

AGGRESSION AND ALLIANCE: THE IMPACT OF RESOURCE DISTRIBUTION ON EXCHANGE STRATEGIES CHOSEN BY PREHISPANIC PHILIPPINE CHIEFS

Mary M. Gunn

Dept. Anthropology, University of Hawaii, Honolulu, Hawaii 96822, USA

ABSTRACT

The role of exchange in the development of social complexity has long intrigued anthropologists and archaeologists. Some recent studies have focused on political economy as the link between exchange and complexity. In essence, political leaders control and manipulate exchange resources for the purpose of gaining increased political power and prestige. In this paper, I review the exchange models proposed by two Southeast Asian archaeologists, Bennet Bronson and Laura Junker, and then show how the same evidence used to support political economy interpretations can be relevant to a model which links the distribution of resources to the exchange strategy chosen by elites; aggression or alliance. That is, with prehispanic Philippine chiefdoms, there were different exchange relationships between coastal villages and between coastal and upland villages due to the distribution of resources. Between coastal villages, an exchange strategy emphasizing aggression would be chosen by chiefs because resource distribution was predictable, dense, and easy to control. However, between coastal and upland villages, an alliance strategy would be preferred by coastal chiefs because resource distribution was unpredictable, scarce, and difficult to control.

INTRODUCTION

The role of exchange in the development and maintenance of social complexity (that is, a social structure which includes group hierarchy) has long intrigued anthropologists and archaeologists (for example: Bronson 1977; Brumfiel and Earle 1987; Earle and D'Altroy 1989; Earle and Ericson 1977; Hall 1985; Hutterer 1974,

1977; Junker 1990a, 1990b, 1993; Nishimura 1992; Sabloff and Lamberg-Karlovsky 1975). Some recent studies have focused on political economy (that is, the control of resource organization and allocation) as the link between exchange and complexity (for example: Brumfiel and Earle 1987; Earle and D'Altroy 1989; Earle and Ericson 1977; Hall 1985; Hutterer 1974, 1977; Junker 1990a, 1990b, 1993; Sabloff and Lamberg-Karlovsky 1975). By and large, however, these frameworks are reconstructed interpretations from archaeological and historical information which are premised on motivated actors and their strategies to achieve goals.

There are two problems with these interpretations:

1. They attribute the cause of social complexity to elite intent and the fulfillment of that intent through action. Intent becomes the explanation for the development of particular types of social hierarchy.
2. By focusing on elites, the rest of the population is ignored or unempowered. The important role of "non-elites" in the persistence of social complexity often is not considered by those who describe prehistoric events from an elite perspective.

The following is a typical interpretation of a prehistoric political economy (for example: Brumfiel and Earle 1987; Earle and D'Altroy 1989; Hall 1985; Higham 1989; Junker 1990a, 1990b, 1993; Kristiansen 1991). A political leader, the chief, organizes and manipulates access to and production of exchange goods. This leader creates a retinue of funds, people and products for the purpose of exchange, an activity which brings wealth and prestige to the leader. As the demand for exchange goods increases, so does the expansion of this hierarchy to fill exchange needs. Additionally, to protect resources or to gain access to more resources, the leader may organize an army for both protection and incorporation of new territory which contains the resources.

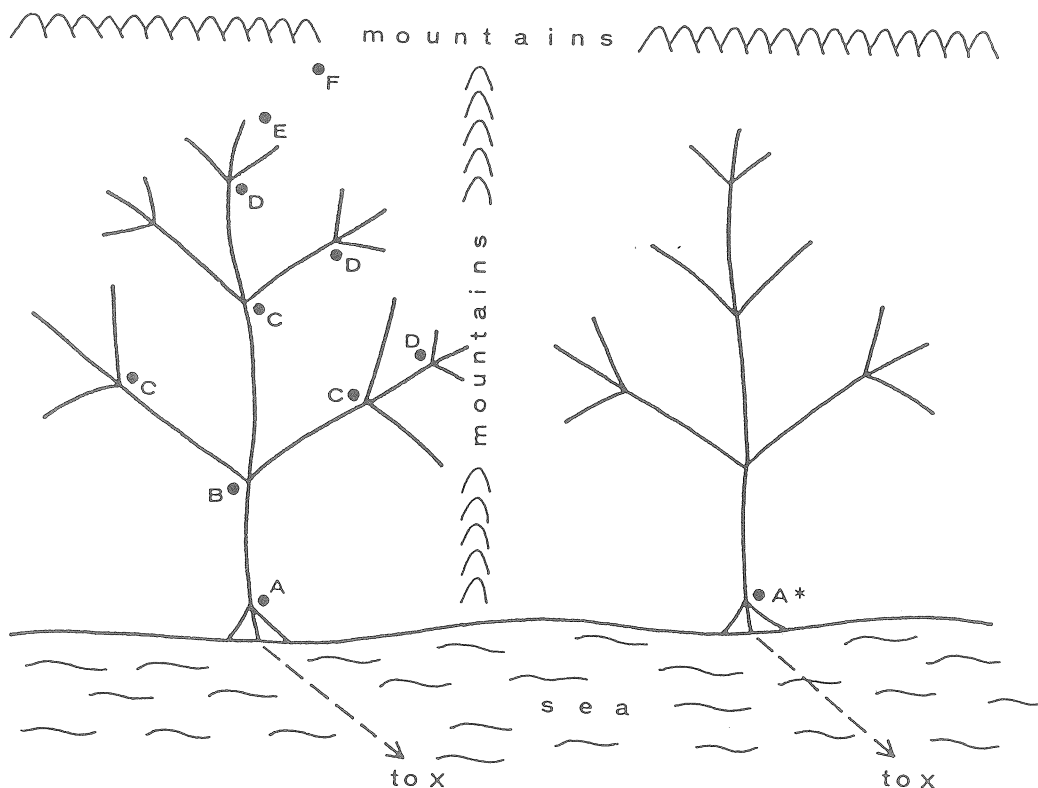


Figure 1: Bronson's functional model of exchange (Bronson 1977:42).

While this type of explanation has been used to describe the development of social complexity in Island Southeast Asia (for example: Hall 1985; Higham 1989; Junker 1990a, 1990b, 1993), there is another way of analyzing prehistoric exchange networks, an important component of complexity. In this paper, I review the exchange models proposed by two Southeast Asian archaeologists, Bennet Bronson (1977) and Laura Junker (1990b, 1993), and then show how the same evidence used to support their political economy interpretations may be used to support another model which ties the distribution of resources to the type of exchange strategy chosen by elites, aggression or alliance.

THE BRONSON MODEL OF EXCHANGE

Bronson (1977) presents a functional model of internal and overseas exchange relationships and their possible impacts on the emergence of particular types of political economy (see Figure 1). In a hypothetical Southeast Asian chiefdom, A is a coastal settlement at the river mouth. B and C are upland communities which are lo-

cated upstream and at primary and secondary river junctions. D is the most distant upstream settlement to participate in the A-based system of exchange. This upland village is the initial concentration point for products originating from more remote parts of the watershed. E and F, more distant upland population groups, are the ultimate producers of goods and perhaps the centers of a separate exchange system which is based on non-market institutions. This means that only part of the goods from these more distant upland groups come from or go through the market system which is centered at the coastal settlement. X is the overseas trader which serves as the main consumer of goods exported from the coastal community and the principal supplier of its imports. Finally, A* is another river-mouth settlement which is located down the coast and which may connect to an entirely separate coastal-upland exchange network.

According to Bronson, characteristics of exchange relationships within the model are the following (Bronson 1977:42-51).

1. A, the coastal settlement, needs a steady flow of exportable goods from D, the upland village. The

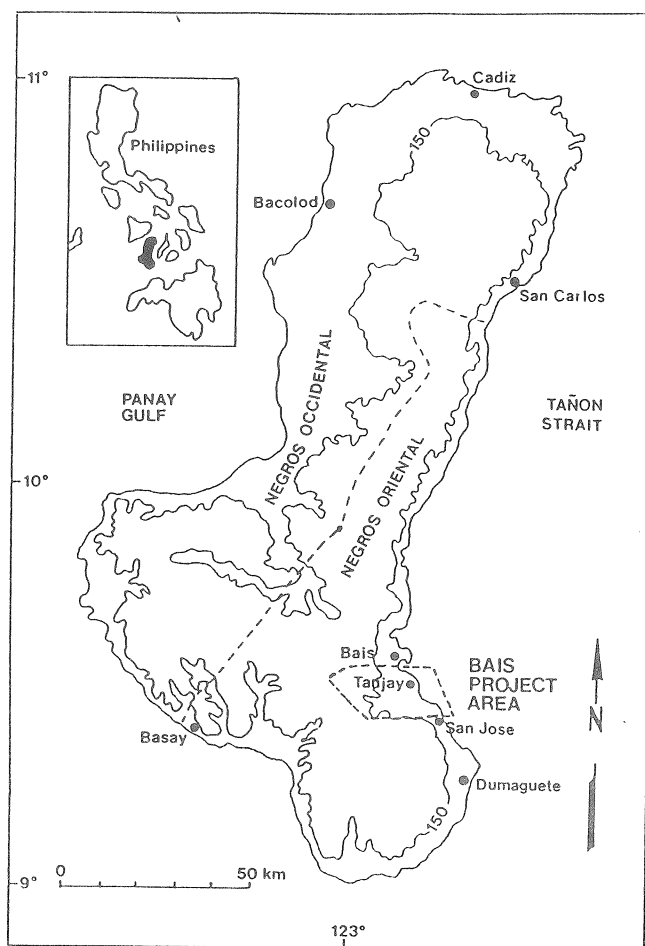


Figure 2: Location of the Bais Region, Negros Oriental (Junker 1990b:183, 1993:6).

coastal center cannot assure this flow through aggressive measures. This is because the upland village collects resources from dispersed, mobile and difficult-to-control populations so that there is no concentration of resources.

2. D, the upland community, obtains goods from E, a more distant upland group, through non-coercive mechanisms. These exchange relationships will involve quasi-kinship institutions, along with clientship and exchange-partner relationships.
3. B and C, the upland villages, are physically accessible to the coastal settlement. Thus, the coastal center will have success in using political methods to assure the flow of exchange materials.
4. Between the overseas trader and the coastal settlement there are relations of political and economic inequality. The trader is essential to the coastal vil-

lage for revenues and goods but not vice versa. As a result, bargaining will take place because overseas traders can visit other coastal centers.

5. Finally, the natural enemy of one coastal center is another center due to price wars and competition for overseas exchange. When this occurs, attempted conquest of peers makes economic sense to ensure a monopoly over this exchange network.

Junker (1990b, 1993) has applied a modified version of Bronson's model to the coastal-inland exchange networks of prehispanic Philippine chiefdoms. Figure 2 is a map of the Bais region in Negros Oriental, the Philippines, where Junker conducted her research. Junker suggests that there was a settlement hierarchy in the Bais lowlands centered around the large coastal site of Tanjay around the 10th century AD. (Junker 1990b:195). Figure 3 is a map of sites and their relative sizes which are indicated by dots.

According to Junker, during the early to mid-second millennium AD there was a significant increase in the overall density of sites and in the mean site size, along with the development of a more distinct hierarchical settlement system (that is, a tier of secondary centers and the growth of a "hyper-large" primary coastal center). Initiation of long-distance exchange with mainland Asian states, such as China, was related to an ever-increasing Filipino elite demand for "status-symbolizing" goods. These new long-distance exchange contacts were grafted on to a native and already well-developed and complex regional system of exchange focused on and controlled by chiefly elites at strategically located coastal centers such as Tanjay (Junker 1990b:195-198). As a result, an intensified and more centrally controlled lowland-upland interaction developed. Upland/interior raw materials and forest commodities such as tropical hardwoods, gold ore and resins were desired by Chinese traders. These products were exchanged for goods such as Chinese porcelains, silks and jewelry which were highly valued by Philippine chiefs (Junker 1990b:202; Junker 1993:2, 11). Upland products could not be controlled directly by coastal lowland chiefs but had to be amassed through internal exchange systems (Junker 1993:11-12). The central role of the chiefly political leader in coordinating and controlling systems of resource mobilization and production exchange was crucial to support an ever-increasing demand for exchange goods (Junker 1990b:203).

Bronson's model is largely a descriptive interpretation of exchange relationships between upland and lowland communities. Because it is a functional model it does not analyze causes for the appearance of particular

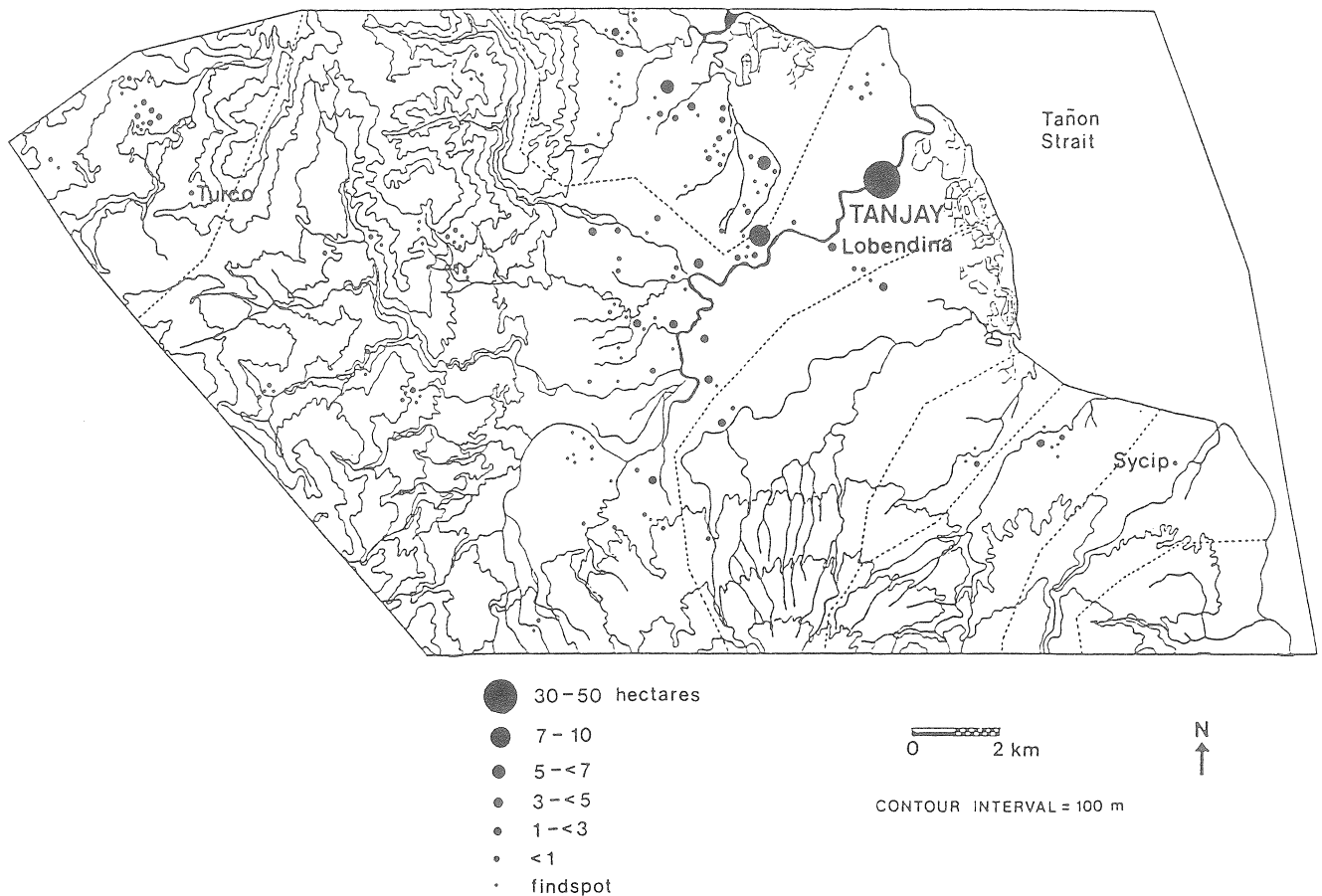


Figure 3: Recorded sites from a 1982 surface survey (see Junker 1990b) of the Bais Region (Junker 1990b:194).

exchange relationships. In addition, it is not a dynamic model which offers explanations for the emergence of particular exchange networks.

In contrast, Junker's application is more ambitious. It has a dynamic quality to it since she examines change over time in the organization of exchange and the relations among localities. Also, it deals with the reasons why chiefs might intensify exchange. The benefits of increased exchange relations for Philippine lowland chiefs were prestige, the possession of luxury "status-symbolizing" goods and its concomitant prestige, and obtaining resources to finance chiefly political activities. However, I would argue that these benefits were the results, not the causes, of exchange relationships.

ANOTHER APPROACH: RESOURCE DISTRIBUTION

While the approaches of Bronson and Junker provide a framework by which to analyze exchange and competition, they focus primarily on individual decision making

whereby exchange is an outcome of the motivations of a powerful individual whose first concerns are status and power. They seem to diminish the material benefits of exchange while stressing the importance of prestige and the strategies employed by chiefs to gain more prestige. That others willingly participate in these chiefly decisions as a "natural" part of exchange relationships is not questioned by the above frameworks but accepted as a premise.

I now propose an approach which focuses on aggression and alliance as strategies within the context of resource distribution and exchange relations. For a strategy to be considered advantageous, benefits should outweigh costs. First, I look at some of the benefits and costs of each strategy. Then, I tie these strategies into a resource distribution model for the prehispanic Philippines.

Benefits and Costs of Aggression and Alliance as Strategies

Aggression may be described as competition or the threat or show of force between two or more groups. Resource competition occurs when an individual or group reduces resource availability for another individual or group (Durham 1976:390). There are two conditions under which aggression is likely to be endemic.

1. *Economic advantages* – A resource distribution which is known, spread over a small range and densely distributed is accessible (Boone 1992:317). For the successful aggressor, these accessible resources hold the highest potential net gain because the benefits of obtaining them outweigh the time and energy involved in searching for them. Once the aggressor controls an area, a spatially “small” territory is less costly to defend and to control, in terms of time and energy expenditures, than one which is large (Cashdan 1992:262). Another advantage is that the aggressor obtains desired resources without having to give up resources in return.
2. *Population size* – In a pre-industrial context it is assumed that weapon technology was relatively equivalent in distribution among and effects upon competing human groups. During a conflict, the competitive “edge” over resource access and defendability could be determined by population size. Thus, between large and small populations, aggression will be infrequent because it is easy to overwhelm a small population. Furthermore, small populations are unlikely to attack larger ones. However, between populations of approximately equal size, aggression may be recurrent because, while one group may defeat another at one time, it will not take long for the “loser” to amass the needed resources for a future fight (Boone 1992:318-319; Durham 1976:400-401). Here, it is assumed that territorial loss to the “loser”, creating the potential for resource inequality between the two competitors, does not occur. Hence, vengeance and potential economic gains are “sweet” from both perspectives.

However, there are two costs.

1. *Unstable relations* – There may be retaliation from the “losers” against the aggressor, creating a situation which encourages periodic hostilities centered around resource control. Another consequence is that, if scarcity occurs (for example, during a drought), hostile groups may not be willing to exchange vital resources or to give shelter.
2. *Economic losses* – There may be a decrease in exchange opportunities because of the unwillingness of

groups to exchange with an aggressor. In addition, there are the time and energy expended in defense, in control of the group with the resources, and in resource search when the aggressor is not familiar with the area. Finally, there may be loss of life over resource capture.

Alliance may be defined as cooperative relations among two or more groups. These cooperative relations may take the form of sharing, peaceful relations, social boundary controls, and exchange, all of which are mechanisms by which to deal with a variable distribution of resources (Durham 1976:391; Smith 1988:250-251). Alliances may occur under two conditions.

1. *Access to resources* – A resource distribution which is highly diverse and spread over a large range is difficult to control (Cashdan 1992:259). In terms of economy of scale, it makes more economic sense for groups to share over large areas than for a group to waste time and energy on aggressive control. Also, diverse resources which are spread over a large territory are accessible primarily to those who have location information (Smith 1988:250). For groups who do not possess this knowledge, a large amount of search time is involved.
2. *Economic advantages* – With alliance, groups provide opportunities for access to multiple exchange items including prestige goods. Distance to resource areas, geographical obstacles (for example, mountain ranges) and defense of resources are less important than with aggression. In addition, there is no need to intensify local production when a resource can be exchanged with another group. Thus, time and labor can be spent on the production of another resource, possibly for exchange. Finally, if one group’s vital resources become unpredictable, the alliance made with another group may pay off because the groups can exchange. This serves as “insurance” against future resource losses (Hunt and Graves 1990:112).

However, there are two costs.

1. One cannot get something for nothing. Resource production and exchange are necessary.
2. There may be uncertainty because exchange outcomes are not easily controlled by either group.

RESOURCE DISTRIBUTION AND EXCHANGE STRATEGIES

Returning to Junker’s research on the island of Negros, Spanish historical documents suggest the existence of at least three distinct groups in the sixteenth century AD: “Ata” hunter-gatherers using upland primary forest, swidden cultivators using the hilly zone between upland

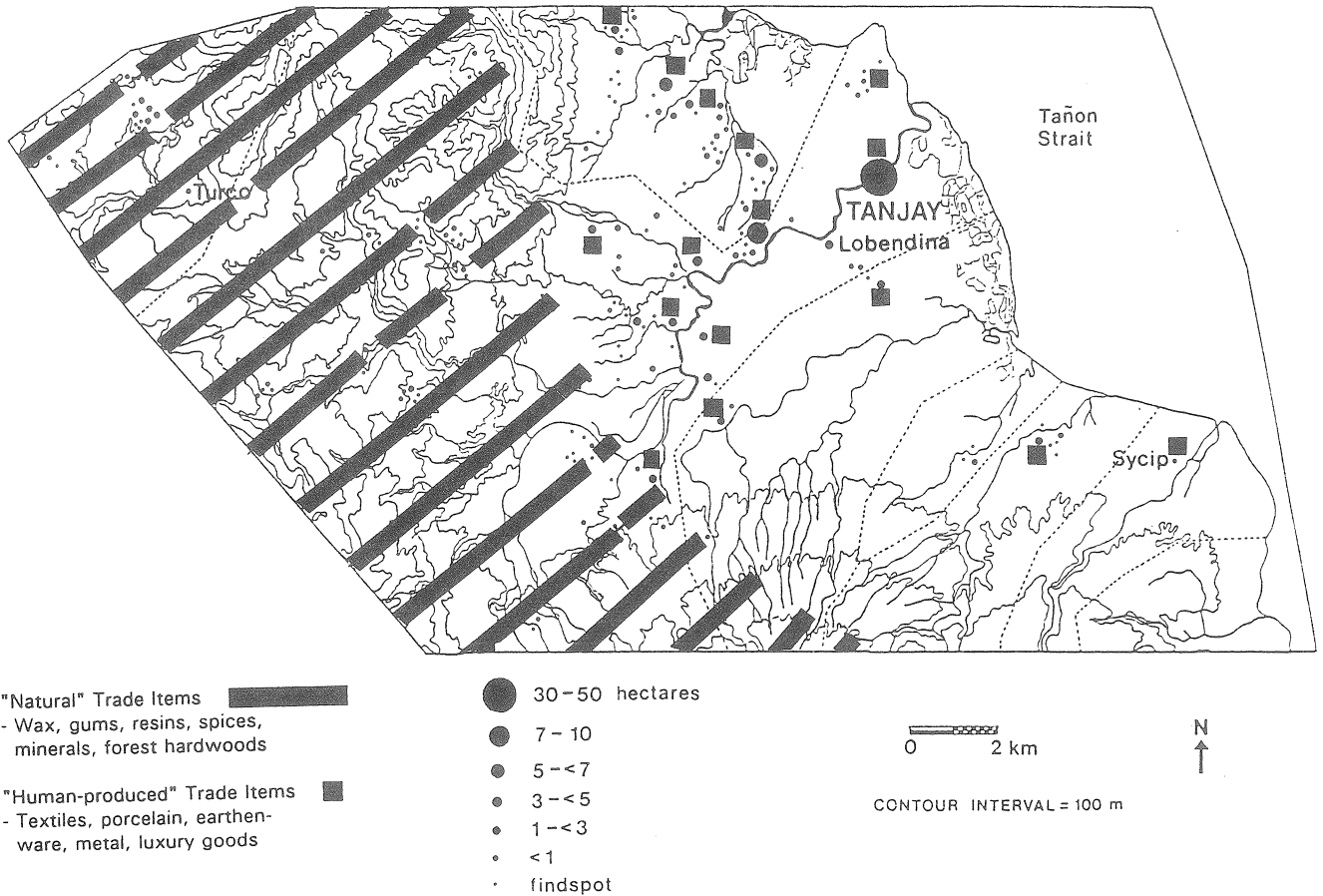


Figure 4: Hypothetical resource distribution model for the Bais Region (adapted from Junker 1990b:194.)

and lowland areas (Magahat or Bukidnon), and sedentary agriculturalists living on the coastal alluvial plain (Visayans). These groups were ethnically distinct but interacted for economic purposes (Junker 1990b:182-185). A substantial coastal settlement, Tanjay, existed along the mouth of the Tanjay River at the time of Spanish contact. Population followed geography with large centers occupied by agriculturalists along the coast and river, and the interior populated by dispersed and mobile hunter-gatherers and swidden-agriculturalists.

This settlement pattern may be accounted for by the distribution of resources. Upland terrain was rugged and resources were unevenly distributed. To exploit resources, groups engaged in hunting and gathering or slash-and-burn agriculture. As swidden agriculture depleted soil fertility, groups moved to new resource areas and established new and temporary settlements. Thus, interior populations were relatively mobile, dispersed and small. However, coastal communities had access to agri-

cultural and marine resources. This resource distribution would sustain a larger, more dense, and permanent population. In addition, exotic goods were available from overseas traders. The benefit of a stable subsistence and economic resource base would attract settlers, resulting in the growth of coastal settlements.

For prehispanic Philippine chiefdoms in the Bais Region, I suggest that the scenario presented in Figure 4 existed. It is an adaptation of the models proposed by Bronson and Junker and shows how resources were probably distributed.

What was the nature of resource distribution in the prehispanic Philippines? By looking at the nature of these exchange items, natural or human-produced, their distribution on the landscape becomes an important issue when considering the predictability of resources and the type of political strategy chosen, alliance or aggression. In general, natural resource distribution in tropical ecosystems is spatially unpredictable. This is because a great

GUNN, THE IMPACT OF RESOURCE DISTRIBUTION ON EXCHANGE STRATEGIES

diversity of taxa is densely distributed over a vast landscape with few concentrated "patches" of resources. Under these conditions, control by coastal elites of upland highly-valued forest resources would be difficult for two reasons.

1. With no concentration of resources providing an economic return on the effort of travelling to the unknown uplands, distance between coastal and upland areas decreases the latter's accessibility for coastal settlements.
2. Resource diversity requires information about its distribution. This knowledge is not likely to be shared with coastal residents.

In contrast, human-produced resources may be more predictable because they are in known and concentrated locations. There is less time and energy involved in controlling and obtaining them. Many of the items from China and the coast were human-produced, such as porcelains and iron tools, while items from the upland areas were natural, for example, forest hardwoods and honey. Thus, foreign and coastal goods may have been more predictable than upland goods.

In applying this model to the prehispanic Philippines, I suggest that upland natural resources were unpredictable because they were diverse and spread over a large territory. Aggressive control of this vast landscape was not economically viable for distant coastal elites. Cooperative relations (that is, alliance-based exchange) between coastal and upland communities were the result. However, once these resources were gathered by upland groups and then transported down river to a spatially concentrated location (that is, the coastal settlement), they became known, accessible, and predictable. Control by coastal elites was relatively "easy".

How did this resource distribution influence the exchange strategy chosen by coastal chiefs? The relationship between coast and upland was an alliance among loosely integrated polities (Junker 1990b:176-177). Junker suggests that gaining prestige was the motivating factor for this situation. But there were material advantages to this type of political relationship. Coastal chiefs and Chinese traders did not directly control upland resources but amassed them through internal exchange systems (Junker 1993:11). Aggression against upland villages might have resulted in the loss of unpredictable but highly valued natural resources. For their part, upland villages desiring coastal and Chinese goods would not attempt aggression against the coast due to a great disparity in population sizes. There was more to be gained for each, in terms of material goods, by alliance than by aggression.

Another prediction of the model is that aggression was the preferred strategy between coastal polities because, as upland products moved to lowland centers, they became predictable. That is, they were in a known, accessible and controllable location. During the sixteenth century AD, coastal population sizes were probably far less variable than those between coastal and upland populations so that coastal polities could pursue intergroup aggression. They were apparently competing for overseas exchange markets. Evidence of this is the "massive" quantities of porcelains and other Asian mainland exchange commodities which have been recovered from large lowland sites in the Philippines (Junker 1990b:167, 1993:9). And coastal polity aggression has been suggested by Junker:

(s)ignificant external competition with other coastal Philippine chiefdoms for control of this expanding foreign luxury goods trade is evidenced at Tanjay in a "mass burial" of beheaded and otherwise violently dispatched people, consistent with ethnohistoric reports of massive interpolity coastal raiding in the sixteenth-century Philippines (Junker 1993:9).

Coastal raiding was used by elites as a strategy to eliminate competitors in foreign prestige goods exchange and to gain access to valuable upland resources (Junker 1990b:179-180).

CONCLUSION

While the Bronson and Junker models are interpretations of prehistoric exchange networks which focus on elite intent, there is another way of analyzing these networks. A model, based on resource distribution, has the potential for offering explanations of why certain political strategies persist. Specifically, it focuses on the influence of resource distribution on exchange strategies chosen by groups. In a situation where resource distribution is unpredictable, alliance is the preferred strategy. Territorial control of large areas by distant elites is economically prohibitive. On the other hand, if resource distribution is predictable, aggression is the preferred strategy because the costs of taking resources are minimal while its benefits are substantial. This model has the potential to account for political alliance and aggression throughout the Philippines and other parts of Southeast Asia where similar resources, population sizes, and exchange goods existed.

ACKNOWLEDGEMENTS

I wish to acknowledge the members of my master's committee, Michael Graves, Bion Griffin and Terry

Hunt, for their invaluable comments on this version and the longer version of my paper. I appreciate their encouragement and advice.

REFERENCES

- Boone, James L. 1992. Competition, conflict, and the development of social hierarchies. In Eric Alden Smith and Bruce Winterhalder (eds), *Evolutionary Ecology and Human Behavior*, pp. 301-337. New York: Aldine de Gruyter.
- Bronson, Bennet 1977. Exchange at the upstream and downstream ends: notes toward a functional model of the coastal state in Southeast Asia. In Karl L. Hutterer (ed.), *Economic Exchange and Social Interaction in Southeast Asia: Perspectives from Prehistory, History, and Ethnography*, pp. 39-52. Ann Arbor: Center for South and Southeast Asian Studies, University of Michigan, Michigan Papers on South and Southeast Asia No. 13.
- Brumfiel, Elizabeth M. and Earle, Timothy K. 1987. Specialization, exchange, and complex societies: an introduction. In Elizabeth M. Brumfiel and Timothy K. Earle (eds), *Specialization, Exchange, and Complex Societies*, pp. 1-9. Cambridge: Cambridge University Press.
- Brumfiel, Elizabeth M. and Earle, Timothy K. (eds) 1987. *Specialization, Exchange, and Complex Societies*. Cambridge: Cambridge University Press.
- Cashdan, Elizabeth 1992. Spatial organization and habitat use. In Eric Alden Smith and Bruce Winterhalder (eds), *Evolutionary Ecology and Human Behavior*, pp. 237-266. New York: Aldine de Gruyter.
- Durham, William H. 1976. Resource competition and human aggression, part I: a review of primitive war. *The Quarterly Review of Biology* 51:385-415.
- Earle, Timothy K. and D'Altroy, Terence N. 1989. The political economy of the Inka Empire: the archaeology of power and finance. In C.C. Lamberg-Karlovsky (ed.), *Archaeological Thought in America*, pp. 183-204. Cambridge: Cambridge University Press.
- Earle, Timothy K. and Ericson, Jonathon R. (eds) 1977. *Exchange Systems in Prehistory*. New York: Academic Press.
- Hall, Kenneth R. 1985. *Maritime Trade and State Development in Early Southeast Asia*. Honolulu: University of Hawaii Press.
- Higham, Charles 1989. *The Archaeology of Mainland Southeast Asia: From 10,000 B.C. to the Fall of Angkor*. Cambridge: Cambridge University Press.
- Hunt, Terry L. and Graves, Michael W. 1990. Some methodological issues of exchange in Oceanic prehistory. *Asian Perspectives* 29(2):107-115.
- Hutterer, Karl L. 1974. The evolution of Philippine lowland societies. *Mankind* 9:287-299.
- 1977. Prehistoric trade and the evolution of Philippine societies: a reconsideration. In Karl L. Hutterer (ed.), *Economic Exchange and Social Interaction in Southeast Asia: Perspectives from Prehistory, History, and Ethnography*, pp. 177-196. Ann Arbor: Center for South and Southeast Asian Studies, University of Michigan, Michigan Papers on South and Southeast Asia No. 13.
- Junker, Laura Lee 1990a. Long-Distance Trade and the Development of Sociopolitical Complexity in Philippine Chiefdoms of the First Millennium to Mid-Second Millennium A.D. Unpublished Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.
- 1990b. The organization of intra-regional and long-distance trade in prehispanic Philippine complex societies. *Asian Perspectives* 29(2):167-209.
- 1993. Craft goods specialization and prestige goods exchange in Philippine chiefdoms of the fifteenth and sixteenth centuries. *Asian Perspectives* 32(1):1-35.
- Kristiansen, Kristian 1991. Chiefdoms, states, and systems of social evolution. In Timothy K. Earle (ed.), *Chiefdoms: Power, Economy, and Ideology*, pp. 16-43. Cambridge: Cambridge University Press.
- Nishimura, Masao 1992. Long Distance Trade and the Development of Complex Societies in the Prehistory of the Central Philippines: The Cebu Central Settlement Case. Unpublished Ph.D. dissertation, Department of Anthropology, University of Michigan, Ann Arbor.
- Sabloff, Jeremy A. and Lamberg-Karlovsky, C. C. (eds.) 1975. *Ancient Civilizations and Trade*. Albuquerque: University of New Mexico Press.
- Smith, Eric Alden 1988. Risk and uncertainty in the "original affluent society": evolutionary ecology of resource-sharing and land tenure. In Tim Ingold, David Riches, and James Woodburn (eds.), *Hunters and Gatherers 1: History, Evolution, and Social Change*, pp. 222-252. Oxford: Berg.

Biogeography and Geomorphology Monographs

2. *Secondary Plant Succession in Tropical Montane Mindanao* (1970) MC Kellman.
4. *The Climate of Mt Wilhelm*. Mt Wilhelm Studies 2 (1976) RJ Hnatiuk, JMB Smith and DN McVean.
5. *The Forests of the Fatima Basin and Mt Kerigomna, Papua New Guinea – with review of Montane and Subalpine Rainforests in Papuasias* (1985) RJ Grubb and PF Stevens.
6. *Coastal Geomorphology and Quaternary Geology of the Port Stephens-Myall Lakes Area* (1992) BG Thom, M Shepherd, CK Ly, PS Roy, GM Bowman, PA Hesp.

Biogeography and Geomorphology Special Publications

1. *The Blockfields of Northeastern Tasmania* (1968) M Caine.
2. *Yankee Maritime Activities and the Early History of Australia* (1973) N Wace and B Lovett.

Biogeography and Geomorphology Conference Proceedings

1. *Quaternary Dust Mantles of China, New Zealand and Australia. Proceedings of a Workshop* (1982) RJ Wasson.
2. *Climanz*. Proceedings of First Climanz Conference, February 1981, 2 Vols (1983).
3. *Applied Quaternary Studies* (1991) G Brierley and J Chappell (eds).
5. *Quaternary Dating Workshop* (1990) R Gillespie (ed.).

Terra Australis

2. *Ol Tumbuna. Archaeological Excavations in the Eastern Central Highlands, Papua New Guinea* (1972) JP White.
3. *New Guinea Stone Age Trade* (1977) I Hughes.
4. *Recent Prehistory in Southeast Papua* (1979) B Egloff.
5. *The Great Kartan Mystery* (1981) R Lampert.
7. *The Alligator Rivers: Prehistory and Ecology in Western Arnhem Land* (1982) C Schrire.
8. *Hunter Hill, Hunter Island* (1984) S Bowdler.
9. *Coastal Southwest Tasmania* (1984) R Vanderwal and D Horton.
10. *The Emergence of Mailu as a Central Place in Coastal Papuan Prehistory* (1985) G Irwin.
11. *Archaeology in Eastern Timor, 1966-67* (1986) I Glover.
13. *Coobool Creek. A Morphological and Metrical Analysis of the Crania, Mandibles and Dentitions of a Prehistoric Australian Human Population* (1989) P Brown.

Prehistory Special Publication

1. *Archaeological Research in Kakadu National Park* (1985) R Jones (ed.).

Occasional Papers in Prehistory

3. *Darling Surveys I* (1981) J Hope (ed.).
4. *Between Plateau and Plain* (1984) J Anderson.
5. *The History and Archaeology of the Sydney Cove Shipwreck (1797): A Resource for Future Site Work* (1987) S Strachan.
6. *Toward a Prehistory of the Hamersley Plateau Northwest Australia* (1987) S Brown.
9. *Ancestors for the Pigs: Taxonomy and Phylogeny of the Genus Sus* (1981) C Groves.
12. *Archaeometry: An Australasian Perspective* (1982) WR Ambrose and P Duerden (eds).
14. *Archaeometry: Further Australasian Studies* (1987) WR Ambrose and JMJ Mummery (eds).
15. *Archaeology with Ethnography: An Australian Perspective* (1988) B Meehan and R Jones (eds).
16. *The Willandra Lakes Hominids* (1989) SG Webb.
17. *Prehistory and Heritage. The Writings of John Mulvaney* (1990).
18. *Pacific Production Systems: Approaches to Economic Prehistory. Papers from a Symposium at the XV Pacific Science Congress, Dunedin, New Zealand, 1983* (1990) DE Yen and JMJ Mummery (eds).
19. *Lapita Design, Form and Composition. Proceedings of the Lapita Design Workshop, Canberra, December 1988* (1990) M Spriggs (ed.).
20. *Report of the Lapita Homeland Project* (1991) J Allen and C Gosden (eds).
21. *A Community of Culture. The People and Prehistory of the Pacific* (1993) M Spriggs, DE Yen, W Ambrose, R Jones, A Thorne and A Andrews (eds).
22. *Archaeometry: Current Australasian Research* (1993) BL Fankhauser and JR Bird (eds).
23. *Women in Archaeology. A Feminist Critique* (1993) H du Cros and L Smith (eds).
24. *Sahul in Review: Pleistocene Archaeology in Australia, New Guinea and Island Melanesia* (1993) MA Smith, M Spriggs and B Fankhauser (eds).







Research Papers in Archaeology and Natural History

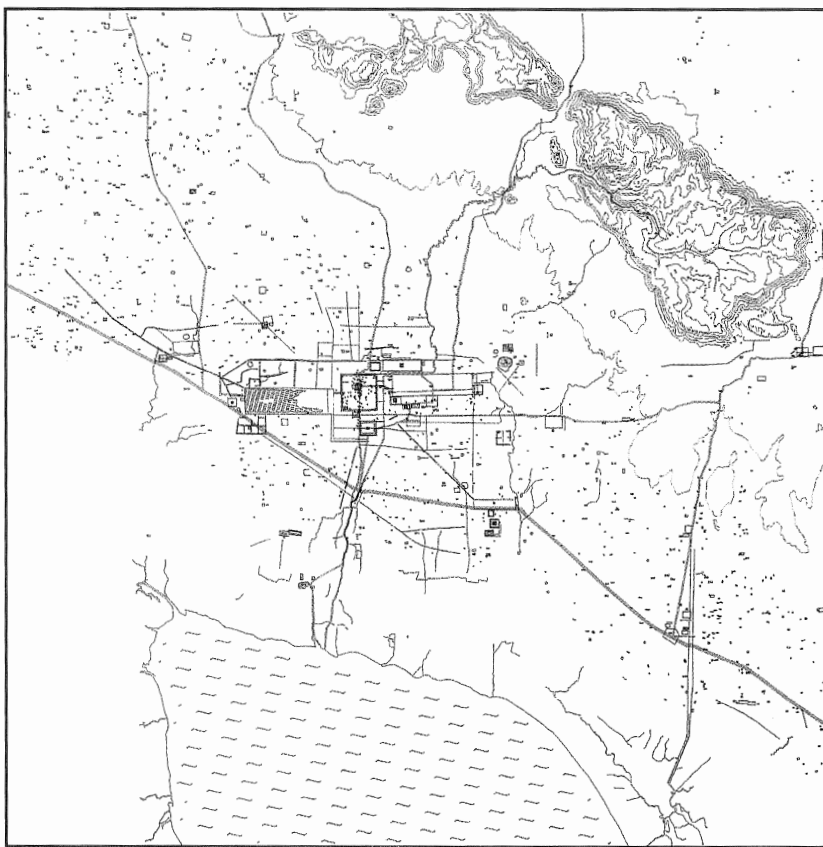
25. *Archaeology of a Coastal Exchange System: Sites and Ceramics of the Papuan Gulf* (1994) D Frankel and JW Rhoads (eds).
26. *Gendered Archaeology. The Second Australian Women in Archaeology Conference* (1995) J Balme and W Beck (eds).

ZONING AND ENVIRONMENTAL
MANAGEMENT PLAN FOR
THE ANGKOR REGION

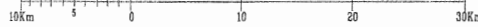
ARCHAEOLOGICAL SITES

LEGEND

-  ARCHAEOLOGICAL STUDY AREA BOUNDARY
-  ARCHAEOLOGICAL SITES
-  CONTOURS, 50 M
-  PERMANENT STREAMS, BARAYS, MOATS
-  NATIONAL ROAD
-  PROVINCIAL ROADS



SCALE 1 : 300 000



MINISTRY OF CULTURE-UNESCO, © ANGKOR GIS, 1994.

Z
E
M
P





E. = 420,000
N. = 1,520,000



ZONING AND ENVIRONMENTAL
MANAGEMENT PLAN FOR
ANGKOR

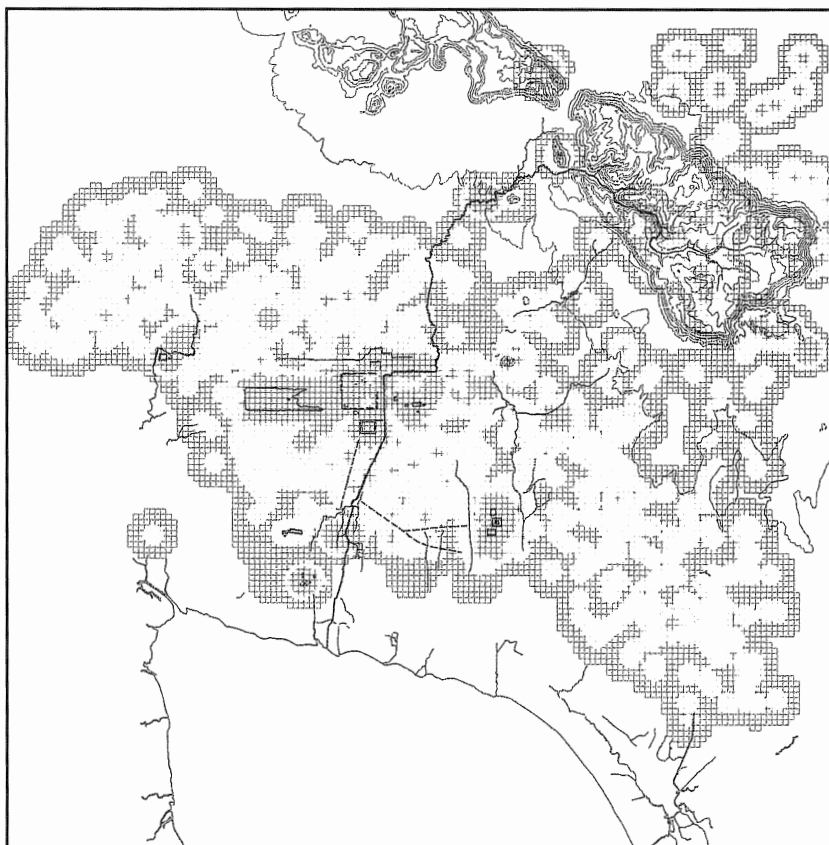
UNESCO - ZEMP PROJECT

ARCHAEOLOGICAL
VALUES

Legend

-  High value
-  Medium value
-  Low value
-  No data

-  Contours, 50 m
-  Permanent streams, barays, moats



E. = 345,000
N. = 1,445,000

Scale 1 : 300 000