Kinship, Property Transmission, and Stratification in Rural Java

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INTRODUCTION

Kinship is a basic institution in human societies, ordering social interaction, reproduction, and the flow of resources. Despite questioning of underlying conceptions and definitions (Schneider 1984), it continues to be a central focus of anthropological inquiry (Shimizu 1991). The goal of this paper is to analyze and represent kinship structures in a precise and comprehensible way, focusing on rural Javanese communities and social strata. We combine cultural analysis of kinship principles (kinship as a cultural construction) with an analysis of differentiation in kinship networks. Specifically, we are interested in studying the linkage among kinship and property transmission in different social strata by means of rigorous methods that are capable of mapping, in concrete ways, the embeddedness of economy and society.

In achieving these goals, we want to be able to map actual networks of genealogical (descent and marriage) ties, but we find the standard genealogical chart (from Rivers 1910 onwards) too crude a way of representing network structure. Genealogies, with symbols for distinct individuals, their (often multiple) marriage ties, and the relations between parents and offspring, are typically so cumbersome as to limit the number of actors, kinship ties, and property flows that can be brought into a comprehensive diagram. In any case they lack a simple visual gestalt. The standard genealogy also cannot be represented as a graph with points for individuals and different kinds of lines for relations between them. This is because one of the basic genealogical relations, that of parentage, is not between one individual and another, but between one individual and a pair of other individuals.

One of our reasons for wanting a genealogical graph as a network representation is that older forms of structuralism have proven too crude at assessing patterns of ordering and transformation(Schweizer 1992): they provide broad views of structure, but are unable to cope with ethnographic details as they mesh into ensembles.

Looking for new solutions to the representation problem of kinship and related domains we have been working in recent years with a joint US-French-German project concerned with ordering patterns in social data (discrete structure analysis). Discrete structure is the ordering pattern of qualitative or relational (binary) data. This approach provided us with a different perspective for analysis of social network data:

1. It helps to keep track of the empirical database as well as establishing structural pattern;
2. It allows computer-assisted analysis of ordering properties as well as visualization of structure in the data.

Boolean analysis, lattice analysis, entailment analysis, and graph theory are examples of discrete structure analysis that can be applied to ethnographic, survey, and comparative data on social networks, material positions, cognition, etc.[1] Within this context, White and Jorion (1992, 1995) developed a discrete structure approach (the PGRAPH, parental graph) to representation and computer visualization of genealogical networks, and to mapping property transfers (inheritance, gifts, exchange) and other flows on the kinship structure.[2]

   In an earlier analysis of the Sawahan village case materials in this article, Schweizer (1988) used the more abstract statistical methods of structural equivalence analysis. By contrast, the PGRAPH computer-generated representations used here (developed by White 1992 and Stern 1993) provide a means of defining and seeing anew the problem of kinship structure and concomitant social processes. The programs are capable of handling large datasets, including multiple social ties and property flows in a comprehensive and concrete way. They are, then, ideally suited for the analyses proposed here.[3]

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[1] The following researchers, among others, are involved in the project: at Irvine D.R. White, L. Freeman, J. Stern, and P. Skyhorse; at Paris and Caen A. Degenne, V. Duquenne, M. Houseman, P. Jorion, A. Cherfouh, and M.O. Lebeaux; at Cologne T. Schweizer, H. Lang, C. Brumann, and S. Servaes. Recent publications include Degenne and Lebeaux 1992, Duquenne 1992a,b, Freeman and White 1993, Houseman and White1993, Lang 1993, Schweizer 1993a,b, White 1992. White and Duquenne 1995 present an overview of the approach, see also several papers in this volume.

[2] The kinship graph was initially stimulated by the work of Lévi-Strauss and Weil in 1949 and given form by Guilbaud (1970). Guilbaud's graphs were mainly applied to permutation group models of kinship (Weil 1949). In contrast to the group-theory approach to kinship, the mathematical idea utilized here of the PGRAPH as a network derives from theories of ordered sets (partial orders, Galois lattices). The PGRAPH is an ordering of kinship relations between couples by individuals who link their parents to their own parental coupling. It is dual to ordinary kinship graphs since individuals are the lines and couplings are points. It is also dual as an ordering by generations, where upward chains generate ever more inclusive sets of ancestors while descent lines include only a single member of each couple or singleton. The PGRAPH, in contrast to assumptions that structural analyses are ahistorical, allows us to include the flow of historical time. It is only as a second step that we impose upon them or reduce them to "cognized" transformational structures repeating themselves in time, the concern of Lévi-Strauss, that may represent natives or observers "thinking about kinship" as social rules and conventions.

[3] In considering large graphs, it is important to distinguish the image of the graph from the graph itself. The PGRAPH programs provide a variety of means of statistical analysis of graphs of very large dimensions, regardless of their interpretability or clarity as visual images. Unless they are well

To analyze kinship in its simplest terms as a network, we adopt one simple expedient that reverses our normal gestalt: we regard marriages, couples, or uncoupled singles as the nodes in the network and individuals as the lines that connect them. This is a difficult switch to make, but worth the effort. It allows us to see an ordering pattern generated by marriages and lines of descent, either bilateral or unilateral, depending on the sex of linking relatives. At minimum, two types of lines are distinguished: links through men, and links through women. Other links, such as transmission of property or exchange, can be superimposed on the basic graph, which is also ordered in time (every line is preceded by its parents, and may join other lines to procreate succeeding generations). Figure 3.1 gives an illustrative example of the traditional and the new PGRAPH representation (an extended treatment is given in White and Jorion 1992).

Seen as a global network, with marriages ordered vertically in time (successive upward links of ancestry, downward of descendants), kinship is a self-organizing system comprising conscious actions guided by cultural rules, customary or routine actions constrained by rules or situations, and unintended consequences of individual actions in the social and material world. Material and social conditions pertain at each level in time in this graph, and various social biographies (of persons and things) meet in the milieu of any given individual.

This way of "imaging" kinship provides a structural skeleton for studying the flow of resources over time as they are embedded and disembedded in their social fields. Marriages rules and strategies change the shape of this structure and may have the effect of rediverting flows of inheritance, exchange and gifts as well as the transmission of immaterial or learned behavior.

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structured, however, images may become visually uninterpretable with larger numbers of nodes. PGRAPHS are not like multidimensional scaling, however, where the graphic image I fixed and can only be rotated in a dimensional space. For large graphs with interpretable statistical structure, the PGRAPH program provides various graphical means for recoganizing visual images to improve visual interpretability. There are also a number of new automated graph drawing algorithms which can improve the visual clarity of hierarchically structured graphs. With large graphs it is often desirable to graph only the core of the matrimonial network – i.e., marriage nodes that are connected two or more times with other nodes – and to emphasize in several complementary visual displays of the graph the various statistically interpretable structural aspects of the core. Within the graphic core, one can also decompose the image into discrete blocks of lines which contain all the maximal sets of circuits in the graph. By means of graph-decomposition and visual structuring techniques, then, unlike MDS (multidimensional scaling), visual image clarity is sometimes achievable even for very large numbers of nodes if the data are highly structured.

(a) Genealogical chart: individuals as points with marriage and descent lines [numbers refer to couples]
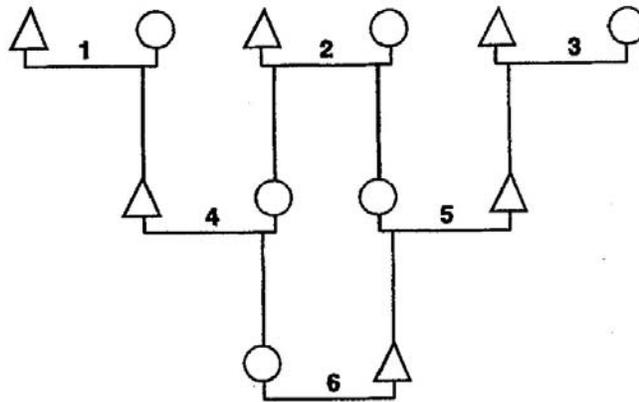
(b) PGRAPH: couples as points, solid lines for males, broken lines for female descent
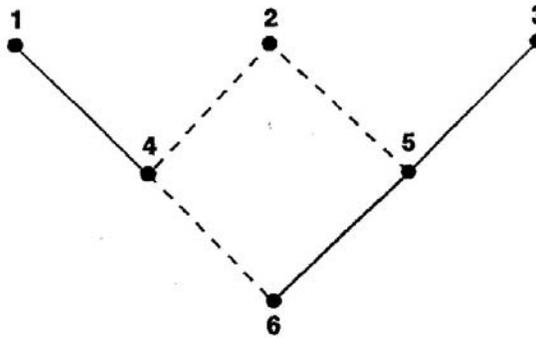
(c) PGRAPH data: input in vector format

couple #	1 2 3 4 5 6	0 indicates unknown ancestry
husband's parents	0 0 0 1 3 5	male descent vector
wife's parents	0 0 0 2 2 4	female descent vector

Figure 3.1 An Illustration of the Old and the New Kinship Representation

THE JAVANESE CASE: ETHNOGRAPHIC BACKGROUND

"Different villages, different customs" (*lain desa, lain adat*) is a popular Indonesian proverb stating the richness of social and economic arrangements to be found in rural Java and other part of the archipelago. Indeed reports from the 19th and early 20th centuries contain a wealth of data on different traditions of heirship, sharecropping contracts and labor relations among Javanese localities (Bergsma 1876-96, Versluys 1938). Present-day ethnographic reports add to this observation of complex variation

in the economic sector. Although at the surface there is considerable local variation in minute customs of tenure, there is much evidence pointing to the ownership of and access to land (especially where irrigated) as the main factor in social stratification in rural Java in the past and present (Boomgaard 1989, Drexler 1988, Franke 1972, Hart 1986, Hefner 1990, Hüsken 1989, Jay 1969, Schweizer 1987, 1989a, White 1976; in a wider Southeast Asian framework: Hart, Turton and White 1989, Peletz 1988, Scott 1985). Trade and other off-farm labor is an important sideline activity. In this introductory ethnography we shall focus on Central Java and use Sawahan, the village studied by T. and M. Schweizer in 1978/79, as an illustrative case. Sawahan is located in the Klaten area which is renowned for intensive wet-rice agriculture and a high degree of commercialization.

There are three classes in Javanese rural society: a lower class of laborers, a middle class of small-scale farmers and traders, and an upper class of village headmen, large-scale farmers, and merchants. Neighborhood affiliations, religious and ritual activities, and patron-client relations cross cut one another and kinship ties. Landlessness (43% of all households in Sawahan; numbers in this section pertain to this village) is mediated by tenancy and share-tenancy contracts, off-farm labor and migration to cities. There is high demographic pressure on land (1315 inhabitants/ km²). The average plot is small (0.23 ha), and land concentration fairly high (Gini=0.48).

Complex variation extends to inheritance patterns. The most general rule, but clearly important in Islamic families and areas, is given by a very popular Javanese saying "One pikul, one gendong" (*se pikul, se gendong*), which means: the man gets two shares, the woman gets one (*pikul* is a traditional weight of 62 kg carried by men in two baskets on a pole; *gendong* is a basket carried by women in a string). This rule conforms to Islamic law. In addition, there are also Javanese customary ideas that property should be divided in equal shares, which is also associated with syncretized Muslims (Jay 1969:64-5,84-85).

Additional variation is created by the kind of property to be distributed and local differences in inheritance rules. Thus in Sawahan (and its neighboring villages which belonged to the Central Javanese sugar or tobacco estates in the Colonial past, cf. Schweizer 1989a:90-110) private land is divided into double plots of 0.48 hectares and this can only be inherited as a whole. The eldest son usually becomes the main heir and receives one plot (0.26) for immediate use; the other plot is temporarily given in usufruct to his younger siblings who share in the revenues or rotate in the tenure of this plot. When they are deceased the whole double plot will fall to the main heir and his offspring. Thus, the laws of inheritance prevent a long-term division of farmland under half a hectare. In rich families parents will try to accumulate land for all children, including daughters. They approach the equality rule of heirship if there is abundance of land in their families (this can also happen in Islamic families). In case of less land the sons will be given preferential treatment according to their birth order. The costs of higher education or capital building for commercial undertakings intervene a bit; so (younger) children who receive higher education and capital will

usually work in the tertiary sector and will not be the prime recipients of land - in contrast to their older brother(s). Village officials are a special case. The official land (of best quality) which they receive as salary cannot be inherited. But they can arrange for succession to office within the family - then the land remains in the family. This is the strategy of social closure they usually chose, apart from matching marriages to other headmen or rich farmers/traders families.

While men enjoy higher status in general and are more respected for power/potency, there is unanimous agreement in the ethnographic literature that Javanese women play an important part in the economy: Thus Jay (1969:87) observes:

> "Wives play the dominant part in the economic operation of most households and in particularly closely control the purse strings. Husbands handle the farming but defer considerably to their wives' opinions in the planning and marketing of the crops. Wives, on the other hand, expect their husbands to leave completely to them most of the domestic decisions, especially on expenditures."

Keeler (1990:129) writes of another village in the Klaten area that gender "certainly doesn't prevent women from exercising great control within the household, since with the exception of some bourgeois families, Javanese wives usually manage their husband's income, as well as the money they may themselves earn through trade or other business dealings."

Javanese kinship is cognatic, but ethnographers describe kinship in very mixed ways: on the one hand, Javanese in their behavior toward kin seem to play with the rules and to suffer from genealogical amnesia. On the other, kinship ties are observed to provide access to land and income-generating opportunities, and the all important patron-client relations among neighbors and religious fellows are built to a considerable part on kinship. Some ethnographers react to the puzzling complexity of kinship rules and discrepancies among behaviors by calling the whole system loosely-structured. Due to the lack of suitable methods the crucial question of how kinship and social stratification are related has been elided in the ethnographic literature (see however the case materials presented in Schweizer 1988 and Hüsken 1988, 1989, 1991). It is our conviction

1. that there is more pattern to the system than has been recognized hitherto.
2. that it is a worthwhile undertaking to study variation of the system in a comparative social network framework.
3. that to detect the overall pattern as well as its concomitant variations and to study the relationship between kinship and social stratification we need better methods for the analysis and representation of kinship and property flows. With the new methods and formal tools of parental graphs (White and Jorion 1992) and visual algebra (J. Stern 1993) we can explore, more fruitfully than in the past, the structural pattern of kinship and its variations in Javanese society and assess its relationship with social stratification.

DATA ANALYSIS

Focusing on the emic rules of kinship and their social consequences section 1 constructs a general framework based on ethnographic observations in the literature (e.g., Geertz 1961, Jay 1969, Schweizer 1989a, b, Hüsken 1991). Section 2 examines some of the structural properties of kinship graphs of cross-sections of socially mixed hamlets in rural Modjokuto (Jay 1969) and Sawahan. Section 3 examines the networks of rural elites, and section 4 examines the property flows and occupational strategies that support the elite networks. The datasets analyzed in sections 1 to 4 have been coded for and are available as part of the PGRAPH suite of programs and datasets (White 1992, also this volume, Appendix).

1. Principles of Equality, Rank, and Stratification in Javanese Kinship Networks

Javanese kinship is often characterized as "loose," "unorganized," or "insignificant." Dutch scholars such as Haar (1948:55) assert that the Javanese *desa* (villages) are "communities in which the kinship factor had no significance." Geertz (1961: 2-3) asserts that "from the point of view of the functioning of the society, the Javanese kinship system... makes relatively few contributions" and "the nuclear family is the only important kinship unit."

Our thesis is that rural Javanese kinship is based on principles of equality, rank and stratification that apply differentially in diverse contexts. Failure to understand these principles has led to characterizations that fail to recognize their coherence of variability in the forms of kinship. Our explication of this common base and its differential elaboration draws on the classic ethnographic work of Geertz (1961) and Jay (1969) and the more recent studies of Hüsken (1988, 1989, 1991), Keeler (1987, 1990) and Schweizer (1987, 1988, 1989a,b, 1993a,b, Schweizer, Klemm and Schweizer 1993).

There are three common factors in Javanese kinship that operate as a partly self-organizing system regulating varying expressions of the contending principles of equality, rank, and stratification. The first is marriage among status equals (homogamy) as the principal factor channeling selection of a spouse at all levels of social rank or class (Keeler 1990:136). This has a differential effect on local village elites owning land whose numbers are small relative to the large proportion of landless peasantry. Although there is no evidence of any greater degree of endogamy among elites, and even if there were a constant rate of endogamy, endogamous marriages among the smaller elite groups are more likely to be among close kin, while for the larger number of landless villagers status-endogamous marriages are more likely to link co-residents than close kin. With village headmen paid salaries of land and the differential effects of endogamy there is a strong connection between degree of elite

stratification via office- and land-holding and the consolidation of landholdings through endogamous marriages with close kin.

The second common factor in Javanese kinship which has differential effects by strata is the operative principle in inheritance of providing for offspring equitably so that none is without a means of support. "Children care for their aging parents, and siblings help each other in agricultural tasks and ritual obligations" (Schweizer 1988: 944-5). In this respect, "Kinship ideology stresses the fundamental egalitarianism of members of the same 'family'" (Hüsken 1991: 156). But there is great flexibility both in the timing of allocations (the "gift" aspect of inheritance is in the timing - but may also create a reciprocal indebtedness) and the principles of division.

> "The transfer of property to descendants is a continual process.... Throughout a man's life he gives his children portions of his [and community] property.... such gifts are taken into account when the remaining property is finally divided up at his death" (Geertz 1961:52).

Inheritance is regarded as customary and uncontentious, rather than based on an impersonal legal prescription, but always within the needs and contingencies of particular families and sets of individuals (Geertz 1961: 46-54). The Islamic rule that sons inherit twice as much as daughters is seen not as an alternative ideology but an alternate interpretation, "less important than the characteristics of the particular problem at hand" (Geertz 1961:49).

> "Customary solutions have a force of their own: the very fact that many people have, in the past, followed a certain path makes it easier for later arrivals to perceive the path as suitable to their values and desires. For this reason it is common, for instance, to divide the estate equally among all children of the deceased, and deviations from this rule are seen as resulting from special circumstances" (Geertz 1961: 49).

For village elites, the customary norm of equal division of inheritance, especially true for landless peasantry, would tend to disperse elite landholdings in successive generations. Both Muslim and non-Muslim elites (as in the village of Gondosari, Hüsken 1991) counterbalance the tendency to land dispersion, however, by intermarriage between relatives in status endogamous marriages, thereby fulfilling the customary norm of homogamy. In Muslim areas, such as the village of Sawahan (Schweizer 1988:944-5), it is also not uncommon for sons and eldest siblings (especially the eldest son) to receive the major lot of land inheritance and for others to receive minor lots.

Thus, we would argue that variations in customary law of inheritance, combined with marriage practices, establish variable "paths" in a structure differentiated by social rank and stratification. The same kinship principles tend to disperse property among the landless and concentrate land among elites.

The third common factor in Javanese kinship, which has differential effects by strata, is that of rank. Rank is reflected in a behavioral continuum of respect-

familiarity that allots greater respect by generation and relative age. There is also a degree of rank asymmetry in affinal relations that accords greater respect and kinship involvements on the wife's side as opposed to the husband's.

In elite networks, however, closure of the marriage circuits also helps to equalize differences of rank between different families. Conversely, the poorer the landless peasant families, the less the closure and the greater the potential ranking of kinship networks. In the poorer segments extended kinship ties take on the character of patron-client ties with the wealthier families (Hüsken 1991). This presupposes precisely the kind of moral commitment to ideological "equality" or sharing resources that we see among the richer landed families who allocate land to their children on the premise of providing for everyone. As we will see below for Sawahan rural elites, siblings who received land allotments allocate land for use (usufruct) to siblings who did not receive land by inheritance. Granting of sharecropping privileges to more distant relatives is an extension of this same principle. Hence kinship is a primary vehicle for resource allocation at all levels of stratification, as we move from elite circles to the landless peasantry, but the idioms of kinship shift between claims of sympathy and equality and those of elder/junior ranking.

Given these three common aspects of Javanese kinship that take different expression by social strata, although kinship is less elaborated among the poorer sector and there is greater spatial dispersion of related families, the kinship system is basically the same, and kinship for landless families retains the potential for establishing broader ties. The concept that "close kin" usually extend to the second collateral degree -- while not referring to residential arrangements -- is firmly held by even the poorest peasantry, and is in fact the means of claiming the privilege of sharecropping land held by richer relatives.

What is clearly different for elites and ordinary peasant families, however, is that the former often congregate into residential blocks, while related families among the latter are more commonly dispersed (Hüsken 1991:164). The consolidation of power through kinship is no accident of the smaller size of the elite strata, but a conscious strategy that builds on a common kinship base.

2. Kinship Networks of the Kradjan (Rural Modjokuto) and Dukuh (Sawahan) hamlets

In this section we focus on cross-sections of marriages in two socially mixed headmen hamlets of larger viallges. Figure 3.2 shows a cross-section of marriages of different statuses in Kradjan hamlet (in the rural vicinity of Modjokuto) in Eastern Java, studied by Jay (1969). In this PGRAPH image women are the solid lines and men the dotted lines. Marriages occur where two descending lines meet (heavy dotted lines are to marriages that relink female lines; these marriages result in the total of four generations we see in Figure 3.2, which are ordered from top (founders) to bottom (descendants). T
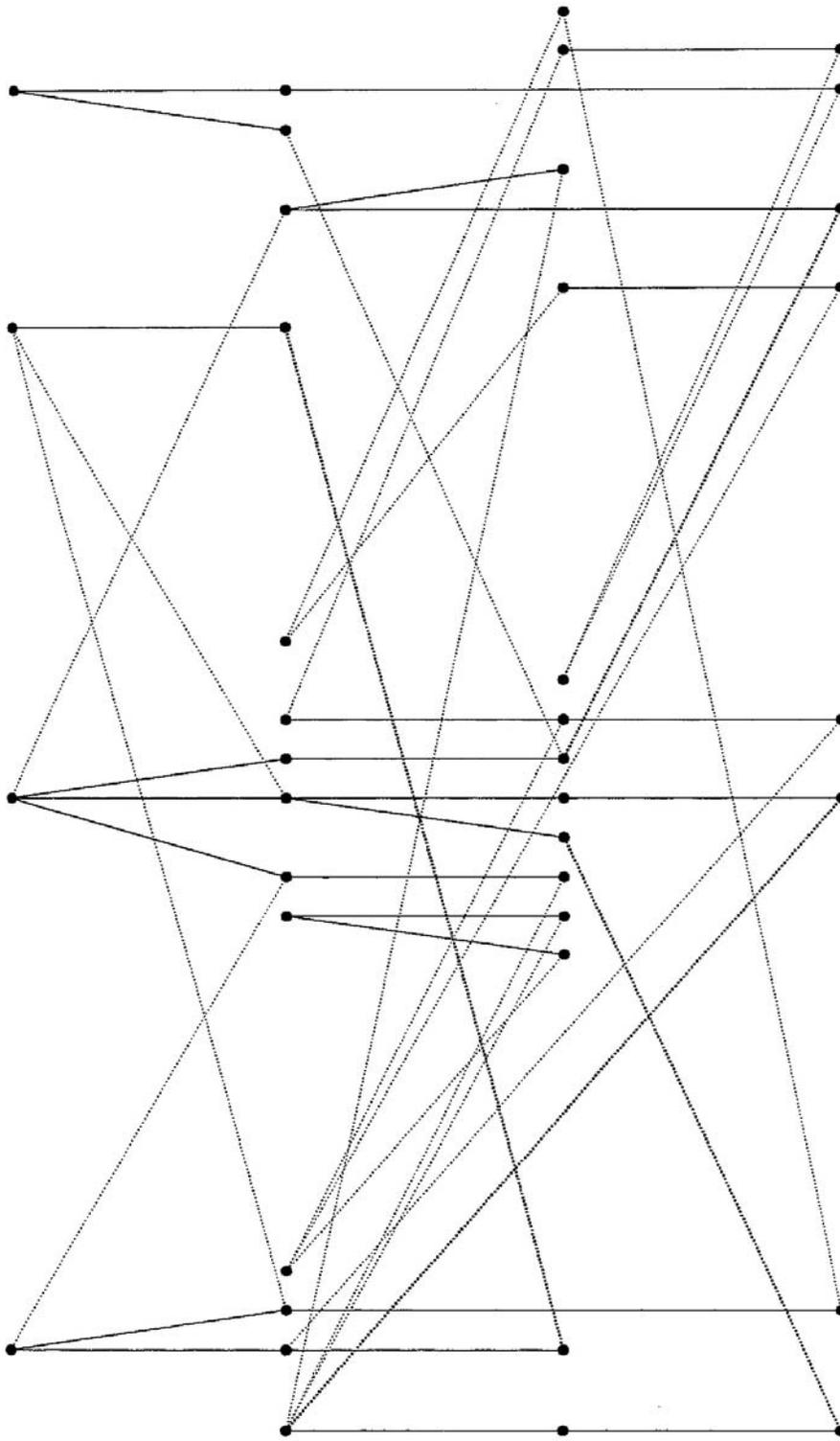
Figure 3.2 Kradjan Hamlet (Rural Modjokuto) 3-Compartment Marriages (dark lines = females; heavy dotted lines = relinking female lines) (based on data in Jay 1969)

The diagram requires three compartments (distinct sets of marriages) to show minimal rules of exogamy, such that the two sets of parents of a married couple do not come both from the same compartment.[4] re are no marriages within compartments. A similar looking diagram, with three compartments, could be drawn where male lines are more vertical (within compartments), and women move between compartments to marry.

Figure 3.3 shows a similar cross-section[5] of marriages in Sawahan (Dukuh hamlet), this time with males as the more clustered vertical links and females (dotted lines) moving between them (heavy dotted lines are to marriages that relink male lines). If female lines are placed within the compartments, three compartments are still needed to represent exogamy, and there are two reciprocal relationships between female lines.

In these two figures, the placement of lines of a given gender within a minimum number of compartments simply provides information about marriage structure. The fact that no fewer than three compartments are needed to express exogamous tendencies, for example, rules out the possibility of marriage systems based on moieties, dual exchange, or the network "sides" of Houseman and White's Chapter 4 in this volume (see also their 1998). Such compartments are not part of Javanese cognition or nomenclature about kinship organization, except insofar as the rule allowing that "affines of affines can be affines" (which rules out two-compartment structures of two-sided or dual exchange) is an implicit element of these marriage structures. Proscriptions against direct exchange of women between male lines, however, are quite general in rural Java. In Kradjan there is indeed only one marriage that relinks two male lines previously connected by marriage, but there are three that reciprocally relink two female lines previously connected by marriage (the double dotted lines in Figure 3.2). In Dukuh hamlet (Figure 3.3), the relinking frequencies are two and two, but for the elites of the entire village

The Javanese do not in general conceive of marriage as linking (or relinking) families but as establishing a new, autonomous household (e.g., Geertz 1961:55). Yet, while men are formally heads of households, links through women provide much of the integration of local hamlets, and there are no proscriptions against males as husbands moving back and forth between female lines. Thus, male lines are prevented from direct exchange of women, while female lines are not, and female lines are indeed intermarried in direct exchange patterns. Since in both cases the minimum

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[4]   A two-compartment solution is equivalent to dual matrimonial organization. Three compartments imply a series of exogamous marriages that are connected in a circuit by an odd number of links between sets of siblings-in-law. K compartments, where $K>3$, imply at least one subgraph of K sibling sets, where each is intermarried with all the others. The two-compartment solution gives a unique partition of a connected set of marriages. For $K>2$, compartmentalization into exogamous groups does not necessairily produce a unique partition.

[5]   In this diagram only those marriages are shown which connect to two or more other marriages. The complete census of this hamlet is included in the PGRAPH suite of programs and datasets (see Appendix).

number of exogamous group compartments is three, female lines are involved in more proximal
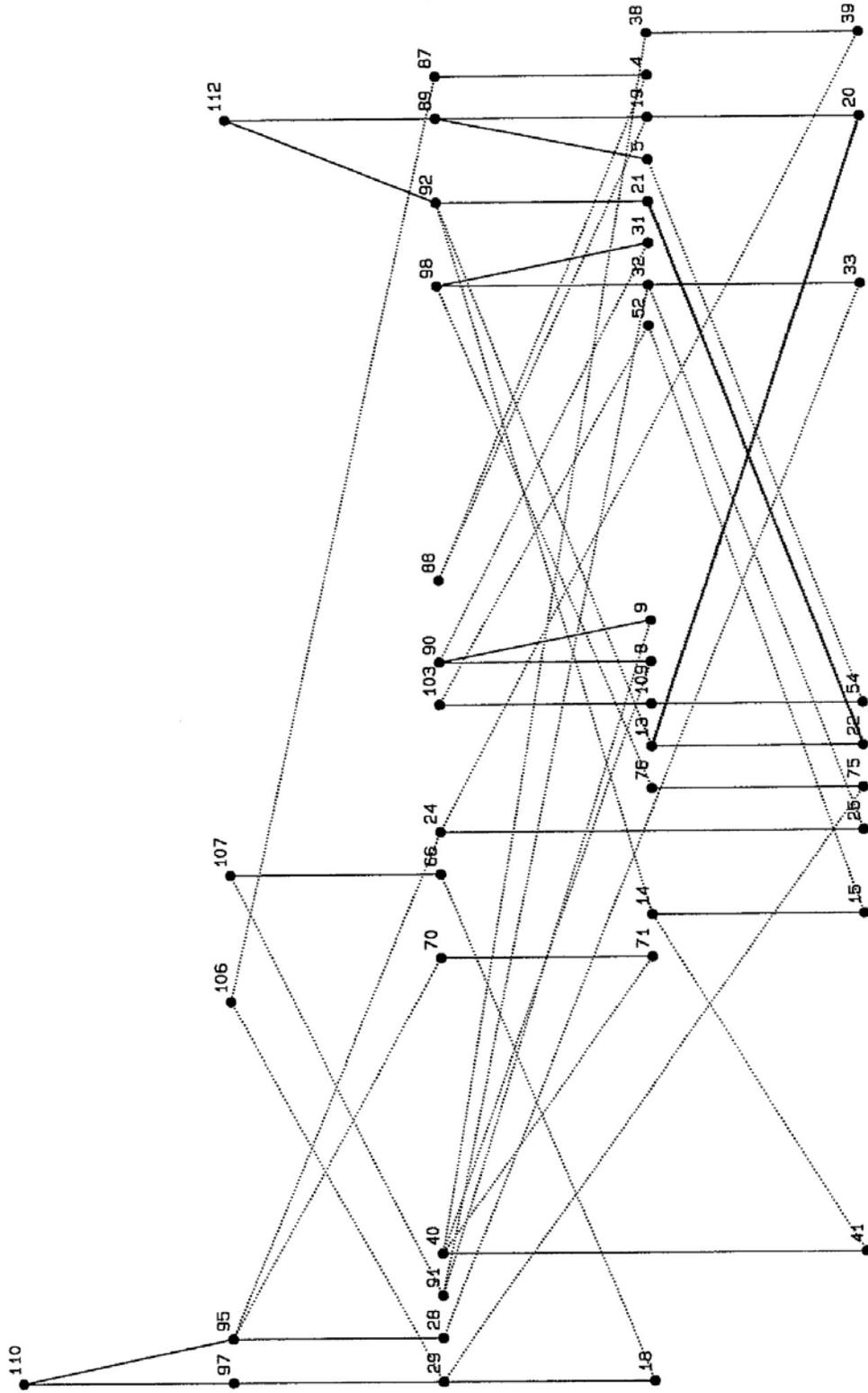
Figure 3.3 Dukuh Hamlet (Sawahan) 3-Compartment Marriages (dark lines = males; heavy dotted lines = relinking male lines)

direct exchanges, while male kinship lines are prohibited from doing so, and can only be involved, if at all, in indirect or more generalized exchanges that cannot be repeated or reciprocated in subsequent generations. Female lines, then, may have multiplex linkages to other female lines, while male linkages to other male lines are largely uniplex. This is commensurate with the generally higher planning and decision making authority of women and their perceived greater support by and satisfaction in kinship networks, and a widespread perception of the relative isolation of men in lower strata.

As we will see below, the kinship pattern among elites in Sawahan village shares a number of these features, but manages to overcome the relative isolation of males in terms of uniplex genealogical ties by greater residential proximity in compounds.

3. Kinship Networks of Rural Javanese Elites

Figure 3.4 examines more closely the kinship network and the means by which property is maintained among the Muslim elite of Sawahan village. Sawahan has a relatively high proportion of practicing Muslims (60%) for rural Java, and a large Islamic elite network (Schweizer 1988:946):

> "...some families played a prominent role in the economic, social and religious fields of activity. A large kinship network connected the religious leaders and the adherents of strict Islam. Moreover, in the past and present some of the most influential village leaders, large-scale farmers, and prosperous traders have proven to be members of this kin group. We tried to cover as completely as possible the set of strictly Islamic families in the village directly related by descent or affiliation. Twenty-four households emerged at the core of this Islamic and landowning kinship network.... For the Islamic village elite... kinship relations, land accumulation, transmission of property across generations, and religious activities co-occurred to some extent.... The network comprises influential ancestors as well as their living descendants.

Political office is a means of land consolidation, since salaries of village headmen are paid in land. Such land is not inherited, but will remain in the family if one's son succeeds to the headship. Marriage with offspring of headmen, rich traders, or farmers, is a means of closing the spiral between land and family.

The elite kinship network in Figure 3.4 is diagrammed with matrilines as the heavy lines and dotted lines for males. This orientation helps to see how women, in this bilateral system, play a more predominant role in Javanese kinship integration (see also Geertz 1961, Jay 1969, Keeler 1990). The largest matriline (13 couples; 22 including sons) integrates 2/3rds of all the couples. The second largest matriline (7 couples; 9 including sons) integrates nearly 1/3rd, and the two together span nearly all members of the network. There is direct exchange of men between the two main matrilines. In contrast, if we look at the network in terms of patrilines, the exchange of women is that of indirect cycles between three groups. As noted above for Dukuh and

Kradjan hamlets, this is consistent with the Javanese prohibition of marriages that imply an
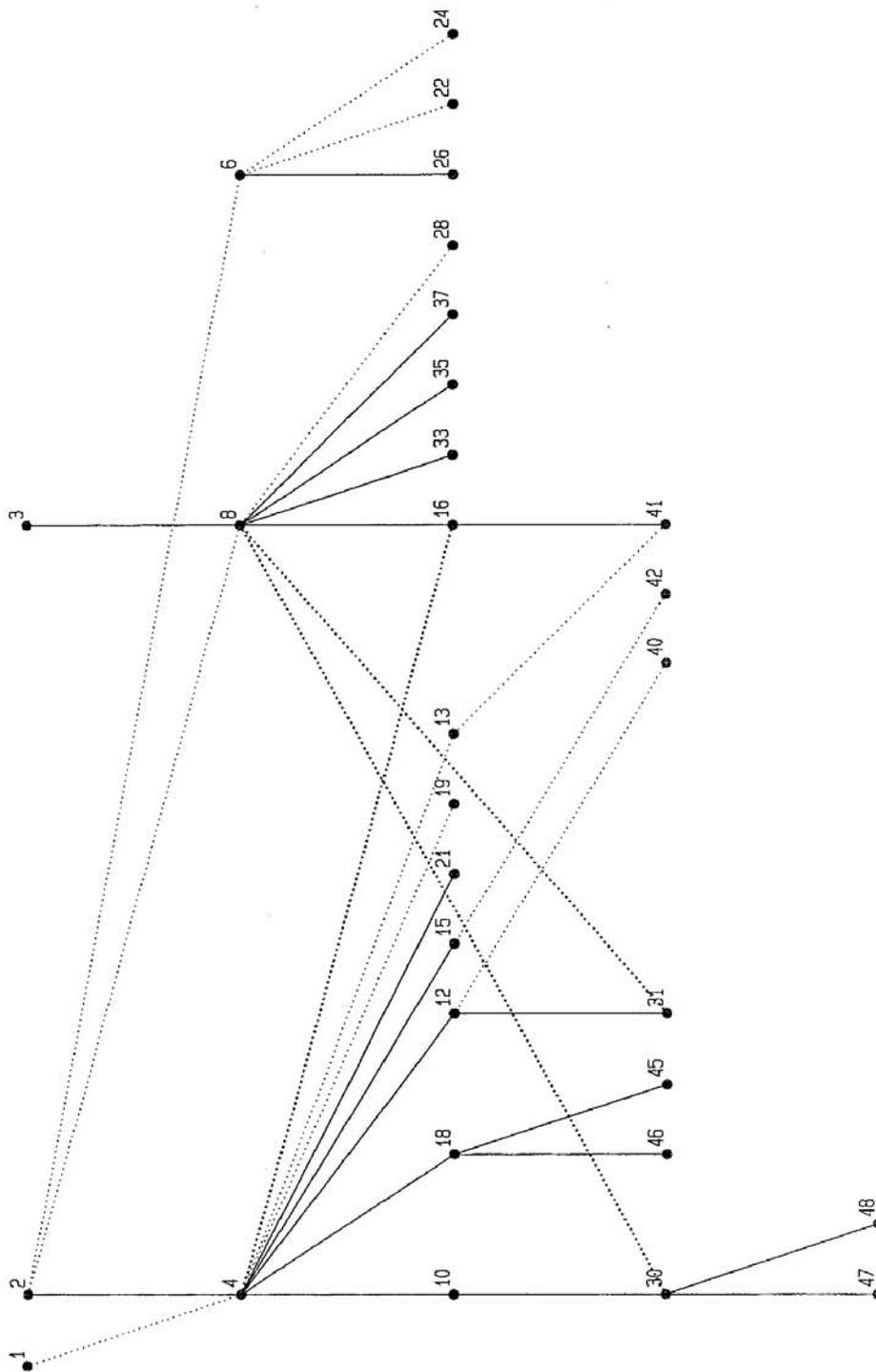
Figure 3.4 Sawahan Village Muslim Elite 3-Compartment Marriages (dark lines = females; heavy dotted lines = male lines relinking two female lines)
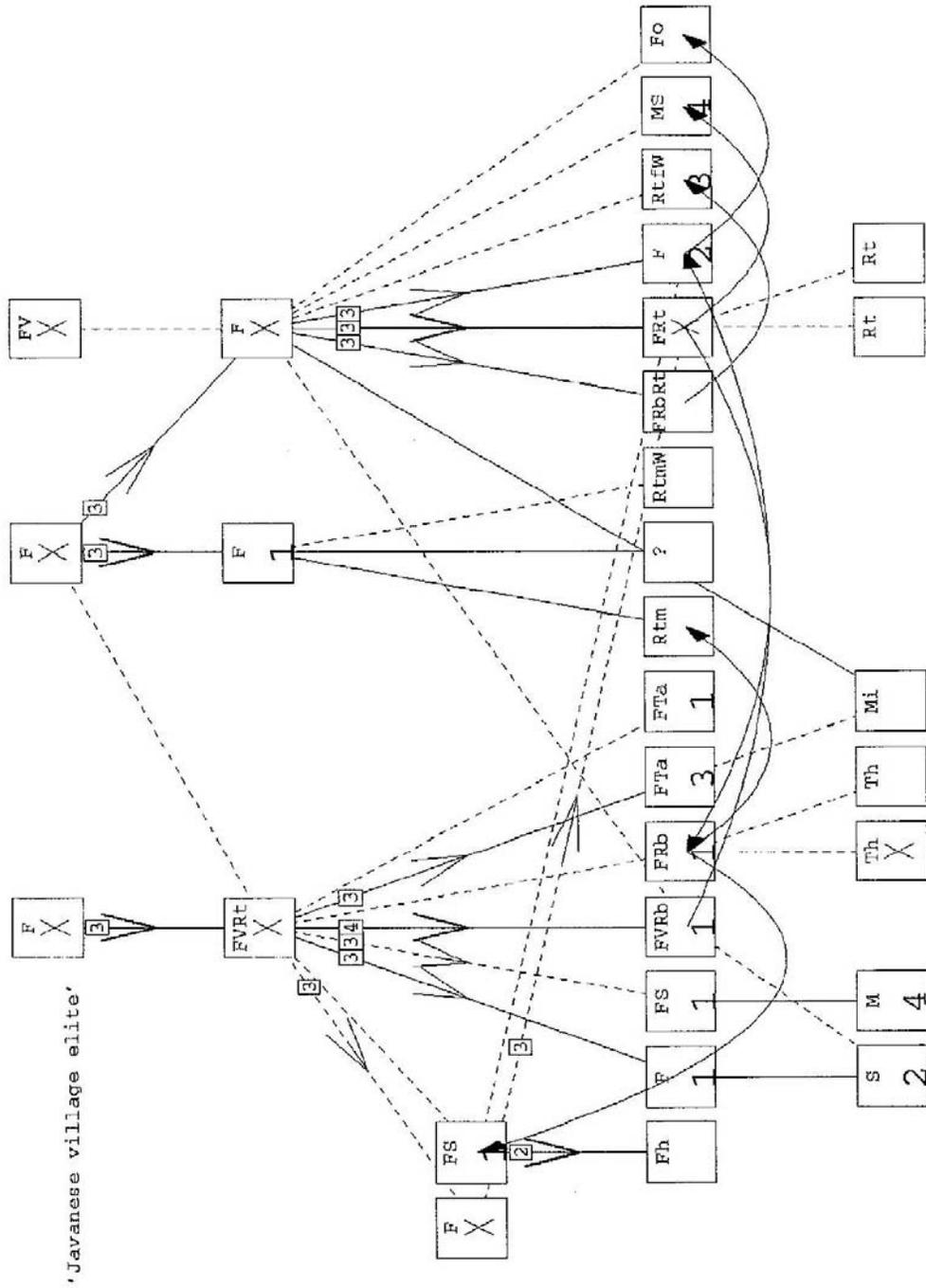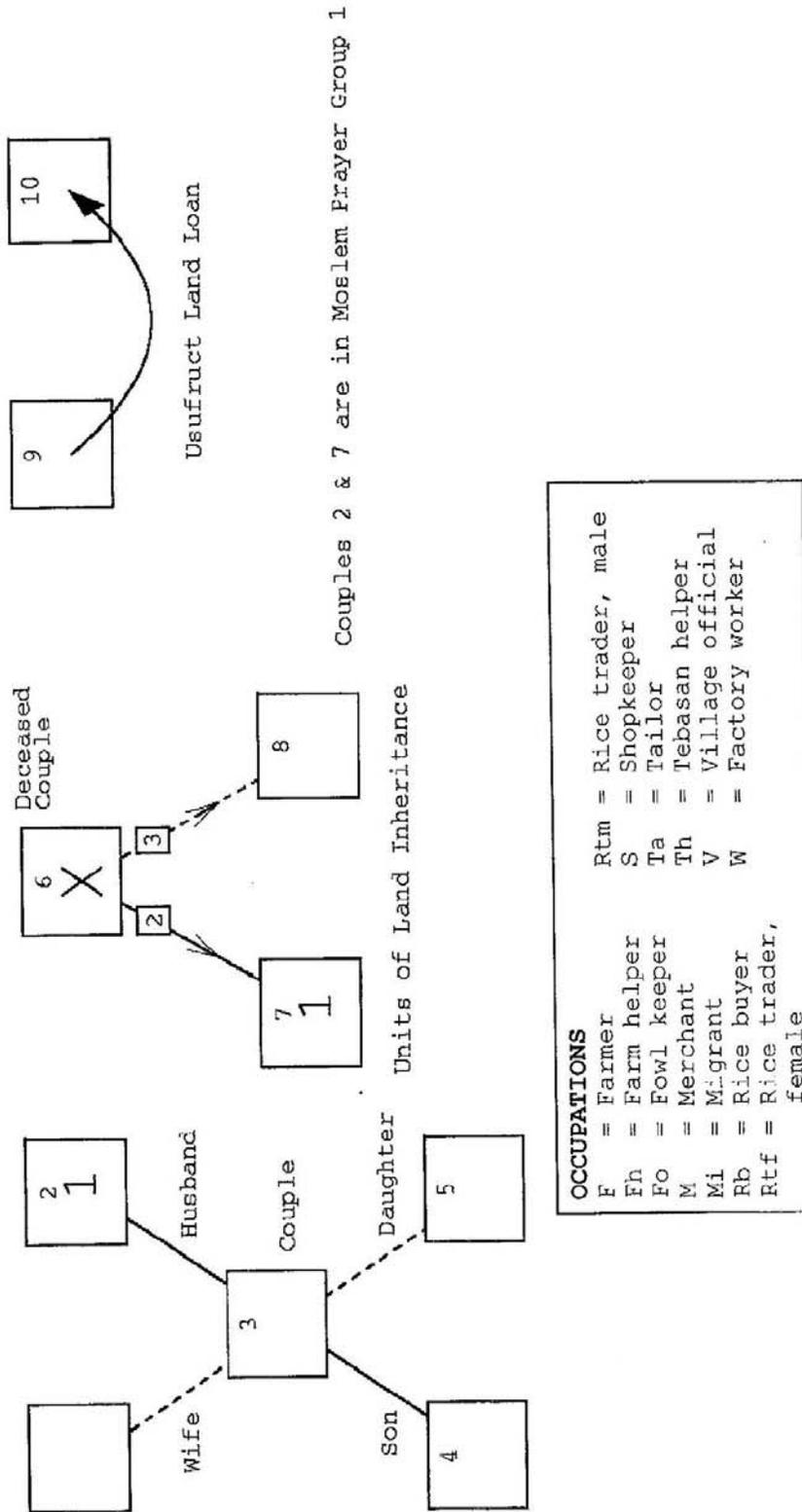
Figure 3.5 Land Transactions and Occupations in the Sawahan Village Muslim Elite

Usufruct Land Loan

Couples 2 & 7 are in Moslem Prayer Group 1

Deceased Couple

Units of Land Inheritance

Husband

Couple

Daughter

Wife

Son

OCCUPATIONS

F	= Farmer		Rtm	= Rice trader, male
Fh	= Farm helper		S	= Shopkeeper
Fo	= Fowl keeper		Ta	= Tailor
M	= Merchant		Th	= Tebasan helper
Mi	= Migrant		V	= Village official
Rb	= Rice buyer		W	= Factory worker
Rtf	= Rice trader, female			

exchange of women between families, and with the greater involvement of women in kinship integration.

The endogamy rate is 16% if we count by couples, but 35% (8 among 28) if we count by descendants. Of the 24 nonancestral couples, four marriages are between relatives, the most common being FZDD (couples 30, 31), the remaining FBD=FMBDD (41) and MBD (16).

In villages with syncretist Islam like Gondosari (Hüsken 1991), with more equal division of inheritance among heirs, the percentages of elite endogamy are much higher (e.g., 40% for Martruna family couples), as would necessarily be the case if a similar consolidation of land were to be achieved.

4. Property Flows in the Kinship Network for the Sawahan Muslim Elite

Superimposed on the kinship graph (Figure 3.4) for the village elite, Figure 3.5 shows the five pieces of information that define Schweizer's (1988) problem of how to analyze the structure of these networks and to show subsets and groupings of actors in this network in terms of interlocking social positions. This image was produced by help of Stern's (1993) visual algebra program, building on the PGRAPH representation.

1. an X through a couple shows that both are deceased;
2. a downward arrow superimposed on an offspring line shows a person inheriting land from the parents;
3. an underlined occupational label for a couple is shorthand for a farming or non-farming couple;
4. heavy and curved horizontal arrows show where land is lent for use by other relatives;
5. the lists of couples show those whose husbands are in one of five Muslim prayer groups.

Cultural rules of land distribution can be identified and explicitly stated from the data on the graph in Fibure 3.5. It can be seen in the image and Table 3.1 that:

A. those who inherit land (typically the sons and some elder sisters) become farmers, with one partial exception, and those siblings who do not inherit land enter non-farming occupations.
B. farming couples provide usufruct land to related non-farming siblings (and sometimes cousins): to those in their own generation of the family who did not inherit land.
C. not so obviously -- since couples 10 and 12 move up with respect to their younger siblings to functionally replace the missing parents (a cultural restructuring of the underlying graph) -- the usufruct distributions are not simply to cousins but (with one exception) to functional equivalents of siblings excluded from inheritance. Land, in this example, passes from deceased parents to the living generation via inheritance and transfer of usufruct, still to be passed down to generations of children yet unborn.

Table 3.1. *Statistical Tests of Resource-Distribution Hypothesis.*

	Became farmer	Nonfarmer
Inherited land	11	0
Did not inherit	2[a]	13

Proposition A: Those couples inheriting land became farmers (*r* = .92, *p* = .0001, Fisher exact)

	Received usufruct land from relatives in "generation"	Did not receive land
Nonland-inheriting couples in generation that has inherited	8	1
Other couples	0	17

Proposition B–C: Nonfarming couples in the generation where land has been inherited receive land in usufruct from farmer relatives in their "generation" (*r* = .92, *p* = .000006, Fisher exact)

[a]Not true exceptions: One case primarily was a rice merchant; in the other case the husband, not shown, inherited land.

Thus, the inheritors of land (I) tend to become farmers F ($\approx$ I), leaving a set B in the generation inheriting land who do not inherit land and are not farmers. There is a subset A of F such that all members of B receive land in usufruct from A by the lending relation U(A,B). It follows that the receivers of usufruct land (B) are "same generation" relatives (S) who do not become farmers (F) (or rice merchants).[6] Algebraically:

I $\cong$ F $\supset$ A and U(A,B)

where

B = S $\wedge$ not(F)

where

$\cong$ is approximate equality, $\supset$ is the superset relations, and $\wedge$ is the logical AND.

Thus, we have sibling groups or their functional equivalents as units for sharing resources and access to land. Inheritance consolidates land by selecting a limited number of heirs whose ownership of land allows them to enter farming and compete successfully on a commercial basis. Usufruct access to land provides those in non-farming occupations, such as shopkeepers or commercial middlemen with agricultural resources.

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6   Rice merchances depend on income through farming or headmanship, or they may receiuve income by usufruch rights to land that derivce from not being the main heirs of land. They represent a secondary elaboration of landed wealth.

These sibling groups overlap first through intermarriage and second through establishment of common residential blocs. Intermarriage intertwines the egocentric concept of a bilateral kindred (consisting of descendants of common grandparents) into a family network that acquires something of a corporate character, but fluid since individuals can affiliate or disaffiliate with respect to the extended family and its residential foci.

Muslim prayer meetings also serve an overarching function that helps to knit the kinship network together as a basis for exchanges at a higher level of integration than the descent lines, sibling sets or lines of inheritance (Schweizer et al., 1992). Here we find a clue to the previous exception where a cousin rather than sibling might be given rights of usufruct: that cousin's father was a member of the donor's prayer group. The groups are usually also a mix of farmers/non-farmers, heirs and nonheirs. Superimposed on the graph in Figure 3.4 we see that while the same prayer group may include siblings, every group has maternal collaterals (two uncles -- MB and MZH, a MMBS, a MBDH) as well. Maternal connections within the prayer groups reinforce the more general importance of maternal connections to kinship integration.

What we see in the elite kinship network is not a "loose structure" but a highly structured set of interdependencies between customary concepts and behaviors, access to resources, stratification, self-organization and boundary maintenance or relative closure of elite kinship networks, reinforcement of extended family cooperation by residential arrangements, strategies for inheritance and usufruct that preserve and consolidate landholdings and the viability of elite occupational specializations, etc. Among other findings PGRAPH visualization has precisely revealed siblingship as an important organizing feature of this kinship network, which has not been given sufficient treatment in the ethnographic literature on Javanese kinship. Examining kinship and property transmission among the matrilineal Malays of Rembau on the basis of ethnographic and historical evidences, Peletz 1988 reaches similar conclusions on the importance of siblingship (since the genealogical raw data for PGRAPH representation is lacking in his monograph we cannot embark on a similar PGRAPH analysis of this comparable case).

CONCLUSION

(STUDYING THE FLOW OF THINGS, KNOWLEDGE, AND POSITIONS ON THE KINSHIP GRID)

The idea of using kinship diagrams to trace the cultural biography of things -- such as land inheritance in our Javanese case -- goes back to W. H. R. Rivers (1910) classic article on the genealogical methods. As summarized by Kopytoff (1986:66)

> "... when the anthropologist is in search of inheritance rules, he may compare the ideal statement of the rules with the actual movement of a particular object, such as a plot of land, through the genealogical diagram ... But a biography [of things] may concentrate on innumerable other matters and events."

Using a number of ethnographic examples, we have begun to think out the relation between kinship and the movement of social goods of qualities through temporal phases on the kinship ordering. The visualizability of the kinship graph and its suitability for formal analysis helps us to define cultural regularities superimposed on a biological and space-time scaffolding; to identify process of social integration and exchange; and to study systematically the social biography of things and the regulation of economic flows via kinship networks.

Ordered kinship graphs are useful tools to help see and think through comparative aspects of social structure not as timeless but as dynamic structures. The Javanese village elite example illustrates how we study social processes such as circulation of goods and wealth (Appadurai 1986, Kopytoff 1986, Ferguson 1989), succession, transmission of knowledge, social behavior, marriage strategies, etc. As part of our research on Discrete Structure Analysis (cf. note 2) we are currently designing the use of computer-generated graphic frames for studying temporal unfoldings through successive time periods. Discrete methods of analysis such as are used in this paper provide precise tools for decomposing multiple ties in kinship networks and yield deeper insight into the structural pattern than standard tools of positional analysis.

Parental graph analysis of actors connected by common descent and marriage ties establish substructures that are internally differentiated within overall social structures. Inheritance of land, religious activities and ensuing occupational specialization can be closely traced as secondary flows on the basic kinship scaffolding.

The Javanese case illustrate one of the most fundamental theoretical propositions that can be formulated, tested, and explored for its evolutionary consequences within this approach: The fundamental kinship "structures" are differential formations that occur within global kinship networks. As such, they enable differential adaptations and differential social learning to take place within the global kinship network. These differential adaptations lead to change in both the intergenerational short run and the transgenerational longer run (we would argue: predictable over one or two generations). Short term social change, social history and "development" and social evolution more generally may be viewed as outcomes of these adaptive processes. The network approach, far from obliterating the contribution of individual actors, their social biographies, and their local social milieux, can help us to locate actor strategies within the changing structures of global networks and to identify the relation between individual and network-driven phenomena in various time perspectives. Computer-assisted kinship network mappings may be used to represent these processes, as it were, in "real" generational time, and kinship net computations may help to formulate and test theory about the dynamic mechanisms of structuration and change in social systems.

NOTES

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