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Ecology of Food Taboos and Fishing Technology: A Complex System of Resource Partitioning among Jalari of North Coastal Andhra Pradesh

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ABSTRACT The present study attempts to bring out how indigenous fishermen groups maintain resource partitioning in undifferentiated open seas. The present research focuses at Jalari caste in the region of Visakhapatnam on the North Coastal Andhra Pradesh. Food taboos of Jalari caste at the descent group level is viewed from a hitherto untouched area of resource partitioning: a unique system of delineating fish resources, which helps each group within the community to achieve resource partitioning: this is achieved with the use of food taboos, prohibition of use of particular technology and the behavioural pattern of certain species of fish. Food taboos are here seen to establish micro resource utilization areas for different descent groups. Thus, complex distinctions of food taboo, 'technology restrain' and species behaviour makes the different descent groups to operate at different distances from the coastline, creating micro resource zones and facilitating resource partitioning.

INTRODUCTION

Marine resource environments are receiving attention of anthropologists in recent extended times, which has lead to a fairly large body of research on aquatic systems especially in the last fifteen years. It is said that fisheries provide some of the most dramatic instances of the collapse of overexploited resources as well as striking examples of incorporation of communal systems of resource allocation into successful development, these aquatic cases have attracted a good deal of attention, specially in fresh water zones (Acheson, 1981: 275-316). Initially it was understood that fishermen in different parts of the world have no ownership of fish resources (see Firth, 1965). It is stated that fishing spots are not formally owned but there is secrecy and information management operate to control some property rights over resources (Forman, 1967). In few instances, certain boat crews have de facto rights to specific niches and ecozones since they are the only ones in the area, which have the technology to fish them (Cordell, 1974). Generally it is a fact that in many of the societies fish resources are truly common property resource. Of late there is a growing body of literature demonstrating that in many different regions there are diverse fishing societies who have established ownership of rights to marine resources (Chang, 1971). In reality there are very wide varieties of sea tenure systems that have been recorded but it is difficult to generalize them.

The need for delineating fishing areas for a ethnic group, or smaller groups within it is of great importance from a number of angles: One of the major reason being that when resource allocation is achieved it has multiple advantages, like it becomes an effective means for maintaining environmental and ecological balance besides it can control conflict for resources and community level reciprocity is also maintained. The Ethno-ecological knowledge of ingenious populations is quite capable of delineating resource zones or territories and for which mental mapping with natural makers is often employed. But in open seas or large water bodies, which are uniform and lack visible makers, it is impossible for the people to fix such territories. At the same time it has been pointed out that in most societies fishing rights involve control over 'fishing space' not the resource itself (McCay, 1978: 399). The space over open sea or large lake, or other large water body is difficult to mark out and borders almost impossible to define.

There are a number of studies which have documented the existence of territorial fishing rights over exclusive fishing zone (Pollnac and Littlefield, 1983; McGoodwin, 1984; Cordell, 1989) It is also recorded that in such cases systems of water tenure involve the holding of exclusive and limited rights by shore communities over fishing resources found in specific parts of the aquatic environment (Levieil and Orlove, 1990). But in these studies it has been shown that the onshore

natural makers are used to delimit the resource boundaries. The question remains as to how indigenous fishermen groups maintain resource partitioning in undifferentiated open seas? In has been reported from the Maluku islands that the natives do use astronomical navigational fixes, to determine their positions in the sea (Ellen, 2003: 171), but there is no evidence as of now to show that they use this method to delineated resource areas in open seas.

The present study attempts to bring out a unique system of delineating fish resources, which helps each group within an ethnic community to achieve resource partitioning: this is achieved with the use of food taboos, prohibition of use of particular technology labeled as 'technology restrain'[1] and the behavioural pattern of certain species of fish.

FOOD TABOO AND ECOLOGY

Taboo has been a concept of considerable interest to Anthropologists since the days of Classical Anthropology. The term taboo is of Polynesian origin. Taboo as such is a very general term applied to anything that is forbidden. In anthropology it has become to be used with prohibition, pollution, sacredness, etc. (Douglas, 1966). Talking of food taboos one may recall that Frazer way back in 1890 referred to the pig as a taboo in Syria (1955: 23). Food taboo in its simplest understanding means that certain food item is prohibited from eating, may be killing or any other culturally applied prohibition by a society or cultural system. In this regard the meaning of 'food' is best understood as something, which satisfies hunger (Malinowski, 1944).

Food taboos have been studied at the level of Hindu society, for example cow in India and pig in the Islamic world. Many explanations have been offered. The sacredness of cow had been in fore front since a very long time. Such a taboo was considered to be religious in nature. In the Islamic world, pig was given an unclean status and this too was drawn from a religious ideology for some. Apparently in India, which is supposed to have the largest cattle population in the world but at the same time, it perhaps has the lowest per capita protein intake, this seemingly huge wastage of the biomass from an economist's or an ordinary person's point of view would be irrational. Recently, the large cattle population of India was looked upon by cultural ecological analysis as a positively functional part of the ecosystem (Harris, 1966: 51-66). Prasada Rao points out that much of the earlier writers have however emphasized the sacredness of Hindu cattle but the ecological view gives a deeper insight (1982: 378). In a similar way, various authors have explained the pig taboo in Arabia as an ill adapted animal in a dry, non-moist habitat (see Diener and Robkin, 1978). There is much controversy, which exists over the finer details of arguments. But basically culture ecological explanation seems to clarify many of the earlier cultural explanations. A group may prohibit an item of food as non –edible on its real nature of biological unsuitability for human consumptions. For example certain poisonous plants are prohibited. This non –edibility is not treated as food taboo. For the present study food taboo means an item of food, which by a positive rule of abstinence is practiced by a society or a section of it.

The study of food taboos in anthropology has been from varied perspectives of inclusive or exclusive groups which practices a specified norms of food taboos, that is the group in question varies in its unitary characteristics, it could be a religious group, an ethnic group, a tribe or any unit smaller then the tribe etc. In anthropological terms food taboos could be different for different units of observations, as such an operational view can be taken for an empirical study, which could be at the level of society as a whole, moiety, phratry, clan, lineage or any other anthropological unit of study. The explanations of food taboos are from different perspectives as emphasized by different scholars who in their analyses of taboo have followed their own theoretical positions. For example Ross pointed out the existence of symbolic and structural understanding of food taboos in his study of Amazon food taboos (1978: 21-41). He went on to analyze food taboos in an ecological framework. The ecological position, which in its broadest engulfment argues that food taboos can be basically explained in the terms of ecological adaptations, nutritional efficiency and various other ecological principles derived from the general body of ecological theory (cf. Hardesty, 1977; Moran, 1982; Abruzzi, 1982). Present study illustrates as to how food taboos interplay with technology to create a resource partitioning over open sea: The restrictions on fishing certain species of fish does not achieve resource

separation directly from non consumption of tabooed fish *par see* but acts to restrict use of certain stretches of open sea to fish in conjunction with use of types of fishing techniques.

The concept of human territoriality especially for hunters and gatherers is thought of as band territoriality where the defense of territory excludes the other bands from utilizing the larger territory of the same ethnic group for resource. The question of sharing resources within a territory does not figure centrally in their arguments (Service, 1962; Lee and DeVore, 1968; Damas, 1969; Williams, 1974). An almost similar usage is found in the study resource area / territory for marine fishermen (Yesner, 1980). The concept of ecological niche has been well established in Anthropology by the pioneering works of anthropologist like Barth (1956). He discussed the ecological niche at multi ethnic level in Pakistan as for the present we would be more interested in resource partition within an ethnic group. Abruzzi (1982) using the general ecological principles of speciation on the basis of food sharing within a given zone argued that resource separation might lead to formation of different ethnic groups. In the case of present study we are dealing with food taboos for resource partitioning within a small zone[2] among local descent groups. The argument is if food specialization can lead to ethnic identity than food taboo, 'technology restrain', and behaviour of species of fish can in complex combination analogously lead to resource separation. Once fishing zone specialization occurs than the local descent groups' identity is maintained and resource partitioning is also achieved. The study presents a detailed case of Jalari fishermen caste of North Coastal Andhra Pradesh.

JALARIS CASTE

The present study focuses at a specific practice of food taboos at a level lower than that have and ethnic unit: in the present case the ethnic unit being a caste. The food taboos of Jalari caste at the descent group level is viewed from a hitherto untouched area of resource partitioning. Food taboos among three such descent group's of Jalari caste in the region of Visakhapatnam on the North Coastal Andhra Pradesh between latitudes and longitudes of 17° 30´; 17° 45´ and 83° 15´; 83° 20´. Jalaris are found all along the north coastal region of Andhra Pradesh. They are more predominant between Kakinada and Kalingapatnam, Jalari are one of the three fishermen castes with descent groups. The Jalari caste people are 'peasant fishermen' as defined by Firth (1966) "…. with simple technology and small-scale production units, partly dependent upon market exchange for their subsistence". Jalari descent groups and the existence of marriage alliance system has been well documented by Kodanda Rao (1973, 1975, 1981, 1985). Marriage alliance is maintained between different descent groups in doing so each of them sustains as a group with an identity and a set of rules including reciprocity. Kodanda Rao did not dwell on the aspect of food taboos in general or among descent groups of Jalaris.

The Jalaris restrict their fishing operations within 15 kms from the coastline. They have both *thappa* (catamaran) and *padava* (planked boat) for their fishing. They do use both oars and traditional sails to propel their crafts in the seas. They use various types of nets and also use fishing lines to catch fish. The bulk of fish catch is sold in the local markets, but they do keep some part of it for household consumption. Senseasonality plays an important role in their fishing operations by dictating use of different types of nets and fishing lines. The Jalari live in segregated villages or hamlets along the shoreline, which are usually situated in the bays and other sheltered areas. As their settlements are close to the seacoast the hut pattern is circular in fashion, which protects them from strong winds. The Joint family system still exists to some extent. The recent modernization has made several of these families to disintegrate. The descent is patrilineal and the local descent group of agnates plays an important role especially in the *pedda vala* (big net) operations amongst other things. There are a number of descent groups, each having an *intiperu* (clan name) such as *kadari*, *vaddamodullu*, *chintapalli*, *karuku*, *nolli* and *pottu*[3]. Each local lineage group is headed by *pillagoudu*, who is traditionally the senior most male member.

FISHING TECHNOLOGY

Jalaris are well versed with the conditions of the sea and weather conditions. They have deep knowledge of sea conditions. Changes in currents, tides and the seasonality of wind changes. Ethnoecological knowledge of fish species and identification of their habitats is extraordinary and

which is so far has not been fully documented. As stated there are a number of local descent groups of Jalaris found in the area of study but for the present we have picked up the three major descent groups *kadari*, *chintapalli* and *vaddamodullu*. All three have marital alliance with each other (Kodanda Rao, 1981a, 1985). At the caste level the Jalaris as a whole do not kill or eat *ganmulu* (Dolphin). This may be due to their belief that the presence of dolphins drives away dangerous shark fish away from the area[4]. Besides this the *dasulu* (sacred specialist) and lineage heads who are called *pillagoudu* are banned from eating *tabelu* (sea turtles). This fact can be explained as a protection mechanism, since the presence of sea turtles in the upper waters invariably indicates the presence of tiger shark underwater.

The beachhead where the catamarans and boats are kept is called *karavaka*, much of the activities take place here, catamarans, boats, nets, and other fishing equipment are dried and repaired. The fish catch is landed on *karavaka* and fishermen's wives, daughters, sisters or mothers come here to collect them in baskets and sell in the local markets. The high tide and low tide conditions are known as *neeru ekkudala* and *padiorindhi*. They also define water condition by its changing colour as *netu-oogu*, this occurs due seasonality and changing sea conditions. The end of the surf line where the waves break is called *dandi*, the depth of water is measured locally in *baralu*, and each *baralu* is approximately 2 metres. Different nets are used beyond the *dandi* line, depending upon the water depth, where they want to fish and what variety fish is available. The first type of nets are shore nets, fishermen from the foreshore operate these nets. The largest of these nets is *pedda vala*, which needs between 15 to 20 men, they usually include agnates and affines, and the catch is shared among all of them. The ownership of net rests with the local descent group, the members of the descent group own portions of the net and they are supposed to maintain it by way of repairing and mending any damages etc. *Pedda vala* is usually 50 metres wide and about 30 to 40 metres in length, it is shaped as a tapered bag. The extreme rear end is tapered and closed, the front end is open and the upper portion is floated with aid of light wooden pieces (recently they have been using synthetic floating material). The open end has two strong ropes attached to it. The whole net is taken to a short distance into the sea. Two or three men on a catamaran hold the rear end up and the two ropes are handed over to the waiting fishermen on the shore by swimmers. When they are sure that sufficient fish are between the open entrance of the net: then the shore crew hauls the net up the beachhead and the trapped fish are picked up.

The whole process of casting the *pedda vala* and hauling it and picking the fish takes 3 to 4 hours, and on any given day during the season a single net is cast twice or thrice in a single day. Of late the *pedda vala*, is disappearing for a number of reasons, chief amongst it is the lack of proper space on the beachheads, as these net cannot be cast at any place they want, but the spot where these are cast is selected carefully from many angles like the slope of the shore the water currents and general behivour of schools of fish. All the traditional spots in and around the city of Visakhapatnam have been taken over by beach developers and many coastal Jalari villages have been shifted due proliferation of aquaculture and development activities. The second reason for the disappearance is the break down of the joint family system; the *pedda vala* operations needs cooperation of a large number of people and it has to be operated under *pillagoudu* (lineage head), the local descent groups have lost much of their former cohesiveness and lineages have lost there traditional role in economic activities. Besides *pedda vala*, there are two more shore nets one is called: *isuru vala* (small single man net) and *konti vala* (two men net). These two nets are used by fishermen in a more mobile fashion in the bays and sheltered areas of the coast, they generally walk around and go on casting these nets and catch small qualities of fish either in the mornings or late in the afternoons, generally aged or young fishermen do these activities.

The Jalaris use distinct types of nets to catch different types of fish in the open seawaters. The first one is gillnets which are flat, long held by first one end and weights in the other. These nets are dropped from catamarans and picked up after the fish are entangled. The sub-type of gillnets are called *pedda kavallu vala, cogula vala, nadipi vala, china oovotu vala*. Besides this in the same category but with a slightly different shape is the *kadiri vala*. The characteristics feature of these nets in the net space (actual net eye size) which varies between 25mm and 5mm in

the same order of nets as given above. Nearest to the *dandi* line the *china voddu vala* is used where the water depth is around 6 metres. Just beyond this the *kadari vala* is used. After this the *nadipi vala* and *chinteku vala* is used and the maximum depth is about 30 metres. *cogulu vala* is used beyond this at a maximum depth of 50 metres. The *pedda kavallu vala* is used at the maximum distance from *dandi* line but at depths not exceeding 60 metres. The overall dimensions of these nets are highly variable for example *pedda kavallu vala* may be as long as 100 metres in length and 4 metres in width. The gillnet size determines the number of fishermen needed on the catamaran. But a single catamaran is sufficient for its operations when the nets are small.

The next important net is a trawling net or bag net called *irragalu.* This is also held by floats and drawn by two catamarans. The length of the ropes between the floats and the net can control the depth of its operation. The net holes of this vary progressively from 100mm at the sides gradually lessening to a mere 5mm at its bag end. The *irragalu* are trawling net is used between 40 to 50 metres depths. The third type of net is called *silku vala*. This is basically a net, which has to be used while it is in contact with the seabed and has a uniform net eye size of 40mm this is used between 60-66 metres depth. A new type of trawling net has been recently introduced called *disco vala*, which has largely replaced *irragalu* and *silku vala*. Original *disco vala* has its origin is Tamil Nadu and is made in accordance with modern shrimp trawling nets with lead bead ticklers on the bottom line to make the floor level fish and shrimp to bounce up and be trapped in the net. Two catamarans are used to trawl with this net. All these nets are seasonally used; the main fish, which are caught, are kavallu (*Sardineiia albella*) and *nethallu* (*Stoleohorus commersonni*). These fish start becoming abundant after the monsoon rains around the month of October when the wind conditions change. By the month of March catch of these fish diminishes this coincides with the change in wind conditions.

The hook and line fishing is called *thallu veta* where regular hook and bait is used (nylon ropes have replaced traditional ropes in recent times). The metallic fishing hooks are used in singularly or multiply configuration on the same long line. The hook and line fishing is done at various depths of waters. The most important aspect is the underwater shelters, in the open sea there are a number of submerged rocks, the position of these rocks are well known to the Jalari fishermen. These submerged rocks have local names by which they are referred to among the Jalari men. Fish of different species are generally found in the shadow areas of these rocks. The fishermen use catamarans to reach these spots and cast their fishing lines with specialized baits for catching particular species of fish. Besides this they also use multiple hooked fishing lines, which are generally dragged along in a submerge mode. Some species which are caught by hook and line method are like seer fish: *vanjaumu* (*Scomberomorus guttatus*), *konamu* (*S. commerson*) and tuna fish: *balla sora* (*Auxis thazard*), *raka sora* (*Thunnus tonggal*), *pedda era sora* (*Euthynnus affinis*), are caught in this type of fishing.

It could be summarized at this stage that the fishing knowledge combined with the technology available (subject to'technology restrain') constitutes a techno-cultural construct for Jalari caste to exploit the open sea for fish resources which are sold in the markets by Jalari women for cash. They use the cash to purchase food gains and other essentials for their subsistence.

RESOURCE PARTITIONING

The *kadiri* descent group is prohibited from eating the fish called *kadiri* (*Balone spp.*) [5], which are found near to the *dandi* line. They are also prohibited from making and using the *kadiri* net (*kadiri* fish are mostly found close to the sea surface). The *vaddamodullu* people are prohibited from eating the fish called *vala avaloosu* (*Coryhaena spp.*) The *vala avaloosu* fish cannot be caught in nets. It is a fish, which can be caught by fishing lines only. The *chintapalli* descent group is banned from eating the fish called *silthi* (*Pltosus anguillaris*). The *silthi* fish it is found at varying depths of sea depending on the conditions of the seawater; when it is muddy it comes to close to the surface of sea and when the water is clear it goes down. *Silthi* fish can be caught in all types of nets but only in deep waters (floor) where *kadiri* net cannot be used. The *kadiri* fish cannot be trapped in *irragalu* (which can trap sea floor level fish) thus creating differences in fishing areas, extending from the surf line (*dandi*) into the open sea. In

other words zones are created starting from the beachfront into the sea, depending on the species of tabooed fish and the prohibition of use of particular type of nets. The varieties of fish tabooed have their own preference for particular condition of seawater and depth of the sea[6], which also can be stated, in terms of distance from the surf line.

The prohibition of particular type of fish net excludes the catch a particular species of fish. In this case making the three descent groups use three different zones which are non exclusive as far as area is concerned but making fishing activities of these descent groups separate. If fishermen do by chance net prohibited species of fish they generally give it away to their affines group, the affines group does return the gesture whenever they happen to net their prohibited fish. A form of reciprocity is thus achieved. Thus, complex distinctions of food taboo, 'technology restrain' and species behaviour makes the different descent groups to operate at different distances from the coastline thus creating micro resource zones and facilitating resource partitioning. A resource zone is multi dimensional: the distance from the surf line, depth of waters and sea surface expanse also comes into play.

CONCLUSION

The complex mechanism of resource partitioning, which is highlighted here, may be useful in understanding the methods of resource partitioning in an overlapping ecological niche. The understanding of the concept of 'technology restrain' within the fishing technology of the Jalari caste clarifies that even if technology is available cultural rules of usage can make its relation with environment different. That is it can make man-environment different for different groups of people of the same ethnic group, making it possible to differentiate resource utilization. Food taboos in conjunction with 'technology restrain', nature of coastal terrain and under water hydrographic details help in establishing of overlapping resource niches for different local descent groups and establish micro resource utilization areas for different descent groups.

NOTES

1. The restriction of use of technology in the present case is the prohibition of use of a particular variety of fishing net. We would like to use the term 'technology restrain' to describe this phenomenon.
2. The term 'zone' for the present study does not mean a well marked area, but it is a three dimensional space in the sea wherein it is consciously felt by the local descent group as a zone where they are likely to get fish which they are not prohibited to eat or catch
3. For the present study data was collected from villages north of Visakhapatnam city, each villages generally has 2 or 3 descent groups
4. This fact has been mentioned in nautical / biological literature, see Reader's Digest (1964).
5. *Nolli* and *Pottu* descent groups also have food taboos; the first group is banned from use of *nolli*, which is actually a type of bait, and the second group is banned from eating *pottu*, which are fish eggs.
6. The fish, which are tabooed, are give in the table below will their availability depth.

REFERENCES

Acheson, J.M.: Anthropology of fishing. *Annual Review of Anthropology,* **10:** 275-316 (1981).

Abruzzi, W.S.: Ecological theory and ethnic differentiation among human population. *Current Anthropology*, **23:** 13-35 (1982).

Barth, F.: Ecological relationships of ethnic groups in Swat, North Pakistan. *American Anthropologist*, **58:** 1079-80 (1956).

Chang, K.H.K.: Institutional changes and the development of the fishing industry in a Japanese island community. *Human Organization*, **30:** 158-169 (1971).

Cordell, J.: Carrying capacity analysis of fixed territorial fishing. *Ethnology*, **17:** 1-24 (1978).

Cordell, J.: The Lunar-tide fishing cycle in Northeastern Brazil. *Ethnology*, **13:** 379-392 (1974).

Damas, D. (Ed.): *Conference on Band Societies National Museum of Canada Bulletin* No.228 (1969).

Diener, P. and Robkin, E.R.: Ecology, evolution and the search for cultural origin: The question of Islamic pig prohibition. *Current Anthropology,* **19:** 493-540 (1978).

Douglas, M.: *Purity and Danger*. Routledge and Kegan Paul, London (1966).

Ellen, R.F.: *On the Edge of Banda Zone: Past and Present in the Social Organization of a Moluccan Trading Network*. University of Hawaii Press, Honolulu (2003).

Firth, R.: *Primitive Polynesian Economy*. Rutledge and Kegan Paul, London (1965).

Firth, R.: *Malay Fishermen: their Peasant Economy*.

Local name	*English name*	*Scientific name*	*Depth (appox.)*
Vala avaloosu	Dolphin fish	*Coryhaena spp.*	0-50 metres
Silthi	Striped cat fish eel	*Pltosus anguillaris*	50 metres (only on the floor level)
Kadari	-	*Balone spp.*	Near the surface of the seawaters

Routledge and Kegan Paul, London (Originally published in 1946) (1966).

Forman, S.: Cognition and the catch: the location of fishing spots in a Brazilian coastal village. *Ethnology,* **6:** 417-426 (1967).

Frazer, J.: *The Golden Bough* (3rd Edition) Abridged edition of 1922 edition reprinted, Macmillan, St. Martin(1955).

Hardesty, D.L.: *Ecological Anthropology*. Willy, New York (1977).

Harris, M.: The cultural ecology of India's sacred cattle. *Current Anthropology,* **7:** 51-59 (1966).

Kodanda Rao, M.: Rank differences and marriage reciprocity in South India: An aspect of the implications of elder sister's daughter marriage in a fishing village in Andhra. *Contributions to Indian Sociology* (ns), **8:** 16-35 (1973).

Kodanda Rao, M.: *Family and Kinship among Jalari of Coastal Andhra*. Unpublished Doctoral Thesis, Andhra University, Waltair (1975).

Kodanda Rao, M.: Processes of Ecologic Adaptation among Jalaris of Coastal Andhra, *Man in India,* **61:** 69-75 (1981).

Kodanda Rao, M.: Descent and descent groups among Jalari. *The Eastern Anthropologist,* **34:** 301-310 (1981a).

Kodanda Rao, M.: Kinship and Marriage among the Jalari of Coastal Andhra: A study of Dravidian Kinship Terminology. *Contributions to Indian Sociology* (ns), **16:** 197-223 (1985).

Lee, R.B.and DeVore, I.: Problems in the study of hunters and gatherers. pp.3-12. In: *Man the Hunter.* R.B.Lee and I. DeVore (Eds.). Aldine, Chicago (1968).

Levieil, D.P. and Orlove, B.: Local control of aquatic resources: Community and ecology in lake Titicaca, Peru. *American Anthropologist,* **92:** 362-382 (1990).

McGoodwin, J.R.: Some examples of self-regulatory mechanisms in unmanaged fisheries. *FAO Fisheries Report No. 289.* United Nations FAO, Rome (1984).

Malinowski, B.: *A Scientific Theory of Culture and Other Essays*. University of North Carolina Press, Chapel Hill (1944).

McCay, B.: Systems ecology, people ecology, and the anthropology of fishing communities. *Human Ecology,* **6:** 397-422 (1978).

Moran, E.F.: *Human Adaptability,* Westview Press, Boulder (1982).

Pollnac, R.B. and Littlefield, S. J.: Sociocultural aspects of fisheries management. *Ocean Development and International Law Journal,* **12:** 209-246 (1983).

Prasada Rao, D.L.: Comments to Vaidyanathan et.al. *Current Anthropology,* **23:** 378-379 (1982).

Reader's Digest. *Marvels and Mysteries of Our Animal World*. Coronet Book, New York (1964).

Ross, E.B.: Food taboos, diet and hunting strategy: The adaptation to animals in Amazon cultural ecology. *Current Anthropology,* **19:** 1-19 (1978).

Service, E.R.: *Primitive Social Organization*. 1st Ed. Random House, New York (1962).

William, B.J.: A Model of Band. *Society for American Archaeology,* Memoir No. 29 (1974).

Yesner, D.R.: Maritime hunter-gatherers: Ecology and prehistory. *Current Anthropology,* **21:** 727-750 (1980).