

A Cybernetic Study on the Andro Ceramic Ecology

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I

Ceramics, one of the most tangible products of man's culture, are a highly specialized part of techno-economic sub-system that adapts to and modifies the environment for socio-cultural ends (Arnold, 1988: 16). Moreover, as an integral part of the larger culture-environment system, ceramics are also systematically tied to the environment.

Earlier studies on ceramics (Gifford, 1960; Rouse, 1960; Whallon, 1972 and Smith et al., 1960) placed emphasis on classification taking potsherds as basic units of study. Such studies were based on the atomistic paradigm that has its roots in Newtonian Physics. It did not taken environment into its account on the ground that environment is a neutral variable which plays no appreciable role in the similarities and differences in ceramics. Another paradigmatic notion that affects ceramic studies is mentalism that dominated anthropological thought in the late nineteenth and early twentieth centuries. This perspective is clearly reflected in the ceramic studies of Bunzel (1929), Gifford (1960) and Deetz (1967). Among archaeologists the environment was thus viewed as having no impact on ceramics except as providing the necessary raw material (Arnold, 1988:9).

Matson (1965), relating Steward's (1955) cultural ecological approach to ceramic studies, first emphasis the relationship of the ceramics with the environment and cultural patterns behind them. He refers to his perspective as 'ceramic ecology' in order to show its difference from the traditional ceramic studies as well as to call academic attention to this approach. In his ceramic ecological approach, he further emphasizes the need to relate ceramics to human choices and cultural patterns. This theoretical approach was later employed by Arnold (1975, 1978 a, b), Kolb (1976), Van der Leeuw (1976) and Rice (1981) in their pursuit of ceramic studies.

The systematic relationship between ceram-

ics on the one hand, and environment and culture on the other can exhaustively be discussed in terms of cybernetics rooted in systems paradigm because ceramics, as one kind of material culture and a part of the exploitative or productive technology, are tied closely to the environment forming a complex whole – a dynamic system. 'Cybernetics is attractive ... because it removes the distinction between living and non-living system and concentrates on the similar properties of both' (Arnold, 1988: 17). These similar properties, from the perspective of cybernetics, consist of goal-seeking behaviour and the processes of control and communication that permit the system to achieve that goal (Boulanger, 1969). These processes of control and communication always work to reduce the difference between the goal and the actual performance of the system by way of collective information about the difference (Miller et al., 1960). These processes, referred to as feedback mechanisms, display mutual causal relationships in which the output (the actions of the system upon its environment) of the system affects the input (the varying external conditions acting upon the systems).

Feedback mechanisms are of two types: negative feedback (regulatory or deviation counteracting feedback) and positive feedback (deviation amplifying feedback). Negative feedback promotes equilibrium of the system counteracting deviations from the stable situation over long periods of time and maintaining simultaneously a prescribed set of boundaries. When a system cannot regulate the external input acting upon it the feedback process promote or amplify deviations: this is positive feedback. It consequently results in the expansion of system and gives rise to the stability of the system at new, more complex levels (Maruyama, 1963). These external inputs, called kicks, redefine the thresholds of the system forcing the inputs of the system through the threshold of the regulatory feedback. Positive feedbacks thus bring about dis-equilibrium and change within the system. Moreover,

the system can gain information and change by means of the process of this feedback. 'Both kinds of feedback are important in their respective capacities for bringing systems upto, or away from states of *equilibrium* or stability' (Clark, 1978: 47).

The processes that relate ceramics to the environment and culture can be viewed as a set of some of the feedback processes that stimulate or limit ceramic production and can aid in interpreting the role of ceramics in ancient society.

The present study endeavours, on the one hand, to explain the relationship of the Andro potters with their environment and culture as a series of feedback mechanisms in the light of cybernetic model and to draw an ethnographic generalization of the relationship that can be applied to the past on the other.

II

Inhabiting the village bearing the same name on the down slopes of the eastern foothills of the Nongmaiching hills in the Imphal East District, Manipur, the Andros is one of the important constituent groups of the 'loi' community¹ of the State. Though listed as a Scheduled Caste (along with their other counterparts – Phayeng, Sekmai, Leimaram, etc.) under the Government of India's Scheduled Castes and Scheduled Tribes Amendment Act (No. 108 of 1956), - the patri-oriented agrarian Andros do not necessarily agree with the configurational hierarchy system of a caste society. However, the people possess the tribal characters at least in the concept of *territorial and cultural boundary* (Majumdar, 1961: 367; Beteille, 1977: 10). The people of the region are acclaimed as wet-cultivators; nevertheless pottery is also practiced as a main economic pursuit by the Andro womenfolk – as favourite bit of household chores. Thus, pottery, by and large, remains as a part-time² occupation of Andro women whereas men share none with their opposites. Continuity, development and seasonality of the women – specialized Andro pottery result from both the negative and positive feedback mechanisms induced by some contemporaneous environmental factors such as, original properties of the raw materials, local

climatic conditions, availability of resources, scheduling conflict, cultural norms and behaviour resulting in exploitation of resources etc.

One of the primary environmental factors responsible for the development of pottery in Andro is the suitability and easy availability of the necessary resources. The raw material of the Andro pottery consists of *leitan* (clay class) comingled with *leichreng* at a given proportion³ just to manufacture a tempered produce. The addition of finely pounded *leichreng* to the paste of *leitan* is effected for the sole effect of achieving workability, counteracting the ill effects of shrinkage and facilitating drying process of the finished product. Rock group of both *leitan* and *leichreng* are of argillaceous variety. The variety of *leitan*, the milky pale lacustrine clay⁴, used in pottery – making is of *good* and favourable quality for potting and it comes within the halloysite group which does not absorb much water and takes lesser time to dry (Grim, 1968: 235). These fine-grained and natural biscuit clays sometimes have reddish-brown tinge owing to the least proportion of ferric oxide in it. The tempering materials (*leichreng*) are the Dishang shale of Tertiary (Miocene) origin. These are reddish black in colour with carbon and iron coating and split easily along the bedding planes.

The Andro-potters gain enough benefit of collecting the resources from places in the vicinity of their dwelling sites. It turns out to be an added advantage to the people when they are in the thin of the profession. The resource site, located in the north-western boundary of the village and on the western side of the inter-village road, further enhanced the job prospects of the regional artisans. This more or less irregularly triangular plain of about half a square kilometer area lies on the south-eastern downslope of the three interlocking hill ranges – Eraoching, Seloilangmaiching and Heinoupokpi. However, the first and third hill ranges are the outgrowths of the main Seloilangmaiching. The descending ridges running parallel to the Seloilangmai hill range are aligned roughly with each other in the south-west north-east direction and incised by the elongated shallow gorges. The slopes that over look the valley are dissected by perennial streams drained into a common rivulet down the delta. Consolidated argillaceous sediments are

thus deposited at this deltoid area of *leitan pekpham* (the collecting site of clay), giving a rich deposit of potting clay to this whole drainage area. At present, a weir (seemingly of recent artificial origin) of about 18 meters length is seen just at the foothill, resisting the perennial water current that flows down the delta, that is, the *leitan pekpham*, to make into an artificial lake (which the people call *laipat*) of about 22×37 square meters in area. This weir, which serves as a footway, stretches north-south, bridging the gorge between the Eraoching and the south-western extension of the Heinoupokpi hill ranges.

The tempering materials (*leichreng*) of Andro pottery are only collected from a particular site popularly known as *leichreng khapham/loupham*. It is situated in the Chembra Leikai of the village, at a distance of about 50 meters to the south-west of the *leitan pekpham*. The welded shales are lying exposed on the western downslope of a small shrubby hillock separated by a small stream from the larger Seloilangmai hill range.

As the village settlement is of nucleated pattern and resource areas are located in one corner of the village, potters naturally have varied geodesic and pheric distances to the ceramic resources. For instance, potter who lives near to the sources of clay and temper shall have a lesser distance (both geodesic and pheric) than those who reside farthest from these two sources. Moreover, a reciprocity in distance variation is also apparent between those potters who settle near the clay source and the others who are near the temper source. Taking the center of the village as a central point, the geodesic distance to the clay source measures 1.281062 km (that is, ≤ 1.5 km) and the pheric distance⁵ 33 min. In case of the temper source, they are 0.87 km (that is 1 km) and 28 minutes, respectively.

III

Other than the suitable clay and temper, other equally important ceramic resources are fuel, water and colours and other items used in the work. The nucleated settlement village area is almost surrounded by agricultural lands. The potters use straw and dried cow dung for firing the green potteries. These are found easily within the reasonable distance from the potter's house.

Water, though equally important, is not a problem as well. The only liquid colouring material used just after firing of the pots is made through prolonged dipping of *kuhi* (*quircus* sp.) tree's bark into water. There is an abundant supply of this variety of tree in the locality, for the downslopes of the nearby hills abound with the same. Thus, the use of local subsistence by-products as fuel, and locally available plants for making colouring item suggests a similar threshold distance as that of the clay and temper.

Other, more or less consumable items of resources in Andro pottery, include: (a) *ukoo*, an elongated mortar-like piece dug out from a big tree trunk (the size ranges from 0.65 m to 1.5 m); (b) *shuk* a wooden pestle; (c) a flattish or rounded fine grained pebble (about 17 to 25 cm in diameter); (d) a half piece of the bivalve shell of the *Kong-greng* (mussel); (e) *tetap*, a rectangular thick bifaced mallet—one face of which is plain and the other opposite side incised with geometric forms of decoration (size of about 7 cm × 15 cm); (f) a piece of wooden plant of about 1.5 cm × 2.8 cm. In size; (g) a split bamboo piece of about the size of 2.5 cm × 17.7 cm (h) one *kang* (*Diptero carpus tuberculatus*); (i) a piece of rough cloth used for rubbing the outer surface of the green pot before being dried; (j) a long bamboo pole of about 1.5 - 2 m in length (known as *phurok-chei*); (k) a broom made temporarily from straws—used for sprinkling the colour of *kuhi* liquid; and (l) bark of *kuhi* tree (*quircus* sp.).

IV

Weather and climate (as the environmental variables of humidity and temperature) also have exerted a profound effect on the consummate success of Andro pottery production. The seasonality of the craft is seemingly an outcome of both the cumulative adverse effects of the economic and socio-cultural regulations and weather and climate that constitute an important feedback mechanism on this craft specialization are two-fold. First, Andro women are debarred from continuing the craft during the hectic season of agriculture, which normally falls within the wet season. Second, the *leitan* and *leichreng* can hardly be collected by any enthusiastic Andro women on the onset of the Andro new

year⁶ without prescribed ceremonial observances. Here, it can be asserted that the fulfillment of these economical and cultural norms have the deviation counteracting feedback in the ceramic production – partly debarring the Andro women from becoming a full-time specialists in the craft. The two factors are also reciprocal in nature, and this reciprocity partly fulfills the favourable steps in pottery production, such as, the collection of raw materials, drying of clay for enabling to pound into powdery state before mixing with the fully pounded *leichreng*, the drying of pottery and other subsequent activities. Rate of drying of green pottery is affected not only by the permeability, mineralogy, and size and shape of the clay body, but also by temperature, wind velocity and relative humidity in the environment. (Shepard, 1956: 74; Grim, 1962: 75). Moreover, drying of the green potteries is not done all too quickly under the direct sunshine just to avoid the chance of cracking of the finished stuff. Such undesirable damages are easily avoided by drying these objects in the shade. Drying is normally carried out in the shade for a couple of days or so or even longer in case of big sized pots. They are then dried in the sunshine for one or two days. Before the stage of drying proper in the shade and sunshine, an initial stage of drying is made during the dabbing stage of pottery, which starts after about one hour of molding. Beating with the help of a mallet (*tetap*) on the outer surface by holding a flattish pebble anvil⁷ oppositely from inside to absorb shock is normally done after two hours if it is a foggy, rainy day. Beating is done every one hour of regular interval till the sutures left on the outer wall by the coiling method is obliterated.

"Pottery making is ideally a dry weather craft; cold and damp (wet.) weather and climate provide significant limiting factor for pottery production" (Arnold, 1988: 71). Manipur belongs to the humid tropics ... where the dry season is less than four months (Ramakrishna, 1985) and has an annual average rainfall of about 146.75 cm. (Statistical Abstract of Manipur 1989). Andro, the village in the Imphal East District, Manipur, enjoys a climatic condition characterized by marked wet and dry seasons. The wet season extends from May to September, or sometimes October, with the greatest

amount of rainfall occurring between June and August. The heavy rains of these period are generally accompanied with high humidity, persistent heavy cloud cover and hence little sunshine. Dry season generally commences from October or November and lasts up to April with February, March and April generally being the driest month. The rainy season, thus, provides partial negative feedback, regulating Andro pottery making to a seasonal pattern and limiting it to the dry months of the year.

V

The craft of part-time, seasonal Andro pottery is entirely in the hands of the womenfolk. Female predominance in pottery making has been reported from many societies, which excel in the trade. For instance, 84% of 37 societies from South Mexico, and Central and South America, and 9 out of 10 societies from tropical forest of South America have female potters (Murdock, 1967: 116). In such agricultural societies, men are exempted from pottery making enabling them to pursue their necessary agricultural activities and paving the way for avoiding scheduling conflict with subsistence activities. Dean Arnold (1988:99) also asserts that "the transition of a population to pottery making depends on the successful solution of two inter-related problems: (1) scheduling pottery making so that it does not interfere with subsistence activities, and (2) if it does, solving this problem by allocating the craft to one sex or the other (or both) without creating conflicts with other responsibilities". Hammond (1966) and Longacre (1974) on the basis of their studies on pottery making among the Mossi and the Kalinga respectively, have arrived at a conclusion that seasonality in pottery making can be explained by scheduling conflicts with subsistence activities. These ethnographic evidences throw light on the explanation of the seasonality of Andro pottery making, for potting is a seasonal occupation of Andro women who engage themselves in various agricultural activities, particularly in the transplantation of paddy seedlings, through an organized, reciprocal labour units as done by their neighbouring Meitei counterparts (Manibabu, 1991, 1992). No one has the time to

work with the clay because of the agricultural responsibilities in the wet season.

Though scheduling conflict as a regulatory feedback mechanism explains the seasonalities of potting among the Andros, it falls short to give a theoretical explanation of the Andro women's monopoly over the specialized craft of pottery making. A wider theoretical speculation is found needed to account for the genesis of pottery as a women monopoly among the Andros. The Andro men do not engage themselves in the work of pottery making though they have enough time of doing it when they are free from their agricultural activities during the slack season. Contrary to our finding, among the Noctes of Dadam, Tirap District, Arunachal Pradesh, as reported by Shyamachoudhuri and Biswas (1963: 64), only men make pots during November and December when they are free from their activities of shifting cultivation and women are forbidden to touch pottery clay. The occupational restriction of pottery to women among the agrarian Andros can be explained in the light of the role expectation of Andro women deeply rooted in the cultural value system of the society.

A brief ethnographic explanation will make the above argument more sound. Women among the Andros, are the custodian of all household activities as well as responsibilities. The role expectation of Andro women has a wide spectrum by virtue of their substantial economic contribution to the family coffer. An ideal man in the society is never expected to take part in any female oriented role. Ceramic production, among the Andros, is a household production. Since females are tied to the household by reasons of culturally accepted value system ceramic production, a household craft is found to be culturally restricted to the females. Sexual scheduling of Andro ceramic production can thus, be explained in the light of role expectation of Andro women.

VI

The collection of the chief raw materials - *leitan* and *leichreng* - of Andro pottery is never done at random but always regulated by culturally prescribed rituals. The conventional rituals, dully performed by clan head (*Piba*)⁸ on par-

ticular days of particular months, mark the approval of resource collection. As stated earlier, clay and temper are collected from the particular site locally known as *leitan* - *pekpham* and *leichreng khap-pham* respectively. The performance of the ritual complex of *leitan leipak hangba* comprising two consecutive ritual acts, namely, *lei-yengba* and *leiphu phatpa* on the morning of the fifth day of *phairel* (January - February) under the ritual supervision of the *Pibas* of the three Andro lineages, viz. Phanjoubam, Ningthoujam and Khunungmayum, marks the general approval of the collection of clay for the coming potting season. This ritual, performed under the ritual headship of the *Piba* of Phanjoubam, is also customarily joined by the *khullakpa* (village chief) and other official of the village council⁹. The significance of the ritual act of *lei-yengba* is the propitiation of the custodial goddess of the site, offering wine or rice-beer and a pure red or pure black live cock locally termed as *sapang* along with other items, such as, an even numbered bunch of bananas, a long complete sugarcane, *kaboknachal taret*¹⁰, seven varieties of locally available flowers and fruits, and *shingju*¹¹. It is followed by the performance of the second and concluding ritual, named *leiphu - phatpa*. It is marked by a nominal spade - depth digging at the site only once each by the three *pibas* with a spade. It heralds symbolically the beginning of the collection of clay for the current season.

The first seasonal collection of tempering material is also always preceeded by the ritual, *leichreng leithong hangba* (literal meaning: opening of *leichreng* site), celebrated on the morning of the fifth day (or the first day as reported by some local informants) of *Mera*, the seventh month of the local calendar year, under the ritual guidance of the three *pibas* mentioned above or any one of them at *leichreng khap-pham*. It is characterized by a cock - oblation rite locally called *yelhing thaba* performed in honour of the custodial goddess of the site. An egg may also serve the purpose, and the *piba(s)* concerned has (have) to bear the same in either case. Other essential items of the rite include a handful of husked rice, even varieties of flowers and fruits, a little quantity of *waiyu* (rice beer) and *kalei* (local wine) and *kabok nachal taret*

that are kept spread categorically on a *yangkok*¹² brought by the wife (ves) of the *piba(s)*. The *piba(s)* who acts (act) as priest(s) then offers (offer) the materials to the guardian goddess letting the cock free to eat the spread husked rice on the *yangkok*. It is also an omen seeking oblation. If the freed cock, after taking the rice, flew away happily the potters, as believed by the people, will have good fortune on their side. After the offering is over the wife (ves) of the *piba(s)* takes (take) some *leichreng* on the *yangkok*, fans (fan) them and then returns (return) home bringing seven handfuls of *leichreng*. It marks the end of the ritual as well as approval of the collection of the tempering material for the current season.

The *pibas* of three Andro lineages, by virtue of their being members of *mangang* clan to which Kings of the State belong, have the prerogative of patronizing the exploitative rituals. These rituals restrictions in resource collection – in conjunction with scheduling conflict act as one of the major adverse mechanisms of regulatory or deviation counteracting feedback in Andro ceramic production thereby preventing Andro women from becoming full time craft specialists.

VII

The foregoing analytical description on the ethnography of the Andro pottery reveals how it articulates with the environment and the culture. It has also offered a multicausal explanation of the development of pottery at Andro and its subsequent development into a part-time, women-oriented craft. Ready availability of suitable necessary ceramic resources provide deviation amplifying feedback for the origin of the craft at Andro. However, local climatic condition characterized by a long spell of rainy season with heavy rains, high relative humidity, cloud cover and cool temperature results in partial negative feedback limiting Andro pottery making to dry season of a year as well as making it a seasonal craft. Here enters another negative feedback – scheduling conflict, resulting from the conflict of pottery making with the subsistence activities – that partly explains the seasonality of Andro pottery. Andro pottery, in spite of its favourable potential for develop-

ment into a full – time speciality, thus remains as a part-time craft because of the deviation counteracting feedback resulting partly from local climatic condition and partly from the scheduling conflict. This environmentally determined negative feedback has been channelised by culturally programmed ways of behaviour expressed in the form of cyclic rituals that have restricted the craft to a seasonal, part-time speciality. The restriction of the craft to female only can be explained in terms of the culturally determined value system of the Andro society.

It is possible to develop a micro-level generalization about ceramic-environment-culture relationship on the basis of the material drawn from Andro ethnography in the theoretical perspective of systems paradigm, for cultures, as they possess the characteristics of systems, bear certain isomorphic relationship. The application of such a generalization to the past will make archaeologists possible to develop a precise interpretation of how archaeological ceramics relate to ancient environment and culture.

NOTES

1. The lois who, "very closely resemble the Meithei" (Hodson, 1908: 3) are 'not recognized as Pure Manipuri' (Brown, 1874: 14), and the people prefer to call themselves as *chakpa*. G.H. Damant (1880) refers to the term 'loi' as 'slave or dependent'. Of the three categorical classification of the lois, namely *lan-ngam-loi* (conquered one), *lanpha loi* (Captured one from war and rehabilitated by the King) and *loithaba* (who were sent into exile as a punishment), - the people of Andro as well as *Sekmai*, *Phayeng*, etc. are not the loi of the second and third types (Devi, 1988-89). The places inhabited by these people are not the places for sending the offenders. Most of the earlier worker described them as *lan-ngam-loi*, and the people of Andro and *phayeng* even claimed as being driven by *Pakhangba*, the suzerain ruler of the Meithei in 33 A.D. (Hodson, 1908). Some scholars are of the opinion that Lois had 'migrated to the Manipur valley from the Chin Hills in Burma (and) According to the Mizo tradition and history, the lois are not the only sub-clan of the Chin, known to them as *Poi*, but a few of their own clans are also of the same extraction' (Shymachandhuri and Biswas, 1963: 61). According to B.S. Carey and H.N. Tuck (1806) 'the pot-making trait was carried into Manipur and Mizo districts' from Burma by the *Poi* (loi) sub-clan and some other such clans as *Fanai*, *Huha* and *Hnialum* in the Mizo district.
2. Part-time potters are those who made pottery for only part of the year (usually seasonally), whereas full-time potters are those who practice their craft during the entire year (Arnold, 1988: 18).

3. In the Andro pottery, raw materials of leitan and leichreng are mixed in the ratio of 1:1.25.
4. A preliminary account on the mineral and element compositional analysis through XRF and XRD of the Andro ceramic materials (clay and temper) has been discussed in an article (Manibabu, M. Ethnominerology of Andro potters: Etics and Emics, Ms).
5. At present, new transportation technology and innovations do not bring about any deviation amplifying feedback mechanism of the pheric distance. The wide notion among the people that those raw/potting made materials should only be transported by head load and not by other means such as cart, vehicles, etc., seems to be the underlying potent factor.
6. The people adopt the lunar year of twelve months starting with Sajibu (March-April) and ending with Lamda (February-March).
7. Such methods of making hand-shaped wares were first invented in the region of southeast Asia, and also in North America (Spier, 1956: 235).
8. The ultimogenitural male issue of a lineage/clan.
9. The Andro village council comprises seven non-hereditary dignitaries, such as – Khullakpa, Luplakpa, Khunjanba, Khabamlakpa, Yupanba, Pakhanglakpa and Naharakpa. They are appointed from amongst the two age-set units, that I, haling (unit/college of elders-ahallup) and hanchok (unit/college of youngsters-Naharup). For instance, the khullakpa, Khunjanba, Yupanba and Pakhanglakpa are appointed from the haling unit; whereas Luplakpa, Naharakpa etc. from the hanchok unit.
10. Kabok (=Baked/heated rice), nachal (=handful), taret (=seven) literally mean a little quantity of baked/heated rice collected from different seven trays of the same, usually sold in the market.
11. An usually eatable concocts of tender vegetable leaves/tendrils-flavoured with chilly, salt and roasted ngari (fermented fish usually taken by the local people).
12. Yangkok is a household item, flat and oval in shape. It is made of plaited bamboo splits, and has a rounded rim of bamboo piece used as frame of the flat plaited bamboo strips. This item is used for fanning the pounded rice so that the husks are separated out/wipped out from the unpounded ones.

KEY WORDS Andro Pottery. Ceramic Ecology. Cybernetics. Paradigm. Manipur.

ABSTRACT The present study, employing the cybernetic model of systems paradigm as a theoretical frame for analysis, has attempted to formulate an ethnographic generalization about the relationship of ceramics to environment and culture in the context of a scheduled caste community of Manipur – the Andros, who inhabit a village of the same name situated on the downslopes of the eastern foothills of the Nongmaiching hill, Imphal East District, Manipur, and among whom pottery is a part-time, women-oriented occupation.

REFERENCES

- Arnold, D.E.: Ceramic ecology of the Ayacucho Basin of Peru: Implications for prehistory, *Current Anthropology*, 16: 186-205 (1975).
- Arnold, D.E.: Ceramic variability, environment and culture history among the Pokom in the valley of Guatemala. In: I. Holder (Ed.): *The Spatial Organization of Culture*, pp. 39-59. Gerald Duckworth, London (1978a).
- Arnold, D.E.: The ethnography of pottery making in the valley of Guatemala. In: R. Wetherington (Ed.): *The Ceramics of Kaminaljuyu*, pp. 327-400. The Pennsylvania State University Press, University Park (1978b).
- Arnold, D.E.: *Ceramic Theory and Cultural Process*, Cambridge University Press, New York (1988).
- Beteille, A.: The definition of tribe. In: R. Thapar (Ed.): *Tribe, Caste and Religion in India*, pp. 7-14. Macmillan India Ltd., New Delhi (1977).
- Binford, L.R.: Archaeology as Anthropology. *American Antiquity*, 28: 217-225 (1962).
- Boulanger, G.R.: Prologue: What is Cybernetics. In: J. Rose (Ed.): *Survey of Cybernetic*, pp. 3-9, Gordon and Breach, New York (1969).
- Brown, R.: *Statistical Account of Manipur*. Sanskaran Prakashak, Delhi (1874, reprinted 1975).
- Bunzel, R.L.: *The Pueblo Potter: A Study of Creative Imagination in Primitive Art*. Columbia University Press, New York (1929).
- Carey, B.S. and Tuck, H.N.: *The Chin Hill*, Vol. I, Gian Publishing House (1806, reprinted 1987).
- Clark, D.L.: *Analytical Archaeology* (2nd Edition), Methuen & Co. Ltd., London (1978).
- Damant, G.H.: Notes on the location and population of the tribe dwelling between the Brahmaputra and Ningthi rivers. *Journal of Royal Asiatic Society (N.S.)*, 12: 228 (1880).
- Deetz, J.: *Invitation to Archaeology, The Natural History Press*, Garden City (1967).
- Directorate of Economics and Statistics: *Statistical Abstracts of Manipur*, Government of Manipur, Imphal (1989).
- Devi, L.B.: The Lois of Manipur, *Regional Integration*, 12-13(1): 1-7 (1988-89).
- Gifford, J.C.: The type-variety method of ceramic classification as an indicator of Cultural phenomenon. *American Antiquity*, 25: 341-347 (1960).
- Grim, R.E.: *Clay Minerology*, McGraw Hill, New York (1968).
- Hammond, P.B.: *Yatenga: Technology in the Culture of a West African Kingdom*, The Free Press, New York (1966).
- Hodson, T.C.: *The Meiteis*, David Nutt, London (1908).
- Kolb, C.C.: The methodology of Latin American ceramic ecology. *El Dorado: Newsletter-Bulletin on South American Anthropology*, 1(2): 44-82 (1976).
- Longacre, W.: Kalinga Pottery making: the evaluation of a research design. In: M.J. Leaf (Ed.): *Frontiers of Anthropology*, pp. 51-67, D. Von Norstrand, New York (1974).
- Manibabu, M.: Meitei Women's working team in agriculture: A non-nuclear approach on an organization in production. *Bulletin of the Department of Anthropology: Dibrugarh University*, 16-17: 101-109 (1991).
- Manibabu, M.: Meitei Women's Khutlang Organization in agriculture – a brief account. *Manipur Today*, 12(1): 47-50, DIPR, Govt. of Manipur, Imphal (1992).
- Majumdar, D.N.: *Races and Cultures of India* (4th revised & enlarged edn.), Asia Publishing House, Bombay (1961).

- Maruyama, M.: The second cybernetics: deviation-amplifying mutual causal processes. *American Scientist*, **51**(2): 164-179 (1963).
- Matson, F.R.: Ceramic ecology: An approach to the study of the early cultures of the Near East. In: F.R. Matson (Ed.): *Ceramics and Man*, pp. 202-217. Aldine, Chicago (1965).
- Miller, G.A., Galanter, E. and Primbaum, K.H.: *Plans and the Structures of Behaviour*. Henry, Holt and Company, New York (1960).
- Murdock, G.P.: *Ethnographic Atlas*. University of Pittsburgh Press, Pittsburgh (1967).
- Ramakrishnan, P.S.: Tribal man in the humid tropics of the North-east. *Man in India*, **65**(1): 1-32 (1985).
- Rice, P.M.: Evolution of specialized pottery production: a tribal model. *Current Anthropology*, **22**: 219-240 (1981).
- Rouse, I.G.: The classification of artifacts in archaeology. *American Antiquity*, **25**: 313-323 (1960).
- Sheperd, A.O.: *Ceramics for the Archaeologist*. Carnegie Institution of Washington, Publication No. 609 (1956).
- Shyamachoudhuri, N.K. and Biswas, S.K.: The trait of making earthenwares in the Mizo district and its cultural evaluation in Assam. *Bulletin, Anthropological Survey of India*, **12** (1&2): 57-64 (1963).
- Smith, R.E., Willey, G.R. and Gifford, J.C.: The typo-variety concept as a basis from the analysis of Maya pottery. *American Antiquity*, **25**: 330-340 (1960).
- Spier, L.: Invention and Human Society. In: H.L. Shapiro (Ed.): *Man, Culture and Society*, pp. 224-246. Oxford University Press, London (1956).
- Steward, J.: *Theory of Cultural Change*. University of Illinois Press, Urbana (1955).
- Van der Leeuw, S.E.: *Studies in the technology of Ancient Pottery*. Amsterdam (1976).
- Whallon, R., Jr.: A new approach to pottery typology. *American Antiquity*, **37**: 13-33 (1972).