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Production, social controls, and ideology: toward a sociobiology of the phenotype

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The paper discusses the relationship between reproductive success and economic control in human societies. It is argued that sociobiology must be concerned with the phenotype, which is in turn influenced by genetic variation, environmental influences during development, the belief structure of the society, socio-political constraints and the economic productivity of the society as independent variables. It is argued that increased production has resulted in increasing importance of belief structures and social controls for explaining variance within cultures in male reproductive success. Although a correlation between reproductive success and control of resources exists in human societies as a main effect, the strength of this association varies in different societies and is importantly affected by the belief structure and socio-political constraints of the society. Sociobiology emerges as an important descriptive but not predictive theory of human societies.

Introduction

Despite a large recent literature on the relation between evolutionary biology and human social behavior, remarkably little attention has been given to developing a theory which encompasses the major factors that have had a prominent role in producing individual differences in reproductive success within human populations. I will be concerned here with proximate mechanisms for the development of adaptive phenotypes. Sociobiological theory presents the best account we now have of the ultimate mechanisms involved in human evolution, e.g. that there is a genetic basis for human social behavior, and that this system evolved by its effects on individual genetic fitness. Sociobiological theory is not a theory of how genes act via proximate mechanisms to produce social behavior, nor is it a theory of how proximate cultural forces have acted to produce adaptive phenotypes and individual differences in reproductive success among humans. A detailed examination of these mechanisms in different cultures provides important information on the flexibility of human social behavior and provides suggestions on the importance of the different factors in different cultures. In particular, I will be concerned with the strength of the association between control of economic resources and reproductive success in particular societies, and with arguing for the importance of the following factors in explaining the strength of this association.

(1) Differences in the effects of socio-political constraints. For example, a male individual at the bottom of an extremely hypergamous society or a highly stratified society with little

social mobility may have little chance of improving his possibilities for reproductive or economic success because of the power of others.

(2) Differences in ideology. Sociobiologists have made two claims regarding ideology. Wilson (1978) states that individuals accept ideologies that increase their chances of reproductive success. One accepts the ideology of a group because one's reproductive success is thereby increased. Successful ideologies, in turn, are presumably those which result in genetic success for those who embrace them. The second claim, very reminiscent of Marxism, is that ideologies are structures which serve the interests of the powerful members of the society. 'Ideology is basically a system of mystifications designed to hide parasitic relationships' (Van den Berghe, 1979: 208-209). These claims about ideology are somewhat at odds with one another, since the second claim implies that a great many individuals in a society could hold beliefs that were not in their own genetic interest. Indeed to the extent that there have been or are genetically exploitative societies which are ideologically unified, the generality of Wilson's proposal is cast into doubt. In this paper I will be interested in describing how the belief structures of the society reinforce or conflict with the reproductive interests of the individuals within the society.

(3) Overall economic productivity. The economic productivity of a society is likely to have important effects on the possibilities for reproductive variance within human societies. It would be inconceivable for a male in a hunter-gatherer society to have a large number of wives but this remains a possibility in a highly productive, exploitative society (Van den Berghe, 1979).

In addition, two other factors stemming rather directly from sociobiological theory are relevant:

(4) Differences between males and females in reproductive capacity. Several writers have commented that males have far greater reproductive capacity than females, so that females become a scarce resource. This fact has had immense impact on human social structure and on differences between males and females in reproductive success. Thus, polygyny is quite common in human societies while polyandry is exceedingly rare (Alexander, 1979).

(5) The principle of the maximization of inclusive fitness states that there is a central tendency for individuals to attempt to maximize their inclusive fitness. Thus, some of the variance in reproductive success in human populations is likely to be due to benefits and losses due to the maximization of inclusive fitness by others. These last two factors will be in evidence throughout the paper.

Finally, two other factors, although not discussed in detail in this paper, are clearly relevant to an adequate theory, and they will be summarized briefly before continuing with the main topic of the paper:

(6) Genetic differences between individuals. Behavior genetic studies have shown genetic variation for many traits, so that a person's adaptiveness could be constrained by his genetic constitution. This is nothing more than the assumption of behavior genetic and population genetic theory that in many cases genes can be assigned fitness values. Genetic variation can also exist for the impact of environmental events on the phenotype. Thus, Ginsburg (1969) found that there was genetic variation for the timing and extent of the sensitive period for the effects of early handling in different mouse strains, and a similar situation may occur in humans.

(7) Differences in environmental influences during development. Developmentalists have repeatedly shown that the environment interacts in complex ways with the genetic constitution of the organism to result in adaptive phenotypes. The facilitation effect (Gottlieb, 1976) of early environments is particularly clear in mammalian behavioral systems. Apart from this facilitation effect, there is reason to believe that human social behavior is funda-

mentally dependent on the affective especially from the parents, during shown to have long-range effects. Other works inspired by the ethology shown that attachment classification mediated by the affective consequences proximate mechanism involved genetically based tendencies to respond of environmental stimuli, results in logically based but also highly flexible during development. What is program stimuli, not the phenotype itself. environment during development has also called attention to the environments.] Differences in early ated with effects on altruism and interest [see MacDonald (1982) for cross-cultural study of 80 pre-ind that fathers tend to be closer to the patrilocal residence, the extended (p. 203). Father distance is also a one study (Whiting, 1965) indicating violence and strife in father distant societies aggression and violence women and resources, a matter of tation of these data is that the a being manipulated with results on

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mentally dependent on the affective consequences to the child of environmental stimuli, especially from the parents, during development. Thus attachment classification has been shown to have long-range effects on both cognitive and social behavior (Sroufe, 1979). Other works inspired by the ethological theory of attachment (Bowlby, 1969; 1973) has shown that attachment classification depends on early parent-child interactions and is mediated by the affective consequences of parent behaviors on the child. In this case the proximate mechanism involved in attachment behavior, which relies ultimately on genetically based tendencies to respond with positive or negative affect to particular types of environmental stimuli, results in a view of human social behavior that is at once biologically based but also highly flexible, since it is responsive to environmental contingencies during development. What is programmed is the affective consequences of environmental stimuli, not the phenotype itself. It thus becomes possible to manipulate the affective environment during development to result in adaptive phenotypes. [Lewontin (1981) has also called attention to the fact that individuals and species can select their own environments.] Differences in early affective environments have been found to be associated with effects on altruism and sexual orientation, two topics of obvious sociobiological interest [see MacDonald (1982) for a detailed discussion of these points]. In addition a cross-cultural study of 80 pre-industrial countries by West & Konner (1976) indicated that fathers tend to be closer to their children in cultures 'where combinations of polygyny, patrilocal residence, the extended family or patridominant division of labor are absent' (p. 203). Father distance is also associated with violent or hyper-masculine behavior and one study (Whiting, 1965) indicates more assault, homicide, and a preoccupation with violence and strife in father distant cultures. West and Konner point out that in many societies aggression and violence associated with father distance are used to accumulate women and resources, a matter of obvious sociobiological interest. The simplest interpretation of these data is that the affective environment of the child during development is being manipulated with results on the adaptiveness of the phenotypes produced.

It is the interaction of individual differences in all these systematic factors, as well as chance events, that result in the distribution of reproductive success among individuals.

Economic productivity, socio-political controls, and reproductive success

Writers on human sociobiology have attempted to link reproductive fitness with socio-economic status (for example, see Chagnon, 1979; Dickeman, 1979; Irons, 1979). This is an attractive strategy because it is intuitively obvious that many humans seek higher socio-economic status, that people with higher socioeconomic status have greater control over resources and other people, and perhaps greater reproductive success.

Central to this discussion is the idea of relative intensity of production, defined as the relative amount of production possible per worker. For example, by using a plough, the potential area of cultivation of one person per season could increase from 6 acres to about 60 acres so that an individual could produce much more than he could consume (Goody, 1976). Human evolution has been characterized by increasing intensity of production. Agricultural economies outproduce hunting and gathering societies, and plough agriculture is far more productive than hoe agriculture (Goody, 1976). From a sociobiological perspective the possibilities of greater individual economic production yield the prospect of greater reproductive variance, since possible differences between individuals in economic production are greater, and Van den Berghe (1979) presents data suggesting such an association. Thus, intensity of production may be related to patterns of individual Darwinian fitness and be an important parameter in any sociobiological theory of human evolution.

Reproductive variance may be affected by increased intensity of production not only as a result of individual differences in the ability to produce, but also by the ability to control resources and/or the production of others. Thus socio-political controls on production and resource control assume great potential importance and make it possible for individuals to inherit much more than genes from the previous generation. Human history is replete with examples of individuals inheriting political and/or economic power.

There is important variation between societies in the importance of these social controls. In some societies there are no means of production that can be passed on. A hunter may be able to pass nothing at all meaningful in the way of possessions or land although he may be able to pass on knowledge and political connections. Scarcity of resources, difficulty in accumulation or storage, or the need for cooperation may prevent individual accumulation and the possibility of passing resources on to the next generation. On the other hand, some individuals may be able to guarantee high reproductive success for their offspring by allowing them to inherit land, titles, political position, etc. However, if reproductive success is indeed associated with control of resources, the individual must decide whether to concentrate his resources in a few offspring or to divide them among many. This is the problem of devolution, and situations can easily be envisaged where the wishes of parent and offspring do not coincide. If the relation between reproduction and resources is linear, then it should make no difference how resources are passed from parent to offspring. If, however, the relationship is a convex function (see Fig. 1), so that for X individuals, an individual with $1/X$ of the estate would leave on the average less than $1/X$ of the total number of offspring possible if the wealth were concentrated in fewer hands, the best strategy is clearly to concentrate the wealth in the next generation despite the fact that this may not be in the interests of the disinherited siblings or half-siblings. This nonlinear relationship between resources and reproductive success could quite possibly occur if maximum reproductive success could only occur with a large, undivided form of wealth. In addition, some social categories relevant to reproductive success and resource control, such as political position, may not be easily divisible at all. This strategy of creating a large variance in the reproductive possibilities of one's offspring would be consistent with adopting the strategy of allowing some of one's offspring to inherit only very limited resources and power. Thus, allowing some of one's offspring to descend economically in no way necessarily implies a voluntary curtailment of reproductive fitness. In a world of finite resources, the best strategy may be to keep a large economic unit intact. This has, in fact, been the case in many stratified Eurasian societies where land is a scarce resource (Goody, 1976).

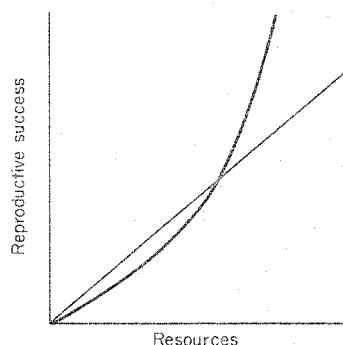


Fig. 1. The convex curvilinear case for the relation between control of resources and reproductive success. In this case the better strategy of devolution for individuals with a large amount of resources is to concentrate the wealth in the next generation.

In considering the various possibilities of increasing importance of what one individual differences in reproductive success, lower levels of productivity, a hunter's success beyond his genes and perhaps effects on the success of his offspring. These personal influences have found that among many groups, the transmission of intangibles as mother's rank and other social resources can be passed on it is important for future success in the next generation. Individual differences (person characteristics) from the previous generation (social structure) influence sons and daughters in how much they achieve, especially if polygyny is possible. The relation between wealth and reproductive success is a simplification of the importance of the relation. Since it is important to keep a large unit intact, the relation between sons and daughters, first marriage and offspring of concubines, and the transmission of non-genetic phenomena, especially in the following sections, examples of the relation between economic resources and reproductive success. Socio-political constraints on resource control are followed by a section emphasizing the importance of controls of the society for the part

Societies with

In a society with low intensity of production, the differences are due to individual differences in the ability to produce, losses due to the fact that others may not be able to produce due to the control by one individual. The relation between wealth and reproductive success is a simplification of the importance of the relation. The Yanomano Indians are due to differences in the transmission of patrilineal. The relatives of the headman, in turn, helps them acquire resources. In the case of kin selection, since there is a high degree of kin selection, it is used for the economic and reproductive success.

Among the Kung, there is a very high degree of hoarding, arrogance, and authority. The relation between wealth and reproductive success is a simplification of the importance of the relation. There is much more inequality in the transmission of wealth (Goody, 1976). The latter group is more successful in the transmission of wealth. Whereas both groups are very successful in the transmission of wealth, the Kung are much more successful in the transmission of wealth. The relation between wealth and reproductive success is a simplification of the importance of the relation. It would be very difficult for a man to pass on his wealth to his offspring. The catch from his hunting must be shared with the group. In competition for women, the man would have to be very successful. In an arid desert environment. In Arnhem Land, the relation between wealth and reproductive success is a simplification of the importance of the relation.

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In considering the various possibilities for devolution, it should be noted that there is an increasing importance of what one might call 'non-person' or 'social' categories relevant to individual differences in reproductive success as societies become more productive. At the lower levels of productivity, a hunter-gatherer or a Melanesian Big-Man can leave little beyond his genes and perhaps effects due to his personal influence during the development of his offspring. These personal influences may be extremely important, and primatologists have found that among many groups of Old World monkeys status is based on such intangibles as mother's rank and membership in political coalitions (Wilson, 1975). When resources can be passed on it is important to realize that individual differences in reproductive success in the next generation will then depend not only on genetic or developmental differences (person characteristics), but also on differences in wealth or power accrued from the previous generation (social characteristics). Parents may also distinguish between sons and daughters in how much to leave to the next generation [Factor (4), above], especially if polygyny is possible (Hartung, 1976). In cases where there is a non-linear relation between wealth and reproductive success as discussed above, there will be an intensification of the importance of these non-person characteristics for reproductive success. Since it is important to keep a large economic-political unit intact, distinctions will be made between sons and daughters, first-born and later born sons, and offspring by a primary marriage and offspring of concubines. Thus, human sociobiology must concern itself with a host of non-genetic phenomena, especially in the more economically productive societies.

In the following sections, examples from the ethnographic literature will be given which illustrate the relation between economic production, resource control, and reproductive success. Socio-political constraints on reproduction will also be discussed. This will be followed by a section emphasizing the importance of the belief structure and socio-political controls of the society for the particular case of Western society.

Societies with relatively low intensity of production

In a society with low intensity of production, individual differences in reproductive success are due to individual differences in production or resource control as well as benefits or losses due to the fact that others seek to maximize their inclusive fitness. A large variance due to the control by one individual of others' production does not occur. Chagnon (1979) argues that the rather spectacular individual differences in reproductive success among the Yanomano Indians are due to differential control of material resources by the heads of the patriline. The relatives of the headman support him with material resources and the headman, in turn, helps them acquire mates. Such a system is most reasonably considered a case of kin selection, since there is no indication that the production of unrelated individuals is used for the economic and reproductive benefit of the headman.

Among the Kung, there is a very low rate of polygyny and strong socialization against hoarding, arrogance, and authority (Cashden, 1980). In a closely related group, the Gana, there is much more inequality in possessions and a much higher rate of polygyny (Cashden, 1980). The latter group is more sedentary and has more buffers against variation in the food supply. Whereas both groups are without formal leaders, the Gana individuals attempted to talk to the group much more often. These results suggest that the economic differences between the two societies affect reproductive variation between the societies. For the Kung, it would be very difficult for a man to produce enough to support more than one wife since the catch from his hunting must be distributed among his wife's relatives. Moreover, intense competition for women would disrupt the cooperation needed for long-term success in a desert environment. In Arnhem Land in Australia, men who are good fighters or have access

to trading monopolies accumulate most wives (Berndt & Berndt, 1964). 'A man wants as many wives as he can get, if necessary by stealing them or killing their husbands' (Berndt & Berndt, 1964). Wives must be paid for so that fathers of girls are quite willing to sell their daughters to men of means. The result is that 'it is the forceful man with entrepreneurial leanings who is able to collect wives around him' (Berndt & Berndt, 1964). There is no wealthy class distinguished by birth and no ownership of land, so that each individual must strive on his own for economic and reproductive success.

Irons (1979) presents data from the Yomut Turkmen of Persia showing that wealthier men had higher Darwinian fitness than poorer men. Polygyny and bridewealth were practiced, and the price of a bride is described as exorbitant. Polygyny is thus the prerogative of the wealthy, and wealthy men marry at younger ages. Sons are provided with a patrimony and this has a moderate effect on their socioeconomic status but there is no evidence of unrelated individuals controlling the production of others. The economy is organized around the household consisting of an extended family. Sons eventually leave home and begin their own households. Thus, there are no unrelated individuals working for the household. The fact that sons receive an equal patrimony suggests a situation in which there is a linear relation between resource control and reproduction success, and indeed, Irons (1982) presents data that this is indeed the case.

Sahlins (1972) describes the greater intensity of production of the Melanesian 'big-man' cultures as compared with hunter-gatherer societies, and notes the large variance in production between households in big-man cultures. It is clear that the over-production of the big man is done not only for prestige but also for women (Sahlins, 1972). 'The Kuma indicate that a man is wealthy by saying of him 'there are wives; there are pigs; there is pig-wealth'. An abundance of one implies an abundance of the other two' (Reay, 1959). The clan of the woman must be compensated when a woman is married so that only a wealthy man has more than two wives. A wealthy man disposes of his valuables, but in doing so he builds up reciprocal obligations. This wealth for the most part cannot be inherited and sons must strive on their own to become wealthy (Reay, 1959). The main route to wealth is individual overproduction (Reay, 1959), and is clearly not exploitative, but the big men may exploit their own kinsmen by arranging marriages for them. The big man makes one large payment to the clan of the woman while repayment to the big man is gradual and more substantial than the original gift. Thus by skillfully arranging marriages a big man may obtain additional wealth (Reay, 1959).

A further interesting case occurred in the Trobriand Islands (Malinowski, 1965). Chiefs, especially in previous times, were highly polygynous, having up to 80 wives. Overproduction was the rule and much of it was used as payment by the family of the wife to the husband's family, so that the chief received vastly more goods than individuals with fewer wives. All individuals worked at cultivation, however, so that there was no unproductive bureaucracy. Every individual had a right to land so that the offspring of the chiefs claimed land easily, and in fact inherited rank from him. The amount of land available for cultivation was not a limiting factor of the system as described by Malinowski, and he states that 'Gardening . . . with a large surplus lies at the root of all tribal authority as well as the kinship system and communal organization of the Islanders' (Malinowski, 1965). Again, there is no class of unrelated individuals producing goods for the chief, since contributions to the chief's household occur only if a female of the contributing family is a wife of the chief. The vastly higher reproductive potential of the chief is maintained not by exploitation as we have defined it, nor by entrepreneurship or any particular skill at fighting, but by the ideology of the inheritance of rank.

The above cases are similar in that there is no class of unrelated individuals whose produc-

tion is being controlled to enhance can occur within this category in political rank or land ownership. have equal access to the means of Australian Aborigines, South Africa. This is definitely not the case with correlated with reproductive success.

Societies with r

Sahlins (1963) states that since the faction and depends on giving outsi to deplete his own faction and an to expand too much at the exper Without a greater intensification of fication of economic production, expect given the principle of inclu necessary to produce a high leve authority in Polynesia where pow They were installed in these offic ticular office. As an official, an in or personal superiority. Office was man obtained by his own labors duction. In a system such as this depend on reciprocity to control th of the people solely by the power

There is very good evidence th with a superior reproductive pos chiefdoms, states that for purpose their own family, a clear case of considered ideal. However, relatio by low ranking women then beco the Hawaiian economy. Moreover to the chiefs, to appropriate wo economic production (Malo, 195 did not engage in production cou prevented this group from becom times these members of the court

Hawaiian society was appare bloated weight of the court was often attempted conquest, with Ultimately, the system became t sometimes rebelled against the chiefs were killed in battle wit tolerated much imbalance in th limit to the high-handedness. M exploitation, even the appropri would fight. Malo (1951) indicat of kinship, although all the pec

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tion is being controlled to enhance the reproductive fitness of others. Important differences
can occur within this category in the importance of inherited social categories such as
political rank or land ownership. Chagnon (1979) points out that the Yanomano Indians
have equal access to the means of production, and this is very likely true in the cases of the
Australian Aborigines, South African Bushmen, and hunter gatherers generally (Fried, 1967).
This is definitely not the case with Trobriand Islanders, and inheritance is only moderately
correlated with reproductive success among the Turkmen (Irons, 1979).

Societies with relatively high intensity of production

Sahlins (1963) states that since the prestige of the big man is built on reciprocity within his
faction and depends on giving outsiders more than they can reciprocate, eventually he begins
to deplete his own faction and an upper limit of size is reached. When the big man attempts
to expand too much at the expense of his followers, antagonism and violence can erupt.
Without a greater intensification of the political order corresponding to the greater intensi-
fication of economic production, control of others cannot be achieved, and as we would
expect given the principle of inclusive fitness, external socio-political constraints would be
necessary to produce a high level of control. Sahlins contrasts this with the system of
authority in Polynesia where power was invested in individuals who had particular offices.
They were installed in these offices, so that competition, even if it did occur, was for a par-
ticular office. As an official, an individual's power did not depend on his personal charisma
or personal superiority. Office was often inherited and the productive ability which the big
man obtained by his own labors resulted now from political control over agricultural pro-
duction. In a system such as this reproductive exploitation becomes possible. Chiefs do not
depend on reciprocity to control the production of others, but can command the production
of the people solely by the power of their office.

There is very good evidence that the superior economic position of the chiefs coincided
with a superior reproductive position as well. Malo (1951), writing of the old Hawaiian
chiefdoms, states that for purposes of inheritance of rank, the chiefs tended to marry within
their own family, a clear case of maximizing inclusive fitness. Brother-sister marriages were
considered ideal. However, relations with other women were common, with some children
by low ranking women then becoming part of the courtly elite, a non-producing sector of
the Hawaiian economy. Moreover, it was common for the court nobles related fairly closely
to the chiefs, to appropriate women of the country people who were responsible for all
economic production (Malo, 1951: 61, 64). Country people who lived at court and hence
did not engage in production could not engage in legitimate sexual relations. This, of course,
prevented this group from becoming too much of an economic drain on the nobility. In bad
times these members of the court were the first to go without food (Malo, 1951).

Hawaiian society was apparently fairly unstable. Sahlins (1972: 145) states that the
bloated weight of the court was difficult to sustain. In order to rectify the situation, chiefs
often attempted conquest, with the eventual result of creating a yet larger bureaucracy.
Ultimately, the system became top-heavy with consumers and at this point, the producers
sometimes rebelled against the chief in conjunction with other chiefs, and many of the old
chiefs were killed in battle with the commoners. Sahlins (1972) states that the people
tolerated much imbalance in the flow of goods between chief and people but there was a
limit to the high-handedness. Malo also makes it clear that the commoners accepted much
exploitation, even the appropriation of women, but there was a point beyond which they
would fight. Malo (1951) indicates that the system was maintained by fear, not the ideology
of kinship, although all the people believed themselves to come ultimately from the same

man and woman. The ideology of kinship was clearly not enough to maintain this level of exploitation. Finally, it is tempting to suppose that the instability of the Hawaiian system was due to the rigid stratification that characterized the system. Offspring of the chiefly class, even by lower class women, remained for the most part in the chiefly class, thus further bloating the non-producing sector.

Tonga was not as stratified as Hawaii (Goldman, 1955). Kinship ties were more important than in Hawaii, and unlike the vast gulf between commoners and nobility in Hawaii, the Tongan commoners were individuals who descended from a series of younger brothers of the chiefs until they were further and further away from the head of the family (Gifford, 1929). The Tui Tonga owned all the land and exacted a tribute of first fruits from the commoners (Gifford, 1929). Goldman (1955) describes Tongan and some other Polynesian societies as exploitative, and this was true in a reproductive sense as well as an economic sense. The Tui Tonga was highly polygynous and 'it is evident by many tales and by a long list of illegitimate children that the Tui Tonga could command the person of any woman of lower rank' (Gifford, 1929). Commoners would sometimes present particularly beautiful girls to the chief so that the chief's blood could be better represented in their communities (Gifford, 1929). Since the inferior offspring of the Tui Tonga were gradually filtered down the social ladder, the system was in theory at least, more stable than the Hawaiian system. In fact, Goldman (1955) points out the increasing incidence of war, physical repression, and lessening of kinship ties among the people as Polynesian societies evolved to greater stratification.

A further intensification of the political order and thus, of socio-political constraints on reproduction is evident in the formation of states. Anthropologists characterize states as having permanent social classes which divide the population into different strata with unequal access to the means of production [see Cohen & Service (1978) for a review of the origin and definitions of nation-states]. The ideology of kinship is no longer of paramount importance in the state, but nepotism exists and there are methods for retaining status between generations. The analysis here relies heavily on the work of Goody (1976) and Dickeman (1979) on Eurasian states. Goody (1976) contrasts the extensive, hoe agriculture of Africa, correlated with polygyny, bride price and lack of states, with the intensive, plough agriculture of Eurasia, correlated with monogamy, dowry and the existence of states. High intensity agriculture means that a very large and variegated superstructure can be supported by agricultural labor and new relationships such as landlord, tenant and serf which are common in Eurasia but absent from Africa are formed (Goody, 1976). Land becomes a limiting resource and those who control the land must find strategies of heirship which allow for the devolution of land to their heirs without breaking up the estate too much. As Goody points out, there is a thin line between having too few heirs and having too many. A man with few children may end up without an heir and his property divided laterally. With too many children there will be too many claims on the estate, especially since women and sons-in-law were viewed as legitimate heirs. Such a system would result in a strong restraint on reproduction among the landowning classes.

One possible solution, discussed above, is to have rules specifying large differences in property rights between offspring depending on birth order, sex and mother. Thus although the Eurasian system tends toward monogamy, it is still possible to have concubines whose offspring have little or no property rights. Even within a legitimate marriage there may be large differences in property due first and later sons, or between the property due sons and daughters. Thus, sexual exploitation based on economic stratification is possible in societies with monogamy as the ideal or only allowable form of marriage. By in effect adopting different types of marriage individuals can allow for the downward mobility of some off-

spring while yet maintaining large e production that characterizes the Eu possibility of a huge variance in m omic production of other individual women, a man may achieve a very advantage intact for a few of his off

The case of classical China fits t rate of female infanticide coinciding China. Concubinage was common a major portions of land but did ob had large numbers of lower class master of the house retained the ri (until 1673) the wives of his male history' (Dickeman, 1979).

Van Gulik (1961), describing Cl that intensive polygamy was pract only one principal wife. During th who had to be a virgin when mar concubines. During the T'ang dyna some 3000 women and similar ca These practices occurred in conj Buddhism, and Confucianism and the Chou dynasty (1100-222 BC) amount of *tê*, i.e. virtue or magi passed to their offspring. Every produce male children who would a maximum amount of *tê*, he requ it through sexual intercourse. Int he could build up his vital force offspring of the queen would be cipal wife was allowed, presumably came from the upper classes, ensu the upper classes. Interestingly, same religious beliefs and commo and no ancestor cult. The result levels of society and a consequent Yet it was these males, as well as wealthy individuals. A similar ve situation in classical India.

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†William Hennessey, Asian Studi Communication.

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spring while yet maintaining large economic units intact. Coupled with greater intensity of production that characterizes the Eurasian civilizations, the immensely important theoretical possibility of a huge variance in male reproductive success exists. By combining the economic production of other individuals and marriage with more or less property rights for the women, a man may achieve a very large reproductive advantage and still leave his economic advantage intact for a few of his offspring.

The case of classical China fits this scenario quite well. Dickeman (1979) notes the high rate of female infanticide coinciding with hypergamy, the dowry and polygyny in classical China. Concubinage was common and the offspring of these lesser marriages did not inherit major portions of land but did obtain some economic benefits. Wealthy individuals often had large numbers of lower class women who served as wives for sons and retainers. The master of the house retained the right of sexual access to 'female slaves, their daughters and (until 1673) the wives of his male servants and slaves through four dynasties of Chinese history' (Dickeman, 1979).

Van Gulik (1961), describing Chinese sexual practices from 1500 BC to 1644 AD, shows that intensive polygamy was practiced by upper class males, although typically there was only one principal wife. During the Chou period (1100-222 BC) the king had one queen who had to be a virgin when married, three consorts, nine wives of second rank, and 81 concubines. During the T'ang dynasty (618-907 AD) the seraglio of one emperor numbered some 3000 women and similar cases occurred during the Sung dynasty (960-1279 AD).[†] These practices occurred in conjunction with a variety of ideologies, including Taoism, Buddhism, and Confucianism and various mixtures of these ideologies. For example, during the Chou dynasty (1100-222 BC) the ruling classes believed that they possessed a great amount of *té*, i.e. virtue or magical power which they inherited from their ancestors and passed to their offspring. Every man had a sacred duty to his ancestors and himself to produce male children who would perform sacrifices in the ancestral hall. Since the king had a maximum amount of *té*, he required a large number of females to nourish and perpetuate it through sexual intercourse. Intercourse with the queen was relatively infrequent so that he could build up his vital force by copulating with other women, with the result that offspring of the queen would be strong and intelligent heirs to the throne. Only one principal wife was allowed, presumably to simplify the process of deciding on an heir. This wife came from the upper classes, ensuring that the male heir's genetic endowment derived from the upper classes. Interestingly, upper and lower class individuals had fundamentally the same religious beliefs and commoners were believed to have only a negligible amount of *té* and no ancestor cult. The result of these practices was a shortage of females at the lowest levels of society and a consequent enforced bachelorhood for many males (Dickeman, 1979). Yet it was these males, as well as the slaves and eunuchs, whose production supported the wealthy individuals. A similar very convincing case is made by Dickeman (1979) for the situation in classical India.

Ideology and reproduction in the West

Dickeman (1979) describes Western Europe as a variant on the general Eurasian theme typified by China, but in fact, no evidence at all is given for a large variance in reproductive success based on socioeconomic position, and certainly, what differences there were could not approach those of societies where polygyny was an officially sanctioned ideal. Dickeman

[†]William Hennessey, Asian Studies Center, University of Illinois at Urbana-Champaign. Personal Communication.

makes it clear that female celibacy was an important way of life among the aristocracy, and male celibacy among the aristocracy, especially young sons, occurred at a higher rate in France and Britain than among the lower classes. Such a system is reasonably supposed to be conducive to socio-economic stability and the devolution of intact estates to favored offspring, but does not suggest higher reproductive success of individuals with greater economic resources.

The issue of polygyny is crucial. Culturally sanctioned polygyny in the West in a sense never existed since it never became the policy of the Christian churches. Polygyny occurred among the Frankish and Irish tribes recently converted to Christianity and persisted for some time after the conversion (Murstein, 1974). Charlemagne is a well-known example of a polygynous Frankish king, and his concubinage was tacitly allowed by the Church, presumably because Charlemagne greatly expanded the Church's power. However, after Charlemagne's death in the early ninth century, marriage became a center of the power struggle between Church and State. An early milestone in this battle was the confrontation between King Lothair of Lotharingia and Pope Nicholas I. In 858 the Pope 'hurled an anathema' at the king because he kept a concubine in addition to his wife, and appealed to other kings to combat him because of this practice. The affair dragged on for several years, with the Church's position reiterated by the next pope, Pope Adrian II, and ended only with King Lothair promising to renounce his concubine. In the following four centuries the Church ruled on marriage and usually succeeded in having its way (Murstein, 1974). Polygyny in Ireland was eliminated by the second millenium, and in 1193 King Phillip Augustus of France, the most powerful king in Europe, could not get his marriage annulled. Thus, beginning with no temporal power over marriage in the sixth century, the Church had complete control by the twelfth century, a control it maintained until the Reformation. Although the Protestant sects had much influence over marriage laws, particularly divorce, polygyny was not reinstituted on a large scale, and indeed many sects advocated extreme sexual repression. Luther did allow Phillip of Hesse to take another bride but did not publicize the fact, and clearly did so for political reasons. In 1650, during a depopulation following the Thirty Years War, the Frankish Kreistag allowed every man two wives (Westermarck, 1926). Such a policy need not lead to a large reproductive variance because all men had this right and no more than two wives were legitimate. This is certainly far less than the maximum variance possible if each man were allowed to have as many wives as he could support economically. Thus, the only instance in which external demographic factors influenced the practice of polygyny is one in which polygyny was encouraged. The consistency of Western monogamy without concubinage is all the more remarkable.

But if polygyny is not a characteristic of Western sexual practices, it remains to be shown that other illegitimate relationships did not, in fact, amount to the same thing so that indeed there is a high correlation between male reproductive success and socio-political rank. Before presenting this evidence it should be noted that the fact that non-monogamous relationships were more or less illegitimate is a fact about the belief structure of the society. One major problem with supposing that belief structures always serve the interests of the powerful (Van den Berghe, 1979) is to explain the existence of such a thoroughly monogamous, indeed anti-sexual, ideology even if the underlying sexual practices grossly violated the ideology.

Data are presented first for pre-industrial England in the sixteenth through eighteenth centuries because more data are available in this case. No claim is made that other areas of Europe did not have quite different patterns, but the data are sufficient to cast grave doubt on the inevitability of a very large variance in reproductive success depending on rank and economic status.

Stone (1977) points out that sex of change but were characterized by part of sixteenth and seventeenth regrettable necessity and an excess adultery. Sex was forbidden on Sur comments that God's looming presence it was believed that sexual excess theologians held relaxed views on of procreation and pleasure by the attitude Dryden, writing in the late practices were a long way from result

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After the eighteenth century thaw repression set in, motivated largely gentry, bourgeoisie, lower middle or the poor.

Stone also documents similar behavior. Church courts and justice of the seventeenth century in attes a lower ratio of bastards to Laslett, 1979), although Wrightso reporting in those years due to the constraint on reproduction. There century but Laslett (1979) states controls which most affected the undoubtedly fluctuated, in some gives a seventeenth century case was accused by his maid of havi inequality. The man was so asha (p. 80) and soon left town. Faircl the second most common cause again indicating the illegitimacy bastards disappeared from wills d and social controls can affect th spring independently of his own bastardy in the eighteenth cent Oosterveen and Smith (1979) co for English bastards than for th on the very high rate of mortali states that attempts were made t ebb and flow of the belief stru suggest that a two parameter t economic control is insufficient t

way of life among the aristocracy, young sons, occurred at a higher rate than a system is reasonably supposed to allow. The evolution of intact estates to favored individuals and the success of individuals with greater

polygyny in the West in a sense Christian churches. Polygyny occurred before Christianity and persisted for centuries. France is a well-known example of polygyny tacitly allowed by the Church, preserving the Church's power. However, after the Reformation marriage became a center of the power struggle. In this battle was the confrontation between Pope Nicholas I. In 858 the Pope 'hurled an anathema' in addition to his wife, and appealed to the emperor. The affair dragged on for several years. The next pope, Pope Adrian II, ended the affair. In the following four centuries polygyny continued to have its way (Murstein, 1974). In the sixteenth century, and in 1193 King Phillip II could not get his marriage annulled. In the sixteenth century, the Church continued to maintain until the Reformation. For marriage laws, particularly divorce, the Church indeed many sects advocated extreme polygyny. One man take another bride but did not publicly. In 1650, during a depopulation followed by every man two wives (Westermarck, 1926). Polygyny was encouraged because all men had to have as many wives as he could. This is certainly far less than the rate at which external demographic factors encouraged polygyny was encouraged. The conclusion is all the more remarkable.

In sexual practices, it remains to be seen whether the fact, amount to the same thing so far as male reproductive success and socio-economic status. It should be noted that the fact that non-monogamy is a fact about the belief structure and that belief structures always serve to explain the existence of such phenomena is to explain the existence of such phenomena even if the underlying sexual

in the sixteenth through eighteenth centuries. No claim is made that other areas of the data are sufficient to cast grave doubt on a reproductive success depending on

Stone (1977) points out that sexual behavior and attitudes did not show a linear pattern of change but were characterized by fluctuations. Christian hostility to sex was a prominent part of sixteenth and seventeenth century moral theology. Marital sex was viewed as a regrettable necessity and an excess of sexual passion towards one's wife was considered adultery. Sex was forbidden on Sundays, during pregnancy and in variant positions. Stone comments that God's looming presence was a powerful force for sexual restraint. In addition it was believed that sexual excess shortens life. However, in the late seventeenth century theologians held relaxed views on conjugal chastity which led eventually to the separation of procreation and pleasure by the later seventeenth century. Despite this relatively relaxed attitude Dryden, writing in the late seventeenth century, was well aware that present sexual practices were a long way from resulting in maximum variance in male reproductivity:

Pious times e'er priest-craft did begin
Before polygamy was made a sin
When man, or many, multiplied his kind
Ere one to one was, cursedly, confined
When Nature prompted, and no law denied
Promiscuous use of concubine and bride.

After the eighteenth century thaw and beginning about 1770 a new wave of more sexual repression set in, motivated largely by Methodist evangelical religion, and influenced the gentry, bourgeoisie, lower middle and respectable working class, but not the aristocracy or the poor.

Stone also documents similar trends in ecclesiastical and secular controls on sexual behavior. Church courts and justices of the peace were increasingly active in the first half of the seventeenth century in attempting to control sex and indeed, much evidence indicates a lower ratio of bastards to legitimate births during the Puritan era (Stone, 1977; Laslett, 1979), although Wrightson (1979) argues that the figures may represent under-reporting in those years due to the harsh penalties involved, an example of a socio-political constraint on reproduction. There was a decline in these external controls in the eighteenth century but Laslett (1979) states that it was the rules of respectability rather than external controls which most affected the rate of bastardy. Although attitudes toward illegitimacy undoubtedly fluctuated, in some cases they were clearly very negative. MacFarlane (1979) gives a seventeenth century case of a man much admired for his religious devotion who was accused by his maid of having impregnated her, presumably a relationship of social inequality. The man was so ashamed he 'keeps out of man's sight', 'fell to drunkenness' (p. 80) and soon left town. Fairchild (1978) also points out that adultery with a maid was the second most common cause of divorce in France during the mid eighteenth century, again indicating the illegitimacy of the action. One clear effect of these attitudes was that bastards disappeared from wills during the Puritan era, a clear case of how current ideology and social controls can affect the reproductive and social chances of a wealthy man's offspring independently of his own best interests. Stone also comments that penalties for bastardy in the eighteenth century often resulted in the children being abandoned and Oosterveen and Smith (1979) comment on data suggesting a higher infant mortality rate for English bastards than for the population as a whole. Fairchild (1979) also comments on the very high rate of mortality among French illegitimate children. MacFarlane (1979) states that attempts were made to abort illegitimate fetuses. Surely the mere existence of an ebb and flow of the belief structure and external controls on sexual behavior strongly suggest that a two parameter theory involving only reproductive variance and variance in economic control is insufficient to explain the data.

The foregoing does not imply that there was no variance in reproductive behavior associated with social class, and indeed, Stone documents greater fertility of the upper classes compared with the lower classes throughout this period, an effect ascribed to earlier age at marriage for both sexes, earlier remarriage if the woman died, and better nutrition and child care in the upper classes. However, even here there was a large percentage of wealthy families which did not leave an heir. Twenty five percent of squires and above left no heir and after 1650 the rate increased to 40%. Later-born children and daughters had much reduced chances of reproduction because of primogeniture, so that having a large number of children did not guarantee a large number of grandchildren. Whereas 90% of the population in general married, including the heirs of the rich, 20-26% of the sons of the rich did not marry. The percentage of unmarried daughters ranged from 10% in the sixteenth century to 25% from 1675-1799 (Stone, 1977). Serial polygamy in cases where the wife was living was difficult. Unlike the middle ages, it was difficult to get marriages annulled. In the late seventeenth century divorce was possible for the rich via an act of Parliament but this was not very common. Individuals in the middle classes had no means of divorce. Finally, between 1650 and 1750 the rich practiced birth control, a practice that also occurred in other parts of Europe.

We must also examine the extent to which the phenomenon of bastardy is associated with social class and attempt a rough comparison with similarly stratified, economically productive cultures where polygamy is practiced. Stone (1977) comments that the English royalty practiced the double standard and states that the English record for bastards by royalty is 20, held by Henry I (1068-1135). There were exceptions, however, and Charles I (1600-1649) is said to have been entirely monogamous. This compares with the performance of several Mormon polygamous males, discussed below, who despite far less wealth and power than the Kings of England had far more children. Indeed, the figure of 20 illegitimate children is comparable to the legitimate production of some monogamous marriages.

Data are now available regarding the general association between social class and illegitimacy in pre-industrial England and some of the findings are clearly relevant. Most illegitimacies were the result of relationships between individuals who might have chosen each other as spouse (Laslett, 1979). The largest group producing illegitimates was male and female servants who were waiting to be married. Moreover, even pregnancies arising from relations between a servant girl and her master could be the result of courtship, since many masters, especially widowers, married their female servants who had been their concubines.

Considering now actual studies of rates of illegitimacy and social class, Stewart (1979) reports data from Banbury parish between 1760 and 1840 showing that gentlemen fathered about the same percentage of bastards as would be expected on the basis of their representation in the population (0.7%) while male servants are disproportionately linked with bastardy, either as fathers of bastards or fathers of mothers of bastards. Levine & Wrightson (1979) found that of 29 fathers of illegitimate children in Terling from 1590-1640 whose social standing could be determined only one was a gentleman. Only one instance of sexual exploitation of a servant by her master was recorded. Again, it was the poor and obscure who were most involved in bastardy. Wrightson (1979) finds that fathers of bastards in mid-seventeenth century Essex and Lancashire were predominately husbandmen, artisans, craftsmen and servants. However, at least 23% of the fathers in Essex and 14% in Lancashire were in a magisterial position vis-à-vis the mother. These figures are higher than in the previous studies, but again they represent a minority of cases. The great bulk of illegitimacy here occurred between young people working as servants and reflected the uncertainties and insecurity surrounding courtship and marriage. A similar situation appears to have existed in France in 1727-1749 (Fairchild, 1978).

Overall one gets a far different picture (1979) for classical China in which status males because of the extreme exploitation of females occurs but account for only a minority of illegitimate degrees of social opprobrium and condemnation. There is the suggestion that women attempted abortions and for legitimate children. Social pressure, wills, a crucial factor if indeed reproductive economic success of one's offspring.

Reproduction, ideology

The thesis of an inevitable correlation between reproductive variance must also explain differences in societies, i.e., Western industrial societies and clandestine polygyny (Van den Berg, 1979). The relationship between fertility and economic system of industrial societies and children become more of an economic problem and provide for them well.

The arguments are cast into doubt prior to the industrial revolution, the strategy of investing resources in a family. In addition, such economic arguments for industrial society need not rely on a large number of children quite as an argument]. These arguments also adaptive for individuals in industrial society of offspring no matter how much between economic control and reproduction, data must be provided that progeny at some future generation have not been provided. If social ecological structure of the theory of control and reproduction. As Boserup's standard of living may be quite a different society. Beyond this level economic out the social-political and ideological simple fact that the great private associated with large numbers of children the belief structure and methods of investing exclusively in a very the optimum strategy, as discussed.

†F. C. Jahre, Department of History, University of California, San Diego. See also Amory (1947) for pre-modern centuries which indicate that illegitimacy

ance in reproductive behavior associated with greater fertility of the upper classes, an effect ascribed to earlier age at marriage, better nutrition and better health of women, and better nutrition and health of children and daughters had much to do with it, so that having a large number of children. Whereas 90% of the population of the rich, 20-26% of the sons of the rich ranged from 10% in the sixteenth century to 20% in the nineteenth century. Polygamy in cases where the wife was difficult to get marriages annulled. For the rich via an act of Parliament. Middle classes had no means of divorce. Birth control, a practice that also

phenomenon of bastardy is associated with similarly stratified, economically. (1977) comments that the English record for bastards by the sixteenth century, however, and Charles I. This compares with the performance of the poor, who despite far less wealth had more illegitimate children. Indeed, the figure of 20 illegitimate children of some monogamous marriages.

association between social class and illegitimacy are clearly relevant. Most of the individuals who might have chosen to produce illegitimates was male. Moreover, even pregnancies arising from rape can be the result of courtship, since many of the fathers had been their concubines.

Illegitimacy and social class, Stewart (1979) shows that gentlemen fathered illegitimate children on the basis of their representation. They are disproportionately linked with the fathers of bastards. Levine & Wrightson (1957) show that in Terling from 1590-1640 whose fathers were illegitimate. Only one instance of sexual intercourse. Again, it was the poor and obscure. (1979) finds that fathers of bastards in the mid-nineteenth century were husbandmen, artisans, and farmers in Essex and 14% in Lancashire. These figures are higher than in the nineteenth century. The great bulk of illegitimacy was concentrated in the lower classes and reflected the uncertainties of the period. A similar situation appears to have

Overall one gets a far different picture of this society than that presented by Dickman (1979) for classical China in which relatively few females were available as mates to low status males because of the extremely hypergamous nature of the society. Instead, sexual exploitation of females occurs but at relatively low rates, and relationships of inequality account for only a minority of illegitimate children. When it occurs it is subject to varying degrees of social opprobrium and guilt as well as the possibility of civil or ecclesiastical condemnation. There is the suggestion that infant mortality was higher for this group and that women attempted abortions and performed infanticide of bastards at rates higher than for legitimate children. Social pressure also affected whether bastards could be mentioned in wills, a crucial factor if indeed reproductive success is to be strongly associated with the economic success of one's offspring.

Reproduction, ideology and social controls in the post-industrial West

The thesis of an inevitable correlation between high economic productivity and high reproductive variance must also explain away the fact that the most economically productive societies, i.e., Western industrial societies, are legally monogamous, show relatively little clandestine polygyny (Van den Berghe, 1979) and indeed show something of an inverse relationship between fertility and social class (Alexander, 1979). Van den Berghe (1979) makes several arguments on this subject. Women make less of a contribution to the productive system of industrial societies and therefore, represent an increasing burden. In addition, children become more of an economic burden so that it is a better strategy to have a few children and provide for them well. Alexander (1979) makes similar arguments.

The arguments are cast into doubt by the preceding discussion of Western monogamy prior to the industrial revolution, where among the other points made, it appears that the strategy of investing resources in a few offspring occurred prior to the industrial revolution. In addition, such economic arguments ignore the fact that a wealthy individual in an industrial society need not rely on the economic production of his wives and could support a large number of children quite adequately [see also Barkow & Burley (1980) for a similar argument]. These arguments also would result in an unstable theory. If indeed it is always adaptive for individuals in industrial societies to give their resources to a minimum number of offspring no matter how much is available, there can be at best only a weak association between economic control and reproductive success. To be a legitimate K-selection argument, data must be provided that the high investment offspring actually leave more total progeny at some future generation than the total from low-investment offspring. These data have not been provided. If social class becomes the only variable of consideration, the basic ecological structure of the theory is lost: There is no longer any connection between resource control and reproduction. As Barkow & Burley (1980) point out, a lower middle class standard of living may be quite adequate for the purposes of reproduction in an industrial society. Beyond this level economic resources affect only social class. One is then led to seek out the social-political and ideological constraints on reproduction in these societies. It is a simple fact that the great private fortunes produced by the industrial revolution were not associated with large numbers of illegitimate offspring,[†] a fact probably much more due to the belief structure and methods of social control exercised by the society than to a strategy of investing exclusively in a very few offspring. Indeed even in societies with concubinage, the optimum strategy, as discussed above, may be to invest disproportionately in a few

[†]F. C. Jahre, Department of History, University of Illinois at Urbana-Champaign. Personal Communication. See also Amory (1947) for portraits of upper-class Boston males in the nineteenth and twentieth centuries which indicate that illegitimate children were not associated with these men.

legitimate offspring but to sire a large number of other offspring at relatively little cost which then move down the social ladder relative to their father's position. This combination of K and r selection strategies certainly cannot be said to be precluded in an industrial society for any theoretical reason. Finally, I will discuss an example of polygyny that occurred within Western society after industrialization. The example illustrates well the interplay between ideology and social control and the independence of reproductive patterns from economic productivity.

The case of the Mormons will be considered for the following reasons. (1) The Mormons advocated and practiced polygamy in the late nineteenth century and sporadically in the twentieth century at a time well past the rise of industrialization. (2) Ideology was a very important force in justifying the practice of polygamy within the Mormon community and indeed, was an important factor for those who opposed Mormonism because of the practice of polygamy. (3) The experiment in polygamy did not end because of any kind of selection against those who practiced it, but was ended by the government of the United States, i.e. it is an example of a socio-political constraint on reproduction. Thus, it is argued that the thesis that monogamy arose after industrialization because of the importance of large amounts of parental investment in a few offspring (Van den Berghe, 1979) is unlikely. (4) There is some evidence that there was an association between economic and social success and polygamy within the Mormon community.

The Mormons of the nineteenth century were a very energetic and successful group of religious people who managed to successfully colonize a large area of the Western United States. Their most famous doctrine, that of polygamy, was promulgated in 1841 and the practice was ended in 1904, although there were few polygamous marriages after 1890 (Ivins, 1972). Polygamy was indeed a symbol of the separateness of the Mormon people from the rest of the world and was viewed by them as a revival of Old Testament practices (O'Dea, 1957). They believed that the practice of polygamy was necessary to provide as many bodies as possible for waiting spirits in heaven, a practice that resulted in an emphasis also on large families (O'Dea, 1957). Progress to glory after death was greatly enhanced by a large family and O'Dea comments (p. 61) that 'As time went on the duty of plural marriage in relation to providing fleshly tabernacles for waiting spirits was more and more emphasized'. As Brigham Young said later in Utah . . . 'We must gird up our loins and fulfill this, just as we would any other duty'. Linn (1923) also discusses evidence that young women were willing to marry venerable church officers who already had harems because the older men were less likely to recant the faith, a circumstance that could result in the women going to perdition.

The considerable opposition to Mormonism centered around the polygamy issue and to a lesser extent around the issue of the political theocracy that characterized it (Hansen, 1972). Mormon polygamy became generally known in the 1850s and was, along with slavery, denounced in the 1856 Republican platform as 'twin relics of barbarism'. Polygamy was reviewed as a threat to morality and as degrading to women (O'Dea, 1957). President Hayes in 1880 called it a duty to suppress polygamy and President Arthur in 1881 referred to it as 'an odious crime'. Lamar (1972) states that the anti-polygamous Edmunds Act of 1882 would not have passed without the pressure on Congress of Protestant Churches and the National Religious Press. Protestant schools were set up to evangelize Mormon children and official government pressure on polygamy followed. The culmination of government actions was a Supreme Court decision in 1879 upholding a conviction for polygamy and the Edmunds-Tucker Act of 1887 which dissolved the Corporation of the Church of Jesus Christ of the Latter Day Saints. The Church announced in 1890 that it would abide by the laws of Congress and the experiment in polygamy was effectively finished. Five hundred

and thirty-seven people were convicted and confiscated.

There is no evidence that Mormon children than monogamous males. In fathering 56 children, Heber Kimball, polygamous families, more than 80%. There were 88 families with more than 50. The average was 15 children. 55 years had 1900 descendants (Ivins). reproduction of the males, polygamous than monogamous women—5.9 vs. 8. ideology [see the comment by Linn]. exploitation of the Mormon women.

Ivins (1972) points out that the r and that at its height perhaps 15–20 not been able to find a great deal of generally the higher ranking males w tion in the 1840s, polygamy was 'p of his trusted disciples' (Ivins, 1972: reproductive strategy as 'selecting selves in large numbers'. O'Dea (19 Mormon leaders. Linn (1923) states 'at least every prominent member a case in which a man was encour good business and could support 40 wives, died with an estate of b any account, it requires considerable by some of these men.

A no

The *jus prima noctis* refers to the individuals other than the husband much evidence that defloration w parts of Asia, Africa, North and S consequences of this practice are male benefiteurs of this practice w males of the community. In several is also clear. For example, the Bra were allowed to deflower the bride the king who made 'use of her at reclaimed her 'taking it as a great a phrase reminiscent of the attitud children by their women.

Westermarck argues that this ri but that the term hints at an ancient King of Ulster, who lived at the the maidens in his control. Belief fees paid to the feudal lord or e

her offspring at relatively little cost
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 n. The example illustrates well the
 dependence of reproductive patterns

following reasons. (1) The Mormons
 nth century and sporadically in the
 trialization. (2) Ideology was a very
 within the Mormon community and
 d Mormonism because of the practice
 end because of any kind of selection
 government of the United States, i.e.
 oduction. Thus, it is argued that the
 because of the importance of large
 (Van den Berghe, 1979) is unlikely.
 ation between economic and social

y energetic and successful group of
 e a large area of the Western United
 y, was promulgated in 1841 and the
 w polygamous marriages after 1890
 separateness of the Mormon people
 a revival of Old Testament practices
 ygamy was necessary to provide as
 practice that resulted in an emphasis
 y after death was greatly enhanced
 'As time went on the duty of plural
 r waiting spirits was more and more
 'We must gird up our loins and fulfill
 also discusses evidence that young
 who already had harems because the
 stance that could result in the women

d around the polygamy issue and to a
 cracy that characterized it (Hansen,
 in the 1850s and was, along with
 s 'twin relics of barbarism'. Polygamy
 g to women (O'Dea, 1957). President
 d President Athur in 1881 referred to
 anti-polygamous Edmunds Act of 1882
 gress of Protestant Churches and the
 p to evangelize Mormon children and
 e culmination of government actions
 a conviction for polygamy and the
 Corporation of the Church of Jesus
 ed in 1890 that it would abide by the
 as effectively finished. Five hundred

and thirty-seven people were convicted of plural marriage and over \$1,000,000 of property confiscated.

There is no evidence that Mormon polygamous males were less successful in raising children than monogamous males. Indeed, many males did quite well, with Brigham Young fathering 56 children, Heber Kimball fathering 65 and John D. Lee fathering 64. Of 1651 polygamous families, more than 80% had 10 or more children and 25% had 28 or more. There were 88 families with more than 30 children, 19 with more than 40 and 7 with more than 50. The average was 15 children per family. One six-wife elder after being dead 55 years had 1900 descendants (Ivins, 1972). Interestingly, although polygamy increased the reproduction of the males, polygamous females actually had fewer children on the average than monogamous women—5.9 vs. 8 (Ivins, 1972). Thus the system, reinforced by religious ideology [see the comment by Linn (1923) above], could be said to result in the genetic exploitation of the Mormon women.

Ivins (1972) points out that the majority of Mormon marriages were never polygamous, and that at its height perhaps 15–20% of the marriages were polygamous. Although I have not been able to find a great deal of evidence on this question, it would appear that it was generally the higher ranking males within the church who practiced polygamy. At its inception in the 1840s, polygamy was 'pretty much restricted to him (Joseph Smith) and a few of his trusted disciples' (Ivins, 1972: 103). Ivins (1972: 107) also characterizes the Mormon's reproductive strategy as 'selecting the highest ranking and having them reproduce themselves in large numbers'. O'Dea (1957) also speaks of polygamy as being an institution for Mormon leaders. Linn (1923) states that the authority of the church was exerted to compel 'at least every prominent member of the church to take more wives than one' and relates a case in which a man was encouraged to take several wives because he was doing a very good business and could support more women. Brigham Young, who had more than 40 wives, died with an estate of between two and three million dollars (Linn, 1923). By any account, it requires considerable wealth to raise the large numbers of children fathered by some of these men.

A note on the *jus primae noctis*

The *jus prima noctis* refers to the custom in many cultures of deflowering the bride by individuals other than the husband. In his classic treatment, Westermarck (1922) provides much evidence that defloration was a remarkably widespread practice, occurring in many parts of Asia, Africa, North and South America and pre-Christian Europe. The reproductive consequences of this practice are obvious and it is clear from the evidence given that the male benefiter of this practice were priests, kings, chiefs and noblemen: the high ranking males of the community. In several instances the role of ideology in maintaining this practice is also clear. For example, the Brahman casts of Malabar were held in such esteem that they were allowed to deflower the brides and in an early account the husband took his bride to the king who made 'use of her at his pleasure' for eight days (p. 173) after which the man reclaimed her 'taking it as a great Honour and Favour that his King would make use of her', a phrase reminiscent of the attitude of ordinary Tongans to allowing the Tui Tonga to father children by their women.

Westermarck argues that this right did not exist in feudal Europe after Christianization but that the term hints at an ancient right associated with the Celtic tribes. Thus Conchobar, King of Ulster, who lived at the time when Christ was born, had the right to deflower all the maidens in his control. Belief in the right probably resulted from misinterpretation of fees paid to the feudal lord or ecclesiastical authority at the time of marriage. The con-

clusion must be that the *jus primae noctis* was not a major source of reproduction for feudal lords in the Christian era and that what remained of the practice originated in pre-Christian times and was not a characteristic of Christian feudal society.

Conclusion

As stated earlier, one major problem with supposing that ideologies always reflect the interests of exploiters versus the exploited (Van den Berghe, 1979) is to understand the anti-sexual, pro-monogamy ideology of Christianity. Even if actual practice completely violated the ideology so that Europe was in reality an extremely hypergamous society in which wealthy individuals had dozens of de facto concubines and males at the bottom had little chance of marrying, it would be difficult to explain an ideology which condemned non-monogamous sex and even sexual pleasure within marriage.

Christianity is, as Nietzsche (1895) scornfully noted long ago, a leveling ideology. It is a fascinating historical fact that Christianity began as a movement of the lower classes in Roman society, including some slaves (Case, 1971; Grant, 1960; Grant, 1971; Malherbe, 1977). Although Christianity became relatively unconcerned with differences in wealth, there is no evidence that its views on sexual matters ever strayed far from the Pauline ideal in which monogamy and celibacy were viewed as the only acceptable roles for humans. Christianity did not invent monogamy, for this was the accepted practice in Rome, but it did reinforce monogamy and in addition, strongly discouraged sexual relationships outside marriage.

Christianity is not the only successful leveling ideology. The political ideologies of the eighteenth and nineteenth centuries are also leveling ideologies which in the West have resulted in political systems that have imperfectly increased social mobility and instituted what Hirschliefer (1978) calls redistributive politics. There are quite possibly many non-Western examples of such ideologies. Mitchell (1978) describes an egalitarian agricultural society in New Guinea, the Wape, in the same area as many big-man cultures. Despite the same level of technology and production as in other parts of New Guinea, there is a strong ideology of egalitarianism which prevents anyone from achieving big-man status. One man who, nevertheless, succeeded in accumulating material goods and political influence with the colonial government was repudiated by his people and died shortly thereafter, an outcast.

It is important to realize that a large variance in reproductive success among males associated with variance in control of resources is consistent with sociobiological theory, and may well represent a main effect in human history, but does not follow from it. In a society where a large variance exists it is in the interests of those with low fitness to change matters. This can be accomplished by obtaining power and then exploiting other individuals. Variance in reproductive success is left unchanged but those with high fitness are changed. This strategy seems to have occurred throughout Chinese history (see Van Gulik, 1961). Alternatively, one can attempt to level the reproductive variance. This strategy is especially attractive to individuals without power to change the status quo in such a way that they could become the successful ones. One way to accomplish this is for those out of power to succeed, as the early Christians succeeded, in having the society adopt a leveling ideology and/or to adopt leveling social-political controls. Thus, among humans the sociobiological scenario becomes enormously complex and the sociobiology of humans, unlike evolutionary theory in general (Ghiselin, 1969), loses its predictive power. Individuals may accept ideologies that conflict with their self-interest, as for example, individuals who accept an inferior role as preordained, or an absolute monarch who abjures polygyny because of his religious beliefs. Huge variances in reproductive success may exist based on economic

exploitation or individual abilities, leveling institutions serve the interest of the few. A large variance may not be allowed to exist, as in the case of the Wape (Mitchell, 1978) where individuals with conflicting interests are leveled to the individual genome. Ideology in such a case can be made for socio-political control of the conflict of interests. As Hirschliefer (1978) notes, it is not always possible to get law out of redistributive politics in human societies. The best viewed as a predator-prey system, any such system, will not be predicated on a situation. In the human case, this is a political controls used by the exploiters to exploit, and the possibility that they will develop socio-political controls and an adequate theory, sociobiology merely attempt to analyze human behavior in terms of inclusive fitness within a particular society. It is this social behavior and its consequences on the relative reproductive success of clearly what we want to understand.

This is not to imply that the variance in reproductive success is a benefit decisions or considerations of the few. (1980) reconciles American divorce rates with the fact that caring for another man's children, the divorce rate does not end in divorce, the median age of divorce is under age 18 and that the median age of remarriage is leave behind one family to begin a new family with younger women. However, Mackey (1978) notes that constraints undoubtedly play a role in a society with officially proscribed divorce. One's wife when she reaches the age of 18, divorce one's wife when she reaches the age of 18, family. This occurs, but is relatively rare. Mackey, one could also propose that the variance in reproductive success is a benefit decisions or considerations of the few. Divorce may be against one's interest, but it is a wife under these circumstances. Environments that develop so that the man would not be based on the experiences of the few. It may be a case of a developmental influence on the few, as due to biological predisposition and others during development [see Mackey, 1978]. Mackey also notes that 7-15% of divorced men remarry and then red divorce without remarriage. Unable or unwilling to sustain such a relationship, divorcing male must also consider the effects of father absence on his children from his first marriage. The effects of father absence on women than divorced men do not. Effects of father absence and divorce

a major source of reproduction for the practice originated in pre-feudal society.

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exploitation or individual abilities, or reproductive variance may be minimized because leveling institutions serve the interests of those on the bottom. Alternatively, large reproductive variance may not be allowed to begin because of a well entrenched egalitarian ideology, as in the case of the Wape (Mitchell, 1978). The belief structure of a society made up of individuals with conflicting interests cannot be a genetically determined property of any individual genome. Ideology in such a situation must be indeterminate. The same argument can be made for socio-political controls on behavior and hence, on the outcome of the conflict of interests. As Hirschliefer (1978) points out, in a society of competing interests it is not always possible to get laws to go in one's favor and he points out the possibility of redistributive politics in human societies. Indeed, if exploitation in human societies is best viewed as a predator-prey system, as Hirschliefer (1978) suggests, the outcome, as in any such system, will not be predictable without a detailed knowledge of the ecological situation. In the human case, this must include a knowledge of the efficiency of the socio-political controls used by the exploiters, the belief structure of both exploiters and exploited, and the possibility that it may be in the interests of the exploited individuals to develop socio-political controls and ideologies which limit or remove exploitation. To be an adequate theory, sociobiology must shed light on these processes and factors rather than merely attempt to analyze human behavior as conforming to cost-benefits or the principle of inclusive fitness within a particular social and ideological structure accepted as given in a particular society. It is this social and ideological structure which can have very important consequences on the relative reproductive success of individuals in the society and this is clearly what we want to understand.

This is not to imply that the variables considered in this paper are not relevant to cost-benefit decisions or considerations of inclusive fitness within a society. For example, Mackey (1980) reconciles American divorce and remarriage patterns, which often result in a male caring for another man's children, with sociobiological theory by noting that in fact, most marriages do not end in divorce, that approximately 40% of divorces do not involve children under age 18 and that the median number of children per divorce is only 0.3. Men often leave behind one family to begin another one and, consistent with this, they tend to marry younger women. However, Mackey (1980) also notes that social pressures (i.e. socio-political constraints) undoubtedly play a role in tempering the ideal male strategy. The best strategy in a society with officially proscribed polygyny but where divorce is possible should be to divorce one's wife when she reaches menopause, marry a younger woman and start a second family. This occurs, but is relatively uncommon. Apart from the social pressures noted by Mackey, one could also propose ideological and developmental reasons for this state of affairs. Divorce may be against one's religion, or one may view it as unethical to desert one's wife under these circumstances. Emotional attachments between the man and his wife may develop so that the man would not want to leave his wife, and these attachments may well be based on the experiences of the man when he was a child (e.g. Bowlby, 1979) and would be a case of a developmental influence [factor (2) above]. These attachments are best conceived as due to biological predispositions interacting with the social stimulation of parents and others during development [see Rajecki *et al.* (1978) for a review of attachment theory]. Mackey also notes that 7-15% of American men who divorce will either not remarry or remarry and then red divorce without remarriage. Some of these individuals may simply be unable or unwilling to sustain such a relationship for developmental or other reasons. The divorcing male must also consider the effects divorce and possible father absence might have on his children from his first marriage, especially since a much higher percentage of divorced women than divorced men do not remarry, particularly as they get older (Mackey, 1980). Effects of father absence and divorce on personality development, cognitive development

and sexual orientation have been found (Biller, 1981a; 1981b; Hetherington, Cox & Cox, 1982; Radin, 1981). One might also mention that it is only recently that divorce has become fairly respectable. For example, Wecter (1937) comments on the extreme impropriety and rarity of divorce in nineteenth-century American upper-class society. Thus, the socio-political constraints on reproduction change from era to era. The variables mentioned in this paper are required then, not only to account for the overall structure of the society but to understand how individuals will assess cost-benefit decisions and considerations of fitness within a society. Sociobiological theory cannot preclude maladaptive behavior based on one's ideas, on one's developmental history or on the socio-political constraints the individual is subjected to, anymore than population genetic theory can do without genes that are being selected against.

Anthropological theory has often emphasized the importance of symboling as a distinctive human activity which results in the creation of a non-biological reality for humans. There is clearly too much evidence that biological theory has a place in anthropology, but the insistence on the theoretical importance of symboling is sound. Man is unique in that a prime source of motivation is symbolic, i.e. one's ideas about reality. This results in a hugely complicated bio-cultural reality for humans, for if symbols define reality, then symboling becomes part of this bio-cultural battleground. Even kinship then becomes ideology and is subject not to a simple calculus of relatedness, but becomes part of the battleground. Firth (1926) comments that Maori individuals attempt to capitalize on kinship relations to obtain favors from others. The saying 'a relative in winter, a son in summer' means that a man calls himself a close relative only at harvest time. Similarly, Sahlins (1963) makes it clear that Melanesian big-men often attempt to exploit their own relatives beyond what they want to give in order to extend the big-man's influence beyond the kinship group. One might even hypothesize that the belief of Tongans that they are related to the Tui Tonga makes them more willing to accept the reproductive superiority of the chief, no matter how distant the relationship really is. Chagnon (1982) also notes many cases of redefining kinship relations among the Yanomano in attempts to gain resources and favorable marriages.

Culture then is not determined by man's biological nature since this nature does not determine the direction of cultural change. The data presented here support the view that culture is in part determined by an internal dynamic based on ideas and by socio-political controls, both of which may be independent of individual genetic self-interest. Sociobiological theory cannot predict the reproductive variance among males in a socio-economically stratified society, but surely one important aspect of any society is the manner in which reproductive variance is regulated. Evolutionary theory does not justify a reactionary or oppressive human society or result in the expectation that all societies will conform to some reactionary or oppressive mode. It merely states that the regulation of reproduction is a major human concern and that the regulation of human reproduction is often achieved as if it had important biological consequences. In studying human societies one must be concerned not only with an association between reproductive success and economic and political power, but also how great that association is compared with the theoretically possible situation in which one or a very few males control all the females of reproductive age. In attempting to account for the actual situation one will then be led to consider the many other factors that can affect this association, including the belief structure of the society, environmental factors during development, genetic variation, socio-political controls, as well as the possibility that established human institutions acquire an inertia of their own which lasts long after they have served the interests of those who benefited from them originally.

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