Stability and innovation in pottery manufacture

Keith Nicklin

Economic Factors

In this paper an attempt is made to examine some of the chief factors involved in stability and innovation in pre-industry pottery manufacture. That is to say, it investigates and systematizes some of the diffuse ethnographic data relating to the absence and occurrence of change in such aspects of pottery as raw materials, tools, techniques, forms, designs and other decoration.

In many parts of the world, such as Africa, South America and Oceania, pottery is produced for domestic use by non-specialists, for example by a man and/or wife. Reynolds maintains that in Africa, only in a few areas is potting pursued 'on anything other than the domestic scale' (Reynolds 1968: 341). At this level, production tends to be sporadic, and undertaken only about once a year. However, local trade in pottery is frequently important, or people may come to the potter with small orders for which remuneration is on a commission basis. Pots are often exchanged for goods in kind, frequently in Africa, for the amount of foodstuff, such as grain, which the pot will contain (e.g. among the Bantu. Anonymous 1967: 26). At this level of production, potters may be part-time specialists, though their work is generally seasonal, particularly in tropical and monsoon regions.

Among peasant societies generally, potters are part-time or full-time specialists forming recognized groups. They usually produce for the market rather than for domestic requirements, and use more advanced techniques than those of hand-forming and bonfiring associated with the level of production discussed above (Roster 1966: 44). In some areas, such as North and West Africa, potters' guilds are prominent in the production of ware for disposal in the market (Reynolds 1968: 341). Pottery middlemen operate in some traditional economies (e.g. in parts of pre-colonial Africa; Drost 1968: 201–2), but the appearance of middlemen tends to signal the extension and growth of modern market economies.

The variation in levels of production and systems of distribution in itself may be an important consideration in changes in pottery methods and implements, and forms. For example, in the Maghreb the housewife herself annually replenishes her stock of domestic utensils. 'All her attention, all her available technical awareness, is mobilized in this effort to reconstitute the chain of traditional steps, the single, brief use of which, once a year, ensures their perpetuation and transmission from one generation to another' (Balfet 1966: 169–70). Personal interpretation is expressed in painted designs, and occasional innovations are incorporated into the 'family or local stock-in-trade' – a process which generates village and regional differentiation.
At the level of the artisan-specialist, Balfet perceives 'a closer relationship . . . between the producer and his product'. There is more routine and repetition, and 'this, under the impulse of qualitative needs from the clientele and quantitative demands for productivity, spurs the search for improvements, attempts at rationalization, and adaptations of tools and new procedures'. What Balfet calls 'the internal cohesion of the profession' at the artisan-specialist level is also seen to be advantageous to innovation (1966: 170–1).

Effects of long-distance trade

The scale and complexity of pre-industrial pottery distribution enterprises is frequently minimized. There is a general tendency to underestimate the importance of cases in which long-distance trading is involved. The view expressed by Shaw (1946: 8) that 'on account of its comparative bulk and fragility, pottery is usually only traded over long distances for special reasons' is not exceptional. Such a view tends to ignore the various measures that are in many cases taken to ensure the possibility of the transport of pottery for trading purposes. Transport technology is a major consideration here, but accommodations are also sometimes made in the form of the ware, and the organization of the groups involved in pottery transport.

Water transport frequently facilitates a vigorous and long-distance trade in pottery.1 The development of water transport in Oceania and the importance of sea-traffic in this region may indeed be a major factor in the characteristically sporadic distribution of the potting trait. In certain cases pottery is a key item in trading patterns, and various social and economic benefits may accrue from the pottery trade. For example, in the Vitiaz Straits area of New Guinea, Harding (1967: 211) observes 'that the elimination of pottery from the “demand schedule” would be a crippling blow to native trading'.

The best-known example of long-distance pottery export in Oceania is that of the Motu, who every year export several thousand pots up to 200 miles across the Papuan Gulf, primarily to the Erema. Motu pottery is found in most Gulf and hinterland villages (Groves 1960: 3ff.). In 1957, five villages sponsored a sailing expedition, hiri, and about 10,000 pots were sent to Erema villages (Groves 1960: 5ff.).

Mailu sea-trading is seasonal and regular, and pottery is the chief export item of these people who dominate local trading patterns. Trading is closely connected with preparation for the large annual feast, and each expedition is a step in the series of co-ordinated craftwork and ceremonial activities (Malinowski 1915: 621–30). Some pots are taken to the mainland, and the people there hold them until an appointed day when inland folk come down from the mountains to do business (Saville 1926: 195).

High-quality, large-sized pots are vital trade-goods of the Amphlett Islanders. 'The natives of the Amphletts are exclusive manufacturers of pottery, within a wide radius. They are the only purveyors to the Trobrianders, to the inhabitants of the Marshall Bennett Islands, and also, I believe, all the clay pots in Woodlark come from the Amphletts. To the south, they export their pots to Dobu, Du’atu, and further south, as far as Milne Bay' (Malinowski 1922: 282–3).

1 Josiah Wedgwood, pioneer of large-scale factory production of pottery in eighteenth-century England, appreciated the need for 'shock-free transport from works to destination' – a canal system to connect with the national system (Arnold 1968: 235).
In the Nicobars, the island of Chowra supplies the whole archipelago with pottery. The chief demand comes from Car Nicobar, about 45 miles to the north, across treacherous waters of the Indian Ocean. Chowran pots are used on Great Nicobar, about twice as far from Chowra as Car Nicobar is, and the most distant island, to the south (Whitehead 1924: 106; Compton Mackenzie 1948: 163; Man 1886: 444). 'The aggregate number of pots made in the course of the year could hardly be ascertained with any degree of accuracy, but having regard to the small number of hands employed in the work – it must be very considerable' (Man 1894: 26). The rhythm of Nicobar trading, in which the Chowrans predominated, is dictated by the regime of the double monsoon, and the climax of trading activity on Chowra is the great ossuary feast held after every third monsoon, at intervals of about eighteen months. The whole island participates in this month-long celebration, during which the entire supply of pork is exhausted, after which 'a new era of work and trading commences' (Bonnington 1932: 74). Pottery production on Chowra is itself an unusually far-sighted activity, for it is considered necessary to store vessels for a year or so 'in the heat and smoke of the huts' in order to 'render the utensils hard and durable' (Man 1894: 27).

The pots are specially adapted for ease of transport in outrigger canoes. Small pots, which are about three or four inches in diameter across the mouth, are tied in neat bundles of five. Pots are made in pairs of six prescribed sizes, varying from the largest at twenty-eight inches in diameter, down to the smallest at four inches. The pairs are of slightly different dimensions, so that one fits inside the other (Man 1887 (unpublished): items 101–2; 1894: 22–3, 26–7). According to de Roepstorff (1903: 170) the pots 'are of uniform thickness...but in different sizes, to fit inside each other. They are made to fit the bottom of the boats so as to be stowed away easily.'

In the Aegean, pottery is prominent in the small sailing-ship trade where 'every harbour is a market'. This is probably the survival of an ancient pattern. The continued transport of pots in these craft is explained in terms of the cheapness of this method of transport compared with steamship freight charges, which, considering the low value of the ware, would make sea-transport economically unviable (Casson 1938: 466; 1951: 188). Saida pots are shipped to Alouite peasants about 500 miles away, who exchange them for dung which the boats take to various coastal farms. A large ship carries about 1,000 to 1,500 pots, and a small one 200 to 400 (Mallowan 1939: 86–7).

In Africa, the possibility of transporting large quantities of pots is expanded where there is access to a waterway. For example, on the East African coast, pottery is important in sea-trade. The Kuinja have direct trading connections in pottery over a distance of about 500 kilometres, mainly in Zanzibar (Drost 1968: 198–201). In other regions in Africa, rivers and lakes are important in pottery trade. For example, Ibe in Nigeria imports pots from a place about 200 miles up the River Benue, from a village between Jalingo and Neuman (Simmonds: personal communication).

Overland transport of pottery is important in many parts of the world. In Central Mexico, pots were carried in large frames on the back for long distances (Wissler 1946: 330; Foster 1966: 56). In rural India groups of women on the march with four or five

1 Man maintained that the 'nesting' effect of the whole series of pots was not intentional, though 'it is quite possible, with a little patience, to procure a nest of the six sizes which will fit one inside the other' (Man 1894: 23).
pots on their heads, ingeniously packed and supported with a pad, are a common sight (Van Bercham 1962: no pagination). Cardew notes (1952: 195) that ‘Pottery is made all over Nigeria, sometimes in small villages with only a limited local trade, sometimes in larger towns and districts which export their ware in great quantities to far-distant markets. The native pottery trade must in the aggregate be enormous. . . . ’ Transport of pots in baskets, calabashes, or nets carried on the head, despite the difficulties of porterage especially in the wet season, is important in much of Nigeria (Cardew 1952: 194; King 1962: 16–19, 23). Yorubaland pot porters travel in a group and share losses from breakage (Ojo 1966: 94–5).1

In Salamanca and Michoacán, Foster points out that men hawk their pottery on burro-back for distances of up to 150 miles. In Tzintzuntzan, the pots are packed in crates called huaoles, padded with grass. Vessels are placed snuggly together, and large pots are useful as carrying vehicles (Foster 1966: 56; 1948: 100–1). An important region of pottery consumption supplied by the Michoacán potters was the tropical tierra caliente to the south, but retailing trips sometimes extended hundreds of miles down the Pacific coast as far as Acapulco (Durston 1969: 3).

In some cases it would appear that makers of big pots move to the vicinity of the market, and this may be an important incentive for peripatetic movements. Huge vessels up to five metres high and three metres wide were made at Colmenar de Oreja in south Spain, for storing wine or oil. Transport from the factory to the firing place and to where they were needed was achieved with the use of ropes and strips of linen, and for longer distances a single pot was carried in a cart (von Rzehak 1902: 175–7).

With the extension of modern transport systems and greater use of motor vehicles throughout the world, the prohibitive effect of distance may be reduced. In Nigeria, a lorry-load of about 1,300 pots was observed setting off for Owo, a distance of about 60 miles (Simmonds: personal communication). Foster suggests that 150 miles is about the maximum distance for the primary distribution of pottery in traditional economies. Perhaps the figure should be put at nearer 200 miles, but the maximum is not important in itself, for factors such as transport technology, terrain, and water conditions are often crucial variables. As Foster points out, long-distance trade is dependent upon the demand for pots, availability of means of transport, and ‘reasonably peaceful conditions’ (Foster 1966: 56). It should also be emphasized that pottery is transported at least as far as other goods, and that this is made feasible by certain adaptations which render pottery safe in transit. Sometimes these measures are only partially effective, but the trade goes on, given the demand. Pottery is transported even in cases where it is particularly noted for its fragility – for example, native Nigerian ware (Cardew 1952: 191–3; King 1962: 16–19) – and also for its vast bulk combined with fragility – as in the case of the Colmenar giant tinajas (von Rzehak 1902: 177).

1 The transport of pottery in pre-industrial Britain continued despite severe practical difficulties, as is suggested in the following passage from Arnold Bennett’s Clayhanger: ‘Duck Square could remember strings of pack-mules driven by women, “trapesing” in zigzags down Woodisun Bank and Warm Lane, and occasionally falling, with awful smashers of the crockery they carried, in the deep, slippery, scarce passable mire of the first slants in the alley.’
Market demand

From the above discussion it will be clear that pottery trade, especially over great distances, is highly dependent upon a sufficient demand for the ware, and in at least some cases such features as the form of pottery produced is largely determined by this factor. Furthermore, we may observe that in many cases where pottery is an important exchange item, a large range of pottery types is made. For example, the Nicobar Chowran pots discussed above are made in a range of distinct sizes. The chief difference in form is that the larger pots have straight walls, and smaller pots tend to have incurving walls, producing a shape which Man calls 'oblate-spheroidal' (Man 1894: 22–3). The Motu manufacture four main types of pot, each with a large range of sizes (Groves 1960: 10–11). In Fiji, pottery was traded by sea and overland, between the various islands and regions. Cooking pots of various types were produced, including the kuro and sira. But the greatest variation is in the varnished pots used for storing liquids, including many zoomorphic forms such as turtles, and representations of fruit clusters, canoes, and flowers (Roth 1935: 226ff.; Machlachlan 1940: 254–62).

Where pots are exported in large numbers, there may also be some tendency towards standardization and specialization in one product. Although there are six pairs of sizes in Nicobar pots, the chief demand is for those of the second and third (i.e. medium) sizes. All Chowran pots are uniformly decorated with a striped pattern formed by burning green coconut-husk strips on the pot as it comes red-hot from the bonfire. Without this decoration 'no Nicobar pot is regarded as finished'1 (Man 1894: 22–5). All types of Motu pot are exported, but the wide-mouthed cooking-pot is the standard export product (Groves 1960: 10).

A greater range of pottery types than in tribal economies is generally found in traditional peasant markets' economies; and Foster (1966: 52) observes that 'In most parts of the peasant world, pottery is sufficiently plentiful so that the buyer has great choice.' The peasant village of Tzintzuntzan is remarkable for the wide range and variety of traditional pottery types. There are four principal types: olla, cántaro, cazuela, comal, with between twelve and fifteen named varieties of each. The complexity of the ceramic terminology is, however, perhaps unique in Mexico (Foster 1948a: 84–8).

Shai pots have for long been sold in markets throughout Ghana, to which they are nowadays frequently transported by lorry (Quarcoo and Johnson 1968: 65). Currently, about thirty-five or so forms are manufactured, of which some two dozen of the commonest are described. Saucer-shaped pots, rounded ones with rims or without rims, open bowls, and vessels with re-curved bases or shoulders are among the chief forms. Storage pots and ritual pots are the most often decorated (ibid.: 62–3).

Foster (1966: 55) maintains that the market may operate in either a 'negative' or 'positive' manner to stabilize traditional forms of pottery. He suggests that the negative

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1 The following description of Chowran pot-decoration should probably be viewed with some caution: 'We also saw them (i.e. pots) being baked on small bonfires and banded with black and red. The combination of black and red has a discouraging effect on devils; the devil-scarers in every house display it' (Compton Mackenzie 1948: 164). The author seems to have misunderstood the nature of the pot-decorating process, which was described by Man (1894: 25–6). Moreover, the colour-effect is dark brown on light brown, or copper. It is not unlikely, however, that the Chowran pot-decoration does have some ritual importance, as do most other aspects of their pottery.
fashion is through the market providing a non-competitive situation, in which there is no economic incentive to produce new wares. The positive manner is illustrated by the widespread preference for food cooked in ceramic rather than metal or other utensils.

Modern European housewives generally agree that foods like stews and casseroles are best prepared in pottery utensils, and similar preferences are frequently expressed in other parts of the world. According to Cardew (1969: 78) the technically more advanced stoneware pots are less suitable from a gastronomic point of view than coarse-textured earthenware, which explains the survival of the latter in Europe.

In Fiji, ‘food cooked in a pot vessel definitely tastes different from that prepared in the European iron pot which is gradually replacing pottery’ (Roth 1935: 227). In the Vitias Straits region of New Guinea pottery survives alongside introduced vessels of metal on account of ‘the pot’s superior heating characteristics’ which means that traditional cuisine such as sago-coconut puddings can still be enjoyed (Harding 1967: 212). In the Eastern Highlands, the ‘alleged superior flavour’ of food cooked in traditional pots, and ‘the greater ease of mashing the food with a stick’ are important factors in the continued demand for locally-made pots (Watson 1955: 125).

The continued demand in many of the hotter parts of the world for porous pots for storing water is another of Foster’s ‘positive’ ways in which the market can operate to stabilize traditional ceramic types. Pottery water coolers are used widely in the New World, the Mediterranean region, and the Near and Far East. Drinking water stored in porous pots remains cool from the effect of water seeping slowly through the walls of the pot, and evaporating at the outer surface. Because of the preference for cool and sweet drinking water in many parts of the world, water-coolers are still in demand, despite the diffusion of certain alternative vessels, principally the petrol and oil can.

Several authors have accounted for aspects of pottery stability in terms of the stability of traditional patterns of demand. Today, in Colmenar, the giant tinajas are still made. Some of these are up to 3.5 metres high, with a 5,000 litre capacity. Cement containers are tending to replace the pots, but in a few places, where the best wine is made, the demand for tinajas for wine-storage still continues, as do traditional work units and methods of production. At Petriades in Greece, and Thrapsanos in Crete, large handmade pots called pithoi are still required for storing olive-oil, both places being in the centre of olive-growing regions (van Bercham 1968: 14–16). On the Greek island of Andros, there is a declining but still important demand for traditional ware, although the spread of piped water and electricity are tending to render obsolete water-fetching pots and cooking pots used on charcoal stoves. Nevertheless, even in the wealthier homes, as elsewhere in Greece, porous earthenware water-coolers are still preferred, while traditional storage vessels, glazed on the inside, are still in demand since they are suitable for the storage of typical island produce, such as honey, cheese in brine, and fruits in syrup (Birmingham 1967: 33–6).

Other than utilitarian factors may account for a stable demand for traditional pots. In New Britain and Umboi Island, for example, pots are important ‘wealth-objects’. In one Kovai village, thirty-five pots were owned by one home with three brothers, and only two pots were used for cooking. The rest comprised a stock of payments for affines – future bridewealth. ‘In fact, in such areas more pots are likely to be found among a man’s store of valuables than among his wife’s cooking utensils’ (Harding 1967: 36, 212–13).
There appear to be three main reasons why the manufacture of Motu pottery will continue in at least some villages for a considerable period yet, despite competition of foreign metalware: food-taste preferences of the chief customers, the coastal Papuans; the ‘important social significance’ of many types of pot used for ceremonial cooking of fish, and on trading expeditions for drinking water; and the continued importance of the hiri as a central event in the lives of the Motu pot-makers (Cochrane 1958: 144–7).

Various authors have commented upon the ‘stagnation’ of pottery manufacture in India. Earlier British writers in particular saw the lack of interest in ‘improving’ the raw materials used, and the design and decoration of pots, as related to the virtually exclusive demand in that country for a cheap ceramic consumer-article, frequently replaced on account of notions of ritual pollution. For example, Risley maintained that the manufacture of pottery in Decca was ‘in its infancy’, and he foresaw no likelihood of ‘improvement’ so long as ‘the obligation of breaking all cooking utensils after a death or any sort of ceremonial pollution, limits Hindus to the use of the cheapest kinds of pottery’ (Risley 1891: 524). In the Punjab, there was a very limited demand for ‘something better than common ware’, because the wealthier Indians bought imported ‘china’ rather than local glazed ware. The European demand sustained a small production of glazed pottery, which was the side-line of a few potters (Hallifax 1894: I, 42). A potter in Dera Ghazi Khan gave up making glazed pottery, because there was no market for it (ibid.: II, 45). A more recent report discusses potting in Shanti Nagr village, Delhi. There, small dishes are made to be used once and thrown away, at certain festivals and at weddings. At a major festival, wealthier families buy some new pots, gradually replacing their whole stock in the course of a year. Ritualy polluted pots are thrown away. Water-pots get smashed in use, and utilitarian ware sags and is cast aside. ‘All wares have a fairly short life.’ The Freedes write that ‘Under the present circumstances, all that is required is a cheap, utilitarian ware and it is also all that the potter can provide’ (Freed and Freed 1963: 41). In these Indian examples, the overall stability of the traditional market is seen to engender stability in the form produced, and the techniques and materials used, particularly in the failure to introduce glazed ware.

In Nigeria there is still a great demand for traditional pottery, though this is predicted to decline in time (King 1962: 16ff.). As compared with imported ware, native pottery is cheap, and better adapted to local uses. Traditional cooking pots have superior thermal shock resistance, which makes them particularly suitable for cooking over open fires (Cardew 1952: 189ff.). Glazed and stoneware vessels which Cardew and his pupils produced at the Abuja pottery were too heavy, and too expensive for most Nigerians, and unsuitable for traditional rough usage. The demand for this type of ware came from better-educated and wealthier townsfolk.

The existence of a strong local demand for glazed and porcelain articles, however, does not necessarily mean that the local potters respond and produce these wares. In many

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1 Many of their reports do contain some useful information, but there is a general want of objectivity; some authors are even derogatory of Indian pottery. For example, one author began: ‘as regards the present manufacture of pottery in South India, there is very little that is at all interesting...’ (Holder 1897: 7). The British appear to have been obsessed with the lack of ‘superior ware’ – porcelain – which is to be found in abundance in other Far Eastern countries.
parts of south-east Asia, large porcelain pieces were imported many centuries ago from the Asiatic mainland, and these are today highly valued among certain remote tribes; they are used ritually and are treasured heirlooms, and there is a complex vocabulary expressing fine appreciation of certain features of the pots. Yet the local potters do not make these types of pots (Harrisson 1950: 270–3, 1951: 541–2, 1955a: 301–6, 1955b: 549–60; Noakes 1949: 25–37). A similar situation is reported from the Philippines where ‘the contrast between the local scantily and simply decorated pottery and the very fine glazed wares imported from China is very striking’ (Kroeber 1919: 205). There is a tendency for authorities such as Kroeber to underestimate the technical difficulty of producing sophisticated glazed ware and porcelain. Indeed, the factor of technical complexity is probably crucial in the ‘failure’ of the potters to ‘advance’ beyond the production of earthenware.1

In addition to the ritual safeguards of their craft, the Nicobar Chowrans appear to have responded in a practical way to foreign competition. First, Chowran pots were well-designed for practical Nicobar uses, which Indian vessels, with narrow necks, were not (Man 1894: 22). Second, a pot called kochi-tatdit, now in the British Museum, is described as made ‘after the pattern of those imported from the Madras coast’ (Man 1887 (unpublished): item 101a). Its form is quite different from that of usual Chowran make, though it has typical decoration. Third, another vessel, now in the Leiden Museum, Holland, differs again from the traditional form, in that it has a spout. Is the latter vessel a copy of a British-style teapot? In 1901, Man threatened to destroy the Chowran pot monopoly by ‘dumping’ ware made in Port Blair (the British convict settlement in the Andamans) in the Nicobars. Several sets of vessels, including teapots, were in fact later distributed from Car Nicobar (Man 1903: 160–1). There is thus some evidence to suggest that in response to foreign competition, the Chowrans innovated new forms by imitating introduced vessels, though this topic has not been documented in detail in the published literature.

There are a few records of the opening up of new demands for products of traditional potters. In the New Hebrides some pots go from Wusi to Luganville, where they are sold to Europeans as curios (Shutler 1968: 18). This new demand, which coincides with the decline in native demand for utilitarian vessels, seems likely to produce innovations, as has happened in other parts of Oceania. For example, in Fiji, milk-jugs, plant-pots, and flower-stands are made in imitation of foreign vessels, and in response to the new demand (Roth 1935: 226). New designs are occurring in Motu pottery, with the stimulus of European demand in Port Moresby (Groves 1960: 5). Among the Gbaya of the Camerouns, potters are making non-traditional forms of pottery to order: for example in response to missionary requests for flower vases. In parts of Nigeria, local potters are now producing two types of ware: ‘the traditional pot for water or cooking, and imitations of “European” pottery made by the native methods and fired at traditional low temperatures. In some districts, beautiful soup-plates, coffee-pots, tea-pots and other articles with fine polish and very good incised decoration are made. . . .’ (Cardew 1952: 197).

1 The production of true porcelain is a matter of great technical complexity, demanding special raw materials (kaolin and a feldspathic rock, petuntse) and high firing temperatures. True porcelain was not made in Europe until the eighteenth century, despite a great aristocratic demand (Leach 1967: 40; Aldridge 1969: 4–5).
However, the traditional methods are not really suitable for the new forms, since plates and teapots are 'too weak and porous for table use'.

Potters of the village of Quina, Ayacucho District, Peru, now specialize in the making of pottery models, mainly of churches of different varieties, which are sold in the Sunday market, and also in the shops in Lima – about 400 miles away. Models were made traditionally, perhaps anciently, and now have new significance in that they are bought by people who see them as distinctive features of old Indian civilization.

In Barcelos, Portugal, anthropomorphic and zoomorphic pottery models have been made for many centuries, in addition to utilitarian ware. One form, 'the Portuguese Cock', is now exported all over the world. The cock is turned out in thousands, is highly stylized, and less care is taken with once hand-modelled details: it has been 'commercialized'. Only one old woman and her daughter keep alive the highly diversified folk-pottery tradition (Flowers 1966: 45–50). In Yugoslavia, peasant pottery production is increasingly geared to the demands of collectors and tourists, as also the traditional pottery forms become obsolete. Some 'artists' have provided the potters with 'new models', with little artistic success, but some buyers have inspired the potters to make certain objects 'of ancient pattern and shape ... and of fine quality' (Tomić 1966: 23).

Around the turn of the century, several British authorities described certain changes in the production of luxury 'art-pottery', which occurred traditionally in some areas in India. These stood in contrast to the basic stability of village pottery in that sub-continent. The chief stimulus for change came from the influence of introduced vessels, and the European demand. Production of pottery in the Sindh and Punjab was a sumptuary rather than village art; it was to this standard which British ceramists encouraged their Indian pupils to aspire, but with limited success. Birdwood (1880: 323) noted that 'the glazed pottery which comes from Bombay of Sindhi designs on Chinese and Japanese jam and pickle pots is a violation of everything like artistic and historical consistency in art'. The Musalmans were in some cases imitating modern European wares and Crooke (1906: 390) complained that 'there has been too much copying of foreign design and too much production of cheap rubbish'. Watt described the 'deterioration' of Kusagar art-pottery in Delhi: design, colour-scheme and colour-purity, finish, and 'character' had all been lost in the space of a few years. He maintained this to be the result of a 'cheapening process' associated with the larger current demand (Watt 1904: 82–3). Halifax described the decline in materials and design quality of the wares of the Multan Kashigars; these changes he associated with the change from the Moslem to European demand (Halifax 1894: 43–4).

A relatively large body of data exists on changes in patterns of demand among the pottery economies of Meso-America and the south-west. The chief considerations have been the decline in demand for utilitarian vessels with the increased use of modern utensils; and the increasing demand for non-utilitarian pieces with the growth of the tourist market.

An early account of San Ildefonso pueblo is a case in point. Oil cans (for storing water), enamelled pots (for cooking), and 'china' dishes (for serving) were replacing native pottery in many pueblos in the region. Degeneration of traditional pottery production was hastened by other changes in demand, the vessels, being mostly made to sell to tourists
or curio dealers, were carelessly fashioned, crudely decorated, and insufficiently fired. By 1907, designs, colours, and finish had declined in quality, and 'ugly non-Indian shapes' had developed.

Then (see below, p. 27) there was a remarkable ceramic florescence in San Ildefonso. Better materials were used, the range of forms extended, and technical and artistic standards improved. Many factors were involved, but economic demand was crucial. The potters were persuaded that it was worth while producing high-quality pottery when selective buying by museum officials and others made this an economically viable proposition. Better quality pots fetched better prices, and sold more freely; mediocre potters followed the standards set by the leading pottery innovators, since the economic rewards had become greater (Kidder 1925: 10–15). The tourist demand has again exerted a powerful effect on the pottery of Acatlán, Puebla, in Mexico. There is experimentation with designs and colours, the secrets of which are not freely disclosed to other potters. Black-finished vessels have been made, and new forms have been introduced, such as candlesticks, tripod bowls, light fixtures, and figures of virgins, swans, and fish, but diffusion is reducing regional variation (Foster 1961: 210–12).

A recent article suggests that in the long-term, despite some distinct exceptions, pottery in the south-west is in severe decline. Downing gives two main reasons for this: better educational opportunities are providing alternative means of employment, so that 'the exacting art of pottery making' is becoming non-competitive as an occupation; and the continued detrimental influence of an undiscriminating demand from tourists who merely desire a genuine 'Indian-made' article (Downing 1969: 39). With official guidance, certain potters in the pueblos of San Ildefonso, Santa Clara, and San Juan responded to foreign demand by producing a wide range of artistic, well-decorated, and well-designed ware. The particular achievement was in polished and incised varieties. But without such guidance the tourist demand in many other places has been less of an artistic inspiration. For example, at Tesuque and among the Jemes Indians, pots are decorated in bright, non-ceramic poster-paints, and merely sun-dried (Downing 1969: 35–6; Underhill 1944: 104–5).

Some recent studies of Meso-American pottery-making communities have focused on particular problems in innovation in some aspects of pottery production and distribution. In general, they have revealed the limited nature of the changes involved, despite apparently powerful stimuli, and in particular the stability of traditional potting techniques. In Tzintzuntzan, by 1966, muleteers had been functionally replaced by owners of pottery-stands, and full-time pottery middlemen. Foster maintains that this change represents the most important advance in 'productive efficiency' since 1945. 'In the overall picture, however, it is a very modest factor' (Foster 1967: 281). The sole improvement in productive techniques for most potters was the buying of glaze in powder rather than the lump (ibid.: 280). In addition to the standard types of ware which had been virtually the only types of vessels produced at the time of Foster's 1945 study, by 1966 new types of pottery had begun to appear. New shapes, designs, glazes, and finishes had been innovated in response to the tourist demand (ibid.: 304–6). The pottery-stands were important in providing 'a quick market test for new ware' (ibid.: 283).

But the success of introducing new materials was very limited, particularly in the beginning in 1953 (ibid.: 282) and attempts to reorganize the pottery industry on a work-
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shop basis, with the use of modern equipment such as kerosene-fired kilns, and electrically-powered wheels, was an almost total failure (idem: 332–5). Besides the technical difficulties, Tzintzuntzanos did not adapt to co-operative work, and the project plan itself was deficient. CREFAI personnel also tended to fail to appreciate the sensitivity of the people of the village (ibid.: 340–7). Sales of pottery are limited through the ignorance of the Tzintzuntzanos 'of the ways of the wider world'. For example, one man was cheated in a deal with a store-owner in Mexico City (ibid.: 282–3).

Recently, Durstan investigated pottery-marketing systems in Michoacán State, Mexico, mainly in Patzcuaro market, and the villages which supply it with pottery: Tzintzuntzan, Santa Fé, Capula, and Erongaricuaro. In particular he emphasizes the great expansion in pottery demand since the 1930s (Durston 1969: 1–4).

In Patzcuaro market, with the growth of consumer demand, a special wholesaling institution has developed; this is the compromiso relationship between potters and middlemen. The compromiso is a casual business contract which guarantees regular sales at predictable prices (ibid.: 5–7).

In the last fifteen years in Tzintzuntzan and Santa Fé, a special type of middleman has emerged, who deals in the growing variety of 'urban middleclass tableware' (e.g. plates and fruit dishes) and glazed and decorated ware in traditional shapes (ibid.: 8–10).

In response to new marketing situations, some aspects of the nuclear family productive unit have occurred. Constant pottery market-prices (plus increasing land-shortage) have led some peasants to exclusive production of pottery; men have begun to help 'in the traditionally feminine job of moulding pots'. Tourist-ware production, requiring more expensive materials, and a longer productive cycle, demands more complex budgeting. Wage labour is beginning to develop, but despite marketing and other changes, Durston states that the potting units are not expanded rationally because the potting units are also nuclear family units (ibid.: 10–12).

Diaz describes the resistance of pottery production to technical innovation, despite economic and market stimuli in the Mexican town of Tonala. For several centuries this town has produced traditional ware, including cooking and water-pots with the use of vertical-half moulds, and mushroom moulds (Diaz 1966: 17, 138ff).

Most pottery is sold in the Tonala markets, usually to comisionistas, or pottery middlemen. Many of these are locals but some are dealers from outside. The potters feel the market for their wares to be good (ibid.: 180–2).

Diaz describes the limited manner in which market demands prevail in pottery production: 'The greatest impetus towards change is the market. Within . . . limits . . . a Tonaltecan potter will make any clay object which can be made by the moulding methods he is accustomed to and by using his kind of kiln' (ibid.: 183). Thus, new pottery types may be made to satisfy demand, but productive techniques remain stable.

The organization of pottery productive units is stable in the face of economic stimuli: the basic potting unit is the nuclear family, which also operates in farming, ceremonial, and domestic contexts. Diaz (1966: 162–3) also states that: 'Ideally speaking, the nuclear family is a pottery-making group, but in actuality the group qualities of the family are weakly developed. . . . Work is done ad hoc.'

1 Centro Regional de Educación Fundamental para la America Latina.
Diaz stresses that Tonalá potting is not like factory work. There is no set working day. Work is done according to the tarea concept (i.e. the notion of what constitutes a day’s work). About three decades ago the Aldana Pottery Factory was established in Tonalá, but this constituted no radical departure from traditional production. There are about twenty employees, making traditional and souvenir items for Aldana’s shop, and other shops. The same techniques are used, apart from the wheel, larger kilns, and racks for loading. The division of labour is the same as in domestic production. The workers toil according to individual needs, as they are on piece-rates; the tarea concept still applies (ibid.: 157–69).

An attempt to introduce the assembly-line method in Tonalá met with no success: no single worker felt responsible for the finished product. Tonaltecans are satisfied with traditional methods. They like being ‘their own bosses’, and appreciate the flexibility of traditional organization, which also permits them to farm (ibid.: 171–3). ‘... the average Tonaltecan is concerned less with getting more goods than with maintaining himself and his family within the matrix of the life of the community’ (ibid.: 174). The economic context of pottery production is not favourable to major technical innovation. Economic goals are short-term, and there is little opportunity for reinvestment. Capital is not usually available. Resources at the potter’s disposal are not manipulated to the greatest economic advantage (ibid.: 205–7).

There are also problems in the distributive sphere. Tonaltecans generally prefer to accept their destino. Departure from family traditions are not easily made. The would-be entrepreneur is restricted by his limited business experience, and is anyway more likely to invest in alternative enterprises, such as livestock. There are no pottery tycoons (ibid.: 215–18).

Nash briefly describes pottery production in Amatenango de Valle, Chiapas, Mexico. He emphasizes that the family unit of pottery production persists in the traditional socio-economic system. In Amatenango ‘change and innovation are not by-products of economic activity’ as they are in industrial societies. Shortage of capital, lack of credit, simple technology, and illiteracy are contributory factors to this general situation. The organization of production on the household basis and social and religious sanctions against the accumulation of wealth ‘prevents the discovery or utilization of economic opportunity’. Wealth is not invested in technical and economic enterprises, but is ‘drained’ by social and religious requirements (Nash 1961: 186–91).

These recent studies by Foster, Durston, Diaz and Nash, unfortunately confined to Meso-America, show the importance of analysing the socio-economic context in order to interpret the operation of changes in pottery production and distribution. Relatively rapid innovation in such aspects of pottery as raw materials, decoration and forms, is seen to contrast with stability in the organization of the productive units and traditional techniques.

Other factors

Relative efficiency of production

Of prime importance in innovation in pottery raw materials, tools, techniques, forms and designs, is the efficiency of those in current use as compared with the efficiency of
potentially new elements. Unfortunately, where this topic is discussed in the ethnography, it is largely in a superficial manner. In pottery production, theoretically there are many different ways of solving the same technical problem, though the potters themselves would probably not agree. Unless the advantages of, for example, a new forming technique or method of firing are seen to be patently obvious by the potters themselves then it is unlikely that the old and well-tried will be replaced by the new; pots can still be made to traditional requirements. Moreover, a potting enterprise is not merely an amorphous collection of interchangeable elements – the elements interact, and change in one sector is likely to implement change in another. As Cardew points out with reference to Nigerian potting: ‘the technique is all of a piece and is (though primitive) yet highly evolved and efficient as regards certain qualities’ (Cardew 1952: 193).

In some cases it is possible to show that a particular pottery technique, device, or form is adapted in some special way to the local conditions or culture of the people possessing it. The possibility of substitution of this element for another is thus greatly reduced. For example, in Northern Nigeria, the Hausa use a method which involves the dry beating of a lump of plastic clay, without using any water, with a beater of unfired clay in a depression in the ground. Any cracks that appear are immediately sealed by beating. Cardew (1969: 91–2) maintains that this forming technique is ‘adapted to the intensely dry climate’, a not unconvincing suggestion, since a similar technique is used by some groups in the arid environment of Upper Egypt (Blackman 1927: 140–2).

In the Nicobars, the Chowrans use a highly distinctive firing method. This involves the use of a special device called a hi-wat, which is a ring of unfired clay placed on top of the pot to prevent firebrands touching the sides of the vessel in the bonfire (Man 1894: 25). It is possible that this precaution is aimed to avoid burn-marks on the pot, which would spoil the essential Chowran pot-decoration.

The form of a pot can sometimes be related to a special function. For example, distinctive perforated vessels are used in the village of Pamulapadu, Guntur, India, for preparing a festive dish from cereal paste. The vessels have perhaps been used in this context in the southern Deccan since Neolithic times (Paddayya 1969: 450–1).1

Almost universally, pots are used for carrying water from the source of supply to the place of consumption, but the form of the pot varies with the mode of carriage. In some parts of Nigeria, pots have long, narrow necks, and round bottoms and are carried at an angle on the head for quite long distances without support by the hands. The narrow neck reduces loss of the contents by spillage. In other parts of the country, water-pots have slightly tapering sides, and round bottoms, and quite wide mouths; these pots are supported with the arms and hands, on the back. In Sokoto, water-pots are almost spherical with narrow necks, well-adapted for transport by donkey (Cardew 1952:

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1 Although this example explains the specific form of this pot in terms of its special function, perforated pots are used for many other purposes. The nearest comparison to Paddayya’s example is a Chachau sieve for making a kind of macaroni from rice-paste from Singapore, Malaya (Pitt Rivers Museum, Oxford: Annandale Collection 370, 1901). A crude perforated dish is used for ‘ parching rice’ in Bengal (Pitt Rivers Museum: collected by R. C. Temple 31889). In the Tamil country, India, perforated pots called ‘pots with one thousand eyes’ are used in ritual prophylaxis for carrying burning camphor (Aiyappan 1939: 71–2) and they are also used in a similar ritual context in Andhra Pradesh; the ‘eyes’ represent small-pox scars (Tapper: personal communication).
192–3). In Ceylon, yet another method is used for carrying water-pots: 'the functional shape (of the pot) will be noted, the curve of the lip fitting the forearm, that of the body the hip and the waist' (Raven-Hart 1962: 82). Thus the possibility of innovation in the form of water-pots is much restricted by the traditional manner of use in each of the above groups.

It is unfortunate that data on the actual situation of ceramic stability and innovation is rarely available. One example, however, concerns the Japanese village of Tamba. A laboratory was established so that Tamba potters could learn 'more advanced' methods, but the new devices and methods were rejected since the potters were interested to maintain the high artistic quality of their wares, in which they took great pride. In particular, use of the new kilns was rejected because they were considered inferior to their own: 'This was not merely conservatism for they know that their pots derive much of their vitality from contact with fire, wood and ash' (Janet Leach 1957: 13–14).

In general, in the discussion of the relative efficiency of different materials, devices, techniques and forms in the context of pre-industrial potting, there is a great need for objective criteria - such as time-and-motion studies of forming techniques, and accurate measurements of firing temperatures and the effect these have on the quality of ware fired. Such data should also be accompanied by information on the cultural context of pottery production. Frequently, at the domestic level, the potters are only casually involved in potting, perhaps only once a year, and they are not themselves concerned with finding a more efficient way of working. For example, 'Mohave pottery was made in a culture which set little intrinsic value on anything technological and looked upon economic acquisition as in itself unworthy and fit only for dissipation' (Kroeber and Harner 1961: 10–11). The Mohave would thus seem unlikely to be interested in possessing more or better pots than the practical minimum, and so there would be little incentive for innovations to make this possible. On the other hand, however, Mohave potters might have changed their tools and methods in order to make the same number of pots more easily, even if this was at the expense of the quality of their ware.

The co-occurrence in the same group of different methods and tools would seem to suggest that in some cases the incentive to change to the most efficient way of potting is small. This applies to the case where a potter from one group settles in another group where different techniques or tools are used, and continue to be used so that both ways of potting are pursued side-by-side. For example, among the Bena of Tanzania, where potting is 'only a side-line among a woman's domestic and agricultural duties', the vessels exhibit 'a most interesting mixture of old and new ideas' (Culwick 1935: 169, 185). Two women, who were co-wives, simultaneously made pots in different traditions, one in a manner which she said to be derived from the coast, and the other in the manner of the Nyamwezi (the old Bena methods had died out in the previous generation). The former woman shapes the pot-base in her hands, then adds 'strips' of clay as required and finishes with a ring of clay for the rim. She rotates the pot as she works. The second woman builds up her pot with 'strips' of clay, then adds the base, and finishes with a special ring for the rim. But she stands her pot on a wicker tray which is rotated with the pot on it (ibid.: 166–7). As we shall see in the following section, individual

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1 At Abuja, Nigeria, water-pots are 'used with a head pad (and) balance better than buckets and can be easily steadied with the arms bent' (Cardew 1952: 196).
variation plays an important part in the diversity of potting methods and devices, and so on.

**Personality and skill of the individual potter**

Certain investigators, particularly in America, have looked into the role of the individual in pottery innovation - who may or may not be a member of an actual potting group. It is Bunzel's view that in Pueblo pottery, stereotypes are due to 'human mediocrity', and in contrast, a genius may make sudden style-changes. She sees that each group is perpetually exposed to influences from outside 'but it takes a genius to utilize such a stimulus' (Bunzel 1929: 87-8). Foster, however, is convinced of the primacy of economic stimulus in style-changes. 'In spite of the presence of an occasional potter-artist in peasant societies, the evidence suggests that market demand rather than artistic urge is the primary cause or change. Peasant potters look upon themselves as artisans, and upon their work as simply an occupation whereby one earns a living' (Foster 1966: 52). It is probably difficult in many cases to separate 'market demand' from 'artistic urge', especially where the innovations of the artist are fetching large profits.

Several authorities have discussed the role of certain remarkable individuals in the pottery 'renaissance' in the New Mexico pueblo of San Ildefonso (e.g. Kidder 1925: 13–15; Marriott 1948; Hall 1959: 109–11; Underhill 1944: 102, 105).

Towards the end of the nineteenth century, and in the beginning of the twentieth, San Ildefonso potting was in decline (see above, pp. 21–2). Then, in 1907, San Ildefonso men were employed in local archaeological excavations. The womenfolk of the labourers attempted to emulate some of the wares which had been unearthed, and there was an improvement in San Ildefonso pottery in the course of the next few years. Certain skilful and imaginative potters - Antonita Roybal, Ramona Gonzales, Maximiliana Martinez, and Maria Martinez - began to exploit the growing market and museum demand for the new types of pottery. Maria stood out as the most brilliant of the potters, and she inaugurated a series of major ceramic innovations. She improved the shapes, surface finish, and decoration of the traditional polychrome and black-on-red wares. Polishing was restored, and vegetable paint once more prepared carefully. Maria discovered a method of decorating polished vessels in a manner which gave the impression of the designs having been etched. Maria's restoration of the famous polished black ware was perhaps her greatest contribution (Kidder 1925: 14–15). As Hall points out, Maria's innovations were specific ones, and though representing single changes in the whole potting process, the result was to improve the quality, and extend the repertoire of San Ildefonso pottery. Further experimentation had been encouraged with regard to surface finish and design, and the way was opened for deviation from traditional patterns. Although each separate change was relatively small, 'Put together, they form the basis for a new formal system once they became consolidated and widely accepted' (Hall 1959: 109–11).

In the Hopi towns of Arizona, Kidder mentions the occurrence of a comparable pottery florescence. A potter called Nampeo, of Hano pueblo, was the wife of one of the labourers employed on an archaeological excavation. Nampeo copied the extinct style of ancient wares, and her bowls and *ollas* sold well and were in turn copied by other Hopi women:
'and thus the potter's art of the Hopi was not only greatly stimulated but also radically changed' (Kidder 1925: 15).

Although many factors were involved in these ceramic developments, not least economic factors, as Kidder emphasizes, 'the inspiring example of exceptionally gifted leaders' was crucial in the innovations (ibid.: 15).

A recent study of pottery among the Pagago Indians of southern Arizona and Sonora Province, Mexico, includes a detailed account of a notable pottery innovator, Laura Kerman. Traditional Papago potters produce a wide range of standard ware. The usual forming method is to pat clay with an anvil and paddle over the base of an inverted pot, afterwards using the paddle-and-anvil technique to thin and shape the walls of the partially-dried vessel. It is then smoothed and slipped, dried, and bonfired. Pots are sometimes painted, and then refired (Fontana et al.: 1962: 22-80). Laura Kerman, however, uses different methods, and produces different forms. She works in a modern studio; she employs plaster moulds, and also hand forming techniques; she fires in two electric kilns; she fetches clay in a jeep, and also uses commercial clay, and commercial paints and brushes; she produces a striking array of pottery types, including candy-dishes, mugs, ashtrays, tea-sets and candlesticks. The authors stress that Laura is a Papago Indian, still living with other Indians, near to her natal reserve. She was taught modern methods by a non-Indian ceramist at Topawa. The following observation is made on the significance of Laura’s work: ‘We are not denying that Laura Kerman is atypical for Papago potters . . . her craft is different from that of other Papagos. But what we are suggesting is that Laura Kerman, Papago Indian, may not be atypical of “aberrant potters in other cultures and at other times” ’ (ibid.: 110-16).

In his recent paper on problems of symbolism, form, and setting in the development of the art of an Ògbáádo Yorùbá potter called Àbátàn, Thompson aims to demonstrate the ‘dynamic unity’ of tradition and innovation in her pottery, showing that ‘her art is embedded in culture and is yet autonomous’ (Thompson 1969: 120-1).

This gifted potter, in the course of her long active-potting life, has indelibly stamped her artistic ceramic innovations on a vital ritual element of Yoruba life. Thompson’s analysis illustrates an aspect of the dual nature of ceramic stability and innovation: the way in which a potter can make innovations of style and form and yet remain within the traditional form of artistic expression.

Foster suggests that in tribal societies, ‘where production is for home consumption, or trade or barter on a small scale’, ‘change comes because the potter is trying to please herself’ (Foster 1966: 52). In the case of Àbátàn, she is certainly a potter who innovates for the fun and satisfaction of it, but she works to commission, and makes relatively large profits. Once again, and in the tribal situation, it is difficult to separate ‘artistic urge’ from the economic stimulus.

In Barcelos, Portugal, the survival of traditional pottery figure-making, and the transformation of this medium by vast increase in the range and complexity of types, has largely been accomplished by one remarkable artist, Rosa Romalmo. In general, Flowers maintains that the folk-pottery tradition is in decline. But, ‘within the form and spirit of the tradition’ of modelling figures, Rosa invents and creates new types. Human and anthropomorphic animal figures, executed in a grotesque humorous manner, are Rosa’s forté. It seems probable that her innovations will survive in the Barcelos ceramic tradition,
since Rosa is instructing her granddaughter in the special skills (Flowers 1966: 45–50).

It is probable that the significance of such fortuitous factors as individual personality, flair, artistry (or lack of these characters) has generally been underestimated in its effect on ceramic development over a period of time. This is probably related to the necessity of highly intensive field-work, the ethnographer having not merely to study a group or some groups of potters, but particular individuals in addition. When such trouble has been taken, the results are often found to be surprising, and of the highest relevance to theories of ceramic development.

Cultural significance of pottery technology

This category applies more to peasant than to tribal potters, since the data relate mostly to fairly large pot-making groups rather than individual potters. The potting group is generally more than simply a group of people who make pottery; sometimes it is a corporate unit which participates in a whole range of socio-economic, political or ritual activities. The nature of the tasks which are done, the tools and materials employed, have a significance which is wider than merely the technological and economic activity, and this will colour the attitudes of the potters to change.

Dumont draws attention to the importance of both cultural and strictly technical factors in ceramic innovation in South India. He goes as far as writing: 'I am inclined to think that here the cultural perspective is more important than the technical one' (Dumont 1952: 83).

Dumont hypothesizes that the beating technique was first associated with the moulding of pots by hand, and was later combined with wheel-throwing. In his view, a new technique did not supersede the old, 'as one would have expected', but combined with it. He suggests that throwing – the new technique – was introduced for a special cultural reason rather than for technical advantage: 'I would submit that the root of this double tendency (i.e. to adopt new features, and still retain the old) is mainly to be found in a psychological consequence of the caste order: a member of a lower caste tends to imitate the kulturgut of higher-caste people, not because of its immediate utility, but as a sign of social superiority.' An important result of this situation is that the introduced feature is 're-cast' in the pre-existing pattern, rather than exploited purely for technical advantage. Probably, Dumont overstates his case, and misunderstands the nature of the technological considerations, but his important contribution is that he convincingly extends the range of factors seen to be operating in a situation of ceramic innovation. His comments are particularly relevant in the context of the Indian subcontinent, where the co-existence of a great variety of techniques and devices, as well as of products, is indeed remarkable (see Foster 1956: 395, for his comments on 'the simultaneous use of so many basic pottery techniques in a single place').

Saraswati states that in north and west India, endogamous potting subcastes are differentiated on the basis of three major criteria: (a) social, (b) territorial, and (c) technological and occupational. With reference to the third criterion, 'technological or occupational distinction is very sharp in the case of the potters who use potters' wheels and those who do not employ (the) wheel'. In some groups, certain features of pottery technology act together with features of dress, food habits, and 'customs' in a complex of differentiating criteria (Saraswati 1967a: 40–3). In cases where features of pottery technology
are important in differentiation of groups, then changes in these aspects of pottery would be likely to be conditioned by non-technical considerations.

A similar situation is described in South India, by Behura, where 'technological individuality' has contributed to the segmentation of potters into subcaste groups. Potting groups can be divided into two categories on the basis of the type of wheel which is used: some use the pivoted, spoked wheel\(^1\) turned by the thrower, and others use the 'block-wheel'\(^2\) turned by an assistant. Each group within both categories is technologically differentiated from the other; for example, the Pandyan Velars practise open-firing, and the Cholar Velars, kiln-firing (Behura 1967a: 35). It is probable that in these cases a whole range of technical possibilities are economically viable alternatives within the broad limits allowed, but each group expresses its identity for social, ritual, and perhaps other reasons, by adherence to distinctive methods, and the use of its own pottery-making devices. This peculiar cultural situation creates and maintains the diversity of ceramic processes, but also limits the possibility of certain changes. For example, Behura (1967a: 37) writes that 'the socio-cultural factors are (the) veritable impediments on the part of the potter in changing his traditional techniques'. Behura also stresses the importance of 'socio-psychological' factors in creating ceramic diversity. For example, the Pandyan Velar potters of Madras do not fire in a reducing atmosphere 'because their customers consider black pots inauspicious' (Behura 1967b: 123).

Other authorities on Indian pottery-making have made similar suggestions to those of Saraswati and Behura as discussed above. For example, Biswas, with reference to Madhya Pradesh, maintains that 'certain endogamous groups have arisen simply from differences in the method of working'. The Hathgarhia make pots by hand-forming only, and the Goria make only white and red pots, not black ones (Biswas 1966: 95). The three potting groups which cater for Poona City each produce different types of articles, and their specialized products do not overlap; this diversity of types appears to be a criterion in the socio-economic differentiation of the potting caste (Gupta 1966: 67–74). In the Punjab and North West Frontier Province, ceramic diversity is one of the criteria (among others including putative origin, territory etc.) in the system of local group differentiation and hierarchy. For example, the Kungar are makers of pottery tubs and troughs—*kunda*—in Malerkotla (Punjab Government 1911: 564–6).

In general, these examples appear to illustrate two important general aspects of pottery-making stability and innovation in India: the creation of patterns of ceramic diversity which play a major role in group differentiating criteria among divisions of the potter castes; and a tendency towards stability in the resulting patterns, change tending to occur only in the event of broader cultural changes.

Information on the cultural aspects of pottery technology from other parts of the world are rather sparse. One example concerns the Bakitara of Central Africa. Only pots made for the king were decorated with a graphite sheen which produced a brilliant black polish (Roscoe 1923: 227). In this case the association of a particular potting

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1. This is a variety of the *simple* potter’s wheel, with a central disc joined by spokes to an outer rim which provides momentum. A pivot projecting from the base of the disc revolves in a socket embedded in a projection on the ground (Childe 1958: 197–8).

2. This is a round 'block' of wood or stone, which usually revolves on a pivot projecting from the ground. It possesses insufficient momentum to run continually, and is turned by an assistant who sits opposite the thrower.
process with a special group of potters (Bakitara chiefs and the king had their own groups of potters) and their products, probably expressed the political predominance and prerogatives of the head-of-state. This situation artificially restricted the possible technical repertoire of the Bakitara potters.

The general aesthetic standards of members of the potting group may be important in determining aspects of ceramic diversity. In her work on Pueblo pottery, Bunzel comments that 'what is technically possible is not always aesthetically possible'. The style of decoration of any group is culturally-determined, rather than limited by technical factors: the selection made usually 'leaves a wide margin for variation within the limits of the technical potentialities' (Bunzel 1929: 3). Bunzel maintains that the potters of each group produce 'accurate, typical forms' unconsciously, and that the vessels of each village showed much uniformity. This was partly the result of the potters' 'distinctly critical attitude towards any deviation from the accepted norms'. Throughout the Pueblo area there was some uniformity, but there was also a tendency towards stylization of design in each village. For example, there are subtle differences between a Zuni and an Acoma water-pot, 'yet they are not unrecognizable by native potters'. A Zuni potter remarked on the 'funny' neck and unusual shape of an Acoma pot (ibid.: 10–11).

Pot-making groups are frequently engaged in activities in a wide range of other spheres, and these other aspects of the group impinge upon the technical and economic activities of the potters. Aesthetic standards, although having vital individual and psychological aspects, are closely related to the distinctive patterns of cultural values, and these cannot be examined in vacuo.

Non-economic sanctions

Here one is concerned largely with what Radcliffe-Brown termed 'social sanctions'. Frequently social sanctions of some kind are important in the incidence of ceramic innovations, and their fate with regard to adoption by other potters.

The potters of Chinautla, near Guatemala City, specialize in the production of water-pots, tinajas. In 1953, Reina recorded that a very old woman was making artistic animal figures for sale along with the usual tinajas in the weekly market. At this time, the woman was teaching her granddaughter to pot – to make both tinajas and models. At age twelve, the girl Dalores was producing a series of small models. Then she gave up making models, and concentrated entirely on water-pots, like the other girls. Reina examines the reasons for this curbing of pottery innovation. What had happened is that Dalores had had three marriage proposals, which failed; with this failure, there was a swing of public opinion against her. Dalores' character and reliability were called into question by the members

1 According to Radcliffe-Brown, 'A sanction is a reaction on the part of society or of a considerable number of its members to a mode of behaviour which is thereby approved (positive sanctions) or disapproved (negative sanctions). Sanctions may further be distinguished according to whether they are diffuse or organized; the former are spontaneous expressions of approval or disapproval by members of the community acting as individuals, while the latter are social actions carried out according to some traditional and recognized procedure.' Within a religious society, social sanctions may be supported by certain beliefs, and thus become 'religious' or 'ritual' sanctions (Radcliffe-Brown 1963: 205–6).
of the community. Chinautleco women identify themselves primarily as potters and to them a potter is a maker of water-pots; deviation from this norm casts the deviant into disrepute, bringing 'personal distress' and 'social embarrassment': 'life in a community like Chinautla is such that it does not foster the growth of individual skills or interests. The artist and the innovator in Chinautla easily succumb under the natural weight of tradition. It is possible that when Dalores becomes old, like her grandmother, having the courage to face the community and having less to lose, she will return to the old enterprise of which she is indeed very capable' (Reina 1963: 24–30).

In Reina’s case-study, regulation of ceramic production is seen to be an aspect of social regulation. In Radcliffe-Brownian terms, the Chinautleco innovator was subjected to diffuse, negative, social sanctions.

At the time of Foster’s first field-study of the Mexican potting village to Tzintzuntzan, Natividad Peña, and her mother Doña Andrea, were two of the most gifted potters, specializing in the production of a type of ware called *loza blanca*. According to Foster, ‘*loza blanca* is an ancient technique which has been modernized’. A variety of forms are produced, including dinner and dessert plates, soup bowls, and candlesticks. Natividad ‘is far more of an artist than her mother’, and experiments much more. She also makes new forms and designs, including models of human figures, and so on (Foster 1948a: 95–8). Foster describes the general attitude to Natividad in the village. In spite of her good nature, she is the object of powerful though informal community sanctions. She is accused of ‘hobnobbing with the outsiders’, and ‘generally bringing shame to the pueblo’. No one in Tzintzuntzan ever expresses pride in Natividad’s achievements, despite her fame, and visits from people who travel to see her from great distances (ibid.: 99).

By the time of some of Foster’s later field-work in Tzintzuntzan, new wares had begun to be produced. Pottery ‘secrets’ had tended to grow up, and community sanctions operated in favour of disseminating new knowledge. For example, one potter refused to give the others the address of a store in Tlaquepaque which sold a type of glaze which is not available locally; another potter would not inform others of his oxygen-reducing process for producing black wares. Both individuals were subjected to criticism by the members of the community, who accused them of being *egoista*, selfish. Rumour and criticism (viz. diffuse, negative sanctions) would normally appear to operate against the maintenance of pottery ‘secrets’ (Foster 1967: 92–3).

Among the Shai potters of Ghana, the sanctions against young potters decorating their pots are real but somewhat obscure. ‘Decoration of pots is the prerogative of old and experienced potters.’ The reasons for this restriction are given variously as follows: that it is ‘impertinent’ for the young to decorate vessels; that young people may use the ‘wrong’ design (most designs are proverbial and symbolic); that the decorations have ritual connotations, and hence are ‘dangerous and presumptuous’ for youngsters to use. ‘For fear of falling into troubles of various sorts, elaborate decoration of pots is not common today among Shai potters. The few line, geometric and animal designs that are to be seen are done by fairly old women.’ The making of images of God is definitely banned (Quarcoo and Johnson 1968: 70–1).

On the Micronesian island of Yap, pot-making was virtually an instrument of political subjection for the people in domination over those of low rank. Women of low rank had to supply great quantities of pots to their masters. The potters ‘were not expected,
Stability and innovation in pottery manufacture

perhaps not permitted, to refine and decorate the standard form' (de Beauclair 1966: 203).

As members of social groups, be these potting groups or other corporate units, potters are subject to processes of social regulation. In some cases their potting activities are controlled in this way, as described above, with certain implications for pottery stability and innovation. Unfortunately Reina's case-study is virtually unique in the literature.

Radcliffe-Brown points out that 'it is a significant fact that in all human societies the negative sanctions are more definite than the positive' (Radcliffe-Brown 1963: 205). Accordingly, I have no definite data on examples of positive sanctions concerning pottery-production. The New Mexico Association for Indian Affairs awards an annual prize for each of the best 'old' and 'new-style' pots produced by the pueblo people (Underhill 1944: 89–90). But this 'organized, positive sanction' (Radcliffe-Brown 1963: 208) is an extra-community procedure, and one can imagine that the winner of a prize might be subjected to jealous criticism, in the same way as Dalores and Natividad.

Secrets

As Foster states, 'sometimes secrecy limits a skill to a single or a few families, and sometimes other potters respect what amounts to primitive patents' (Foster 1966: 57). This is particularly important during a period of increased market stimulus, for example: 'The expansion of the tourist market in Tzintzuntzan has produced a flowering of styles. A potter who hits upon a new technique in colouring or glazing jealously guards his secret, so that pottery-making knowledge is no longer universally shared' (ibid.: 58).

The artist Skeaping studied potting in a Mexican village of Metepec State. After a considerable period, the potters of one family 'began to divulge their secrets'. For example, they showed him how they fired pots black, and used the seeds of a certain plant as a binder to stiffen clay. Skeaping remarked that although the potters expressed the greatest interest in the processes which he described to them, they did not adopt any of them. Skeaping (1952: 138–41) comments that 'Throughout Mexico each village has its own distinct designs, its own methods of working and firing.' Presumably, the possession of pottery secrets contributed towards this diversity of techniques. The possession of distinctive methods would appear to contribute to the ceramic diversity, but preclude the possibility or likelihood of certain innovations without the incentive of strong stimuli such as expansion of the tourist market.

But in addition to the occurrence of pottery-making secrets which are closely related to economic factors, are those which have grown up for other reasons. Sometimes aspects of potting are made secret since they are included in a group's esoteric activities.

1 Pottery-making secrets are often important in industrial production, for economic reasons. A sixteenth-century Italian potter wrote of those who keep secret the knowledge of their craft – making tin-enamelled ware, majolica. Then on their deathbeds they pass the knowledge on to their successor (Piccolpasso 1934: 1). One author wrote that 'In Staffordshire and elsewhere secrecy has long been synonymous with ceramics.' Wedgewood wrote some of his formulae in code, and at Etruria Hall elaborate safety measures were installed to protect secrets concerning special products, such as basalt and jasperware (Wills 1969: 147–8). Great lengths were taken to restrict knowledge of profitable wares, in which certain potteries attempted to retain monopoly of production.
Group identity may be reinforced by the restricted access to ceramic knowledge. This appears to be the case among the potters in Bida, Nupeland, Nigeria. The making of small plates, which are broken up for covering floors, is seen to require special training. The manufacturing technique is kept secret, among the women of three compounds in the glass-workers’ quarter in Bida (Nadel 1942: 296). However, neither the device used, nor the technique, are described.\(^1\)

The Dakarkari of Sokoto Province, Nigeria, produce a special type of pottery, which is placed on tombs, and expresses the status and character of the deceased (Harris 1938: 146–9; Fitzgerald 1944: 43–57). The chief forms are ‘pagados’, ‘elephants’, ‘small pots’, human and animal figures, and household pots (Fitzgerald 1944: 44–56). According to Harris, ‘the women who make the tomb pottery are very secretive and refuse to say anything at all about the pots’ (idem: 147). Fitzgerald only saw its manufacture on one occasion, and he describes moulding on a gourd base, then with the hands and a piece of broken gourd (idem: 56). The process is still a secret one, done by a few specialists – old women (Simmonds: personal communication).

In some cases, particularly in tribal societies, potters are reluctant to demonstrate their craft. This is particularly true of cases where they have a local monopoly, with vested interests in non-dissemination of the technical knowledge. One of the advantages to the Shai potters who used to work in their hill-top towns, was that here there was ‘peace and privacy’ (Quarcoo and Johnson 1968: 52–3). On Chowra, the native potters are highly secretive about their craft: in respect of foreigners and other Nicobarese. Two Central Group natives who accompanied Man had not before seen the potting process, in spite of their frequent visits to the island: it not being customary with these people . . . to gratify idle curiosity on the part of visitors and strangers, but to intimate, if necessary in plain terms, that their room will be preferred to their company, or in the case of Europeans to endeavour to mislead them or to attract their attention to some distinct part of the island’ (Man 1894: 24). Even Malinowski had difficulty in persuading the Amphlettan potters to let him watch them at work (Malinowski 1922: 46–7).

The potter’s wheel

Consideration of the potter’s wheel has been left until last because there is a relatively large body of material on the wheel in the ethnographic literature; some of the problems involved are specific to the potter’s wheel as opposed to other potting devices; and it will be possible to demonstrate the importance of taking into account some of the factors which have been postulated as of importance in influencing stability and innovation in pottery manufacture.

The acceptance or rejection of the potter’s wheel

In the past, much misunderstanding has occurred because many authorities have not made clear the essential features of the potter’s wheel and the mode of operating it.

\(^1\) King refers to ‘clay floor tiles’ made in Badeggi, near Bida. These appear to be the same as those referred to by Nadel, and this implies that the process is not (or no longer) the exclusive possession of the Bida group (King 1962: 23).
According to Foster (1959b: 99) 'the most fundamental characteristic of the true potter's wheel is that it is (or incorporates) a flywheel that provides momentum and continuous rotation so that centrifugal force can be utilized to "throw" a pot from soft plastic clay'. Hodges (1965: 28) gives a straightforward definition of throwing: "This is the making of pottery from a single lump of clay on a turn-table that can be made to rotate continuously over a fairly long period of time, the centrifugal force acting on the clay being utilized by the potter to form the vessel."

I have used these definitions because they draw attention to the importance of utilizing the centrifugal force which the wheel can provide, to throw pots. Previously, there was a tendency to overlook the fact that small-scale potters frequently do not make use of the wheel in this way. Using examples from pre-industrial potters in many parts of the world, Foster illustrates the repeated failure of potters to exploit the full potential of the wheel. Foster maintains that 'a good many people who are described as "wheel"-using artisans are such only by courtesy. They only partially understand, or do not understand at all, the real potential of their instrument. For many of them . . . the wheel is merely an improved mobile platform or simple turntable' (Foster 1959b: 113). In India and Pakistan, potters usually combine one or a number of hand-forming techniques with throwing on the simple wheel: in this context the paddle-and-anvil technique is important. Childe defines the simple wheel as 'essentially a centrally pivoted disk of wood, stone, or clay on a wooden frame. The wheel must be heavy enough to retain its momentum when set spinning.' Momentum is imparted by the use of a stick which is used to turn the wheel, or by pulling a strap wound round the disc-rim or its axle (Childe 1958: 197).

In the village of Boral, near Calcutta, there are three basic processes employed in potting: on the wheel, by hand, and partly on the wheel, and partly by hand. This example shows that not only may the techniques be combined, but they may be used separately, according to the type of vessel that is being made (Das and Ray 1966: 48). In wheel-throwing, a simple pivoted wheel is used to throw several pots from the centred lump of clay. Vessels are cut off the lump with an iron wire (ibid.: 49–50). In hand-forming, a round pancake of clay is prepared, and pressed down over a convex mould, the shape being then formed by alternative slapping and rotating in an anticlockwise direction. Some pitchers and cooking pots are made by a combination of hand and wheel methods. The upper part of the vessel, called pakui, is thrown on the wheel. Then a clay pancake is prepared, and joined to the lower part of the pakui, which is allowed to become leather-hard and its lower edge thinned with a beater, by beating with the paddle-and-anvil. Pitchers are shaped to a rounded form in this process, and cooking utensils are left with a sharp line at the point of the join (ibid.: 50–1).

In the Government School of Art in Colombo, Ceylon, wheel-throwing is combined with paddle-and-anvil in a different way. A thick-walled cylinder is thrown, with neck

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1 There are descriptions of throwing in the following works: Hodges 1965: 28–30; Leach 1967: 70–80; Christy and Christy 1969: 89–92; Cardew 1969: 97–110. Most authors stress the difficulty of verbal description of throwing, as opposed to direct observation and practice.

2 Sometimes a pot is not rotated while it is being made, but more frequently it is placed on some device which simply facilitates its rotation, and saves the potter the trouble of walking around the pot. The generic term for such a device is 'turntable'. See notes 1 and 3, p. 38 below for further definitions.
and lip at the top. When leather-hard, the cylinder is beaten between a mushroom-shaped anvil and wooden paddle, to thin and enlarge and shape the walls to produce a globular water-pot of the traditional type. Casseroles with thin bases are made by throwing the wall and rim, which when leather-hard is beaten from outside to close the hole, and give the pot the desired curve. The pots are given a second beating after further drying (Raven-Hart 1962: 81–3).

In many parts of the world, hand techniques are combined with use of the double or kick wheel (Foster 1959b: 111). According to Foster ‘this wheel is characterized by two horizontal discs rigidly joined by a vertical axle, supported at the bottom by a thrust bearing . . . and beneath the head by a second bearing’. The potter usually sits at the wheel, kicking the lower disc, which serves as the source of power, and as a flywheel to govern speed and give momentum (ibid.: 104).

In Takouchtem village, Morocco, the kick-wheel is used to throw smaller pots; big water-pots, however, are formed in a special way. The bottom part is thrown as usual, then left to harden a little in the sun. The middle part of the pot is formed by adding coils of clay to the bottom part, while it rotates slowly on the wheel. The neck and handle are modelled separately, then added to the top of the coil-built section while the clay remains damp (Beckett 1958: 186). In this method of making a pot, no less than three main techniques are used to form the different sections; only the first section involves throwing, and the middle section involves the use of the wheel as a turntable.

In Sr. Aldana’s pottery ‘factory’ in Tonala, the potter’s wheel is employed — but merely as a turntable for finishing off the large vessels (Diaz 1966: 168). Otherwise, only the traditional type of moulds are used, as in domestic production (ibid.: 143).

The fact that small-scale potters often fail to exploit the potential of the wheel for throwing pots, or combine hand techniques with limited throwing allows the situation with regard to potters accepting or rejecting the wheel to take on a new complexion. First, the acceptance of the wheel need not imply that the pre-wheel techniques are entirely replaced, but may be integrated into the new productive process. Second, important considerations are raised with regard to the efficiency of hand-forming techniques as compared with wheel-using techniques. If the wheel is not fully exploited for throwing pots, then its advantages over non-wheel techniques are questionable.

In modern large-scale potteries, and at the level of studio and craft production in industrial societies, hand techniques persist alongside wheel techniques, and are in some cases combined in the production of certain vessels. For example, the combination of coil and wheel techniques for making large pots is standard teaching in craft-schools in Britain. Cardew points out that the upper limits on the size of vessel in throwing vary according to such factors as the skill of the thrower and the character of the clay. A lump of clay up to 100 or 200 pounds may be used, in which case the base of the pot is kept thick to support the weight of the pot, and subsequently turned, but his recommended limits for one-piece throwing not intended for turning lie between 30 and 50 pounds. There are thus practical limits on the size of vessels which can be thrown. This is surely true of the pre-industrial (ethnographic) situation, but the limits are not likely to be quite the same as those suggested by Cardew, since the standards of workmanship, types of vessel required, character of clay, local climatic conditions, and so on, will vary
in different situations. As will shortly be illustrated in some specific cases below, the upper limits on the size of vessel which can be wheel-thrown sometimes comprises a significant factor in the retention of hand techniques of potting. There is a great need for objective measurements on the size-limit of vessels with regard to wheel-throwing, conducted in the field and in controlled laboratory situations, where the importance of variable factors may be established.

Individual variation may be highly significant: for example, it is a commonly-held notion that a pot thrown from a single lump cannot be taller than the length of the potter’s arm. Eley, however, refutes this notion; he centres about a half-hundredweight of clay, makes the base of the pot, then brings up the walls, leaving them thick at the top in order that the height can again be increased. He thus ‘pulls up’ the clay twice: once from the base, and again from half-way (Eley 1952: 67–8). In field observations it would be important to study variation in the skill and methods of different potters, after the basic processes of a particular group had been recorded.

For the pots which exceed in size those given above, Cardew recommends a combination of throwing and building techniques. A deep bowl form is thrown, removed from the wheel, and allowed to stiffen a little, then replaced. A thick coil of clay is added, and welded on. Throwing is then continued, and the new zone finished off level. If necessary, the pot can be allowed to stiffen again and a new coil added, and so on ‘indefinitely’. Cardew adds that if the pot becomes lop-sided through irregular drying ‘this may be remedied by using the West African method of beating with a hard clay-beater, turning the wheel from time to time to test for symmetry’ (Cardew 1969: 107–8). Leach describes a Japanese method for making pots two feet tall: bowls one foot high are thrown and allowed to stiffen until they are ‘quite hard’, when they are put back on the wheel, and extended by coiling (Leach 1967: 75). In Delft and Sèvres today, tall pots are built up in horizontal sections, ‘these being joined by rabbeting and slip, and the joint consolidated by beating’ (Raven-Hart 1962: 81).

As well as the size-limitation on wheel-thrown pots, there may be limitations on form.1 Flat shapes such as dishes and plates are not easily thrown (Hodges 1965: 29). Certain large shapes are difficult or impossible to throw in one piece on the wheel, even if the pot is afterwards turned. One such form is ‘a flattened-spherical form with pronounced carination’. This is made by throwing two bowls, one with an open end, and joining them subsequently (Cardew 1969: 107).

The situation with regard to the use of the potter’s wheel, then, is complex: in many small-scale (ethnographic) situations, the potentialities of this device are not fully exploited, and some studio and commercial potters in both East and West for certain purposes employ ‘pre-wheel’ methods and devices.

It is difficult in the present state of knowledge to determine the extent to which the pre-industrial potter is genuinely handicapped by the limitations of his particular type of wheel. There are many varieties of the two main types of wheel (viz. simple wheel, and kick-wheel), and probably much variation in their efficiency. The chief disadvantage of

1 These limitations are of minimal importance, however, in general, since ‘the possible number of forms that can be thrown on the wheel is endless, which probably accounts for its popularity amongst artist-potters today and possibly even its survival after the introduction of the jigger into industry’ (Hodges 1965: 29).
the simple wheel, particularly the socketed type, is that it oscillates in spinning, deviating gyroscope-like from the horizontal plane (Foster 1959b: 106, 109, 1956: 396). 'It permits throwing, but would appear to preclude turning (i.e. tournassage), or at least render it very difficult' (Foster 1959b: 106).

The fact that primitive and peasant potters are likely not to exploit the full potential of the potter's wheel, and the fact that the actual way in which this device is employed varies considerably cross-culturally, means that it is difficult to determine on what grounds the wheel may be accepted or rejected. The problem is exacerbated by an almost complete lack of quantitative data.

In some cases, hand techniques of pottery production are retained for fairly specific cultural and economic reasons.

According to Van Bercham, Europe is par excellence the land of the potter's wheel: where they were virtually universal before the days of mechanization. Yet still, today, the use of the turntable, and building techniques survive in parts of the Continent. In southern Spain, gigantic pots are made for storing and cellaring wine (see above, p. 18). They are hand-built by the so-called colombin method: in successive segments, with a drying period of ten to fifteen days between the completion of each segment. The pot-construction thus continues over several months. Once a certain height is reached, the vessel is supported by scaffolding, so that the potter can complete the upper segments (Van Bercham 1968: 14–15). In this case, the survival of hand-techniques 'of antique simplicity' (von Rzehak 1902: 176) can be seen to be directly related to the continued demand for very large pots, which it would be out of the question to throw on the wheel.

One of the regions in Europe where the pivoted turntable still survives is Bosnia, at Lijesevo, north-east of Sarajevo. It is turned on an axle of wood or metal, and operated by a man sitting on a stool with his legs open. Van Bercham maintains that pre-wheel techniques of potting survive where pottery-making is secondary to such major activities as farming, where it is a part-time occupation, and that in certain mainly rural zones, peasant societies still resist modern technical uniformity (idem: 16–19). Similar reasons for the survival in Jugoslavia of hand techniques of making pottery are given by Tomic, who points out that Neolithic techniques still survive in some areas – this being associated with the old Balkan cultures, and the complex ethnic past of the Jugoslavs. Pottery is still made by hand, with a 'handwheel' (a turntable?) and by 'treadlewheel' (a type of kick-wheel) (Tomic 1966: 16).

Aiyappan describes the survival of pre-wheel methods in several places in tribal India, particularly among the hill-tribes. Potters from the plains, using the wheel, have tended to extend their trade into tribal areas in India. This has happened to a less extent in parts

1 In this variety of simple wheel, 'the wheel revolves freely on a fixed pivot which fits into the socket on the underside of the disk' (Childe 1958: 197).

2 This account is largely corroborated by an earlier description of the building process. von Rzehak pointed out that the gigantic tinajas are fired in the months of August to September, and the rest of the year is spent forming the pots. Because of the weight of the wet clay it is impossible to progress with building without drying periods. Successive rings of 0.4 metre thick are added, each being allowed to dry out before the next is applied (von Rzehak 1902: 176).

3 According to Foster, 'this consists of a disc, usually of wood, with a hollow or socket on the underside that is balanced on a fixed boss or pivot' (Foster 1959b: 106).
of Malabar, such as Wynad. Most of the pots of the Wynad people are made by the
immigrants, but one group of tribal artisans – the Urali Kurumbars – still use non-
wheel techniques and make ware for the local market.

In the Urali Kurumbar potting process, the rough shape of the pot is modelled from
a lump of clay, then beaten with a wooden mallet on a plank. The neck is made by
scraping up the clay and shaping, and the rim is cut off clean. It is then allowed to dry for
a while, then scraped inside with a bamboo blade. After further drying, the inner and
outer pot-surfaces are polished with a quartz pebble (Aiyappan 1947: 57–8). It appears
that the Uralis know about the wheels of the immigrant potters, and their ancestors
probably knew of the Malabar ‘tournettes’. Aiyappan considers that the Uralis possess
the requisite technical skill to copy the construction of the wheel ‘but they seem to have
made no efforts at such imitation’. Their possession of an ‘ancient traditional technique’
has precluded acceptance of the wheel. Even so, an important point in the survival of
pre-wheel methods is that the Wynad people prefer their food to be cooked in Urali
pots, rather than in the wheel-made vessels of the immigrant potters (ibid.: 59). This
fact could account in large measure for the retention of a technique used to produce ware
for a significant (though shrinking) market.

A most important consideration in the acceptance or rejection of the potter’s wheel is
the relative efficiency of existing hand techniques. This is a matter which is examined
only rarely in the field. Foster’s material on non-wheel potting methods in Mexico is
exceptional in this respect. Pottery moulds are widely used in Mexico today. There are
two main varieties. The first is the moulds making up two identical vertical halves.
In use, a ‘tortilla’ of clay is pressed into each of the mould-halves, smoothed off, the
moulds joined, and the clay smoothed at the juncture inside. The moulds are removed
after a short while, and the outside of the pot smoothed and polished. Vertical-half
moulds are largely confined to Michoacán State, where they have been studied primarily
by Foster at Tzintzuntzan (Foster 1948b: 356–7). The convex mould, which because it
frequently has a handle is called the ‘mushroom’ mould, is more variable in form, and is
widely distributed in central Mexico. The basic method of use is forming the pot simply
by pressing a ‘tortilla’ of clay over the outside of the mould: the convex side of the mould
shapes the interior surface of the pot, on which patterns are produced from the incised
designs on the mould (idem: 357).

Foster maintains that these traditional hand-forming techniques are highly efficient:
pots can be made ‘more rapidly than by all but the best wheel-throwing potters’. He holds
that on any criterion such as speed, strength of the ware, or artistic quality, Mexican
hand methods, particularly pottery moulds, are much superior to the usual form of the
Indian simple wheel. However, when potters are entering a market economy with less
efficient hand techniques than moulds, the relatively greater attraction of the wheel might
courage its adoption (Foster 1959b: 115–14). In addition, Foster argues that the type
of mould used by potters in Mexico had predetermined their reaction to the wheel. He

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1 There may be a certain amount of confusion over the use of this term. Moulds may be of wood, stone, metal or pottery; in use, clay is rolled out evenly into a ‘pancake’ or ‘tortilla’ and pressed into the mould or over it (Hodges 1965: 27). The American spelling of this, which occurs in some of the quotations used, is mold. Neither mould nor mold should be confused with molde which has a very different meaning. The molde is a Mexican pottery-making unpivoted turntable which is turned by hand (see p. 40).
maintains that mushroom-mould using potters more readily accept the wheel than those using vertical-half moulds. In using the mushroom mould for making the bottom part of the pot, the latter is revolved as strips of clay are added to the top of the vessel. The wheel may be used to speed up this process. ‘Anciently the pot was revolved while being formed; today it is revolved in a more efficient manner . . . the introduction of the wheel did no violence to established procedure.’ But where the mushroom mould is used to complete the whole pot, and/or vertical-half moulds are employed, no rotary process is involved: ‘the wheel, far from being complementary, is incompatible in the extreme’ (Foster 1948b: 368–70).

Two further important Mexican potting devices discussed by Foster comprise the molde and the kabal, which occur in the southern and eastern parts of the country. There is much variation in both types of devices, and mode of use, between different villages. They are both ‘mobile supports for pots’, and turned while the potter sits or kneels during the pot-forming process. But they differ in the ways in which they are rotated.

In some Chiapas villages, pots are formed on a flat circular board which revolves on a larger board. It is turned by the hands working the pot. This is the simplest form of molde. At Coyotepec, the hand-made crude vessel is placed on a convex pottery saucer which balances on a saucer of the same kind which is placed upside-down on the ground. The pot is balanced while working, and turned by hand. The Coyotepec is the most sophisticated form of molde.

The typical Maya kabal is a small wooden cylinder, the bottom of which is rubbed with some lubricator such as wax, and revolves on a board on the ground. The kabal is turned by the toes, or the soles of the feet, and also by hand. No molde is turned by foot (Foster 1959a: 53–5).

The remarkable fact about the Coyotepec molde is that on it, vessels are rotated ‘at speeds comparable to those of the true wheel’. For forming and smoothing the neck of the pot, speeds of about sixty revolutions per minute were recorded. With reference to the technique of the Coyotepec potter Maximino Matec: ‘the momentum of the spin was astonishingly smooth, and it was this momentum that produced the centrifugal force that resulted in a lip as perfect as that of wheel-thrown pottery (ibid.: 55–9). Although the Coyotepec potters do not throw vessels, they ‘come very close to throwing the neck’ (ibid.: 62).

In the use of the Yucatecan kabal, as with the molde there are two kinds of turning motion. The first is slow and serves to keep the pot in a suitable working position. The second type is more continuous and rapid, and used for finishing the vessel. ‘The faster type of movement is somewhat similar to the fairly slow but steady lathelike motion employed by wheel-using potters to “turn” or “tool” already formed pieces.’ At Lerma, where Thompson made his major Yucatecan observation, fast turning is employed for shaping the rim and rounding the lip of the pot, and also for incising horizontal guidelines for the ‘fillets’ (which are applied for decoration), applying the ‘fillet’ and for smoothing the pot-surface (Thompson 1958: 78–9).

Although the above examples of the use of the unpivoted turntable are admittedly

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1 The unpivoted turntable is usually a simple rotary device and Foster states that ‘customarily pots are modelled or built on these supports, which turn very slowly’ (Foster 1959b: 109). In special cases unpivoted and pivoted turntables may be used for throwing part of a pot. For
rather exceptional (e.g. Foster 1959a: 55), they do illustrate the use of non-wheel rotary
device in ways which appear to be as efficient as many uses of the actual wheel. Unless
the full potentiality of the wheel for throwing is exploited, then it has a dubious ad-
vantage over certain efficient hand techniques of forming pottery.

One of the relatively few studies which records accurate timings of the various stages
of pot-making is Guthe’s intensive work on San Ildefonso, New Mexico. Some of the
problems involved in assessing the efficiency of certain pre-wheel potting techniques are
apparent in this study.

Like both Foster (1959a: 56–9) and Thompson (1958: 78–9), Guthe draws attention
to the great variation between individuals in skill. The forming process is briefly as
follows: an unpivoted turntable – which is the base of a broken pot – called puki, is
used as both mould and rotary device. A pancake of clay is pressed into the puki to form
the base of the pot, and the walls are ring-built. In shaping and smoothing the pot it is
turned on the puki, and smoothed with a gourd spoon, kajepe (Guthe 1925: 27–40).

Five to thirty pots are made in the course of a day’s work – the number depending on
the size of the vessel, and rapidity of work. Guthe points out that ‘comparisons between
potters are apt to be misleading, for no two make bowls of exactly the same size or
exercise the same amount of care in finishing, which, from the point of view of time
consumed, is the most variable phase of the moulding’. Maria Martinez, as well as the
most artistic, was seen to be the fastest and most dexterous of San Ildefonso potters,
forming pots a quarter to one-third faster than the slowest of the others (ibid.: 39–40).

Guthe measured the time taken for each phase of pot-making, but the sum of the separate
timings for each process is far less than the total time from beginning to having the
pots ready for sale. Everyday chores constantly interrupted pottery work, and there were
major breaks for fiestas (ibid.: 77).

It is unfortunate that since Guthe’s pioneering of quantitative methods of field docu-
mentation, little has been done in this sphere since, especially outside of south-west and
Meso-America. Such concrete data would have facilitated comparative and analytical
work in pottery technology, which, with the present standard of documentation, is as a
rule difficult.

The speed of some African hand techniques, though not in general accurately recorded,
is remarkable, and would appear to compare favourably with throwing. For example,
using the techniques of tamping in a hollow in the ground, the Sokoto potters were
observed to form the body of round water-pots in three to five minutes each. In the
Yoruba town of Ilorin, in each of some fifty to sixty workshops, potters work together
in family groups. A lump of clay is beaten over an old inverted pot which serves as a
mould, with a clay beater, then rolled with a corncob, and smoothed with the hand. The
bottom edge is trimmed off, then the pot is left while the potter moves on to another.
This is repeated five or six times, using separate moulds, until the pot which was
moulded first is stiff enough to be lifted off. While the pots are drying, the potter prepares
clay for the next batch, then repeats the process. On the next day, the pots are built up
by coiling. They are finished by polishing and the outside is given a red-ochre wash.

example, in Canamos, Philippines, a pivoted turntable is used for imparting the desired shape
and finish to the modelled pot: the turntable appears to be turned with the left hand, but both
hands are used in the final throwing technique (Maye 1967: 202–4 and plate 1).
Pots are fired periodically in a huge communal clamp (Cardew 1969: 89–91). Although the Ilorin potter does all the potting tasks by herself, there is considerable rationalization of the potting tasks, and standardization of the work procedure. As Cardew states: 'pottery making is so highly organized that it can almost be called mass-production by hand. Each individual pot is the work of only one woman or girl, but the quantity produced is astonishing' (ibid.: 89, 91).

The Ilorin methods illustrate the sort of proficiency which can be obtained by ordinary hand techniques. With quantitative data, such evidence would be invaluable in the comparison of efficiency of hand and wheel methods of potting.

Two African cases illustrate some of the problems and disadvantages of changing from traditional hand methods to wheel production of pottery. The suitability of traditional Nigerian pottery has been referred to above (see p. 34). Cardew states that 'contrary to common belief, the potter's wheel would not be a help to the making of the most characteristic types of native ware'. The first reason is that the local clay would need to be refined to make it suitable for throwing; this would add to the cost of the pots, which, moreover, could not be bonfired. The second reason is that many traditional pots are large, and it is not practicable to throw pots of this size (Cardew 1952: 196–7).

Cardew insists that the change-over from traditional to modern production is a complex undertaking: 'an entirely new trade' must be learned by the potters, and one which requires equipment which is relatively elaborate and expensive compared to traditional devices. His policy is to introduce the wheel as part of ceramic development, properly guided, on a broad front. He stresses that introduction of the wheel into a traditional industry such as is characteristic of Nigeria demands directed development of the whole industry – including proper processing of clay, and kilns to fire the thrown ware. He considers that all this is a pre-requisite of the successful introduction and exploitation of the wheel (ibid.: 197; 1960: 47–50).

In Nigeria, lacking this broad approach to the 'improvement' of the traditional pottery industry, previous ceramists had failed. One of the chief reasons for failure was the continued reliance on imported raw materials, rather than local resources. For example, Roberts was of the opinion that 'Mother Nature's West African clay cannot be altered and made more suitable for finer and more durable wares.' Roberts met with no success in his attempt to introduce a variety of wheel into a large potter's compound in Oyo (Anonymous 1934: 54–6).

The second example concerns the Shai potters of southern Ghana. At Agomeda an English-trained potter, not native to the area, uses the potter's wheel. Shai potters have watched him working, and discussed technical details of his craft with him. Yet they do not adopt new methods. Quarcoo and Johnson see that the explanation of this lack of innovation is not wholly explained by the 'natural conservatism of old women who have not had the benefit of modern education ...'

Again, it is important not just to examine the situation with regard to the wheel itself: there are various important considerations of the pot-making methods of the ceramist and the local women potters, from preparing the clay-body to firing the ware. The ceramist levigates his clay (the women wedge their clay and add filler in the traditional manner) and weighs out the quantity desired for throwing (the women use their judgment in taking clay for making coils). Pots are thrown on the wheel in 'a little less time'
than it takes initially to form the pot by hand. No additional treatment is necessary for thrown pots – while the women must smooth and polish theirs. Certain difficult shapes, such as narrow-necked forms, are more easily made on the wheel – but the women potters require virtually no capital equipment, and the ceramist requires both equipment and a person to turn the crank on his wheel. The women fire their pots in a bonfire, for about half an hour. The kiln-firing takes about three days and nights. The kiln also involves capital expenditure. ‘The ceramist argues that his pots are more thoroughly fired, which is no doubt true; but the firing of the Shai pots seems adequate for all practical purposes.’ The short firing time of traditional pots may be connected with the long period of drying allowed by the Shai potters: this is compatible with their own methods, ‘whereas the kiln firing as practised by the ceramist is not’. In addition, the kiln consumes large amounts of wood, and this rate of consumption could not be sustained by local resources on a more extensive scale.

In the authors’ opinion, radical reorganization of the industry would be necessary to adopt the methods of the ceramist. It is doubtful that the women, most of them old, and the backbone of the present industry, would ever be able to learn the use of the wheel; the existing Shai training system would be destroyed; the price of pots would increase. They maintain that the Shai women’s techniques are ‘in many ways . . . at least as effective as his’ (i.e. the ceramist’s). Quarcoo and Johnson see that there is room for a small wheel-using industry, producing shapes that are not easily made by other methods, but in the meantime the traditional industry continues virtually unchanged, and highly competitive in the Ghanaian market (Quarcoo and Johnson 1968: 72–4).

A particular phenomenon which calls into question the advantages of wheel as opposed to hand techniques is that of the replacement of wheel by hand methods of potting. In Algeria, wheel and hand techniques have co-existed for long periods of time without influencing each other. A simplistic interpretation offered by Van Gennep is that groups of wheel-using people have in the past been swept out by aggressors, while groups using other techniques have survived (Van Gennep 1911: 297). In the Rif, Morocco, Coon maintains that ‘the diffusionistic tendency’ has been ‘against rather than for’ the dissemination of the potter’s wheel. In Tarquist, he writes that ‘Wheels have been abandoned in favour of cruder techniques’, which is also the tendency in Bokoya, Benin Tuzin, and Tamsaman (Coon 1931: 75).

The Romans introduced the wheel to many parts of Europe, but after the fall of the Western Empire wheel-production of pottery lapsed in many places in the north-west, ‘and barbarian handmade ceramic traditions revived’ (Jope 1956: 284–9). In his paper on Netherlands pottery, van der Waals documents the failure of the adoption of the wheel, even after its temporary introduction by the Romans. Only in the few centres of military and economic importance was there a great change in economic life, and here there was no gradual introduction to the new ceramic techniques, but drastic reorganization of the industry by ‘immigrant entrepreneurs’. The latter established workshops, where the new methods were employed. Old methods were simply replaced. Away from such centres, however, there was no spur to innovation, and the old methods persisted. On the fall of the Empire, the centres of advanced economic life perished, and ‘conditions were apparently no longer favourable for the making of pottery on the wheel’ (van der Waals 1966: 133–4).
This interpretation is reinforced by Foster's view that the distribution of the wheel in the New World is partly on account of the activities of small-scale entrepreneurs, setting up workshops where apprentices might be taken on and taught new methods. The incentive to accept the wheel would be economic survival: 'If one's livelihood is dependent upon learning a new technique, a greater effort will be made than if it is a matter of personal choice' (Foster 1966: 51).

Two authorities, Tax and Reina, show the socio-economic context of potting to be crucial in the rejection of the wheel in Guatemala. Tax states that 'questions of efficiency' are not the sole factors explaining why many European elements are not assimilated by Indian culture.

Guatemalan potting is a household enterprise. If they wanted to learn to use the wheel, Indian women would have to become apprenticed to a Spanish potter – who would probably not consider taking a female apprentice. Indian women are shy, and do not speak Spanish. Moreover, any woman trained to throw would not be likely to set up business in her native community, and the wheel would remain outside Indian culture. This has happened in the case of wheel-trained Indian males (Tax 1953: 25). In addition, Tax maintains that competition of native with wheel methods is only a theoretical consideration, since an Indian woman's time has no economic value. There is no incentive for saving time by throwing pots (ibid.: 26).

Reina also states that the Chinautleco woman's time 'has little economic value' – 'she sees no use for the time she would save by using a potter's wheel' (Reina 1966: 67). In Guatemala traditional hand-forming potting methods are normally used by the Indians; Chinautlecos continue to coil-build their pottery.

Having discussed a wide variety of cases with regard to the acceptance and rejection of the potter's wheel, and attempted to determine some of the main factors involved in this process, I will now briefly discuss modifications and variations in this potting device.

*Innovation and non-innovation in the type of wheel used*

The relatively sophisticated wheels used in modern studios, craft-schools and small potteries – generally some variety of kick- or power-driven wheel – have varying characteristics which render them appropriate for different purposes (Cardew 1969: 217–27). It is probable that similar limitations apply in the case of the wheels used in small-scale societies. However, there is little detailed or accurate information on this topic.

One important consideration is the relationship of traditional wheel methods to the requirements of the industry in general; this subject is discussed by the Freeds with reference to a village in the state of Delhi.

In Shanti Nagar a wide range and large quantity of pottery is produced and consumed (Freed and Freed 1963: 39–41). The simple wheel, and paddle-and-anvil technique comprise the traditional pottery forming process. The authors maintain that these techniques are better suited to the type of clays which are utilized, and the low firing temperatures, than use of 'the double-disc, kick-wheel' (ibid.: 34–5).

The Freeds' conclusion on the predominance throughout India of the simple wheel and paddle-and-anvil technique is as follows: 'This process provides a cheap, utilitarian ware sufficient for the needs of the villagers, and at the same time suitable for the avail-
able secondary clays and firing techniques. We suggest, therefore, that it better suits conditions in village India than does pottery manufacture on the double-disc, kick-wheel upon which pots are thrown and finished’ (ibid.: 42).

Behura suggests that problems of customary working position have been important in the rejection of what appears to be some type of kick-wheel in parts of South India. These wheels, made of iron, were introduced by the Khadi and Gramodyog Commission, and not adopted by the local potters. Even in the Industrial Cooperative Society workshops, the new wheels were not used. The use of the traditional pivoted block wheel still continues: in using these the potter ‘squats on the ground and shapes pots without any discomfort’. With the new type of wheel the potter has to lean on the wheel with his legs apart, ‘which is undoubtedly a strenuous job for those potters who are never accustomed to it’ (Behura 1967a: 37).

Learning to throw pots skilfully is a fairly long and difficult process, and it is understandable that a potter will be reluctant to adapt to working on a wheel of different type. Behura stresses that South India potters ‘can be good and efficient potters’ only with their own devices. He maintains that it is easier to train the young son of a potter than the mature potter, but the son tends to follow the example of his father from an early age (ibid.: 37).

In Haut-Berry, central France, a new type of wheel was accepted by the potters, but it permitted the continuance of the traditional style of throwing. Formerly, they used a variety of simple wheel, with an oak wheel-head, and an iron rim about four feet in diameter, which was revolved with a stick.1 Traditionally, the potter sat above his wheel, with his feet resting on two planks. About half a century ago electricity was introduced to the area, and used for powering potter’s wheels: ‘But the system of having the wheel-head not more than a foot above ground level has stayed.’ The pots are still ‘pulled up’, instead of the more usual method of ‘pushing up’ which is associated with the kick-wheel (Hanssen 1969: 8).

Reports as to the efficiency of the Indian simple wheel are highly variable – perhaps this partly reflects differences in the efficiency of wheels of the same general type. Most accounts are impressionistic rather than objective. Balfour referred to the high quality of pots thrown on the simple wheel, though it is probable that he was inadvertently extolling the virtues of paddle-and-anvil treatment (Balfour 1857: 1505). Holder considered the Madras simple wheel a ‘clumsily constructed and defective apparatus’. Among its disadvantages were the following: (a) its size (?) which forces the potter to bend over it awkwardly, (b) its irregular speed of rotation, with tendency to wobble, and (c) the waste of time and effort when it slows down. Nevertheless, Holder admitted that ‘the natives are expert at throwing’, and some delicate, thin wares are produced. He maintained that the accompanying paddle-and-anvil technique was ‘long and tedious’ (Holder 1897: 7–10). Several other authors place emphasis on the oscillation of the simple wheel, and the inconvenience of having to impart fresh momentum to the wheel with the aid of a stick. Mackay points out that large pots slow the speed of the wheel, and at slower speeds, the wheel has a wobbling tendency ‘which makes it difficult to mould the vessel perfectly true’. The Sind kick-wheel does not have these drawbacks, and its design

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1 This appears to be the same type of wheel as that used in Brittany, and illustrated by Scott (Scott 1954: 389) and also the type from Normandy, illustrated by Leach (Leach 1967: 68).
enables the potter to get closer to his work on the wheel-head (Mackay 1929: 127). In general, this material is suggestive for future lines of investigation, rather than of use for comparative or analytical purposes as it stands.

Hallifax drew attention to some of the advantages of the simple socketed wheel, ram chak, in the Punjab, where both simple and kick-wheels exist. The chief advantage of the ram chak is that it is cheap, and easily moved to wherever it is desired. The relative advantage of different types of simple wheels is related to the factors of durability and cost: a wooden wheel lasts for about twenty years, and costs one rupee. A clay wheel costs nothing to make, but only lasts for five or six years (Hallifax 1894: 36). The same two factors are relevant in the case of the simple, socketed wheels of the North-western Provinces, which are made of clay, wood and stone respectively (Dobbs 1897: 3–4).

In Crete, the potters of Thrapsanos continue to use two types of wheel: the simple pivoted type for making large pithoi, and the kick-wheel for throwing smaller vessels (Xanthoudides 1927: 121–3). These varieties of wheel have been used since ancient times. Oscillation of the simple wheel has been eliminated by a horizontal cross-bar (Foster 1959b: 106).

Using the simple wheel, the master potter makes about ten pithoi per day. He uses a combination of building the pots up in sections, and throwing. The wheel is turned by an assistant by hand (ibid.: 124–5). This device appears to have been retained because it is an efficient way of making the traditional large vessels which have remained virtually unchanged since the Bronze Age.

The Chinese and Japanese ‘hand wheel’ (Leach 1967: 68) is an advanced variety of simple wheel in which oscillation is prevented by a cylinder extending from the socket to provide an annular bearing near the base of the pivot (Childe 1958: 197).

In operation this wheel is turned by the thrower inserting a short stick into a notch in the heavy wooden head. A small pot may be thrown after the momentum has been given once only, but in throwing a large pot, the momentum must be continually renewed. ‘In spite of this apparently laborious method, the day’s output of an Oriental thrower compares favourably with that of our own in the West.’ Leach emphasizes a particular advantage of this type of wheel: viz. the potter can keep his head and body still for throwing delicate shapes and turning the bottom of pots (Leach 1967: 68–9).

The main aim of this section has been simply to demonstrate that whenever possible the use of the potter’s wheel or its failure to be used, should be considered with reference to a potentially wide range of both cultural and technical factors. The rejection of the wheel, and the refusal of wheel-using potters to modify or replace a traditional in favour of a more ‘advanced’ form of wheel, can now be seen in terms other than the supposed natural conservatism of non-industrial potters.

In particular I have drawn attention to the advantages and relative efficiency of existing non-wheel and wheel devices and techniques. Throughout, I have emphasized the limitations of this type of approach because of the poor documentation at present, especially in quantitative terms, on hand potting methods, and the surprising degree of ignorance about the different varieties of the wheel, which one authority believes to be ‘one of the most peculiar and intimate devices which human beings have invented’ (Leach 1967: 66).
Conclusion

First, particular attention must be drawn to the ethnographic evidence of the exchange of pottery, frequently involving its carriage and transport over long distances. Some communities are virtually totally dependent upon imported pottery, and the economies of other communities may be dominated by the export of this commodity. It would appear that in the past the fragility of pottery and problems of transportation have been overemphasized. Archaeologists have traditionally relied upon stratigraphic deposits of pottery as a means of establishing connections between peoples of different regions and different cultures. However, it would appear that the possible importance of transport of pottery has until recently been underestimated by some archaeologists. Examination of thin sections of pottery from a British Neolithic site suggested that some of the ware was brought from elsewhere: 'We can no longer assume that, because it may appear to us excessively fragile, prehistoric pottery was never transported. . . . In any study of ceramic change involving social contact the exchange of pottery itself is a fact, now established, that we can no longer afford to ignore' (Cornwall and Hodges 1964: 33). The ethnographic evidence suggests that incentives other than strictly economic ones are sometimes prominent in the exchange of pottery – as in the case of the Motu and the Nicobarese, where the sailing expeditions are important institutional activities in their own right. It should not necessarily be presumed that archaeological evidence of the exchange of pottery represents the occurrence of so-called 'trade'.

Some authorities have explicitly been aware of individual potters of exceptional talent and the possible importance of this type of person in ceramic changes in the past. For example, Kidder maintains that it is conceivable that 'some of the striking mutations in pottery making, which have so puzzled archaeologists', may have been brought about by stimuli such as the discovery of superior clay deposits acting upon 'the genius of prehistoric Marias and Nampeos' (Kidder 1925: 15). With reference to the Papago Indians' remarkable ceramic innovator Laura Kerman, the question is asked: 'Is there any reason to suppose that other cultures in the past might not have had similar individuals?' And the answer given: 'We think that they did; and we point to Laura's tremendous range of possible pottery types to warn the archaeologist who would try to infer too much from technological differences in sherds' (Fontana et al. 1962: 116).

Despite the proverbially inherent conservative nature of the craft of pot-making, and the disposition of potters, the factors which seem to propagate stability in such aspects of pottery as materials, techniques, and forms are engendered by static economic and other conditions. Changes in these conditions often give rise to changes in the aspects of pottery manufacture referred to above. However, the complexity and variability of these factors should not be underestimated.

Archaeological notions of cultural development which postulate the occurrence in the past of events such as invasion to account for the replacement of one series of pottery types by another would appear in many cases to be highly simplistic and misleading, in view of the range of factors (excluding invasion) which are known to precipitate ceramic change in ethnographic pottery manufacture. As Clark points out, 'invasions and intrusions' may have occurred in the past, but rather than assume their existence they must be demonstrated from the evidence available (Clark 1966: 172f.).
It seems that the differences between hand and wheel techniques of pottery making are not so great as they once appeared to be, and that there is a gradation of intermediate processes. Production of pottery on the wheel can no longer be taken to signal major socio-economic advances. More efficient production of pottery, which was thought to stimulate commercial development in pottery production and the wider economy, is not necessarily concomitant with adoption of the potter’s wheel. Foster writes: ‘I am inclined to believe that the commercialization of pottery-making is a function of a growing population and trade specialization, and that the presence or absence of the wheel in this process is purely fortuitous’ (Foster 1959b: 113).

There are still proponents of the pre-Foster view of the significance of the potter’s wheel, or at least there were so until recently. Woolley points out that ‘machinery’ such as the potter’s wheel enabled greater efficiency of production; for Woolley, the wheel is ‘the first really mechanical device, ushering in a new age . . . ’ (Woolley 1963: 577–8). According to Neumayer: ‘The discovery of the potter’s wheel is one of the great achievements of the human spirit. It facilitated the manufacture of good clay vessels which served at first for all kinds of daily needs’ (Neumayer 1967: 5).

Remains of pottery have always tended to be prominent in the archaeological record on account of its great abundance and variety in many cultures, its exceptional preservation qualities, and its fragility which ensures a constant stream of sherds. It is thus not surprising that archaeologists have attempted to extract the maximum amount of information from pottery. Its chief attribution is its sensitive registration of cultural change; pottery is held to have ‘no equal as a horizon marker’ (Adams 1968: 197–8).

Comparative investigation of the ethnographic data on pottery manufacture has demonstrated and extended the range and complexity of possible factors represented in different situations of ceramic change. I hope to have performed a timely stock-taking service, in which attention has been drawn to certain serious inadequacies in existing ethnographic pottery studies. Today, the situation is indeed urgent in view of a certain piece of ‘writing on the wall’: ‘comparatively little primitive pottery is being made in the mid-twentieth century, owing to improved communications, and the opening up of vast tracts of land in Africa and elsewhere, and the interest of this section (on primitive pottery) tends to be historical’ (Ency. Brit. 1969: 343).

For list of references, see page 94.

Abstract

Nicklin, Keith

Stability and innovation in pottery manufacture

The ethnographic evidence of long-distance transport and the effects of market demand are examined. The efficiency of various methods of production; the stimulus provided by the individual potter; the cultural significance of some methods of pottery manufacture; and the results of non-economic sanctions are all shown to cause or inhibit innovation in ceramic technology. The use of the potter’s wheel, and similar devices, and the reasons for its adoption or rejection are discussed.