ZAPOTEC INHERITANCE

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Past studies of the social and economic consequences of inheritance overemphasize categories borrowed from kinship studies and legal concepts. In contrast, this study lays stress on four components: testator-heir relations, property rights, time interval of estate transfer, and inheritance rules. This framework is applied in a study of a partible inheritance in a group of Zapotec Indian-peasants in southwestern Mexico. Comparison of societal structure and inheritance patterns shows inheritance to be an important element in a broader sequence of social exchanges between parents and children. This sequence generates a network of alliances between households that, in turn, contributes to the solidarity of Zapotec communities. Inheritance is placed in an economic context by developing and applying measures of its effect on wealth distribution, field fragmentation, and unequal distribution between co-heirs. A computer simulation model is used to measure the effects of changes in inheritance rules, marriage and population patterns on wealth distribution. Unlike previous studies the measurement of the rate of fragmentation reveals that partible inheritance does not create an unbridled dismantling of fields.

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For Major Department

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Dean of Graduate Studies

PREFACE

Inheritance assumes an important role in explanations of a variety of social phenomena. Anthropologists postulate its influence in sibling rivalry, litigation, residence decisions, land tenure, wealth leveling, and the formation of local level aristocracies. Notwithstanding its assumed importance, descriptions and analyses of inheritance are informal, sporatic, and often nebulous. Most contemporary references tersely report normative rules. Less frequently, inheritance cases are presented to illustrate the complexities of the system (see Tax 1953, Fel and Hoffer 1969) and only a few processual models of inheritance have been formulated.

Two divergent perspectives may account for the anthropologists' lack of interest. Some seem to consider inheritance behaviors as ideosyncratic or as not susceptible to systematic generalization. Apparently, they feel that more easily studied behaviors satisfy their desires for discovering cultural patterns. Others find inheritance uninteresting, in this case, meaning "adequately understood at present." Either perspective rates inheritance as an exotic, marginal topic for investigation. This essay rejects both extremes and explores a fertile band between these poles.

This examination is not, however, another petition for ethnographic completeness, i.e. a request that anthropologists add inheritance to their "notes and queries." Such pleas of any "anthropology on the fringe" should be evaluated according to its relevancy to other theoretical interests of the discipline. Marginal ethnographic pursuits are vindicated only to the extent they become encompassed

within the theoretical gestalt of anthropology. For this reason, I will argue that Zapotec social organization and economics are better understood when inheritance behaviors are considered.

I begin with a review of previous anthropological research on inheritance (section one) and discover a lack of well developed concepts. With a few exceptions, this failure of anthropology to consider the functions of inheritance may be attributed to an overemphasis upon classificatory schemes borrowed from legal and kinship research.

In the second section, I outline what are the important components of inheritance and distinguish between questions as to its social and economic consequences. This discussion forms the theoretical background for the rest of this research.

Next, I explore the consequences of inheritance upon societal structure. Using data from a community of Zapotec peasant-indians in Southeastern Mexico, I outline the key characteristics of their social organization (section three) and inheritance (section four). After establishing that inheritance is a type of social exchange, I present a modified, Levi-Strauss exchange model which shows how inheritance contributes to the solidarity of Zapotec villages (section five). I also emphasize the crucial function of Zapotec inheritance in providing care for dependents.

The fragmentation of fields has long been considered an ecological and economic consequence of equilateral inheritance. In the sixth section, I challenge this assumption by examining the long range effects of inheritance on the division of fields. A method for measuring the rate of field fragmentation is used to demonstrate that

although Zapotec inheritance dismantles fields, the rate of fragmentation is slower than previously thought.

In section seven, the question of the meaning of "equal division of shares to all heirs" is considered. This rule is a common characteristic of most Mesoamerican inheritance. I develop quantitative methods for measuring the strength of preference factors (such as sex, sibling order, social exchange between testators and heirs) on the unequal distribution among sexes depending upon the size of the estate being divided. Futhermore, hypotheses are offered relating population changes to the frequency of such preferential distributions.

Finally, I consider the economic consequences of inheritance (section eight). An attempt is made to clarify this problem by introducing the concept of wealth adjustment mechanisms and suggesting ways to measure their effects. A computer simulation is described that will permite the exact measurement of the consequences of inheritance rules upon wealth distribution. This primitive model may be a first step toward exciting future research.

This essay is methodological, exploratory, and sometimes recklessly deductive. My objective is to provide methods and measures for the study of inheritance as a process with both social and economic consequences. To a lesser extent, I hope to provide ethnographic data about Oaxacan Zapotec inheritance. For this reason, I wish to apologize beforehand to my fellow Oaxacan ethnographers for an absence of ethnographic detail which is so necessary to understand this colorful Mexican counterpart to the United States Ozarks. I promise to meet this responsibility elsewhere.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

1. THE STUDY OF INHERITANCE

A successful traveller remembers three rules. He distinguishes his objective, glances over his shoulder, and ponders whether his past travels are taking him where he wants to go. Likewise, a student must discover where his research is heading, what has previously happened in his topic, and whether he feels past and present research will take him where he wishes to be.

The same rules may be followed by someone studying inheritance. First, the objective of inheritance research must be unambigious. A review of the literature will reveal, however, that it often provides answers to questions that never were asked. Second, the difficulties faced by contemprary students can be understood within the perspective of previous trials and errors. A glance at earlier studies shows short excursions into the topic by peoples who were marginally interested in inheritance. The lack of a unifying paradigm (Kuhn 1962) forced each to start anew and created sporadic monologues rather than progressive dialogues. And finally, it will become apparent that current investigations into inheritance are not leading anthropology to productive paradigms or theories. Perhaps another traveller is willing to walk in circles before discovering his objective. I am not.

This review begins with W. H. R. Rivers' abortive attempt to establish inheritance as a distinct subject for investigation by contrasting it with the study of kinship and politics. Radcliffe-Brown ignored Rivers' efforts and relegated inheritance into a minor topic within kinship. This subordination lead investigators to modify kinship-derived distinctions into categories for inheritance.

In addition to these categories that were uncritically borrowed from kinship studies, inheritance has also been inundated with dichotomies and trichotomies derived from Western European legal concepts. With a few exceptions, inheritance "theories" have been attempts to correlate one such conceptual scheme with another. Few have succeeded. The result of these attempts has been considerable confusion which has prevented generalists, such as Murdock, from making definitive statements about inheritance.

One exception to this generalized paralysis of inheritance theory has been Homans' research into the social consequences of partible and impartible inheritance. A comparison of this dichotomy with those schemes derived from kinship theory and law suggests that any serious investigation on inheritance requires a return to River's separation of inheritance and kinship. Goody and Leach are given credit for rediscovering the utility of this distinction.

In sum, anthropology has inadvertently ignored the more critical issues in the study of inheritance in its haste to classify inheritance systems. The present situation of inheritance studies is worthy of Homans' general criticism about social modelling. "No science can proceed without its systems of categories, or conceptual schemes, but this in itself is not enough to give it explanatory power. A conceptual scheme is not a theory (1961:10)." Only a handful of anthropologists step beyond this rudimentary, yet necessary, phase of scientific discovery. A glance at these schemes connotes what previous researchers considered significant dimensions and questions of inheritance, and will help place my research in perspective.

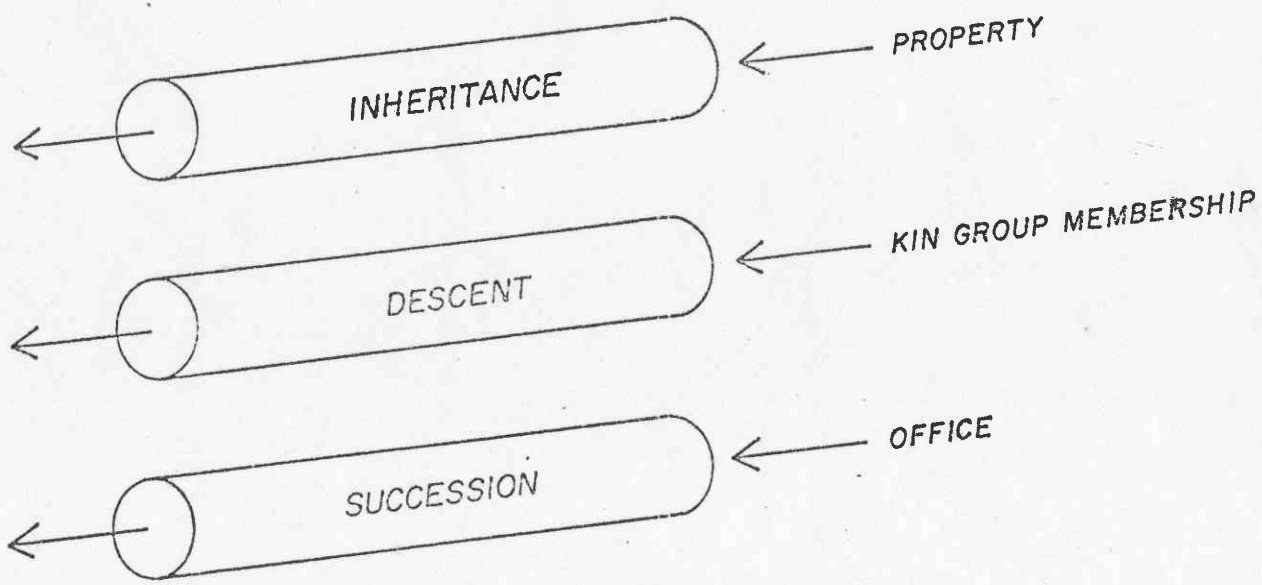
1.1 Rivers' Trichotomy

The questions that are asked concerning a process, such as inheritance, depend upon the social phenomena included within its definition. W. H. R. Rivers (1924:87) differentiates descent, the transmission of kin group membership; succession, the transmission of office; and inheritance, the transmission of property (Figure 1.1). It would appear that he considered each process worthy of distinct investigation, i.e. a set of questions is applicable to each transmission. The possibility of comparison of these processes is implied in this trichotomy.

Acquiring kin group membership and exclusive rights to property, in some respects, are similar processes. Each involves individuals (or groups) relinquishing control of something to other individuals (or groups). This transfer of rights is structured; it invests exclusive rights in some subset of the total society. Structuring accrues from rules for exclusion that distinguish the haves (those receiving the transmission) from the have-nots (those receiving other transmissions or none). Most societies invoke some criteria of kinship when delimiting the appropriate "haves" in inheritance. All societies invoke some criteria of kinship when determining the "haves" in descent

Further refinement of the subset of "haves" in inheritance requires rules in addition to those written for kinship. Some, but not all, of these other criteria are held in common with descent group transmission, i.e. relative age and sex. Other criteria used in inheritance transmissions are not found in descent, i.e. residential status and individual attributes like industry, merit, or esteem.

FIGURE 1.1 RIVERS' CONCEPTUALIZATION



What is the pattern of flow through each structure ?

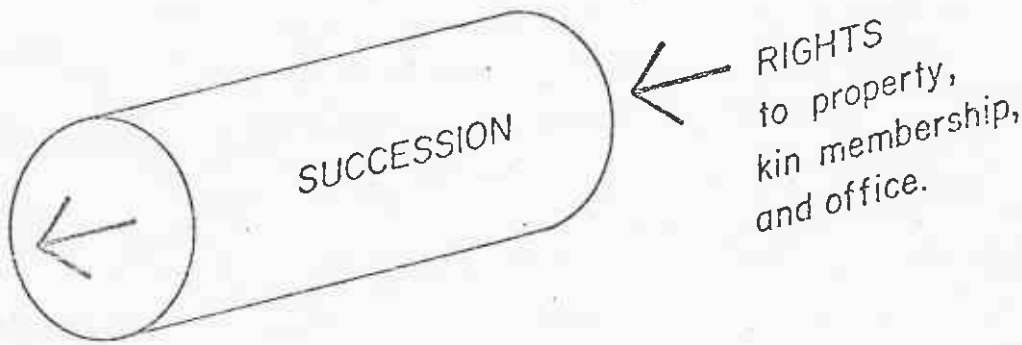
Subsequent anthropological research, under the influence of Radcliffe-Brown, rejected Rivers' distinction and its implied questions. Then, after considerable conceptual confusion, anthropology returned to them with renewed vigor. This cycle, however, left its imprint upon the anthropological study of inheritance.

1.2 Radcliffe-Brown's Unwarrented Synthesis

The first phase of this cycle begins with Radcliffe-Brown. He subsumes inheritance under his concept of succession and effectively dismisses it as a topic worthy of distinct discussion. Ignoring his own warning against the uncritical adoption of Roman legal distinctions in sociology, he defines inheritance as "hereditas est successio in universum jus quod defunctus habuit - inheritance is a succession to the entire legal position of a deceased man" (1935:34). In turn, succession assumes a meaning that blurs Rivers' tripartite distinction (Figure 1.2). Succession becomes the "transmission of rights in general" (ibid:32). Then, axiomatically, Radcliffe-Brown decides that "in general, though there are a few exceptions, it may be said that the transmission of property follows the same line as does the transmission of status" (ibid:42).

Fussion of the concept of property transmission and status transmission is based upon knowledge that property and status are correlated in social systems. Although this may be true, the transmission of these rights does not always follow identical paths. Nor can it be assumed that the social consequences of status transmission and property transmission are identical. It is possible to achieve high status in many social systems without receiving inheritance and visa versa.

FIGURE 1.2 RADCLIFFE-BROWN'S SYNTHESIS



RADCLIFFE - BROWN'S "succession" = $\sum$ RIVERS' INHERITANCE
+SUCCESSION
+DESCENT

Radcliffe-Brown obviously understood that property and status were not correlated on a one-to-one basis. Why then, did he synthesize these concepts? It appears that his redefinitions represent more than terminological gymnastics. The consistency of Radcliffe-Brown's theory of social structure hinges upon placing inheritance in this context. Social structure is considered a bundle of jural rights forming corporate units that continue beyond their members' lifetimes. These bundles of jural rights are called "estates."

To Radcliffe-Brown, the continuity of social structure is defined as ongoing estates that are unambiguously transmitted through time. Or, to make this statement "structurally" correct, estates persist and individuals pass through them. A detailed treatment of inheritance behaviors in societies without unilineal principles would have forced Radcliffe-Brown to radically modify his "working" paradigm. Such societies would have required him to consider situations that transmit different types of "rights" through different lines, and in which some estates do not outlive the holder's lifetime.

In a footnote (ibid:48) Radcliffe-Brown defers discussing such societies on grounds of "complexity" and "lack of space."[1] In retrospect, better reasons can be given. A consideration of non-unilineal societies would require his concept of social structure to undergo a fatal face-lifting. Radcliffe-Brown would be forced to return to Rivers' distinction between descent, succession, and inheritance. A modified theory of social structure would be required to conform with those societies in which descent, and perhaps inheritance or succession, play minimal roles in organizing social relations. It is important to recognize that the validity of

Radcliffe-Brown's paradigm would not have been threatened, only its universality. Apparently, this was too drastic a revision.[2] His suggestions lead his students to overtly avoid economic aspects of society, an action that would seemingly preclude a discussion of property transmission. Radcliffe-Brown's ground-rules for inquiry forced an avoidance of inheritance among his students in lieu of such more easily made and observed decisions as "to which descent group should X belong?"

Radcliffe-Brown's merger of River's original distinctions gives the appearance of scientific progress. Rivers delineates the problem by asking--do inheritance, succession and descent show different structures and obey different laws?" Radcliffe-Brown solves it by stating--"no, they are the same." Unfortunately, his answer comes from the manipulation of concepts - renaming the pigeonholes - rather than from data or deductive reasoning.

Under Radcliffe-Brown's powerful influence, anthropological research focused most upon descent, less upon succession, and least upon inheritance. Whole societies were classified according to "succession" principles (Rivers:descent) with the taxonomic division of societies into matrilineal, patrilineal bilateral, and double descent.

Radcliffe-Brown's influence did not altogether prevent mention of inheritance. However, it did receive the same classificatory vanier as descent. Societies were classed according to their mode of inheritance, i.e. patrilineal, matrilineal, and bilateral.[3] Such tags did little to further understanding of what inheritance does as either a social or an economic process.

Murdock appears to be aware of this confusing situation in his cross-cultural analysis of social structure. Summarizing the inheritance literature, he notes:

> "In the literature, two primary modes of inheritance are commonly distinguished, namely, patrilineal and matrilineal. They are different according to whether the preferred heir traces his relationship to the deceased through males or through females. Thus, if a man's property passed to his son, inheritance is partilineal; if to his sister's son, it is matrilineal; if to his brother, it may be either, with the rule becoming clear only when there are no surviving brothers...
>
> In actuality, the complexity of inheritance rules is such as to make the simple dichotomy of patrilineal and matrilineal highly inadequate for satisfactory analysis...A really adequate study of property rights and inheritance in cross-cultural perspective remains to be made". (1949:37-38)

1.3 Vintage Homans

At approximately the same time that Radcliffe-Brown was remolding social anthropology, George Casper Homans (1941) demonstrated the utility of a centuries old distinction between partible and impartible inheritance. Partible inheritance divides property among more than one heir. In contrast, impartible inheritance passes property to only one heir.

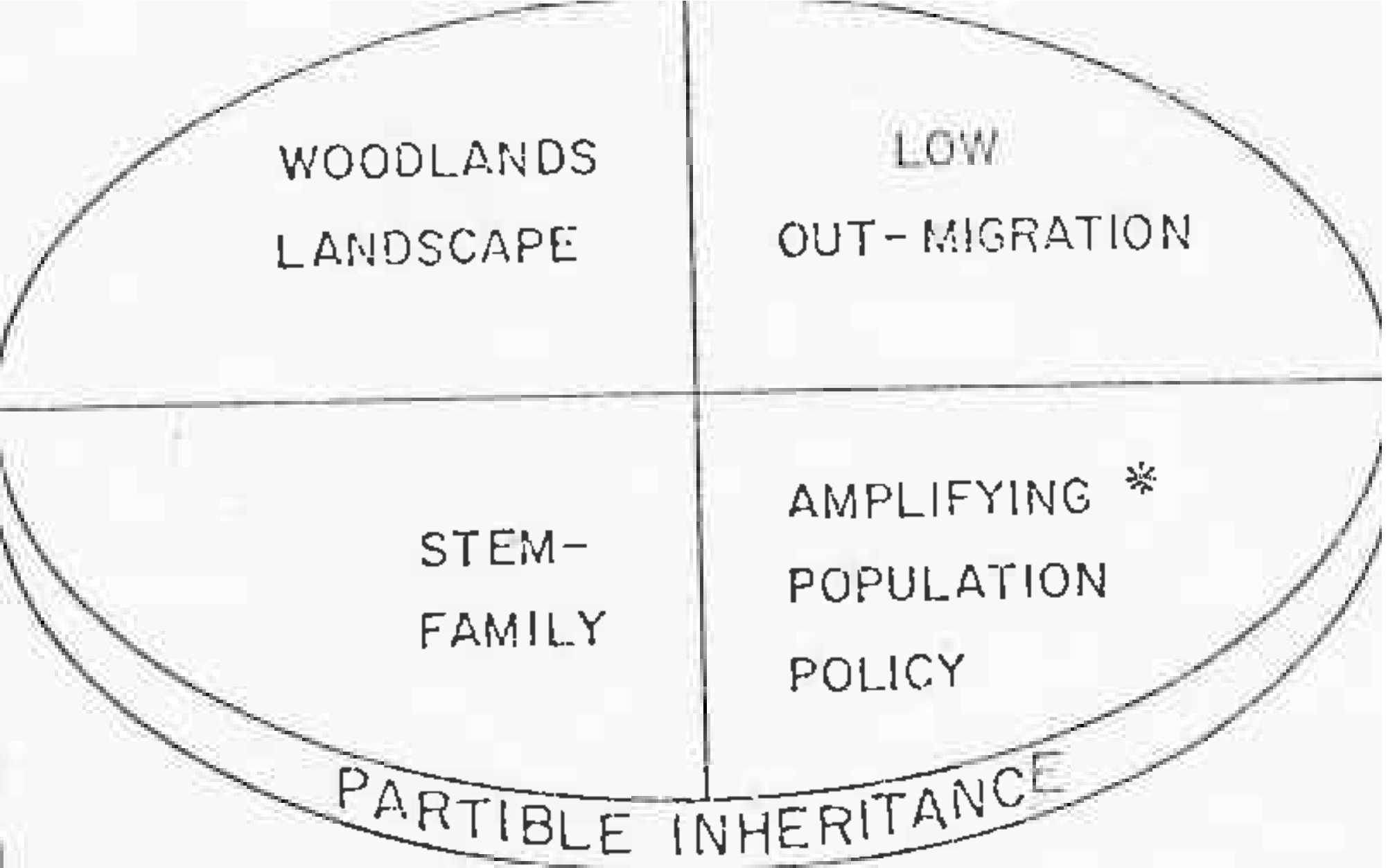
Homans was not investigating inheritance, per se, in English Villages of the Thirteenth Century. His stated objective was a presentation of the "anatomy of a society," meaning a functional analysis of various social institutions and customs within one time period of relative social stability. Methodologically, he searched for non-statistical correspondence of institutions in space, holding time constant. Then he attempted to account for this spacial parsimony of customs through functional explanations.

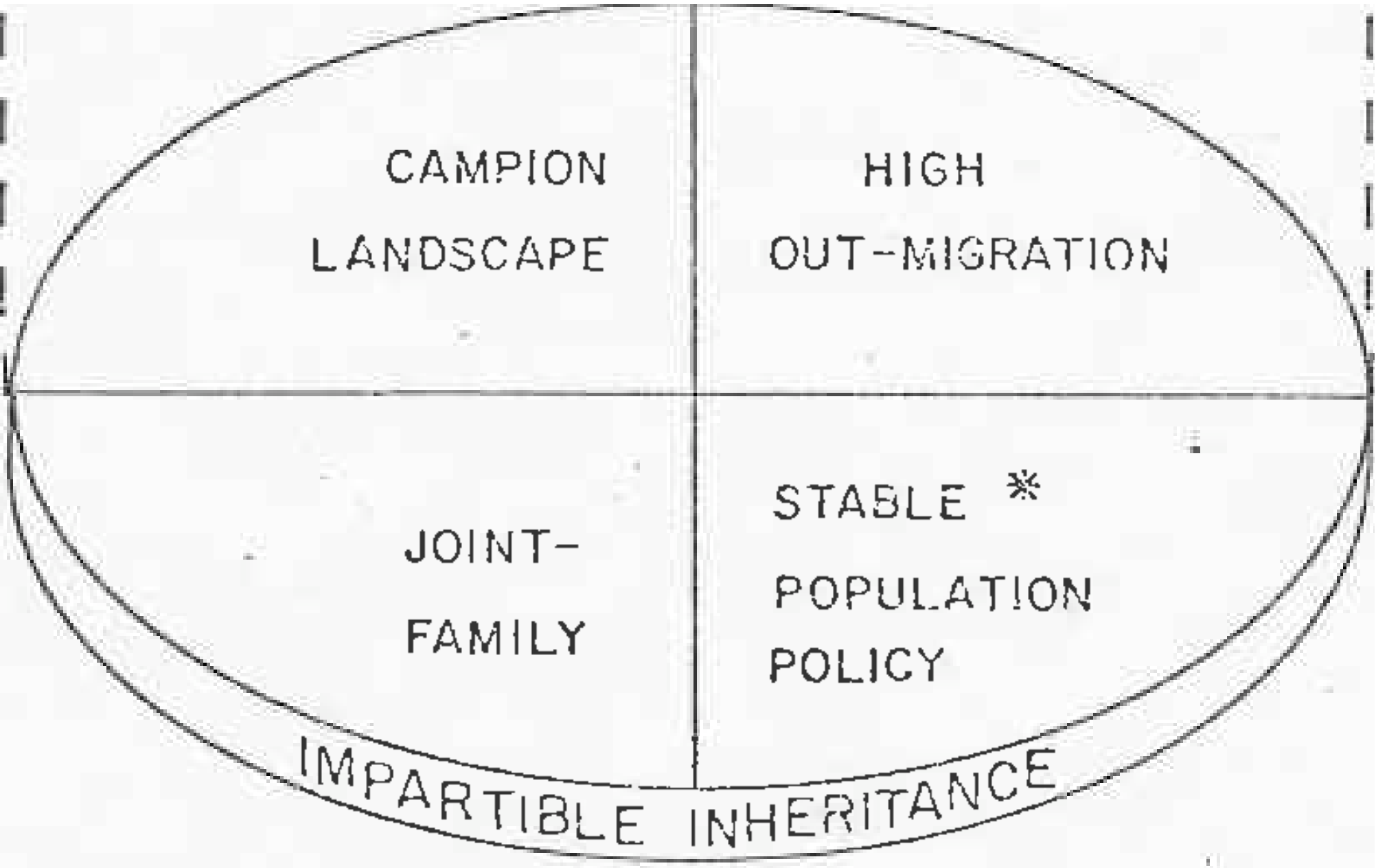
Homans distinguishes two "landscapes" in Thirteenth Century England: "campion" and "woodland." Campion was characterized by expansive, unfenced fields and populous, compact villages. Geographically, it corresponded to a broad "band running across England from the North Sea coast through the Midlands to the Channel." Flanking this broad band to to the east, west, and north stretched "woodland" country. In contrast to campion, woodland landscape was dotted with tiny, fenced fields and small, scattered hamlets.

A type of inheritance corresponded to each landscape. Campion had predominantly impartible inheritance; woodland had predominantly partible inheritance. Homans considers these distinctions indicative of different social organizations.

Homans real interest appears to be family structure. Having much inheritance data available and little information on family types, he borrows a hypothesis from Le Play and jumps from inheritance to family type. Le Play suggested stem-families occur with partible inheritance and joint families with impartible inheritance. Homans and Le Play define stem families as those in which one child remains in the household after marriage. In joint-families, all married sons stay with their father after marriage. Homans assumes Le Play's correspondence correct.

Homans feels that the association of family structure and inheritance has additional consequences upon society (Figure 1.3). Impartible inheritance fixes and stabilizes field size, wealth strata, and social relations. It creates a class of non-inheriting people who are faced with at least two alternatives: (1) leave the community or (2) stay in the community in a non-marital status (these alternatives were


WOODLANDS
LANDSCAPE
LOW
OUT-MIGRATION
STEM-
FAMILY
AMPLIFYING *
POPULATION
POLICY
PARTIBLE INHERITANCE


CAMPION
LANDSCAPE
HIGH
OUT-MIGRATION
JOINT-
FAMILY
STABLE *
POPULATION
POLICY
IMPARTIBLE INHERITANCE

normatively stressed in 13th Century English Society). He verifies this hypothesis by finding historical documentation referring to non-landed, migrant workers (anilepimen) and unmarried non-landed heirs within villages practicing impartible inheritance.

Partible inheritance has different social consequences. Each heir receives a share of his testator's estate. With this share, he is able to marry and establish a household. These form a large class of poor, landed peasantry, characterized by instability in estate size, wealth stratification, and social relations. Secondarily, bachelorhood and spinsterhood are less frequent among villages practicing partible inheritance.

I might note at this point that Homans' argument can be extended. If marriage is more common in a society practicing partible inheritance, this system maintains a "built in population policy" (cf. Wagley 1951) favoring population growth. Impartible inheritance, on the other hand, withdraws adults from the reproducing population, resulting in slower population growth. No one has adequately modelled the differential effects of either partible or impartible inheritance upon population. (In section 8, a means of answering this question is suggested.)

Homans also discusses another distinction common in inheritance studies: preference. Given impartible inheritance, a problem exists--who among the members of the society shall be the heir? This selection is normally and normatively based on at least three characteristics found in all societies: kinship, sex, and age.

In 13th Century England, kinship and sex were given: one's heir was selected from one's male children. Although this limits the universe of potential heirs considerably, a choice remains as to which

male offspring should receive the estate. A solution to this problem draws upon a third critieria of social organization: age. Because the time of transfer is mitigated by forces making the age of transfer uncertain (i.e. death, weakness, or senility of testator) this principle must be based upon relative rather than absolute age. The logical possibilities are limited to either the eldest or youngest son. "Middle son" selection would be ambiguous because more than one son might fit this criteria, and an additional selection principles would be necessary. Selection wherein the eldest son receives the estate is called "primogeniture" and if the youngest son receives the estate it is called "ultimogeniture."

Homans discovers both principles operative in 13th Century impartible inheritance. He asks: "is this distinction significant?" "Significance" is operationally defined. If a shift from one principle to another brought negligible alterations in the social structure, then the distinction was irrelevant to his discussion.

Homans finds the ultimo-primogeniture distinction meaningless. Empirical cases revealed villages shifting <u>by fiat</u> between ultimo and primogeniture without notable changes in the social organization. Concerning this shift, he remarks:

> "The ease with which a change was made . . . shows that the difference between inheritance by primogeniture and the inheritance by the custom of Borough English was not an important one. Changing from one to the other does not seem to have radically altered the social order of the village. The important difference was between either one of these customs and the custom of inheritance by a group of joint heirs." (ibid: 127)

This question of significance is, of course, relative. The selection on the criteria of relative age may have significant systemic

consequences such as regulating the relative age of an heir's takeover of a farm, the abilities of non-inheriting heirs to fend for themselves, etc. However, modelling becomes extremely conditional when these effects are investigated. Realizing this, Homans dismisses the ultimo-primo distinction as marginally useful.

1.4 Comparison of Homans and Radcliffe-Brown's Impact on Subsequent Studies

These two classificatory schemes, the matri-patri-bilateral and the impartible-partible, have dominated subsequent studies of inheritance. They have not, however, proved equally productive. Conceptual schemes are like cheap ball point pens, some work and some don't. The value of these schemes may be measured in terms of the productive explanations and questions they produced. Look at the impartible-partible distinction first.

The partible-impartible dichotomy emphasized by Homans has generated modifications and additional queries from other researchers (Cole 1971, Wolf 1966). For example, Wolf extends Homans' model of 13th Century peasant inheritance to a "preliminary functional explanation" of the social correlates of inheritance in all agrarian states. Wolf's definition of impartible and partible inheritance is more encompassing than that used by Homans. He includes cases in which either sex is a potential heir. Thus, partible inheritance is the division of property among two or more heirs and impartible inheritance is the passing of property to one heir. Partible inheritance, he argues, fosters disguised unemployment because succeeding generations of heirs receive smaller and smaller shares (note: he assumes a growing population). Families, who are linked to their farms by land, turn to craft specialization as

they find it increasingly difficult to make a living solely based upon agriculture.

Impartible inheritance, on the other hand, generates a class of non-inheriting peoples. Given an increasing rural population, Wolf believes that the ability of the farm to assimilate this class becomes saturated, eventually forcing surplus labor out of the rural sector. Impartible inheritance, therefore, encourages internal migration from rural to urban areas, a condition favorable to industrialization.

To this point, his argument is a generalized restatement of Homans' specific theory. Wolf goes beyond Homans when he suggests that each type of inheritance has distinct political consequences for the state. The continual generation of a poor, landed peasantry accruing from partible inheritance gives the state a large tax base. More importantly, this tax base expands and contracts with population changes. It tends to reshuffle wealth and power among the peasants.

Impartible inheritance, however, fosters a strong, enduring landed aristocracy at the local level. As a tax base, this group is fixed in size and is insensitive to population dynamics. Given this argument, it may be hypothesized that the tax collecting and administrative bureaucracy in a state favoring impartible inheritance would be relatively simple compared with that necessary for partible inheritance. Finally, Wolf suggests that partible inheritance should correspond to a condition of land availability while impartible inheritance should correlate with land scarity.

This last hypothesis was recently explored by Goldschmidt and Kunkel (1971:1064-5) using a sample of 46 peasant communities. Their article illustrates how a cross-cultural survey of inheritance may run

aground when little consideration is given to the concepts employed in the test. Tables 1.1 and 1.2 reproduce their results.

TABLE 1.1 INHERITANCE PATTERNS IN RELATION TO LAND AVAILABILITY*

	Inheritance Pattern			
Land availability	Impartible	Patrilineal Partible	Bilateral Partible	Totals
1. Available	0	0	3	3
2. Formerly available	1	11	11	23
3. Limited	1	0	3	4
4. Unavailable	7	6	3	16
Totals	9	17	20	46

TABLE 1.2 THE RELATIONSHIP BETWEEN INHERITANCE AND LAND AVAILABILITY*

	Inheritance		
Land	Impartible	Partible	Totals
Scarce	7	9	16
Available	2	28	30
Totals	9	37	46

*From Goldschmidt and Kunkel (1971:1064)

Justifiably, they consider the first table inconclusive. Their coding of land scarcity forced most of their sample (43 cases) into a land scarcity category. Hoping to find something significant, they collapsed the categories (1, 2, 3) in Table 1 and called this "available" land (Table 1.2). This table might appear to offer a more direct test of the Wolf hypothesis. They summarize their results as follows:

> "While the fourfold table shows a correlation between land scarcity and impartible inheritance, several facts may be noted: (1) the cell frequencies for impartible

> inheritance are too small for simple tests of significance, (2) both types of land inheritance can exist with scarcity or availability of land resources, and (3) both patrilineal and bilateral inheritance are associated with land availability." (ibid: 1065)

Note that Goldschmidt and Kunkel test only half of Wolf's hypothesis. Wolf suggested that partible inheritance may coexist with land scarcity IF outside economic opportunities supplement peasant incomes. In other words, heirs receiving less land than necessary for subsistence farming might supplement their incomes with household crafts or migrant labor and continue practicing partible inheritance.

The most perplexing aspect of the Goldschmidt and Kunkel article is their uncritical use of the kinship derived categories of patrilineal and bilateral inheritance. In brief, these categories prove worthless additions to their statistical manipulations. It is unclear whether their merging of the categories of "patrilineal" and "bilateral" partible inheritance was an artifact of their desire for a testable chi-square or a realization that the distinction contributed nothing to their argument.

If they would have investigated the bastard origin of this distinction, the impotency of their test to distinguish between "partible patrilineal" and "partible bilateral" would have been explicable. Its inclusion can only be explained by "tradition" within the history of anthropological thought. In brief, the questions generated by the patri/matri/bi distinction are simplistic and unrevealing of either the social or economic consequences of inheritance: through which line does inheritance pass? or what is the sex of the testator and heirs? The continuity of this worthless distinction suggests that the halflife of any concept in anthropological research increases with its proximity to kinship.

Difficulties in the Goldschmidt-Kunkel cross-cultural test might

also have been avoided by a careful review of Murdock. After expressing discomfort with the lineal classification of inheritance systems, he reluctantly adopts a patrilineal, matrilineal, and "mixed" typology in Social Structure (1949) and thereafter avoids the topic. He demonstrates continued apprehension of his own trichotomy in his Ethnographic Atlas (1961:11) in which he warns against deriving indiscrete interpretations from such distinctions. Fortunately, Goldschmidt and Kunkel were never given an opportunity to indiscretely interpret this conceptual scheme; their statistical tests using this trichotomy never provided them with significant results.

Anthropology in the fifties contributed more inheritance cases to the literature, but theoretically, nothing noteworthy appears to help reduce Murdock's earlier skepticism. In Social Structure of Southeast Asia (1960) he ignores inheritance in summarizing the symposium and typologizing types of cognatic social organization. This ommission is not followed by the contributors to the symposium: two-thirds of whom discuss inheritance.[4]

In summary, two conceptual schemes dominated the early study of inheritance. One was based on the number of heirs receiving inheritance from a testator. It contrasted systems in which only one heir received all an estate with systems that divided an estate among more than one heir. The social consequences for these two types of inheritance is clear only in models that are strongly simplified ideal types. Within each type certain cases may violate the definition of the process. This may occur more frequently in partible systems. For example, in partible inheritance it sometimes happens that only one heir is available to receive the estate because of high mortality, low fertility, or both.

Thus, a testator cannot divide equally among more than one heir. He has only one. The outcome of this decision would be identical to that of impartible inheritance. The frequency of such "one heir only" cases in a population practicing partible inheritance depends upon the testator's fertility and heir's probability of mortality before heirhood. Similarly, impartible inheritance to an heir of a specific sex may be sensitive to demographic factors.

Therefore, the systemic results of inheritance would appear to be heavily dependent upon population processes. If quantification of the above relationship between partible inheritance and the type of landscape, family, rate of migration, craft specialization, etc. is desired, then the parameters of the population must be defined and controlled. This has not been done.

Contrast this interesting set of queries with those generated by Radcliffe-Brown's decision to subjugate inheritance into a minor role in social life. The second conceptual scheme based upon a trichotomy produced few hypothesis beyond the relationship of the line of inheritance to the line of descent. Lineality of inheritance transfers is important only in societies where descent lines form corporate groups holding property. For example, if a society passes descent status along the patriline and includes groups of patrilineally related males who hold joint-rights to property, then land tenure, inheritance and descent groups may be identical. In many societies the mere fact that people are kinsmen does not imply shared property rights. Exclusion principles of inheritance reduced the total universe of "kinsmen" to include only specific "kinsmen" with whom property is shared. Therefore, knowing a society's descent principles fails to reveal how property rights are

linked to kin groups. Any explanation of such an inheritance system must go beyond this descent-biased conceptual scheme and show internal variations and countervailing tendencies effect property dispersion and accumulation of specific types of kin groups (cf. Collier 1971).

1.5 British Rumblings

If the study of inheritance was to advance, the unproductive merger of inheritance, succession and descent theory had to be dissolved. This premature synthesis was rebuffed in the early sixties. Within a year of one another, both Leach (1961) and Goody (1962) rejected Radcliffe-Brown's marriage of inheritance, descent,and succession and returned to something similar to River's earlier distinctions.

Like Radcliffe-Brown, Leach searches for principles of structural continuity in a society. In Pul Eliya (1961) something vital to a Radcliffe-Brownian explanation was missing. Leach's initial problem was "to understand the principles of structural continuity in this small scale society which lacked any obvious type of exclusive on-going corporation (ibid:300)." Maintaining Rivers' distinction between inheritance and descent, he investigates the social structure and tenure of this community and finds that descent principles are not always required to form on-going corporations. What, then, endures and gives Pul Eliya its structural continuity? He finds that "continuing entity" to be Pul Eliya's compounds (gedura) and their associated lands. These compounds, with an unquestionable structural continuity, have persisted unaltered over at least a century. Leach calls these compounds "corporate aggregates."

> "(the compound) is a 'corporate aggregate' in Maine's sense; the estate is a continuing entity, certain types of ownership rights relate to the estate as a whole

> rather than to any particular part of it, and are vested equally in all individuals who acquire rights in the estate." (ibid: 101).

But what gives continuity to the compounds?

Leach concludes that "the continuing entity is not Pul Eliya society but Pul Eliya itself." This paradoxical statement is, on the surface, quite simple. In Pul Eliya, what endures is a technological land tenure system whose parameters are rigidly prescribed by environmental limitations. Individuals adapt themselves to these territorial realities. Social organizations, including kinship, become rationalizations of the limited possibilities for individual variation within these constraints. And most important, principles of inheritance function to attach individuals to land through time.

Thus, Leach replaces one continuity principle (descent) for another (inheritance). Rights in Pul Eliya are attached to individuals through inheritance. The shift from one social continuity principle to another and the continuing importance of Radcliffe-Brown's queries, albeit with different answers, suggest the in-house nature of Leach's rebellion. His bombastic conclusion does not conceal the necessity for something to endure. Leach and Radcliffe-Brown disagree as to what that "something" is. However, there is a crucial difference between the enduring descent groups and enduring land tenure relationships supported by inheritance as principles of social solidarity. Descent groups consist of people and are socially discrete entities. Inheritance is a set of rules which Leach abstracts from the behavior of Pul Eliyan individuals and groups. Thus, his analysis puts forth rules, not groups, as the key elements to Pul Eliya continuity.

The universality of Leach's argument is weakened by the Pul Eliyan

case itself. His structural argument is contingent upon a society wherein compounds and farm land are bound together in an indivisable unit. In Pul Eliya people hold "shares" in an estate, rather than physically fragment it. In other societies holders divide their estate among heirs, i.e. the estate can be split and new estates formed by combining shares. Leach's argument does not apply to such societies and appears to require modification. It could be the case, then, that nothing endures. Shortly, I will discuss such a possibility.

Goody also revives Rivers' old distinctions and queries. Commenting on his numerous studies on inheritance, he notes:

> "I have tried to separate systems of inheritance from systems of recruitment to unilineal descent groups. But while no one-to-one correlation exists, there is clearly a correspondence between the rules of transmission and the rules of membership of kin groups." (1962:318)

Goody's interest in inheritance began, I believe, from a fortuitous marriage of a theoretical problem and field experience with some hard-headed informants. The LoDagaa of West Africa insisted that inheritance differences in patterns accounted for dissimilarities between their villages. Apparently, Goody belived his informants rather than his descent-oriented British colleagues. His Death, Property and the Ancestors (1962) is a lengthy controlled comparison of two LoDagaa villages that proves the native's ethnotheory correct.

In this work, Goody explains differences in descent (specifically, differences in direction or line of ancestor worship) in terms of inheritance. Maine (1883) had argued that differences in inheritance systems were caused by differences in ancestor worship. Goody reverses causality in this theory. He argues that obligations instituted during

inheritance force continuation of holder-heir relations after the holder's death. Different directions in the flow of goods through kinsmen cause different ancestors to be worshipped. He demonstrates that agnatic holders and heirs maintain this linkage in one village, in contrast to a neighboring village where both agnates and uterine kin are heirs and where both agnatic and uterine ancestors are worshipped.[5]

Goody and Leach share credit for breaking the logjam entrapping numerous interesting and unanswered queries which were meaningless as long as the study of inheritance was only a part of descent theory. These questions include a discovery of an adequate definition of inheritance and an investigation of its social and economic effects of inheritance.

ENDNOTES

1. In those cases in which Radcliffe-Brown found it necessary to discuss non-unilineal descent, as in European society, his unit of analysis shifts. The continuing corporate entity becomes the nation-state in place of the lineage.

2. Radcliffe-Brown's own pedagogic directives might also account for the disinterest in inheritance among his followers. Leach (1968) notes that Radcliffe-Brown encouraged his students to "concentrate on those aspects of a social system which displayed clear-cut formal characteristics and which reflect to a minimal degree the interplay of personal rivalries" (ibid:484). His suggestions lead his students to overtly avoid economic aspects of society, an action that would seemingly preclude a discussion of property transmission. Radcliffe-Brown's ground-rules for inquiry forced an avoidance of inheritance among his students in lieu of such more easily made and observed decisions as "to which descent group should X belong?".

3. This exercise was never carried to its logical extreme. To my knowledge the concept of "double-inheritance" never emerged.

4. Condominas, Frake, Eggan, Koenjaraningrat, Leach and Mabuchi all discuss inheritance in this book.

5. A note for those that enjoy kinship terminology. Goody maintains "patrilineal and matrilineal" as descent concepts and reserves agnatic and uterine for inheritance. He appears to reject Radcliffe-Brown's synthesis but never questions the overall utility of the descent-based distinctions arising from this terminological jumble.

2. COMPONENTS AND QUESTIONS

Inheritance is the transfer of property rights from testators to heirs. This transfer may be described by rules that generate appropriate outcomes from some body of information. These rules are time sensitive; a transfer is more likely to occur at certain points in a testator's or heir's lifetimes. From this, it follows that a minimal description of inheritance must consider these four components: property rights, testator-heirs relationships, rules, and time.

2.1 Property and Property Rights

Property, the material good, is distinct from property rights which are those agreements between peoples that give exclusive rights to property by excluding others (Goody 1962). This distinction is important because different individuals or groups may hold putative rights to the same piece of property. Inheritance, therefore, not only transfers property rights; but also realigns people to people with reference to these rights.

This realignment of people to people may be approached using a simple paradigm developed by Bohannon, Dalton, and Leyton. Bohannon (1955) and Bohannon and Dalton (1965) applied a concept of "economic spheres" to their reanalysis of Trobriand exchange. An economic sphere is a system of exchange whose goods, rules of transfer, and values cannot be equated with another sphere; i.e. the goods and services moving within one sphere cannot have a common medium of exchange with those of another. This definition does not prevent an economic comparison of spheres. A "transformation" may take place by assigning something like a dollar value to both spheres. However, such an "etic"

economic analysis would not be useful in understanding peoples behaviors when using these spheres. To a participant, the separation of spheres is clear; his actions and decisions are predicated upon these distinctions.

Leyton (1970) first applied this concept of spheres to inheritance. He isolated three spheres of inheritance in a North Ireland fishing village. Each sphere is characterized by a unique set of goods or property rights which are not "exchangeable" in the spheres. The rights within an inheritance sphere are transmitted between generations according to different "principles or ideals." Leyton distinguishes between spheres by measuring the amount of goods transmitted, the principles emphasized in their transfer, and the sex of the recipient (Figure 2.1).

Unfortunately, Leyton's discussion of the cognitive status of these spheres is nebulous. Although they appear emically distinct because "ideologies do exist at different entities" (?). Furthermore, his "principles or ideals" mix analytically derived rules (genealogical distance) with normative statements by informants ("deserts" and "need"). Thus, although Leyton succeeds in showing that the distribution of different property rights follow different sex lines, he fails to indicate how, why, or if these differences are considered significant by the natives.

Leyton's primary contribution is his demonstration that a society may have several sub-systems of inheritance; i.e. it may not transmit all its property rights in the same way. If the purpose of an inheritance study is to demonstrate its social and economic consequences, then such a situation would suggest a separate investigation of each inheritance sphere. Because this suggestion might

Figure 2.1 SPHERES OF INHERITANCE AMONG AUGHNABOY, NORTH IRELAND

		Sphere #1	Sphere #2	Sphere #3
Kind of good transferred		Farms, businesses, trawlers	Houses	Money
Principles emphasized		-Continuance of family name -Transfers through males	-Share based upon heir's "need" -Family name is secondary	-Received by "deserving or most esteemed" heir -Bilateral transfers
Recipients*	Males	89%	61%	33%
	Females	11%	39%	67%

*Percentage of items passed. Leyton does not specify number of items.

create descriptive overload in social settings with numerous spheres of inheritance, it might be useful to concentrate upon those spheres with the greatest economic and symbolic importance to the native participants.

Leyton's findings also reveal the futility in classifying whole societies by their mode of inheritance. Using the typology derived from descent theory, his village would be classified as having patrilineal inheritance (of farms and businesses and trawlers) because the major source of capital primarily passes through males. If, for some reason, this fixed capital were considered unimportant, then an emphasis on the transmission of money would force a reclassification as matrilineal inheritance. And finally, if all three spheres were considered, this society would be classified as having "bilateral" or "mixed" inheritance.

Leyton's data also illustrates the weakness of using a single attribute of property to classify the inheritance system of a society. The typology of movable as opposed to immovable property is also borrowed from Western European legal concepts. Movable property may be physically displaced through space; immovable property, sometimes referred to as "real property," includes all things that cannot easily be displaced, such as trees, houses, and land. From the information in Figure 2.1, this Northern Ireland village would be classified as having patrilineal inheritance of both movable and immovable property and matrilineal inheritance of a movable commodity (money).

Using an attribute of property to classify inheritance systems blurs the distinction between property and property rights. If attributes of property, such as mobility, are important in determining the social rights linked to them, then this is a problem for analysis, not an _a priori_ classification. For this reason, the mobility of

property has proved little more than an additonal pigeonhole for classifying ignorance of inheritance and fostering a false confidence that inheritance is well understood.

In summary, it appears most profitable to approach inheritance with the following queries.

(1) What exclusive rights to property exist in a society?

(2) How are these rights created, acquired, relinquished, and destroyed?

(3) What individuals or groups hold these rights?

2.2 Testators and Heirs

Any society recognizing exclusive rights to property makes some provision for their transfer when the holder withdraws from social activity. Those relinquishing rights are "testators" and those receiving them are "heirs." A more specific definition of either testators or heirs is an emic problem because the identification of both varies between societies.

Defining testators is intimately related to the question of property rights. It may not be assumed that these rights are always attached to an individual. The right to dispose may also be held by more than one person or corporations (i.e. joint tenure). In situations where testatorship is shared by more than one individual, an inheritance study would have to refer to testators (plural).

Defining heirship is a somewhat different task. Here the problem is one of expected rights held by some groups of persons toward others. These expected rights are revealed either by norms or, preferably, high-frequency behaviors. The ultimate definition of heirship rests upon rules which systematically exclude peoples who may not derive rights

from a holder. As previously suggested, these exclusion factors may not always be the same as those used to define kinship categories. Although age, sex, and generation may be crucial in defining both heirship and kinship a complete specification of an heir also might require consideration of marital status, industry, co-residence, or previous interactions between heirs and testators.

Finally, discovering the social impact of inheritance requires an exploration of all the other roles that the testators may share with heirs. Testators and heirs may also interact as parents and children, leader and follower, socializer and socialized, or head of household and member of household. When a dyadic relationship involves multiple roles, it is possible that the complementary roles of testator/heir may be of minor importance in an extensive nexus of social interactions. In that case, a study must be careful not to attribute social behavior of individuals who are testators and heirs exclusively to their inheritance roles.

2.3 Time of Transfer

Another Roman legal dichotomy classifies different times for the transfer of property rights. Causa-Mortis inheritance is defined as all transfers of property rights occuring after a holder's death. It contrasts with inter-vivos inheritance: all transfers occuring while the holder lives.[1]

This dichotomy rigidifies a very fluid cultural situation. Most societies practice both causa-mortis and intervivos transfers even though they may normatively stress one extreme (Selby 1966). In a society subscribing to intervivos transfers, unexpected deaths sometimes forced causa-mortis transfers. And conversely, senility and deviant behavior

may lead to inter-vivos transfers in societies stressing causa-mortis ideals.

Testators also transfer property to those who would eventually be their causa-mortis heirs before their death. These transfers would occur through processes that are not usually considered inheritance. This proves to be a crucial problem in defining inheritance. Should transfers of property rights through marriage doweries, brideprice, levirate and gifts also be considered inheritance?

Goody (1962) recognizes this as a major definitional problem facing the study of inheritance. He contends that these transfers should be considered intergenerational and, therefore, they are inheritance. His definition broadens the definition of inheritance to include what had previously been considered rather distinct institutions and processes. This expanded concept also requires reclassification of many situations that had heretofore been considered strictly causa-mortis inheritance systems.

Problems still remain. The causa-mortis/intervivos classification assumes that death is the point at which a member retires from active social life and forms the breaking point for classifying the time of transfer. It is possible, however, that certain other events in an individual's life cycle can be considered to indicate his retirement time, thereby making death a less significant indicator of the transition from active to passive social activity. Other social events, like the marriage of the last single child, death of one's spouse, or completing community obligations may more effectively signal when a transfer should occur. If this is the case, then the breaking point for the dichotomous classification discussed above must be redefined.

Finally, it should be emphasized that the transaction of property rights from testator to heir may occur over an extended period. Allowing for the possibility of joint tenure, it is possible that both the testator and heir may share rights during the transfer. Classifying the time of transfer becomes exceedingly difficult under such situations.

2.4 Rules

Taxonomic schemes are not the only means by which inheritance has been described. Ethnographers also describe inheritance by presenting "norms, rules, and principles." A norm is a native's statement about how his inheritance system should (or appears) to operate. A rule summarizes the operation of a system in analytical terms and need not correspond with any one native's statement. A definition of a principle is nebulous. Nader's description of Zapotec inheritance in the Handbook of Middle American Indians may be used as an example.

> "The general rule for inheritance states that children of both sexes are to inherit equally from their parents. Another rule is that if the youngest is living with their parents at the time of their death, he will inherit a greater share. A farther rule states that if one child is more deserving than the rest, parents may favor him . . . . .
> Needless to say, there is much variation, such as the observed fact that girls tend not to inherit as much land as boys." (1969:348)

Selby (1966:76) describes Zapotec inheritance in Santo Tomas Mazaltepec in terms of ". . . the principle of supremacy of parent's will and the principle of bilateral equality of apportionment." Neither Nader nor Selby reveal how they derive these "rules" and "principles." In both instances, their analytical statements appear to be restatements of normative expressions.

The number of contingencies encountered when eliciting inheritance

norms from informants often creates situations that make it difficult to maintain the distinction between norms and rules. Selby's principles are easily elicited from most adult Zapotecs. However, it is obvious that under certain conditions that norms are inapplicable or inappropriate. In cases of step-parents, which parents' will is dominant? Under what circumstances is bilateral, equal-apportionment relaxed? Or in the case of Nader's "rules", if a parent dies and leaves an elder "deserving heir" and a young undeserving child, who receives a larger portion of the estate? What happens if the testators have no children?

These contingencies rapidly exhaust the universe of easily elicited norms and force anthropologists to ask more and more complex, conditional questions. Under persistent questioning, informants often generalize norms from those few cases known to them in which such conditions have occurred or, more commonly, they make-up what would appear to be an appropriate outcome. To call statements elicited by such questioning "norms" is to destory the common meaning of the concept. If an informant generalizes from specific cases, he is no longer stating norms. Rather, he is generalizing from specific cases to abstract rules in a manner similar to that of an ethnologist. Such generalizations are best considered informant-derived rules. It is not surprising, therefore, that anthropologists prefer reporting a few norms, rules, or principles, and then ignore the topic altogether.

Many more methodological advances will be necessary before inheritance rules can be completely described, but it is unnecessary to await an exhaustive set of rules in order to discover the general social and economic effects of inheritance. Many contingencies in a set of inheritance rules occur so infrequently that they may be ignored.

Nevertheless, it is necessary to understand the externalities upon which even the simplest rules depend. For example, given a rule that "testators lacking heirs in their own corporate group relinquish property rights to the next higher, inclusive corporate group," it would not be possible to predict the amount of property passed to the more inclusive groups by such a rule unless an estimate could be made of the frequency of testators who lack heirs. In this and many other inheritance situations, the impact of a rule on behavior depends upon a combination of social and demographic parameters. Only by controlling for both these parameters may the systemic importance of the rules be discovered.

2.5 Key Questions

Assuming that an adequate description of the property rights, testators--heirs, time, and rules were available, the study of inheritance would still be incomplete. A demonstration of the consequences of inheritance would be missing. I prefer to distinguish between two general types of consequences: social and economic. The social consequences of inheritance are those that effect the alignment of people to people. Its economic consequences effect the alignment of peoples to property. Little is known about either.

2.5.1 Social Consequences

Theories concerning the social effects of inheritance are primarily limited to societies with corporate groups. Some theories emphasize a role viewpoint and suggest the effects of inheritance behaviors on the testator-heir relationship. Others take a kin group perspective and attempt to determine the impact of inheritance upon the continuity or solidarity of corporate groups.

Goody's Death, Property and the Ancestors (1962) is an example of the role approach. Aside from his interest in the lineality of ancestor worship, Goody is concerned with the interpersonal relationships between the complementary roles of holders and heirs in LoDagabaa inheritance. To study this relationship, he develops the most elaborate theory of inheritance in the literature.[2]

Goody views inheritance as one of a set of processes responsible for the continuity of a society (ibid:Chap. 13-16). Social continuity, he argues, is maintained by an orderly transmission of information and rights between generations.[3] The transmission of information does not deprive the giver of anything. An example would be the linguistic socialization of a child by his parents. In contrast, the transmission of exclusive rights leaves a giver with less than he started. Among those exclusive rights commonly transferred are rights to women, office, and material goods. Transfer of exclusive rights creates a cleavage crucial to the workings of society; it distinguishes haves from have nots. In inheritance, this divides testators from heirs. Goody feels inheritance relationships are characterized by hostility and tension that is ultimately reduced by the transmission of rights (ibid:276). Testators battle heirs to retain what they have and heirs pressure testators to make them (or force them to) relinquish their rights.

Goody never clearly demonstrates that LoDagabaa testators and heirs actually express this hostility and tension. It would appear to be either latent or so common as not to merit demonstration. The reality of this latent tension becomes important because Goody generates an explanation of inter-vivos inheritance using this emotional strain as an explanatory variable.

In societies that transfer property rights before death, Goody feels that inter-vivos transfers reduce hostilities at the risk of "increasing the problems of the old, since by this (intervivos) process the senior generation undergoes a social euthanasia before their physical death" (ibid:278). How is it, then, that in some societies the heirs exert enough power to force inter-vivos transfers while in other societies, they must await the death of the holder?

This question should be tackled only if it is firmly established that a testator/heir relationship is actually characterized by hostility and tension. It is possible that tension might characterize the relationship without hostility. For example, a romantic relationship might lack hostility and yet provoke tension. Even assuming that the type of tension could be specified, it still must be established as a product of testator/heir role conflicts. It is also possible, that hostility or tension between testators and heirs may come from other roles they share.

Another interpretation of inter-vivos transfers makes the issue of hostility and tensions superfluous. It is possible that the transfer of property rights from testator to heir is but one transaction in an elaborate series of social exchanges. If this were true, then the testator/heir relationship might better be seen as one of mutual obligations.

Goody's reaction to an interpretation of inheritance as social exchange is sharply negative. The distinctiveness of inheritance rests, by his definition, in its contrast to information exchange which may create social exchange ties.

> "The aim (of information transmission) is to pass on such items to the junior generation within a short space of time, and although the process inevitable creates some friction, nobody loses by the actual business of giving. On the other hand, this is only true of the transfer of exclusive rights if the process is one of exchange, and intergenerational transmission such return transactions are minimal." (ibid:274-5)

Furthermore . . .

> "Although the heirs have duties toward the holder, there is no definite concept of reciprocity or roughly equivalent return implied in the transmission." (ibid:278)

Herein Goody reveals that when he refers to "exchange" he means "economic exchange" in the strict meaning of the term, i.e. material for material goods. However, it is generally understood that many economic exchanges may also have a "social exchange" dimension. When uncertainty arises as to the meaning of a transaction, it is best analyzed as possibly a social or an economic exchange or both.

Viewing inheritance as both a social and economic exchange does not exclude possibilities of either cooperation or tension among the parties. If inheritance is a social exchange, then the status of interpersonal relationships will depend upon the valence of the exchange at any one moment. A social exchange theory of inheritance is not dependent upon demonstrating perpetual tension among the testators and heirs. Questions of the quality of role relations become secondary.

This brings the discussion back to an earlier point concerning the definition of testators and heirs. If the aim of a study is to find the social effects of inheritance, then the fact that testators and heirs may share other obligations and rights with respect to each other, apart from inheritance, becomes extremely critical. Goody's ignorance of the diverse roles held by testators and heirs results in a conflict model of inheritance. I hope to demonstrate that this conflict situation

is only the case if one ignores the other roles of the individuals called testators and heirs.

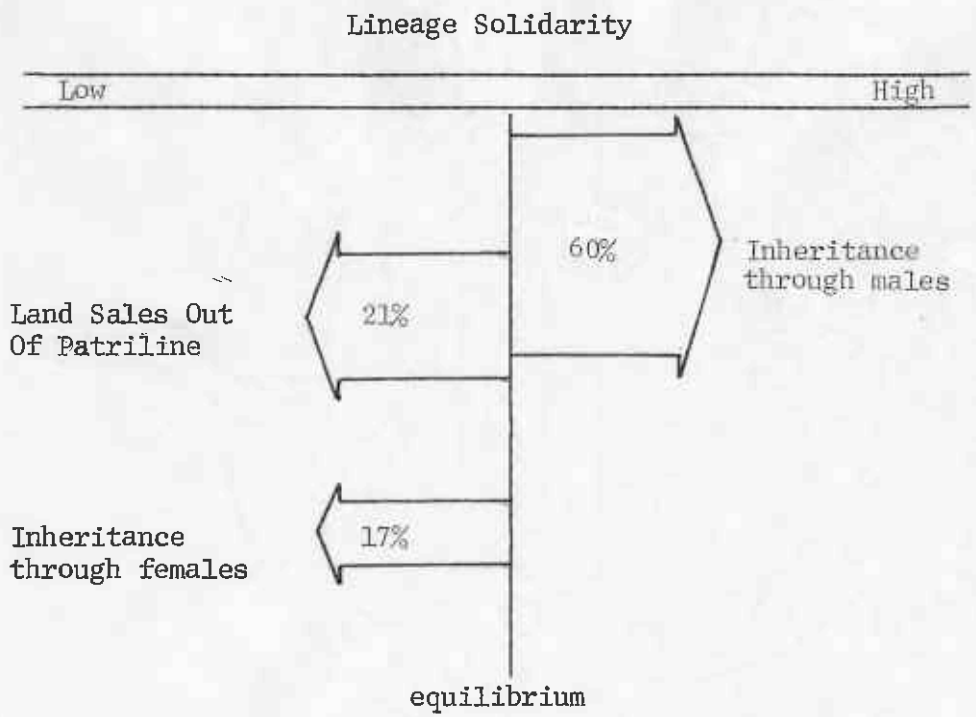
If it is found that inheritance is a social exchange between generations, then more elaborate models of the effects of inheritance on social structure are possible. These models are of much greater power than one that postulates the direction of ancestor worship or the quality of role relationships. I refer to models of social exchange such as developed by Levi-Strauss and Homans. If these models prove applicable to the study of inheritance, then the topic is rescued from its peripheral, exotic position into the mainstream of ethnological theory.

The kinship group perspective can be illustrated by Collier's (1971) study of the social consequences of a Maya hamlet's inheritance. He demonstrates that lineage solidarity, measured by the maintenance of land in a patriline, is strengthened by inheritance through males. He also shows countervailing tendencies in the inheritance system by demonstrating that inheritance through women and land sales outside the lineage undermine the solidarity of a lineage (Figure 2.2). As inheritance through males is more frequent than inheritance through females or land sales, he infers some dynamics to the system as a whole.

> "The balance between the two trends (male inheritance vs. land sales and female inheritance - T. D.) is thus in favor of the continued existence of propertied descent groups, at least in the short run. Over extended time, however, transfer through women and sale gradually erode the landed estates of previous generations and permit new local aggregates to form, these in turn will perdure over the short run, their solidarity promoted by their property." (ibid:139)

Collier is explicit as to what factors are held constant in this model: land availability, population size, and inheritance ideology

Figure 2.2 COLLIER'S PROCESSUAL MODEL



Note: Interpretation based on Collier's Figure 5-9, (Collier, 1972). Percentages are based upon 190 parcels transmitted between "pre-1900" and 1967. "Out of patriline by inheritance" was interpreted to mean inheritance through females.

(ibid:140). He postulates the directional effects of changes in these conditions. Like Maine, he suggests that changes in the ideology concerning death could shift the balance in the system. Newly available land could reduce the significance of traditional land, thereby undermining the strength of the equilibrium model as an integrating mechanism in the society. And finally, population increase could force the Zinancantecos into a non-land based economic system which would also minimize the importance of both inheritance and lineages.

Collier differs from Goody by focusing on the social consequences of inheritance at the level of the social group rather than individual roles. Moreover, he discovers the dynamics of an inheritance system, taking into account those demographic and regional economic factors that influence its operation.

Leach, Collier, and Goody have isolated particular social consequences of inheritance transfers and supported a general theory that inheritance influences the social solidarity or continuity of discrete corporate groups. Anthropologists are also familiar with societies in which no corporate group endures beyond the lifetime of its membership and the social unit that holds exclusive rights of property dissolves upon the death of its founders. In this situation, the social consequences of inheritance remain unclear. Questions of solidarity and continuity might be appropriate, not for corporate societal groups but for the society itself. In the next three sections, I will develop a processual model, similar to Collier's, to account for such a situation.

2.5.2 Economic Consequences

An important aspect of inheritance is its impact upon the distribution

of wealth. In agrarian societies, inheritance is the primary wealth adjustment mechanism for property due to restrictions in the fluidity of capital between different spheres of economic exchange and the land-based economy.

Unfortunately, neither anthropologists nor economists have devoted their attention to the wealth distribution effects of inheritance. At the present time it is impossible to predict a society's wealth distribution given a description of its inheritance system and its previous wealth distribution. Instead, crude guesses can be made as to the long-term, wealth-adjustings consequences of inheritance rules. These guesses indicate directionality, i.e. whether an inheritance system will lead to greater equality or not.

Nash's (1968) discussion of the "wealth leveling mechanisms" is an example of directional guessing. He suggests that wealth leveling mechanisms in Mesoamerica include bilateral inheritance, a civil-religious hierarchy, low level of technology, and limited land. These mechanisms insure that "rich or large landholders, change from generation to generation, and if the technical and economic leveling factors do not inhibit accumulation of wealth or capital, there are social means for ensuring that wealth does not adhere to family lines" (ibid:320). This hypothesis suggests that wealth is scrambled by inheritance and other mechanisms insuring what he calls a "democracy of poverty."

Nash does not suggest measures of the degree of scrambling or shuffling in wealth distribution. It seems possible that different mechanisms, such as inheritance or a civil religious hierarchy, might result in different degrees of turn-over. It also seems possible that

a particular mechanism might shuffle wealth at different rates depending on other conditions, such as population growth, sibling set composition, or the kind of wealth.

Furthermore, Nash is only interested in the effects of wealth leveling mechanisms on the distributions of wealth in family lines. In essence, he asks, do these mechanisms effect the transmission of wealth between familial units that are linked through time by kinship ties? Although this question seems critical to inheritance systems occuring where corporate kin groups outlive the lifespans of their members, it seems somewhat out of place in a society that lacks continuing corporate groups based upon kinship. Ironically, it is in just such a social setting that Nash asks this question.

The economic impact of wealth adjustment mechanisms may be viewed from another perspective. Rather than focusing upon the wealth distribution along family lines, the entire society may be taken as a unit of analysis. Then, the question would be: what are the effects of X, Y or Z mechanisms on the distribution of wealth among societal groups at successive points in time? This viewpoint searches for the effects of a wealth adjustment mechanism on the degree of economic inequality in a society. Economic inequality is defined as the differential access to property rights held by different groups which need not outlive the lifetime of their members.

Another distinction that must be maintained in all discussions of wealth distribution is between relative and absolute wealth. Absolute wealth is the total of all the resources held by a given unit of analysis, in this case, a village. Relative wealth, in contrast, refers to the distribution of wealth within this social unit.

If the objective of studying economic inequality is to discover its derivative effects upon social inequality (i.e. the unequal distribution of status and power), then anthropologists should concentrate on perceived wealth differences. These differences seem more closely related to relative than absolute wealth. Probably both concepts will be necessary to explain not only the peasant's interactions with one another, but also their interaction with the outside economy.

Several good measures of the distribution of wealth (relative or absolute) are available to the economic anthropologist. Measurement, however, is not enough. The distribution of wealth is nothing more than a symptom of several underlying institutions, behaviors, rules, or whatever Nash's "mechanisms" really are. The distribution of wealth is the result of all these mechanisms working together and against each other. It is my task to show how such mechanisms can be modeled. This model will not only indicate the directionality of economic inequality generated by inheritance, but also measure the degree of inequality generated by different inheritance rules. Further, it will also suggest means to measure the wealth distributation effects or outcomes of a set of rules.

2.6 Objectives

It might seem appropriate to beg for more data, but the collection of data in itself implies some theory. The real problem would appear to be a lack of questions and methodologies for studying inheritance. This dissertation stresses clarification of the questions more than presentation of the answers. It does not assume that what is true of descent is generally true of inheritance, and even if it did, the current status of descent studies could not be considered so definitive as to

preclude an investigation of inheritance.

Finally, it will become apparent that not one, but several unrelated explanations of inheritance will be presented. Anthropologists have learned that it is unrealistic to except a single theory of any substantive topic like kinship, marriage, incest, or inheritance. It is more reasonable to look for a family of theories concerning a particular substantive topic. One theory may explain the impact of inheritance upon social structure, another upon wealth distribution, and yet another upon land fragmentation. A family of theories about inheritance shall be the objective of this research.

ENDNOTES

1. Agricultural economists have used this dichotomy for some of their theories about the economic effects of inheritance (see review by Lindgren 1968). Inter-vivos inheritance, they argue, fosters innovative household farms by giving managerial control to young heirs. Less frequent transfers in causa mortis transfers retains farm managers for longer periods and, thereby, does not reduce the production of the farm by placing it in the hands of inexperienced management.

2. Goody's work on inheritance is not limited to this book. His research spans more than a decade (1958, 1959, 1968, 1969, 1970) and ranges from an in-depth case analysis to statistical, cross-cultural research. Much of my thinking on this topic is either an adoption, modification or reaction to Goody's work.

3. Goody's theory of transmission of information and rights is an adaptation of Veblen and Common's theory of transactions (cf. Doffman 1968). Transactions are "any form of desirable, organized economic activity containing conflicting, but reciprocal interests" (ibid:Vol. 3:23). As is pointed out in the text, Goody does not embrace this definition in its entirety, specifically, he concentrates upon the "conflicting" interests and ignores the "reciprocal" interests.

3. ZAPOTEC SOCIETAL STRUCTURE

Evaluating the social consequences of inheritance is a difficult undertaking because "social consequences" can refer to a wide variety of social phenomenon. For this reason, I will concentrate on one aspect of the problem, the effect of inheritance on societal structure. Following Pospisil (1964:399), societal structure refers to "the nature and interrelationships of the society's segments (subgroups)." "All aggregates of people under this heading will represent cases of discrete groups, described absolutely, without an individual (ego) as point of reference." Thus, the original question raised in the last section, "what are the social consequences of inheritance?", may be reworded to "what are the consequences of inheritance on societal structure?"

3.1 The Setting

The analysis will draw on ethnographic information about Zapotec Indians in the southeastern Mexican state of Oaxaca. Oaxaca borders the Pacific coast and is slightly larger than North Carolina. Its rugged, mountainous landscape is punctuated by a few, small fertile valleys. The largest of these, the Oaxaca Valley, is formed by the intersection of three smaller valleys or "wings" 2-17 miles wide and 30-40 miles long. At this intersection lies the state capital and primary market place, Oaxaca de Juarez. The wings of the Oaxaca Valley extend to the south, northwest, and southeast; they are named after their secondary market towns: Zaachila, Etla, and Tlacolula, respectively.

The Oaxaca Valley has retained cultural and economic dominance over its surrounding hinterland since Prehispanic times. Palerm and Wolf (1957) consider the valley a "key area" in Meso-American cultural

history, meaning that it has remained a center of massed population and economic power. In recent times this power has been eclipsed by northern Mexico's phenomenal economic growth, leaving Oaxaca City with a dominant position in a marginal state.

Part of Oaxaca's marginality may be explained by its geography. Its irregular surface is broken by a few rivers that provide natural avenues for communication. Most movement in or out of the Oaxaca valley is limited to the paved Pan American Highway which leads north to Mexico City and south to the Isthmus of Tehuantepec. Two poorly maintained dirt roads connect the valley with the Pacific coast ports of Puerto Angel and Puerto Escondido. Another unpaved road winds north over the continental divide to Veracruz and the Atlantic watershed.

As a region, Oaxaca has a subsistence agricultural economic base. Maize is the major crop, supplemented by a trickle of cash crops including caster bean, wheat, chick peas, and other crops that do not conflict with the growing season of maize. The most important "industry" is tourism and considerable quantities of handicrafts are produced for local sale and export, but a minority of Oaxaca's peoples benefit directly from this industry. Except for a plywood manufacturing plant in Oaxaca City, the industrial revolution has never travelled down the Pan American Highway to Oaxaca. Most indications are that it never will. Oaxaca is one of the poorest states in Mexico and, barring a new chapter in the immortal Revolution, it will remain so.

Ironically, Oaxaca's greatest contribution to contemporary Mexican development has been its poverty-striken peoples. These peoples provide cheap, unskilled labor for the more economically viable regions of Mexico. Oaxaca's primary export is servants and manual laborers for the

booming Mexican economy.

3.2 Background Information on Zapotecs[1]

Most of the state's two million people have a strong Indian heritage and speak a Native American language. Of the regions 26 linguistic groups, Zapotec dominates with 246,000 speakers over five years old. (Resumen General Abrieviado, 1970).

Zapotecs have been considered a culture because they share a common linguistic and historical tradition. Nevertheless, their language shows considerable diversification; most of its so-called dialects are mutually unintelligible. Linguistic classification of Zapotec dialects (languages?) has been inadequate and controversial (Pickett 1967:292, Beals 1969).

Contemporary Zapotec speakers never identify themselves as an ethnic group, Zapotecos. In contrast, the little they know about their common background filters through school teachers whose nationalistic objectives distort the past. The rural Oaxacan identifies with his natal community (San Miguelenos, Santa Ana, etc.), less often with geographic regions (los del valle, Rinconeros, sierra, or Ismo), followed by the state (Oaxacanos), and lastly, the nation-state (Mexicanos). This native emphasis upon village identity and the strong preference of Meso-American anthropologists for "community-studies" has meant that most ethnographic work within Oaxaca has used the community as the level of analysis. Two exceptions would be the regional market studies by Malinowski and de la Fuente (1957) and Beals (1965).

3.3 Characteristics of Zapotec Villages

Zapotec societal structure may be most efficiently approached by describing its most inclusive social group: the village. Villages

approximate what Wolf (1957) has identified as a "closed corporate community" and form the basic building blocks of Zapotec regional organization. From current ethnographic information, valley villages share the following characteristics:[2]

*There are over 300 villages in the Valley that range in size from 500 to 5000 peoples, with a median of 1100 inhabitants.

*Villages are nucleated settlements surrounded by agricultural fields. Most have a central plaza with a small municipal building, church, jail, courthouse, school, and basketball court.

*Villages recognize a discrete territory, clearly demarcated with boundary markers (except where village boundaries are in dispute). Within this territory, villagers recognize both individual and communal tenure. Most communal land is non-agricultural, consisting of forests, barren hillside pastures, public square, graveyards, church grounds, roads, and river beds. Agricultural land, except for a few ejido plots, is usually held by individuals and households.

*Villagers have extensive knowledge about their territory. This knowledge includes names for sub-sections of lands with similar topographic or ecological characteristics (parajes, see Schmieder 1930). Villagers do not have this detailed knowledge of lands outside their own boundaries.

*Villages exhibit considerable ecological diversity within their territories, ranging from the fertile alluvial plain to pine covered mountains several thousand feet above the Valley floor.

*There are strong intravillage pressures to prevent any lands within this territory from falling under the control of peoples from other villages.

*Village membership is achieved by birth with the provision that at least one parent must be a village member.

*Villages are heavily endogamous. Marriage between villages account for less than 5% of the total marriages within a village.

*Each village has a hierarchy of political, judicial, and religious offices which are occupied without compensation by the village members. Men take these cargos after considerable pressure from the community. After they hold one, they are permitted to "rest" for several years. In contrast to other regions of Mexico, most Oaxacan cargos do not involve heavy expenses. Rather, the cost comes from a reduction in time the holders normally devote to agricultural production. Prestige may be achieved by holding a cargo, if the community feels the holder did his job correctly.

*Most social interaction occurs within the boundaries of a village and between members of the same village. This is especially true of older women, whose knowledge of the outside world seldom exceeds weekly visits to the market town and an occasional visit to Oaxaca City. Men are better versed in "outside" ways and, although they may have heavy interaction with non-villagers during their absence from the village, they spend most of their lives interacting with fellow townspeople. In short, the village forms the universe for face-to-face interaction.

*Villages share a corporate reputation or "personality" from the perspective of other villages. This is expressed in statements such as "those from the village of Loma Larga are thieves and cut-throats 'or' the mountain village of Betasa has shapely, blue-eyed women."

This list of characteristics could continue, but the basic point is this: villages are societal groups. They are corporate groups in the sense that they persist beyond the lifespans of their members.

Taylor (1972) finds this persistence to be quite strong. In Landlord and Peasant in Colonial Oaxaca, he contrasts continuity of Oaxacan Indian communities with those of North Mexico.

> "The history of land in colonial Oaxaca represents a significant departure from the North Mexican model . . . the degree of change in the Valley was different, and the effect of the rise of the hacienda on Indian tenure less severe. In much of the viceroyalty Indians lost a good deal of land, as millions fell victim to epidemics and haciendas surrounded, and in some cases completely overran, their towns. In contrast, Valley caciques and pueblos retained a considerable amount of land, certainly more than enough to meet their basic needs and keep them independent of Spanish landowners." (ibid:195)

Taylor presents an excellent analysis of the historical factors effecting this continuity. These factors include a peaceful, bloodless Conquest; Spanish disinterest in the Valley; and the strength of community life at the time of Conquest.

The continuity of village lands and organization has continued through the Independence period into modern times. The Revolution of 1910 was of little consequence to villagers in the Valley compared to North Mexico.

> "The Revolution in the countryside was essentially a struggle for land and economic independence, not for political freedom. Valley towns, firmly rooted in the land, had never really lost what Zapata and his followers were fighting for. Thus, they showed relatively little interest in the revolutionary cause." (ibid:199)

Neither Conquest, revolutions, epidemics, famines, droughts, floods, haciendas, nor changes in market demands for major cash crops (wheat to caster beans to chick peas) have destroyed the basic integrity of the Valley Zapotec villages.

Taylor's historical findings pose an interesting anthropological

problem: what accounts for the persistence and continuity of the Oaxacan village? The question can be rephrased in several conceptual frameworks: historical conditions, social solidarity, integration, continuity, structural continuity, or acculturation. Each of these conceptual frameworks emphasizes different, although often overlapping, viewpoints. The framework selected here will be that of social solidarity and structural continuity. This viewpoint offers the possibility of two distinct levels of analysis.

First, using a regional perspective, the continuity of villages may be attributed to some pan-village alliance structure, some structural unity that protects the whole by summing the parts. An example might be analogous to a system of segmentary lineages that merge and divide into different alliance structures. There are three candidates for a regional or pan-village explanation of village structural continuity: political, economic, and religious systems.

The most unlikely possibility that might explain regional continuity is in the political sphere. A wide variety of pan-village political structures have been superimposed on these societal groups. These range from a complex four level hierarchy of national, state, district, and municipal organization during the Porfiriato to the sporatic absence of supra-village political organization during the chaos of the Revolution. Although these shifts in regional political structure had some impact upon specialized segments of village organization, none seriously altered the previously outlined characteristics of their corporateness. The basic societal structure of the village has thrived under diverse political regimes ranging from Porfirio Diaz to Lazaro Cardenas. Most significantly, there are no examples of intervillage political alliances in the history

of Oaxaca (ibid:196).

Considerably more research is necessary before the effect of market and religious spheres on village continuity becomes clear. Villages are linked within a nested or hierarchial market system that has both central and standard markets (cf. Skinner 1964-5). Intervillage interaction in the market place appears tightly circumscribed. Although communication between villages occurs, the market's primary function appears to be economic exchange. There are no clear indications that market areas are "culture bearing units," as Skinner has discovered in Asia. This is probably due to the absence of village exogamy common to other market systems (Downing 1967).

Religious fiestas are held annually in each village but have never been studied for their effects on regional integration. Little more can be said than that they exist and villagers appear to stay together at these intervillage events, mixing infrequently with non-villagers. Additionally, poorly understood spheres of intervillage contact are peddling and basketball tournaments.

Until these three spheres of intervillage contact are adequately understood, their effects on the solidarity and structural continuity of village social structure will remain problematic. In the meantime, it would appear that a large share of village solidarity and continuity can be explained by factors internal to the village itself. This, the second level of analysis, concentrates upon processes common to villages, as societal units. Its investigation can begin by looking at the most inclusive societal group <u>within</u> the village: the household.

3.4 Characteristics of Zapotec Households

A household may be defined as consisting of a single person or

persons who use common kitchen throughout most of the year. Households occupy a territory called a solar (Sp.) or sulari (Zap.) with at least one adobe house, sometimes a thatched kitchen, several fruit trees, and a garden. The solar is invariably fenced with either cane or organ pipe cactus.

Zapotec households share those functions of other Mesoamerican households that Nash (1968:318) has called "multi-purpose units"; they are the units of socialization, production, consumption, daily interaction, and to a less extent, ritual. Their production is usually based on subsistence agriculture, meaning the household's members produce most of what they eat, and sell what surplus they might have for other necessities such as meat, eggs, salt, and so forth. Many households also have non-agricultural specialities: weaving, pottery making, hair cutting, grave digging, small stores, etc. (Vargas Baron 1968, Plattner 1965). The Oaxacan household's income is supplemented by cash received from work outside the village.

Just as villages form the basic building block of regional organization, households are recognized as the basic unit of village societal structure. Rights and obligations of villagers to the community and to one another use the household as a point of reference. Selection of positions for the civil and religious hierarchy is made with reference to households, not individuals; only one adult male in a household is obligated to serve at one time. Village taxes, although small, are due from each household, regardless of its composition. Levies for village projects, such as electrification, village fiestas, building of public water systems, and government matching funds are equally divided between households. Compadrazgo obligations occur

between households. The important credit institutions of guelagetza, ayuda, and tequio (Beals 1970) are rights and obligations of households. And an individual's reputation, prestige, and wealth are measured with reference to his (or her) household.

Household composition has been of considerable interest to Valley ethnographers. Table 3.1 shows the household composition for almost every household in the village of Diaz Ordaz, located in the Tlacolula wing of the valley. This composition appears typical for other Oaxacan villages (Hotchkiss and Downing 1968). A majority of the households contain nuclear families: a husband, wife, and their children. Another fourteen per cent are fragments of what was or will be a nuclear family household if children were present (sub-nuclear). Of the more complex households, lineally extended families make up the larger portion, outnumbering bilaterally extended families forty to one. This is the first indication of a preference for lineals over collaterals, a point that will become important as this argument progresses.

Changes in household composition derive primarily from births, deaths, and shifts in residence patterns. The domestic cycle of households may be traced beginning with a newly married couple with a nuclear family household. This hypothetical couple has three male and a female child who live to a marriageable age. The sons marry serially, eldest first, then the next youngest, and finally the youngest. The daughter marries at anytime and moves to her husband's parents' household. As each son marries, he brings his new bride to reside in his parents' household. They remain patrilocally until the next younger brother decides to marry, then the elder brother and his wife move neolocally. This system of patri-neolocal residence continues

Table 3.1 Household Composition of Diaz Ordaz, January 1970

Type	Includes	Percentage	Number of Households
Sub-Nuclear	(A = b) (A = x) (X = a)	.139	45 13 12
Nuclear	(A = b) - (...) (A = x) - (...) (X = a) - (...)	.60	286 30 25
Patri-Stem Lineal Extended	(A = b) - (C..)/C = d + (...) (A = x) - (C..)/C = d + (...) (X = a) - (C..)/C = d + (...)	.153	29 13 35
Matri-Stem Lineal Extended	(A = b) - (c..)/D = c + (...) (A = x) - (c..)/D = c + (...) (X = a) - (c..)/D = c + (...)	.018	2 3 4
Daughter with Fatherless Child	e.g. (A = b) - (c..)/ (Y = c) - (...)	.026	13
Bilateral Extended Family	(A = b) - Cod/(C = e)/ (D = f)	.004	2
Split Generation	(A = b) - X/ X = x - (C..)	.009	5
Orphaned Nephew or Niece with Uncle		.009	5
Non-related orphaned in house	A = b/c X = a - (...)/b	.005	3
Others		.034	17
TOTAL		1.00	502 households

Note: Romney (n.d.) system of household composition notation, X = dead, Y = alive but not member of house.

through the last, youngest son. He brings his bride to his parents' household, but unlike his brothers, he remains until (1) his parents die, which leaves him with a nuclear family household, as in the case of his brothers or (2) the parents divide their inheritance among their heirs. In the latter case, the parents or surviving parent might relinquish control of the lands cultivated by the household. The household of the original couple dissolves after either of the two events. After inheritance, the parent may practice a curious form of residence whereby he moves from one of his married children's households to the next, spending a few months in each. This might be called "multi-local residence." Many of the households in Figure 3.1 that were classified as patri or matri-stem lineal extended families are actually phases of multi-local residence and should be classified as nuclear family households. This process continues through each generation and eventually every couple heads a nuclear family household.

One consequence of this residential pattern is that each married child spends approximately the same time in the parents' household. Table 3.2 shows that siblings spend roughly the same time in the parents' household from birth until they establish independent households.

TABLE 3.2 VARIATIONS IN THE LENGTH OF CO-RESIDENCE FOR SIBLINGS, CONTROLLING FOR SEX, DIAZ ORDAZ.*

	Years coresident		
	Males	Females	Males and Females
Mean	24.7 years	21.2 years	22.9 years
Median	23.5 "	20.5 "	22 "
Range	12-43 "	13-40 "	12-43 "
Standard Deviation	6 "	5.8 "	5.9 "

*From 18 cases of sibling sets. Measure in years from birth to time of inheritance division.

This serial sequencing of residence equalizes the distinction between sibling rank and length of residence, two factors that do not significantly correlate. Moreover, the length of time spent by female children in their parents' household is only slightly less than that of males, indicating that sex is also of minor importance to the length of co-residence.

This information on residence practices and the definition of households indicates that a household does not persist beyond the lifetimes of the couple that establishes it. A new household is established with the post-marital shift to neolocal residence. The new household carries no obligations, as a household, from its two parental households. Once established, a new household assumes all the rights and obligations of an independent societal unit.

Household composition is volatile during a short period of time. Recensusing a population after a few months indicated major and rather rapid structural changes. Structural change means that the composition of a household has shifted from one category to another on Table 3.1.

In June 1966, I censused 28 households in the village of Diaz Ordaz. Nineteen months later, a recensus of these house lots revealed over forty per cent (12) with structural changes (Table 3.3).

TABLE 3.3 CHANGES IN HOUSEHOLD COMPOSITION (DIAZ ORDAZ)

	Household Composition	
	June 1966 Census	December 1967 Census
Subnuclear (A=b)	1	4
Nuclear (A=b)-(...)	19	23
Patri-stem extended family (A=b)-(C)/(C=d)±(...)	4	2
Matri-stem extended family (A=b)-(c)/(c=D)±(...)	1	1
Other	3	2
	28 Households	32 Households

Of these changes, seven lost members to urban migration. Four extended family households fissioned into new nuclear family households. The remaining household added a new adult member who was not a relative. Klug (1965) also discovered short-term instability in household composition in Diaz Ordaz's neighboring village of San Miguel del Valle.

> "Out of a total of 36 households, only 12 remained the same over the 7 month period between censuses. In only two cases is the change due to birth or death in the family." (ibid:27)

Within the household, Zapotecs strongly emphasize the supremacy of parental authority over their children (Selby 1966). Parents have absolute authority over their children's schooling, labor, discipline, residence decision, migration decision to work outside the village, labor, and inheritance. This authority is not sex-linked to males or females, but is the shared power of the parents. Conversely, parents do not distinguish types of authority by the sex or rank of their children, a strongly adhered to norm is that all children should be treated equally. The worse thing that a Zapotec child can do, aside from capital crimes,

is to challenge parental authority (to be grosero).

3.5 What endures?

Zapotec societal structure has two basic groups: villages and households. Villages are highly stable entities that have maintained their integrity for at least four hundred years. They have endured despite radical alterations in the political and economic atmosphere of the region and the nation. In contrast, households are mortal and show considerable metamorphosis within a short span of time. Households come and go, but the village continues. Viewed from the perspective of corporateness, villages are a corporate group, enduring beyond the lifespan of their members; households are not.

This contrast may be considered a major problem for Valley ethnologists. What principles or organizations within the village account for its solidarity? What endures? An adequate explanation of village solidarity would require a consideration of factors outside the village as well as those within it (Wolf 1957:9). Moreover, at this stage of the development of Mesoamerican ethnology, no one would propose that a single organization or process within or without the village explains its solidarity. Rather, the objective of current ethnological theory might be better defined as an exploration of the impact of various factors upon village solidarity. The objective is to test and probe various hypothesis and find a few reasonable answers. Integration of the answers into a general theory of village solidarity will come later.

Explanations of the solidarity of corporate groups, such as villages or tribes, have focused upon discovering principles that underlie other corporate groups nested within the larger group, such as lineages.

Goody's work discussed in the first section is an example. The argument would be that the solidarity of the more inclusive group is maintained by the solidarity of its parts which are also corporate groups. Explanations of solidarity have also been based upon the principles of succession, the passing of office in some orderly fashion, and descent, the transmission of kin group membership. Leach's work in Pul Eliya uncovered a new problem: where does one look for a solidarity explanation when the community lacks a corporate group based upon either descent or succession? Again, what endures? Leach's answer was that a system of land tenure relationships endure in what he calls "compounds." Compounds share common rights to lands and individuals move through them. A compound is also a corporate entity because it continues past the lifespan of its members. Inheritance forms the rules linking individuals to compounds. Collier's theory, discussed in the last section, represents a variation on Leach's theme. Collier shows that inheritance influences the social solidarity of patrilineal descent groups.

Testing any of these three propositions--solidarity created by corporate groups based upon descent, succession, or inheritance and land tenure--becomes difficult in the Zapotec case. Zapotec's lack corporate descent groups, succession is unimportant because political office is <u>not</u> passed on from generation to generation, and land tenure does not retain any compoundlike estate <u>in tact</u> through time. Inheritance fragments an estates holdings among different heirs. At first glance, the Zapotec case appears to force Leach's question to its extreme. Could it be the case that nothing endures? Further discussion of this question requires a more complete description of Zapotec inheritance.

3.7 Diaz Ordaz

To focus upon the details of Zapotec inheritance and societal structure, the discussion will now be narrowed to one particular Zapotec community for which there is considerable ethnographic information. In addition to my own research, others have studied on different aspects of this community (Quinn 1964, Molony and Ugalde 1965, Vargas Baron 1968). The summer field training school at Stanford is responsible for this ethnographic effort in this and other communities in the Valley.

Diaz Ordaz, also known as Santo Domingo del Valle, is a village of over 4000 inhabitants situated six kilometers north of the standard market town of Tlacolula. Its village territory encompasses approximately 50 square kilometers, making it one of the larger villages in the valley in both population size and territory. Its population is divided into 550 households, eighty per cent of which hold scattered fields in the countryside ranging from 1 to 16 parcels per household with a mean of 3.2 per household. Twenty-one per cent of the households are either landless or own too little land to provide for their subsistence, even in the best of agricultural years.

Other characteristics of Diaz Ordaz important to the argument will emerge during the following discussions or may be found in Vargas Baron's dissertation (1968:18-44, 79-107).

ENDNOTES

1. For a summary of Zapotec culture and more information on this region see Beals (1969), Nader (1969), and Schmieder (1930).

2. Information for these characteristics was distilled from numerous ethnographic sources: Anderson 1967, Appleby 1970, Bowerman 1967, Dennis 1968, Fjellman 1966, Izaevich 1968, Klug 1965, Kronenfield 1965, Molony and Ugalde 1965, Plattner 1964, Quinn 1964, Starns 1966, Trueax 1966, and Weesner 1964. All these papers were products of the Stanford field school program, NSF Grant GZ-764, and are kept in the Oaxaca Archives, Department of Anthropology, Stanford University.

4. ZAPOTEC INHERITANCE

Using the criteria established in Section 2, this section presents a description of Zapotec inheritance which includes rights to agricultural property, testator and heir relationships, the timing of transfers, and the rules of inheritance.

4.1 Inheritable Property

Leyton cautions anthropologists that inheritance may be more complex than the simple transfer of a right to property; rather, a society may transfer rights to different kinds of property by different rules. Each combination of rights and rules he calls an "inheritance sphere." Leyton also suggests that spheres have distinct ideologies. Pospisil (1964) is more specific concerning the native informants' cognition of what Leyton calls sphere; he suggests that a sphere is semantically segregated in the native language. The Zapotec inheritance patterns supports their suggestions.

In 1964, Quinn conducted a brief study of Diaz Ordaz inheritance. Most responses to her formal elicitations were multiple and varied between informants. Nevertheless, one question produced stable, consistent answers: "What are the kind of properties that can be inherited?" The responses collected by Quinn and verified in 1970 were:

RESPONSE[1]	GLOSS
Terrenos (hu)	Lands
Solares y cases (sulari)	Housesites and houses
Animales (mae'in)	Animals
Dinero (mal)	Money
Cosechas (coseč)	Crops
Bienes de la casa (*)	Household goods
Deudas (di'in)	Debts

*Apparently no Zapotec term. Spanish was used.

In some instances, these categories of property were further partitioned.[2]

Land (hu) subdivides into two exclusive classes: countryside (hu_lonia'a) and townsite (huj). The countryside includes all lands controlled by villagers in Diaz Ordaz. As might be expected among agriculturalists, they further subdivide the category countryside in a variety of ways: by tenure, location (parajes, Schmieder 1930), soil quality, rockiness, water resource, and class. When villagers discuss inheritance, class proves the most frequently used subdivision. The Spanish derived distinction between "first, second, and third class" land indicate the agricultural qualities of land (Downing 1966).

The countryside category also excludes ejido lands; villagers do not consider them part of inheritable property. Control of ejido parcels passes to another (not necessarily an heir of the testator) in accordance with a national process of transfer called "succession." Ejido lands only become a relevant part of inheritance among extremely poor families who own few other properties.

Sular or housesite parcels are the only subcategory of "townsite" land that may be inherited. Housesites are always located within the boundaries of the nucleated village and often include a house. Housesites vary from a few hundred square meters to half a hectare. Although larger housesites are sometimes used for agriculture, they are not considered part of the countryside.

A person or persons may hold rights to several housesites, but one is distinguished as a person's natal house and housesite (sulari_trənk). This is the house where the testator established his household and, in most cases, raised his heirs. The natal house receives special consideration at one of the most important ceremonial occasions in the

village (Dia de los Muertos) and at inheritance.

Informants also distinguished between animales mayores and animales menores, important and unimportant animals. The former includes oxen, burros, sheep, goats, cows, dogs, and cats. The latter category includes pigs, chickens and turkeys. On rare occasions, testators might have money or crops to transfer to their heirs. Crops (coseč) include corn, wheat, and beans. Furthermore, certain debts incurred by a testator may be passed to heirs even though the Mexican Civil Code does not hold an heir responsible for such debts. Inheritable debts are usually those incurred by the testators for mayordomias and guelagetza.[3] These debts are owed by and to households, not individuals. Personal loans are not considered by the villagers to be the responsibility of heirs. Household goods are the only class of properties whose disposition depends upon the sex of their user. Farm implements are male property; kitchen items, such as cooking pots, pans, metates and manos, and spoons, are female property.

When transferring their estates, testators use these general distinctions between kinds of property in a manner which they call "turnos." A testator begins his testament by dividing lands, normally his most valuable property, then his next most valuable, housesites and houses, and then his important animals, and so on. Property in one Zapotec sphere cannot be distributed to make up for a deficiency of distribution in another sphere. Judgments concerning the disposition of property are made for each class of property. For example, if a testator provides one daughter with less agricultural land than other heirs, then he cannot overpay her in another sphere, such as household goods, in order to satisfy his inappropriate distribution in the previous

sphere. Goods in different spheres are not represented in equivalent values, such as pesos, although most villagers are capable of making the conversion.

In addition, the distinctions between property types correspond to differences in how the property itself is normatively considered divisable. The natal house and housesite should be given to the youngest son. Important animals should be distributed equally among the heirs. Unimportant animals should first be sold and converted to cash, afterwards this cash is divided between the heirs. Household goods used by males should go to males, those that are used by females go to females, and those not distinguished by their user's sex may go to heirs of either sex. With this brief description of inheritance, it would appear that Zapotec evidence supports Leyton and Pospisil's hypothesis; inheritance involves various spheres which are cognitively distinguished.

This evidence also supports another suggestion in Leyton's, and perhaps Pospisil's works. All spheres are not of equal importance. When responding to the question of what kinds of property are inherited, the order of response proved extremely structured. Invariably the informants responded with (1) lands, (2) housesites and houses, and (3) animals, in that order. Responses to the next three kinds of property, money crops, and household goods, lacked sequencing; all permutations seemed equiprobable. The response of "debts" was the only category frequently omitted and normally was added if "Is there anything more?" was asked.

The rest of this dissertation will focus upon one sphere: the inheritance of agricultural lands. This sphere was selected for three reasons. First, it is the most important sphere to the villagers as evident from its primary position among responses and from what specific

items both testators and heirs emphasize when describing their own inheritance. Second, it provides the subsistence basis of almost all Diaz Ordaz households; villagers rank the wealth of a household by reference to its lands. Even the lack of agricultural lands strongly influences a household's choice of alternative economic activities. Finally, there are some practical reasons for concentrating upon the agricultural sphere. The analyses of this one sphere proves to be quite complex. It will provide, however, a perspective on Zapotec structure, and to a lesser extent, economics. Extending these analyses to other spheres probably would yield only marginal returns. The crux of this dissertation, I repeat, is not to write a definitive work on Zapotec inheritance, but to explore ways of analyzing inheritance that will make it more applicable to the other objectives and theories in anthropology.

4.2 Rights To Property

Determining who had rights to a particular piece of property proved a difficult ethnographic task. The question, "Who has rights to this (property)?" produced different answers. Sometimes a name of a household was given in response to this question, i.e. la casa de Juan Martinez (hu liza Juan). At other times, the name of an individual was given (Matilde Perez, wife of Juan Martinez). These linguistic differences indicate another crucial distinction: both individuals and households may hold rights to property. A household member may exploit any property held by themselves or any other member of their household. If a household member dies, his or her property remains with the household unless the property is transferred through inheritance. This tenure may be called "joint rights." In addition, villagers claim that individuals have the

ultimate right to dispose of inheritance received from their parents. This individual right, however, is seldom exercised unless disagreement arises between spouses. Why?

It was observed that reference to the individual's right to dispose of property was most vehemently expressed with reference to newly formed households. For example, relatives of newlyweds referred to the couple's lands as either (1) the husband's or (2) the wife's by making some reference to the couple's parents. This reference to individual rights decreases as the couple matures, has children, and these children get married. In the twilight years of a couple's lives, villagers, including the couple themselves, refer to "our lands" and sometimes assert that it is unimportant to discuss from whose parents the property was originally inherited. This decreasing reference to individual rights among matured households will become a clue to understanding effects of inheritance upon societal structure.

4.3 Testators and Heirs

One's heirs are one's children. Conformity to this normative statement proved extremely high. In a sample of 32 inheritance transfers, property passed to someone other than a testator's child in only three cases. The first exception was that of the wealthiest man in town who, after providing his children with large portions of the original estate, gave his childless mistress a few blankets, a little cash, and some crops for her "well-being until her death." A second exception was a childless old bachelor whose estate was given to a non-kinsman who watched after him while he was ill. And finally, in a situation that informants felt was extremely exceptional, a man passed his estate to his bastard grandson (by-passing this young man's mother).

Adherence to this norm is so strong that it may be considered a rule, a statement of appropriate behavior in this social system. Testators and heirs may be referred to as parents and children, respectively. This rule is ambiguous when either or both of the parents have had offspring by another marriage. In this situation, pre- and post-marital residence decides who are legitimate heirs. Heirship may be claimed only if a person has resided and been socialized by a testator. Conversely, testators may treat someone other than their biological children as an heir if they have raised him (her). The second exception, reveals an interesting situation for childless couples who would otherwise be intestate. Such a couple may form a "surrogate parent" relationship with a younger couple from another household and, if the relationship proves meaningful to both couples, the younger couple may become the elder's heirs.

Heirs are not distinguished in normative statements as to their sex, age, or sibling order. There is one exception: the natal house should pass to the youngest male (sometimes qualified to "youngest married male"). There is also considerable agreement between actual behavior and the norms on this point (Table 4.1).

TABLE 4.1 HEIR RECEIVING NATAL HOUSE AND HOUSELOT

Relation to Testator	No. of cases	Relative Frequency
youngest son (with other brothers)	17	.54
youngest son (and only son)	10	.31
eldest son	1	.03
middle son	1	.03
unmarried daughter	2	.06
non-kin	1	.03
Total	32 cases	1.00

In eighty-five percent of the cases, the youngest son inherited the natal house. It should be stressed that in ten of these twenty-seven

cases, testators had only one son alive at the time of division. In eight of these ten cases, younger sisters were passed over in favor of the only son.[4]

The five cases that do not conform to this norm indicate what might be called "demographic defaults." Demographic defaults are situations in which the application of a norm is logically impossible. For example, an eldest son inherited his natal house after both his parents died. At that time, he was still young and became the guardian of his younger brother until his marriage. The younger brother stated that his elder brother raised him "like a father" and deserved the natal house. In another case, a middle son inherited the natal house after the youngest son married out of sequence (before his elder brothers) and moved matrilocally. The parents passed the house to the next youngest son. In two cases, women inherited the natal house. Both lacked brothers and parents chose the daughter who remained with them in their old age. The non-kin case refers to the bachelor testator mentioned previously.

The absence of discrimination by sex is also true for testators. The converse of the rule "one's children are one's heirs" reads "<u>one's testators are one's parents</u>" and is a correct statement. Just as usufruct property rights are held in common by all members of a household, testatorship is shared. Lands are referred to as "my parent's lands" or "my spouses parent's lands" by heirs that have recently received their inheritance. When these heirs near the time of being testators themselves, they refer to "our parents' lands."

This concept of joint testatorship does not mean that the directionality of property (either through husband or wife) is unimportant. Under certain conditions, such as the death of a spouse

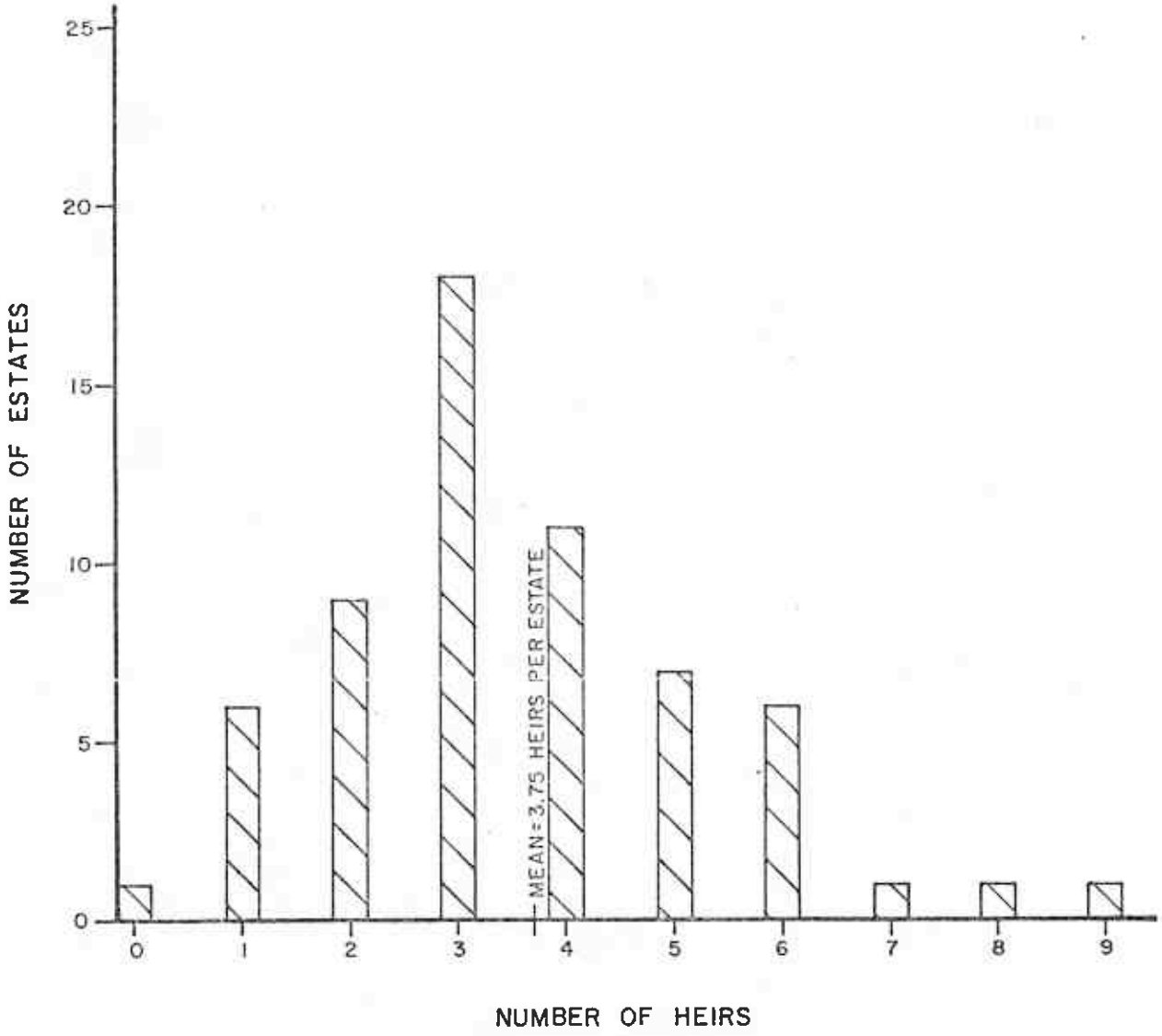
before a couple has children, the widow or widower must relinquish his rights to the deceased's natal household. If a spouse dies after children are born, his (or her) parents and siblings have never been known to dispute the right of the surviving spouse to hold the property in trust for their children. The surviving spouse refers to these rights as belonging to their children and "watches" them until these children marry and establish their own households. At marriage, the children receive their share of the deceased parent's property. In this sense, all inherited property may be considered a trust for the next generation rather than a right of an individual to property.

How many heirs does an estate normally have? This number is equal to the number of children surviving to the time when a testator relinquishes his rights. This number will usually be less than or equal to the number of children the testators have had. The concept of joint testatorship and joint heirship (a man and his spouse), however, does not mean that the mean number of children in a household will equal the mean number of new households in the next generation. A marriage merges two individuals into a single, household unit. Thus, the number of potential households in a generation is less than or equal to half its number of children. Figure 4.1 shows the distribution of the number of heirs to sixty-one estates in Diaz Ordaz.[5]

4.4 Timing and Manner of Transfer

Selby (1966) stressed the gradual, processual quality of Zapotec inheritance transfers in Santo Tomas Mazaltepec. He discovered that most testators slowly relinquish control over their lands to their heirs rather than pass inheritance in one instant in their lifetimes. This process may include allowing heirs to work some of the testators' lands

FIGURE 4.1 NUMBER OF HEIRS TO AN ESTATE



COMBINED QUINN-DOWNING SAMPLE (SEE FOOTNOTE 5, SECTION 4.)

for several years before they actually transfer title. As the testators grow old, retire from active participation on community affairs, and finally become physically unable to work, they progressively relinquish more and more managerial decisions concerning their estate to their heirs. Of course, this process may abruptly end by the death of one or both of the testators.

Diaz Ordaz inheritance also exhibits a gradual transfer. In general, it proves likely that most testators will pass their estates to heirs by the time either (a) the spouse has died, (b) they are unable to work a full day in the fields, or (c) all the children have been married and the youngest son or daughter moves into the natal house with his spouse. In practice, these events may happen within several years of one another and signal the eventual dissolution phase in the domestic cycle of a household. At present, it is impossible to discriminate which event(s) precipitates the decision to divide an estate.

No norms state when testators should begin their division. Some begin as early as the marriage of their first child; passing a small portion of their estate to the newlyweds. In cases where a widower or widow has been holding land "in trust" for a child, this early decision may be stimulated by badgering from the deceased spouse's relatives. Other testators hold onto the entire estate after the spouse is deceased and then, literally upon their deathbed, make their final decisions. An adequate explanation for why a person divides one way or the other would require modelling the individual personality characteristics of the testators. I lack data for such an analysis.

4.4.1 Actual Division

Once the testators decide to indicate the disposition of their

estate, something like the following scenario takes place. This description is an ideal type case based on the common elements from the three divisions that I personally witnessed.

A surviving testator feels it is time to formally transfer his estate. Early one morning and without advance warnings he calls his heirs, their spouses, and two witnesses to the heir's natal house. Although no norm specifies it, the witnesses often are representatives of both testator's natal households.

After breakfast, the testator reminds his heirs that he and his deceased wife have cared for them since birth and provided them with what little there was in their "humble home." He recounts how he has grown old, how devoted his spouse was, and how she died. He repeats what he and his deceased wife have given them. On several occasions during this emotional, lengthy narrative, tears fill the old man's eyes as he looks around the table at his sons and daughters, and their spouses. He continues relating how he has tried to avoid scandals, serve his village, and get along with his neighbors both in the town and in the fields.

Then, he asks the witnesses to listen carefully to his words and (more recently in the past ten years) to write them down. Following the turno pattern, he designates the exact disposition of his entire estate, beginning with his most valuable property. If there are numerous lands, he divides his best lands first, then his second best lands, and so on. Next, he divides the houses and housesites, stating the norm as his justification for passing the natal house to the youngest son. And so he continues until the last mano and metate have been designated for transfer.

From a small sampling of cases, it would appear that the degree of simplification or elaboration of the turno pattern depends upon the size of the estate. In a small estate, housesites and houses might be included in the sphere of farm lands. In larger estates turnos involve a finer contrast between kinds of goods and might even include a category of "fine metates" as opposed to "poor metates."

This collapsing of turnos, dependent upon the wealth of the household, suggests a revision of Leyton's concept of inheritance spheres. If further investigation confirms that the number of spheres vary with the wealth of the household, then the definition and analyses spheres would have to be considered situation-dependent rather than the same for all estates.

Between turnos, the testator reminds his heirs of their responsibilities and obligations to him after they have taken possession of all his worldly goods. He requests that they treat him justly, feed, cloth and shelter him, and not force him into the street without sustenance any more than he denied them the same when they were young.

Following the verbal testimony, the witnesses read their transcription of the testament. The father listens carefully, correcting slight details in the record. Next, the testator asks each heir if he is in agreement with his wishes. All answer affirmatively. A negative response at this point might result in partial or complete loss of an heir's inheritance. Then, if a testament is to be written, the testator asks the witnesses to type the testament. The testator, heirs, and witnesses sign it at a later time.

Next, the testator asks the witnesses and all male heirs (son-in-laws, in the case of a female heir) to accompany him to all his agricultural

fields. The sequence of field visits also follows the turno pattern, beginning with the best set of fields and ending with the poorest. At each field the testator indicates precisely how the parcel of land will be distributed. Every field is measured and recorded by the witnesses for inscription in the testament. If a parcel is being divided into more than one piece, the testator buries several stones along the new boundaries of the fields.

During this walk, which may last all day, the testator recounts past happenings in his fields: how he moved rocks from here to there, when his old burro died under a certain tree, and how a certain corner of a field produces more when there are early rains. He reminds his heirs of his good relations with his field neighbors; how one gave him food, how another helped him build a terrace, and so on. He urges his heirs to continue this harmony after he gives them the land. The heirs remain silent, listen to the old man's words, and carefully observe the measurement. Most of the conversation is either between the testator and witnesses or a never-ending monologue by the testator. Afterwards, the group returns to the townsite where they complete the turnos for houses and housesites. The group finishes the turnos at the natal house, where the testator indicates the disposition of household goods. Meanwhile, the women have prepared a meal for the group. They eat and go home.

It is extremely important to point out that this day may represent nothing more than a signalling of the ultimate disposition of the estate and not its actual division. The time of the final disposition depends upon the testator and may occur anytime between the day of the reading of the disposition and the death of the testator.

Parenthetically, the inheritance transfer is a "private" affair between the testator, heirs, and witnesses. It is not a ceremonial occasion. Unlike the rites of passage, the day's events lack drink, music, dance, and invited guests. The group's walk through the fields is the only indicated the community receives that an inheritance transfer is taking place.

4.4.2 Testaments and Judicial Procedures

Although parents usually present a verbal testament to their children, they do not always record a written testament. If the testament is written, the testator has several alternatives for recording the transfer. He may have copies of the will drawn up by the witnesses and then signed and kept by all heirs, witnesses, and himself. Or he may, in addition, file one copy of the testament with the local village authorities. As a third alternative, he may process his disposition through the state-defined legal procedures.

Table 4.2 shows the frequencies of these choices among 31 inheritance completed transfers.

TABLE 4.2 LEGAL FORM OF THE TESTATOR'S DECISION

Form	No. of cases	Relative Frequency
I. Written Testament and		
a. no copy given to local authorites	6	
b. copy given to local authorities	8	
c. copy filed in district court	3	
d. disposition unknown	1	
	18	.58
II. No Written Testament and		
a. verbal transfer by testator	9	
b. testator died intestate	3	
c. disposition unknown	1	
	13	.42

Unfortunately, these cases span a fifty year time period and do not permit discovery of any temporal changes in the relative frequencies of disposition patterns. However, older informants including some local village authorities, feel that the practice of filing written testaments with local authorities is increasing.

According to state law, an inheritance transfer is legal only if a written testament is filed in the district court (Table 4.2, Form Ic). The Codico Civil of Oaxaca (1967) encodes an elaborate procedure for the transfer of an estate and directs that all transactions go through the state courts. Table 4.2 shows that only a few transfer take this alternative. This avoidance of state's inheritance procedure is consistent with the villagers' avoidance of any encounter with or use of the state legal system.

If Zapotecs in Diaz Ordaz wish to comply with state law, they are faced with enormous expenses: lawyer's fees, court costs, filing papers, transportation to Tlacolula or Oaxaca, and bribes. Moreover, any land transacted through a state court must be registered and taxed. If the property is not registered, all back taxes must be paid as well as the registration fees before the land may be inherited. Most village lands are unregistered (ocultos) which means that their transfer through the state system would require considerable expense. The scarcity of cash, and capital that may readily be converted to cash, makes the state procedures unattractive, unless the testator is willing to liquidate the more valuable assets of his estate to pay for the transfer.

The state seems aware of the vast amounts of land bypassing their legal system and several years ago it required local level courts to shunt all property transfers of estates worth more than 100 pesos

through the state courts. Villagers have avoided this legal tangle by ostensibly declaring their estates are valued at 99 pesos or less and/or recording an inheritance transfer as a land sale of less than 99 pesos.

Another reason for non-compliance with state procedures is the villagers' beliefs that state courts are places for disputes (delitos). Villagers distinguish between several classes of disputes, one of which is always taken to the state level: serious disputes (diletos graves). A serious dispute would be something like capital crimes, divorce, or personal injury. Submissions of a serious dispute to a state court is considered a scandal by villagers and choice gossip. If a testament is taken to the state court system, even with the innocent intention of legalizing an inheritance transfer, it may be considered a delito grave by other villagers. Gossip spreads that the heirs were not really in agreement with their parents' wishes.

In contrast, submission of legal problems to the local level courts are not immediately considered scandalous. Figure 4.2 reveals several cases where testaments were registered with the local level authorities. This use of the local level legal system corresponds with the native conception of the dual nature of their local court. It is both an administrative and adjudicative institution.

A common reason for taking something to the authorities, other than a testament, might be to register an intra-familial event to preclude future problems. This is reflected not only in the custom of registering births, deaths, and marriage with the local authorities (which is a state law), but also in the villager's rather strange habit of notifying the authorities that so-in-so did such-and-such to them and then requesting that nothing be done by the authorities at this time. For example, a

woman will notify the local judges that her husband falsely accused her of laziness and then tell them that she just wanted them to be aware of what was happening. She requests no action be taken. Such actions are known as convenios and include the notification of some wrong done to one or the registration of a birth, marriage or death. Presentation of a testament to the authorities for the village archives is also classed as a convenio. Convenios are simply public records of a private agreement that protect all parties if disagreements should ever arise.

The testators, heirs, witnesses, and local authorities do not consider a convenio to be indicative of a conflict and the action does not draw community attention. In contrast, an inheritance dispute is categorized as a delito and attracts widespread community interest and gossip. The local court's role changes in these disputes from one of confirming an intra-family decision to adjudicating a dispute and achieving "balance" among the litigants.

4.4.3 Conflicts and Disputes

Inheritance disputes are prize gossip and one may receive the mistaken impression that they are quite common. This would be analogous to impressions one would receive about crime rates by talking to the homicide squad of a large U.S. city. However, few inheritance transfers become entangled in litigation. Table 4.3 indicates that most inheritance transactions are tranquil events.

TABLE 4.3 FREQUENCY OF DISPUTES

	No. of cases	Relative Frequency	Adjusted Relative Frequency
No disputes	21	65%	.84
Disputes	6	19%	.16
Not applicable	5	16%	(see text)
Total	31 cases	100%	1.00

In this table, "no disputes" means that at the time of the interview (1970), no one had questioned the manner in which the estate was divided. A "dispute" indicates that someone had questioned and contested the transfer. "Not applicable" refers to cases that (a) had only one child who became the only heir or (b) the testators were childless and transferred their property to someone without dispute. These two situations did not result in litigation and have been classified as "no dispute" in the third column of the table.

This tabulation fails to consider disputes between co-heirs or parents and children that were expressed in other forms, i.e. without reference to inheritance. An example would be the common Zapotec disputes over chickens which takes up over half the local authority's court proceedings. This includes peoples, whom are sometimes co-heirs, making claims and counter-claims of chicken theft, trespass, and injury. Chicken disputes allow not only co-heirs, but also any villager, to participated in a rather minor form of litigation without directly escalating the conflict into more serious accusations.

Inheritance disputes proved so rare that in order to collect an adequate sample for analyses, I intentionally collected every dispute remembered by any of the thirty-one informants interviewed. These dispute cases were combined with those collected by Quinn. A case was defined as any dispute occurring between co-heirs or testators concerning the division of an estate. Although the question of Zapotec disputes deserves much more attention, the nineteen cases of inheritance disputes may be summarized with respect to (1) the level they reached in the legal hierarchy, and (2) the kinship relations of the litigants.

As an inheritance dispute escalates, litigants may take it to

different levels in a hierarchy of institutions. Failing a resolution satisfactory to both parties at any one level means that the dispute is taken to the next level. These levels are:

1. The testators (if between co-heirs), provided they are alive.
2. Members of the testators' kindred. Specifically, his or her siblings and sometimes depending upon the side from which the disputes property came.
3. Local village authorities (the alcaldes).
4. The district court in Tlacolula.
5. The state court in Oaxaca City.

Each shift into a higher level institution increases the monetary loss to the litigants, decreases the probability of ending the conflict within their lifetimes, and expands their involvement with strangers.

Table 4.4 indicates that most disputes are resolved at the local level, either within the family or by local level authorities.

TABLE 4.4 HIGHEST LEVEL OF LEGAL INSTITUTIONS THAT A DISPUTE REACHED

	No. of Disputed Estates	Relative Frequency
Family (testators and heirs)	10	.53
Diaz Ordaz authorities	4	.21
State court at Tlacolula	5	.26
State court at Oaxaca City	0	0
Total	19	1.00

These few cases reaching the state courts are often based upon misunderstandings of the state law. In one case, a son brought suit against his intestate, deceased parents for repayment of a loan he claimed to have made them. The Tlacolula judge found the request humorous and dismissed it on two grounds: suits may not be filed against a deceased party and debts are not the responsibility of the heirs. This claim, however, might have been considered legitimate at

at the local level court, if the debt was for obligations incurred by the deceased's household.

Recent trends in the village and state suggest that the use of the state courts for inheritance disputes may increase in the near future. As outmigrating and increasingly educated villagers become more familiar with the extra-village legal system, some are realizing that their testaments are not legally binding. In two cases, individuals have claimed in state court that their parents died intestate. Furthermore, they claimed to be the sole heirs to their parent's estate. Such a legal maneuver has brought what appeared to be a peaceful, settled inheritance case into immediate dispute. In one case, the father had died in 1952 and the claim for a "legal" transfer was made by his heir in 1971. The heir was now 54 years old. At this writing, it would appear that the plaintiff will win and collect the inheritance his siblings have been farming for almost twenty years (in fact, some of the man's co-heirs have already passed it to their own heirs). The real winners in these disputes are the courts and lawyers who have charged the siblings over a thousand dollars in fees. Several unethical lawyers are hoping to tap more of this latest rake-off of the peasantry by attracting more "country bumpkins" who are dissatisfied with their parents' "illegal" division of their estate.

Another reason that the use of the state legal system may increase comes from pressure for more capital intensive agriculture. Those farmers desiring credit for their agricultural inputs must show legal title to their lands. This requires registration of the property, which, in turn, requires proof of heirship.[6]

If any pair of heirs or a testator and heir enters into disagreement,

it would be classified as a "dispute" case in this study. Considering the number of dyadic relationships involved in inheritance cases, the low frequency of inheritance disputes appears even more striking. If the testators are considered to be one party then the number of parties in an inheritance case (n) would equal the number of heirs + 1. The number of pairwise combinations of testators to heirs and heirs to heirs would be:

$$C^{n}_{r} = \frac{n!}{r!\,(n-r)!} \qquad \text{where } r = 2$$

Thus, a case with four heirs and a testator (n = 5) would have ten possible dyadic relationships.

Even when disputes occur, they rarely involve all the heirs, rather they most frequently represent disagreements between one dyadic pair (17 of the 19 dispute cases). The remaining two cases involved two and three litigant pairs. Table 4.5 shows the kinship relationship between litigant sets.

TABLE 4.5 LITIGANTS' KINSHIP RELATIONSHIPS IN CASES OF DISPUTED INHERITANCE (19 cases of inheritance transfers)

In Conflict	No. of Litigant Sets
A. Siblings vs. sibling	
- sibling vs. sibling	10
- half-sibling vs. half-sibling	2
Subtotal	12
B. Deceased testator's spouse or children vs. his (her) kindred	
- deceased testator's spouse vs. deceased testator's parents	2
- deceased testator's spouse vs. deceased testator's siblings	1
- deceased testator's children vs. deceased testator's siblings	3
Subtotal	6
C. Parents vs. their children	4
Total litigant sets	22

This table suggest which dyadic relationships are the most brittle in this social situation, i.e. who is most likely to enter into litigation over inheritance. Sibling relations appear most fragile and may become fission points in inheritance disputes. Less frequently, the spouse or children of a deceased testator will enter into litigation with relatives from the deceased's natal household. And least frequently, parents (as testators) will become engrossed in conflicts with their children (as heirs).

Municipal authorities do not intervene in an inheritance dispute unless specifically requested. They and their fellow villagers expect siblings to fight and know that interference in a family feud is outside the limits of their authority. This non-interference is not true in disputes between parents and children. These conflicts are carefully observed by the authorities and the first pretext of violence of children toward their parents, the child is reprimanded.

These attitudes reflect the reason why an heir may be disinherited. Fighting with a sibling or half-sibling is neither unusual nor considered grounds for disinheriting heirs. Likewise, conflicts between a spouse and his (her) family falls outside the interest and powers of the local court. In sharp contrast, fights between parents and children are a legitimate reason for disinheriting an heir. Such disputes violate a strong norm that Selby (1966) elevated to a "principle" for Zapotecs; the "principle of the supremacy of parental will."

4.5 Rules and Norms

Thusfar, rules of Zapotec inheritance have been derived by comparing normative statements to actual behavior. Two rules discovered in this manner were: (1) one's heirs are one's children and (2) the youngest son

inherits the natal house. But this method of using norms to discover rules quickly exhausts itself; there is only one more commonly agreed upon norm: all heirs should receive equal shares of the estate. Unlike the previous norms, comparison of this statement to actual behavior proves complex. It is not clear what "equal" means. Selby (ibid:78-9) believes the Zapotec villagers of Santo Tomas Mazaltepec use the concept of equality in two ways. In some instances, equality refers to "mathematical equal" division of an estate between the heirs. In other situations, equality refers to the equal treatment or consideration of all heirs. Selby claims that his informants use both meanings of equality when discussing inheritance. These two definitions may lead to different outcomes in an inheritance case. In section 7, the degree of mathematical equality in inheritance will be measured. At this point, I wish to concentrate upon the importance of norms as guides to decision making.

Aside from these three norms, Zapotecs have very few norms that indicate to testators what the society finds "a particular kind or quantity of behavior is one that they find valuable for their actual behavior and others whom they specify to conform to (Homans 1961:116)."

Moreover, norms are of limited value in discovering inheritance rules. Norms are often ineffective guides to action because certain external conditions and situations make them inapplicable. Do step-children hold the same status as heirs as children? What should a testator do if he lacks a male heir for his natal household? If no two parcels or property are identical, then what is an "equal share?" Clearly, these external conditions, many of which are generated by the stochasitic nature of life, influence the applicability of a norm to

a particular circumstance.

These norms are best considered guidelines rather than strictures for appropriate behavior. This view is supported by an absence of community sanctions if these norms are violated. Passing inheritance to someone other than children, giving a natal house to an eldest son, or dividing an estate into unequal shares brings no jural action from the community. The testators behavior might be considered odd, but no one questions their right to dispose of the estate the way they wish.

4.5.1 Decision Making

Another method for discovering the rules of an inheritance system would be to analyze it as a decision-making process. This analysis proves difficult. Inheritance is a unique type of decision for which decision theorists have not provided adequate models. The uniqueness of inheritance decisions may be seen from four perspectives.

First, inheritance decisions are infrequent compared to other decisions a person makes in his lifetime. Several times in his lifetime, a man may have to decide where to seek medical help or who shall be his *compadre*. More frequently, he must decide what to plant each season, and even more frequently, what shall he purchase in the weekly plaza. In contrast, a person disposes of his estate only once in his lifetime. In a community of a little over 500 households, the decision to dissolve an estate is a relatively rare event. During a year's fieldwork, I witnessed only a handful of actual inheritance transfers.

A second factor making inheritance decisions difficult to study is their highly individualistic nature. Before testators divide their inheritance, they never discuss the issue in concrete terms, and after the division, they seldom discuss how a decision was reached. Heirs

never discuss inheritance with their testators for fear of at least a strong reprimand if not a reduction in their inheritance.

Exactly who decides the final disposition of the estate appears to vary between households. If both husband and wife are alive, then the decision is reached jointly. If one is deceased, the surviving spouse may take into consideration the conversations he or she had with the deceased spouse. It appears that the surviving testator does have the right to modify any decisions made by the deceased co-testator if circumstances warrant. Cause for such modification would include the death of an heir before the testator, acquisition of additional property, or bad conduct of an heir toward the testator.

And third, inheritance decisions are difficult to draw rules from because they are made over a long period of time. Testators may begin to consider possible ways of dividing their property as early as their eldest child's marriage. As the years pass, an initial decision may be modified by bits and pieces until it is considerably different from the original choices. This long sequence of decisions are impossible for a testator to recall and the rational may soon be lost for a decision even though its consequences remain.

And finally, inheritance does not represent a single decision, rather it is a cluster or nest of decisions. A testator must not only decide who are the heirs, but also how much of each class of property to give to each heir, when the transfer will take place, whether or not a testament should be written, and if so, where it should be recorded, etc. Also many of these decisions are contingent upon previous decisions; e.g. if a testator decides to write a testament, then where should it be recorded? These complexities create an ethnographic situation that makes

most of the decision-making process non-recoverable.

Inheritance decisions are not unique in sharing the characteristics of being low in frequency, individualistic, lengthy, and nested. The crucial choices of who one marries, when to migrate, and choosing an occupation share these same general characteristics. It will prove interesting if these decision-making processes prove similar. However, until such developments occur, the best source for the derivation of rules cannot be a study of the decision-making process itself. The only alternative appears to be an investigation of the results of past decisions. This forces a study to look into a rear view mirrow; studying what has happened rather than what is happening. At present, there appears to be no alternative.

ENDNOTES

1. Spanish terms are indicated by solid underline. Zapotec terms are indicated by dashed underline.

2. This list does not exhaust the response to a question such as, "What kinds of property are there?" Excluded from the category of inheritable goods are ejido lands, community property, and personal possessions (combs, clothing, and jewelry).

3. If one of the heirs has a mayordomia debt contracted when he was living with a testator, the debt is not transferred to the other heirs. Rather, it is considered a debt of the heir's future household.

4. Quinn's data closely correspond to these frequencies. In 28 cases, 22 passed the natal house to a youngest son. I could not determine how many of these were also the only sons. Males, other than the youngest son, received this house in 2 cases. Females, without male siblings, received the natal house in 4 cases. She has no cases in which someone other than the testator's children received the natal house.

5. Where reference is made to sixty-one cases, the data was collected by Naomi Quinn in 1964 and Downing in 1970. Both drew samples of inheritance cases in the same community, Diaz Ordaz. Quinn (1964) used an area-based sample, all her cases came from the northeast corner of the village. Cases of double counting, i.e. two heirs of the same testators, were merged into one case. I defined an inheritance case identically; one dissolved estate equalled one case. My sampling technique was different. I consciously attempted to draw cases from households scattered throughout the villages. As a test of the relationship between the sample that Quinn and I drew, I tested the null hypothesis that there was no difference between the number of heirs receiving lands from a testator in the two samples ($p = .05$). A one-way analysis of variance confirmed the null hypothesis ($F = 1.19$, $N = 30$, Quinn; $N = 31$, Downing). Thus, with respect to the distribution of the number of heirs per case, the two samples were drawn from the same population. This indicates that no bias were operating in our samples for families with few or with many heirs, or at least if such bias were operating, it was operating in the same direction.

6. Diaz Ordaz farmers are reluctant to apply for agrarian loans because they fear the legal hassle and expenses that would be necessary to properly register their lands with the state. Thus, the complexity and expenses of the extra-village legal system is one of many factors indirectly working against the acceptance of new agricultural inputs. This is another example of the widespread class exploitation of the peasantry by the engineers, judges, lawyers, doctors, and politicians.

5. INHERITANCE AND SOCIETAL STRUCTURE

5.1 Is Inheritance a Social Exchange?

Earlier, I suggested that inheritance might be a social exchange (sec. 2.5.1). Social exchange, in contrast to economic exchange, involves human interactions that Mauss (1925) referred to as "obligatory" and "interested." These characteristics have been further defined by Blau (1964), who says that a sequence of behaviors may be considered social exchange if they meet four criteria. First, a social exchange implies unspecified obligations on the part of the recipient. Second, it entails an element of trust that others will fulfill what are often unstated obligations. Third, it strengthens or creates feelings of personal obligation, gratitude, and trust. And fourth, the benefits of social exchange have no medium of exchange in which they are evaluated. A mutually beneficial sequence of social exchanges, moreover, fosters relationships that continue. And unlike economic exchange, the transaction of a social exchange does not terminate the obligations between the giver and taker.

Blau's four elements of a social exchange are present if Zapotec inheritance is viewed as a transaction between parents and children. The reciprocal obligations of heirs and testators are vaguely stated. The precise meaning of "providing food, shelter, and clothing" is vague and metaphorical to anthropologist and villagers alike. This obligation is metaphorical because it includes listening to one another and carrying on a multitude of other social exchanges, in short, maintaining social interaction. There are no answers to questions such as: after the inheritance transfer, does the heir and his spouse owe their testators one, two, or three shirts a year? How often should each

heir feed the testator? Should heirs provide their father with drinking money? But the lack of specific answers to these questions, and others like them, does not mean that Zapotecs do not discuss them. When either party begins to feel an imbalance in reciprocal relations developing, these issues surface into verbal statements. Like all social exchanges, relations between testator and heir are cemented by nebulousness and uncertainty. Fulfillment of the obligations of testators to heirs and vice versa rest completely upon trust and the validity and continuity of the testator/heir relationship is completely dependent upon their conduct toward one another. No community sanctions protect either party if the social contract is broken, yet the risks of breaking this social contract are serious. An heir apparent could lose one of the two sources of his inheritance. And a testator could be abandoned to beg in the streets, although this tragedy has happened only once in the memory of elderly informants and never within recent times.

Certainly the parent-child relationship is one of personal obligation, gratitude, and trust. The relationship almost never involves irreparable conflicts. Fights between kinsmen in the same household usually occur within rather than across generations, i.e. between siblings or husband and wife rather than between child and parents. Conflicts between parents and children are most shocking and command widespread discussion throughout the community. On several occasions I was told what Diaz Ordaz villagers considered a shocking, one sentence gossip: "Juan B. struck his father." This would bring gasps from everyone except the anthropologist. Then, people would comment, "how could he?, I've never heard the likes of this" and other such expressions of amazement.

Zapotec inheritance also meets Blau's fourth criteria for a social

exchange; there is no standard or medium for evaluating the exchange. Zapotec heirs do not calculate the value of their testators' estate in terms of how much care is owed the testators in their dotage. Even if they tried, there would be no way to estimate how long a dependent testator might live. Nor would any testator attempt to calculate how much each child had given him in terms of a common medium like pesos. These obligations are measured subjectively and, unfortunately, their measurement is beyond the current state of anthropology's understanding of social exchange. Also, incomparibility of spheres represented by the turno pattern hinders co-heirs from comparing their shares on a single dimension.

Further support for inheritance being a social exchange comes from the only case witnessed in which an heir was almost disinherited. A widower father was on his deathbed. One of his sons had been working in Mexico City for several years and, after being notified by telegram, rushed to his father's side. A friend of the father's and I reconstructed the following dialogue:

Son: "And my share?"
Father: "Here is my testament - to you I have left nothing."
Son: "But I am your son . . ."
Father: "Yes, you are very much my son, but little have you recently spoken to your father, little did you give him one centavo, little have you visited him while he reclined, dying here on his deathbed. You are no son of mine."
Son: "But then, whose son am I?"
Father: "Yes, we gave you life. But when you began to work, you did not consider your father. So, when your father dies, neither is he going to remember that he had a son.

The conversation was interrupted, the son continued to plea, and finally the father said . . .

Father: "Good enough, I leave you a little piece of land so that you stop crying like a suckling . . ."

Son: (objecting) "Yes, but this small fragment is worthless . . ."

Father: "That is what I give you, if you don't want it, then your brothers and sisters will be happy to use it."

Son: (after hesitating) "I'll take it. Thank you, my father."

Afterwards, while transcribing the dialogue with the father's friend, the friend commented: "The boy did the right thing (accepting the small parcel), he could have gotten nothing."

It seems apparent that some type of a social contract had been violated. From the father's perspective, the son failed to meet both material and social obligations. After threatening negative reciprocity, the father gives his son a fraction of what the young man's co-heirs, who presumably had to meet these obligations, received. This contract is seldom so explicitly verbalized, but stressful circumstances helped silhouette it.

Less substantial evidence comes from the way villagers classify inheritance as a type of exchange. There appears to be no Zapotec term that corresponds to the Spanish meaning of inheritance (herencia). Rather, what I have been calling inheritance, the villagers refer to as dizdo'. This term also includes offerings to the saints, small gifts of food between households, and the presentation of clothing by a godparent to his godchild. It might be best translated "gift."

Taken together, this evidence supports the proposition that inheritance is a social exchange between parents and their children; testators (parents) exchange land for the return gift of superannuity, i.e. food, clothing, and shelter from their heirs (children).

5.2 Social Exchange Between Parents and Children

Inheritance is not the only social exchange between parents and

children. In proper perspective, it is only one of a series of exchanges between them. These exchanges involve parents and children interacting in roles other than testators and heirs. To place inheritance within its social context, it is necessary to view these other dimensions of the parent/child relationship.

Table 5.1 summarizes the high frequency exchanges between parents and children throughout the life cycle. The distinguishing criteria used in this chart was derived from the Zapotec life stages (Merida Blanco, personal communication 1967). The table also lists the approximate ages at which a person is referred to by these terms. These stages are not based on chronological age, rather they signal behavioral patterns. One stage shades into the next. Although it would be impossible to list all the interchanges between these two pairs for even one stage of the life cycle, these data demonstrate that inheritance is one of many social exchange transactions taking place between parents and children.

An interesting question for further research concerns the relative importance of these multifarious exchanges to the participants. From the preceding dialogue between a testator and his heir, it appears that certain exchanges are singled out for "marking" the balance and status of the overall relationship. These marker exchanges include money sent to parents if the child worked outside the village, payment of the child's marriage expenses by the parents, post-marital residence by the child, inheritance, and superannuity. Reneging on these major exchange obligations appears to threaten the continuity of the relationship.

From the viewpoint of societal groups, what is most important about the exchanges between parents and their children is the transformation of obligations and the exchange relationship at marriage. Following a

TABLE 5.1 HIGH FREQUENCY EXCHANGES BETWEEN PARENTS AND CHILDREN THROUGHOUT THEIR LIFE CYCLES

DISTINGUISHING CRITERIA	Nursing infant	Toddler until first year of elementary school		Elementary school children		Unmarried persons		Married persons (young)		Married persons (older) with all children married		Dead persons
APPROXIMATE AGE	Birth - 2 yr	2 - 7		7 - 13		14 - 20		20 - 60		60 +		Deceased
SEX	♂	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂
TAROTZI LIFE STAGE	BEDO BEZ	BINI'NI GIU'NE	BINI'NI CA'APE	BINI'NI RO'O	CA'APE	SULTEI	CA'AP RO'O	BINGUL	UNA' GUL	BINGUL DO' O	NANGUL DO' O	TUGUL
EXCHANGES FROM CHILDREN TO PARENTS	Negligible (perhaps social approval)	*Carry things around the house *Obey parents *Care for younger siblings	All the exchanges of young, male toddler plus: *help mother in kitchen with small tasks	*All the previously mentioned things and *feed animals *run errands to other households and store *spying on other households *household task outside the house	*All previous exchanges plus: *heavier kitchen duties *run errands to other households *spying *wash clothes *household tasks inside the yard	All previous exchanges plus: *feed animals till send money home if working outside the village *spying, but decreasing *errands to market outside of village *represent household at fiestas *work in fields	Make tortillas Go to mill if accompanied by elder female Send money to parents if working outside the village represent household at fiestas	*Post-marital residence with his parents *Assist in parent's fields *Curing and burial expen. of parents if they die	*Help her husband's or her own parents if they give a fiesta *share all exchange relationships of her husband	*Feed, shelter, and clothing *Burial expenses	*Feed, shelter and clothing *Burial expenses	Ritual obligations on "Day of the Dead" *Pay outstanding debts with help of other siblings
EXCHANGES FROM PARENTS TO CHILDREN	*Food, clothing, shelter, socialization and affection. Curing expenses.							*Pay costly marriage ceremony *Food, clothing, shelter for sons and their wives while they reside patrilocally. *Help children and wives establish new household	*Dowry *If parents wealthy, may give land to daughter and son in law at this time	*Pass inheritance *Give advice on cargos, cultivation *Assist in socialization or care of grandchildren	*Pass inheritance *Give advice on ritual cooking *Care for grandchildren periodically	If an unmarried child died before his parents, ritual obligations at Day of the Dead
	*Baptismal expenses shared with godparents			Help with homework small allowance for sweets		send to secondary school outside the village, if child doesn't work. Teach him to farm	Teach her household tasks Less frequent send to secondary school.					
RESIDENCE OF CHILDREN	IN HOUSEHOLD OF ORIENTATION							BRIEF PERIOD OF PATRILOCAL RESIDENCE THEN MOVE NEOLOCALLY, EXCEPT FOR YOUNGEST SON.		IN HOUSEHOLD OF PROCREATION		

POSSIBLE "MARKER EXCHANGES" ARE UNDERLINED

child's marriage and establishment of a separate household, the participants in the exchange network shifts from parents exchanging with their child to parents exchanging with their married child and his spouse. Or, viewed from the perspective of societal groups, it shifts from intra-household to inter-household exchange. Furthermore, the newly established household is now in a position to exchange with other households and fulfill community rights and obligations. Thus, any household head and his spouse carry on exchange relationships with his and her parent's households in the first ascending generation and with their children and their children's spouses' households in the first descending generation.

The importance of marriage in Zapotec ceremonial events, when compared to other rites of passage, is related to this structural transformation of exchange relationships occurring at, or shortly after, marriage. In short, marriage not only links individuals and, to a lesser extent, their families, but also marks the beginning of a new societal group within the village: a household. Marriage and neolocal residence give birth to the basic building block of Zapotec societal structure and is recognized accordingly.

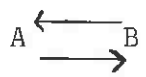
Acceptance of inheritance as another type of social exchange between households places inheritance within its social context. It is part of a larger exchange network. The testator/heir relationship does not exist in a social vacuum, but grows out of a much older relationship of parents and children. If the consequences of inheritance upon societal structure are to be ascertained, this larger network of social exchange demands further attention.

5.3 Alliance Theory

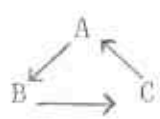
Mauss' original statement of exchange theory was further explored by Levi-Strauss (1949). His research has come to epitomize what is known as "alliance theory." Among its many objectives, alliance theory attempts to identify the structural implications of different types of exchange systems; thereby providing a general statement of the impact of exchange on social organization. This impact is sometimes evaluated in terms of social solidarity; the assumption being that the greater the reciprocity between individuals (or groups), the stronger their solidarity. Use of this methodology requires a typology of exchange systems, determination of which type of exchange system one is dealing with in a particular case, and then, formulation of the structural model. From this structural model, deductions may be made that must be consistent with the ethnographic facts. This deduction process could be considered one type of explanation.

In an analysis of cross-cousin marriage, Levi-Strauss identifies two general basis for exchange systems: direct and generalized exchange. Direct exchange (also called restricted exchange) refers to giving and receiving of something between two groups. An often cited example of direct exchange would be two exogamous unilineal moieties trading women. Generalized exchange refers to a situation where a giver receives a return exchange indirectly through one or more additional parties. For example, patrilateral cross-cousin marriage may create a circulation of women between three or more patrilineal groups. This distinction between direct and generalized exchange may be diagramed as follows:

DIRECT



GENERALIZED



direction of giving women.

Direct and generalized exchange often thrive in an atmosphere of prescriptive rules that strengthen their applicability. These rules sometimes have an "extension" property that states what to do if in a particular situation a strict adherence to a rule is inapplicable. For example, if a prescriptive rule states that ego should marry his mother's brother's daughter and this kin type is not present, ego may marry someone called by the same kin term as his MBD. Exchange structures also foster an ambiguity of relationships between exchanging groups and, most important, they generate alliances structures between groups which assist in explaining the social structure in which these groups are imbedded.

Levi-Strauss derived most of his examples of alliance structures from kinship data. Goody (1956:282, 1963:47) has criticized Levi-Strauss for assuming that kinship is built through marriage. Goody feels that filial alliances should receive as much attention as affinal alliances and that too little emphasis has been placed upon cross generation exchanges and relationships. Referring to Levi-Strauss, Goody summarizes his position:

> "relations within and between generations coexist within the social system at any one moment in time. The allocation of primacy to one set as against the other would seem to be a misapplication of developmental analysis." (Goody 1956:46-7)

Goody is not saying that Levi-Strauss is wrong in his analysis of within-generation exchange structures, rather, he is stressing the importance of also looking at relationship across generations. The difference is one of degree and emphasis, not kind.

Goody's modification of Levi-Strauss's objectives proves applicable to the Zapotec inheritance case and produces an interesting question:

what types of alliance structures between generations are created by Diaz Ordaz social exchange patterns? This question becomes more interesting because Levi-Strauss might appear inapplicable to the Zapotec case; they lack corporate descent groups, marriage prescriptions, and place little emphasis on descent. In other words, Zapotecs have what has been called a "cognatic" society, a type of society that has been largely ignored by alliance theorists. If Goody is correct, then this neglect and inability of alliance theorists to apply their concepts to cognatically organized societies might come from their emphasis on marriage and affinal ties. Such an emphasis represents a rather narrow, surface interpretation Levi-Strauss's objectives in The Elementary Structures of Kinship.

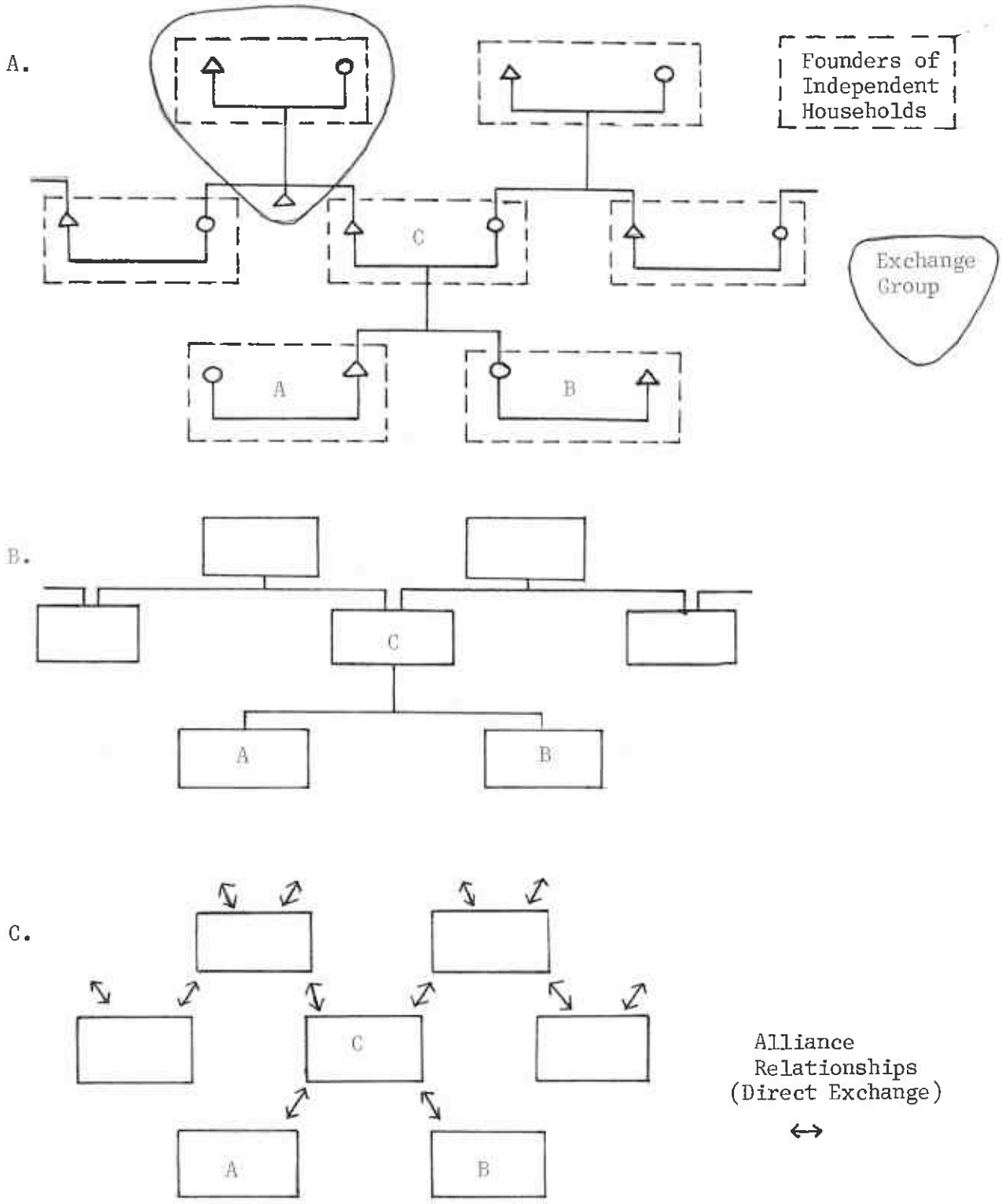
Levi-Strauss's foremost interest is exchange (1949:Chapter 5). His emphasis upon the structural implications of exchanging women should always be viewed from the perspective of his comments on exchange systems, in general. These systems involve not only the exchange of women, but also food, goods, and services. The emphasis that both the anthropologist and the native place on the exchange of women comes from several factors that have little to do with "womanhood" per se. Women are valuable commodities, measured by the amount of labor invested in their preparation for prestation. The ambiguity which occurs when defining their "ownership", in turn, allows flexability in defining membership of the exchanging group. And women are visible features of the social landscape, permitting them to be indicators of the status of obligations and counter-obligations between groups (what I have earlier referred to as "markers"). In sum, the importance of woman in some societies is based upon these characteristics and the social bonds created by the exchange. To paraphrase Robin

Fox (1967), there is nothing magical about being a bride.

Just as women represent a heavy investment of time and labor in unilineal societies, so also does land represent the most expensive capital to which a Zapotec couple holds rights. In turn, defining rights to land may involve as much ambiguity as defining rights to women; a particular parcel of land may be claimed as either individual or joint tenure, depending upon the purpose of the claim. And land is one of the visible markers of the exchange status between parents and children, much as bride-exchange is a marker for relationships between corporate kinship groups. In sum, among Zapotecs, land is the structural equivalent of women in unilineal societies; it is an important commodity exchanged between social groups. Of course, inheritance and the exchange of women are in some respects dissimilar transactions. When women are exchanged, reciprocity is in kind. Women are traded for women. Most other prestations between groups that exchange brides are secondary. In inheritance, different commodities are transacted between the exchanging groups. Children receive their parents' material goods and, in turn, give superannuity to their parents. But such a mix of exchanged commodities does not negate the use of alliance theory.

The multifarious exchanges between parents and their children (and their childrens' spouses) creates a distinct alliance structure among Zapotec households. Figure 5.1A shows an idealized kinship diagram. Married couples whom have established their own households are outlined with a dashed line. Unmarried persons (marked X on the figure) merge into their parental household as members of its exchange group. Couples are linked on this diagram because they form an exchange unit from the perspective of other, similar groups in the community and hold joint

FIGURE 5.1 DIRECT EXCHANGE ALLIANCES OF ZAPOTEC HOUSEHOLDS



tenure over the household's property. Figure 5.1B simplifies this picture and shows the exchange groups, excluding unmarried persons that have not established their own households. And figure 5.1C indicates the directions of direct and high frequency exchanges between households. A household exchanges with the natal households of the couple that established it and with households established by its own children and their spouses. This diagram may also be interpeted as indicative of directions of alliances resulting from frequent exchanges. If the entire village were to be diagramed in this manner, a general alliance structure or exchange network would become apparent.

This final diagram represents an extremely simple model of the alliance structures which I feel is applicable to most Zapotec villages. Unfortunately, it fails to make allowances for other, less intense inter-household exchanges such as compadrinazgo, guelagetza, and tequio. Elsewhere, Beals (1970) has discussed these inter-household exchanges using data I provided him from Diaz Ordaz. None appear frequent and intense enough to overshadow the importance of this alliance system.[1]

5.4 Implications of the Alliance Model

This simple alliance model of Zapotec societal structure is consistent with the ethnographic puzzles and facts presented in the last two sections.

5.4.1 Sparcity of Norms

Earlier, it is noted that only three rules (which are also norms) guide inheritance behaviors and decisions.

1. One's heirs are one's children.
2. The youngest son inherits the natal house and housesite.
3. All heirs should receive equal portions of the estate (to be discussed in section 7).

Interpreting these rules in light of the suggestion that inheritance is one element in a network of social exchanges between households indicates that these rules are sufficient to maintain the basic alliance structure of the village.

"One's heirs are one's children" insures that every household will have obligations to specific peoples in adjacent generations. In the first ascending generation, a household is obligated to the parental households of the husband and wife. In the first descending generation, a household will have obligations to all households that its children establish. Furthermore, this rule insures that most households will have two chances for receiving land with which it can form an independent economic unit within the village. Provision for economic viability permits the household to fulfill its community obligations such as participation in labor calls (tequio), the civil-religious hierarchy, and payment of taxes.

In addition, these rules make it likely that an elderly couple will have as many sources of support in their dotage as they have heirs. The provision that all heirs receive equal shares of the estate increases the chances of the elderly for receiving some type of superannuity. Ideally, the cost of caring for the testator is divided among all the heirs. Because inheritance is a social exchange, an unequal division might place a heavier obligation of superannuity upon the heir receiving the larger share. If this heir failed to reciprocate, the testator would be hard pressed to demand the same care from heirs who received smaller shares. The equal shares rule also reflects relatively equal costs to the heirs themselves as evidenced in the pattern of serial, patri-neolocal residence. This residence sequence distributes the social

obligations of children to parents rather equally, except the youngest son.

The provision for the youngest son inheriting the natal household does not mean that he receives a larger share than his co-heirs (see section 7.3.1). Rather, he receives a particular piece of property with ritual value. This may be interpreted as an extra reward to the youngest son for his increased period of residence with the testators. Unlike his co-heirs, the youngest son maintains patrilocal residence until his parents divide their estate and begin their serial residence shifts between the households of their heirs. Provision of the youngest son with the natal household also acts as a cultural back-up system protecting the testators in cases where their heirs may slight their superannuity obligations. The youngest son owes his parents more than the other sons and daughters since he is in possession of the natal house and housesite where his testators originally established their household.

Maintenance of these three norms insures that the system of inter-household alliances between generations regenerates itself through time. It protects both testators and heirs alike from losing their economic base to competition from others. Conversely, it tightly circumscribes the obligations of households to one another. This viewpoint seems consistent with Homan's insistance that norms reflect high frequency behaviors and have some benefit to the individual, otherwise they are not worth following.

5.4.2 Sibling Relations

The alliance model also suggests that sibling relations should be weaker than parent-child relations. Exchange theorists predict that

if two or more groups (A and B) are exchanging with another group (C) and C has limited resources (Fig. 5.1C), then the relationship between A and B will be competitive. The pie held by the testator is limited and both they and their heirs know it. Evidence presented earlier on the frequency of inheritance disputes between different kin types supports this hypothesis. Siblings are much more likely to enter into disputes over inheritance with one another than parents and children. More evidence could be presented to show the brittleness of sibling relations among Zapotecs, although this seems unnecessary because this relationship appears as one of the more obvious observations about Zapotec social organization.

5.4.3 Lack of Emphasis on Genealogies

Zapotecs place little emphasis on their ancestors as witnessed in their burial customs, shallow genealogical reckoning, and lack of ancestor worship. The alliance model suggests that ancestors do not have any direct role in the exchange network, this situation may be contrasted with the LoDagaba studies by Goody. They place great emphasis on exchanging with the second ascending generation. Among Zapotecs, exchanges are made and interpreted in terms of succeeding, rather than alternating, generations. Social exchanges occur between alternating generations but exclude the "marker" commodities that are necessary for the development of the household. The grandparent-grandchild relationship is definitely secondary to the parent-child relationship because the former carry on fewer social exchanges and, thereby show weaker solidarity.

5.4.4 The Shift in Reference from Individual to Joint Rights to Land by Elderly Couples.

It was also discovered that as couples grew older, their children

married and established their own households, and as the time for inheritance transfer drew near, couples preferred to merge their individual rights and to dispose of their property as a common estate that was undifferentiated as to the laterality from which the property originally came. Elderly couples referred to our land rather than distinguish the husband's inheritance from the mother's. Considered from the perspective of social exchange, this represents an adaptive strategy for the testators; they maximize their distribution by insuring that their heirs are equally obligated to both of them. Otherwise, if heirs distinguished between the individual rights of their parents to different segments of the estate, obligations would be divided into those that received the "father's land" as opposed to those that received the "mother's land." The concept of joint testatorship interjects ambiguities into the reciprocal obligations of the heirs that insures either testator a future if the other should die. In other words, it is in the self-interest of the testators to gain exchange-value from the entire estate rather than from the part that he or she received from his or her parents.

5.4.5 Social Solidarity

Earlier, the question was raised: what endures? The answer to this question seems to be the following. The system of alliances between households regenerates the basic structure of independent households with specific obligations to one another through time. It is the system of dyadic alliances between households that endures and provides the diachronic continuity to Diaz Ordaz's social structure.

The characteristics of Zapotec societal structure whereby a household

may be withdrawn or added to the village without any basic change in the community structure may be interpreted in terms of the alliance model. The disappearance or addition of a household only effects a few strands in the network that binds many households into one tight structure. The only danger would come from a complete loss of exchanging households in either the first ascending or first descending generations. In this case, a household would be pressed to maintain its economic viability.

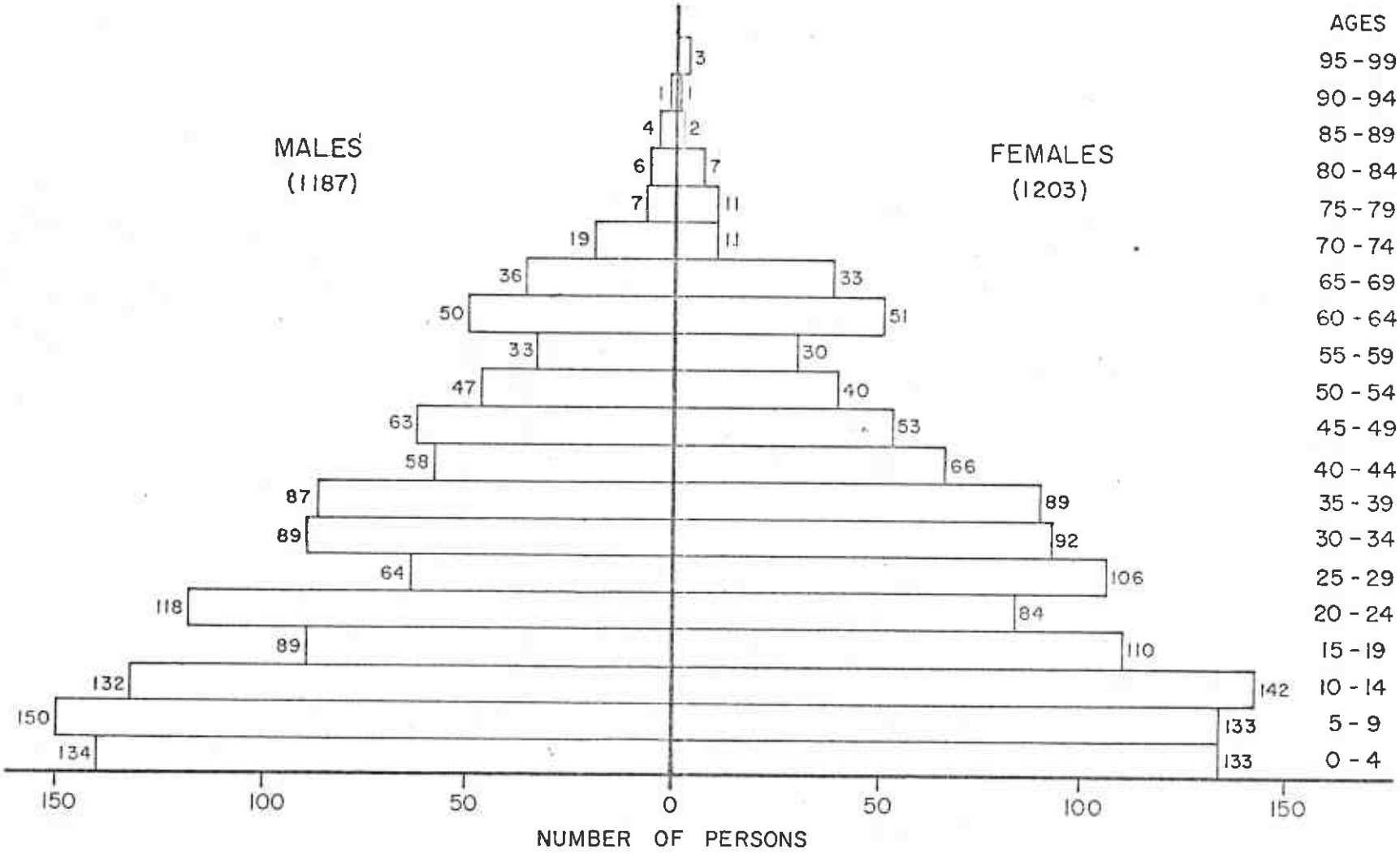
This latter situation is protected by a rule which parallels that of the extension rule in cross-cousin marriage. This rule states that a couple without descendents may form a "parent-child" like relationship that would allow the sorrogate parents to trade their inheritance for superannuity with another household.

5.5 Superannuity: An Underlying Reason For Social Exchange

It would require another dissertation to explore all the reasons for social reciprocity between parents and children. An explanation could range from explaining individual motivations, such as a desire for unambiguous social relations, to a national state model that considers the regional factors influencing the maintenance and origin of this system. At this juncture, however, I shall concentrate upon a middle-range explanation that, although obvious, demands formal recognition.

Figure 5.2 breaks down the population composition of Diaz Ordaz by age and sex. One interesting statistic that may be derived from this population pyramid is the dependency ratio. The dependency ratio is the proportion of children and elderly peoples in a population who are economically inactive to those that are active. This ratio is calculated

FIGURE 5.2 AGE AND SEX COMPOSITION - DIAZ ORDAZ - 1970



by comparing those in the population under age 14 and over age 65 to those between ages 15 and 64. The middle range are called the "actives" and those under 15 and over 65 are called "inactives." Calculation of the dependency ratios for the 1970 Diaz Ordaz population reveals there are 61 dependents for every 100 actives. Of these 61 inactives, 51 were children and 10 were elderly. This information may be compared with the United States (1968) dependency ratio of 62.2 inactives to 100 actives, 46.2 of which were children and 16 of which were elderly (Statistical Bulletin 1972).

Although an accurate estimate of the dependency ratio, defined by the degree of economic activity of all individuals could not be calculated, the general social situation seems clear. Someone or some institution must accept responsibility for the young and elderly. Almost by default, inheritance plays this crucial role. Aging villagers cannot depend on the state to care for them in their dotage. Mexico has no national welfare system, retirement plan, old age assistance program, social security, or any other such institution responsible for dependent peasants. This national situation leaves the provision for the elderly and young completely within the hands of the local level institutions. Unfortunately, the strong pattern of economic independence of Zapotec households does not give way to local level or community responsibility for dependents. Moreover, extended kinship ties are not so strong as to obligate a kinsman to care for another without a more interested rationale. The tie that really binds kinsmen to kinsmen is the bond of parents to children, a bond which has been shown to result from strong social exchanges between their respective households. To make this statement more accurate, an exchange relationship begins at the birth of the heir

and continues until and often after the parents relinquish control of their lands. At this point, the parents' household ceases to exist and they become temporary members of their heir's households, moving for short, one or two month residence with each heir and attempting to stay an equal period of time in each household. Thus, inheritance becomes the functional equivalent of a welfare system for the aged at the village level, insuring their care during their twilight years. The obverse may seem facetious, but is equally true. Parents are interested in the welfare of their children for more than sentimental reasons. Failure to attend to their needs endangers the parents' future.

The complete dependency of testators upon their children after division produces what Wagley has called a "built in population policy" supporting population growth. A marriage is not healthy in the in-laws' eyes until children have been born. Childlessness proves dangerous for a parent because it makes his future uncertain and may force a barren couple into a new, potentially unstable, social exchange with the sorrogate heirs. This relationship is unstable because the sorrogate children may already have a productive base from their own inheritance, which means that the testator's power over the heirs is weakened.

In contrast, care for dependent young does not prove difficult. An orphaned child is welcomed into almost any household, including those that already have children. When the children are small, the foster parents have an opportunity to develop the long term social exchange relationship that binds the heirs to them after they have disposed of their land. And, of course, the additional child decreases the testators' probability of being abandoned in their dotage.

From this perspective, it should be clear why the sex of an heir is

an irrelevant consideration to most testators. The exchange is not one between father and son, mother and daughter, or any other such combination. The social exchange is between parents (plural) and their child and his or her spouse (plural), between one household and another. In such a social situation measuring the laterality of Zapotec inheritance becomes an academic game that is important only if an attempt is being made to discover whether discrepancies exist between normative and actual behavior.

5.6 Review of the Argument

Zapotec societal structure consists of two primary groups: the village and household. These groups encompass most of an individual's activities, loyalties, and identification. The village forms the elementary unit of the regional market and religious system and the household forms the primary social unit in village life with reference to obligations for loans, civil-religious hierarchy, local taxation, corvee labor, *guelagetza*, and social exchange.

Regional solidarity appears to be based on a different type of integration from that of the village. Within a region, villages are linked by a degree of organic solidarity, each cooperating in specialized productive roles with relation to others. The villages exhibit strong temporal stability with most maintaining their integrity since the Conquest. In contrast, the internal organization of the village is based on a degree of mechanical solidarity, consisting of undifferentiated households that are similar in form and function. Households, unlike villages, are mortal; they are created at marriage, grow, decline and finally die. They are not corporate entities that endure beyond the

lifetime of their founders as do lineages, chiefdoms, or compounds. What, then, accounts for the stability of the village, as a societal group, in view of the lack of internal continuity of its primary parts, the households?

A complete answer to this question would require a consideration of the contributions to social solidarity of the actions and counteractions of all village institutions and processes. Given the current status of Zapotec ethnography this is clearly impossible. An alternative was to consider the obvious explanations for community social solidarity. The cognatic nature of kinship and emphasis upon kindred does not outline a distinct societal group that could form an organizing principle among the Zapotecs and was rejected. Succession, although appropriate to other societies, does not generate enduring alliances across generations and was similarly rejected. Exploitation oriented groups, such as irrigation sections, were considered elsewhere and likewise proved incompatible as a corporate principle explaining social solidarity (Downing 1973).

Inheritance was considered as a possible candidate for "something that endures" but was discovered to be a part of a larger social process involving most village households. This process was one of social exchange between parents and children, or phrased in terms of societal groups, between a household established by a parent (testator) and households established by their children and these children's spouses (heirs). Thus, placed within its social context, inheritance is one important element in a series of social exchanges between households.

Recognizing inheritance as a commodity in social exchange and

sensing the importance of this exchange network in which all Zapotec households are enmeshed, the search for "what endures" turned to an alliance model based on the work of Levi-Strauss. Zapotec village structure was seen to be generated by a network of direct (or restricted) exchanges between parents' households and those established by their children. Again, inheritance reinforces these social exchanges as a critical, although not the only, commodity transacted.

Finally, this alliance model of Zapotec societal structure was compared and found consistent with several ethnographic patterns presented earlier in the discussion. The few rules for Zapotec inheritance prove sufficient to maintain the structure of alliances. The brittleness of sibling relations is consistent and predictable from the alliance model, as is the deemphasis upon ancestors, geneaological reckoning, and their stress upon alliances between adjacent rather than alternating generations. The puzzling shift in reference from individual to joint rights in property among matured households was explained in terms of maximizing the opportunities involved in social exchange.

And finally, the mechanical solidarity of Zapotec villages wherein households were expendable within the society without disrupting its basic structure proved consistent with predictions from the simple alliance model. In sum, the answer to the question of what endures is: "nothing," if solidarity is searched for at the level of finding a corporate societal group that continues beyond the lifetime of its individual participants and contains unambiguous lines of recruitment, authority, and membership. What actually endures is a network of social exchanges that recreate the basic societal structure of the village through time. Inheritance is an important part of this larger process.

ENDNOTES

1. I am dissatisfied with the apparent inability of current ethnology to more adequately define the "frequency and intensity" of social exchange. My statement that parent-child exchanges are more important than other forms of inter-household exchanges, although intuitively correct, is unsupported by an empirical measure of these dimensions of social exchange. At this point, it is best considered an assumption.

6. FIELD FRAGMENTATION

Nothing reflects the primitive state of inheritance studies better than the lack of precise, descriptive terminology. Of importance is the confusion underlying the commonly expressed conclusion that "inheritance leads to the fragmentation of estates." This conclusion may take on at least three distinct interpretations:

a) the reduction of the total capital of estates through time;

b) the dispersed spatial distribution of fields constituting an estate; and,

c) the division of fields into two or more parts in an inheritance transfer.

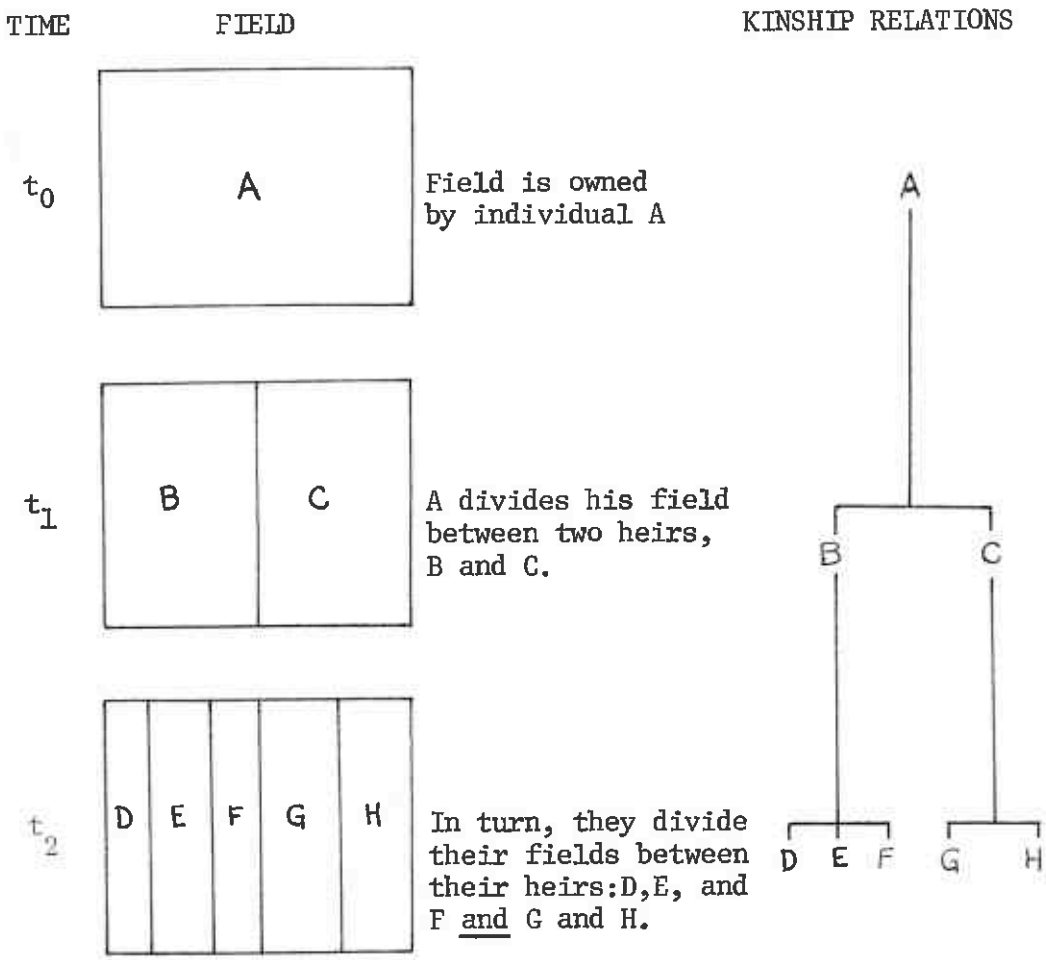
It will prove useful to distinguish these as estate diminution, field dispersal, and field fragmentation, respectively. This section will focus upon field fragmentation.

6.1 Pitfalls of Illustrative Explanations

As was seen earlier, ethnographic treatment of inheritance commonly is illustrative rather than analytic. This probably reflects disinterest in inheritance by the ethnographers more than intentional neglect. Typically, a description will invoke a diagram together with a genealogy, as in Figure 6.1, to show how an estate's fields are passed during inheritance. Such an illustration is frequently accompanied by an observation that inheritance dismantles fields and results in minifundia.

That such illustrative explanations may misrepresent the fragmentation process by oversimplification can be seen by a formalization of the implicit assumptions behind the illustrative approach and then, extrapolating from them.

FIGURE 6.1 COMMONLY USED ILLUSTRATION OF FIELD FRAGMENTATION



Assuming an initial number of infinitely divisable fields (N) to be divided in half with a probability (p) at successive generations 1, 2, 3, . . . i, then the number of fields N_i that would result after "i" generations would be estimated by the function:

$$N_i = N_o\ (1+p)i$$

Figure 6.2 projects this function for various values of the parameter "p" -- which is the proportion of fields fragmented in each generation.

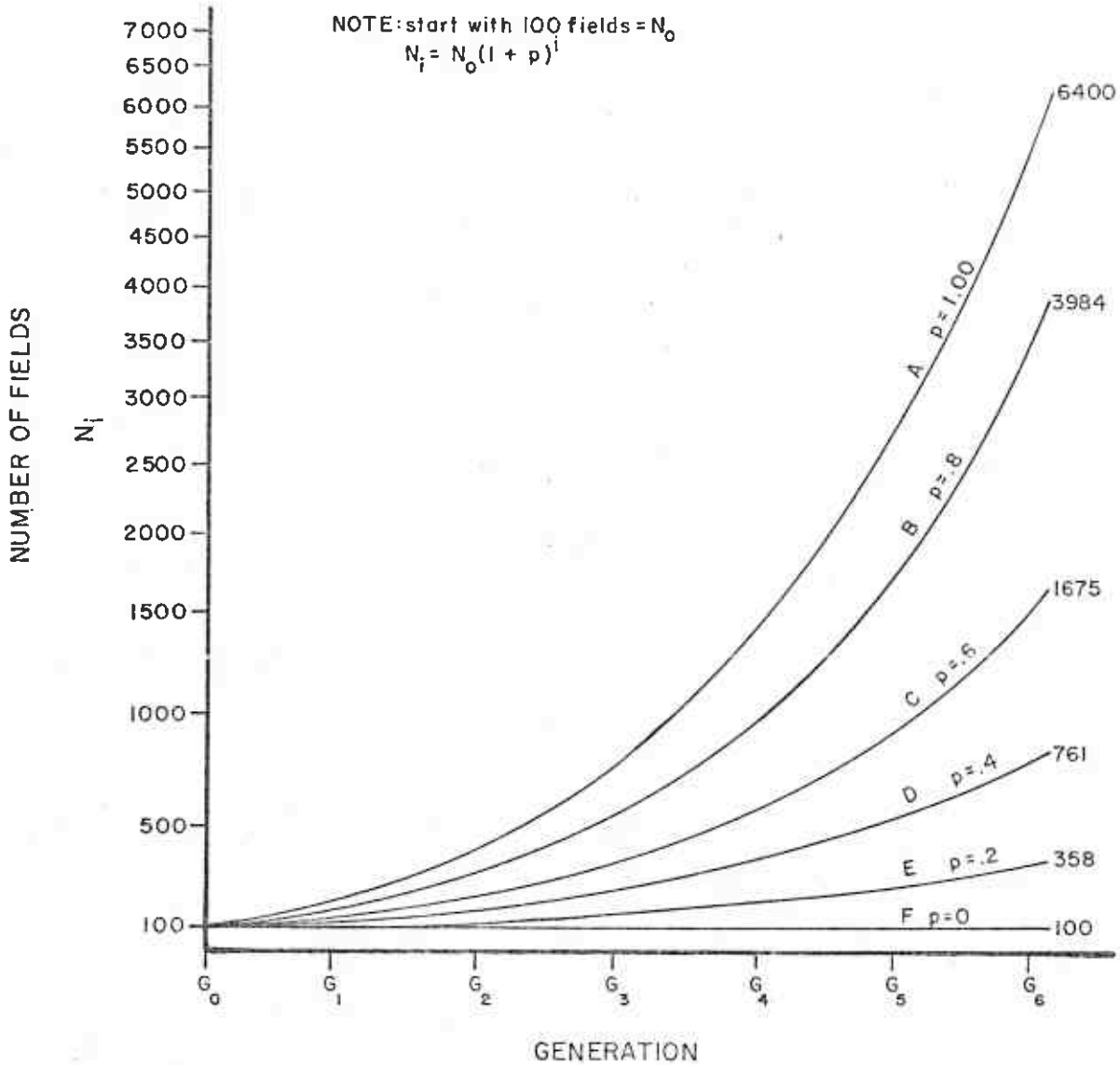
Clearly, the assumptions implicit in the illustrative approach, that a field will be divided nearly every generation by virtue of nearly every testator having more than one heir is untenable. Logically, it results in a fragmentation rate (as shown in curve A, Figure 6.1) far higher than observed empirically.

The realities of field fragmentation become more explicable when allowance is made for testators passing fields to their heirs intact as well as fragmented. An intact transfer of a field occurs when a particular field of an estate is passed to one heir without subdivision. This substitutes a lower value for "p" in the aforementioned function. And, since effects are cumulative, the increment in fields (N_i) is greatly reduced through time (see curves B through F, Figure 6.2). This strongly suggests that a measurement of the field fragmentation rate (p) is important to understanding the long term consequences of any inheritance system.

6.2 Measurement of Field Fragmentation Rate in Diaz Ordaz

A measurement of the magnitude of field fragmentation can be estimated from a sample of 26 estates, totaling 151 former fields, now all in the hands of heirs, some of them intact, others fragmented.[1]

FIGURE 6.2 NUMBER OF FIELDS AFTER SIX GENERATIONS OF FRAGMENTATION GIVEN ASSUMPTION THAT EACH FIELD IS DIVIDED IN HALF WHEN PASSED BETWEEN EACH GENERATION.



In all (Table 6.1) 59% of the former fields were inherited intact, while the remainder (41%) were fragmented. Furthermore, these proportions seem to have held constant over 5 decades.[2]

Table 6.1 Proportions of Fields Passed Intact and Fragmented in Diaz Ordaz

	Year	Fields passed to heirs	
		Intact	Fragmented
Year of transfer	1925-54	50 [.60]	33 [.40]
	1955-70	39 [.57]	29 [.43]
	1925-70	89 [.59]	62 [.41]

Note: Percentages for rows in brackets.

The conception of inheritance as linked inexorably to field fragmentation is, then, demonstratively erroneous. A suitable fragmentation model would focus upon a low probabilistic fragmentation rate. The change in the illustrative model is one of degree, not of kind, yet results in radically different effects over time, as curves B through E of Figure 6.2 suggest.

Here I should mention that an intuitive realization of defects in the illustrative approach prompts many working on inheritance to point to mechanisms of parcel consolidation to counter fragmentation by inheritance. Consolidation mechanisms are practices which results in the reunification of fields such as would happen if a man sold a field to one of his neighbors.

I found consolidation. Zapotecs buy fields, but infrequently. Land sales account for only 11 percent of all fields transferred. Swapping of previously fragmented fields between heirs occurs even less frequently than purchase. Only four cases could be recalled by 29

informants. The frequency of consolidation which could occur by land passing from an heirless couple to the child of one of their siblings is also exceedingly low. In short, none of the consolidation mechanisms that have been assumed important occurred with a high enough frequency to counteract the suggested fission force of inheritance.

Another alternative countering fragmentation in other inheritance systems is joint tenancy, i.e. fields are passed to several heirs who farm them jointly. In this case, the field is not physically divided. Only one incident of joint tenancy was encountered, and this was in reference to one field where four brothers alternated cultivating a plot over four years thereby not farming together. A system having a high degree of joint tenancy should show radically different effects on the inter-relation of siblings and their domestic groups. It would probably show high connectivity between domestic groups, in contrast with the strong Zapotec principles stressing individual household economic independence and minimal sibling solidarity.

A probabilistic model, such as the one suggested above, weakens the logic of the functional necessity of consolidation mechanisms and/or joint tenancy. Given lower rates of fragmentation, consolidation mechanisms have less work to do.

Most important, a probabilistic description provokes new queries. Do larger estates show a higher propensity to fragment their fields than small ones? Do certain field attributes (i.e. irrigation, multicropping, size) enhance the tendency to fragment? What criteria does a testator use in deciding which fields to fragment and which to pass intact to his heirs? And what would be the effects of alterations in the rate of field fragmentation upon the social and physical environment?

The problem of analyzing field fragmentation may be approached at two levels. Understanding that fields are elements of an estate, at highest level one may ascertain if certain types of estates fragment a higher proportion of their fields. At the lowest level are attributes of particular fields which might increase a field's chances of being split.

6.3 Field Fragmentation and Attributes of Estates

Analysis demonstrates that the size of an estate is related to its fragmentation rate (Table 6.2). Larger estates fragment their fields less than small estates. It appears that testators holding larger estates have more latitude in passing fields intact, as they have more fields to pass.

The number of heirs to an estate shows no significant relationship to the degree of fragmentation (Table 6.3). The Zapotec ideology of "equal shares to all heirs" does not require the fragmentation of every parcel in an estate into as many shares as there are heirs. For example, a testator with four heirs faced with the task of transferring two of his fields would be more likely to give a half of a field to each heir, than he would be to divide both fields into four parts.[3] This indicates that even when fields are fragmented, restraints are operating which limit the generation of new fields below that which would be theoretically possible.

6.4 Field Fragmentation and Attributes of Individual Fields

I had expected that certain types of fields would be more likely to fragment than others. For example, I thought that non-irrigated fields, having a low investment of capital, would be more likely to

TABLE 6.2 FIELD FRAGMENTATION BY SIZE OF ESTATE

		Proportion of the estate's fields fragmented	
		Low	High
Estate Size	Large	11	3
	Small	3	8

N = 26 estates

Definitions

Estate Size: Total number of fields held by an estate before division.

Large: 5 or more fields
Small: 4 or less fields

Proportion of the estate's fields fragmented:

Low: .00 to .49 of the estate's fields fragmented
High: .50 to 1.00 of the estate's fields fragmented

Test

Fisher Exact Test, null hypothesis rejected at the .025 level (see Table I, Siegel 1956).

TABLE 6.3 FIELD FRAGMENTATION BY NUMBER OF HEIRS TO AN ESTATE

		Proportion of the estate's fields fragmented	
		Low	High
Number of Heirs	Many	8	8
	Few	8	2

N = 26 estates

Definitions

Number of heirs: Number of heirs receiving any shares in an estate.

Many: 4 or more heirs
Few: 2 or three heirs

Proportion of fields fragmented: See Table 6.2

Test

No relationship.

fragment than irrigated fields. But neither this, nor any other ecologically important field attribute proved significantly related to fragmentation. Fields that were irrigated fragment with an equal likelihood as those which were not (Table 6.4). Fields of various ethno-defined land classes show similar tendencies to fragment (Table 6.5). And fields using similar cropping patterns could not be singled out as fragmenting more frequently than those with another cropping pattern (Table 6.6). These null hypotheses appear equally true irrespective of estate size (Table 6.7).

On the positive side of the ledger, field fragmentation proved significantly related to three variables: (a) field size, (b) maize seed input, and (c) maize yields. These variables are highly interrelated and are best considered a cluster approximating acreage. Large fields (i.e. over 2225 meter^2, with 4+ kilos of maize planted, and yields of 15+ piscadores of unhusked maize) tend to fragment more frequently than small fields (Tables 6.8-10). This tendency is independent of the size of estate from which these fields come (Tables 6.11-13).

These relations suggest a threshold of acreage below which fields are infrequently divided. But the level of this threshold may be relative, dependent upon the specific situation of each estate. Nevertheless, a threshold does not exist in the minds of the testators, as far as I was able to determine through interviews. The conclusions that larger fields show a higher propensity to fragment does indicate that testators attempt to maximize the field size passed to their heirs, given the necessity to fragment some of their estate's fields.

In sum, a field may be assumed to be highly likely to fragment when

TABLE 6.4 FIELD FRAGMENTATION BY IRRIGATION

		Field is: Irrigated	Field is: Not Irrigated
Field was passed	Intact	38	40
	Fragmented	29	27

N = 134 fields

Definitions

Field was passed:

Intact: This field was not divided into 2 or more parts when passed from testator to heir.
Fragmented: This field was so divided.

Field is:

Irrigated: Irrigation water is available for this field.
Not Irrigated: No irrigation water is available.

Test

H_0 accepted, no relationship.

TABLE 6.5 FIELD FRAGMENTATION BY CLASS OF LAND

		Class of Land		
		First	Second	Third
Field was passed	Intact	17	27	44
	Fragmented	15	16	30

N = 151 fields

Definitions

Field was passed: See Table 6.4

Class of Land: This is a division of farm land types defined by the natives, roughly indicating quality of land.

First: Best land, irrigated and normally has two crops or corn per year.

Second: Intermediate class of land, often irrigated but no more than one crop of corn per year.

Third: Poorest land, unirrigated, and occasionally gives one minor crop of corn per year.

Test

Raw Chi-square = .718, No relationship.

TABLE 6.6 FIELD FRAGMENTATION BY MICRONICHE

		Microniche			
		A	B	C	D
Field was passed	Intact	17	15	45	9
	Fragmented	15	6	34	6

N = 151 fields

Definition

Field was passed: See Table 6.4.

Microniche:

A. Two crops of corn per year.
B. One crop of corn ± one crop winter wheat or chickpea.
C. One crop of corn.
D. Beans only (swidden).

Test

Raw Chi-square = 1.97. No relationship.

TABLE 6.7 FIELD FRAGMENTATION BY CLASS OF LAND (Controlling for estate size)

A. For Large Estates (5 + fields)

		Class of Land		
		First	Second	Third
Field was passed	Intact	2	3	7
	Fragmented	5	3	8

N = 28 fields

Test:

Raw Chi-square = 0.79. No relationship.

B. For Small Estates (4 or less fields)

		Class of Land		
		First	Second	Third
Field was passed	Intact	15	24	37
	Fragmented	10	13	22

N = 121 fields

Test:

Raw Chi-square = 0.15. No relationship.

Definitions

See Table 6.4

TABLE 6.8 FIELD FRAGMENTATION BY FIELD SIZE

		Field Size	
		Large	Small
Field was passed	Intact	32	57
	Fragmented	42	20

N = 151 fields

Definitions

Field passed: See Table 6.4

Field size: Measured in square meters

Large: greater than median field size (2225 meter^2)

Small: less than median field size

Test

Raw chi-square = 13.53. Significant at the .001 level.

TABLE 6.9 FIELD FRAGMENTATION BY SEED INPUT TO FIELD

		Seed Input	
		High	Low
Field was passed	Intact	29	60
	Fragmented	43	19

N = 151 fields

Definitions

Field passed: See Table 6.4

Seed input: Kilos of corn planted on this field, also a native measure of field size.

High: Seed input greater than median, i.e. 4 kilos.

Low: Seed input 4 kilos or less

Test

Raw Chi-square = 18.36. Significant at .001 or above.

TABLE 6.10 FIELD FRAGMENTATION BY YIELD OF FIELD

		Yield of Field	
		High	Low
Field was passed	Intact	29	60
	Fragmented	43	19

N = 151 fields

Definitions

Field passed: See Table 6.4

Yield of field: Estimated yield of corn from field each year measured in piscadores which are baskets of unhusked corn giving approximately 16 kilos of grain.

High: Greater than 15 piscadores of corn annually.

Low: 15 piscadores or less annually.

Test

Raw Chi-square = 12.54. Significant at .001 or above.

TABLE 6.11 FIELD FRAGMENTATION BY SIZE OF FIELD (Controlling for estate size)

A. For Large Estates (5 or more fields)

		Field Size	
		Large	Small
Field was passed	Intact	29	48
	Fragmented	31	14

N = 122 fields

Test

Raw chi-square = 9.87. Significant at .001 or above.

B. For Small Estates (4 or less fields)

		Field Size	
		Large	Small
Field was passed	Intact	3	9
	Fragmented	11	6

N = 29 fields

Test

Fisher's exact, significant at .05 level (See Siegel, Table I)

Definitions

Field passed: See Table 6.4

Field size: See Table 6.7

TABLE 6.12 FIELD FRAGMENTATION BY SEED INPUT (Controlling for estate size)

A. For Large Estates

		Seed Input	
		High	Low
Field was passed	Intact	26	51
	Fragmented	32	13

N = 122 fields

Test

Raw Chi-square = 14.42. Significant at .001 level or above.

B. For Small Estates

		Seed Input	
		High	Low
Field was passed	Intact	3	9
	Fragmented	11	6

N = 29 fields

Test

Fisher's exact test, significant at .05 level (See Siegel, Table I).

Definitions

Field was passed: See Table 6.4.

Seed input: See Table 6.8

TABLE 6.13 FIELD FRAGMENTATION BY YIELD OF FIELD (Controlling for estate size)

A. For Large Estates

		Yield of field	
		High	Low
Field was passed	Intact	30	47
	Fragmented	31	14

N = 122 fields

Test

Chi-square = 9.013. Significant at .01 level

B. For Small Estates

		Yield of field	
		High	Low
Field was passed	Intact	3	9
	Fragmented	11	6

N = 29 fields

Test

Fisher's Exact = Significant at .05 level (See Siegel, Table I).

Definitions

Field was passed: See Table 6.4.

Yield of field: See Table 6.9.

it is passed to the next generation if (1) it belongs to a smaller estate, that is, one with few fields, and (2) if it is one of the larger fields within that estate. Another, as yet unquantified factor, appears to influence field fragmentation. Those fields more easily accessible to the settlement appear more likely to fragment than more distant fields. However, a test of this observation would demand more rigorous control than is presently available. Other micro-ecological attributes of parcels seem unrelated to fragmentation.

6.5 Some Influence of Field Fragmentation Upon the Physical and Social Environment

Field fragmentation adds to the number of fields in each succeeding generation. Fragmentation results in an increase in the number and extent of boundaries between fields. Such an increase in boundaries would have two potential effects, one disruptive to the total agricultural productivity of the community and the other a threat to social solidarity.

Boundary delimitation, a requisite of private property, takes land out of production. In the Zapotec case, each field is surrounded by at least a half meter of uncultivated land. Given the average field size of 2225 square meters (90 x 20 meters), this means that about 2% of a field's surface is used to distinguish boundaries with adjacent fields (using a .25 meter edge to every field). This may seem minute until one recognizes the large number of fields occurring in even a small valley like Diaz Ordaz. Assuming that there are over 7000 fields, this forces a crude estimate of some 350,000 square meters devoted to the cultural necessity of delimiting private property.

Even a slight increase in the probability of fragmentation would,

as we have shown, have disproportionately large consequences on the number of fields, and correspondingly, on the amount of productive land lost to define property lines. In sum, lower frequencies of fragmentation may be assumed to directly reduce the amount of land edged out of production for the necessity of delineating boundaries between fields.

If the assumption can be made that boundary disputes are a function of boundary ubiquity, then the implication of lower rates of field fragmentation is greater social harmony. In other words, the more neighbors in the fields, the greater the probability of conflicts over boundaries. Moreover, the manner in which Zapotecs are passing land has more direct consequences upon sibling relations. Because siblings, as co-heirs, tend to receive lands which are non-contiguous (through intact inheritance of fields) the chance that they will be field neighbors is reduced, as is the likelihood of their conflicts over field boundaries. Intact inheritance of fields, in situations with two or more siblings as co-heirs, could be interpreted as disabling one probable cause of sibling rivalry. But as was previously shown, siblings have no problem finding other causes for animosity.

Finally, I would like to stress that the rate of field fragmentation is not necessarily dependent upon population growth. It is logically possibly to have a zero population growth rate and a field fragmentation rate approaching unity. Table 6.3 suggests this independence in that the numbers of heirs (an indicator of population growth) is found not to be related to the tendency of an estate to fragment. Thus, the simplified equation of "population increase = an increase in the number of fields" is not one to one.

ENDNOTES

1. Ejido fields were excluded from calculations of field fragmentation. Estates own from 0 to 3 ejido plots and are not considered by most villagers to be part of inheritance. They may not be fragmented, according to national legislation and local custom, although rights to cultivate an ejido are passed along to heirs of other properties of an estate.

2. I am not completely satisfied with this means of measuring field fragmentation, as it was time consuming and required the interviewing of heirs of all estates. A random sampling of fields might have proved better for finding the attributes of fragmented vs. intact fields.

3. The only cases found where every field of an estate was divided into shares equal to the number of heirs were those involved in legal disputes between co-heirs where division was made by village officials, not the parents of the heirs.

4. Professor Eder, Department of Anthropology and Geography, Hayward State College, suggested in a personal communication that land used to delineate boundaries between fields may provide a niche for edible wild plants. This imaginative hypothesis demands further consideration.

7. EQUAL AND NOT

This section considers the meaning of the norm "all heirs should inherit equal portions of an estate." To accomplish this task, it is necessary to introduce several measures for inequality and the various factors that have been hypothesized to explain preferential distributions to some heirs at the expense of others. These analyses offer a glimpse of the dynamics of inheritance different from that presented in the last section.

7.1 Measuring the Magnitude of Inequality

The dependent variable in this section will be the degree of inequality of shares received by co-heirs. An inheritance case is defined as a completed transfer of a married couple's estate to their children.[1] Only the inheritance sphere of farm lands (hu_lonia' or terrenos) are considered.

As I wish to measure the relative inequality between inheritance cases, it is desirable to rank all cases according to the degree of discrepancy in shares that siblings received. Such a distribution demands some standard or definition of "equal division" with which to compare actual distributions. This baseline shall consist of the mathematically equal distribution of an estate - defined as the total value of an estate's tillable lands divided by the number of heirs.[2]

Estimation of an estate's value, and correspondingly, that of the shares received by its heirs, is difficult. An evaluation of the cash or peso value of land is unreliable and frequently unavailable because land is not a freely transacted good. Land value is best approximated by employing criteria used by Zapotecs themselves, but as was mentioned

earlier, they evaluate land using numerous attributes. However, two criteria are frequently emphasized when discussing a field's value or quality. These are (1) its seed input and (2) irrigation.

7.1.1 A Kilo Measure of Land

Diaz Ordaz Zapotecs consistently reply to queries concerning land size with an almud or kilo measurement.[3] A kilo of land, in local parlance, is the amount of land needed to plant one kilo of maize seed. If a field yields more than one crop per year, it is "measured" by the seed necessary for one cropping, not the cumulative annual input.

It must be emphasized that the kilo measurement of land does not correspond to an area based measurement. Fields with the same kilo input vary in size. For example, twenty-one fields were surveyed that were all classified by their owners as "four kilo fields." Table 7.1 demonstrates that although the mean and median field size fell near 2000 square meters, the standard deviation was large (S.D. = 638).

I emphasize this lack of correspondence between the kilo measure and field size because other valley ethnographers have used conversion ratios of kilos to meters which they claim were furnished by informants. Undoubtedly, such responses can be received and I have received them myself, but the actual measurement of fields reveals that this is, at best, only a rough approximation of field size. Furthermore, the use of an unweighted kilo measure must be suspect when attempting to rank informants according to wealth because, in villages with more than one cropping per year or strong micro-ecological variations, the kilo measure may not reflect differences in land productivity.

Preliminary analysis of the reasons for this variability indicate that smaller fields are more heavily seeded than larger fields. The

TABLE 7.1 VARIATIONS IN SURFACE AREA OF FIELDS CLASSIFIED AS "FOUR KILO FIELDS" BY THEIR OWNERS

Field No.	Size in Mtr^2
1	2860
2	2080
3	2220
4	1690
5	2050
6	2020
7	1500
8	1110
9	1300
10	1755
11	1624
12	1630
13	1600
14	1600
15	3600
16	2310
17	3100
18	2770
19	2170
20	2870
21	1810

Distribution Statistics

N = 21
mean = 2083 mtr^2
median = 2020 mtr^2
S.D. = 638

mean field size of "three kilo fields" is 1971 square meters (median = 1860 mtr^2, S.D. = 304 mtr^2), a disproportionately higher figure than would be expected if a four kilo field was used to estimate field area from its kilo input.

Additional discrepancy between a kilo and area measure occurs because better quality fields are seeded more heavily, per unit area, than poorer quality fields. Irrigated, "four-kilo" fields show a mean size of 1713 square meters. While dry farmed fields of the same kilo size, being of poorer quality, have a mean of 2686 square meters.[4] And to make matters even more complex, it appears that households farming only a few fields seed them more heavily than those with many fields.

Thus, a kilo measure of land only roughly indicates a field's (or estate's) value. Nevertheless, because it is one criteria that villager's used in proving or disclaiming equal division, it will be adopted as a measure to assist in estimating the degree of differential distribution between heirs. For simplicity of reference, it will be called a "seed input" measurement in the forthcoming discussion.

7.1.2 A Quality Measure of Land

The kilo measure fails to account for a field's quality. Two fields might require the same input of seed, but differ in productivity. One might be irrigated, yielding two crops a year, while the other might be dependent upon rainfall with a small probability of any yield. This distinction is important because informants raised the possibility that some testators were discriminating between their heirs by providing them with fields of the same kilo input, but of varying quality.

It seems advantageous to weight the value of fields in terms of quality. A number of possibilities were available for weighting the

shares that heirs received. Again, I choose the most salient criteria used when Zapotecs discuss agriculture. Irrigated fields were ranked as more valuable than dry farmed fields.[5] A comparison of the annual yields for these two types of fields in 1969, shows that irrigated fields yield approximately two and one-half times more maize than dry farmed fields (Table 7.2).

7.1.3 Calculating the Magnitude of Inequality

Given these measures of land value (seed input and quality), an estimation of the degree of inequality is possible. This measure is the sum of the squared differences between what an heir actually received and what he would receive if the estate was divided into mathematically equal portions. The measure is corrected for sibling set size by dividing by the number of siblings (heirs).

FOR EACH CASE

$$\text{Degree of inequality} = \frac{\sum (Si - Se)^2}{N}$$

Where: Si is the size of the share received by the "i"th heir.

Se is the size of the share the heir would have received, if mathematical equal division of the estate occurred, i.e. the total size of the estate/ no. of heirs.

All transfers were ranked according to their degree of inequality with the most disproportionate distribution of shares ranked the highest.

Thus, two inequality scales were constructed for each inheritance case. One represented the degree of inequality expressed in seed input. The other ranked transfers according to their degree of inequality in terms of seed input weighted for land quality. This double scale is useful, in that it is isomorphic to two of the several criteria used by Zapotecs when they discuss equality and inequality.

TABLE 7.2 ANNUAL YIELDS OF FIELDS, CONTROLLING FOR IRRIGATION

(a) Irrigated Fields

Field No.	Output in piscadores/ Kilo input	Descriptive Statistics
1	5.00	
2	6.25	
3	5.00	
4	8.66	
5	5.00	
6	5.33	
7	3.12	
8	5.00	N = 17 fields
9	11.00	
10	4.00	mean = 5.43 piscadores
11	5.00	S.D. = 2.34 piscadores
12	3.75	median = 5 piscadores
13	5.00	
14	10.00	
15	2.50	
16	4.44	
17	3.40	

(b) Non-irrigated Fields

1	.25	
2	.16	
3	1.25	
4	5.00	
5	1.66	
6	2.50	N = 27 fields
7	2.00	
8	.66	mean = 2.16 piscadores
9	3.00	S.D. = 1.33 piscadores
10	1.25	median = 2.00 piscadores
11	2.50	
12	1.50	
13	2.00	
14	1.66	
15	2.00	
16	3.00	
17	2.00	
18	.80	
19	4.00	Note: This sample is
20	2.66	also controlled for
21	3.60	fertilization, in that
22	2.50	none of the fields
23	1.00	were fertilized at the
24	.35	time the yields were
25	5.00	calculated.
26	3.12	
27	3.00	

7.2 Measuring Factors Affecting Preference

Factors affecting preferential division (the independent variables) may be classified into those common to (1) sibling sets, (2) estates, and (3) parent-children (holders-heirs) interaction.

7.2.1 Sibling Set Characteristics

Sex proves a powerful and easily observable variable in most social theories. As shown earlier, sex distinction forms the basis of the most common taxonomic schemes used in inheritance studies. However, Diaz Ordaz informants disagree as to the importance of sex in preferential division. Some adamantly claim that the heir's sex does not affect the quantity or quality of the shares he or she receives. Men and women are equal. Others felt that males always receive more than females (Quinn: 1964).

To test the strength of sex as a criteria for differential division, a scale was constructed representing the degree of preference for males over females. This preference is estimated by taking the ratio of those dyads where brothers received more than their sisters <u>to</u> the total number of brother-sister dyads in each transfer. Or . . .

$$\text{Preference}_{m>f} = \frac{m>f}{m.\ f}$$

Where: $m>f$ are the number of brother-sister dyads in which brothers received more than sisters, and

m is the number of brothers, and

f is the number of sisters

All transfers were rank ordered by their degree of preference for male over female heirs, using both measures of land value.

Some informants felt that larger portions of a parental estate went to younger siblings. Preference for junior over senior siblings

was measured by the ratio of such a preference to the total combinations of junior-senior dyads. In each case, siblings were ranked in order of age. Each sibling's share was then compared to that of his juniors and seniors. Preference was then estimated by:

$$\text{Preference}_{j>s} = 2\left(\frac{j>s}{N^2 - N}\right)$$

Where: $j>s$ is the number of sibling dyads where junior siblings received more than their seniors, and

N is the number of siblings.

All transfers could then be ranked according to their degree of preference for junior over senior heirs. Finer discrimination by sibling position, controlling for sex, was impossible. The numerous logically possible combinations did not occur in this small sample of cases.

7.2.2 Estate Characteristics

Section 4 showed that Zapotec estates pool the land received by both husband and wife, making the question of "kin lines" of inheritance irrelevant. Individuals invoked the right to dispose of their lands, distinctive from that of their spouses, only in cases of severe marital disputes. In all other cases, the estate is joint, formed of lands received by both husband and wife through inheritance or purchase. Thus, estate value must be calculated as the sum of all holdings of a married pair.

Therefore, the value of an estate was calculated as the sum of all land held by a husband and wife at the time of division. Value was defined in terms of the two previously mentioned dimensions of seed input and quality.

7.2.3 Parents, Children and Social Exchange

Previously I also suggested that "equal shares to all children" might be referring to equitable treatment of heirs by testators. That is, children were receiving shares proportionate to their magnitude of social exchange with their parents.

Testing this hypothesis logjams on a familiar problem - how to measure social exchange.[7] Cost accounting even the simplest two-party, short term interaction is a complex methodological problem. This can be seen in any review of the work with laboratory experiments in social exchange.

Parent-child interactions rank among the more complex in any society. Exchanges begin at the cradle, with parents providing nurturance for their newborn. They end at the deathbed, with the offspring comforting his dying parents. Between these events lie a generation of prestations, counter-prestations, advice, and conflict of varying quality and quantity. Any summarization of these interactions courts error and approaches unmitigated prestidigitation with data.

Furthermore, operationalization of social exchange, as a variable, geometrically increases the analyst's problems as different types of exchanged "commodities" are included in the cost-accounting tableau. The analyst is faced not only with difficulties in "weighting" distinct types of commodities - the "how much is a kiss worth" problem - but also his summary of such long term relationships is limited because of his short period of field observation. This limitation forces strong reliance on people's descriptions of their past interaction. Such descriptions are obscured by the obliqueness of language in describing social relations. These methodological difficulties have discouraged exchange theorists

from studying one of the basic long-term relations in any human society - that between parents and children.

Fortunately, this problem demanded only a relative measure of differences in social exchange between siblings and their parents. Leaning toward the macro-side of the cost-accounting spectrum, I constructed a crude indicator. The indicator rests upon two assumptions and a corollary.

The first assumption is that the more time two parties spend in social exchange, the greater will be their mutual obligations relative to any third party with whom they have exchanged for less time. The corollary, limited to the Zapotec case for the moment, is that members of the same domestic unit are more likely to exchange among themselves than with members of different domestic groups. The second assumption is that most co-residents exchange positive (i.e. beneficial) commodities.

Given these assumptions, it follows that the more time a child co-resides with his parents in a household, the greater will be the numbers of debts, counter-debts, and repayments between the parent and this child. Thus, the length of shared co-residence between parent and child should be a crude indicator of the testators' proportionate exchange with this child relative to all others.

This definition of the magnitude of social exchange was operationalized by summing the number of co-residence years spent by each child with his parent(s) and then creating a discrepancy measure similar to that used to detect skewedness in the distribution of shares. The time in co-residence was calculated from birth until the time of transfer. The time of transfer being defined as the first definite indication by the parents as to what proportion of their estate their

children were to receive.

Given a measure of the length of co-residence with parents and each child, the measure of the degree of inequality in co-residence times (D_s) was defined as:

FOR EACH CASE

$$D_s = \frac{(r_i - r_e)^2}{N}$$

Where: r_i is the actual time in co-residence for the "i"th child

r_e is the average residence time for the entire sibling set

N is the number of children

All cases could then be ranked according to their degree of disproportionate co-residence times represented by the children (i.e. heirs) in the transfers.

A disadvantage of this measure is that it assumes exchanges of similar quality will occur during the same period of co-residence for all individuals. For example, I assume that a girl co-residing with her parents until she marries at age twenty-eight has exchanged "more" with her parents than her married brother, who moved out of the domestic group at age twenty-one. This measure would be invalid if many children remained with their parents for some time practicing negative reciprocity. That is to say, the above sister could have spent the last seven years of her co-residence fighting with her parents, thereby changing the balance of the social exchange equation. However, given the little we know about Zapotec domestic groups, it appears unlikely that a child would remain any length of time under his parents roof practicing negative reciprocity (see Selby's discussion of the "principle of parental authority").

As an alternative possibility, I considered giving extra weight to children that bring a spouse into their parents' home. The argument would be that this child had at least doubled his exchange potential with his parents, per unit of time. As the results of the analysis will demonstrate, this weighting would have changed the findings.

One advantage of this social exchange measure is its simplicity. Cost-accounting different types of exchanges is avoided. Also, a co-residence measure proves applicable to both sexes - a distinct utility in societies where the kinds of social exchanges that children have with parents might differ for daughters and sons.

Furthermore, the measure requires that informants only recall minimal details concerning their past - when they were born and when they left their natal domestic group. In all honesty, even this proved difficult for some to remember. Considerable double-checking was necessary to achieve some consistency.

I wish to be perfectly clear that I am not saying that Zapotecs calculate social reciprocity in this manner. When and if a Zapotec cost-accounts his social exchanges during the twilight of his life, he probably bases his sense of exchange upon factors that the analyst will never discover.

7.3 Inequality and Preference

Rank order correlation coefficients were calculated between both measures of inequality (seed input and quality) and the potential factors influencing preferences (sex, sibling order, estate size and co-residence). Use of sex as a preference factor necessitated the exclusion of transfers having only one sex represented in a set of co-heirs. Cases showing only one heir were also excluded as inapplicable to any discussion of

preference factors. This reduced my original sample of thirty-one cases to eighteen, including other exclusions for lack of reliable data.

7.3.1 Sibling Order

Sibling order, defined as a preference for junior over senior children, showed no relation to differential distribution. Neither measure of the inequality of shares proved significantly related to any preference in sibling order (Tables 7.3 and 7.4). This independence of sibling order and inequality corresponds to the majority opinion of informants that birth order makes no difference in the proportion of parents' tillable lands an heir receives. Moreover, the unimportance of sibling order in this sphere of agricultural lands contrasts with the definite preference shown for younger male siblings in the realm of the natal house (Table 4.1).

7.3.2 Sex and Co-Residence

Preliminary rankings revealed a strong preference for males to receive larger shares than females. This preference occurs using either measure of land value (Tables 7.5 and 7.6). In addition, an equally high relation was found between co-residence differences (as measure of social exchange) and an unequal distribution of shares among siblings (Tables 7.7 and 7.8). This relationship appeared to hold for both measures of share value. Thus, at first glance, it appears that both sex and social exchange are strong factors influencing inequality.

However, further examination revealed a strong association between the two independent variables, sex preference and co-residence (Table 7.9). This brought into question the feasibility that both independent variables were related to unequal distribution, i.e. it seems possible

TABLE 7.3 RELATION OF SIBLING ORDER TO INEQUALITY

Case No.	Preference of Juniors Over Seniors	Degree of Inequality of Shares
22	16.5	1
2	9	2
10	11	3
21	4	4
7	12.5	5
9	16.5	6
23	7	7
13	14	8
1	1	9
4	16.5	10
15	2.5	11
18	9	12
16	5.5	13
8	12.5	14
19	9	15
29	16.5	16
12	2.5	17
26	5.5	18

-Spearman's Rank Order Coefficient, correction for ties: $r_s = -.25$, not significant at the $p \leq .05$ level, for $N = 18$.
-Measure of estate value: seed input.

TABLE 7.4 RELATION OF SIBLING ORDER TO INEQUALITY

Case No.	Preference of Juniors Over Seniors	Degree of Inequality of Shares
2	12.5	1
22	17	2
7	7.5	3
10	11	4
15	1.5	5
8	14.5	6
29	7.5	7
23	14.5	8
21	3	9
13	7.5	10
4	4	11
16	7.5	12
1	5	13
19	10	14
18	17	15
9	12.5	16
26	1.5	17
12	17	18

-Spearman's Rank Order Coefficient, corrected for ties: $r_s = -.02$, not significant at $p \leq .05$.
-Measure of estate value: land quality.

TABLE 7.5 RELATION OF PREFERENCE FOR MALES OVER FEMALES TO INEQUALITY

Case No.	Inequality of Shares	Preference m>f
1	9	10.5
2	2	4
4	10	16
7	5	10.5
8	14	4
9	6	16
10	3	4
12	17	16
13	8	8.5
15	11	4
16	13	4
18	12	4
19	15	13
21	4	12
22	1	4
23	7	8.5
26	18	16
29	16	16

-Spearman's Rank Order Coefficient, corrected for ties, $r_s = .43$, sig. $> .05$.
-Measure of estate value: seed input.

TABLE 7.6 RELATION OF PREFERENCE FOR MALE OVER FEMALE HEIRS TO INEQUALITY

Case No.	Inequality of Shares	Preference for Males Over Females
2	1	5
22	2	5
7	3	5
10	4	5
15	5	5
8	6	5
29	7	17
23	8	14
21	9	10.5
13	10	5
4	11	17
16	12	5
1	13	10.5
19	14	15
18	15	5
9	16	12.5
26	17	17
12	18	12.5

-Spearman's Rank Order Correlation Coefficient, $r_s = .53$, sig. at $p \leq .05$, corrected for ties.
-Measure of estate value: land quality.

TABLE 7.7 RELATION OF LONG CORESIDENCE TO INEQUALITY

Case	Degree of Skewing From Equal Division To Each Heir	Degree of Skewing From Equal Proportion of Co-Residence Among Heirs
22	1	1
2	2	2
10	3	10
21	4	9
7	5	5
9	6	6
23	7	11
13	8	12
1	9	8
4	10	15
15	11	13
18	12	3
16	13	18
8	14	7
19	15	17
29	16	4
12	17	16
26	18	14

-Spearman's Rank Order Correlation $r_s = .532$, sig. $> .01$ level.
-Measure of estate value: seed input.

TABLE 7.8 RELATION OF LONG CORESIDENCE TO INEQUALITY

Case No.	Degree of Inequality of Share	Degree of Differences in Coresidence Among Siblings
2	1	2
22	2	1
7	3	5
10	4	10
15	5	13
8	6	7
29	7	4
23	8	11
21	9	9
13	10	12
4	11	15
16	12	18
1	13	8
19	14	17
18	15	3
9	16	6
26	17	14
12	18	16

-Spearman's Rank Order Correlation Coefficient $r_s = .51$, sig. at $p \leq .05$.
-Measure of estate value: land quality.

TABLE 7.9 RELATION OF PREFERENCE FOR MALES OVER FEMALES TO LONG CORESIDENCE

Case	Preference m > f	Inequality of Coresidence
1	10.5	8
2	4	2
4	16	15
7	10.5	5
8	4	7
9	16	6
10	4	10
12	16	16
13	8.5	12
15	4	13
16	4	18
18	4	3
19	13	17
21	12	9
22	4	1
23	8.5	11
26	16	14
29	16	4

-Spearman's Rank Order Correlation, $r_s = .28$.
-Measure of estate value: seed input.

that an indirect relationship was creating a spurious correlation. It will be recalled that males tend to reside longer with their parents than females because of the queued sequencing of patrilocal residence (Section 3). Should the high inequalities expressed through differential divisions be attributed to long co-residence, regardless of sex? Or should the relation between co-residence and inequality be considered specious, resulting from males co-residing longer with their parents than females?

One alternative for deciding was to use a statistical control on sex, and examine the interaction between co-residence and unequal division. Two artificial "estates" were factored out from each case having at least two heirs of the same sex. One artificial estate consists of all those lands received by males; the other, those received by females. This control for sex permitted the examination of the relation of co-residence to inequality. The results proved different for shares measured by seed input and land quality.

The relation between co-residence and disproportionate division is spurious with regard to the quality of shares. Long co-residence does not result in a qualitatively better share (Tables 7.10 A and B). Nor does long co-residence give males an edge in terms of the seed input value of shares received (Table 7.11 A).

However, long co-resident females appear to inherit larger shares, measured in terms of seed input (Table 7.11 B). This may be considered mild favoritism for an increased period of co-residency or, if one accepts this as an indicator of social exchange, for increased social exchange.

The consequences of this form of preference are direct. Long co-resident females reduce their chances of finding a husband and

TABLE 7.10 RELATION OF LONG CORESIDENCE AND INEQUALITY, CONTROLLING FOR SEX

Case No.	Degree of Inequality of Distribution Among Heirs	Degree of Difference In Coresidence Among Heirs	Test Statistics
(A) Male Heir "Estates"			
16	1	12	
21	2	7	
23	3	7	
1	4	3	
19	5	13	
18	6	1	
8	7	11	
10	9	10	$r_s = -.27$
7	10	9	Not sig. at
4	12	2	$p \leq .05$
13	12	5	N = 13
26	12	7	
(B) Female Heir "Estates"			
1	1	3	
2	2	9	
7	3	1	
4	4	11	
15	5	6	
22	6	2	$r_s = .24$
21	7	11	Not sig. at
10	8	8	$p \leq .05$
9	9	4	N = 12
13	10	5	
26	11	11	
29	12	7	

-Measure of estate value: land quality.

TABLE 7.11 RELATION OF LONG CORESIDENCE TO INEQUALITY, CONTROLLING FOR SEX

Case No.	Degree of Inequality of Distribution Among Heirs	Degree of Difference in Co-Residence Among Heirs	Test Statistics
(A) Male Heir "Estates"			
21	1	7	
1	2	3	
18	3	1	
23	4	7	
19	5	13	
10	6	10	
8	7	11	
16	8	12	
12	9	4	
7	10	9	$r_s = .00$
4	12	2	Not sig. at
13	12	5	$p \leq .05$
26	12	7	N = 13
(B) Female Heir "Estates"			
22	1	2	
7	2	1	
21	3	11	
9	4.5	4	
29	4.5	7	
1	6	3	
2	7	9	
10	8	8	$r_s = .51$
13	10.5	5	Sig. at
12	10.5	6	$p \leq .05$
4	10.5	11	N = 12
29	10.5	11	

-Measure of estate value: seed input.

producing legitimate children. Given Diaz Ordaz's social system, where children and husbands are the providers for women, a woman's welfare is increasingly endangered by long co-residency with her parents. A woman's liberation advocate may wish to argue that an old bachelor's welfare is equally threatened but, with Zapotecs, this is not the case. A spinster has more difficulty finding a spouse than an old bachelor. If she happens to have additional inherited land, it may give her an edge over younger, less-landed competition.

Providing spinsters with a larger portion of the inherited estate is adaptive both for the individual and the community (in the survival sense of this multilateral concept). Additional land equips the spinster with a means of support in her dotage, husband or not. At the same time, it reduces the likelihood of the community having many landless spinsters thrown into a relationship of dependence on other households. Such an interpretation is supported by the observation that all unmarried spinsters in Diaz Ordaz lived in independent, sub-nuclear households. This echoes an earlier theme. Inheritance provides welfare for dependents - young and old.

7.3.3 Estate Size

Inheritance was more unequally distributed among heirs in larger estates. This relation holds for seed input, but not for quality (Tables 7.12 and 7.13). I have diagramed the relationships of estate size, preference for males over females, and inequality (Figure 7.1). Double lines indicate a relationship significant at the .05 level or above. Spearman's coefficients are also listed.

TABLE 7.12 RELATION OF ESTATE SIZE TO INEQUALITY

Case	Estate Size	Degree of Inequality
1	1	9
2	2	2
4	3	10
22	4	1
7	5	5
12	6	17
16	7	13
10	8	3
21	9	4
19	10	15
8	11	14
9	12	6
18	13	12
15	14	11
23	15	7
13	16	8
26	17	18
29	18	16

-Spearman's Rank Order Correlation Coefficient, $r_s = .45$, Sig. at $p \leq .05$
-Measure of estate value: seed input.

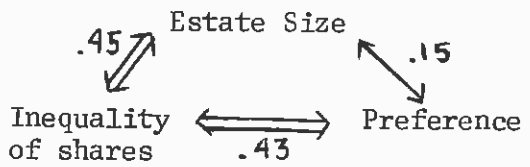
TABLE 7.13 RELATION OF ESTATE SIZE TO INEQUALITY

Case	Estate Size	Degree of Inequality of Shares
1	1	13
2	2	1
7	3	3
4	4	11
12	5	18
22	6	2
16	7	12
21	8	9
10	9	4
8	10	6
9	11	16
13	12.5	10
19	12.5	14
23	14	8
26	15	17
18	16	15
15	17	5
29	18	7

-Spearman's Rank Order Correlation Coefficient, corrected for ties, $r_s = .19$, not sig. at $p \leq .05$
-Measure of estate value: land quality.

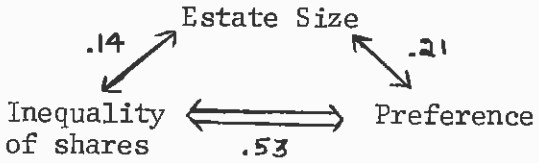
FIGURE 7.1 RELATION OF ESTATE SIZE AND PREFERENCE TO UNEQUAL DISTRIBUTION

FOR SEED INPUT



Reference: Tables 3.5, 3.12, 3.14

FOR LAND QUALITY



Reference: Tables 7.6, 7.14, 7.15.

Interestingly, no significant association occurs between estate size and a preference for males over females. Then, what is the source of the variance strong enough to produce a correlation between estate size and inequality?

Controlling for sex, the association between estate size and inequality vanishes (Table 7.16). This indicates that the source of the relationship comes from cross-sex distinctions in share values. Simply stated, males are receiving more than females, but there is no variation in shares received by members of the same sex.

The results may be displayed graphically (Figure 7.2).

TABLE 7.14 RELATION OF ESTATE SIZE AND PREFERENCE FOR MALES OVER FEMALES

Case	Estate Size	Preference for Males Over Females
1	1	10.5
2	2	4
4	3	16
22	4	4
7	5	10.5
12	6	16
16	7	4
10	8	4
21	9	12
19	10	13
8	11	4
9	12	16
18	13	4
15	14	4
23	15	8.5
13	16	8.5
26	17	16
29	18	16

-Spearman;s Rank Order Coefficient, corrected for ties, $r_s = .15$, not sig. at $p \leq .05$.
-Measure of estate value: seed input.

TABLE 7.15 RELATION OF ESTATE SIZE TO PREFERENCE FOR MALES OVER FEMALES

Case	Estate Size	Degree of Inequality
1	1	10.5
2	2	5
7	3	5
4	4	17
12	5	12.5
22	6	5
16	7	5
21	8	10.5
10	9	5
8	10	5
9	11	12.5
13	12.5	5
19	12.5	15
23	14	14
26	15	17
18	16	5
15	17	5
29	18	17

-Spearman's Rank Order Correlation Coefficient, corrected for ties, $r_s = .21$, not sig. at $p \leq .05$.
-Measure of estate value: land quality.

TABLE 7.16 RELATION OF ESTATE SIZE TO INEQUALITY, CONTROLLING FOR SEX

(A) Male Estates

Case	"Estate Size" Held by Males	Degree of Inequality Between Males
1	1	2
16	2	8
12	3	9
4	4	12
10	5.5	6
7	5.5	10
21	7.5	1
19	7.5	5
8	9	7
18	10	3
23	11	4
13	12	12

-Spearman's Rank Order Correlation Coefficient, r_d, corrected for ties = .14, not sig. at $p \leq .05$.

(B) Female Estates

Case	"Estate Size" Held by Females	Degree of Inequality Between Females
1	1	6
4	2	10.5
2	3	7
7	4	2
22	5	1
21	6.5	3
9	6.5	4.5
10	8	8
15	9	10.5
29	10	4.5
26	11	10.5
13	12	10.5

-Spearman's Rank Order Correlation Coefficient, corrected for ties, $r_s = .34$, not sig. at $p \leq .05$.
-Measure of estate value: seed input.

FIGURE 7.2 DIFFERENCE IN THE SIZE OF SHARES IN LARGE AND SMALL ESTATES

DIFFERENCES IN SHARE SIZE BETWEEN

		Brothers	Sisters	Brother/Sister	
Estate Size	Large	Bo $\approx$ Bo	Si $\approx$ Si	Bo $>$ Si	$\Rightarrow$ High Inequality
	Small	Bo $\approx$ Bo	Si $\approx$ Si	Bo $\leq$ Si	$\Rightarrow$ Low Inequality

In large estates, brothers receive larger shares than their sisters, in terms of seed input or farm area. In small estates, brothers receive less than or equal to their sisters. Among brothers and sisters, on the other hand, there is no significant differences in the size of the shares they receive no matter what the size of their testators' estate.

Thus, the inheritance sphere of tillable land shows a tendency to reduce differences in share size among females, while accentuating differences among males. This tendency, however, is limited to sibling sets with both males and females. From the information that I currently have on marriage patterns, it appears that most men do not consider wealth when looking for wives. Parents certainly wish they would, but this decision seems to be based upon other factors, such as love, good looks, and contact. If the marriage pattern is random, with respect to parental wealth, then this preference for males over females in large estates and females over males in small estates might be interpreted as a wealth leveling mechanism in inheritance. Positive confirmation of this hypothesis demands more information of marriage patterns, with respect to the wealth of parents.

7.4 Concealed Cases

The preceding statistical analyses and generalizations avoided a confrontation with the question of the overall effect of preference

factors in Zapotec inheritance. In fact, only part of the evidence has been considered. The dilemma of excluded cases has been succinctly expressed by Koestler in The Act of Creation:

> Statistics are like a bikini.
> What they reveal is suggestive.
> What they conceal is vital.

At the beginning of section 7.3, thirteen of thirty-one inheritance cases were excluded from these analyses of preference, based on the assumption that they were not germane to the question or test at hand. It seems worthwhile to reconsider the importance of these inheritance cases that did not fit neatly into the statistical tests. What do they conceal?

Certain demographic conditions prevent a testator from having any opportunity to express preference. An expression of male preference is contingent upon a sibling set having at least two children of which one must be female; the other male. Some inheritance situations fail to meet such preconditions. The frequency of such situations partly depends upon demographic factors. This means that generalized statements of an inheritance system based solely upon evidence of preference tendencies must be approached cautiously.

As an illustration, only eighteen of thirty-one cases that I sampled were relevant to tests of sex preference, i.e. they meet the above preconditions. More correctly, four cases were excluded because of "technical problems": division by municipality officials, incomplete data, or absence of farm land in the estate. Six cases were excluded because they were unisex transfers, that is, the heirs were all males or females. And two cases were inappropriate because they had only one heir.[8]

The frequency of unisex sibling sets in a population is a function of (a) the time of transfer (relative to ages of holder and heirs), (b) fertility, and (c) mortality rates. Increased fertility and/or decreased mortality increases the average sibling set size in a population. And the frequency of unisex sibling sets is geometrically and inversely related to the average sibling set size - being analogous to the decreasing probability of the coin toss outcome "either heads or tails" as the number of coins increases.

Although an exact estimation of the interaction for these three variables remains problematic, the directions of variation are discernable. All other things being equal, increased fertility, decreased mortality, or an earlier transfer time would reduce the proportion of unisex transfers in a population and thereby, increase the opportunity for an expression of sex preference in the universe of inheritance transfers.

Inversely, a reduction in population growth rate in that segment consisting of "heirs-in-waiting" and/or delay in transfer time augments the proportion of unisex sibling sets, thereby making the exercise of sex preference less important to the overall frequency of inheritance outcomes.

Likewise, the frequency of transfers involving only a single heir depends on demographic parameters. All other things being equal, increased fertility, decreased mortality, or delayed transfer times would reduce the frequency of one-heir only transfers in a population.

Such crude directional formulations suggest interesting hypotheses. Given a combination of fertility, mortality, and transfer time, which all combine to create an ever increasing sibling set size, preference

expressed by sex discrimination would have an increasing impact on the overall distribution of inheritance. The wealth adjustment tendencies discovered (Figure 7.2) would have a greater impact on the overall inheritance system.

Inverting this relation, any combination of demographic parameters reducing the average size of sibling sets would make unisex and one-heir transfers more common. Under such conditions, inequality based on sex preference would be more difficult for the population to express. If "preference" were to become a significant component under such conditions, then it would have more universal impact on the society if it were (a) expressed in terms of some other criteria, such as sibling order (applicable to any sibling set with two or more members, regardless of sex), or (b) expressed by extending the definition and universe of heirs beyond the confines of being only children of the testators.

In Diaz Ordaz, decreasing mortality and relative steady fertility could be interpreted as increasing the average sibling set size since the Revolution. Thus, preference may be gaining momentum as a systemic variable affecting the distribution of farm land. However, informants felt that the frequency of early transfer (inter-vivos) has increased since the Revolution. If this should turn out to be the case, then further modelling would be necessary wherein the time of transfer acts to counter-balance demographic pressures.

7.5 The Other Meanings of Equality

It may come as a surprise to know the informants' views on this question about the equality of their inheritance. Although there was measurable inequality in almost all of the preceding cases, interviews

early during this fieldwork found informants insisting that the divisions were equal. This opinion was expressed after two or more hours of discussion on what appeared to be unequal division. After considerable soul-searching, this investigator pressed deeper into this question by appearing to disbelieve their answers. When pressured, informants changed their responses to the negative . . ."it was not an equal distribution." What explains this flip-flopping of viewpoints?

It appears that Zapotecs claim their inheritance divisions were equal and not depending on the context of the discussion. Under certain conditions, they may claim that their testators' division was equal. Here, the purpose would be to reaffirm their parents' authority and respect for their wishes. But in other social situations, and if litigation, conflict, or doubt are brought into the conversation, the same informants may choose to claim an unequal distribution. One thing is certain, they have several options for evaluating their parents' distribution and each criteria for measuring their shares produces a different result. The answer to the question "Is inheritance equally distributed among the Zapotec heirs?" is revealed in their response to the question. "Yes, it is equal and not."

ENDNOTES

1. Of thirty-one sampled cases, only one involved lands being exclusively transferred to heirs other than children of the testators. And in only two of the remaining cases were heirs that were non-children part of the co-heir set.

2. This is equivalent to the definition of equality used by the local level court when it becomes necessary to divide an estate between disputant co-heirs. I might also note that ejido lands are excluded from all tests in this section, because Zapotecs do not consider ejido lands part of an estate's inheritance even though such lands are often transmitted from parents to children.

3. In Oaxaca, one almud of maize is equivalent to four kilos. In this essay, I prefer to refer to this measurement as a "kilo," rather than an almud scale because of the discrepancy of almud measurements in various parts of Mexico.

4. Irrigated fields, four kilos in value: N = 13, mean = 1713 square meters, S.D. = 315. Non-irrigated, dry farmed fields, of the same kilo input: N = 8, mean = 2686 square meters, S.D. = 530.

5. Irrigated fields are more valuable than dry fields for reasons other than yields. Among these advantages are:

    a. A wider variety of cultigens may be planted on them.
    b. Their yearly variations in yields for any given field is much less than occurs on dry fields.
    c. And, they are usually more accessible to cart roads, and periodic visits because they are located on the edge of the river, which serves as a major means of communication when it is not flowing or has been diverted upstream for irrigation purposes.

    Given these additional advantages, a 2.5 multiplier seems conservative.

6. Most estates have a mix of both irrigated and non-irrigated, or dry farmed fields, the transformation from a seed input to a quality measure did not blur the relative ordering of rankings on estate size beyond recognition that the same population of estates was being considered. The rank order correlation between estate size measured in kilo input and in quality was .95, using Spearman's r_s.

7. The cost-accounting difficulties in quantifying social exchange cannot be considered a valid criticism of the theory itself. Kuhn (1961) finds long lag periods in the history of the physical sciences between major theoretical breakthroughs and the theory's verification by measurement techniques. This represents a crude, first approximation at quantification of social exchange theory.

8. Numbers of excluded cases may be broken down more specifically: all male heirs, five cases; all female heirs, one case; only one heir, two cases; no farm lands in the testator's estate, one case; division by municipality officials, one case; and incomplete data, two cases.

8. INHERITANCE AND WEALTH DISTRIBUTION

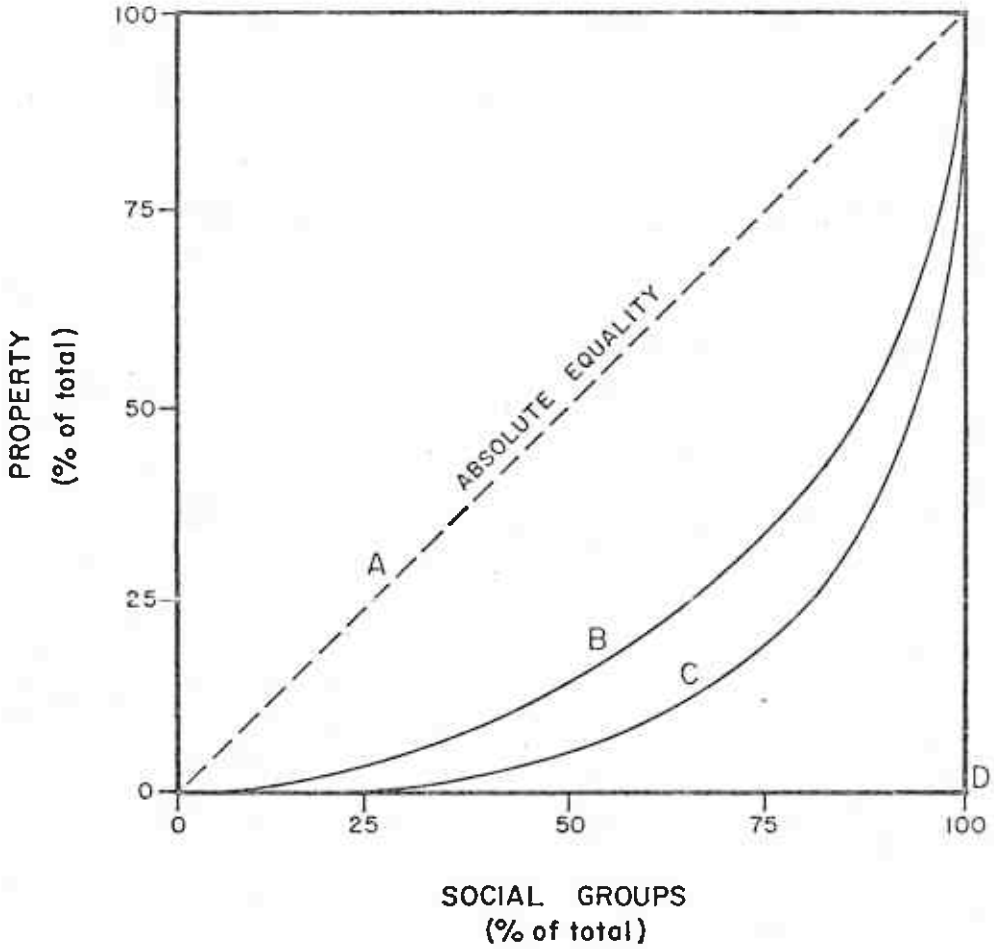
The last section offers a glimpse of the complexities awaiting attempts to model the economic consequences of inheritance. The modeller should consider not only inheritance rules, but also marriage and population patterns. In this section, this argument will be pursued using a different research strategy than that used in the preceding sections. Rather than squeeze ideas out of a handful of Zapotec inheritance cases, a more deductive thrust will be made. The objectives will be first to discuss the place of inheritance in relation to other institutions that distribute wealth and second, to consider methods of measuring and modelling the economic impact of inheritance.

8.1 Wealth Distribution

Imagine a society divided into X social groups (or individuals) holding exclusive rights to Y units of property. The distribution of social groups to property may be represented by a Lorenz curve (Lorenz 1905). This curve compares the percentage of social groups (horizontal axis) with the percentage of property they hold (vertical axis, Figure 8.1).

Line A represents absolute equality. Ten percent of the social groups own ten percent of the property, twenty percent have twenty percent, and so on. Absolute inequality is depicted by a line from the origin to point D and then up the right-hand side of the graph. If property can be assigned a value and mutually exclusive social groups be defined, then the wealth distribution of any society could be represented by either of these lines or, more likely, by some curve between these two extremes.

FIGURE 8.1 LORENZ CURVE



Lorenz curves permit measurement and comparison of the degree of wealth (or income) stratification. For example, if curves B and C represent the distribution of property for two societies, respectively, then society B has a greater equality of property distribution than society C. It must be emphasized that this does not mean that one society is wealthier than another; these curves are percentages and measure relative rather than absolute wealth.

Lorenz curves also may be used to compare changes in wealth distribution for one society through time. B and C could represent the distribution of property for a society at two successive time periods, thereby indicating that wealth became more unequally distributed between time B and C. Several methods exist to measure these changes in wealth distribution (Yntema 1933).

The Swiss economist Pareto believed these wealth distributions a part of Natural Law and stable for all societies. He felt "there is an inevitable tendency for income to be distributed in the same way - regardless of social and political institutions and regardless of taxation" (Samuelson 1967:111). Pareto's generalization was refuted from many sources, including evidence from the U.S. economy showing change to a more equal distribution of income over the past few decades (ibid:111). Refutation of any Natural Law generates new questions. In this case, it was realized that the distribution of wealth varies through time and is undoubtedly effected by other social institutions.

8.2 Wealth Adjustment Mechanisms

Lorenz curves and other measures of wealth distribution are symptoms of numerous, poorly understood processes that accumulate, store, disperse, and destroy wealth. All factors influencing the

distribution of wealth in a society may be called "wealth adjustment mechanisms (WAMS)." It would also be permissable to call these factors "people adjustment mechanisms" because this distinction is relative: people are to wealth as wealth is to people. Nash's term, "wealth leveling mechanisms," is not used because of its implication of directionality in the wealth adjustment processes toward more equitable distribution which, in fact, may not be present.

Some WAMS are cultural; for example, taxes, land sales, reciprocity rules, and population shifts. Others are physical; floods, famines, and plagues are examples. Socio-economic theorists, including economic anthropologists, wish not only to measure the degree of inequality present in a society, but also to identify, quantify, and compare the dynamics of different types of WAMS.

Wealth adjustment mechanisms may be classified into two types: substantive and structural. This distinction is actually based on the degree of abstraction used in the analysis of WAMS. Substantive WAMS are specific behaviors or institutions which are believed to have some effect on wealth distribution. The list of these mechanisms is long and should include land sales, marriage, auctioning, potlatching, marriage, and inheritance.

Structural processes are fewer and more generalized: they include reciprocity, redistribution, and market exchange (Polanyi 1957). Unfortunately, economic anthropologists have ignored the effects of these processes on wealth distribution because of their preoccupation with a ridiculous debate over what is and isn't worthy of being called economic. If the next generation of economic anthropologists can dampen their enthusiasm for this debate, several more concrete issues

age. Both can involve economic consequences.

(2) Individual control. Some WAMS are more within an individual's control than others, e.g. a choice as to whether a child should study outside his village is more controlled than the occurrence of a drought.

(3) Frequency. Some WAMS occur annually and regularly, like taxes and rents. Others happen infrequently, such as marriage, funerals, and disasters.

(4) Magnitude of Effect. Some WAMS have radical effects on the wealth holding units, such as an expensive political office in a cargo system. Other WAMS, such as a minor illness, have less disastrous consequences.

It might prove interesting to test hypotheses concerning these dimensions. Do wealth adjustment mechanisms that occur with high frequency show a weaker magnitude of effect? Do individuals exert more control over the least random WAMS? Or do populations exert least control over WAMS with a great magnitude of effect?

Answering these queries demands dynamic, innovative models that demonstrate how incremental changes in WAMS effects wealth distribution. To achieve this degree of specificity, these models must (1) define parameters that influence the process being considered, (2) state rules as to how the process operates, and (3) show results on wealth distribution of changes in either the rules or the parameters. Inheritance may serve as an example of the problems involved in modelling a wealth adjustment mechanism.

8.3 Procedures for Discovering the Wealth Distribution Consequences of Inheritance

A brief review of the ways in which the economic consequences of inheritance have been studied might clarify the approach taken in the present study. Nash and Wolf considered bilateral inheritance a "wealth-leveling mechanism." Their analyses consisted of functional arguments, e.g. under certain conditions inheritance shuffles wealth along descent lines.

Earlier, I offered several criticisms of Nash's approach which may now be made more specific. He searched for continuity of wealth along family lines in societies that place little importance upon the lineal transmission of wealth. Deciding whether this is a result of a decreased emphasis on lineal descent or a result of an inheritance pattern that de-emphasizes sex when transmitting property is essentially a chicken and egg question. Chicken: Amatenango villagers do not emphasize descent when considering wealth transmission because of the shuffling effects of their inheritance system. Egg: they de-emphasize lineal transmission of wealth along one descent line because they maintain bilateral descent. I cannot see how this issue may be clearly resolved.

Nash's inability to perceive the sensitivity of inheritance to demographic parameters is a more serious failing. My discussion of the expression of preference in Diaz Ordaz and Collier's model of Zinacantan inheritance suggest that the effect of inheritance rules on wealth distribution is heavily contingent on population parameters. An adequate inheritance model cannot ignore these factors.

Furthermore, Nash's claim that bilateral inheritance levels wealth is ambiguous. If he means that inheritance shuffles wealth along family lines, preventing heirs from having more than their parents, then

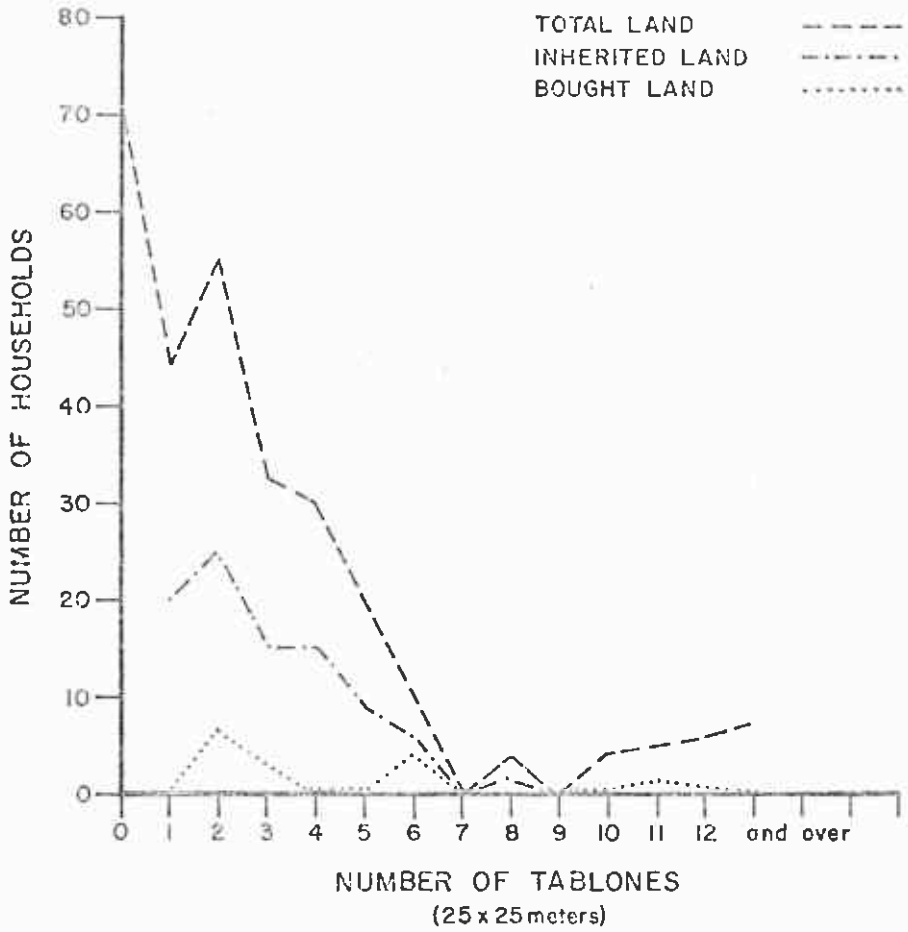
his evidence neither supports nor refutes his argument. He presents no longitudinal evidence concerning the dispersal of wealth along family lines. On the other hand, if he means that wealth is shuffled among households and creates what he called a "democracy of poverty," then he not only fails to present diachronic evidence to support this hypothesis, but also provides evidence to suggest that this hypothesis may be incorrect (Figure 8.2). This figure shows considerable inequality of wealth among households in Amatenango. This may be seen by translating his figure into a Lorenz Curve and comparing it to Diaz Ordaz and the United States in terms of the relative inequality of wealth distribution.[1]

Figure 8.3 indicates that Amatenango's wealth distribution is roughly similar to that of Diaz Ordaz and the United States. In fact, if Nash had provided information on the property held by the wealthiest segment of this Chiapan village, and the actual distribution might have been even more skewed toward inequality than this figure suggests. Whichever is the case, Amatenango is certainly not a "democracy of poverty." Although the absolute wealth differences between it and the United States are stupendous, the relative differences are small. All three societies show substantial inequality.

Finally, Nash's concept of "wealth leveling mechanisms" is as suspect as his concept of the "democracy of poverty." Collier and I have independently shown that inheritance may have wealth accumulation tendencies at the same time that wealth is leveled.

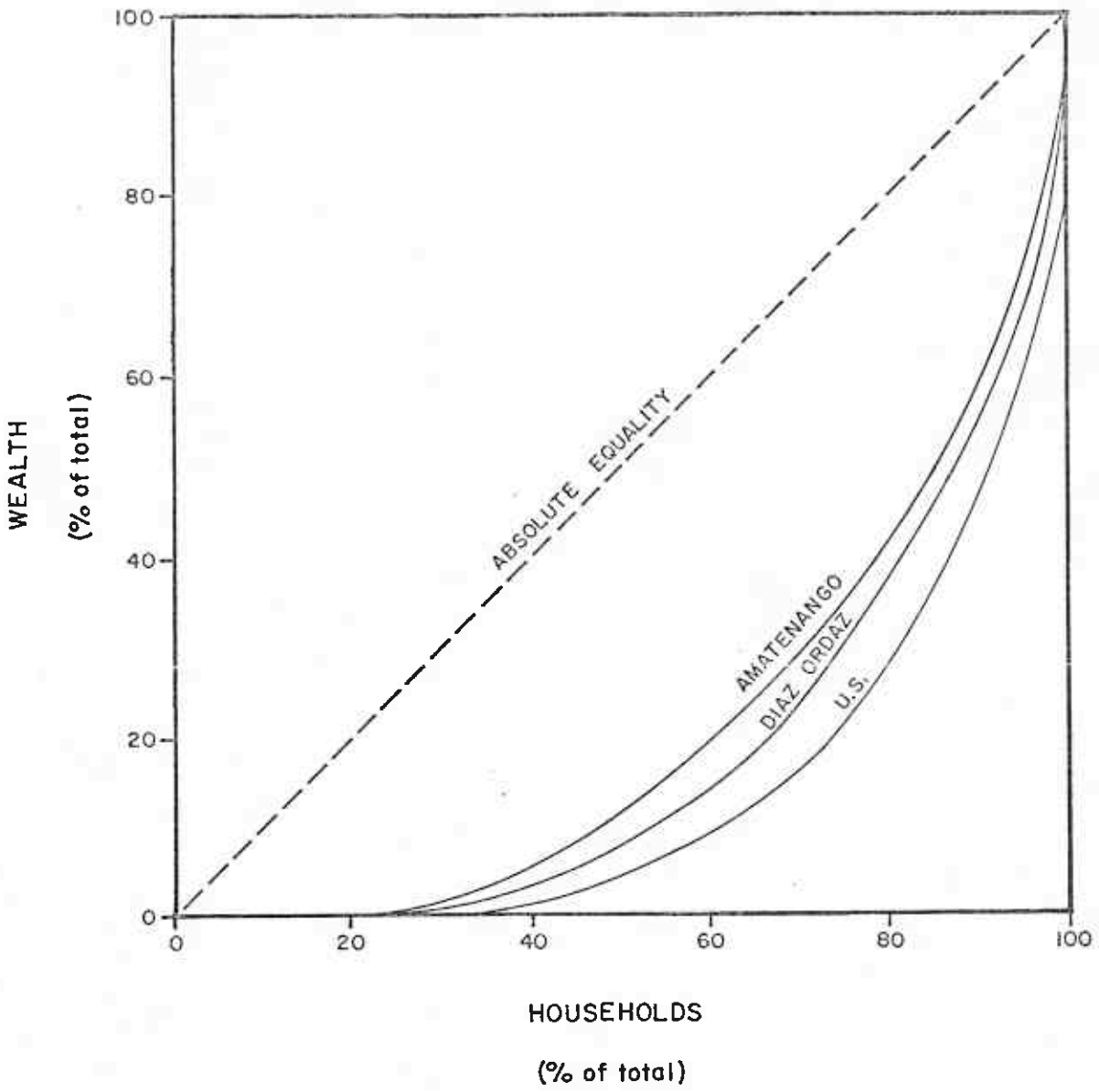
Verbally expressed, functional explanations have serious shortcomings in discussions of the wealth adjustment consequences of inheritance. Such explanations only indicate directionality in a WAM (either dispersal, accumulation, or maintenance of the status quo). They lack precision and

FIGURE 8.2 SIZE OF LANDHOLDINGS IN AMATENANGO



FROM NASH (1968, figure 19-3)

FIGURE 8.3 WEALTH DISTRIBUTION IN UNITED STATES, DIAZ ORDAZ, AND AMATENANGO



do not state the degree of inequality that a particular inheritance system creates; it is impossible to derive a Lorenz curve from the models offered by Nash, Homans, Collier, Wolf, or those suggestions in the preceding section. This failing limits their usefulness to studies that search for the dynamics of an inheritance system or compare different social systems. Although some directionality is indicated in functional models, the models are too heavily dependent on ceteris paribus reservations to permit flexability in the study of the dynamics of inheritance systems.

A related shortcoming of functional models is their inability to adjust for changes in those parameters that are known to influence the outcome of inheritance rules. Each time a parameter, such as sibling-set size, is changed a new verbal model becomes necessary. Manipulation of these models can become complex and laborious.

Models based on historical analysis of changes in inheritance rules and wealth distribution might appear to rectify the deficiencies of functional models. Historical models help document diachronic, incremental shifts in parameters, rules, and wealth distribution. They also assist in the discovery of causal relationships.[2] Such analyses, however, are as unwieldly as functional, synchronic models when parameter manipulation is desired. They have an additional disadvantage of requiring considerable information, all of which may not be relevant in a formal model.

In Diaz Ordaz, the recovery of historical information on inheritance proved frustrating. Records on the transfer of estates were incomplete, neither the past inheritance rules nor wealth distribution could be reconstructed. Frustration with functional, verbal models and the absence of historical documentation edged this research to consider

quantitative models. In retrospect, this decision fostered a more general approach to the study of inheritance than was initially anticipated.

Compared to verbal models, quantitative models have distinct advantages for determining the wealth adjustment effects of inheritance. Their parameters may be more easily manipulated or changed. Greater precision can be given to the measuring changes in the degree of wealth distribution than is achieved with expressions such as "greater, more, or less." And they offer a better format for comparing different inheritance systems than verbal models. Two types of quantitative models were considered for use in modelling inheritance.

An algebraic model might give the formula for a Lorenz curve based on equations with certain numeric inputs to variables such as estate size, number of heirs, and sex of heirs. Sargan (1964) developed a linear equation model that seems to approach a solution to this problem, but it is too abstract from directly observable socio-economic relations to be applied cross-culturally. Unfortunately, I repeatedly failed to discover an acceptable algorithm. The probabilistic nature of inheritance rules and their conditioning parameters produced hopelessly insoluable formulas nested in conditional probability statements. It seems unlikely, at this time, that inheritance systems will ever be modeled by relatively straight forward algebraic and probabilistic techniques.

Inability to develop algebraic models of the economic consequences of inheritance lead to a consideration of alternative, analogue solutions. An analogue model creates a simplified replica of those features considered essential to the working of a system. It seemed reasonable that if an analogue model of a society could be built with specific

rules of property rights, population dynamics, marriage, and inheritance rules; then any operation on this model would be indicative of cultural changes in the illusory "real world." A computer program offers a method to build such models which belong to an analytical technique called a "computer simulation."

8.4 Computer Simulation and Models

A computer simulation is an analogic representation of the elements and variables of a system, including the rules for their interactions through time. By mimicing events and processes in some artificial time framework (that may be expanded or compressed), the dynamics of a system may be studied.

It must be realized that a computer simulation is not a model of anything in particular. Models may be represented by many different media: words, equations, diagrams, and physical structures are just a few. Each medium can model an infinite number of phenomena. Verbal statements, for example, have been used to model such diverse things as nuclear reactors, cross-cousin marriage, and landscapes. It should be obvious that the media of the model is not, in and of itself a theory. Nevertheless, uninitiated enthusiasts continue to believe that computer simulations are machines that grind data into theoretical generalizations. Nothing could be more inappropriate than to assume that computer simulation is a data analysis technique. As Schultz and Sullivan (1972) point out: "computer simulations are the use of a process to model another process." Computer simulations are to models, as words are to poets, simply media through which ideas can be organized and transmitted to others.

The pros and cons of using the medium of computer simulation have

been extensively discussed elsewhere (Schultz and Sullivan 1972, Gullahorn and Gullahorn 1972, Downing and Luebbermann 1973). In brief, computer simulations assist in:

(a) explicit definition of concepts, variables, parameters, and processes;

(b) experimentation with a machine analogue of some referent system that may be impossible or impractical to direct manipulation by the investigator;

(c) evaluation of the systemic importance of a variable in a system by its manipulation in the analogue model.

Computer simulations also have disadvantages.

(a) Compared to other analytic techniques, their development requires considerable time and money.

(b) They are often unintelligible to anyone except their developers.

(c) They sometimes become too complex because too much detail is incorporated into them.

(d) The attendant mathematics is poorly understood.

Other, more technical problems exist, but it would be wise to discuss these with specific reference to INHERIT, a preliminary computer simulation model of inheritance.

8.5 INHERIT I

INHERIT I is a preliminary model that imitates the creation, fussion, and merger of wealth held by households. Households are defined as entities that (1) have heirs, (2) hold rights to property, and (3) transfer these rights to their heirs according to inheritance rules. The temporal dynamics of this model are based on a simple notion of a "household generation." A household generation has taken place when

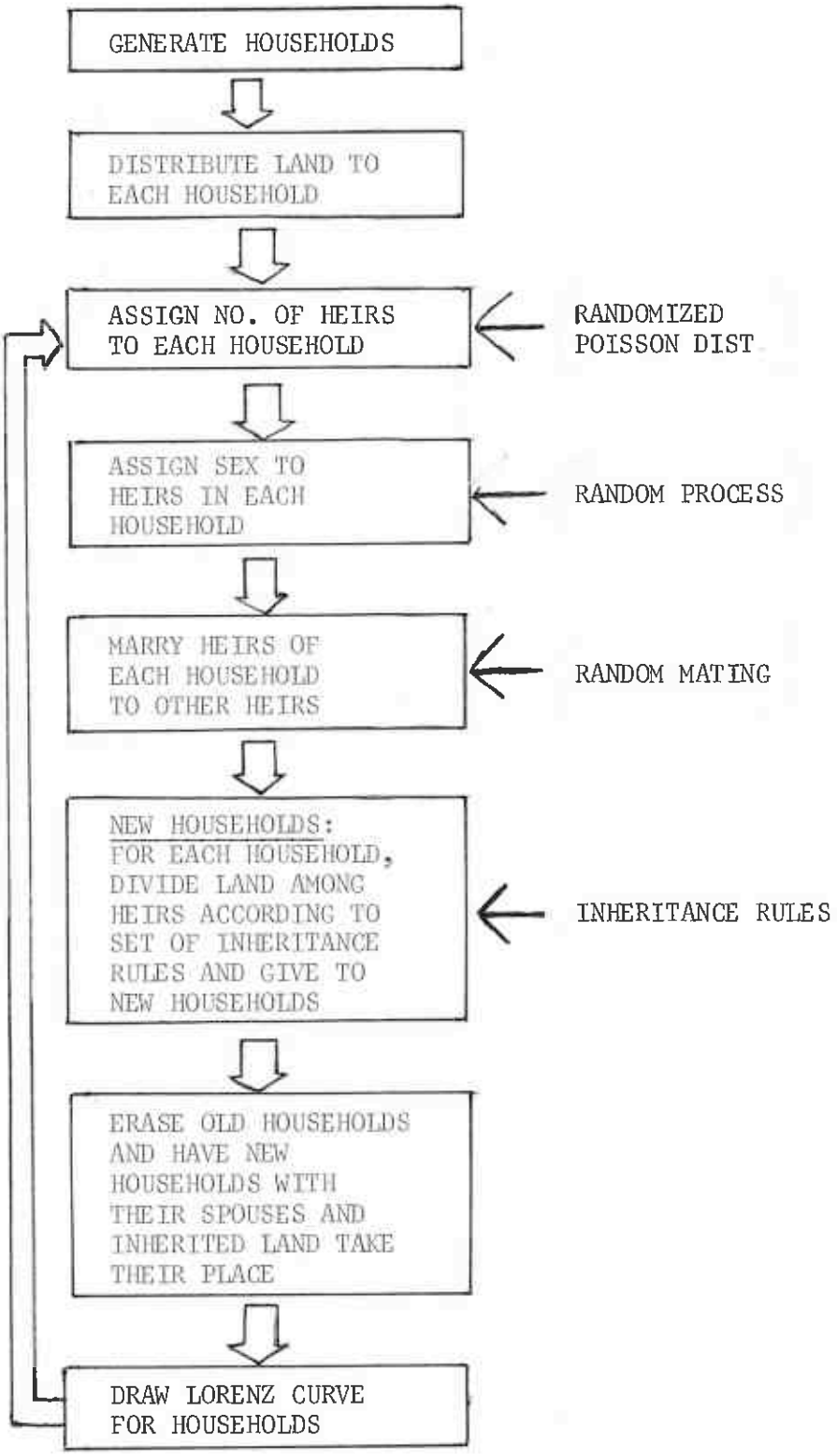
the following sequence of events has occurred.

1. Every household in a parental generation receives an initial allotment of property (the starting conditions).
2. A randomized process assigns heirs to each household.
3. Their heirs are married.
4. These newlyweds form households of the succeeding generation.
5. The parental generation passes property rights to their heirs in the newlywed generation according to a set of inheritance rules.
6. The distribution of wealth for these newlyweds, who now have their inheritance, is plotted by means of a Lorenz curve.
7. The newlywed generation now becomes the parental generation for the next cycle and the process begins again (number 2).

The model repeats this sequence of events over and over again (figure 8.4). Comparison of the successive Lorenz curves permits an estimate of wealth distribution consequences for any combination of inheritance rules, population dynamics, and marriage arrangements. Most importantly, this model permits almost unlimited experimentation into the effects of various parameter changes on wealth distribution. An experiment takes place when one or more variables are changed while everything else in the simulation is held constant. Comparison of the outputs of experiments allows a quantitative estimate of the effects of different wealth adjustment mechanisms on wealth distribution.

In this model, wealth adjustment mechanisms are defined as any variable that changes or effects the shape of the Lorenz curve. This would exclude a variable that failed to influence the shape of the curve after it was permitted to range from one extreme value to the other. In one sense, this is a formal statement of Homans' technique for discovering

FIGURE 8.4 INHERIT I SIMULATOR



the functional significance of an element in inheritance mentioned in section 1. It will be recalled that he searched for cases in which villages had shifted from primogeniture to ultimogeniture and compared their social structures before and after the change. When he discovered no significant changes, he assumed that this distinction was unimportant. But INHERIT has an advantage over the Homans' technique; experimentation is not limited to particular historical circumstances or inheritance rules.

At present, INHERIT I is a prototype that forms a comparitive base for future experiments. The research design for this model is (1) to develop a simple prototype and generate results which (2) may be compared with future changes in the model. INHERIT I might be considered an "ideal type" that mimics a social system with the following characteristics:

a. the population has a zero growth rate

b. marriage is random

c. wealth is fixed, limited and infinitely divisable

d. inheritance is distributed equally to all offspring of a household.

Computerizing this simple model proved complex and is explained in Appendix I and II by following it through its operations step by step.

8.6 Preliminary Results

To date, two experiments have been performed with this model. The first, INHERIT I, is identical to the second, INHERIT II, except for one crucial change. INHERIT II does not assume a stable population, as does INHERIT I. Rather, it permits the household population to increase through time. This change is made by changing the probabilities of the

number of heirs per household to a mean of 3, and truncating the maximum number of heirs per household at 8 (Figure 8.5).

The results of these models should be considered tentative and preliminary. Many more runs of the model would be necessary to adequately perform these experiments. For example, it is necessary to permit a different sequence of random numbers to control each run, develop a better marriage system and test incremental shifts in variables on wealth distribution. The preliminary results indicate the current working status of the model and suggest tendencies in the ideal system.

Figure 8.6 shows the percentage of wealth held in the population after eight generations in INHERIT I.[3] The simulation begins with the initial conditions of each household holding 100 units of wealth (i.e. absolute equality). After one generation, the Lorenz curve began to skew toward greater inequality. This skewing continues into the eighth generation where it appears to be stabilizing or slowing. Only further, longer tests can demonstrate exactly when stabilization can be expected to occur. Figure 8.7 illustrates the upper, lower and mean values of these eight generations of computer simulation in INHERIT I. It would appear that this set of inheritance rules force a Lorenz distribution to fluxtuate around a mean after it eventually stabilizes from its initial starting conditions.

Substituting the population stability assumption of INHERIT I with INHERIT II's assumption of population growth produced different, and equally inconclusive, results. To prove the fallibility of computer simulations, this one encountered difficulties when its storage matrix ran out of living space in the fourth generation. These four generations of output (Figure 8.8) suggest that wealth was skewing at a slower rate than occurred in INHERIT I.

FIGURE 8.5 PROBABILITY OF HAVING DIFFERENT NUMBERS OF HEIRS (POISSON DISTRIBUTION)

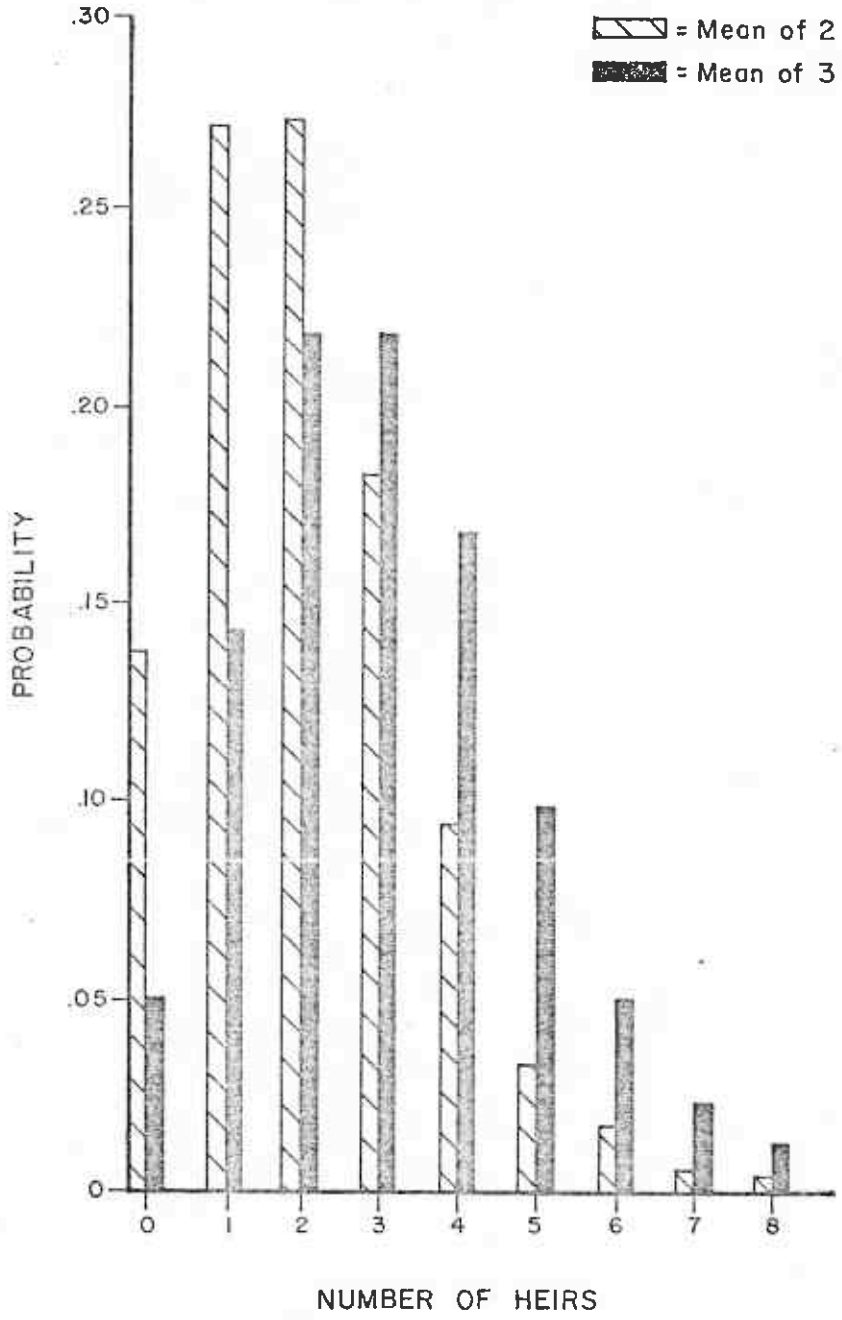


FIGURE 8.6 PERCENTAGE OF WEALTH HELD BY HOUSEHOLDS

INHERIT I (POPULATION STABLE)

GENERATION

Households (% of total)	0	1	2	3	4	5	6	7	8	$\overline{X}$ (excluding g=o)
0	0	0	0	0	0	0	0	0	0	0
10	10	4	4	3	2	2	3	3	2	2.9
20	20	10	9	7	7	7	7	7	6	7.5
30	30	17	16	13	13	12	12	12	10	13.1
40	40	25	24	19	20	19	18	19	16	20
50	50	33	33	26	28	26	25	26	23	27.5
60	60	43	43	36	37	35	33	37	31	36.9
70	70	53	54	47	48	46	44	48	40	47.5
80	80	65	67	62	59	58	59	62	52	60.5
90	90	81	81	80	74	77	75	78	68	76.8
100	100	100	100	100	100	100	100	100	100	100

RANGE (Units of Wealth)										
	Low	100	25	11.25	7.1	11.5	3.7	10.4	6.4	7.9
	High	100	200	200	158.2	187	227	166.7	157.3	141

FIGURE 8.7 LORENZ CURVES FOR INHERIT I
(8 GENERATIONS)

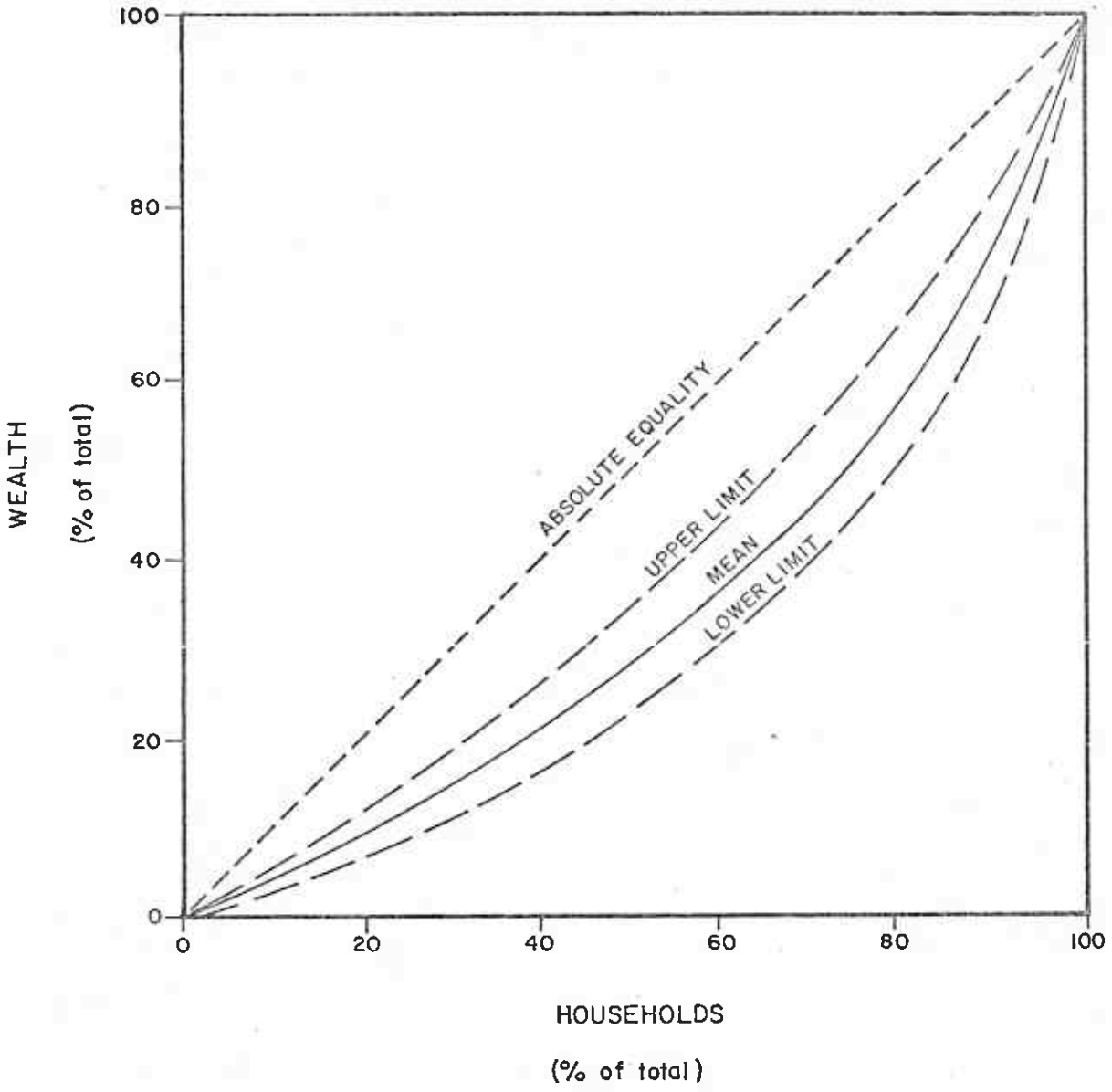


FIGURE 8.8 PERCENTAGE OF WEALTH HELD BY HOUSEHOLDS

INHERIT II (POLULATION INCREASING)

		GENERATION 0	1	2	3	$\bar{X}$ (excluding g = o)
	0	0	0	0	0	0
	10	10	5	4	3	4
	20	20	12	10	8	10
	30	30	20	16	14	16.7
Households	40	40	28	23	21	24
(% of total)	50	50	37	32	30	33
	60	60	46	41	39	42
	70	70	57	51	49	52.3
	80	80	69	62	61	64.0
	90	90	83	77	76	78.6
	100	100	100	100	100	100

Range	Lower	100	14.2	8.5	2.9
(Units of Wealth)	Upper	100	150.0	154.0	158.0

The most interesting preliminary results relate to the growth of the wealth held by the government or sink due to bottlenecks in the inheritance rules. The hypothesis set forth at the conclusion of section 7 was that the larger the average sibling set size, the smaller the probability of intestate transfers. In the Zapotec population, intestate transfers stay within the village population, i.e. another villager ends up with the property. But assume the state could effectively gain access to all intestate property. The analogy of this situation was built into INHERIT. The depository of these funds was called the "government" or "sink". Thus, the hypothesis would continue . . ."the smaller the probability of an intestate transfer the less wealth accumulated by the government.

Comparison of the tentative results of INHERIT I and II shows that this hypothesis is supported (Figure 8.9). Beginning the initial population with 10,000 units of wealth and the government holding nothing, INHERIT I permitted the government to accumulate 67 percent of the total wealth by the end of the eighth generation. Comparison of this output with that of INHERIT II suggests that the accumulation occurs much slower when the population is growing. At the termination of the fourth generation, the government or sink in INHERIT II owned 20 percent of the total wealth; compared to 47 percent for INHERIT I.

Future experiments with this model will carry the INHERIT I and II models through to stabilization and give a probability measure of their answers. That is, each model generates not one, but a variety of answers. These answers may be likened to a belt or band across a Lorenz curve indicating the most probable results. Although it would be interesting to see if the model could be calibrated with an ethnographic case, like

FIGURE 8.9 PERCENTAGE OF TOTAL WEALTH HELD BY GOVERNMENT

		INHERIT I	INHERIT II
	0	0	0
	1	9	3
	2	25	8
Generation	3	36	13
	4	47	20
	5	54	*
	6	61	*
	7	66	*
	8	67	*

*Results not available.

Diaz Ordaz, it is not necessary to establish the validity of a model by searching for the correspondence of data or cases to each output. The model may be used to test the dynamics of ideal type systems in a manner similar to that used by theoretical physicists when they employ the ideal concept of frictionless space or a perfect catalyst. The truth of the matter is, if stochastic parameters are introduced into modelling, then the number of possible outputs or futures that may be generated by a few simple cultural rules is enormous. Any one path, although perfectly corresponding to the rules, may not occur in the ethnographic record because all systems have a past and are contingent on their previous history. If one of these inheritance simulations suggests the wealth distribution of a combination of marriage rules, inheritance rules, and population dynamics that has never occurred in the world, then this does not negate its validity as a theoretical tool. It simply provides a solution to non-occurring social situation that is consistent with the model. Some might like to say it predicts, although that is a bit pretencious given the simplified status of the current simulation models.

The important point is that this simulation model appears to be <u>one</u> effective technique for attacking the questions concerning wealth adjustment mechanisms. I have demonstrated how such a model can be built and shown the extremely tentative results of its first, infantile experiments.

ENDNOTES

1. Sources of data for figure 8.2

   Diaz Ordaz: Census of land holdings of 99 households holding 1324 "kilos" of land.

   Amatenango: Nash (1968:319, figure 3). It was assumed that "over 12 tablones" on this figure meant at least 14 tablones. This assumption skews the curve in favor of a more equitable wealth distribution than is probably the case.

   U.S.: Samuelson (1967:111, figure 6-3b). The data is approximate because the scale of his figure prevented precise duplication.

2. Professors Robert Netting and Arthur Wolf are independently exploring this historical approach and I anxiously await their results.

3. These percentages do not include wealth held by the "government" or "sink."

9. CONCLUSION

Research is uncomfortable and untidy. The preceding discussion was no exception. Following a rather magnanimous and broadly focused introduction, the substance of this research shrank to a narrowly defined journey into contemporary and unimaginative ethnology. The trail was strewn with unfulfilled expectations and promises. Inheritance, in general, was not discussed. Rather the discussion narrowed to one culture, Zapotecs; one valley, Tlacolula; one community, Diaz Ordaz; and one sphere, agricultural land. Moreover, after dehydrating the research to an ethnographic speck, the investigation considered only a fraction of the interesting and possible problems.

The problems were divided into those effecting the distribution of (1) people to people and (2) people to resources. The former topic concerns the social consequences of inheritance and drew on data from the Zapotecs in southeastern Mexico. The question was further specified to only an investigation of the effect of inheritance on societal structure. Then, the ecological and economic consequences of field fragmentation was considered. It was asked, "does inheritance fragment fields at a high rate?" Next, the meaning of equilateral distribution was discussed. Methods were developed to discuss the importance of different preference factors on unequal distribution in a set of heirs. The question of unequal distribution opens the second half of the dissertation, the discussion of wealth adjustment mechanisms. At this point, Zapotecs become trivial to the thesis. An interesting question is raised as to the possibility of a computer simulation model of inheritance. This model would assist in laboratory experiments with ideal type models of inheritance systems.

The preliminary results of a model called "INHERIT" was presented. Again, the results of this effort proved interesting but tenuously related to ethnographic reality. And if the questions asked about this rather insignificant corner of culture were only partially answered, then what progress has been made other than the award of another Ph.D.?

From this research, it appears that little faith can be placed in taxonomic schemes which implicitly decide that kinship is the overriding consideration in inheritance. Rivers' original distinction, scrambled by Radcliffe-Brown and reassembled by Goody and Leach, must not be lost again. What is true of descent appears not to be true of inheritance. Therefore, a study of one should not be considered to be a study of the other.

Second, it appears the principle components of inheritance that should be considered are testator and heir relations, the time of transfer, rights to property, and rules. An application of this consideration produced a description of inheritance that does not rely on taxonomic categories.

Third, this application showed that a particular kind of societal structure was supported by a particular type of inheritance system. But the social context of inheritance required that it be de-emphasized as the only mechanism effecting Zapotec solidarity. If nothing more, this research has elevated the topic to a hypothesis: inheritance is the primary variable explaining Zapotec solidarity. This hypothesis may be considered a challenge to my colleagues to actively consider methodologies for defining, quantifying, and comparing the concept of social solidarity. In Zapotec inheritance, social solidarity is strenghtened by a form of social exchange between parents and children that has structural

consequences for the village's societal groups. Inherited property appears to be a significant commodity in this exchange system.

Fourth, models of inheritance that predict an unbridled dismantling of field were shown to be demonstratively erroneous. Instead, a probabilistic model of field fragmentation was proposed. This model permits testators to pass fields to their heirs intact as well as fragmented. Given this modification, consolidation mechanisms which reunite fields become less important. Furthermore, the analyses isolated certain attributes of estates and fields that influence the chances of a field being fragmented.

And fifth, it also seems clear that more caution must be exercised when discussing equilateral inheritance. Some attempt must be made to discover the relative valence of preference factors in skewing the distribution of inequality. Methods were developed and presented for measuring inequality, and the strength of preference factors: sex, sibling order, estate size, and a measure of social exchange. Application of these measures to the Zapotec case revealed countervailing tendencies in Zapotec wealth distribution. In large estates, brothers received larger shares greater than their sisters; and in smaller estates, brothers received shares less than or equal to that of their sisters. In the other logical possibilities, brothers and sisters tended to receive approximately the same size share. Unfortunately, the importance of this tendency on the distribution of wealth in the population could not readily be discovered.

The difficulties involved in measuring wealth distribution formed the last topic of this study. A general discussion of wealth distribution did not resolve the question of the economic impact of Zapotec inheritance.

Rather, it focused on the theoretical concept of wealth adjustment mechanisms (WAMS), these are any cultural processes that influence the relative distribution of wealth. The components and parameters of one wealth adjustment mechanism, inheritance, were described and used to construct an ideal type model of an inheritance system in a computer. The preliminary results of this computer simulation model suggest the utility of this tool in exploring this question of the economic consequences of inheritance.

Naturally, it is hoped that future studies of inheritance will move in the directions suggested here: toward reconsideration of taxonomic distinctions, definition of components, analyses of the social consequences using alliance or other exchange models, and precise measurements of systemic tendencies either through data analysis or computer simulations. This optimism should be tempered with the lesson derived from the earlier review of the previous, discontinuous research on inheritance. Professor Roy G. D'Andrade used to proclaim to his students that the best predictor of future behavior is past high frequency behavior. If his little law holds for those that investigate inheritance; then this study, like those that preceded it, is destined to be unread by the next person studying inheritance.

APPENDIX I. THE STRUCTURE OF INHERIT I

Computer simulations are difficult to describe. It is more common to discuss their results than their structures. A communications gap has been created between the simulator and non-simulator. Unfamiliar expressions in computer jargon and the bewildering complexity of computer simulation programs have become obstacles to the acceptance and adoption of this medium in anthropology. The simulator himself must assume responsibility for the anomalistic place of his technique in anthropology. In an attempt to bridge this gap, INHERIT I will be described in as non-technical terms as possible.

A simulation model contains variables, operations, and bookkeeping devices. Variables are things that can take on different values as the model acts. Simulation variables are characteristically arranged and stored within the computer and these arrangements effect their meaning and manipulation. Operations are computer statements indicating "what should happen next" as the simulation progresses. They are like tiny traffic signs directing the flow of information and decisions within the model. Operations occur in either subroutines or the Master Program. Subroutines are clustered operations for some specific purpose: drawing a Lorenz curve, marrying heirs, or dividing property. The Master Program controls the initial conditions and sequence of subroutines and the length of the simulation.

Bookkeeping devices may also form a distinct subroutine or be nested within the Master Program. These devices are used to determine the status of the system at different points in its history. In this simulation, bookkeeping devices include counts of the number of households, mean number of heirs in each generation, and drawing a Lorenz

curve.

In addition, computer simulations have characteristics which are not explicitly written into the computer program. These include the model's underlying definitions and assumptions. Some proponents of computer simulations optimistically feel that definitions and assumptions are easily discoverable during model construction. Unfortunately, simulations do not explicitly reveal their assumptions to their builders any more easily than other models. Rather, assumptions must be searched for between the lines. The following statements of assumptions for INHERIT I are probably incomplete and more will be discovered as this simulation model is tested and used by others.

VARIABLES

Households are the basic units in this simulation. They have three characteristics: address, wealth (which may be zero), and heirs (which may also be zero). This definition is very abstract and these units do not need to be considered "households." At another level of abstraction, they could be considered to be any social unit having exclusive rights to property and heirs, but for purposes of the present work, they will be referred to as "households."

Wealth is also defined in a general manner. It is something that has an interval value and is held by a household. For example, a household may hold 100 units of wealth. What "wealth" actually represents is left to the reader's imagination. It could be land, territorial rights to fishing grounds, goats, earrings, or some other commodity. Wealth will be considered synonymous with property in this description. Wealth is assumed to be infinitely divisible. Moreover, this version

of the model simulates only one sphere of inheritance. These two assumptions reduce the realism of the simulation, but either could be modified at a later time.

Heirs have two characteristics: sex and address. They are defined as offspring of a married couple in some household. Other characteristics of heirs that might influence their inheritance include sibling position, personality, and marital status. Future versions of the model might consider these other variables, however, at this point, the inhabitants of this simulation are simple folk with only their sex and household address to distinguish them from one another.

Variables are stored in several one-dimensional matrices (Figure I). This arrangement may be represented by 5 columns and X rows, where X is the number of households in the generation. Each row describes a household by listing its address (H1), amount of wealth (H2), number of heirs (H3), and their sex (H4 and H5). In Figure I, for example, row 6 is read as being a household with address 6 that has 40 units of wealth and 4 heirs, three of whom are female.

OPERATIONS, INITIAL CONDITIONS

Simulation models assume an initial state of the simulated population before they can run. They may be primed with data derived from either real or hypothetical populations. The real-prime method might use ethnographic data on wealth distribution and the number of heirs per generation from a group such as the Zapotecs. This type of priming involves assumptions, such as an expanding population that reflects a high average number of heirs per household. In contrast, the initial state of the simulated system may be defined with hypothetical data, derived from what an ideal-type model of the ethnographic world. INHERIT I

FIGURE I STORAGE ARRANGEMENT OF INHERIT I

INFORMATION IN MATRIX
(ARRAY NAME)

	Address (H1)	Amount of Wealth (H2)	Number of Heirs (H3)	Number of Male Heirs (H4)	Number of Female Heirs (H5)
Household 1	1	100	2	1	1
	2	20	3	2	1
	3	.5	0	0	0
	4	20	5	3	2
	5	50	1	1	0
	6	40	4	1	3
HOUSEHOLDS CHARACTERISTICS	7	30	2	0	2
	8	22	1	0	1
	9	1.6	0	0	0
	10	3.4	8	4	4
	11	200	1	1	0
	12	8	2	1	1
Household 13	13	2	6	4	2
	499	4	1	1	0
	500	23	0	0	0

was not designed to predict the wealth adjustment consequences of a particular ethnographic case, rather, it was designed to form an ideal type model against which other populations and inheritance rules could be compared. This research strategy might be considered analogous to the establishment of a law of motion in a frictionless space to which real situations may be compared. For this reason, the hypothetical priming method was used.

The initial conditions for INHERIT I are 100 households, each holding 100 units of wealth. The distribution of sex and numbers of heirs in each household is controlled internally according to assumptions and operations in the subroutine ASSIGN.

SUBROUTINE ASSIGN

Given the initial conditions described above, the Master Program calls the subroutine ASSIGN into action. This subroutine determines the sex and number of heirs to be assigned to each married couple.

This model focuses on the number of people surviving to heirship and not on the number of offspring in a household (the former always is smaller than the latter in a population which selects its heirs from its children). The mean number of heirs per generation is a critical statistic in this simulation since it defines the growth rate for the population. If the mean exceeds 2 heirs per household, then the population increases and vice versa. The initial conditions of INHERIT I calls for a stable population, thus it uses a mean of 2 heirs per household in every generation.

The next problem to be resolved concerns how a specific number of heirs that will be distributed to each household. If it is assumed that the minimum and maximum number of heirs per household is 0 and 8,

then should it also be assumed that having 0 heirs will occur with the same probability as having 8 heirs? Intuitively, it would seem that having 8 heirs is the less probable event having fewer heirs. Fortunately, the distribution of children per couple in natural populations approximates a Poisson distribution. Assuming that preheirship mortality effects both sexes similarly, a Poisson distribution may be used to approximate the distribution of heirs among household. Figure 8.5 shows the probability of having different numbers of heirs using a Poisson distribution with a mean of 2 and a range between 0 and 8.

Each household is assigned a random number between 0 and 1. The probability space in the Poisson distribution within which this number falls corresponds to the number of heirs selected. This decision on the number of heirs is stored in array H3(i) where i equals the household address. Thus, if household #6 draws the random number .122, it will receive no heirs. The random assignment continues until every household receives its number of heirs.

Once this is accomplished, sex is assigned. A second random number between 0 and 1 is drawn for each heir in a household. If this number is .5 or greater, then the heir is classified as a "male," and conversely, the heir is female if the number is less than .5. Matrices H4 and H5 keep records of the total males and females in every household.

When the assignment process terminates, all eligible households have been offered the opportunity to reproduce. Control of the simulation returns to the Master Program.

SUBROUTINE MARRY

In this model, childrearing and adolescence are inconsequential since birth is immediately succeeded by marriage. Simulating marriage

systems is a formidable task itself and anthropologists have devoted their energies specifically to computer models of just this problem.

A future objective of INHERIT is to test hypotheses concerning the wealth adjustment consequences of marriage systems. However, at this state of model building, it attempted to control for marriage by modelling the simplest system imaginable. Further experiments with marriage systems may be able to use the results of this simple system for comparison. The simple system chosen for this prototype was random mating. This proved most simple for reasons related more to computer technology than to anthropological theory. The model, in its present state, does not have a geneaological memory; that is, it does not "remember" kinship beyond parenthood.

Random mating is achieved by making a copy of each heir's household address in two matrices (Figure II). Matrix A lists the household address of each eligible male in the population and matrix B holds similar information for females. Even though the objective of the assignment routine is an equiprobable distribution, it is often the case that the number of males does not equal the number of females. Thus, one array will be longer than the other.

The second phase of the marriage process takes the longer of the two arrays and randomly shuffles its occupants between cells. Then, the third phase unromantically consumates marriage by merging the occupants of adjacent cells of matrix A and B to form a new household. The mass marriages cease when the last member of the shortest array has merged. The remaining occupants of the larger array are then classified as unmarried. Unmarried individuals also form single person households in the next generation. These unmarried individuals are unique. Although

FIGURE II MARRIAGE IN INHERIT I

PHASE I: SORT

All males and females are placed in two arrays (A and B, respectively). They are identified by their house of orientation in the H1 array.

ELIGIBLE MALES (array A)

1	2	3	3	4	6	6	8	8	9	10	96	97	98	99

ELIGIBLE FEMALES (array B)

3	4	5	5	5	6	6	7	7	8	8	93	94	94	95	96	96	97	99	100

PHASE II: SHUFFLE

The larger of the two arrays (B, in this example) is randomly shuffled. All the addresses are randomly assigned new positions.

ELIGIBLE MALES

1	2	3	3	4	6	6	8	8	9	10	96	97	98	99

ELIGIBLE FEMALES

96	4	13	75	27	75	74	7	7	99	6	90	40	91	10	90	55	78	18	94	3

PHASE III: MERGE

Males and females marry individuals in adjacent cells and form a new household of N+1 generation.

MALES NO.

1	2	3	3	4	6	6	8	8	9	10	96	97	98	99

"marries"

unmarried

FEMALES NO.

96	4	13	75	27	75	74	7	7	99	6	90	40	91	10	90	55	78	18	94	3

"and form household no. (G2 array)

1	2	3	4	5	6	7	8	9	10	11	100	101	102	103	104	105	106	107	108	109

they are eligible for inheritance, they cannot reproduce during the ASSIGN subroutine. This forces a decision concerning the disposition of their inheritance.

The most serious failing of the random marriage model is its treatment of incest; it is not modelled. Future explorations of marriage systems will require building a geneaological memory into the program so that the range of marriageable individuals for any ego will be more restricted than the catch-as-catch-can assumption used in this version.

SUBROUTINE DIVIN

In the subroutine DIVIN, the parental generation passes its wealth to its heirs. This transfer is regulated by inheritance rules. Of course, the possible combinations of rules that could be incorporated into this model are enormous. Again, I cling to the strategy that simplification is meritorious (if for no other reason than to see if the model would work). INHERIT I mimics an equal inheritance rule which is essentially the Zapotec "ideal" system. It reads: ALL CHILDREN RECEIVE EQUAL SHARES OF THE PARENTAL HOUSEHOLD'S WEALTH. That is, a couple will receive shares from two directions; from the husband's and the wive's parents. In each case, they will receive a share equal to that received by their siblings. If there is only one heir, then he or she will receive everything.

In FORTRAN, this rule translates into a simple mathematical expression. The total wealth inherited by a household (X) will be:

$X = HS + WS$,

where $HS = TWHP/HS$ and $WS = TWWP/WS$

HS is the number of heirs to the husband's parental household

WS is the number of heirs to the wife's parental household

TWHP is the total wealth held by the husband's parental household

TWWP is the total wealth held by the wife's parental household

A need for further interpretation arises in two situations: where the household was assigned no heirs (either SH or SW is zero) and where the household consisted of a single person who, therefore, could not be assigned heirs.

In the first situation, the wealth of a household lacking heirs was transferred to a source called "government." The name of this source does not imply that this "sink" represents some polity. It is just a convenient name. In reality, this sink might actually be a church, a landlord, or some other corporate entity that takes wealth when it is intestate. For example, in France much intestate land automatically reverts to the state.

In the second situation, where children do not marry, this does not effect their abilities to receive inheritance. However, in the succeeding generation, their inability to reproduce results in passing inheritance to the government, just as childless parents must do. This assumption permits the prototype to test the influence of an intestate rule on the accumulation of wealth in a single source. It was decided to exclude this source from calculations of the relative wealth distribution and view it as a distinct resolution to the question of wealth adjustment mechanisms.

After each household receives its inheritance, the control returns

to the Master Program and a Lorenz distribution is calculated. Next, the model returns control to ASSIGN and the households that have just received inheritance are now assigned heirs and the process continues to the next iteration. Iterations continue for as long as they are defined in the Master Program.

APPENDIX II INHERIT II COMPUTER PROGRAM

```
      PROGRAM TEDA(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT)
C
C     INHERITANCE SIMULATION   RUN WITH EQUILATERAL RULES
C              BY THEODORE EDMOND DOWNING    BEGAN MAY 1972
C
C             POPULATION INCREASING
C
      INTEGER H1(500),H3(500),H4(500),H5(500),G6(500),G7(500),
     1 DM(500),DF(500),TH1,XX,A,B,PT1,PT2,PT4,
     2 PT3,MK,T,C,E,F
      REAL GOV,PD(9),H2(500),G2(500),MH
C       H1   ADDRESS COLUMN
C      H2   GODDIES COLUMN IN THIS GENERATION
C       H3   ARRAY LISTING NUMBER OF HEIRS IN EACH HOUSEHOLD
C         H4 ARRAY LISTING NUMBER OF HEIRS IN EACH
C       HOUSEHOLD
        H5  ARRAY LISTING NUMBER OF FEMALE HEIRS IN
C           HOUSEHOLD.
C      G2   AMOUNT OF PROPERTY OR GOODIES IN NEXT
C            GENERATION.
C      T   TIME (COMPLETED ITERATIONS)
C      L1   LORENZ CURVE TABLE, NUMBER OF HOUSEHOLDS
C            BY PERCENTAGE OF TOTAL GOODIES.
C     PD IS A POISSON DISTRUBUTION WITH A MEAN OF 2.0.
C     L2 IS ARRAY WHICH GIVES LORENZ CURVE.
C     GOV IS RESIDUAL GOODIES GIVEN TO GOVERNMENT WHEN
C     THERE ARE NO HEIRS.
C      TH1 IS NO OF MARRIAGES IN THIS GEN
C      C IS NO OF MARRIAGES IN NEXT GEN
C      E IS NO OF HOUSEHOLDS IN NEXT GEN
C     I TO Q ARE BOOKKEEPING VARIABLES IN PROGRAM
C       INITIALIZE AND SET VALUES OF TOTAL LAND AND TOTAL HOUSE
C    HOLDS  IN INITIAL POPULATION
      TH1=100
      E=100
      GOV=0.0
C       READ IN POISSON DISTRIBUTION FOR NUMBERS OF HEIRS
C       PER HOUSEHOLD.
C         MEAN OF THIS DISTRIBUTION = 2,TRUNCATED AT 8.
      READ(5,200)PD
  200 FORMAT(F5.3)
      WRITE(6,601)
  601 FORMAT(1H1,5X,*POISSON DISTRIBUTION*)
      WRITE(6,600)(PD(I),I=1,9)
  600 FORMAT(5X,F5.3)
C     FILL H1 ARRAY WITH GOODIES, ASSUME 100 HOUSEHOLDS
C     WITH EQUAL AMOUNTS OF GOODIES IN EACH.
      XX=0
      DO 55 I=1,500
          XX=1+XX
          H1(I) = XX
   55 CONTINUE
      DO 1 I=1,100
```

```
          H2(I)=100
    1     CONTINUE
C       PRINT A LORENZ DISTRIBUTION CURVE FOR
C       STARTING CONDITIONS OF THIS RUN.
         CALL LOREN (TH1,H2)
C
C       ***********************************************************
C           M A I N   P R O G R A M
C       ***********************************************************
        DO 88 M=1,8
C        RANDOM ASSIGNMENT OF HEIRS ON HOUSEHOLD ARRAY H1
        CALL ASSIGN(E,PD,H3,H4,H5)
         T = M
        WRITE (6,211) T
  211   FORMAT (///,5X,*HOUSEHOLD ARRAY AFTER ASSIGNING, TIME= *,I3)
        WRITE(6,212)
  212   FORMAT(17X,2HID,13X,7HGOODIES,11X,5HHEIRS,10X,10HMALE HEIRS,
     1    5X,12HFEMALE HEIRS//)
        DO 213 I= 1,TH1
           WRITE (6,214)H1(I),H2(I),H3(I),H4(I),H5(I)
  213   CONTINUE
  214   FORMAT(5X,I15,F15.6,3I15)
C        CALCULATE MEAN NO. OF HEIRS
        PT4=0
         DO 37 I=1,E
           PT4 = PT4 + H3(I)
   37   CONTINUE
        MH = PT4/E
        WRITE(6,38) MH
   38   FORMAT(/,10X,*MEAN NO. OF HEIRS = *,F15.6)
C        ARRANGE HEIRS IN TWO ARRAYS, DM FOR MALES AND
C        DF FOR FEMALES.
        A=1
        B=1
C        A = NO. OF MALES ELIGABLE FOR MARRIAGE
C           B = NO OF FEMALES ELIGABLE FOR MARRIAGE
        MK=1
        DO 12 I=1,TH1
           MK = I
           PT1 = H3(I)
           IF(PT1)12,12,13
   13   PT2 = H4(I)
           PT3=PT1-PT2
           IF(PT2)14,14,15
   15      DO 16 J=1,PT2
           DM(A)=MK
                A=A+1
   16      CONTINUE
   14   IF(PT3)12,12,17
   17      DO 18 K=1,PT3
                DF(B)=MK
                B=B+1
   18   CONTINUE
   12   CONTINUE
```

```
      A = A-1
      B = B-1
      C = MAX0(A,B)
      E = MIN0(A,B)
      F = A-B
      WRITE(6,19)A,B



   19 FORMAT(/,10X,*A =  *,I5,*B = *,I5)
   33 WRITE(6,34)T
   34 FORMAT(1H1,6X,*MARRIAGES AT TIME*,I3)
      IF(A.GE.B) GO TO 100
      CALL MARRY (C,DF)
      GO TO 101
  100 CALL MARRY(C,DM)
  101 DO 102 I=1,E
         G6(I) = DM(I)
      G7(I)= DF(I)
  102 CONTINUE
      E = E+1
      IF(F)103,103,104
  103 DO 105 I = E,C
         G7(I) = DF(I)
  105 CONTINUE
      GO TO 107
  104 DO 106 I=E,C
         G6(I) = DM(I)
  106 CONTINUE
  107 E = E-1
      WRITE (6,108)
  108 FORMAT(5X,*MALE    TO    FEMALE*)
      DO 109 I=1,C
         WRITE(6,110) G6(I),G7(I)
  109 CONTINUE
  110 FORMAT(8X,I5,6X,I5)
C     DIVIDE UP INHERITANCE WITH PARTIBLE, EQUAL SHARES RULE
       CALL DIVIN (E,C,G2,G6,G7,H2,H3,GOV,TH1)
      WRITE (6,209) T,GOV
  209 FORMAT (4X,*GOVERN SHARE AT TIME *,I3,*IS *,F10.4)
      DO 500 I=1,500
          H2(I)=G2(I)
          G2(I)=0.0
          G6(I)=0.0
          G7(I)=0.0
       H3(I)=0
       H4(I)=0
       H5(I)=0
  500 CONTINUE
```

```
         TH1 = C
      WRITE(6,504) TH1
  504 FORMAT (/,5X,*TH1  BEFORE LORENZ = *,I5)
      WRITE(6,250)T
  250 FORMAT(///,5X,*LORENZ DISTRIBUTION AT TIME*,I3)
       CALL LOREN (TH1,H2)
      WRITE(6,502)T
  502 FORMAT(1H1,5X,*H1 ARRAY AT BEGINING OF TIME*,I3)
      WRITE(6,503)
  503 FORMAT(13X,2HID,13X,7HGOODIES,8X,5HHEIRS,10X,
     1     10HMALE HEIRS,9X,12HFEMALE HEIRS)
          DO 11 I=1,TH1
          WRITE(6,501) H1(I),H2(I),H3(I),H4(I)
   11     CONTINUE
  501 FORMAT(5X,I15,F15.6,2I15)
   88 CONTINUE
  999 STOP
      END
C
C*************************************************************
C
       SUBROUTINE LOREN(TH1,H2)
C     FILL ARRAY L1 WITH PERCENTAGE OF TOTAL LAND
C     HELD BY HOUSEHOLDS.
      INTEGER PT3,TH1,Y
      REAL U,V,W
C   V = PERCENT OF TOTAL WEALTH
C     U = PERCENT OF TOTAL HOUSEHOLDS
      REAL L1(500),H2(500),TW,KR,TLD
      DO 1 I=1,500
         L1(I) = 0.0
    1 CONTINUE
      TW = 0.0
      DO 2 I=1,TH1
         TW=H2(I) + TW
    2 CONTINUE
      WRITE (6,452) TW
  452 FORMAT (10X,*TOTAL WEALTH IN HOUSEHOLDS = *,F15.6)
C     L1 IS ARRAY LISTING PERCENTAGE OF TOTAL LAND OWNED
C      BY EACH HOUSEHOLD WITHOUT GOVERNMENT LAND
C      INCLUDED .
      WRITE(6,13) TH1
   13 FORMAT (/,10X,*TH1  IN LOREN = *,I5)
      DO 3 I=1,TH1
         L1(I) = H2(I) /TW
    3     CONTINUE
C     L1 IS SORTED WITH LOW VALUES AT THE TOP.
      WRITE(6,100)
  100 FORMAT(1H1, 5X,*L1 BEFORE SORTING*)
      WRITE(6,776)(L1(I),I=1,TH1)
  776 FORMAT(5X,F10.7)
```

```
      Y=TH1-1
      DO 9 I=1,Y
          DO 8 J=1,Y
               PT3=J+1
               IF(L1(J).LE.L1(PT3)) GO TO 8
               KR=L1(J)
               L1(J)=L1(PT3)
               L1(PT3)=KR
    8          CONTINUE
    9     CONTINUE
      WRITE(6,451)
  451 FORMAT(///,5X,*L1 AFTER SORTING*)
      WRITE(6,776)(L1(I),I=1,TH1)
C     L1 IS NOW SORTED
      W = 0.0
      U=0.0
      V = 0.0
      W = 100/TH1
      DO 16 I=1,TH1
         U=L1(I) + U
         V = V+ W
      WRITE (6,454)V,U
   16 CONTINUE
  454 FORMAT (5X,F6.2,*PERCENT OF THE HOUSEHOLDS OWN  *,F6.2,
     1 *PERCENT OF THE WEALTH*)
  777 CONTINUE
      RETURN
      END
C     ***********************************************************
```

```
      SUBROUTINE ASSIGN(E,PD,H3,H4,H5)
C     ASSIGN HEIRS TO EACH HOUSEHOLD.
      INTEGER PT3,QM,H3(500),H4(500),H5(500),E
      REAL Q,PD(9)
      DO 1 I=1,500
          H4(I) = 0
          H5(I) = 0
    1 CONTINUE
      QN=1
      YX=RANF(1.3)
          PT3=0
C       RANDOM ASSIGNMENT OF NUMBER OF HEIRS PER HOUSEHOLD.
      DO 99 I=1,E
            Q=RANF(0)
          QM=0
          DO 98 J=1,9
               IF(QM.GT.0.0) GO TO 98
               IF(Q.GT.PD(J))GO TO 98
               PT3 = J - 1
          H3(I)=PT3
               QM=1
   98          CONTINUE
           IF(PT3.EQ.0) GO TO 99
C     ASSIGN SEX TO HEIRS IN EACH HOUSEHOLD
           DO 102 K=1,PT3
               Q = RANF(0)
          IF (Q.GT.0.5) H4(I)=H4(I)+1
          IF (Q.LE.0.5) H5(I)=H5(I)+1
  102          CONTINUE
   99     CONTINUE
      RETURN
      END
C     ***********************************************************
      SUBROUTINE MARRY(C,DD)
      REAL R1,R2,PC
      INTEGER C,PT1,PT2,PT3,DD(500)
       YX = RANF(1.5)
C      AND RANDOMLY SHUFFLE SEX ARRAY WITH MOST MEMBERS
      PC =1.0/C
      C = C-1
      DO 2 I=1,C
    5 R1=RANF(0)
      PT1 = R1/PC
      IF(PT1) 5,5,6
    6 R2 = RANF(0)
      PT2 = R2/PC
      IF(PT2) 6,6,7
    7 PT3 = DD(PT2)
          DD(PT2) = DD(PT1)
          DD(PT1) = PT3
    2 CONTINUE
       C=C+1
      RETURN
      END
```

```
C     ************************************************************
      SUBROUTINE DIVIN(E,C,G2,G6,G7,H2,H3,GOV,TH1)
      INTEGER E,C,G6(500),G7(500),H3(500),PT6,PT7,TH1
      REAL X,GOV,G2(500),H2(500),Y
      WRITE (6,6) C,E
    6 FORMAT (7X,*C=  *,I4,*E= *,I4)



      X = 0.0
       Y = 0.0
C     ALL MARRIED COUPLES RECIEVE THEIR INHERITANCE
C     FROM THEIR PARENTS ACCORDING TO AN EQJAL
C     DIVISION OF WEALTH BETWEEN ALL CHILDREN.
       DO 301 I=1,E
          PT6 = G6(I)
          PT7 = G7(I)
      WRITE (6,4) PT6,PT7
   4  FORMAT(/,10X,*PT6 =  *,I4,*PT7=  *,I4)
          X = (H2(PT6)/H3(PT6))+(H2(PT7)/H3(PT7))
          G2(I) = X
       Y = Y+X
      WRITE (6,5) GOV
      WRITE (6,2) X
   2  FORMAT (10X,*X = *,F15.6)
      WRITE (6,3) Y
    3 FORMAT(10X,*Y= *,F15.6)
  301     CONTINUE
       E=E+1
C   HEIRS WHO ARE NOT MARRIED HAVE THEIR INHERITANCE TRANSFERED
C   TO THEM.  THEY KEEP THIS INHERITANCE THROUGHOUT THE NEXT
C   GENERATION,BUT DO NOT HAVE HEIRS AND,THEREFORE,MUST PASS IT
C   TO THE GOVERNMENT AFTER THEY USE IT FOR ONE GENERATION.
       DO 303 I=E,C
         PT6=G6(I)
          PT7=G7(I)
          WRITE (6,4) PT6,PT7
         IF (PT6.EQ.0) G2(I) = (H2(PT7)/H3(PT7))
         IF(PT7.EQ.0)  G2(I) = (H2(PT6)/H3(PT6))
  303 CONTINUE
C   ALL HOUSEHOLDS WHO DID NOT HAVE HEIRS BECAUSE EITHER
C      (1) THEY DID NOT MARRY    OR
C      (2) THEY DID NOT GET HEIRS DURING ASSIGNMENT
C   HAVE THEIR INHERITANCE PASSED TO THE GOVERNMENT.
      TH1 = TH1 - 1
      DO 302 I=1,TH1
          IF(H3(I).EQ.0) GOV = GOV + H2(I)
  302     CONTINUE
      TH1=TH1 + 1
      WRITE (6,5) GOV
    5 FORMAT(10X,*GOV IS = *,F15.6)
       E=E-1
C*************************************************************
C
      RETURN
      END
```

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