in a number of societies and the perception that themes of gender opposition and hierarchy are both familiar and different among these societies. As the locus of a controversy about the significance of descent, New Guinea also invites an analysis of the relation between descent and gender. The common concern of the five papers was to leave behind simple stereotypes of "patrilineal descent" or "sex antagonism" in New Guinea by focusing on differences in the relationship between gender and kinship in particular societies. A focus on regional variation within New Guinea seemed a most fruitful way of uncovering the distinctive dynamics of specific systems, especially because, in contrast to the situation in Europe, material on historical transformations is here difficult to obtain and of little depth. Participants generally agreed that groups of the central and western highlands could be distinguished from lowland and eastern highland societies and that the difference is seen strikingly in the elaboration of ceremonial exchange and big-man prestige systems in the former and the emphasis on male cult activity in the latter.

Two lessons may be usefully drawn from the New Guinea discussion and generalized to the study of kinship and gender in all societies. First, we must not assume that labels such as "patrilineal descent" describe societies in which descent, marriage, exchange, prestige, and gender are interrelated in such a way as to constitute a single kind of social system. Second, we must not assume that gender has the same social meaning and structural role in all societies and therefore constructs "men" and "women" who are the same kinds of actors in kinship relations everywhere.

Summary. Feminist anthropologists began their investigation of gender constructs and hierarchies by combing ethnographies for information on "the position of women." Such information was generally found in chapters on kinship, marriage, and the family, and received perspectives on kinship therefore seemed appropriate tools for the analysis of gender. A closer examination of gender organization, however, has led us to reexamine linkages between gender and kinship once thought to be universal. In particular, this conference questioned the universality of the domestic/politico-jural domain distinction and the cross-cultural comparability of descent categories such as "patrilineality."

In reconceptualizing "kinship" as an analytical tool, conference participants also raised provocative questions about "gender" as a principle of social organization. Conference papers and discussions demonstrated that we must situate gender in historically specific social and cultural systems before we can assess its significance and the character of its relationship with kinship. Rather than diminishing the importance of gender studies, this approach highlights the ways in which feminist perspectives on gender must be incorporated into anthropological analysis of culture, stratification, and history.

The conference papers will be published in a volume edited by Jane Collier and Sylvia Yanagisako. The collection will be dedicated to the late Michelle Rosaldo, whose pioneering scholarship and personal dedication to the anthropological study of gender were remembered throughout the conference.

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Ethnographic Atlas of Ifugao: Implications for Theories of Agricultural Evolution in Southeast Asia[1]

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The Ifugao are a tribal people, numbering slightly over 100,000 (as of 1970), who inhabit the upland interior of north-central Luzon, the Philippines. Since first contacted by outsiders (the Spanish) in the late 16th century, they have been renowned for their spectacular irrigated mountain rice terraces. There are approximately 20,000 km of these terraces, 7,000 km of which are built of stone, and they date back at least 400 years. They are currently the subject of an atlas prepared by the Yale University anthropologist Harold C. Conklin (1980).

Conklin says (p. 1) that he began the *Ethnographic Atlas of Ifugao* in an attempt to address the following questions: "How have these [irrigated terraces] and similar tropical upland agricultural systems developed? What are their long-term effects on soils, terrain, vegetation, and animal life as well as on human activities?" Thus the *Atlas* complements Conklin's earlier work (1955, 1957) on another Philippine group, the Hanunóo, in which he made a major contribution to the study of systems of unirrigated, swidden agriculture, by making an equally major contribution to the study of systems of irrigated agriculture. It merits an in-depth review both for its theoretical interest—what it has to say about how such systems evolve—and for its perhaps unique combination of ethnographic, photographic, and cartographic analysis.

The *Atlas* (measuring 41 × 47 cm) consists of a 40,000-word text, 184 black-and-white photos, and 57 colored map-plates. It was put together over the 18-year period from 1961 to 1979. It is based on a total of over 1,000 aerial photographs of a 96-km² area in the north-central Ifugao region. Conklin interpreted and checked these data during a total of 38 months of fieldwork in the region, supplemented by archival research (in cartographic and photographic archives) in the Philippines, Spain, and the United States.

The book is divided into two main sections. The first is an illustrated essay on Ifugao life, with subsections entitled "Introduction," "Land and Society," "The Agricultural Year," and "Interpretation." The text, which dwells most on the technology and ecology of the irrigated rice terraces, is keyed by number to the photographs, whose number, technical quality, infor-

[1] An earlier version appeared in Indonesian in *Prisma* (Jakarta), the publishers of which have given their permission for reprinting here.

mative content, and sheer artistry is unequalled in any other work known to me. It is also keyed by number to the maps, which constitute the second section. The maps are grouped into five subsections, the first presenting the general geography of the Philippines, northern Luzon, and the Ifugao territory, the second land use in north-central Ifugao, the third more detailed land-use and cultural data for three agricultural districts, the fourth even more detailed agricultural data on a single district, and the fifth reproductions of maps of the Ifugao area published between 1659 and 1922. At the end there is a topical index and a comprehensive index of place names.

The maps of the *Atlas*, in their intricacy and in the amount of labor that they have consumed, are a fitting complement to the Ifugao terraces themselves. Maps 8–25, for example, show every irrigated terrace-plot (averaging just 270 m^2 in area) and every house or hut, among other features, in the entire 96-km^2 survey area. Maps 26–37 show, among other things, the source, flow, and management of all irrigation and drainage water in an area of 18 km^2. Maps 38–47 show the location, configuration, and ownership of all of the 1,946 individual terrace-plots in one agricultural district, covering 3.1 km^2, and a wealth of additional information on each plot, including the manner of its construction, the source and direction of flow of its irrigation water, the presence of ritual markers, seed beds, fish pits, vegetable mounds, taro plants, and so on. This agricultural information is supplemented with detailed and valuable data on other, related topics. For example, Maps 36d and 37c show how patterns of feasting link families, hamlets, and districts. Taken as a whole, these 57 maps (actually over twice that number, since many of the colored map-plates are subdivided into two or more smaller maps) present exhaustive data on the productive relations (in particular those involving the irrigated and terraced cultivation of rice) between the Ifugao and their physical environment.

Conklin's *Atlas* makes distinctive contributions in substantive, methodological, and theoretical areas:

1. *Substantive contributions*. In the introduction and in the text, Conklin makes it clear that he perceives this work *as* an atlas. His presentation of data on this particular human society and physical landscape is an end in itself, not a means to the end of some particular theoretical stance or analysis—a basic point which has been misunderstood by some early reviewers (e.g., Ellen 1982:171; Hanks 1982:207). Conklin does not pretend to analyze all of the data presented in his maps. Clearly, he is presenting these data, in as rigorous and accessible a form as possible, to be used selectively by other scholars. With this work and his *Ifugao Bibliography* (1968) he has immeasurably strengthened and broadened the data base for the study of this Philippine society and for the comparative study of other societies.

One aspect of the agroecology of the Ifugao which is brought out clearly in the *Atlas*, and which is of potential relevance to agroecological research and development throughout Southeast Asia, is the Ifugao's apparently very successful system of forest conservation and management. This traditional and indigenous system of agroforestry is based on what Conklin calls "woodlots." He writes (1980:50): "For much of Ifugao, forested higher slopes and woodlot-covered ridges alternate with areas of intensive agricultural terracing." These woodlots, averaging less than one hectare apiece in area, cover 25% of the land area in the Ifugao territory surveyed by Conklin, more than any other category of agricultural land (p. 8). The woodlots represent an extremely sophisticated system for managing the indigenous flora. Conklin writes (p. 31): "On some well-managed woodlots more than 200 protected, planted, or cultivated floral types may be found, ranging from hard- and softwood timber for house beams to fruit trees and medicinal herbs." They represent a "combination of tree farms and slope gardens," which also have an important role in environmental preservation. Conklin writes (p. 50): "the widely recognized importance of woodland in assuring the supply of needed fuel, construction materials, and irrigation water, as well as for protection against landslides and other forms of erosion, has led to the maintenance of this overall pattern even in the most densely populated areas." Given that population density in the most densely populated areas of the Ifugao territory rises to as much as 360 persons/km^2, the maintenance of this woodlot pattern is a matter of considerable interest.

The Ifugao situation contrasts with that in parts of rural highland Java, for example, where population densities are equal to or lower than the figure just cited but where the population's relationship with critical forest areas is less one of conservation and management than one of maximum short-term exploitation. Among many possible reasons for this contrast, one which is suggested by an initial examination of the *Atlas* is landownership. The Ifugao woodlots are privately owned. Indeed, according to Conklin, the woodlots' value as real property is second only to that of the rice terraces, ranking ahead of, for example, root-crop swiddens (pp. 24, 31). This ownership may provide the crucial incentive to sustained-yield management of the forests—a possibility which is relevant to current attempts to deal with the critical condition of Java's upland state-owned and state-managed forests.

2. *Methodological significance*. The *Atlas* is probably unique among works on human ecology in its presentation of data and analysis equally by text, photographs, and maps. The balanced use of these three media follows from Conklin's use of an equally catholic—and unusual—field methodology. He writes (p. 1):

> This is an *ethnographic* atlas in that it forms part of an effort to record and describe the culturally significant patterns of behavior in a particular society. It is based on, though not limited to, a long period of intimate study and residence in one community, knowledge and use of the local language, and the employment of a wide range of observational and recording techniques, including direct participation in everyday activities and a greater emphasis on work with individual members of the society than on secondary sources or survey data.

The use of the local language and techniques of participant observation, in the course of a lengthy residence in the field site, has long been established practice in anthropology and related fields, but it is *not* common for them to be used in the same instance as remote-sensing techniques such as the extensive aerial photography (and, to a lesser extent, satellite photography) used by Conklin. His principal methodological contribution is to demonstrate how much richer are the results of remote-sensing when informed by exhaustive on-site fieldwork and, conversely, how inadequate these results are when they are not so informed. Conklin writes (p. 1):

> For this type of inquiry there are important limitations as well as tremendous advantages in the use of aerial photography and machine mapping. As I have shown elsewhere [Conklin 1967:118–20], such techniques and their products cannot by themselves determine the form and incidence of many kinds of ethnographically relevant terrain features. Personal observations and ground measurements are still required in cases where vegetation covers trails, watercourses, dams, and marked property boundaries, and where the grain of surface vegetation is too fine or too dense for photographic penetration. Furthermore, the perceptions, categorizations, usages, and communicative interactions of the local inhabitants frequently constitute the only sources of information on the extent and ordering of spatially depictable data within the complex and changing sociocultural landscape.

This is a powerful argument against the gathering and use of remote-sensing data in the absence of some more immediate experience of the field situation. This argument comes at an opportune time for the many countries in the region (e.g., Indonesia) that are in the process of rapidly expanding their capacity to utilize remote-sensing techniques in the context of land-use study and planning. Conklin's *Atlas* represents a challenge to study landscapes at close range as well as from afar, drawing (in the former case) not only on their own senses, but also—and this is perhaps most important—on the perceptions

and accumulated knowledge of the *local inhabitants*. It may bear repeating that this requires not a mere field "survey," but rather, as Conklin explicitly states, a longer-term, in-depth experience of the field situation involving personal observation and close work with key informants, not with countless anonymous "questionnaire-respondents" (cf. Mubyarto, Soetrisno, and Dove 1983).

3. *Theoretical implications*. The data and analysis in Conklin's *Atlas* are potentially relevant to a number of theoretical questions. One of the most intriguing of these is why (some) systems of agriculture intensify—or, more specifically, in the case of most Southeast Asian nations, why (some) systems of swidden agriculture intensify into systems of irrigated, permanent-field agriculture. This question is prompted not simply by the observation of instances of such intensification, but by observations of the failure of swidden systems to intensify even though they could (e.g., in many of the outer islands of Indonesia), observations of irrigation farmers' becoming swidden farmers (e.g., among some Indonesian transmigrants), and observations of agricultural systems that combine swiddens and irrigated fields (e.g., also in many of the outer islands of Indonesia). In this regard, it is serendipitous (or, more likely, no accident at all) that Conklin has chosen to lavish his research attention on the Ifugao; representing the last and most intriguing of the cases mentioned, they are an ideal test case for theories of agricultural intensification.

Conklin writes in the *Atlas* (p. 82) that "virtually every [Ifugao] household," in addition to cultivating rice in irrigated terraces (and assorted tree crops in woodlots), also cultivates sweet potatoes and some other, lesser crops in unirrigated swiddens. Active and fallowed swiddens cover at least 15% of the area surveyed by Conklin, which compares with the 17% covered by irrigated terraces and the 25% covered by woodlots (p. 8). These swiddens are not peripheral to the Ifugao household economy. Quite the contrary, as Conklin writes (p. 25): "Swiddens furnish the *bulk* [emphasis added] of the food consumed by most families except the wealthy." This is startling information for what has long been represented as one of the region's prototypical "wet-rice" societies. The distortion in past representations is but one example of a pattern of politically and economically motivated "mythologizing" about agriculture which pervades Southeast Asia (see Dove 1983*b*).

The *Atlas* contains a variety of data and analysis on Ifugao swidden cultivation and on the way in which it is articulated to the cultivation of terraces and woodlots. Still, Conklin's focus is on the irrigated terraces. For example, the *Atlas* maps individual terrace plots for all 20 districts in the survey area but individual swidden plots in only one. This is consonant with an apparent belief on Conklin's part that the irrigated terraces are not merely more important and hence determinant within the cultural system, but also somehow determinant within the agricultural system as well. The swiddens, he seems to suggest, play more of a dependent or contigent role within the overall agricultural system. Conklin calls the swiddens "insurance," "supplementary," and "complementary" (pp. 1, 24). He writes further (p. 25): "With respect to the entire agricultural system, the most important aspect of Ifugao shifting cultivation is the relative ease with which swiddens can be made and extended when there are signs that the rice crop will be poor." While noting how the swidden subsystem responds to failure in the terrace subsystem, he does not mention whether failure of the former leads to any response in the latter (or in some other subsystem). This is not an unimportant question, however, given the notorious unreliability of swidden harvests and the fact that the Ifugao appear to depend on these harvests for the bulk of their foodstuffs.

Questions are raised not only by the volume of production in the swiddens, but also by its efficiency or ease. Conklin's characterization of the swidden cultivation of tubers as "insurance" against the failure of the terraced cultivation of rice implies that the Ifugao essentially make swiddens out of duress and terraces out of preference. Such a preference, if it indeed exists, is puzzling in light of the relative productivity of the two technologies (cf. Hanks 1982:207). Production per hectare averages 2 tons of unmilled rice in the terraces but 6.5 tons of tubers in the swiddens (pp. 25, 35). If productivity is compared in terms of unit of labor, the differential is greater yet because of the much greater demands for labor in cultivating the irrigated terraces. Thus, the return on labor is just 2.5–4 kg of rice per work day in the terraces, compared with a return of 26 kg of tubers per work day in the swiddens (pp. 25, 37). A comparison of irrigated *sawah* and unirrigated swidden in Indonesia in terms of productivity *per unit of labor* tends also to reveal higher figures for the swiddens (see Dove n.d.).

This initial and very cursory examination of the production data in Conklin's *Atlas* at least raises the possibility that the historical development of the Ifugao irrigated terraces may be explained less in terms of their attractiveness than in terms of their necessity. This would be in accord with Boserup's (1965) theory of agricultural growth—that it is *resisted* by a population until the less extensive patterns of agriculture are no longer possible, whether because of population/land pressure or because of state intervention. The latter does not appear to have been a factor in the Ifugao case. Conklin writes (p. 38): "There is no evidence that this Ifugao pattern [of terracing] ever required, or resulted in, a complex bureaucratic organization, a widely based form of political integration, or recognition of a centralized authority." While state pressure can be ruled out, pressure from population cannot. As of 1970, population/land pressure in the area surveyed by Conklin ran as high as 291 persons/km^2, or 360 persons/km^2 if only cultivable area is reckoned. These figures far exceed that given by Pelzer (1948:23), 50 persons/km^2, which is still cited as a rule-of-thumb figure for the carrying capacity of tropical lands under swidden agriculture. They suggest that the growing Ifugao population long ago ran out of land to support itself solely or largely by swiddens. Irrigated terracing would have been one answer to growing population/land pressure, because terraces yield two tons of rice every year on average, whereas the swiddens yield less than two tons of tubers per year on average, given the necessity to fallow swidden land for at least two to three times as long as it is cropped (Conklin 1980:24). Population/land pressure undoubtedly played an important role in the development of irrigated rice cultivation in Java, for example, this system of cultivation developing there not necessarily because it maximized yields or minimized labor, but (in part) because it minimized land requirements (see Dove n.d.).

According to this analysis, and following Boserup, the Ifugao today cultivate as much swidden land as possible but only as much irrigated terrace land as necessary, which is the opposite of what Conklin seems to imply in the *Atlas*. More intensive analysis of the *Atlas* might shed more light on this seeming difference in opinion. One fact to bear in mind is that agricultural development (here meaning intensification) probably rarely involves the precipitous and complete abandonment of one system of cultivation for another. It is likely that long stages in the evolution of agriculture have been occupied by composite systems consisting of more and less intensive subsystems like that of the contemporary Ifugao. These mixed systems reflect the impact of evolutionary pressures, at given points in time, on very mixed local social and physical environments. At some times in some environments, that is, it is most adaptive to pursue not a single system of cultivation, but two or more, differing in intensity as well as in other respects. Such composite agricultural systems have a number of virtues, perhaps the most basic being that high-diversity, "patchy" environments are the most stable and productive ones (cf. Dove 1983*a*, Pickett 1976).

It is very clear from the *Atlas* how the combined exploitation of terraces, swiddens, and woodlots enhances the adaptation

of the contemporary Ifugao to their environment. One aspect of this is spatial. The Ifugao locate their most intensive system of cultivation, irrigated terracing, on the land most proximate to, and hence accessible from, their settlement sites; the greater the distance from the settlements, the fewer and smaller the terraces and the more and larger the swiddens and woodlots (pp. 32, 73–79). A second aspect is topographic. The Ifugao make their swiddens on slopes—ranging up to 45°—which would be difficult to terrace, the terraces being made by choice on the gentlest slopes (p. 25). Other aspects involve the same principle. Thus, the sweet potatoes which constitute the main swidden crop thrive in well-drained soils but not in clayey ones (p. 25), the latter being the most common soil type in the irrigated terraces (pp. 21, 80). Conversely, the main terrace crop—rice—cannot be grown in the swiddens. At altitudes above 700 m at this latitude, rice can be grown only under irrigation, which then makes its cultivation possible up to an elevation of 1,600 m (p. 46). Since most Ifugao valleys lie at elevations of from 700 to 1,400 m (pp. 4–5), it is clear that without the irrigated terraces agriculture and diet would be dependent on tubers alone. One further aspect of the complementarity of swiddens and terraces involves responses to drought. The irrigated rice crop is distinctly threatened by periods of below-average rainfall (especially during the critical rice-booting period [p. 27]), whereas this is less true of the swiddens. Indeed, an appropriately timed drought may even enhance swidden yields by facilitating the burn, which is often the most problematic stage of the swidden cycle. Hence, the Ifugao tend to emphasize swidden cultivation in unusually dry years, in the expectation of poor harvests from their irrigated terraces (p. 82) and, perhaps, in the expectation of unusually good harvests from their swiddens.

These several complementary aspects of swidden agriculture and irrigated terrace agriculture would avail the Ifugao little were the two systems not also complementary in terms of their respective chronologies of labor use. Conklin writes (pp. 36–37), speaking not only of swiddens and terraces but also of the Ifugao woodlots:

> While each cycle overlaps in time with each of the others, main periods of planting and harvesting in these three land-form zones do not. . . . Staggered periods of peak activity and of agricultural inputs and outputs—not only for the dominant crops in these three zones but also for many individual plant types—form an essential part of this system.

Because many of the demands for labor in swiddens and terraces are not coincident, in particular during the peak demand periods of planting and harvesting, participation in swidden cultivation does not necessitate a great lessening of participation in terrace cultivation, and the reverse is similarly true. Thus, the Ifugao are able to cultivate terraces as well as swiddens (and woodlots) and thereby increase the extent of the local environment that they can exploit and the stability of this exploitation with a relatively low cost in terms of conflicting demands for labor.

In analyzing the complementarity of the terrace and swidden subsystems, it may be less important to emphasize the fact that their joint cultivation is made possible by staggered demands on labor during the year than the fact that their joint cultivation (along with the woodlots) makes possible a near-continuous demand on labor throughout the year. In many traditional systems of agriculture, a major problem is not competition for—or overutilization of—available labor; rather it is underutilization of labor due to seasonal constraints on labor inputs. This tends to be a characteristic problem of systems of extensive agriculture, and it would very likely apply to the swidden agriculture of the Ifugao if it were practised in isolation (that is, not mixed with the use of terraces and woodlots). It might also apply to the Ifugao terraces used in isolation, since the Ifugao can only crop them (in rice) once each year. By cultivating both terraces and swiddens, as well as woodlots, the Ifugao can achieve maximum utilization of a scarce resource, their own labor (cf. Dove 1983*a*, Miles 1972).

In sum, the Ifugao irrigated rice terraces and dryland tuber swiddens appear to be complementary components of the single agricultural system (which also includes the management of woodlots, the multiple intercropping of secondary crops, and animal husbandry [Conklin 1980:36]) by which the Ifugao exploit their highland Philippine environment. The precise nature of the balance between these two subsystems remains a challenging question that I presume to do no more than raise here. I do not doubt, however, that the answer to this question will follow from more detailed study of the *Atlas* by other scholars and further commentary from Conklin himself. The answer is of not only theoretical, but also practical importance, for government policy in the region uniformly and naïvely assumes that intensive agricultural systems are natural and/or necessary successors to extensive ones.

The fact that the *Atlas* gives rise to such intriguing questions testifies to its scholarly depth as well as to the inherent fascination of its subject matter. It can be studied with profit by all those concerned with the analysis of the relationships between agricultural communities and their environments in Southeast Asia.

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