

1346a (1967)
Turkumanhā-yi Iran; Barrasi-yi
Zaminhā-yi Ijtimā'i, III. Hunar va
Mardum 61 and 62: 48-64.

1346b (1968)
Turkumanhā-yi Iran, IV. Hunar va
Mardum 63: 25-33.

1347a (1968)
Inchah Burun. Hunar va Mardum
71: 43-55.

1347b (1968)
Inchah Burun. Hunar va Mardum
73: 25-41.

1349 (1970)
Turkumanhā-yi Dihkadeh-yi Gushah
Tappah. Hunar va Mardum 91: 38-
48.

Secoy, F. R.
1953 Changing Military Patterns on the

Great Plains. American Ethological
Society Monograph 21. Seattle: Uni-
versity of Washington Press.

Spooner, Brian
1972 Population Growth: Anthropological
Implications. Cambridge, Mass.: The
MIT Press.

Wrigley, E. A.
1969 Population and History. New York:
McGraw-Hill.

Wynne-Edwards, V. C.
1962 Animal Dispersion in Relation to
Social Behavior. New York: Hafner.
1964 Population Control in Animals. Scien-
tific American, August: 68-74.
1965 Self-Regulating Systems in Popula-
tions of Animals. Science 147: 1543-48



delayed coresidence of spouses. When this happens the Yomut, and other groups like them, will have to find other means of maintaining a good balance between wealth and population. It may be easier for the governments of developing nations to assist groups like the Yomut in making transitions of this sort if they can design development programs in the light of a fuller understanding of the relationship between social behavior and population dynamics.

REFERENCES CITED

- Alland, Alexander
 1967 *Evolution and Human Behavior*. New York: Natural History Press.
 1970 *Adaptation in Cultural Evolution*. New York: Columbia University Press.
- Baker, Paul T. and William T. Sanders
 1972 *Demographic Studies in Anthropology*. In *Annual Review of Anthropology*. Vol. 1. Bernard J. Siegel, Ed. Palo Alto, California: Annual Reviews Inc.
- Bender, Donald R.
 1971 *Population and Productivity in Tropical Forest Bush Fallow Agriculture*. In *Culture and Population*. Steven Polgar, Ed. Cambridge, Mass.: Schenkman Publishing Co.
- Benedict, Burton
 1972 *Social Regulation of Fertility*. In *The Structure of Human Populations*. G. A. Harrison and A. J. Boyce, Eds. Oxford: Clarendon Press.
- Boserup, Ester
 1965 *The Conditions of Agricultural Growth*. Chicago: Aldine.
- Campbell, Donald T.
 1965 *Variation and Selective Retention in Socio-Cultural Evolution*. In *Social Change in Developing Areas*. Herbert R. Barringer, George I. Blacksten, and Raymond W. Mack, Eds. Cambridge, Mass.: Schenken.
- Douglas, Mary
 1966 *Population Control in Primitive Groups*. *British Journal of Sociology* 17: 263-273.
- Dumond, E. D.
 1965 *Population Growth and Cultural Changes*. *Southwestern Journal of Anthropology* 21: 302-24.
- Irons, William
 1969 *The Yomut Turkmen: A Study of Kinship in a Pastoral Society*. University of Michigan Doctoral Thesis. Ann Arbor, Michigan: Ann Arbor Microfilms.
 1972 *Variation in Economic Organization. A Comparison of the Pastoral Yomut and the Basseri*. In *Perspectives on Nomadism*. William Irons and Neville Dyson-Hudson, Eds. Leiden: Brill.
- Newcomer, Peter J.
 1972 *The Nuer are Dinka: An Essay on Origins and Environmental Determinism*. *Man* 7: 5-11.
- Polgar, Steven
 1972 *Population History and Population Policies from an Anthropological Perspective*. *Current Anthropology* 3: 203-211
- Purkarim, Hushang
 1345a (1966)
Turkmanhā-yi Iran. *Hunar va Mardum* 41 and 42: 28-42
 1345b (1966)
Turkumanha-yi Irān, II. *Hunar va mardum* 50: 22-34.

which according to this hypothesis have caused overpopulation (situations of rapid ecological change) will continue to occur frequently in the further pathological population growth is probable even if there is some inherent tendency for populations under stable conditions to maintain a healthy balance with resources. The existence of the latter tendency, if proven, would merely imply that programs designed to control population growth should take cognizance of this tendency and find ways to encourage it. Basically this would mean in terms of practical policy applying a somewhat broader approach to population control.

For example, it would suggest that an understanding of the effect of existing patterns of social behavior on population dynamics in particular region might lead to some reasonable expectation as to the demographic consequences of specific economic or social changes in that region. Thus, it might be discovered that among a particular agricultural group small land holders are more concerned about limiting family size because of the problem of fragmentation of land holdings through inheritance than are landless agricultural laborers for whom larger families provide more labor to sell without any accompanying concern about inheritance. This would imply that land reform would have the effect of limiting population growth and would suggest a means by which an economic reform could assist in the area of population control. Similarly it might be discovered that sedentarization of nomads as small land holders rather than as landless agricultural laborers would similarly lead to less extensive population growth. This all would imply that with sufficient understanding of the relationship between social and economic variables, on the one hand, and demographic ones, on the other hand, it might be possible to design and coordinate reforms of a social and economic nature in such a way as to discourage pathological increases in population.

Most effort to control population growth has focused on persuading people to substitute a small-family norm for a large-family norm and to encourage the use of contraceptives for this purpose. The type of broader approach suggested above would consist of combining these efforts with reforms in the economic and social spheres which will also indirectly encourage the acceptance of a small-family norm. A further understanding of the social context of fertility in a particular region might also suggest ways of limiting fertility once a small-family norm is accepted. For example, if in a particular region local tradition condemns use of contraceptives but condones delay of marriage for economic reasons, efforts to encourage delaying marriage might prove more successful in controlling population growth than encouraging use of contraceptives. These are only a few hypothetical examples, but they should serve to indicate ways in which a fuller understanding of the interrelationship of social behavior and population dynamics can be of value in designing practical solutions to population problems (Cf. Polgar, 1972: 210-211).

The point of all of the above discussion is that our understanding of the relationship between social behavior and population is inadequate, and that improvement of our understanding of this area would have vast practical as well as theoretical value. The material reviewed briefly above also suggests that the Wynne-Edwards hypothesis could profitably be the focus of much of the research needed to develop an improved understanding in this area.

Many rural populations in developing nations are, like the Yomut, caught up in a process of rapid social change. In the future, those social practices of the Yomut which were described above will be transformed beyond recognition. Increases in the general level of education and the rising status of women in rural areas of this sort will put an end to such customs as bridewealth and

theoretical perspective would suggest the following somewhat different view. Most human populations that have had a chance to work out a stable adjustment to their ecological situation do regulate their size in such a way as to preserve a healthy balance between numbers and resources, and social constraints on fertility as well as disease usually play a significant role in this process. However, each such population has a set of mechanisms regulating numbers which are effective only under the set of conditions to which that population has adapted. Changes in health care can upset these mechanisms as is well appreciated, but so can other changes. Economic changes can alter the optimal size and organization of families, and average ages in marriage, all of which can in turn affect fertility and upset a formerly stable situation. Similarly economic changes can lead to shifts in patterns of migration which can easily upset a stable demographic situation. Most populations, especially those in developing nations, have experienced a number of changes of this sort in their recent history, and the result has often been a pathological growth in size. However, given time to adjust to a new set of stable conditions, most populations will make social adjustments that will restore effective regulation of their numbers. There is evidence from a number of sources suggesting the importance of the social regulation of fertility among human populations before the advent of modern medicine. E. A. Wrigley has summarized an important body of historical demographic data for pre-industrial Europe indicating that behavioral checks on population growth (primarily delaying the average age at marriage until well past puberty) were in fact significant in those populations (1969: 39-53, 62-94). Comparable data for non-European populations is not as extensive, but that which does exist suggests a similar picture. Steven Polgar reviewed the limited body of anthropological literature on non-European populations in a recent article and drew con-

clusions paralleling those of Wrigley (Polgar, 1972). Data of this sort strongly challenges, as Polgar points out, the widely held view that before modern medicine human populations were limited in size primarily through disease.

Thus, material from a number of sources suggests that social checks on population growth have played a significant role in the dynamics of many pre-industrial human populations, even though such checks have not been completely successful on a world-wide basis in the current century. The social practices were -- and where they continue still are -- not motivated by any conscious appreciation of the dangers of overpopulation and overexploitation of resources, but rather resulted from norms governing who should have children, at what ages and under what social conditions child bearing should start and stop, how siblings should be spaced in age, and what the sex composition of sibling groups should be (Polgar, 1972: 209). However, as pointed out above, such conscious appreciation of the value of these practices was not necessary for their maintenance and spread.

All of this would suggest replacing models of the Boserup variety with more complex ones which allow for the possibility of feedback from cultural (technological, economic, and political) variables to demographic ones (Cf. Dumond, 1965), and allowing for the possibility that under at least some conditions other than modern ones social limitation of fertility has been instrumental in maintaining a stable, healthy balance between numbers and resources (Polgar, 1972).

Policy Implications

It must, of course, be emphasized that this is only theory, and even if proven its somewhat optimistic implications would not justify the conclusion that overpopulation is not a problem that the various governmental and private programs designed to deal with this problem are not necessary. The situations

cance of selection at different levels. Any innovation in social behavior among the Yomut which would lead to higher fertility would be favored at the level of small lineages. Such innovations might consist, for instance, of a drastic lowering of bridewealth and a shortening of the period of delayed coresidence of spouses among a particular lineage. The immediate result would be a faster rate of population growth for that group in comparison to competing groups. This by itself would amount to selection favoring these innovations. An appreciation of this fact might lead other lineages in the same tribe to imitate this innovation leading to still further selection favoring these new practices. However, the resulting population growth could lead to an unfavorable balance between population, wealth, and resources for the tribe as a whole assuming its territory and hence its economic resources do not expand. This could lead to an increase in malnutrition and disease as well as an overexploitation of natural resources and a decrease in the productivity of these resources. Such conditions might in turn lead the tribe to lose ground in competition with other tribes that had not been affected by these innovations. Thus selection at the tribal level would work in the opposite direction leading to a restoration of the original practices which are more adaptive in terms of competition at the tribal level even though they are less adaptive in terms of competition at lower levels.

It is important to observe that adaptive forms of behavior may spread through imitation even though those imitating them do not understand why or how these behavior patterns are adaptive. Whenever a group at any level encounters another group which is superior in competition to itself, the weaker group is likely to imitate the behavior patterns of the stronger one whether they fully understand them or not. This also applies to the originators of a new adaptive pattern of behavior. They may originate a new form of behavior on the basis of false beliefs

about its consequences. Later the enjoyment of its advantages will encourage them to continue the new form of behavior even though they do not understand how it works. Other groups who come into competition with them are likely to imitate this same pattern of behavior without any clearer understanding of why it is advantageous.

This explains why many people observe customs which in fact benefit them as a group, but justify these customs in terms of completely false understandings of their consequences, or in some cases do not even bother to rationalize traditional behavior. In more advanced societies, it is, of course, more often the case that people justify their behavior in terms of an understanding that would stand up to scientific investigation. The advantage of a scientifically accurate understanding of one's behavior is that it often allows more rapid successful modification of behavior in response to changing conditions.

If social conventions that regulate population size are seen as the product of an evolutionary process of this sort, there is no reason to expect a successful adaptation of this variety among every group at every point in time. Rather one would expect adaptation always to be to some extent imperfect. Further, when a group has recently experienced a rapid change in its environment one would often expect to find that formerly adaptive patterns are no longer adaptive and that situations such as pathological population growth, or other forms of maladaptation, are likely to occur frequently in times of rapid changes.

Applying perspective of this sort to the problem of overpopulation would lead to a view different from, and somewhat more complex than, the now widely accepted view that overpopulation is primarily the result of improving health conditions. The latter view derives from the assumption that before the availability of modern medicine, disease was the primary factor limiting human population growth. However, the above

derlies the more specific hypothesis that some human populations regulate, or have in the past regulated, their size through social conventions in such a way as to increase their long term chances of survival. A careful examination of this more basic theory suggests an explanation of current overpopulation in terms of the breakdown of adaptations under conditions of rapid environment change.

This theory hinges on the fact that human populations are always divided into a number of socially distinct groups which are in a sense in competition with one another. In a culturally advanced setting, there are the large political corporate groups which we call nations. Within these groups there are a myriad of smaller corporate groups, business organizations, universities, political parties and so on. At the lowest levels there are small domestic units. In a more primitive setting, the nature of these groups is likely to be different. The largest political units might perhaps consist of only a handful of villages united occasionally for purposes of making war. These groups might in turn be divided into only a few subgroups of simple structure, descent groups, residence groups, and at the lowest level again domestic groups.

Whatever setting one chooses, one finds that the various socially distinct units into which the population is divided have different survival experiences over a long period of time. Some domestic groups are larger than others and produce a larger number of descent groups in the next generation. Certain settings compete with one another in a fairly leaving a large number of descendant groups while others decline and occasionally even vanish. Business organizations in a modern setting compete with one another in a fairly direct way with some expanding and others losing ground. The largest sovereign political groups whether they are nations or small confederacies of residence or kinship groups also have a similar experience. To some extent these different group experiences are the result of certain populations growing and

others contracting, but since individuals can change their group identity much of this change can occur by other means, by the absorption of new members on the part of expanding groups and the loss of members on the part of contracting groups.

Whenever a group has characteristics which encourage its expansion at the expense of its competitors, there is a definite selective process favoring the spread of those characteristics. This is true whether it is a difference in military technology favoring one group over another (Secoy, 1953), a difference in political form allowing one group to unite larger numbers of people for military purposes (Newcomer, 1972), a new technique of manufacturing which allows one automobile company to outproduce another, or a modern nation whose total industrial structure allows it to outproduce competing nations. Whenever a difference in behavior pattern confers an advantage in intergroups competition, two processes of a selective nature are likely to occur. The advantaged group is likely itself to expand, and at the same time disadvantaged groups are likely to attempt to imitate those features of the advantaged group which favor them in competition. Whichever process, or combination of these processes, occurs the end result in terms of social and cultural evolution is the same: there is a selective process in which certain social forms and certain elements of culture spread consistently at the expense of others.

It is significant that selective processes of this sort occur at every level at which there is a division into groups and that selection of higher levels can determine the characteristics of groups at lower levels. For example, social practices which limit fertility are not likely to have selective advantages at the level of smaller social units -- households or small lineages -- but is likely to be favored in selection at higher levels. The system of population regulation hypothesized in this paper can be used to illustrate the signifi-

It is also worth emphasizing that a significant long-term increase in wealth would lead to an increase in population. Thus, under certain conditions rapid growth as is currently occurring should be expected on the basis of this hypothesis. Actually the situation among the Yomut since the early 1950's has been one of rapid increase in wealth and rapid increases in population. Testing the above hypothesis under current condition would have to hinge, therefore, on demonstrating that various subgroups of the Yomut which differ in overall wealth increase their population at significantly different rates with the poorer subgroups growing more slowly than the wealthier ones.

In addition, it should be noted that a population regulating device of this sort if it operates as hypothesized here would do so in conjunction with other forces. Thus, a social mechanism of this sort may have worked well in conjunction with the high mortality rates that existed before the 1950's, but may no longer work under the improved health conditions that have recently been experienced by the Yomut. This is a question that will have to wait future investigations.

Research in Progress

The objective of the reasearch in progress is to gather information from suitable samples of households in order to test the validity of the hypothesis outlined above. Two subdivisions of the Yomut which are largely endogamous and which differ significantly in wealth will be selected and a systematic sample of households will be taken from each group. The expectation is that in the group that is less wealthy a higher proportion of the fecund women will be unmarried and the birth rate will be lower. From the households in the sample, information on household compositions, births, deaths, marriages, and economic conditions over the last ten years will be gathered in order to test this expectation. If time permits

similar information going back over a longer span of time will be gathered from a smaller sample of households in order to obtain some indication of demographic conditions before health conditions improved drastically in the 1950's.

Similar data will also be gathered from other groups who differ significantly from the Yomut in their domestic organization and marriage practices. These groups will include the Goklan Turkmen, **Welayet** living near Yomut country, and one of the several small groups of Turkmen called **Eolad** who claim descent from the first four Khalifs.

The data gathered from all of these samples will be analyzed and compared to determine the effect of both variations in wealth and social organization on population dynamics among these groups. It is hoped that this analysis will reveal whether the subdivisions of the Yomut that were studied have ever regulated their population size in the manner predicted by the Wynne-Edwards hypothesis.

After Wynne-Edwards What?

If investigations of the sort described above do prove that certain human populations conform to the Wynne-Edwards hypothesis or at least have done so until recently, we are still left with the problem of explaining the current situation of rapid world-wide population growth. What would be needed at such a point is a theory concerning the role of population dynamics in cultural evolution which can explain both cases of successful population regulation and cases of overpopulation. Such a theory is, I believe, available to us if we think through some of the implications of the more basic theory that cultural patterns and institutionalized forms of group behavior are the product of a long process of variation and selection which tends to produce adaptive forms (Alland, 1967: 169-177, 199-228; 1970, 30-51, 178-188; Campbell, 1965). This theoretical view necessarily un-

TABLE 3
COMPOSITION OF A CHARWA COMMUNITY BY
AGE, SEX AND MARITAL STATUS

Sex	Age	MARITAL STATUS				Widowers, Widows or Divorced Persons	Polygy- nously Married
		Never Married	Married Period of Spouse Avoid ance Current	Living With first Spouse	Living With Second or Third Spouse		
Male	60+			5	4	3	2
	45-59			13	6	2	
	30-44	1*		23	6	1	
	25-29		5	9			
	20-24	10	9	8			
	15-19	25	1	2			
	10-14	26					
Female	60+			1	1	3	3
	45-59			8	1	4	1
	30-44	1**	1	22	2	2	
	25-29			18	2		
	20-24	2*	3	18			
	15-19	5	8	3			
	10-14	22	1				

* Crippled and feeble-minded.

** Badly crippled.

capita wealth, there would be a decrease in fertility and population size would stabilize.

It should be observed that a population regulating mechanism of the sort hypothesized here would be successful only if it kept population at a level well below the maximum level supportable by the existing wealth. In other words what the situation calls for is a healthy margin of safety rather than a fine adjustment to the overall wealth existing at any one point in time. This is so because wealth is subject to continuous short-term fluctuations and a human population could continually readjust its size to such short-term fluctuations only at great cost. The only adaptation that would make sense would be to keep the population low enough so that during the worst years wealth resour-

ces would still be adequate.

Readjustments to new conditions would only occur slowly. Thus, a single bad year, although it might cause a few marriages to be delayed a short time, would not affect current population size and probably would not have a noticeable long-term effect. On the other hand if the overall wealth available to a group were to change significantly, either by decreasing or increasing, and remain changed for a decade or more a long-term readjustment of population size would occur. In the case of a downward adjustment, the fact that population was well below the maximum size supportable before the change would compensate for the fact that such an adjustment could only be accomplished slowly.

reasons for believing this effect is density dependent revolves primarily around the fixed nature of bridewealth. As mentioned above, there is a limit to which the bridewealth can be reduced, and, therefore, as a family's wealth is reduced it can ease its situation in regard to bridal payments only to a limited degree through negotiating lower payments. Beyond that point such a family can only respond to diminishing wealth by delaying the marriages of its sons in order to have a longer time over which to put together the bridewealth. This fact is reflected in a great variation in the ages at first marriage for men. Data on this subject from 133 marriages recorded in the charwa community studied is presented in Diagram 1. A breakdown of this data according to the wealth of the man (or family of the man) entering marriage indicates that wealth differences more than anything else explain the variance in age at marriage for men.

The effect of diminishing per capita wealth on ages of females at marriage is more complex. In general the age at which women marry does not depend on their family's wealth and does not vary as greatly as the age of men at marriage (see Diagram 1). The usual practice for poorer families is to marry off their daughter as soon as suitable suitors appear, but not to use the bridewealth in order to immediately marry off sons (if there are any ready for marriage). Rather the usual practice is to delay the marriage of sons and use the bridewealth as income to ease their economic circumstances. Thus, a girl's age at marriage is not affected by her family's wealth, and a poor boy's age at marriage is not affected by his having sisters who themselves bring in bridal payments.

Despite the above consideration there is reason to believe that a decrease in average per capita wealth for an entire endogamous population (large subregions of Yomut territory occupied by distinct and largely endogamous descent groups) would increase the

overall average age at marriage for females even though it would affect women of the different wealth strata equally. The reasons for this lie in processes involving the entire population. The composition of the populations studied in terms of age, sex, and marital status will probably be revealed by the survey research in progress to be very similar to that of the single community for which such data is already available (see Table 3). If this is so there will be a fairly large number of fecund women in this population who are not married, and, therefore, given the social context, not exposed to pregnancy. The frequency with which these women marry will correspond obviously to the frequency with which men marry. Thus, a decrease in per capita wealth which diminishes the number of marriages per year will diminish the frequency with which unmarried fecund women enter marriage and begin to have children. At the same time, the number of women leaving the category of fecund married women through their own death, the death of their husbands, or menopause would not diminish in response to diminishing per capita wealth. The end result of all these processes is expected to be that a large permanent decrease in per capita wealth would lead to a large decrease in the number of fecund women who are married and therefore a decrease in fertility.

It is expected that this would be reflected in a later average age at marriage for women. Logically it could result in no shift in the average age at marriage, but rather the relegation of a portion of the female population to permanent spinsterhood (a result which would also dampen fertility). However, the requirement that women marry according to their birth order would tend to encourage the former pattern.

This means that if population density were to increase among the Yomut to the point at which natural resources (arable land and pasture) were scarce enough in relation to the population to create a decline in per

hold, his wife's children by her first marriage become a part of his independent household.

If the agnates of a widow wish to claim her, and her children's agnates are unable to raise the *otirtma mal* or the bridewealth for a marriage to one of the widow's deceased husband's brothers, the widow may actually be married off elsewhere and separated from her children. However, by far the most frequent solution is either for a widow not to remarry, or to enter a marriage with a bro-

ther of her former husband which is for demographic purposes the equivalent of not remarrying.

What the available data indicates concerning the effect of these practices (high fixed bridewealth and delayed coresidence of spouses) on population dynamics can be summarized by examining the population of the pastoral community that has already been studied. Table 2 gives the age-sex composition of this population.

TABLE 2
AGE AND SEX COMPOSITION OF
THE POPULATION OF A PASTORAL
COMMUNITY, AUGUST, 1967

Age	Yomut		Non-Yomut
	Male	Female	Female
60 +	14	8	
45-59	21	14	
30-44	31	27	1
15-29	69	57	2
0-14	84	91	
Totals	219	107	3

Table 3 further breaks the population down by marital status. If the women in this table between the ages of 15 and 44 are considered to be fecund there are 87 fecund women in this community. Of these, two are excluded from marriage for health reasons. This leaves 85 reasonably healthy, fecund women. Twenty of these were either not married, or not coresident with a spouse, at the time the data were gathered. This means that approximately 23% of the women who were fecund and suitable as wives were not living

with a spouse. (The fact that one of these, as is explained in a footnote to Table 3, is not coresident with her husband because of unusual circumstances does not seriously affect the overall picture.)

The hypothesis drawn from this data may be summarized as follows: the high fixed bridewealth of the Yomut and their practice of delaying the coresidence of spouses for several years after marriage inhibits fertility, and this fertility inhibiting effect increases as per capita wealth diminishes. The

Divorce is said not to exist among the Turkmen, and the existing genealogical and household census data from the study made in 1966 and 1967 indicated that it is in fact statistically insignificant.

Because of the high bridewealth necessary to marry Yomut women, occasionally Yomut men marry either Turkmen women from the Goklan confederacy (these transactions usually entail a bridewealth of about six *mal*) or non-Turkmen rural women from regions near Yomut country (these marriages usually involve about one *mal*). All of the cases of marriage with non-Yomut women which were recorded were cases of either widowers seeking their second (or third) wives, or of married men seeking polygynous marriages. Such marriages, however, account for no more than about two percent of all those recorded in the data (this included both marriages now intact as well as those dissolved by the death of one or both partners).

Remarriage for a widow poses a problem if she has children. It is by no means unusual for a young bride to be widowed during the period between marriage and the beginning of coresidence of spouses or in the early part of her residence with her husband before any children have been conceived. Such widows are invariably remarried to widowers. If a widow has children, however, residence rules pose a serious hardship for both her and her children if she remarries. If remarried, she would have to reside with her husband, while her children, once they were physically able to be separated from her, would as a rule be required to reside with their agnates. Such separation is difficult for both mother and child and attempts to avoid such separation underlie the somewhat complicated subject of the disposition of widows.

After a woman's husband dies, her agnates have a right to reclaim her and to give her in marriage to another man and collect another bridewealth. At the same time, her husband's agnates have a right to claim her children. A number of means are available

which usually avert the necessity of separating mother and child. The most common solution is for the widow's agnates to abrogate their right to reclaim her. Concern for the welfare of one's sister and sister's children is the main factor motivating this sort of solution.

Occasionally, however, the father or brothers of a widow decide they do wish to arrange a new marriage for her. If they do this, the agnates of the widow's children may intervene. Under these circumstances they can prevent the children from being separated from their mother by arranging a marriage with one of the widow's deceased husband's brothers. An alternate way of accomplishing the same end is to pay the widow's family a compensation equal to the bridewealth the widow would probably fetch if remarried. This compensation is called "the causing to stay livestock" (*otirtma mal*).

Marriage to one of her former husband's brothers is the more common solution since Turkmen religious teachers maintain *otirtma mal* is forbidden by Islam. This sort of marriage, however, is frequently little different from the solution posed by the payment of *otirtma mal*. Often although the widow is married to some close agnate of her deceased husband, she does not become a part of his household or in any way assume the position. This sort of arrangement occurs when the widow is married to man who already has a wife. The bridewealth for polygynous marriages of this variety is not higher than that for marriage to an unmarried brother of a widow's former husband. Usually such marriages are never consummated, and, therefore, for demographic purposes they are the equivalent of a widow's not remarrying.

An alternate arrangement consists of giving a widow in marriage to a previously unmarried agnate of her first husband. In cases of this sort, the widow assumes an active role as the wife of her new husband who ordinarily does not later seek a second wife. When he establishes an independent house-

usually falls between 6,000 and 8,000 tumans. South of the Gurgan River, where the Turkmen are predominantly engaged in mechanized agriculture, bridal payments are made largely in money, and it was said that ten **mal** plus one **mal** "inner money" was interpreted there as having a value of 12,000 tumans in 1966. This is not surprising since this is a generally more prosperous region. Among the pastoralists, a bridal payment made only in cash would be 11,000 tumans, reflecting the lower price of livestock in that region. (In general, the more of the payment made in livestock, the lower the market value of the payment.)

Thus, although the payment is said to be fixed, it is in fact fixed only within a certain range, and actual payments representing the value of eleven **mal** both vary in individual payments and also vary regionally. Nevertheless, in poorer regions and among the poorer strata of Yomut society, there is

a definite limit to which bridewealth can be lowered by negotiation and the usual result of these bridewealth conventions in these cases is an elevation of the average age at marriage for men. (The effect on the age at marriage for women is more complex and will be discussed below.)

Economic data from the pastoral community studied indicates that a family of median wealth (in terms of wealth stratification within that community) needs somewhere between three and six years to raise the eleven **mal** necessary to marry off one of its sons. The time required is variable to a large degree because income itself varies extensively from one year to another. For poorer families the time required can be much longer.

Variations in bridal payments other than those mentioned above depend on the marital history of the partners to the marriage. The customary marital payments are summarized in Table 1.

TABLE 1
CUSTOMARY BRIDAL PAYMENTS

Marital history of partnees	Bridewealth	"Inner money"
Both partners previously unmarried	10 mal	1 mal
Widower-virgin bride	20 mal	1 mal
Married man-virgin bride	30 mal	1 mal
Widower-widow	Variable	None paid
Married man-widow	Variable	None paid

It should be noted that in the case of widower-widow marriages, the bridewealth though variable usually falls in the range of fourteen to seventeen **mal**. Thus a widower is faced with the choice of a marriage with a previously unmarried girl at the cost of twenty **mal**, or a somewhat less expensive marriage to a widow. In either case he must pay more than he did when he first married. As will be explained below most widows do not remarry and for this reason, a widower seeking a widow usually faces a fairly long

search. It should also be noted that when widows do remarry they only marry widowers (or married men). (Marriages of widows to brothers of their deceased husbands are occasionally exceptions to this rule.)

In the cases of marriages of widows, the practice of delaying the coresidence of spouses is dispensed with. In cases of marriages of previously unmarried girls to widowers or married men, coresidence is delayed only for a much shorter period, usually about six months.

lowed by a year in which the bride travels periodically back and forth between her father's, and her father-in-law's, house spending alternate periods of three weeks to a month in each household. Thus, a woman does not normally assume the full-time role of wife until four years after she is married. (There is a general trend among more progressive Yomut communities at present to shorten this period of delayed coresidence.)

On rare occasions pregnancy cuts this process short. The marriage is consummated during the two or three nights which the bride and groom spend together after the wedding if both bride and groom are old enough. If pregnancy results, the bride must return to her husband's house to have her child and the period of wife avoidance is terminated. It is also possible that the year during which the bride alternates between her father's and father-in-law's households can be cut short by pregnancy. These are exceptions, however, and normally a groom must wait three years for a part-time wife and four years for a full-time one.

One result of this period of wife avoidance is that usually a man does not have children until the fifth year of his marriage. Usually a young man marries sometime between the ages of fourteen and twenty-five, and establishes an independent household sometime between the ages of thirty and forty. At the time of establishing independence a man is given a portion of his father's capital in livestock and land. The amount given is at his father's discretion, but usually an attempt is made to provide each son with an equal patrimony.

At the time of marriage most men are still under their father's authority as a member of their father's household, and, thus, marriage transactions are usually arranged by the fathers of the prospective bride and groom. The payment of bridewealth, under these conditions, is made by the groom's father to the bride's father. If a man is independent at the time of marriage as some-

times occurs in the case of widowers or men entering polygynous unions, he raises and makes the payment himself. If a bride's father is deceased, the payment goes to the senior male patrilineal relative, usually a brother. This applies in the case of widows as well as women marrying for the first time.

Conventions regarding bridal payments set relatively rigid limits within which to negotiate. Bridewealth conventions are stated in terms of livestock. The customary marriage payment when both partners have not previously married is usually said to be ten **mal**. **Mal** in this context means one large domestic animal, either a camel, horse, or a cow. Not infrequently the payment is referred to as "ten camels." It is understood that ten sheep or ten goats can be substituted for one **mal**. In addition to the ten **mal** paid to the bride's father, an additional payment of one **mal** called "inner money" (**icher pul**) is paid to the bride's mother.

Negotiations concerning marital payments settle the question of precisely what sorts of livestock, or equivalent values in money, will be paid: how many ewes, yearlings, lambs, she-goats, yearling goats, or kids will in fact be given to satisfy in value of ten **mal**. Occasionally a part of the payment is also actually made with larger livestock -- camels, horses, or cows -- and frequently a part is paid in money. Those too are matters to be settled by negotiation. When money is paid the current market value of mature animals is used to convert **mal** into cash. Because payments in livestock usually include immature animals, the actual market value of such payments is as a rule less than a cash payment would be.

Although the basic amount is set in terms of the measure ten **mal**, the market value of the animals used to make up this value varies, so that the actual value paid can vary. Among the **charwa** the main part of each bridal payment consists of sheep and goats. The equivalent cash value of the livestock given

are, predominantly pastoral. Mainly they raise sheep and goats, but also some horses and camels. In addition, in the past they raised small amounts of wheat and barley. In recent years, the **charwa** have expended their agricultural activities and have taken up a semi-sedentary residence pattern. Most of their agricultural activities are now mechanized. The **chomur** occupy the better watered portion of Yomut country and were in the past predominantly engaged in the rainfall cultivation of wheat and barley with the production of sheep and goats serving as a secondary activity. Since the 1950's the **chomur** have become heavily involved in the commercial production of cotton. The use of agricultural machinery and irrigation is now universal among this group. The locations of these groups before 1950 are shown on the accompanying map. The location of the non-Turkmen population of the region at that time is also shown on this map. These people are divided into Persian and Turkish speaking groups, but they are all referred to by the Turkmen as **Welayet**. The **Welayet** have traditionally devoted themselves to irrigation agriculture and have always been sedentary. Now like the **chomur** they are heavily involved in the commercial, mechanized production of cotton.

The Hypothesis

On the basis of information drawn from a study of a single **charwa** community made in 1966 and 1967 (Irons, 1969, 1972), a hypothesis concerning the regulation of population by means of social conventions has been framed. Future investigations will consist of the collection of a comparable body of data drawn from a sample of households representative of the Yomut population of two geographic subregions of Yomut country. How different the data drawn from this sample will be is not clear at present. It is expected that the more progressive **chomur** communities will show significant differences, but

that these differences will not be so great as to make it impossible to test the hypothesis presented here. Nevertheless the reader should keep in mind that the data presented below is drawn entirely from a single conservative community, and probably is in many ways not representative of present conditions among the Yomut as a whole.

The hypothesis is concerned primarily with the domestic organization and marriage practices of the Yomut. These aspects of Yomut social life can best be explained in terms of the developmental cycle of domestic groups. Normally this cycle is one of nuclear family households separating off from patrilineal extended-family households. Ordinarily a man leaves his father's house and establishes an independent domestic unit when he has children approaching the age at which they can function as adult economic producers. This newly formed household consists of a nuclear family, which, with the passage of time, eventually grows into a patrilineal extended family. The process of growth is regulated by a number of prescriptive norms. These norms, among other things, dictate that a man shall acquire brides for his sons in the order of their birth, using a portion of the household property for each bridal payment, and that later he shall give all his sons, again in order of their births the capital necessary to establish an independent domestic group. Thus, each nuclear family develops first as part of an extended-family household before becoming economically independent.

The process of developing the core of a new independent household is prolonged by the fact that co-residence of spouses is ordinarily delayed until three years after marriage. Following a wedding, the bride and groom spend two or three nights together, after which the bride returns to her father's household and is forbidden any contact with her husband until she returns to her father-in-law's house three years later. The return of a bride to her husband is customarily fol-

pothesis maintains that any animal population which does not control its size by means other than starvation is in danger of destroying itself through overcropping of its food resource. Animal populations naturally respond to starvation by exploiting their food resources more intensively, but such intensification of cropping past a certain point leads to a decrease in the food resource itself, and eventually if the overcropping continues, to its complete destruction. This process is the familiar one that has led to the extinction, or near extinction, of many forms of wild life which have been hunted too intensively. As a means of avoiding this threat most animal populations have evolved various social means of regulating their size which cause them to stabilize at a density well below that at which food shortages and overcropping would occur. These social mechanisms include competition for nesting sites, various other forms of territoriality, and dominance hierarchies, all of which, with increasing population density, exclude more and more fecund individuals from breeding. Also included are certain forms of the destruction of young which can eliminate surplus population growth. The fact that certain human populations have stabilized at densities much lower than their food supplies would allow suggests that for these populations at least a similar social regulation of population growth may exist. Such social practices as high bridewealth, non remarriage of widows, polygyny, long postpartum taboos on sexual intercourse, and infanticide have been suggested as adaptive mechanisms controlling population size among such groups (Polgar, 1972: 209). Demonstrating that such social practices are in fact adaptive devices of this sort, however, depends on empirical studies of their actual effect on population dynamics. Only on the basis of a number of studies of this sort can anthropologists arrive at an evaluation of the Wynne-Edwards hypothesis which will be suitable as a stepping stone toward a better understanding of the interrelationship of population growth

and cultural evolution.

This paper examines the evidence available on a particular group, the Yomut Turkmen of northern Iran, in relation to the Wynne-Edwards hypothesis. This group is suitable for investigation of this sort for two reasons. First, before the recent large-scale migration of non-Yomut into the territory traditionally occupied by the Yomut, population density in that region was low enough to allow large tracts of arable land to go uncultivated. Second the Yomut have a number of social practices which appear to regulate fertility in a density dependent way. The evidence available, however, is not conclusive, and further investigation of this question is currently in progress. The data available on the Yomut is examined in terms of a hypothesis to the effect that through a combination of social practices they regulate their population density in the manner suggested by the Wynne-Edwards hypothesis. Following this is a brief description of the investigation in progress and a discussion of the broader implications of this sort of research. (The research in progress is supported by the National Science Foundation; Washington, D.C., U.S.A. (Grant G5-37838) and is being carried out in cooperation with the Ministry of Culture and Fine Arts, General Office of Anthropology and Folklore.)

The Yomut

The Yomut are one of two large Turkmen confederacies in Iran, the other comparable group being the Goklan (Purkarim, 1345a/1966; 1345b/1966; 1346a/1967; 1346b/1968; 1347a/1968; 1349/1970). Traditionally they were all nomadic, living in tents of the Central Asian variety called yurts. Economically, however, they were not all predominantly pastoral fathers they have always been divided in terms of mode of economic production into two groups, the **charwa** and the **chomur**. The **charwa** who occupy the more arid portion of Yomut country were, and still

Social Regulation of Population Sizes: the Implications of Research among the Turkman of Northern Iran

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In the last decade, there has been increasing interest among anthropologists in the role of population growth in cultural and social evolution. Few of those who have concerned themselves with this issue would debate the proposition that there is a close relationship between population growth and the development of more productive economic systems, and more complex forms of social and political organization. There is, however, more disagreement when one turns to the question of causation.

A number of anthropologists have been convinced of the usefulness of a simple model in which population growth is seen as an independent variable and such developments as a more intensive exploitation of economic resources, and more elaborate forms of social and political organization are seen as dependent variables (Spooner, 1972). Models of this sort have to a large extent been inspired by the work of the economist Ester Boserup who has been concerned with the cause of agricultural development (Boserup, 1965). According to Boserup extensive forms of cultivation generally yield more produce per unit of labor than do more intensive means of cultivation, but yield less produce per unit of land. This means that given sufficient land people prefer the more extensive techniques which meet their demands with less labor, but given a shortage of land owing to population density people will shift to more intensive

techniques rather than face food shortages. This being the case, only increasing population density leads to intensification of productive techniques. As population becomes denser and land shortages develop, two things happen. Warfare intensifies among sovereign political units competing for land and groups defeated in warfare can no longer flee to virgin territory as was possible before land shortages developed. As a result victorious groups incorporate defeated ones as political subordinates, and large stratified political units develop.

Others, however, have pointed to evidence indicating that many populations have stabilized below levels at which population density would stimulate the changes posited in models of this variety (Bender, 1971; Benedict, 1972; Douglass, 1966; Lee and Devore, 1968; Polgar, 1972; Wrigley, 1969). The obvious conclusion to draw is that the causes of population growth and stabilization are of great theoretical importance and yet are poorly understood (Baker and Sanders, 1972: 166-167).

One theory which very recently had attracted attention among anthropologists and others concerned with this issue is the Wynne-Edwards hypothesis (Wynne-Edwards, 1962, 1964, 1965). This hypothesis was originally developed for animal populations since the agricultural revolution (Wynne-Edwards, 1964: 74; 1965: 1548). Basically the hy-