugar lactose, one needs the enzyme lactase. It is now widely recognized that the original human condition (i.e., 8,000 or more years ago) was one in which infants and childen possessed this enzyme but gradually lost it in adolescence or adulthood. When adults who cannot digest lactose drink milk they suffer from severe gastrointestinal distress. This original human condition came to be modified for northern Europeans and some Africans but not for East and Southeast Asians. The former became lactase-sufficient (and thus lactose absorbers) as adolescents and adults, but the latter remained lactase-insufficient (and thus lactose malabsorbers). Durham (1991) has presented the following figures for lactose absorbers by region and type of economy: 4 hunter-gatherer societies (traditionally lacking dairy animals), 12.6 percent; 5 nondairying agriculturalists, 15.5 percent; 5 recently dairying agriculturalists, 11.9 percent; 5 milk-dependent pastoralists, 91.3 percent; 16 dairying peoples of North Africa and the Mediterranean, 38.8 percent; 12 northern European societies, 91.5 percent; and 13 populations of mixed dairying and nondairying ancestry, 62.0 percent. Harris points out that less than 5 percent of Chinese, Japanese, Korean, and other East Asian adults are lactose absorbers.

By and large, those populations with a high percentage of lactase-sufficient individuals have had a long history of dairying and milk drinking. It appears that the genetic evolution of lactase-sufficiency and a

culture devoted to dairying and milk drinking have coevolved. How did it happen? With the movement of human agricultural populations into northern Europe sometime after 8,000 years ago, people would have been at risk for bone diseases like osteomalacia and rickets, diseases due to a deficiency of calcium. Northern Europeans would have been at risk for these diseases because their agricultural system did not include green, leafy vegetables (a good source of calcium), and because the rainy climate provided few sunny days (sunlight helps the body manufacture Vitamin D_3, which improves calcium absorption). Milk, of course, is an excellent source of calcium, and lactose helps the body absorb calcium; it could thus be of great advantage to those individuals who could continue to drink it throughout life. Selective pressure was therefore placed on lactase-sufficient individuals, whose better health would make them more likely to survive and reproduce. This put pressure on populations to develop dairying, and so dairying, milk consumption, and lactase-sufficiency evolved in tandem. It was a case of gene-culture coevolution.

Why did East and Southeast Asian peoples never develop dairying, milk consumption, and a high percentage of lactose absorbers? Harris argues that they had no real need to do so because their agriculture had long contained green, leafy vegetables, and they also had soybeans, an excellent source of calcium. Moreover, plenty of sunny days allowed the body to make more Vitamin D_3 and thus absorb calcium better. As for African populations, many of these were nondairying agriculturalists who were under no evolutionary pressure to drink milk; many other African populations were devoted to an economy of pastoralism in areas where agriculture was difficult or impossible, and it is these populations that came to contain a high percentage of lactose absorbers. It is interesting to note that there are populations with dairying traditions in which a high percentage of individuals are lactose malabsorbers. These are populations that have processed most of their milk into such low-lactose forms as cheese, and consequently they have been under no evolutionary pressure to drink fresh milk (Durham, 1991).

The Acquisition of Food Preferences and Aversions

As Marvin Harris (1985) has pointed out, except for such things as a preference for sweet foods and for meat, human food preferences and aversions are learned. Throughout the world an extremely wide range of animals is eaten, but animals that are highly desired in some cultures are thought of as disgusting in others (Rozin and Fallon, 1987). The Chinese abhor milk, thinking of a glass of milk as Western milk drinkers would regard a glass of cow saliva (Harris, 1985). The Yanomamö of the Amazon rainforest eat all kinds of insects, including large spiders, animals that are abhorent to the members of modern industrial societies. The Yanomamö's favorite delicacy is fresh monkey brains, and yet they regard peanut butter and hot dogs with disgust because they think of the former as some kind of feces and the latter as an animal penis (Chagnon, 1983). The Yanomamö are also like the Chinese in abhoring milk. Many Eskimo groups eat decayed meat and the contents of animal guts (Rozin and Fallon, 1987). One could go on and on in the same vein.

Yet despite the fact that most food preferences and aversions are learned, they are not learned in a vacuum. There seems to be a brain module that directs the learning of preferences and aversions in an evolutionarily adaptive way. Elizabeth Cashdan (1994) proposes that the mode of learning of food tastes and distastes has evolved by natural selection, and she goes on to claim that there is a critical or sensitive period for learning food tastes. This critical period, she argues, is largely confined to the first two years of life. Cashdan carried out a study of American children in which she found that children younger than 2 were highly receptive to novel foods. However, after the age of 2 their receptivity to novel foods dropped sharply and continued to drop between the ages of 3 and 4. Cashdan's findings are consistent with data obtained by Rozin, Hammer, Oster, Horowitz, and Marmora (1986), who found that children are much less willing to eat "disgust" food substances once they reach their second birthday. What appears to be happening is that children will eat almost anything offered them by their parents until the age of 2 and come to regard such foods as "normal" or "proper" foods. Foods encountered after this age, especially animal foods, are regarded with distaste and often outright disgust (Pinker, 1997). Cashdan shows that for her sample of American children there is a very close relationship between receptivity to novel foods and the

likelihood of poisonings. Almost 40 percent of all poisonings happen to children who are 2 years old or younger, and the likelihood of poisoning drops in almost exactly the same fashion as the emergence of disgust reactions. This leads Cashdan to conclude that "sensitive period learning probably evolved as an adaptation to the high costs associated with eating toxic and unwholesome foods" (1994:287). Why is it that disgust reactions occur almost entirely with respect to animal rather than plant foods? Rozin and Fallon (1987) have summarized a variety of interpretations, but I find none of these convincing. This remains a puzzle for further research.

PREINDUSTRIAL MODES OF SUBSISTENCE TECHNOLOGY

For some 99 percent of human existence, people lived in small-scale societies dependent entirely on the the hunting of wild animals and the gathering of wild plant foods. A few of these societies have survived into the modern world and most of what we know about the hunting and gathering way of life is based on studies of these contemporary societies. In hunter-gatherer societies, it is usually men who do the hunting, especially the hunting of big game, and gathering is primarily an activity engaged in by women. Technology is extremely rudimentary, with men hunting with spears, spear throwers, and the bow and arrow. Women usually employ some kind of digging stick if they are taking roots or tubers out of the ground. Otherwise, no gathering technology is really needed. In most environments hunter-gatherers must be nomadic, moving camp frequently in order to have an adequate supply of game and plant foods. They must also remain at extremely low levels of population density in order not to deplete their resources beyond their natural recovery points. Usually hunter-gatherer bands do not exceed 50 members, often being much smaller. In more bountiful environments, such as those of the Indian tribes living along the Northwest Coast of North America, resources may be sufficient to provide for permanent settlements of hundreds of people.

Beginning around 10,000 years ago in the Middle East and somewhat later in other parts of the world, there was a major technological revolution known as the Neolithic Revolution. This revolution ushered in the first societies that made use of some type of agriculture. The earliest agriculture is best known as horticulture, which means the cultivation of garden sites using hand tools. Horticultural societies are still found today in such parts of the world as Africa, southeast Asia, New Guinea, and South America. The most common form of horticulture is what is known as slash-and-burn cultivation. Here men cut down the forest and burn off the accumulated debris. The wood ashes that result are spread around the garden plot and make a passable fertilizer. The garden will be cultivated for a few years and then abandoned - allowed to remain fallow - in favor of a new garden, although eventually the first garden site will be cultivated again. In most cases the primary cultivators will be women; they are more likely than men to tend the crops and harvest them. Unlike most hunter-gatherers, horticulturalists occupy permanent settlements, living in villages that may number in the hundreds. Gerhard Lenski (1966, 1970) has drawn a distinction between simple and advanced horticulturalists, and he distinguishes between them on the basis of the technology they use for tending the soil. Simple horticulturalists cultivate using only wooden digging sticks, whereas advanced horticulturalists use metal hoes. I have modified Lenski's distinction by focusing on the length of the fallow period rather than the cultivating tool (Sanderson, 1995a). For me, simple horticulturalists are those that have long fallow periods. They might cultivate a garden for, say, one to three years, and then allow it to remain fallow for another 20 to 30 years. What I call intensive horticulturalists, on the other hand, tend to cultivate a garden plot for a longer time and then allow it to remain fallow for a shorter period. They might, for example, cultivate for five years and then fallow for only five to ten years. In some cases, such as aboriginal Hawaii and other parts of Polynesia, the cultivation of land may become continuous, with no fallow period at all. Some horticulturalists have acquired domesticated animals, such as pigs and chickens, but many have not. The latter still depend on hunting for their supply of meat.

Another type of society dependent on agriculture is what sociologists call an agrarian society and anthropologists an intensive agricultural society, which emerged in human history about 4,000 years ago. Agrarian societies practice a more technologically sophisticated form of agriculture in which large plots of

land (fields) are completely cleared of shrubs and trees and cultivated with the use of the plow and traction animals. Land is cultivated permanently or semipermanently (i.e., with the use of crop rotation) and is extensively fertilized with animal manure and other products. In drier parts of the world extensive irrigation systems have had to be constructed in order to provide crops with sufficient water. Because the agrarian mode of subsistence is physically demanding and requires extensive labor inputs, it is men who do the bulk of the agricultural work. For this reason, Ester Boserup (1965, 1970) has called horticultural societies "female-farming" societies and agrarian societies "male-farming" societies. The latter emerged sometime between 4,000 and 5,000 years ago and have dominated world history until the last century or two. Lenski (1966, 1970) has distinguished between simple and advanced agrarian societies. Advanced agrarian societies have acquired iron tools and weapons, whereas simple agrarian societies have tools and weapons made of other metals, normally bronze. There are actually a number of societies, or parts of societies, that use a very intensive mode of agriculture but do not use the plow. These societies can for all practical purposes be classified along with agrarian societies because they cultivate the land permanently, and, like agrarian societies, are extremely productive economically. In some parts of China and Southeast Asia, for example, one finds intensive agricultural societies without the plow.

Pastoral societies are a highly specialized type of society found in very dry regions of the world where agriculture is difficult or impossible. Pastoralists live off animal herds and either practice no agriculture or do so only minimally. They live off the products - meat to some extent, but mostly blood and milk and milk products - supplied by their animals, which are normally goats, sheep, cattle, camels, or even reindeer. Like hunter-gatherers, pastoralists are nomadic, moving in conjunction with the needs and demands of their animals. Pastoralists today are mostly found in the Middle East, North and East Africa, and parts of Siberia.

Leaving out pastoral societies, the modes of subsistence technology we have been discussing can be arranged in an evolutionary sequence in terms of the level of intensity of the mode of subsistence, i.e., how much subsistence demands in terms of the use of labor, time, resources, and technology. This evolutionary typology corresponds closely to the actual historical emergence of these types of societies over the past 10,000 years. What has been responsible for the shift from one subsistence type to another? The answer is ecomaterialist, specifically demographic. In a classic work, Ester Boserup (1965) proposed that in agricultural societies (as in all societies) people are following a kind of Law of Least Effort. They are attempting to minimize inputs of time and energy and wish to use the agricultural practices that will make this possible. They only shift to a more intensive mode of agricultural production when population pressure has built up and there is a need for greater economic production to feed more mouths and to try to maintain an acceptable standard of living. Mark Cohen (1977, 1985) has extended the logic of Boserup's argument to the transition from hunting and gathering to horticulture. He argues that knowledge of agriculture probably existed among hunter-gatherers for tens of thousands of years but was not used because the hunter-gatherer mode of subsistence provided an acceptable standard of living with low labor inputs. By around 10,000 years ago, Cohen argues, a prehistoric "food crisis" had begun to emerge and it was at that point that hunter-gatherers began to incorporate agriculture into their subsistence practices. As population continued to grow, agriculture gradually replaced hunting and gathering.

Archaeological and historical data have shown a close correlation between population density and the mode of subsistence. But ethnographic data also show the same thing. Using the SCCS, I cross-tabulated subsistence type with population density and found an extremely strong relationship. Eighty-one percent of foraging societies have population densities less than one person per square mile, whereas 62 percent of intensive agriculturalists with the plow have population densities of more than 100 persons per square mile. The Pearson r for this relationship is -.726. Subsistence type was also closely related to stage of political evolution ($r = .670$) and community size ($r = .587$). When these three independent variables were entered into a multiple regression analysis with subsistence type as the dependent variable, the three variables together explained 65 percent of the total variance. Population density explained the most, but stage of political evolution was a fairly close second.

In additional analyses, various subsistence variables were put into regression equations with the same three independent variables along with social stratification. Population density and social stratification

explained 59 percent of the variance in the importance of hunting and gathering, with population density explaining a clear majority of this. Population density turned out to be clearly the best predictor of the degree of subsistence contributed by hunting, the degree of subsistence contributed by gathering, the degree of subsistence contributed by agriculture, and the length of the fallow period. However, regarding the use of the plow, stage of political evolution was by far the best predictor, with population density a distant second. Only 9 percent of bands and tribes use the plow, but 67 percent of small states and 100 percent of large states use the plow. It is not completely clear why we should get this result for the use of the plow when population density is clearly the main determinant of subsistence practices as a whole. Lenski (1966, 1970) has argued that the plow was adopted because of its superiority as an instrument of cultivation. This is undoubtedly true, but it could be that the desire to use the plow to increase production has a political context: The plow is adopted when the aim is to generate more surplus for elites to skim off, not to feed more mouths. Thus, at least one aspect of subsistence may have a polimaterialist dimension. Frederic Pryor (1985) has provided an ecomaterialist alternative to this polimaterialist argument. On the basis of cross-cultural research, he shows that there are several conditions that must be present before the plow is adopted. These are the availability of animals that can be domesticated for purposes of traction, land that is suitable for plowing, short or nonexistent fallowing periods, and the cultivation of "plow-positive" crops such as wheat, barley, rye, and wet rice. Wheat, barley, and rye are crops that require extensive preparation of the land and enough land to produce a sufficient number of calories to feed a family. Wet rice requires that the land can be prepared for cultivation in a short period of time. In these instances the plow contributes heavily to labor productivity. In the absence of further research it is not clear whether the polimaterialist argument, Pryor's ecomaterialist argument, or some combination of the two is the right explanation. In all likelihood it is a combination of the two.[1]

HUNTER-GATHERER SOCIETIES

Hunter-Gatherers or Gatherer-Hunters?

It was during the 1960s that hunter-gatherer societies first became a central object of anthropological research. At this time Richard Lee (1968), one of the leaders in the study of hunter-gatherers, estimated that hunter-gatherers derived approximately two-thirds of their subsistence from gathered rather than hunted foods. This idea was widely accepted, but it turned out to be wrong. Lee was perhaps overgeneralizing from his study of the !Kung, who did in fact draw about two-thirds of their subsistence from gathered foods. Carol Ember (1978) took a closer look at the subsistence patterns of 181 hunter-gatherer societies drawn from the *Ethnographic Atlas* and found that gathered foods provided more than half of the calories people were consuming in only 23 percent of the societies. Moreover, she found that gathering was the most important foraging activity in only 30 percent of the societies, but that hunting (including fishing) was the most important activity in 63 percent. Data presented by Kelly (1995) on 123 hunter-gatherer societies show enormous variation among societies in the proportion of food contributed by hunting or gathering. Among some Eskimo groups, all of the diet is provided by hunting or fishing, and in many others the figure is 90 percent or more. At the other extreme are groups like the Walpiri, !Kung, G/wi, Siriono, Chenchu, and Penan, where anywhere from 70 to 85 percent of the diet comes from gathered foods. This wide variation can be explained ecomaterialistically. I reanalyzed Kelly's data and found that the critical factor was mean annual temperature. Percentage of the diet contributed by gathered foods correlated .638 (Pearson r) with temperature, whereas percentage contributed by fishing correlated -.470 and percentage contributed by hunting correlated -.151. This means that gathered foods form a larger part of the diet in warm or hot regions whereas meat constitutes a bigger part of the diet in cold regions.

Hunter-Gatherers as Optimal Foragers

In the 1970s an approach to the study of how hunter-gatherers spend their time foraging was developed under the name of *optimal foraging theory* (e.g., Winterhalder and Smith, 1981; E.A. Smith, 1983; Hawkes, Hill, and O'Connell, 1982; Hawkes and O'Connell, 1985;Winterhalder, 1987; Kaplan and Hill, 1992; Kelly, 1995). Based on Darwinian assumptions, optimal foraging theory was originally applied to the study of nonhuman animals but in due time came to have human applications. The theory assumes that natural selection has designed humans to forage in such a way that they receive the greatest possible benefit for individual survival and reproductive success. It assumes that foragers are trying to maximize their rate of energy return for any given unit of foraging time.

Optimal foraging theory contains two separate models, known respectively as the *diet-breadth* (or *prey choice*) model and the *patch-choice* model (E.A. Smith, 1983; Winterhalder, 1987; Kelly, 1995). The diet-breadth model can be summarized in the following way:

1. A forager encounters prey types in a random fashion, i.e., prey types are distributed throughout a foraging area in approximately the same relative proportions.
2. Total foraging time is divided into two separate categories, *search time* and *handling time*. Search time is the amount of time it takes to locate a plant or animal, whereas handling time is the amount of time it takes to harvest, capture, and consume the plant or animal once it has been encountered. This process of time allocation involves opportunity costs in the sense that time spent handling any item means that the same unit of time is unavailable for searching for other items.
3. Foragers rank food items along a single continuum of utility, which is the net energy or food value they obtain from any item relative to the amount of time they spend handling it.
4. Foragers achieve an optimal diet by continuing to collect food items in an order of descending rank until such time as the expected return in net energy is maximized for every unit of foraging time. If a newly encountered food item yields a lower rate of return than the rate that a forager is currently experiencing, it will be ignored.

Kaplan and Hill (1992:170-71) summarize the diet-breadth model as follows:

> First, all resources are ranked in descending order of their profitability. The prey type that yields the highest return upon encounter . . . should always be pursued. Other lower-ranked resources should be included sequentially in the set to be pursued until the next most profitable resource yields a lower rate of return upon encounter than could be obtained by continuing to search for and pursue the more profitable items. None of the resources that are ranked lower in profitability should be pursued when encountered.

An extremely important implication of the diet-breadth model is that decisions to include a food item in the diet are made not in terms of that item's own availability, but rather on the availability of a higher-ranked item. For example, Hadza hunters focus on large game and generally ignore small game even though the latter are much more abundant. Several anthropologists carried out an experiment in which they asked the Hadza to concentrate only on hunting small game. When the hunters did this, their average return per unit of time for small game was significantly lower than the average return for large game, so in ignoring small game Hadza hunters are foraging optimally (Kelly, 1995).

The patch-choice model (sometimes called the *marginal value theorem*) involves decisions concerning whether or not foragers should leave one foraging patch for another. This model assumes that foraging in any patch gradually depletes the resource level of that patch, which in turn leads to a decline in that patch's net return rate. Thus, "the optimal solution is to leave each patch when the marginal capture rate (i.e., the instantaneous capture rate at the end of a foraging period within that patch) is equal to the overall mean capture rate (averaged over the entire set of patches utilized, including travel time between patches)" (E.A. Smith, 1983:631). The patch-choice model leads to several predictions:

1. Foragers should abandon a patch when its resources have been depleted to a point such that foraging in other patches will produce higher returns per unit of time.

2. As the overall productivity of a set of patches - a habitat or environment - increases, foragers should spend less time in any given patch.
3. Any patch not yet being used by foragers should not be included in the total set of foraged patches unless it is capable of producing a marginal return rate that is at least equal to the average return rate for the entire set of patches.

Numerous studies have been carried out attempting to test the diet-breadth model (summarized in E.A. Smith, 1983, and Kaplan and Hill, 1992). These include Winterhalder (1977, 1981) on the Cree, O'Connell and Hawkes (1981) on the Alyawara of Australia, Hawkes, Hill, and O'Connell (1982) on the Aché of Paraguay, Keegan (1986) on the Machiguenga of Peru, E.A. Smith (1991) on the Inuit of the Arctic, and Hames and Vickers (1982) on the Yanomamö and two other Amazonian groups. For the most part, the data collected from these diverse societies fit the diet-breadth model reasonably well. An especially illuminating study is that of Hawkes, Hill, and O'Connell (1982) on the Aché. The authors followed a group of Aché foragers on several foraging trips lasting a total of 61 days, noting what plants and animals they collected and how much time they spent obtaining and processing them. They found that the Aché conformed closely to optimal foraging theory and reconstructed the Aché optimal diet as shown in the table below. This table shows the rank order of plants and animals in the diet in terms of the ratio of calorie returns to each hour of time spent handling the resource. These results should be interpreted in the following way: If the Aché took only collared peccaries and deer, they would receive an average rate of return of 148 calories per forager per hour. However, if they took paca and coati as well, their average rate of return for all four resources would increase to 405 calories per hour. Likewise, if they also took the third-ranked resources, armadillo and snake, their average rate of return would improve to 546 calories per hour. The Aché are best off if they take all 16 resources, because this gives them an average return of 872 calories per hour. They will stop collecting a resource only when it reduces the average rate of return for all

Table 14.1 The Rank Order of Plants and Animals in the Aché Diet

Resource	*Calories per hour of work*	*Rank*	*Average calories per hour of work after resource added*
Collared peccary	65,000	1	
Deer	27,300	1	148
Paca	6,964	2	
Coati	6,964	2	405
Armadillo	5,909	3	
Snake	5,882	3	546
Oranges	5,071	4	625
Bird	4,769	5	632
Honey	3,266	6	660
White-lipped peccary	2,746	7	783
Palm larvae	2,367	8	799
Fish	2,120	9	821
Palm heart	1,526	10	829
Monkey	1,215	11	
Palm fiber	1,200	11	871
Palm fruit	946	12	872

Source: Hawkes, Hill, and O'Connell (1982: Table 3, and p. 390).

resources combined. Hawkes, Hill, and O'Connell note that high-ranked resources never drop out of the Aché diet, whereas low-ranked resources move in and out according to the extent to which they or other low-ranked resources are encountered.

There have been no attempts to test the patch-choice model rigorously (E.A. Smith, 1983; Kaplan and Hill, 1992), but some studies do present data that are consonant with this model (summarized in E.A. Smith, 1983). These include Winterhalder (1977) on the Cree, O'Connell and Hawkes (1981) on the Alyawara, Hames (1980) on the Yanomamö, and E.A. Smith (1980) on the Inuit.

One of the great merits of optimal foraging theory is that it shows that the food preferences of foragers are not determined by cultural definitions of what is good to eat (or "good to think"). Rather, preferences themselves derive from a cost-benefit calculus of foraging efficiency. Foods are preferred if they can be collected efficiently relative to other foods. However, one problem with optimal foraging theory is that it is too rigid in its assumption that net energy per unit of foraging time is the only consideration foragers are using. It is clear that they have a preference for animal proteins and fats over plant foods and that such a preference enters into their foraging decisions. As Kaplan and Hill (1992:189) point out,

> Aché foragers bias diets away from energy maximization in favor of foods containing high proportions of lipids and protein. During the dry season, Yaminahua foragers of Peru exploited three major food types (wild bananas, caiman, and several species of fish), but would have maximized energy return rates if they only exploited bananas and caiman (Hill and Kaplan, 1989; Hill, 1988). Including fish in their diet decreased overall return rate. Similarly, among the Hiwi foragers of Venezuela, men pass by roots that yield 8500 cal/hr on encounter in favor of hunting, which yields an average of 3070 cal/hr (Hill, 1988). Virtually all South American horticulturalists obtain much higher caloric return rates from farming than they do from hunting or fishing (Beckerman, 1989; Hames, 1988), yet most spend considerably more time hunting and fishing than farming (Hames, 1988). In even more extreme cases net energetic return rates from hunting may be negative, and yet horticulturalists still chose to hunt rather than farm exclusively (e.g., Dwyer, 1974; Johnson and Behrens, 1982). This bias in favor of exploiting resources of relatively low energetic profitability but high in protein-lipid content is found in many other human groups and among nonhuman primates (e.g., McGrew, 1979; Terborgh, 1983).
>
> Some nutritional requirements are absolute and inflexible; other nutrient requirements apparently can be met partially or completely by substituting sufficient quantities of an alternative nutrient. This introduces complexities that have yet to receive substantial theoretical or empirical treatment in foraging research.

This strong preference for animal proteins and fats is consistent with what was said earlier about human food preferences. It does not overturn optimal foraging theory, however, but only serves to qualify it. It seems clear that human foragers are not trying to maximize net energy alone, but maximize certain kinds of energy as well.

Mobility, Land Tenure, and Group Size and Density

Although hunter-gatherers tend to be nomadic, there is considerable variation in how far or how often they move, and some hunter-gatherers actually occupy permanent settlements. The key to the degree of movement appears to be the balance of the costs and benefits of moving or remaining in the same place (Kelly, 1995). As Robert Kelly (1995:160) has put it, "The cost of moving (which is related to the terrain to be crossed but includes the nature of housing), the distance to the next camp (which can be affected by nonfood variables such as water and firewood), the difference between the mean and variance of the current and anticipated return rates, storage, and the time frame over which foraging rates are averaged and decisions are made, all enter into decisions to move." Kelly suggests that hunter-gatherers who are sedentary are likely to be occupying environments characterized by local abundance within a larger context

of regional scarcity. The patch-choice model applies here. For hunter-gatherers in this type of environment to move would not be rational because they would be lowering their overall return rate from foraging.

Hunter-gatherers have often been thought of as having little or no concept of ownership or territoriality, which is often the case, but once again considerable variation exists. And, as in the case of group mobility, territorial defense or the lack of it depends on the relative balance of costs and benefits. Dyson-Hudson and Smith (1978; summarized in Kelly, 1995) have developed what they call an economic defensibility model of boundary maintenance. The basic assumption of the model is that boundaries will be established to defend resources when the benefits of doing so outweigh the costs. Dyson-Hudson and Smith envision four possible scenarios:

1. *High resource density, low resource predictability.* Here groups will be highly mobile, will share information about the state of resources, and territoriality will be low (because of constantly shifting territories).
2. *High resource density, high resource predictability.* Here territoriality is prominent because the benefits of defending dense resources outweigh the costs.
3. *Low resource density, low resource predictability.* Here groups are highly dispersed and highly mobile. Territoriality is absent because the costs of defending resources outweigh the benefits.
4. *Low resource density, high resource predictability.* Here groups tend to remain in areas of predictable resources, and any territoriality that develops is a "passive territoriality."

To the above should be added the factors of competition and size of the foraging territory (Kelly, 1995). As competition increases, *ceteris paribus*, territoriality will increase. And groups with large foraging territories will, again *ceteris paribus*, often have little or no territoriality because the costs of patroling and defending the territory are too great. However, in the latter situation it may also be costly to allow unregulated visitors into the territory, and so some regulation of territorial access may be necessary (e.g., allowing visitors to use resources so long as there is a reasonable expectation of future reciprocation).

Most hunter-gatherers live in small bands that average around 25 members (Kelly, 1995). This may be an ideal size for several reasons. For one thing a group of this size will contain about five to seven families, which may be the maximum allowable in order to maintain an informal and nonhierarchical decision-making process (G. Johnson, 1982; Kelly, 1995). In addition, a group of 25 will provide about seven or eight full-time foragers. This can be very advantageous, for as Robert Kelly (1995:213) has said, "In most environments, a group containing this number of foragers probably minimizes daily variance in return rates while also minimizing the rate of local resource depletion." In addition to living in small groups, hunter-gatherers virtually always live in very thinly populated groups. Kelly (1995) provides data on population densities for 206 hunter-gatherer societies from all over the world. These vary from a low of 0.001 persons per square mile for the Yellowknife of Canada to a high of 5.23 persons per square mile for the Chumash of California. The average for all of the groups listed by Kelly is 0.31 persons per square mile. Variations in population density are closely related to the density of food resources, as would be expected.

MODES OF ECONOMIC DISTRIBUTION AND EXCHANGE

Reciprocal Altruism and Cooperation

Many sociologists and other social scientists object to biomaterialist arguments because they see them as portraying humans in a very negative light, concentrating as they often do on human selfishness, dominance and status orders, the tendency toward aggression, and so on. However, a biomaterialist perspective recognizes that there is also a much more positive side to humans. They cooperate with each other extensively and frequently behave altruistically. It can even be said that cooperation and helping are just as fundamental a part of human nature and human society as selfishness and competition. Indeed, the

famous nineteenth-century Russian prince Petr Kropotkin (1902) argued that it was cooperation that was fundamental to social life (cf. Ridley, 1996). Evolution, he argued, designed people to engage in mutual aid and benefit just as much as it designed them to be competitive. Kropotkin argued that life had to be much more than a competitive struggle because cooperation was such a prominent feature of human society and of many animal societies. Matt Ridley (1996) argues that Kropotkin was about half right, and this seems a fair assessment. However, what we need to see is how cooperation and helping have evolved as *selfish strategies*. For something to evolve by natural selection, it has to favor the survival and reproductive interests of the organisms behaving in that way.

As we saw in the chapter on sociobiology, in 1971 the biologist Robert Trivers introduced the concept of *reciprocal altruism* in order to understand cooperative and altruistic behavior that occurs between unrelated individuals rather than kin (Trivers, 1971). Reciprocal altruism requires individuals to respond in kind - do for others what was done for them - if the behavior is to continue. Reciprocal altruism is based on the principle "You scratch my back and I'll scratch yours." It involves an organism's assisting another organism with the expectation that, in time, the favor will be repaid. This kind of cooperative behavior could evolve by natural selection, Trivers argued, because it served the selfish interests of the organisms displaying it. Both would be better off in the long run with the behavior than without it. For reciprocal altruism to work, organisms must interact frequently and be able to recognize each other. Fleeting relationships will not allow its development.

In his book *Social Evolution* (1985), Trivers provides a number of examples of reciprocal altruism in different animal species. Vampire bats feed on blood and cannot live for more than about two days without a meal. These bats try to feed at night on the blood of such animals as horses and cattle, but sometimes they are unable to get a meal. Bats missing a meal are usually able to get other bats with very full stomachs to regurgitate blood. However, once this happens, the bat that regurgitated blood expects to be fed at some future time by the other bat when it misses a meal. This kind of pattern does tend to hold up, and bats who are not reciprocated will not reciprocate themselves in the future. Dolphins and whales are legendary for their reciprocal altruism, and they even go so far as to extend their helping behavior to members of other species. They commonly give physical support to the sick, the injured, and the very young. They engage in three forms of help, which Trivers refers to as standing by, assisting, and supporting. Standing by occurs when an animal stays by another animal in distress without directly assisting it. Assisting involves such behaviors as approaching an injured conspecific and swimming between it and its attacker, biting the attacker, or pushing the injured individual away from its attacker. Supporting amounts to maintaining a distressed animal at the water's surface. Dolphins and whales commonly travel together in large groups, with species intermixed. Trivers believes that it is predation that has probably selected for this pattern, especially predation from sharks. The altruistic behavior is adaptive under these conditions.

Moving phylogenetically closer to humans, we find that food sharing and cooperative hunting are common forms of behavior in chimpanzees. Frans de Waal (1996), a leading world expert on chimpanzee behavior, has shown that chimpanzees do not share plant foods but do engage in extensive sharing of meat. When they hunt for small monkeys or other prey, they show themselves to be very good cooperative hunters. They often work in pairs, trios, or sometimes even larger teams when they hunt arboreal monkeys. When a monkey is captured there is usually much celebration, with individuals gatherering into clusters and begging and handing meat to one another. De Waal's analysis of food sharing suggests that it is closely regulated by the principle of reciprocal altruism. He found that the number of transfers of food in one direction correlated with the number moving in the opposite direction. If chimpanzee A shared a lot with chimpanzee B, then B generally shared a lot with A; but if A shared little with C, then C also tended to share little with A. Unsurprisingly, the most extensive and highly developed systems of reciprocal altruism are found in humans. Much of human social life is based on this form of behavior. It is especially prominent in band and tribal societies, with the outstanding example being the sharing of meat among hunter-gatherers. We shall examine this form of reciprocal altruism shortly.

In recent years we have gained considerable insight into how reciprocal altruism may have evolved among highly social species, humans in particular. In game theory there is a famous game known as the Prisoner's Dilemma, which seems to underlie many of the behaviors of ordinary social life. In the

Prisoner's Dilemma two people play a game in which neither player knows what the other is doing. If both players cooperate, each gets 3 points. If one refuses to cooperate (defects) and the other cooperates, the defector gets 5 points and the cooperator 0 (this is known as the sucker's payoff). If both defect, they each get 1 point. When people play this game, the rational thing for each player to do is to defect in order to avoid the sucker's payoff (no points), and that is what players usually do. However, something else happens when the players play the game more than once and no one knows when the game will end. Robert Axelrod (1984) held a computerized tournament in which he asked a number of game theorists to submit strategies for winning the Prisoner's Dilemma. A variety of strategies was submitted, some of them quite complicated, but the strategy that won was the simplest of all: Tit-for-Tat. In this strategy a player cooperates on the first move and then on each subsequent move does whatever his or her opponent did. Axelrod went on to conduct a second round of the tournament in which many more entries were submitted and in which the participants knew the results of the first round. Tit-for-Tat won again. What do these results mean? According to Axelrod (1984:20), they show that "under suitable conditions, cooperation can indeed emerge in a world of egoists without central authority."

It is important to realize that Tit-for-Tat did better as the tournaments wore on. It often fell behind nastier strategies early on, but gradually got better. Axelrod says that what accounts for its success is that it is nice, retaliatory, forgiving, and clear. Trivers (1985) says there are three features critical to its success: never be the first to defect, retaliate only after your partner has defected, and be forgiving after just one act of retaliation. The success of Tit-for-Tat has immense implications for evolutionary biology. John Maynard Smith (1974, 1978, 1982) has argued that natural selection should have designed species to behave, at least much of the time, according to the logic of Tit-for-Tat. As Axelrod has put it (1984:49),

> imagine that there are many animals of a single species which interact with each other quite often. Suppose the interactions take the form of a Prisoner's Dilemma. When two animals meet, they can cooperate with each other, not cooperate with each other, or one animal could exploit the other. Suppose further that each animal can recognize individuals it has already interacted with and can remember salient aspects of their interaction, such as whether the other has usually cooperated. A round of the tournament can then be regarded as a simulation of a single generation of such animals, with each decision rule being employed by large numbers of individuals.

Thus the assumption is that various forms of reciprocal altruism have evolved in various species, especially in humans, because reciprocal altruism is the strategy that has done the best job of maximizing benefits for each organism. Or at least reciprocal altruism has done the best for each individual under the kinds of conditions specified in the Prisoner's Dilemma game. Under different conditions, as we shall see, reciprocal altruism is likely to give way to very different strategies.

The big question now is, What does all of this have to do with economic behavior and the formation of different types of economic systems? Economic systems consist of networks of individuals who carry out activities in regard to the production, distribution, and exchange of valued goods and services. Reciprocal altruism underlies much of that kind of economic behavior we call exchange. Over two hundred years ago the famous political economist Adam Smith argued that humans have an innate tendency to "truck, barter, and exchange." This argument has been considered axiomatic by most Western economists, but many sociologists and anthropologists have strongly challenged it, arguing instead that economic behavior is socially constructed and culturally determined. They have considered Smith's argument tantamount to claiming that human nature is essentially "capitalistic." My view is that humans do indeed have a natural tendency to exchange, and to do so in a self-interested manner. However, this does not necessarily make all humans natural capitalists any more than it makes them all natural altruists. Humans are just as naturally one as the other, and the direction in which their behavior moves is determined by the interaction between their natural tendency to exchange and the range of environmental conditions they confront. Leda Cosmides and John Tooby (1992) have argued that the human brain is equipped with a highly specialized set of algorithms for social exchange that provides the biological basis for our economic and social institutions. However, this same set of algorithms leads to very different results in different circumstances. As Cosmides and Tooby (1992:206) put it, "Wherever human beings live, their cultural forms and social life are infused with social exchange relations. . . . Such relations appear in an

enormous range of different guises, both simple and highly elaborated, implicit and explicit, deferred and simultaneous, practical and symbolic. The magnitude, variety, and complexity of our social exchange relations are among the most distinctive features of human social life, and differentiate us strongly from all other animal species."

Economic Reciprocity in Human Societies

Reciprocal altruism is found in all human societies and economies, but in many respects it is the essence of economic life in most hunter-gatherer societies. Hunter-gatherers are extremely noteworthy for their extensive food sharing, especially of meat. When a man brings an animal back to camp, he will divide it into portions and give these away, expecting only that he will likely be repaid in some way at some future time. A hunter may give to others repeatedly without any repayment taking place because he knows the chances are excellent that reciprocation will eventually occur. Where reciprocity is of crucial importance, powerful norms of sharing and individual humility develop. As Richard Lee has commented regarding the !Kung San (1978:888), "The most serious accusations that one !Kung can level against another are the charge of stinginess and the charge of arrogance. To be stingy or 'far-hearted' is to hoard one's goods jealously and secretively, guarding them 'like a hyena.' The corrective for this in the !Kung view is to make the hoarder give 'till it hurts,' that is, to make him give generously and without stint until everyone can see that he is truly cleaned out. In order to ensure compliance with this cardinal rule, the !Kung browbeat each other constantly to be more generous and not to set themselves apart by hoarding a little nest-egg."

What explains this enormous emphasis on cooperation and sharing, especially the sharing of meat? Probably the most common answer to that question is that it is a strategy of *variance reduction* (Wiessner, 1982; Cashdan, 1985; Winterhalder, 1986a, 1986b; cf. Kelly, 1995:168-72). The argument goes something like this. Hunter-gatherers normally live in very small groups, and those found in the modern era are usually located in less desirable environments. While resources might not be scarce in any absolute sense, they often vary markedly from region to region and from time to time. This is particularly the case for animal resources. Because of this, and because hunters differ in their skills and levels of motivation, the success of individual hunters varies markedly as well. What to do? A rational response would be to place a great deal of emphasis on sharing because that will work to the advantage of each individual over the long run, and quite often in the short run as well. If Morg kills a big animal now and only he and his immediate family eat it, he and his family will suffer, perhaps even starve, when Morg brings home nothing day after day and no one shares game with them. But if Morg generously shares his kill with others, then those others will likely reciprocate by sharing their kills with him and his family in the future. Thus Morg's generous behavior helps to guarantee security for him and his family. Bruce Winterhalder (1986a, 1986b; discussed in Kelly, 1995) has shown that sharing is most likely to occur in hunter-gatherer societies when there is, in fact, a great deal of variation in the returns of foragers on any given day. However, "a limit is reached at about seven to eight foragers, after which there is no significant reduction in net-return-rate variance. Thus, the limits to sharing are realized at fairly small group sizes. This case accounts for why meat is shared more than plant food, since hunting is usually a riskier venture than plant collection, and, in the case of large game, produces more food than is immediately needed. It also explains why large game is shared more than small game, since the latter is less risky" (Kelly, 1995:170).

The main alternative to the variance reduction argument is that developed by Nicholas Blurton Jones (1984, 1987) and is known as *tolerated theft*. Blurton Jones argues that there is little difference between giving away a piece of food and allowing it to be taken by someone else. He reasons that among hunter-gatherers a common situation will occur in which one hunter will have killed a large animal while others have killed nothing. Since the successful hunter cannot eat the entire animal on the spot, nor would he benefit from trying to do so, it does not pay him to defend the kill against the unsuccessful hunters who happen upon it. By contrast, it would pay the unsuccessful hunters to fight for the remainder of the kill, and thus the most rational thing for the successful hunter to do if he wishes to avoid serious conflict is to allow others to take the rest of the kill. As Blurton Jones notes, this situation will occur again and again, but with a different hunter likely to make the kill, and thus over time individuals will be repeatedly allowing

others to take over the rest of their kills. As Blurton Jones puts it (1984:2), "In effect, each individual's 'donations' are sooner or later 'reciprocated.' Individuals who attempt not to reciprocate will suffer the losses of injuries in fights with more motivated opponents. Thus, if we suppose these individuals to meet often, we have exactly the conditions that Trivers (1971) proposed as necessary for the evolution of reciprocal altruism."

Which of these models, variance reduction or tolerated theft, should be preferred? Blurton Jones (1987) claims that his model is the simpler of the two and that, moreover, tolerated theft actually leads to variance reduction. Robert Kelly (1995) suggests that both tolerated theft and variance reduction may explain food sharing. Either model is fully consistent with a Darwinian conflict perspective. To make matters more complicated, a third alternative, also consistent with Darwinian conflict theory, has been proposed by Kristin Hawkes (1993). Hawkes argues that the empirical evidence is against the variance reduction model. This model assumes that one must give in order to receive, and Hawkes claims that among three well-known hunter-gatherer societies, the !Kung, the Hadza, and the Aché, this is just not so. In these societies most of the meat is supplied by only a small number of men, and some men never supply any meat. Hawkes seems to accept the basic logic of the tolerated theft model; it may simply be too costly to try to prevent people from claiming the remains of kills. However, there is still the question of why only a few men hunt if they get back no meat in return. Her answer is that these men enjoy the "social attention" they receive from others. The most successful hunters will get more sex from more women, and as a result increase their reproductive success. It does seem to be the case that among the Aché men must exchange meat for sex. However, Hawkes presents no data showing a general connection between hunting success and reproductive success (Jeske, 1993). In the end, then, it is difficult to know how to choose among these three models of sharing. More research is clearly needed.[2]

When should sharing give way to hoarding? One major reason would appear to be a seasonal glut (Blurton Jones, 1987). Hunter-gatherer societies that experience a season of highly abundant resources combined with a season of scarcity, such as a cold and snowy winter, will be highly motivated to store large amounts of food. Indeed, Alain Testart (1982) has drawn an important distinction between hunter-gatherers who store and those who do not, and it seems that sharing is much less common among storers than among nonstorers. Sharing also declines as societies make the transition from hunting and gathering to agriculture, as we shall see shortly.

Three Types of Reciprocity

Marshall Sahlins (1965, 1972) has formulated a celebrated distinction between three types of reciprocity, which he calls *generalized*, *balanced*, and *negative* reciprocity. Generalized reciprocity is the most altruistic, and involves sharing, generosity, or pure gift. One of the hallmarks of generalized reciprocity is the vagueness of reciprocation. Individuals to whom things have been given incur a debt and are obligated to repay it, but there is no specification of the time, quantity, or quality of the reciprocation. The nature and timing of the reciprocation are highly indefinite. Under this type of reciprocity, it is considered inappropriate that there should be any overt calculation or discussion of the nature of the debt. The sharing of meat in hunter-gatherer societies is guided by generalized reciprocity. Balanced reciprocity is different in that overt calculation and discussion are not only permissible but expected. It is a more direct form of exchange in which the parties come to a clear understanding of the nature of the debt and the time and mode of its repayment. It is less "personal" and "more economic," and includes such things as gift exchange, trade, and buying and selling. Sahlins says that the real test of balanced reciprocity is its intolerance of one-way flows. Finally, negative reciprocity is the unsociable extreme, an attempt to get something for nothing. It is the most impersonal form of exchange and the "most economic," involving as it does such economic transactions as haggling, gambling, and theft. In its most extreme form it amounts to exploitation. The participants understand that their interests are opposed and that each will try to benefit at the expense of the other. In this sense, negative reciprocity is not really a form of reciprocity at all.

One of the most interesting aspects of Sahlins's analysis is the connection he draws between the form of reciprocity and the social circumstances under which each most frequently occurs. Generalized reciprocity is largely limited to the household or to the lineage, and thus occurs primarily among kin. Within the larger village or within the tribe itself, generalized reciprocity normally gives way to balanced reciprocity. Negative reciprocity occurs largely outside the tribal sector and thus is mainly limited to interactions among strangers or at least among individuals with whom one is barely acquainted. The remarkable thing about this formulation is that it fits the expectations of inclusive fitness theory almost perfectly, and yet Sahlins was one of the earliest and most dismissive critics of that approach. As Richard Alexander (1975:91) has noted:

> Sahlins' model concentrates generalized reciprocity in the household and implies its extension across the lineage sector of the village. He is in fact speaking largely of nepotism. Evolutionary biologists have dealt with such behavior under the rubrics of kin selection and inclusive fitness. They have come to expect that selection will mold organisms to assist their closer kin over their more distant kin, and kin over nonkin even when reciprocity in kind is unlikely, and at least to concentrate such one-way beneficence on genetic relatives, perhaps dispensing it to no one else. Sahlins is telling the evolutionists that their expectations are fulfilled to an astonishing degree in primitive human societies in which kinship is "the organizing principle or idiom of most groups and social relations."

And it is the same with respect to balanced reciprocity. As Alexander remarks, it is completely unsurprising that Sahlins concentrates this form of reciprocity in the tribal sector and sees it as seldom extending beyond the limits of the tribe. Nor can it be the least bit surprising that negative reciprocity is concentrated outside the tribal sector. "The more overt or blatant the cheating, the less likely one is to conduct it among relatives or groups of friendly persons, and the more likely he is to receive admiration or appreciation for success involving strangers or, better yet, mutual enemies" (Alexander, 1975:93).

In the book in which he formulated his major critique of sociobiology, Sahlins (1976a) has responded to Alexander's charges by claiming that kinship is culturally constructed rather than biologically determined. Societies' definitions of who counts as a near or distant kinsman, he claims, have little to do with genealogical relationships. This response, though, is thoroughly unconvincing. Is Sahlins denying that most of the members of a household or lineage are genetically related? It would be absurd to do so. And is he denying that people are most altruistic toward their own offspring? That would be equally absurd (Alexander, 1979).

In thinking about generalized, balanced, and negative reciprocity ranging along a continuum from the most cooperative to the most competitive or conflictive forms of economic behavior, what now remains to be done is to show how these behavioral categories relate to the evolution of economic systems. Under what conditions will economic behavior be highly cooperative, and under what conditions will this kind of behavior break down and be replaced by much more competitive and exploitative behavior? People behave most cooperatively among kin, friends, and acquaintances, and they behave most competitively or exploitatively among strangers. The expectation is therefore that throughout social evolution cooperation will gradually be replaced by competition and exploitation. This is because one of the most important features of social evolution is an increase in the scale and complexity of social life. In more large-scale and complex societies most people cease to have either direct or sustained contact with most other people. Moreover, the economic evolution of human societies is closely tied up with technological advance and increases in economic productivity. In more evolutionarily advanced societies there are many more economic goods over which competitive or exploitative behavior can arise. When there is more to be had, and when relationships become more impersonal and remote, people are much less likely to cooperate than to compete. It is a simple matter of people following their economic self-interest. As we will see in the sections ahead, these expectations about economic evolution correspond closely to the actual record revealed by human history and prehistory.

From Reciprocity to Redistribution

As we have seen, in hunter-gatherer societies reciprocal altruism, often in the form of generalized reciprocity, is a fundamental form of economic behavior. This kind of economic behavior generally continues in the transition to horticultural societies, but a new form of behavior known as *redistribution* emerges. Redistribution is a process whereby goods, mostly in the form of food, are sent from individual households to a central source and then eventually returned to those households in some way. Redistribution differs from reciprocity in that it is a more formal process involving the movement of goods into the hands of some agent (person or group) who reallocates them. Moseley and Wallerstein (1978) have distinguished two different forms of redistribution, which they call *pure* and *partial* redistribution. In pure redistribution the redistributive agent reallocates all goods and keeps no extra portion (or at most only a small extra portion) for himself. In partial redistribution the redistributive process is less complete; the redistributive agent, which in this case is likely to be an organized group rather than a single individual, keeps a portion of goods (sometimes a very large portion) for itself.

Pure redistributive economies are most frequently found among simple horticulturalists and vary from place to place and time to time. Perhaps the best-known type of redistributive economy is that which is characteristic of Melanesian village societies. Many of these societies contain very ambitious men known as "big men," individuals who seek recognition through their roles as economic organizers and political leaders (Harris, 1974, 1977). They spend a great deal of time cultivating their gardens and, if they have them, trying to increase the size of their pig herds. A major objective of an actual or potential big man is to accumulate enough goods to hold a feast, at which time the various foodstuffs will be redistributed to other members of the village and perhaps to kin from other villages. One of the interesting things about the big man system is that, although any given village may have only one publicly acknowledged big man, there are apt to be several other ambitious individuals who are competing to attain this position of economic leadership. They too will be working harder in order to accumulate foodstuffs and hold their own feasts. The Kaoka-speakers, who are Melanesian simple horticulturalists, have this type of redistributive economy (Hogbin, 1964; Harris, 1974). When a candidate for bigmanship has made his gardens flourish and has a sufficient number of pigs, he tells people that he wishes to build a larger dwelling, an indication that he intends to compete for the leadership of his village. Once the new dwelling has been constructed the Kaoka-speakers celebrate the end of the job through an elaborate feast that they call the "feast-to-remove-the-splinters." In one such feast, the aspiring big man and his closest relatives contributed 250 pounds of dried fish, 3,000 yam cakes, 11 bowls of yam pudding, and 8 pigs. Other villagers contributed additional foodstuffs, which increased the final total to some 300 pounds of fish, nearly 5,000 yam cakes, 19 bowls of pudding, and 13 pigs. It was then the feast organizer's task to redistribute this food to everyone associated with the feast (Harris, 1974).

Marvin Harris (1974, 1977) stresses that a big man, despite seeking recognition, is still a pure redistributor. Big men are expected to redistribute so that everyone gets something and the leader himself gets no more than anyone else. In the transition to more intensive or advanced horticultural societies, however, the redistributive agents become partial rather than pure redistributors: They redistribute to everyone but keep a portion, often a large portion, of what they accumulate for themselves. Advanced horticultural societies are usually in a position to produce an *economic surplus*, or a quantity of goods above and beyond what is necessary for daily subsistence. Much of this surplus remains in the hands of those who cause it to come into existence. In a classic article, Marshall Sahlins (1963) has highlighted the differences between pure and partial redistribution by comparing the redistributive systems of Melanesian and Polynesian societies. Melanesian societies have tended to have simple horticulture and big-man systems, whereas Polynesian societies have been more frequently characterized by intensive horticulture and partial redistribution. Melanesian big men may have a great deal of prestige but they hold little or no real power over the rest of the society. By contrast, in many Polynesian societies big men had at some point been transformed into chiefs, political and economic leaders who hold a great deal of power and economic leverage over most of the population. Chiefs are able to produce an economic surplus by compelling the

people to worker harder and relinquish a portion of their harvests. A "public treasury" or great storehouse is thus created, from which chiefs support themselves and their families. They also use it for providing lavish entertainment for visiting dignitaries, initiating major public projects such as irrigation works, building temples, sponsoring military campaigns, and supporting a vast range of administrative officials. Portions of this storehouse are redistributed to the people as the need arises, either during times of poor harvests or on special ceremonial occasions that require elaborate feasts.

Quite a gulf can separate pure from partial redistributive systems. The latter are redistributive in the sense that they involve a counterflow of goods from the chiefs to the people. However, this counterflow is always less, and often much less, than the flow of goods from the people to the chiefs. While clearly similar in principle to pure redistributive systems, partial redistributive systems constitute a notable evolutionary departure from pure redistribution.

From Redistribution to Expropriation

In agrarian societies, partial redistribution has been replaced by what is often known as *surplus expropriation.* This involves powerful landlords' compelling a large peasantry to work hard enough to produce a large economic surplus and then relinquish it. The surplus may be handed over in various ways, but this normally occurs in the form of rent, taxation, and labor services. Sometimes a fine line can exist between partial redistribution and surplus expropriation, but analytically the distinction is easy to make. Landlords have acquired much more economic power than chiefs, and as a result have been able to place greater economic burdens upon peasant producers than chiefs are capable of placing on their followers. The flow of goods and services between peasants and lords is by and large a one-way flow, there being little counterflow from lords to peasants.

This type of economic relationship has prevailed in virtually all agrarian societies. In medieval Europe, for example, peasants had to pay rent to their landlords, either in the form of cash or a percentage of the crop. They also had to pay various kinds of taxes for, say, having the right to grind their grain in the lord's mill or to fish in the lord's fishpond. Peasants also owed their landlords labor services, being required to spend so many days each week working on the lord's demesne (home farm). In ancient Rome a vast system of surplus expropriation resting primarily on slave rather than peasant labor existed; there were many huge Roman estates worked by large slave gangs. Slavery has also been found in many other agrarian societies, usually in conjunction with serfdom. Where slavery rather than serfdom has been the principal labor mode, the system of surplus expropriation has been more direct and obvious, and the primary producers more brutalized and dehumanized.

Many scholars have used the term *exploitation* to characterize the relationship between landlords and those who worked the land. This seems entirely appropriate. I would say that exploitation exists when one party is compelled to give to another party more than it receives in return. The notion of exploitation implies that one party is benefitting at the expense of another and that the disadvantaged party does not have the means to leave the relationship and enter another that would be less punitive. When exploitation exists there is always an element of compulson and unequal power. What then of the primary producers in advanced horticultural societies? Were they being exploited as well? Probably, and if so then we can mark the beginnings of true economic exploitation at the emergence of these types of societies. But the level of exploitation surely was much lower. There were definite limits on the abilities of horticultural chiefs to extract surplus production from the people. Indeed, in precontact Hawaii many a chief was killed who "ate the powers of government too much" (Sahlins, 1963). That is a fate that almost never befell an agrarian landlord.

A major reason for the shift from reciprocity to redistribution to expropriation throughout the course of social evolution has involved who owned the means of production on which people have depended for a living. There is a clear evolutionary pattern in resource ownership away from more communal modes and toward increasingly privatized modes. In hunter-gatherer societies, especially those with low resource density and high resource unpredictability, there is little territoriality and little concept of

ownership (Kelly, 1995). Under these conditions, which characterize the majority of contemporary hunter-gatherer societies, hunter-gatherers tend to share land to about the same extent that they share food (Kelly, 1995). In small-scale horticultural societies there is seldom any sort of privatized ownership, but a concept of ownership does exist. Land is usually owned and controlled by lineages or clans, and people only have the right to use the land that belongs to their kinship group. However, within these groups a strikingly egalitarian pattern of use prevails. In terms of the dichotomy communal vs. private, land is communally owned in this type of society. The shift to a more privatized form of landownership generally occurs with the shift to more intensive or advanced horticultural societies. Here, as might be suspected, land is often said to be formally owned by powerful chiefs who have the right to make use of it as they see fit, including dispossessing commoners or requiring them to increase their rate of productivity and relinquish a portion of their harvests. It is well known that in some advanced horticultural societies the claim to formal ownership of land by a chief is to some extent a fiction. For example, among the Kpelle of West Africa the ownership rights of chiefs are quite limited (Gibbs, 1965). Here every man in a lineage was entitled to the use of that lineage's land, and a chief was more like a steward than a true owner. In other advanced horticultural societies, such as precontact Hawaii, formal ownership of land by a chief, especially the paramount chief, was actually closer to reality than to fiction. Chiefly ownership marks a significant movement in the direction of private ownership, but because it often retains many of the characteristics of lineage ownership it is not a true mode of private ownership. True private ownership is reached with the emergence of what I have called *seigneurial ownership* (Sanderson, 1995a). This involves ownership of the land by a powerful class of landlords or by a centralized state that has usurped some of the rights and powers of the landlord class. Seigneurial ownership has been most characteristic of large-scale agrarian societies.

The evolution of property rights throughout the past 10,000 years of human history and prehistory has involved a steady movement in the direction of private ownership rights, and by and large the more privatized the system of ownership has become, the more unequal has become the system of economic distribution. What, then, has been driving changing modes of property ownership? A major part of the answer, I think, is population pressure, which has been in fact one of the great driving forces of all of social evolution (Sanderson, 1995b, 1999). Population pressure has increased resource scarcity, especially of land, and this has increased the fight over land with its consequent unbalanced outcomes. Once again we see human nature coming to the fore. When it is advantageous for them to do so, people share food and land, but they readily abandon the sharing of food and land when *that* is to their advantage. They begin adopting those modes of property ownership and resource distribution that are most suitable for them and their kin under the evolving conditions. The evolution of economic ownership and distribution has run in the same basic way all over the globe throughout history and prehistory, and that suggests the existence of the very kind of organism that Darwinian conflict theory has described.

STRATEGIES OF ECONOMIC GROWTH IN WORLD HISTORY

In two recent books the economic historian Graeme Donald Snooks (1996, 1997) has proposed that the members of human societies have relied on one or another of four strategies of economic growth or wealth expansion. These are strategies quite apart from those of redistribution and surplus expropriation just discussed. Snooks calls these strategies, which he refers to as *dynamic strategies*, the *family multiplication strategy*, the *conquest strategy*, the *commerce strategy*, and the *technological strategy*. He argues that the members of a society (or their economic and political elites) select the strategy that works best under the circumstances in which that society finds itself. Any particular dynamic strategy eventually exhausts itself, at which point the society shifts to the next-best strategy.

The dynamic strategy most likely to be found in small-scale preindustrial societies is the family multiplication strategy. Here families hive off from other families and occupy new land. This strategy has also been used by more complex societies in the settling of frontier regions, such as in colonial America.

The most common dynamic strategy in the world of large-scale agrarian civilizations has been the conquest strategy. Here the political leaders of a society, usually in close collaboration with its economic leaders, engage in a pattern of constant war against other societies. War becomes a large-scale business, and wealth is created in the form of the spoils of war: "additional agricultural land; additional labour in the form of slaves and soldiers; additional fixed capital in the form of captured military equipment, irrigation systems, buildings, transport facilities, etc.; treasure; and additional tax revenue" (1996:276). This strategy was preferred to all others because it was usually the most cost-efficient and produced the greatest return on investment. In order to achieve this return, ancient civilizations had to emphasize one form of technological advance, that involving military technology. The advance of military technology in the ancient world occurred, Snooks says, because war was not a game but a business, and in fact a very big business.

By far the greatest example of the conquest strategy is the Roman Republic and Empire. The dynamic strategists were the senators, who had launched this strategy by about the middle of the fifth century BC. Later the senators were replaced by the emperor as the primary strategist, a change necessitated by the need for greater centralization of the whole process of conquest. According to Snooks, by AD 138 the Romans had essentially exhausted their conquest strategy, but since there were no real alternatives to it the empire started on a process of long and slow decline. As another example of the conquest strategy Snooks discusses the Aztecs, whose budding empire in the fifteenth and sixteenth centuries was centered around the capital city of Tenochtitlán. Unlike Rome, the Aztecs did not make use of a large slave labor force, and there was no permanent army. But as in Rome, war became a serious business, and merchants, who relied on the commerce strategy, were greatly distrusted; however, since their wealth was useful to the state they were tolerated. The Aztec conquest strategy was cut short by the Spanish conquerers early in the sixteenth century before it had a chance to spread and ultimately to exhaust itself. Snooks speculates that had this not happened the Aztecs would soon have embarked on the conquest of much of North and South America.

A few agrarian societies have been fortunate enough to use the commerce strategy rather than the conquest strategy. This strategy involves the creation of wealth by producing and trading goods over as large an area as possible. It depends on favorable geographical and other circumstances that give a society the necessary access to markets and trade routes. Since commerce societies could not coexist peaceably with conquest societies, the former had to be beyond the reach of the latter. Snooks's leading examples of the commerce strategy are ancient Mesopotamia, Minoan society, the Phoenicians, classical Athens, the Italian city-states of Venice and Genoa at the time of the Renaissance, and Europe between the sixteenth and eighteenth centuries. The greatest commerce society in all of premodern human history was ancient Greece. The Greeks were not only geographically suited for the commerce strategy, but, since they were divided into a number of small and independent states that were equally matched militarily, the conquest strategy could not be successfully employed. The Greeks employed their commerce strategy between approximately 800 and 550 BC. An integral part of this process was the founding of many Greek colonies in both near and distant regions. These colonies were important to the Greeks because "they were the means by which Greek city-states attempted to gain a monopoly over trade in a particular part of the Mediterranean" (1997:213). By around 550-500 BC the Greek commerce strategy had exhausted itself and Greece was forced to turn to the conquest strategy. However, it had no particular advantage in the use of this strategy and as a result subsided into insignificance as a world-class society. Venice in the time between approximately AD 1000 and 1500 was also a major commerce society. It followed a path similar to Greece's. It was ideally geographically situated for commerce, and it followed this strategy for several centuries. Soon, however, the strategy had run its course and, like Greece two millennia earlier, it turned to conquest. But since it had, also like Greece, no particular advantage in the use of this strategy the conquest strategy failed, and early in the sixteenth century Venice opted for a policy of neutrality and diplomacy.

According to Snooks, the history of Europe, England in particular, over the past millennium reveals a sequence of dynamic strategies. Between about AD 1000 and 1450 England used a conquest strategy. Once this strategy had been played out England adopted a commerce strategy. This latter strategy had itself been played out by the middle of the eighteenth century, and as a result England embarked upon what Snooks calls the technological strategy, or what I think might be more appropriately called the

capitalist strategy. This involved the substitution of inanimate for animate energy and was marked by, of course, the Industrial Revolution (1997:293-94):

> As far as Britain's dynamic strategists were concerned, the essence of the Industrial Revolution was that it devised cheaper ways (both technically and institutionally) of producing old products, such as cotton textiles, and new products such as consumer durables, and cheaper ways of transporting those products to markets at home (by canals and railways) and abroad (by steam-driven steel ships). . . . By providing ways of achieving favoured access to resources and markets other than the exhausted traditional ways of force, diplomacy, and physical proximity, the British Industrial Revolution imparted a new impetus to commercial expansion. But this time commercial expansion was the outcome of the technological rather than the commerce strategy.

Despite its short history, the United States has also undergone a sequence of dynamic strategies. In colonial America the strategy followed was that of dependent commerce, a version of the commerce strategy in which the colonies were a junior partner to England. This strategy came to an end late in the eighteenth century, and the United States then embarked, according to Snooks, on a strategy of family multiplication by expanding into the Western frontier. Once this strategy had been exhausted by around 1890, the United States took up the technological strategy. Snooks argues that the key to understanding US society is that it was the world's first "megastate" and the first society to create a "megamarket." Prior to the Civil War the United States was really made up of two subsocieties that were committed to different dynamic strategies. The North wanted to expand industrial capitalism into the Western frontier in order to create a megamarket, but the "longrun material success of Southern strategists depended more on their economic relationship with Britain than with the rest of America" (1997:379). The Civil War was really fought over this clash of strategies, and Snooks contends that had the South won the war the United States would have been divided into a number of nation-states rather than becoming one megastate. Thus, the outcome of the Civil War was essential to the preservation of the North's technological strategy, for this strategy could not have been sustained without a megastate and a megamarket.

The technological strategy has been relatively little employed in world history compared to the three other strategies. Why should this be so? Snooks's answer is that it was generally too expensive in comparison to other strategies. Snooks is highly critical of the conventional assumption made by historians that the agrarian civilizations of the ancient world gave little emphasis to technological advance because they were essentially uninterested in economic growth. They were keenly interested in such growth, he says, but had more cost-effective ways of achieving it.

By way of criticism, I have some difficulty understanding just what Snooks means by the family multiplication strategy. His discussion of it in his first book seems to make it clear that this was a strategy suitable to very small-scale societies. Yet in his second book we read that this was the major strategy of American society in the century between 1790 and 1890, and we also learn of the enormous amount of wealth that the use of this strategy created. But surely family multiplication cannot be much of a wealth-creating strategy on its own, let alone of the level of wealth that Snooks is referring to. Perhaps I misunderstand the family multiplication strategy, but it would appear to me that it could not create much wealth unless it were combined with one of the other strategies. For example, the expansion of the railroads was a major aspect of the expansion into the Western frontier of the United States, but this was driven by Snooks's technological strategy (or what I prefer to call the capitalist strategy) rather than by simple family multiplication.

Questions can also be raised concerning Snooks's specific employment of his four economic strategies. To take just one of the more prominent examples, consider Snooks's claim that Europe between AD 1000 and 1500 relied heavily on the technological strategy. To support his claim he is able to cite numerous examples of technological development during this time, but is it not just as logical, if not more logical, to regard European societies at this time as employing the commerce strategy? William McNeill (1982) has argued that the world as a whole experienced a tremendous leap forward in the level of commerce after AD 1000, and certainly Europe, in particular the Italian city-states of Venice and Genoa, was a huge part of this commercial thrust. In fact, why separate the technology and commerce strategies in this case? Could it not be persuasively argued that Europe was using technological advance to promote a

commerce strategy, just as the ancient civilizations promoted the development of military technology to support their conquest strategies? And what about the period since the Industrial Revolution? Once again Snooks refers to this period as one characterized by the use of the technological strategy, but could we not argue that it was really the commerce strategy -better labeled the capitalist strategy, since it was world production as well as world trade that was involved - that was dominant and being served by technological advance?

Snooks also gets himself into trouble by seldom if ever looking at world history as a sociologist would. I agree with his rational choice and methodologically individualist grounding assumptions, but one cannot simply stop there. His work seems to contain *only* individuals, there being little if any recognition of the importance of social classes and economic inequalities as strongly implicated in world historical development. A glaring example of this absence involves Snook's analysis of Roman conquest. As he puts it, "Conquest was a business pursued to achieve the materialistic ends of *all Roman citizens*" (1996:293; emphasis added). *All Roman citizens*? Does Snooks really believe that the needs and concerns of all Roman citizens, rather than those of Roman elites, were being considered by the Roman polity in its mapping out of its objectives? Indeed he does, for he says at the beginning of the book that "the dynamics of human society arises from the decision-making not just of small elites but of all members of society both male and female throughout the world" (1996:xiv). Although elites may capture a disproportionate share of the economic surplus, he says, they merely express the general desires of humanity. If we shift our focus from the ancient world to modern times, we run into a similar problem. The modern world, many would say, is quintessentially a capitalist world, but capitalists are strangely absent from Snooks's view of this world. There are just individuals pursuing their economic objectives, all of which are the same.

In my view one of the most compelling features of Snooks's work is its resolute materialism. Snooks calls the theoretical model that underlies his work *materialist man* or *dynamic materialism*. This model holds that humans have an innate desire to increase their wealth and power. Indeed, he claims that they have an insatiable desire to accumulate material possessions. Snooks also appears, at least on the surface, to be grounding his economic materialism in a deeper Darwinian materialism. Snooks's humans look like Darwinian organisms in the sense that they have been built for a struggle for survival and a maximization of material advantage. Unfortunately, Snooks takes his argument too far and ends up producing a distortion of Darwin. Snooks attacks sociobiology and claims that its adherents have badly misunderstood Darwin. Humans only struggle for wealth and power, he claims, and this has nothing to do with the struggle for reproductive success. Indeed, Snooks claims that the latter struggle does not even exist (at least in the case of humans), and he contends that Darwin himself emphasized only an economic struggle, a struggle for material resources, not a reproductive struggle.

However, it is not the sociobiologists who have misunderstood Darwin; the misunderstanding lies entirely with Snooks. Not only did Darwin emphasize reproductive success, but his theory depended intimately upon it and makes no sense without it. Life is a struggle for both survival and reproductive success, and evolution cannot occur if organisms do not mate and leave copies of their genes in future generations. This is the only way an adaptive trait can spread throughout a population. What Snooks fails to see is that his general theory, materialist man, is not only compatible with sociobiology but makes sense only in terms of it. Why do people strive for wealth, status, and power? Because these are the resources they need in the struggle, not only to survive and prosper, but to attract mates and perpetuate their genes.

THE TRANSITION FROM FEUDALISM TO CAPITALISM[8]

The Transition in Europe

I take capitalism to be an economic system devoted to the sale of goods in a market in which the objective is to realize the maximum profit. This kind of economic activity has existed for thousands of years, but it has been only in the past few centuries that it has come to be the dominant form of economic action. Immanuel Wallerstein (1974a, 1974b) dates the emergence of modern capitalism in Europe from the

sixteenth century, but it is clear that important things were developing even earlier. Maurice Dobb (1963) sees merchant capitalism as beginning in the fourteenth and fifteenth centuries with the disintegration of the old feudal system and the rise of the towns, the latter being associated with the increased importance of the bourgeoisie, or merchant class. The primary source of merchant wealth was trade rather than production; the latter would not become the primary source of merchant wealth until after the middle of the eighteenth century. However, industrial production did exist and grew in importance in the centuries prior to the Industrial Revolution of the eighteenth century. Capitalism was also applied to agriculture in that estates came to be run with hired workers along the lines of capitalist farms (Wallerstein, 1974a).

Some students of European capitalism prefer a very early date for its emergence. Jere Cohen (1980) notes that in Renaissance Italy there was a form of capitalism that satisfied most of Weber's (1981[1927]) criteria for modern rational capitalism. Capitalism was born in Renaissance Italy, Cohen says, and then later copied by northern Europe. Fernand Braudel (1984) also sees European capitalism as beginning in Italy, and of the Italian city-states it was Venice that was the greatest capitalist city of them all. Venice had not only financial and banking institutions, but also factories and wage labor; it was overwhelmingly specialized for trade and its merchants and bankers stood at the very top of the social hierarchy. It was also the Italians who invented double-entry bookkeeping, marine insurance, and commercial law (J. Cohen, 1980). However, for Wallerstein the capitalistic developments of late medieval Europe differed in a crucial respect from what began to develop after the sixteenth century. He stresses that these early capitalist endeavors focused much more on trade in luxury goods or preciosities than staples or basic goods, whereas beginning in the sixteenth century a world-economy began to form on the basis of the production and trade of staples.

As we saw in Chapter 4, Wallerstein has stressed that capitalism was never simply a phenomenon limited to the nation-state, but rather from the sixteenth century on existed within the framework of a larger world-economy. At the end of this world-economy's first stage (about 1640), the capitalist core was concentrated in northwest Europe, mostly in the Netherlands, England, and northern France. Agriculture had come to be highly organized along capitalist lines, and industry and trade were of growing importance. Wage labor had largely replaced forced labor (serfdom). In the early seventeenth century all three core societies established mercantilist trading companies that allowed them to gain a monopoly on trade with their newly created colonies. For example, the Dutch East India Company, which formed in 1602, had a navy of between 40 and 60 ships and an army of almost 12,000 men. In the middle third of the seventeenth century it controlled the routes of the Far East and brought into Europe each year on the order of 10 to 12 million florins worth of goods. The periphery was located in Eastern Europe, mainly Poland, and in Iberian America (i.e., the Spanish and Portuguese colonies in the New World). Eastern Europe concentrated on grain farming for export to Western Europe using what Wallerstein has called "coerced-cash-crop labor." Hispanic America concentrated on gold and silver mining using several unique forms of forced labor, and Portuguese America engaged in both mining and plantation agriculture (sugar cane production) using slaves imported from Africa. In the second phase of the capitalist world-economy, which Wallerstein dates from 1640 to 1763, the world-economy expanded to include Sweden, Prussia, and the United States North as part of the semiperiphery and the Caribbean and United States South as part of the periphery. The core remained much the same, although there was great rivalry between the major core powers for control of the system. At this time the world-economy probably included no more than 20 to 25 percent of the world, but in capitalism's third phase, 1763-1917, the system expanded to include most of the globe. At the beginning of this phase the British Industrial Revolution got under way and a highly industrialized form of capitalism developed in the nineteenth and twentieth centuries in Western Europe and North America. That is a story much too detailed to tell in the limited space available here, but it is in any event a story that is very well known.

The Transition in Japan

Striking historical parallels seem to have existed between Europe and Japan from late medieval times through to the development of industrial capitalism in the nineteenth and twentieth centuries. Medieval Japan had a form of feudalism that closely resembled European feudalism, and Japan also underwent a transition from feudalism to capitalism that was very similar to the European transition to modern capitalism (Duus, 1969; Reischauer, 1956; Jacobs, 1958; J.W. Hall, 1970; T.C. Smith, 1959; P. Anderson, 1974b; Halliday, 1975). One of the first scholars to recognize the major economic developments in Tokugawa Japan (the period from 1600 to 1868) was Daniel Spencer (1958). Spencer has described a series of interrelated processes involving large-scale urbanization, commercialization of agriculture, increasing flight of peasants into the towns and cities, the worsening economic condition of the nobility, growth in the wealth and economic importance of the merchant class, increased monetization of the economy, and the beginnings of the factory system. More recently, Kozo Yamamura (1980) has shown that between 1550 and 1650 there was an agricultural and commercial revolution in Japan. The main cause of the major increases in agricultural productivity, according to Yamamura, was a change in property rights involving peasants' acquiring more control over their land. This was essentially a shift toward more capitalistic land tenure. With these changing property rights there arose a class of independent farmers similar to the yeoman farmers of early modern Europe. Yamamura holds that greater control over their land gave peasants increased incentives to make it productive. The commercial revolution involved a variety of state-supported measures to promote commerce, such as decrees to protect merchants, decrees designed to eliminate various restrictions on the operation of markets, active development of transportation networks and facilities, and standardization of measurements.

Sheldon (1958) has traced the rising economic importance of the merchant class throughout the Tokugawa period, but, like Yamamura, notes that important economic developments were taking place in the century before Tokugawa. Sheldon sees the Genroku period (1688-1703) as the critical one in the merchants' economic evolution, because by this time there was a thriving money economy and the merchant class had grown strong enough so that the nobility was forced to regard it as a serious economic competitor. John Whitney Hall (1970) sees the growth of mercantile activities during the Tokugawa epoch in similar terms, pointing out that it was during this time that a bourgeoisie first rose to a position of national prominence.

An important part of Japanese economic development during the Tokugawa era, the seventeenth century in particular, was urbanization at a level so extensive that Hall (1970) regards it as very likely without historical precedent (cf. Goldsmith, 1987). For example, Edo (modern Tokyo) was not much more than a small village at the end of the sixteenth century, but by the early eighteenth century it had reached half a million in population and by the end of that century it contained well over a million persons (Spencer, 1958). The extent to which capitalism was emerging in Tokugawa Japan can also be seen by examining one of the most important aspects of capitalist development: proletarianization of the labor force. During the Tokugawa period Japan was becoming a more impersonal, money-dominated society with an increasing part of its labor force being compensated in the form of wages; by the end of the period wage labor had become the major form of compensation, at least with respect to urban workers (Leupp, 1992). Wage labor even became increasingly important in agricultural work (T.C. Smith, 1959).

By the end of the Tokugawa Shogunate in 1868 Japan had become an essentially capitalist society in economic terms despite retaining largely feudal social and political arrangements. The merchant class had grown enormously in economic importance. Japan had undergone tremendous commercialization, both in agriculture and in industry, and had become one of the most urbanized societies in the world. It has even been claimed that by the end of the eighteenth century nearly 95 percent of Japan's wealth was in the hands of the merchants, a clear indication of the extent of the economic changes (Spencer, 1958). It was the merchant class that was in economic if not political control of late Tokugawa Japan.

Explaining the Transition

My explanation of the rise of capitalism in Europe and Japan is largely ecomaterialist but to some extent polimaterialist. There were several basic characteristics shared by Europe and Japan that I argue operated as important preconditions facilitating their transition to capitalism. However, these preconditions occurred only within the context of a particular historical juncture that marked the culimination of a great historical trend. It was the interaction of these factors - the preconditions on the one hand and a major historical trend on the other - that made the transition possible in these two regions of the world.

What did Europe and Japan have in common that gave them a decided advantage in the capitalist transition? I see five factors as critical. First there was *size*. Japan and two of the three leading capitalist countries of early modern Europe - England and the Netherlands - were small, and as such contrasted markedly with such Asian societies as China and India, which were large bureaucratic empires. This is important because maintaining a large state is more costly than administering a small one (cf. Braudel, 1984, in the case of early modern France); a large state drains resources that could be used more directly for economic development. Large Asian societies like China and India were simply so large that obstacles were put in the way of economic development. In Asia Japan's much smaller size gave it a clear advantage. Of additional importance was *geography*. Japan, England, and the Netherlands were all located on large bodies of water, and this allowed them to give more emphasis to maritime than to overland trade. Maritime trade is far superior in terms of trade efficiency in that it allows a much greater quantity of goods to be moved, and to be moved more rapidly and at lower cost (Hugill, 1993; Braudel, 1982). A third factor was *climate*. Europe and Japan both had temperate climates, which is significant when we recognize that most of the world colonized by Europe had tropical or subtropical climates. These colonized regions were best suited to the kinds of economic activities - production of raw materials for export - that European states wanted to use its colonies for. Two extremely successful British settler colonies, the northern United States and Australia, had climates poorly suited to peripheral economic activities and as a result were given much more freedom to develop under their own impetus. Climatologically, Japan was like these settler colonies. It may have escaped peripheralization by Europe at least partly because of its climate or its distant northerly location, and escaping peripheralization has proven to be extremely important to a society's economic success. Fourth, there was *demography*. Both Europe and Japan experienced dramatic population growth during their feudal and early capitalist periods. Population grew substantially throughout the first half of the Tokugawa era (Jannetta, 1987), and continued to grow, albeit more slowly, during the second half of this era (Hanley and Yamamura, 1972). The total population of Europe in AD 1000 was approximately 30 million. By 1340 that had increased by some two and a half times to 74 million. Population declined between 1350 and 1450, but after about 1450 Europe began to undergo a long trend of increasing population, and between that time and the eve of the Industrial Revolution the total European population more than doubled (Livi-Bacci, 1992). Marvin Harris (1977) and others have seen the buildup of population pressure as contributing to the declining efficiency of European feudalism and the shift toward capitalism, but I see the significance of population growth somewhat differently. Population growth led to growing urbanization, and this provided a larger pool of workers and stimulated expansion in the size of economic markets. Urbanization also promoted economic differentiation and specialization and more efficient utilization of various resources (Boserup, 1981).

The fifth factor, *political structure*, was quite likely the most important precondition of all. Europe and Japan had the only true feudal regimes in world history (Anderson, 1974b). Moreover, the feudal systems of Europe and Japan arose at about the same time in world history and persisted for remarkably similar lengths of time, about seven centuries. The feudal regimes of these two regions were extremely important because of the freedom they gave to their merchant classes to pursue their economic objectives relatively unhindered. It is widely agreed that large bureaucratic empires smother mercantile activity because they see it as a threat to the way in which they extract surplus. The high levels of political decentralization in Europe and Japan meant that mercantile activities could not be constrained as tightly as they were in large bureaucratic states. Perry Anderson (1974a, 1974b) has called attention to the unusual

level of economic freedom enjoyed by the towns of Europe and Japan, and Norman Jacobs (1958) has stressed the remarkable freedom and independence of Japanese merchants compared to merchants in China. Mercantile activity had an importance in Europe and Japan that exceeded by a considerable amount the significance it had in Asia.

Yet as significant as these five preconditions were, they could not have produced capitalism when and where they did without another important condition, and that was the long-term expansion of world trade and the growth of world commercialization over several millennia (Sanderson, 1995b, 1999:107-13). Between about 3000 BC and the beginnings of the modern capitalist era, there was a dramatic increase on a world scale in the size and density of trade networks and in the level of urbanization. Cities grew larger and there were many more large cities as time went on. Prior to about 2200 years ago, trade networks did not transcend local or regional levels, but after this time a worldwide network of trade stretching from the Mediterranean to China was established (Curtin, 1984). After approximately AD 1000 trade networks became even more extensive and a greater quantity of goods passed through them (McNeill, 1982; Wilkinson, 1992). This long process of expanding world commercialization was critical for the development of modern capitalism because capitalism could not emerge suddenly, even if suddenly is operationally defined to mean a few hundred years. Because agrarian elites were usually hostile to capitalist activity, it could only emerge slowly and therefore required a long period of incubation before it could reach a "critical mass" essential to a tipping of the balance of economic power in its favor.

My explanation of the rise of modern capitalism is thus that it resulted from the interaction between the five preconditions and the level of world commercialization that had been reached by about AD 1000-1250. Once a critical threshold of commercialization had been achieved, a capitalist "takeoff" in those two regions of the world most hospitable to capitalist activity was possible. The long-run expansion of world commercialization is in all likelihood the truly critical factor in all this because, as Fernand Braudel (1984:96) has said, "There could be no world economy until there was a dense enough urban network with trade of sufficient volume and regularity to breathe life into a central or core zone." Braudel is speaking of Europe, but his argument applies to Japan as well. Japan carried on a very substantial trade with East Asia during the second millennium AD, and it has been considered a major maritime power in this part of the world between the thirteenth and fifteenth centuries (J.W. Hall, 1970; Braudel, 1982). Of the preconditions that interacted with this expanding level of world commercialization, I regard the most important as the economic freedom allowed to merchants by decentralized political relations. Merchants in Europe and Japan could not have accomplished what they did when they did if they had been smothered by a centralized agrarian state.

ADDITIONAL EVIDENCE

In terms of food preferences, Harris (1985) and Abrams (1987) provide long lists of societies that eat insects and the various types of insects they eat. A surprising number of societies eat insects, and these are not just preliterate societies but in some cases true civilizations. On the basis of optimal foraging theory, Harris argues, quite persuasively in my view, that societies that eat insects tend to lack large vertebrate species suitable for eating and thus will remain highly meat deficient if they do not turn to insects. Insect eating is most common in tropical forests that contain large swarming insects. Dogs and cats are eaten in some societies, but are not in most because, as carnivores, they have to be fed meat. They are therefore very inefficient sources of animal protein, and tend to be eaten only when other sources are highly restricted. Harris (1985) has some interesting things to say about cannibalism, especially warfare cannibalism. Eric Ross (1980) has developed an interesting ecomaterialist theory of the shift from pork to beef as the most highly esteemed meat in American society in the nineteenth century. He gives emphasis to changes in ecological, technological, and economic forces. Why is hot and spicy food so popular in so many regions of the world? Rozin (1987) suggests that one possibility is that spices like chili peppers cause the brain to secrete opiates that, at a sufficient level, bring pleasure. Billing and Sherman (1998) show that spices are used more frequently in regions with hotter climates. They argue that this is because in such

climates food spoils more rapidly and spices have important antimicrobial properties. The hotter the region, the more likely people will use those spices with the greatest antimicrobial properties. Billing and Sherman conclude in good biomaterialist fashion that people spice their food becauses it enhances their health, longevity, and reproductive success.

There has been a major revival in the last several decades of the study of slavery in the New World, and much of the new literature is devoted to showing the economic foundations of slavery. The really pioneering work was undertaken by Fogel and Engerman in their book *Time on the Cross* (1974). These economic historians carried out detailed quantitative analyses of slavery in the American South showing how it was a highly efficient capitalist system through and through. Their book provides the answer to antimaterialist analyses such as those of Genovese (1965, 1968, 1969, 1974). Tomich (1990) shows the relationship between slavery and the capitalist world-economy in Martinique in the middle of the nineteenth century. Blackburn (1997) deals with the relationship between slavery and capitalism in a much broader geographical and historical sense. See also Fogel (1989), Tomich (1991) and McMichael (1991). In a fascinating article, Halliburton (1975) has shown that a number of slaveholders in the U.S. South were black, demonstrating the priority of economics over race in the formation and maintenance of slavery.

NOTES

1. For a much more detailed treatment of subsistence modes and their determinants, see Sanderson (1995a:Chapter 4, 1999).
2. The Meriam, who are located between Australia and New Guinea, hunt turtles and a few men do most of the hunting, so here we have a fourth ethnographic instance of a few men bringing home most of the meat (E.A. Smith, 1999; Smith and Bliege Bird, 2000). It is possible that this pattern represents a form of "costly signaling," a term used by Zahavi and Zahavi (1997) with respect to their so-called Handicap Principle. (See Chapter 15 for discussion of this concept.)
3. A much more detailed treatment can be found in Sanderson (1994, 1999:134-80).