TECHNOLOGY AND STYLE: POTTERS AND POTTERY AMONG BAFIA OF CAMEROON

OLIVIER P. GOSSELAIN

Musée Royal de l'Afrique Centrale, Tervuren

In archaeology, the stylistic approach to artefacts is most often restricted to parameters which are considered to be completely free from any non-cultural constraint. This view also prevails in pottery studies where the stylistic parameters traditionally used are limited to those of decoration and morphology. Another common conception is that technological processes in pottery are so strongly governed by environmental and functional constraints that little scope remains for stylistic expression. In this article, I refute this view, by detailing and analysing successive stages of pottery production among Bafia potters of Cameroon, and by comparing their technological process with other technological processes in both neighbouring and more distant groups. The results show that pottery technology can be the locus of stylistic expression. Moreover, some stages of the manufacturing process appear to be more salient than others as indices of cultural variation, because they are both insensitive to innovation and grounded in specific patterns of learning.

Introduction

The cultural approach to technological systems has been largely developed by anthropologists, especially in France (Creswell 1972; Digard 1979; Lemonnier 1976; 1983; 1991; Leroi-Gourhan 1943; 1945). Surprisingly, it has not been a major topic of interest to archaeologists even though the objects of their investigations – artefacts – are, as the word denotes, the results of technological processes. Except for some rare examples (see for instance Balfet 1973; Childs 1986; Lechtman 1977; Lechtman & Steinberg 1979), only the finished object has been the focus of cultural study and not the action leading to its achievement.[1] This situation may to some extent be explained by methodological and theoretical limitations within the discipline, indeed without the contributions of experimental archaeology, ethno-archaeology and archaeometry, the study of technological behaviour would have had few opportunities to develop and to become integrated into archaeological discussion. In fact, technological processes only became of interest to archaeologists when their methods allowed these processes to be identified from the artefacts themselves, and this is quite a recent development.

Identifying technological behaviour is not of course an end in itself; it needs to be interpreted and situated within a cultural framework. Nevertheless, the formulation of relationships between technique and culture, as anthropologists conceive them, has remained quite vague. Depending on the nature of the

technological system under consideration, and especially on the theoretical point of view of the investigator, technology may be seen to have an impact on culture (Creswell 1972), or technology and culture may be regarded as influencing one another (Digard 1979; Lemonnier 1983; 1991), or raw material and function may be supposed to have an impact on technology (Leroi-Gourhan 1943; 1945). These different perspectives, which cannot be reduced to a simple set of contrasts, all have at least one important notion in common: that of *choice*, or *option*. This notion has been developed in particular by Lemonnier, who speaks of variants, defined as 'different ways of doing the same thing' (1983: 17). This means that, in every technological system, there are no external constraints sufficiently tight to allow only one, or at the most, a few options which would *dictate* the patterns of the system (i.e. the nature of its elements and their interrelationships).

This observation is important because it leads us to the concept of 'style', a concept which is curiously absent from the French anthropological literature and rarely used by archaeologists concerned with technology. In other areas of archaeological study, however, style is a consistent preoccupation, as revealed by the number of publications aiming to define its characteristics and potential applications to archaeological problems (Plog 1983; Sackett 1977; Sterner 1989; Wiessner 1984; Wobst 1977; for a recent survey see Conkey 1990). But the definition recently proposed by Sackett (1990) seems quite appropriate to the problem to be considered here: from an 'isochrestic' point of view, style would be present whenever there is a *possibility of choice between equally viable options*. If there are no or few viable options, there is no style but only *tendencies*, as defined by Leroi-Gourhan.

> Style enters the picture when we see that the artisans of any given fraternity (or sorority) are aware of only a few, and often choose but one of the isochrestic options potentially available to them when performing any given task, and that the choices they make are largely dictated by the technological traditions within which they have been enculturated as members of the social groups that delineate their ethnicity (Sackett 1990: 33).

This link between style and technology might look trivial were it not that style plays a leading role in the reconstruction of past societies. In assigning as much weight to the discussion of technological systems as to the classification of the resulting artefacts, the stylistic approach to archaeological phenomena may become more relevant, as I shall show. This means, however, that the existence of style in technological behaviour must be recognized. As Lechtman has remarked, 'What we haven't seemed to recognize or at least paid much attention to is that the activities themselves which produce the artefacts are stylistic' (1977: 5).

As regards pottery technology, which I discuss in this article, only Dietler and Herbich (1989) have attempted a stylistic approach to technological process, or *chaîne opératoire*,[2] comparing a number of potters' communities among the Luo of Kenya. These authors show that the different choices made during each stage of the manufacturing process result in regional micro-styles. Nevertheless, their analysis is primarily directed against Wobst's functional definition of style as a strategy of communication (1977), and they adopt the concept of technological choices as a *fait accompli*. This concept, however, is far from being generally accepted by ceramologists. In the rare comparative attempts to use ethnographic evidence, the chapter on technology is typically reduced to its most basic form

(Kramer 1985), or is limited to a catalogue (Drost 1967), or else technology is considered from an essentially deterministic point of view according to which environmental and functional constraints prevail (Arnold 1985; Rice 1987). Although not always openly stated, this last approach, which entails an identification of the reasons underlying technological diversity and similarity, is derived directly from the work of Leroi-Gourhan (1943; 1945). But to give too much weight to external constraints on the *chaîne opératoire* is to deny the existence of equally viable alternatives, considering each technological process as a more or less successful local adaptation. Little scope, then, is left for stylistic expression.

The observation of manufacturing processes on a micro-regional scale often reveals, however, a great deal of variation, which can only be explained in cultural terms (see David & Hennig 1972; Dietler & Herbich 1989). Moreover, as Lemonnier (1986; 1991) has clearly shown, a *chaîne opératoire* cannot operate independently of the society that produces it (1991: 16). Therefore, for pottery as for any other kind of artefact, stylistic evaluation requires that the range of possible technological choices be identified. As Lechtman and Steinberg put it: 'If we claim that technologies are totally integrated systems manifesting cultural choices and values, what is the nature of that manifestation and how can we "read" it?' (1979: 130).

In the analysis below, I attempt to evaluate that manifestation in detailing the pottery technology of a Central African Bantu society, and in comparing each stage of the manufacturing process with corresponding stages observed in both neighbouring and more distant groups. This will enable us to isolate a series of technological choices that could have been made, and to evaluate the reasons underlying some of the choices which were made. The comparisons may appear superficial and may fall short of expectations; my analysis, however, remains preliminary.

The material I adduce is drawn exclusively from sub-Saharan Africa, essentially because I am more familiar with this part of the world, but also because previous comparative studies (Arnold 1985; Kramer 1985; Rice 1987) have largely neglected the potential of this material. Moreover, De Crits (1991) has recently produced a cross-cultural compilation of sub-Saharan pottery production systems from a stylistic point of view. His data, much more complete and better organised than those of Drost (1967), allow for a new approach to the analysis of pottery technology in this region.

Ethnographic background

The Bafia live in Central Cameroon in an area bordered to the east by the Mbam river (a tributary of the Sanaga) and to the west by the Bapé mountain, between 4°35' and 4°52' N and between 11°0' and 11°20' E (fig. 1, and Leiderer 1982: 19). The region is characterized by a savanna environment, probably of anthropic origin (Kuete 1989), with patches of woodland and gallery forest along water courses. The substratum consists of gneiss, mica schist, quartzite and granite with rivers and swamps frequently containing beds of clay (Leiderer 1982).

According to Dugast (1949) and Guarisma (1967; 1973), Bafia name themselves Bekpak, and include Beké and Bekpak groups. Both groups speak *rikpak*, a

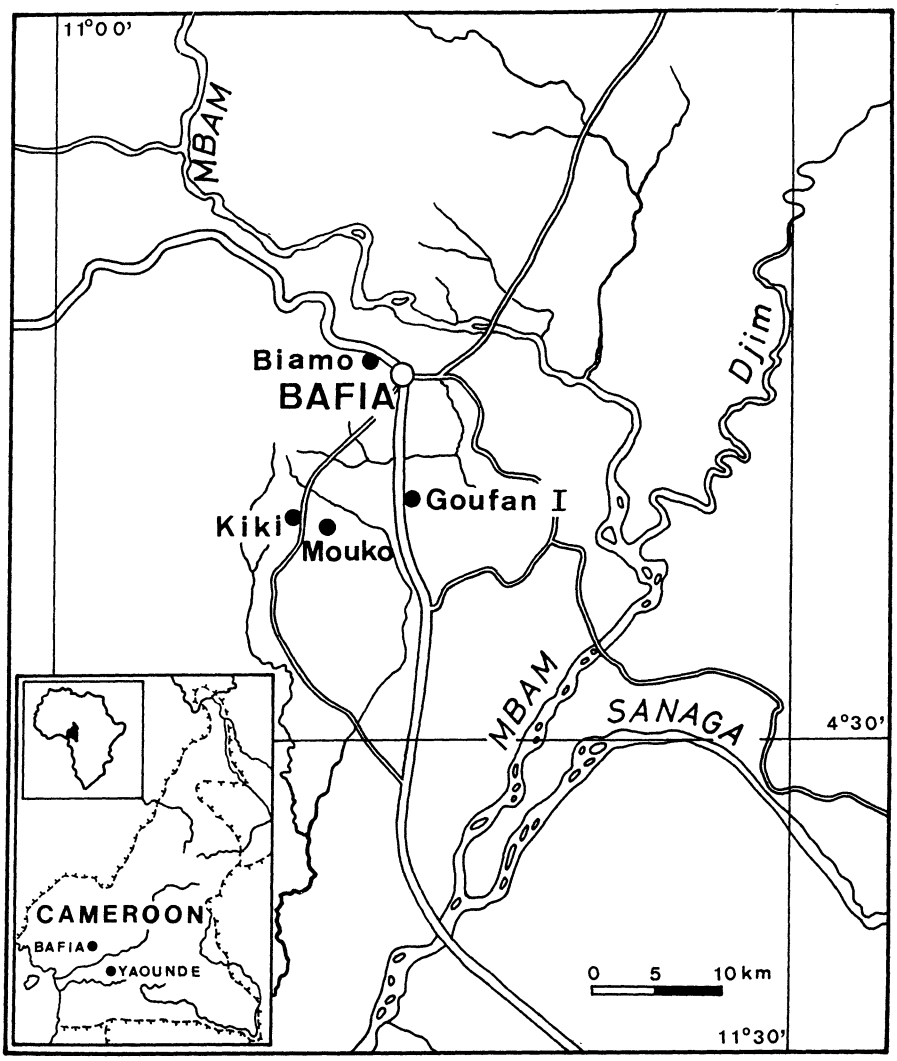

FIGURE 1. Map of the region inhabited by Bafia and the positions of the villages mentioned in the text.

Bantu language classified A53 by Guthrie (1948). They are essentially farmers. Their villages stretch along roads and tracks. Traditional huts are rectangular and have a palmfrond roofing. Today cement houses and corrugated sheet roofs dominate the picture, especially in villages near tarmacked main roads.

The potters

I conducted a series of enquiries among Bafia in summer 1990 and spring 1991, as part of an interdisciplinary research programme on pottery technology. Observations were made of seven potters in four villages (see fig. 1 and table 1): Biamo, Kiki, Mouko and Goufan I. Two other potters were contacted at a fifth village (Bouraka), but no technological observations were made here.

TABLE 1 Information on the Bafia potters whose work was studied (except the last two). The code name in the first column is used in the text to identify each of the potters.

Code name	*Village*	*Potter*	*Age*	*Place of birth*	*Learning age*	*Teacher*
OUF.01	Goufan I	Ma Ndjama	62	Kiki	Child	Grand-mother
KIK.01	Kiki	Guibang M-L	± 55	Kiki	Adolescent	Mother
KIK.02	Kiki	Belek A.	58	Kiki	Child	Aunt
KIK.03	Kiki	Gomoko M.	40	Kiki	Child	Mother
KIK.04	Kiki	Kouba M.	63	Kiki	Adolescent	Second wife of the father
BIA.01	Biamo	Makae à Babang S.	± 40	Biamo	Child	Mother
MOU.01	Mouko	Dang Amoumbo A.	60-70	Kiki	Adult	Mother-in-law
-	Bouraka	Koss	± 50	Kiki	-	-
-	Bouraka	Assen P.	± 50	Kiki	-	-

Although domestic pottery production among Bafia is mainly a female activity, it is not prohibited to men. For instance in the village of Kiki, at least two men used to make pottery, but had ceased because of lack of time. In both cases their mother had been a potter. The possible association of men with pottery is reinforced by the story of its origins, told to me by an old healer from Goufan I: in a dream a man received the technique of pottery from an ancestor. He transmitted it to a man of his family who, in his turn, taught it to his brothers. Faced with this, one may wonder whether the habit of considering pottery in sub-Saharan Africa as an essentially female activity (from a survey of 215 ethnographic accounts, the artisans are said to be women in 86 per cent. of cases [De Crits 1991: 21]), is not, at least in part, the result of superficial observation. As I shall show, the preponderance of women among potters in a society such as that of Bafia may have another explanation than that it is due to ritual restrictions or an arbitrary sexual division of labour.

Moreover, contrary to what is often observed in West Africa (Barley 1984), anyone under any circumstances is allowed to produce pottery. As with most Bantu societies, Bafia have not assigned a particular status to the artisan. The only preconditions for becoming a potter are first, to find someone who is willing to teach the technique, and secondly, to show a certain skill right from the start. As revealed by my observations, the learning process, when it takes place during childhood or adolescence, is always supervised by a female member of the family (mother, sister, grandmother, aunt, second wife of the father) in the native village. In only one case did the learning process take place in adulthood after marriage, under the supervision of the mother-in-law in the village of the husband (see table 1). Since nobody learns the technique nowadays, it is difficult to obtain a clear idea of the learning process. When asked about this, potters explain that they started by assisting their teachers in extracting, transporting and

pounding the clay (operations that involve more physical strength than skill or thinking), and were progressively initiated into the shaping, decorating, drying and firing processes. For instance, when learning the shaping process, all their clumsiness was immediately corrected. It is important to stress that this kind of learning always involves a close relationship with an expert, and is never attempted individually.

In economic terms, although pottery is a specialist affair, since it is something only a few women can do, it is not a *craft* specialisation, at least according to the imperfect definition still prevalent in archaeology (Rice 1987: 188-91). It is more a form of domestic production, with every potter occasionally making pots for her own needs, sometimes to order, and sometimes to sell on the market when in need of money. Like all other women, the potters are primarily concerned with their fields, spending only their rare moments of leisure in potting. This may be due to the weak economic returns of this activity nowadays, and there is nothing to indicate that this has always been the case.

In fact, potting is presently becoming obsolete in the Bafia area, as elsewhere among most of the groups in Central and South Cameroon. At the time of my enquiries, only five potters were still producing pottery: at Goufan I, Kiki, Biamo and Bouraka. Four other women, at Kiki and Mouko, were willing to reproduce pots; one of them had ceased potting some twenty years previously. Several other women claimed they had once been potters, yet absolutely refused to touch clay again. Their reluctance is understandable in the light of the effort involved in producing pottery for which there is hardly any market. Nowadays Bafia use plastic, aluminium or glass containers, and the only potential customers for pottery are people from towns such as Bafia, Yaoundé and Douala, who sometimes buy it for ornamental purposes.

Apparently, however, Bafia used to have a reputation for pottery. According to many elders, the technique was invented in the village of Kiki. When they were young, almost all women of the village produced pottery and each time a woman would leave to marry in another village, she would take along the technique. Three facts seem to corroborate this recollection: (1) most potters in the Bafia area live in the village; (2) the potters of Goufan I, Bouraka and Mouko all come from Kiki, and (3) the area of the village has apparently the richest concentrations of suitable clay in the region.

The process of pottery manufacture

Selection of raw material. Bafia potters do not keep a reserve supply of clay (*fyòò*) at home. Each time they produce pottery, they first have to set out to procure the raw material. In fact, fresh clay is ready for use and loses its plastic properties the longer it is kept.

Clay-pits are never very far from the potter's residence. With the aid of a pedometer I measured distances ranging from 200 to 1200 meters, which corresponds to the most frequently occurring distance to clay sources as calculated by Arnold (1985: fig. 2: 5) for domestic pottery production. At Kiki, clay is found in a cultivated swampy area bisecting the village. I observed that the substratum contains numerous pockets of clay which occur at least one metre below the surface. The clay at Mouko, a village about one kilometre away, is found in

similar conditions. At Goufan I and Biamo, clay is extracted in cocoa plantations, on the banks of a small river or in damp depressions.

The locations of sources of clay are apparently closely linked to the daily activities of women. Whilst labouring out in the fields or making earth dams in rivers for fishing, the potter may find clay and will test its suitability. The first criterion is its colour: each potter considers a particular clay suitable according to the preferred colour, which varies from potter to potter (grey, beige, blue or green). Next, the workability is tested by taking a handful of clay and kneading it for a while in order to assess its plasticity (i.e. whether the clay is sticky enough and not too sandy). If the clay meets these two criteria, the potter makes an experimental pot whose strength, after firing, will determine whether or not the new source of clay will be exploited.

The tests of plasticity that I performed in the field (see below for details), and the chemical and mineralogical analyses of the different clays used by the potters (Impedovo 1991), clearly indicate that there is no specifically preferred clay type and that the range of selection is quite broad. The most important desideratum is that the clay should be plastic enough for immediate use, meaning not too wet or sandy. This is probably a cultural choice, since among other populations, such as Gbaya and Kaka of East Cameroon, I observed the systematic selection of clays similar in water and sand content to those usually disdained by Bafia, even though their environment provided clays similar to those chosen by Bafia. In order to be able to use the clays they selected, Kaka and Gbaya potters were forced to let them dry, and then to pound, sieve and wetten them again. These, and a number of other observations that I made among some twenty ethnic groups in Cameroon, seem to indicate that, regardless of the specific properties of the raw material, there is a basic contrast between the selection of clays whose plasticity needs to be increased, and those for which it needs to be decreased, prior to processing. As far as I observed, these different choices have nothing to do with local pedological contexts, but seem to be determined by the technological knowledge of the artisan.

To test for any possible relationship between the choice of raw material and the nature of the shaping process (Franken 1971), I conducted an experiment with the potter from Goufan I, in bringing her a clay collected from a Banen potter (a neighbouring group of Bafia) whose manufacturing technique is completely different (see Dugast 1955). She immediately shaped it into a pot, without any problem.

Clay extraction. The actual extraction of the clay always proceeds through the same stages: first the water is bailed out of the hole, and leaves and other organic litter on top of the clay layer are removed. Next, pieces of clay are taken out with a hoe (fig. 2: 1), kneaded and cleaned of dirt that may be mixed in them (this, as the potters say, is to prevent pots from exploding when fired). The clay is then transported to the village but, since the procurement operation is considered to be very exhausting, no potter would ever start the manufacturing process on the very same day.

Potters claim that the clay-pits are not their personal property. Nevertheless, except for KIK.02[3] and KIK.03 (who constantly worked together), each of the potters I observed used a different source.

A series of taboos are directly linked to the process of extraction: (1) never extract clay with the aid of a matchet, otherwise pots will crack whilst drying; (2) a pregnant or menstruating woman cannot extract clay, otherwise pots will explode when fired or the clay source will dry out at once; (3) sexual intercourse is prohibited on the eve of extraction, otherwise pots will explode when fired; (4) when a place is found which yields suitable clay, it should not be said to yield a lot, otherwise the clay will become jealous and disappear.[4]

Of these taboos, the first and second were common to the majority of the potters, the third was cited only by OUF.01, and the fourth only by KIK.01. Potter BIA.01 claimed not to be aware of any taboos.[5] Despite this, every potter is convinced that the others respect exactly the same taboos as she does. When told that this was not so and that certain potters manage to produce pottery after having entered the claypit with a matchet or having had sexual intercourse on the eve of extraction, they were not amazed at all, explaining that what restrictions are to be respected is basically an individual affair. The important thing is to respect the taboos they were taught at the time they learned the manufacturing technique, from which the restrictions are inseparable.

In general, Bafia explain that each family has its own taboos, transmitted from generation to generation, although some are shared by the entire society (for instance the taboo on touching or eating turtles). The taboo linked to the matchet could be explained in symbolic terms, since among Bafia, as among a large number of Bantu speaking agricultural societies, this tool is closely associated with men. But this remains questionable since men are allowed to produce pottery and to be present when the clay is extracted.

The restriction preventing pregnant or menstruating women from extracting clay is systematically reiterated among some twenty other Bantu or Bantoïd groups of Central, Western and Eastern Cameroon, with whom I have had the opportunity to work.

From a functional point of view, these taboos apply to only three stages of the production sequence: the extraction of a suitable clay, the drying and the firing. These are precisely the stages that do *not* involve any manual skill on the part of the potter, and therefore cannot be controlled directly. They depend essentially on external parameters which can hardly be mastered given the potters' technological knowledge: these include the geological properties of the local environment, the nature of the raw material, meteorological fluctuations, the nature of the fuel and fluctuations in firing temperatures. Although, as we shall see, potters can achieve indirect control over some of these parameters through experience, they all resort to additional safeguards – the taboos – in order to ensure the success of the entire production process.

Treatment of raw material. The fresh clay is ready for use and does not require any other treatment than an intensive pounding. This, however, is considered essential because it homogenizes the clay and prepares it for the forming process. The potter puts the clay in a piece of trunk of the *ìtón* tree,[6] *Erythrophleum suavolens*

(fig. 2: 2), or on a flat stone (*rìkém*) identical to the grinding stones still used for grinding cereals. After having sprinkled a little water (in order to prevent the clay from becoming too sticky), the potter pounds it vigorously with the back of the haft of a hoe (fig. 2: 3). Both the hoe and the grinding stone are tools used only by women and the entire operation is strongly reminiscent of the daily preparation of meals (especially of couscous of maize or manioc which also needs pounding).

Clearly, after this pounding the clay is much more homogeneous, but this is not the only result. I observed and measured, with the aid of a standard shear device (type Thorvane),[7] a systematic decrease of plasticity, to the advantage of better workability. The results are significant (table 2). Moreover, at the start the

TABLE 2 The shearing strength of clays used by potters before and after pounding. Results are expressed in grammes per cm^2.

Potter	*OUF. 01*	*KIK. 01*	*KIK. 02*	*KIK. 03*	*KIK. 04*	*BIA. 01*	*MOU. 01*
Clay before pounding	340	350	280*	280*	500	330	290
Clay after pounding	140	150	135	170	180	100	160

* Both potters use the same clay

difference in shearing strength between the clays used was up to 220 gr/cm^2, but after pounding the difference was reduced to 80 gm/cm^2. In other words, the initial plasticity of the selected clay does not seem to matter, so long as it is above a certain threshold (which in terms of shearing strength can be estimated at around 100 gr/cm^2 in this case). Pounding is sufficient to obtain a suitable workability which is much the same for all potters. Other tests of shearing strength carried out among groups using different shaping techniques, however, also yielded results mainly between 100 gr and 200 gr/cm^2. This would indicate that there is no particular relationship between the workability threshold and the shaping technique involved. The most important difference, as I have already emphasized, concerns the initial plasticity: because of their technological knowledge when treating the raw material, Bafia can only select those clays whose plasticity is greater or at least equal to that needed for the shaping process.

The shaping process. Generally speaking, the forming technique is that of coiling. Observations in other groups (Gosselain 1991) have, however, revealed that a refinement of technological definition is necessary, as this very technique is subject to considerable variation.

The potter first takes a small handful of clay which she will knead between her fingers, removing coarser inclusions. Next she rolls the clay between the palms of her two hands, until she obtains a coil of some thirty centimetres long and some five centimetres thick (fig. 2: 4). On average the potter makes fifteen of these coils, which she puts at her feet on a leaf of teak or banana tree. She then takes a coil and places one end against the palm of her left hand, crushing it progressively in an opposite rotating movement of her two hands, until a kind of small concave cap is formed in prolongation of the coil (fig. 2: 5-7). At this stage, the shape is

1. Extracting the clay.

2. Placing the clay in the *ìtón* tree trunk.

3. Pounding.

4. Forming a coil.

FIGURE 2. Manufacturing process.

5-7. First shaping stage.

8. Adding a coil.

9. Scraping the outside wall with a palm-tree stem.

that of an eccentric mushroom. Within a few seconds the potter enlarges and deepens this small bowl, pressing the remainder of the coil against the already existing wall. She thus obtains a calotte of some ten centimetres in diameter and height, which she puts into a shallow circular sherd of appropriate size, on top of a leaf of banana tree or teak. It is placed on her knees and permits her slowly to turn the vessel during the entire manufacturing process.

The walls are mounted by successively adding pressed coils, with half of their width overlapping the upper part of the inside of the vessel (fig. 2: 8). This is not a vertical superposition but a horizontal side-by-side joining. The length of the operation and the number of coils depend on the size of the vessel.

Next, the potter takes a scraper made of a palm-tree stem (fig. 4: 2-3) and starts scraping the outer wall, to make it thinner, more regular, masking the joints between the coils (fig. 2: 9). Once this work is done, she scrapes the inside with a fragment of calabash, carefully shaping the curve of the body (fig. 3: 1, 4: 1). She repeats the former scraping operation, and then the latter, from time to time adding a lump of clay where a crack appears or where the wall is too thin.

In most cases the potter carefully thickens the lip into a one-centimetre-thick square section (fig. 3: 2). She then takes a leaf of the *rìkùm* tree (*Ficus thonningii Blume*) or of a banana tree, folds it into a small rectangle, and places it onto the rim, overhanging the wall on both sides. The potter holds it between her thumb at the outside and second finger on the inside, keeping her forefinger firmly pressed in the middle on the horizontal part of the lip (fig. 3: 3). Whilst the pot is turned rapidly, the lip becomes slightly everted with a marked shallow depression in its middle. This rim shape is a distinct characteristic of Bafia pottery.

After that, the pot is carefully smoothed with the flat part of a scraper. The inside and the neck receive special attention, whereas on the outside only the upper part of the body is smoothed.

1. Scraping the inside wall with a fragment of calabash.

2. Thickening the lip.

3. Shaping the lip with a leaf of the *ríkúm* tree.

FIGURE 3. Manufacturing process (continued).

4. Decorating with a knotted strip roulette.

5. Scraping the bottom.

6. Final smoothing with a quartz cobble.

7. Preparing the firing.

8. Removing a pot after firing.

9. Sprinkling a pot with the decoction.

This stage of the *chaîne opératoire* is clearly crucial from a stylistic point of view. As shown by De Crits (1991) and Drost (1967), there are countless ways of shaping pottery in sub-Saharan Africa, each one independent of any constraints having to do with the nature of the raw material or functional morphology. Because they are not dictated by external restrictions, the choice can only be explained in cultural terms, yet choice is a relative matter because all the potters I have been able to interview, among Bafia as among other groups, are convinced that there are no possible alternatives to their shaping technique. For each of them, it is not a matter of choosing from a catalogue of available procedures, but of carrying on, deliberately or not, a technological tradition of which the historical background remains unclear.

On the other hand, close observation of the course of this stage among Bafia or other potters (with the exception of West African potters using the paddle and anvil technique) shows that tools are not very important and that, through a sequence of particular gestures, it is basically the potter's hands which determine the specific character of the technique. At this moment, no thinking or decision-making process takes place. Only a series of psycho-motor schemata are involved, which are acquired during the learning process, gradually becoming deeply rooted through practice. In fact, when shaping clay into pots, the potters are unable to explain *what they do*; they are only able to show *how they do* it.

Among Bafia this sequence of gestures is absolutely similar from one potter to another. Only during the final shaping of the rim do some slight variations occur (in the orientation of the thumb and middle finger, the force of application, and the regularity of the rotating movement) resulting in slight morphological differences (width and depth of the depressions, width and orientation of the rim).

We have seen how the learning process, being the focus of a close interaction between teacher and pupil, makes possible the transmission of the psycho-motor schemata and their persistence from one generation to another. No other social pressure would seem to prevent the future potter from adopting any particular technological schema at any time. The procedure of acquiring the technique is alone responsible for its uniformity.

As regards the comparison with shaping processes observed in other societies, it should be mentioned that, so far as is known, the Bafia technique is quite limited in distribution: I observed it among Balom, linguistically affiliated neighbours to the north, and directly to the west and north of this group, among Bamum and Tikar. The only other mention of this technique comes from the Shaï of Ghana (Quarcoo & Johnson 1968), some 1500 kilometres further west. The Banen, western neighbours of the Bafia, have a completely different shaping process (Dugast 1955), and the Sanaga, their eastern neighbours, use still another technique. Unfortunately, nothing is known about the Yambassa, their southern neighbours.

Decoration. Three decorative techniques are used: impressions made with different kinds of roulettes, incisions made with the point of the scraper or bifid stick, and applications of knobs or coils of clay. The tools used for these decorative purposes vary from potter to potter (see table 3 and fig. 4: 3-6; the classification of roulettes follows Soper [1985]). This variability is even more surprising since it took place

TABLE 3 Tools used by each potter for the three decorative techniques, and dates of occurrence.

Potters	*Impression*	*Incision*	*Application*
OUF.01	Accordion pleat strip roulette (1990) Hair curler (1990) Knotted strip roulette (1991)	Bifid stick (1990, 1991)	Small knobs (1991)
KIK.01	Knotted strip roulette (1990) Twisted string roulette (1991)	Point of the scraper (1990, 1991)	Coils (1990, 1991)
KIK.02	Knotted strip roulette (1990)	Point of the scraper (1990)	Coils (1990)
KIK.03	Knotted strip roulette (1990)	Point of the scraper (1990)	Coils (1990)
KIK.04	Knotted strip roulette (1990)	Bifid stick (1990)	Small knobs (1990)
BIA.01	Twisted string roulette (1990, 1991)	Point of the scraper (1990, 1991)	
MOU.01	Twisted string roulette (1990)		

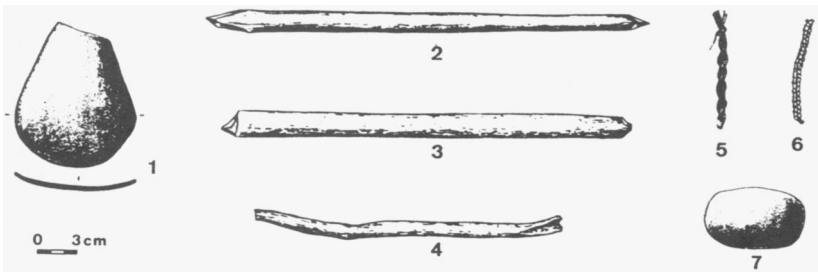

FIGURE 4. Potters' tools: (1) fragment of calabash, (2-3) palm-tree stems, (4) bifid stick, (5) twisted string roulette, (6) knotted strip roulette, (7) quartz cobble.

over a span of one year: in 1991, OUF.01 suddenly used a knotted strip roulette and also applied knobs of clay, and KIK.01 used a twisted string roulette.

As shown elsewhere (Gosselain & van Berg in press), beyond the differences in the ways of performing the decoration, there exists a decorative system that is shared by all potters. This system comprises three levels, of which only the first is compulsory: (1) establishing a rouletted zone on the upper part of the body, which may be further delimited with horizontal incisions and/or applied coils; (2) optional superposition in this zone of a series of lines or incisions, or of parallel beams of lines or incisions, that generally form angles; (3) optional application of small knobs of clay at the top of these angles. Though very simple, this ornamental system is also quite unique, since decoration systems outside the Bafia area follow other rules.

In the fields and around the villages, however, sherds and pottery may be found decorated with impressions made with carved wooden roulettes, of a kind

that was made, according to the potters and other villagers, until some ten years ago. This indicates the relatively recent abandonment of a decorative technique which is still used among neighbouring groups such as Eton (Elouga n.d.; Swartz 1989) and Sanaga (Gosselain 1991). According to the potters, this abandonment is due to the fact that the few men who knew how to make roulettes ceased to do so, or did not transmit their technique before their death. Now, every potter is obliged to make her own tools, and none of them knows how to carve wood.

Potters claim that the decorative motifs have no specific meaning. Decoration either follows the personal fancy of the maker or is produced to the requirements of the customers. It is pure embellishment, 'just as hairdressing is'. This observation strongly contrasts with those recorded among non-Bantu groups of northern Cameroon (Barley 1983; David *et al.* 1988; Sterner 1989), but does not seem to be systematic among Bantu groups. Among Eton, for instance, each motif (made with a carved wooden roulette) bears a name, and the decoration has the function, among others, of protecting the pots against demons: if pots are not decorated, the demons will claim them immediately for their own use (Elouga n.d.). The clear lack of interest of Bafia in the symbolic function of the decoration may be explained by the present decline of potting activity, but may also have historical origins.

Finishing. After having dried for one night, the pot is removed from its support and the base is scraped and smoothed into a regular convex shape (fig. 3: 5). The walls are again carefully smoothed, the outside with a thin stem of palm-tree and the inside with a fragment of calabash, both instruments being repeatedly soaked in water. Finally, a last smoothing is performed with a small, moist quartz cobble (fig. 4: 7), first inside and then outside. The finished pots are left to dry upside down in the shade.

Drying. The duration of drying varies and is crucially dependent on meteorological conditions. My observations were made during the short dry season, a period of relatively sunny weather, occasionally interrupted by short showers. Humidity was generally above 65 per cent. and temperatures fluctuated around 30°C. Each potter waited approximately a week before firing the pots. All asserted, however, that during the dry season (December-March) one or two days of drying would be sufficient.

On the second day, potter OUF.01 placed her pots on bamboo racks above the domestic fireplace. This type of drying, also found among Banen, neighbours of the Bafia (Dugast 1955), and among Teke of Congo (Pinçon 1984), is not specific to pottery, but is used above all for the preservation of food, a task only performed by women. The other potters kept their pots outside their houses during daytime, sheltering them from direct sunlight during the first few days, since sudden drying can cause them to crack. One or two days before firing they put them inside the kitchen, around a fireplace.

The change in colour of the pots (usually into clear beige), informs the potters that the pots are ready to be fired.

Preparation of the decoction. A few days before (or even on the eve of) firing the potter sets out to collect bark of the *ìsóp* shrub (*Bridelia ferruginea*) that is found in the savanna. The bark is crushed on a grinding stone and put in a cooking pot filled with water. The decoction is then boiled for several hours and is heated again on the day of firing.

Pre-heating. Just before firing, the vessels are put in turns near a domestic fireplace in which a few logs are smouldering. The potters closely watch the fire to prevent it from flaring up, yet they do not always succeed in doing so. Hence, some vessels are already black before the actual firing. Temperatures on the walls usually reach 200 to 300°C, but occasionally they may reach 600°C. Each vessel is pre-heated for some two or three minutes, or more in the case of larger specimens. Pre-heating is necessary, according to the potters, in order to evaporate the water that is still held in the clay. Otherwise the sudden evaporation may cause the vessels to split when fired. This operation is strongly redolent of the smoking of meat, which is also performed by women at the same spot and according to the same procedure.

The potters add, however, that pre-heating is not an obligatory stage since pots should actually dry on their own, even if it takes one or two months. But in the event of an urgent order pre-heating makes it possible to speed up the procedure. In fact, pottery is normally an activity of the dry season because only at that time will the vessels dry correctly. In case of an order or of an urgent need for money, pots will be made during the wet season or the short dry season. In these seasons pre-heating is necessary in order to overcome a meteorological obstacle. The drying process, which in humid conditions would take months, is then accelerated. This observation corroborates those of Arnold (1985: 211-12) as regards the humid tropical zone.

From a functional point of view, pre-heating is essential when, as among Bafia, the artisan does not use a kiln but an open fire. Given the characteristics of the open firing (fast heating rate, instability of temperatures), water still held in the clay on incomplete drying will evaporate quite briskly resulting in partial or complete destruction of the vessels. The potters, very well aware of this, watch carefully to see that the pots are completely dry. Some pots nevertheless shatter during firing, but the only accepted explanation for this is the breaching of a taboo.

Firing. Firing always takes place at a spot less than a hundred metres distant from the potter's residence. Fuel is collected on the eve or on the same day and brought to the firing spot. It consists basically of palm-fronds, but dry grass is also used, and in one case (BIA.01) only small twigs were used.

The potter starts by sweeping the firing area and laying down pieces of palm rachis on which the vessels are placed on their sides. Whatever the number of vessels, they are never piled on top of one another or stacked. They are then covered with fuel until a pyramid of some 1.5 to 2 metres in height is constructed (fig. 3: 7). The fire is set at the top of the structure and spreads very rapidly: after a few minutes the whole structure is ablaze. Between 15 and 25 minutes after the fire is set, the first pot is removed from the glowing embers with a long bamboo

pole (fig. 3: 8). The other vessels are removed soon after. In the case of OUF.01, 8 per cent. of the production was damaged by firing, and KIK.04 lost 18 per cent. of her production. The other potters lost nothing at all.

The thermometric properties of the Bafia firings (recorded with the aid of 11 thermocouples) have been described in detail elsewhere (Gosselain in press) and are only briefly discussed here.

Temperatures vary a great deal both between and within firings. They range from 450 to 950°C, but three quarters of them lie between 600 and 800°C. Consequently, temperatures can also vary over parts of a single vessel, by as much as 200 to 300°C. The only characteristics common to all firings are a fast heating rate and a short time of exposure to high temperatures. The first is typical of open firing (Gosselain in press), the second is typical of the firing technique employed by Bafia and other groups where pots are directly removed from the glowing embers. This has been regularly observed in East, Central and Northwest Cameroon, but also among Kongo and Teke of Congo (Mpika 1986; Pinçon 1984), Bambuba of Zaire (Kanimba & Bellomo 1990), Ibibio of Nigeria (Nicklin 1981) and Luchazi of Angola (Woods 1984).[8] By judging the moment of removing the pots in relation to heating rate, the potters may gain some control over the temperature thresholds to which the pots are exposed. The problem is to identify the underlying reasons for such control. Tests of re-firing and analyses conducted on Bafia clays and pottery (Impedovo 1991) have not revealed any convincing explanation. But it would be wrong to regard the application of a decoction (see below) as the only reason for removing glowing pots from the fire. In fact, this same decoction can be applied on cold pots, as I observed among Bamum of West Cameroon, or the vessels may be immediately cooled without any application of decoction (Kanimba & Bellomo 1990).

Application of the decoction. While still hot, the pots are put on a leaf of banana tree or on a piece of sheet metal. They are immediately sprinkled with the decoction, which carbonizes, resulting in a black, glossy, caramel-like coating (fig. 3: 9). The outer walls are usually coated with more care than the inner walls. However, KIK.04 and OUF.01 paid as much attention to the inside as to the outside, taking great care that the decoction was spread evenly everywhere.

All potters claim that this treatment is no more than a final embellishment, though one may wonder about its true purpose. Among other populations, such as Senufo of the Ivory Coast (Spindel 1989: 71), or Bena of Tanzania (Culwick 1935: 167), the bark of the *Bridelia ferruginea* is used in much the same way, but according to the potters, this is to strengthen the pots. *Bridelia* decoction is used by all the groups from Central, East and Western Cameroon that I have visited, but other plants and other types of treatment are known to be used for the same purpose in sub-Saharan Africa (De Crits 1991: 169-77) and elsewhere in the world (Arnold 1985: 140).

In fact, the general idea is to reduce the porosity of the walls by filling the pores and cracks on the surface. That this reduction leads to increased strength has been demonstrated in experiments (Dinsdale *et al.* 1967). Furthermore, resistance to thermal shock increases when no liquid can run through the walls and thereby causes supplementary stress. Schiffer (1990) has also demonstrated

convincingly that thermal conduction is positively related to the watertightness of the pottery.

The treatment with decoction therefore appears more functional than decorative, but the effect of using *Bridelia ferruginea* in this connection needs further investigation. The question remains as to what extent its functions are perceived as such by the potters. Everything, however, leads me to believe that Bafia have forgotten the original purpose of sprinkling, or else they have copied the operation from other peoples without understanding its purpose.

On the other hand, it is striking that in traditional medicine, Bafia use the *Bridelia ferruginea* decoction for curing diarrhoea and for healing open wounds (Leiderer 1982: 49-50), in other words, to stop discharges. Perhaps this is a functional shift of symbolic origin, which is not very surprising when one considers the close association between the human body and the pot (David *et al.* 1988).

Form and function

As already mentioned, Bafia hardly use pottery nowadays. Information on the functions of vessels is consequently incomplete. To gain some idea of the morphological diversity of pottery I had to rely entirely on the potters, asking them to make any possible form they knew of and to explain its function. The result is not necessarily an adequate picture of the diversity of forms once used by Bafia: some may have been forgotten, others may be imitations of imported ware.

This kind of analysis is important not only for archaeologists in attempting to assess vessel function through the identification of universal morpho-functional classes (Henrickson & McDonald 1983; Smith 1985), but also for anthropologists, in their development of a cognitive approach to taxonomic systems (see, for instance, Kempton 1981). As regards form-function relationships, the classes identified up to now are superficial and weak, because a number of functions may be ascribed to the same morphological class or even to the same vessel. The Bafia system, although not very representative due to the small number of cases and the temporal and geographic situation, is no exception to this since almost all the observed vessels were used for cooking food. The functions of storing and carrying are almost absent, and no religious function was identified.

As shown elsewhere (Gosselain & van Berg in press), some correlation exists between shape and function in the Bafia system. Nevertheless, the names given to each morpho-functional class may vary depending on the potter interrogated. The potters, however, consistently identified three morphological criteria in making their classifications: (1) presence or absence of a rim; (2) narrowness of the opening, and (3) volume. The first and second criteria are formal and are used for establishing morphological classes. The third is scalar and allows for the identification of dimensional sub-classes, always correlated with specific functions. The presence or absence of handles can play a role in classification, yet remains a criterion of marginal importance. It is interesting to note that the criteria used by these potters are also those traditionally used by archaeologists in establishing typologies (see Rice 1987).

A morphometric analysis of Bafia vessels clearly indicates that morphological classes can easily be differentiated, and these are shared by the potters. The

dimensional sub-classes, however, depend on the individual perception of what is large, medium or small, and are consequently hardly comparable (Gosselain & van Berg in press). Generally, four morphological classes can be distinguished: (1) vessels with rims of which the diameter of the opening equals or is only slightly smaller than the maximum diameter; (2) vessels with rims of which the diameter of the opening is somewhat smaller than the maximum diameter; (3) vessels with rims of which the diameter of the opening is much smaller than the maximum diameter (these may be described as bottles), and (4) vessels without rims. Within each of the first, second and fourth classes, there are two or three dimensional sub-classes.

Class 1.

Bʌŋí:	large vessel for preparing couscous, manioc tubes and sometimes sauces (fig. 5: 4)
Máábʌ́ŋɨ[9] or *Fɪ́ɣəŋ*	vessel of medium size for preparing sauces, vegetables, meat or couscous (fig. 5: 5, 7)
Bɔ́kɔ̀bɔ́kɔ̀ or *Mááfɪ́ɣəŋ* or *Fɪ́ɣəŋ:*	small vessel for preparing the meat of the old men,[10] reheating a small quantity of food, and sometimes for preparing sauces (fig. 5: 6).

Class 2.

Sɨŋ or *Béé:*	vessel for cooking taro, manioc tubes, ignam, macabo and green bananas, sometimes also for preserving maize flour. The opening has to be small because for smoking food the vessel needs to be closed (fig. 5: 1-3).
Máásɨŋ or *Bɔ́kɔ̀bɔ́kɔ̀* or *Béé:*	small vessel for cooking taro and manioc, reheating a small quantity of food, preparing the meat of the old men and sometimes traditional medicine (fig. 6: 11, 15).

Class 3.

Béé ɨ márɔ́k:	for collecting palm wine or preserving water (fig. 6: 8-9).

Class 4.

Kɪ́ɣəŋ:	large vessel for baking peanuts, fish or meat (fig. 6: 10).
Cɔ́ɔ́ or *Kpɛ́ 'gɔ́ŋ:*	small vessel for preparing the meat of the old men, traditional medicine or sauces (fig. 6: 12-14, 16).

Conclusion

The detailed description of the entire manufacturing process shows that far from being restricted to a few stages of which shaping and firing would be the most crucial, the *chaîne opératoire* appears to be very complex, involving numerous fields of activity and calling for different levels of skill. Comparison with other manufacturing processes in sub-Saharan Africa reveals that the originality of the system lies not in the nature of its stages but in their combination.

The techniques used by Bafia potters for successfully completing each stage are not exclusive to pottery. Most of them are employed in the realm of food production, procurement, preparation and preservation, which are always associated with women. This helps to explain the female preponderance in this

activity. Among Bafia, as among most African peoples, women clearly have much greater opportunities than men to learn and practise potting, by virtue of the nature of their daily tasks. Consequently the limitation of the craft to women does not necessarily entail the establishment of a symbolic barrier, especially

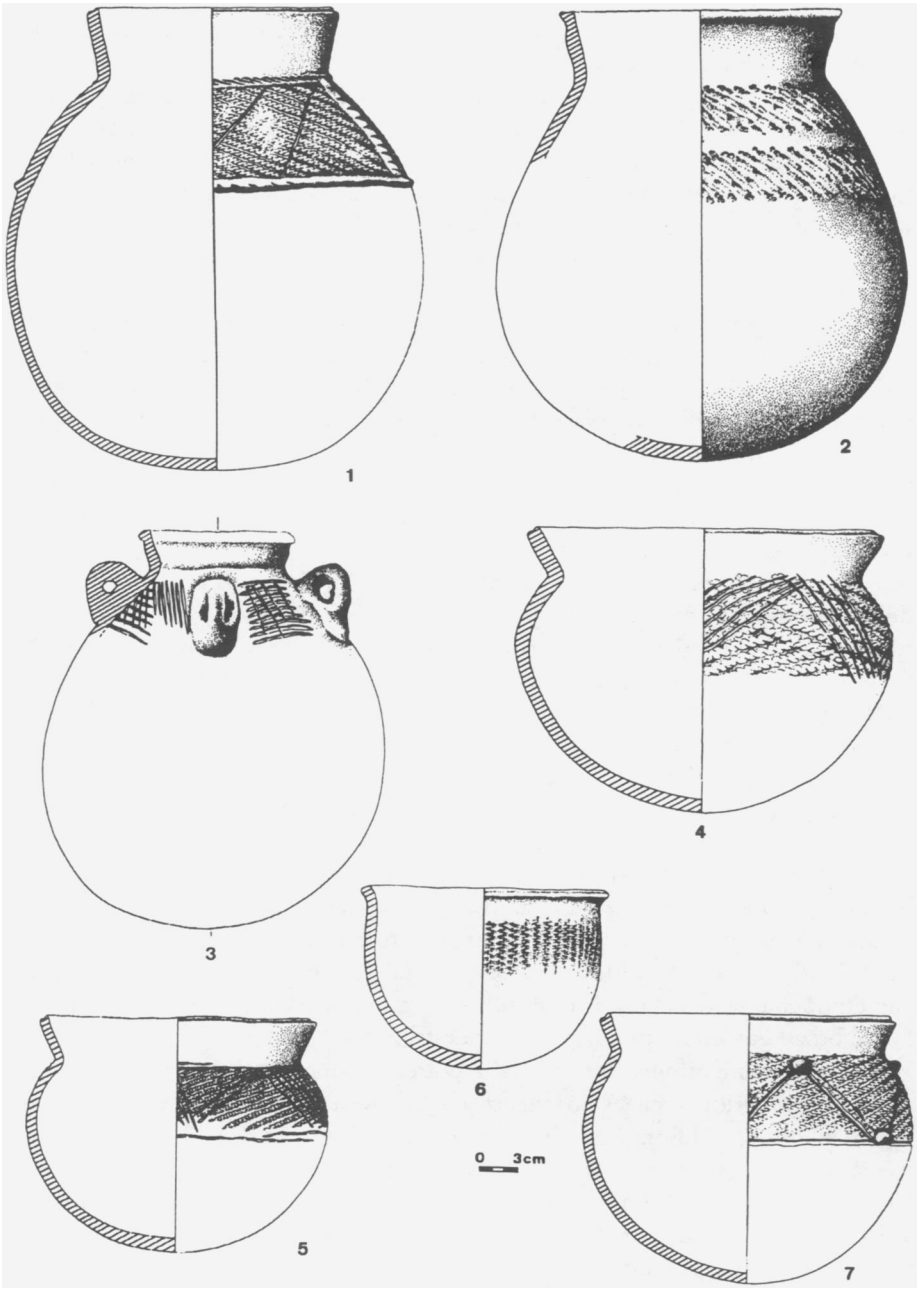

FIGURE 5. Bafia pottery: (1-3) *Sɨŋ*, (4) *Bʌ́ŋɨ́*, (5-7) *Máábʌ́ŋɨ́* or *Fɨ́ɣəŋ*.

when the system draws on specific techniques that already have a pronounced gender connotation.

If Bafia men consider themselves the inventors of pottery, this is because of their general habit of appropriating all important creations. They can learn how to pot because it is neither forbidden nor demeaning for them to do so, but they never continue to make pottery because, as they say themselves, it is an activity much more convenient to women.

As regards the assessement of the role of culture in this technological system, I have shown that for each stage, other functionally viable options are available. The *chaîne opératoire* cannot be fully explained in terms of environmental and functional constraints, but must be understood as an original contribution to the solution of a problem, in this case, transforming clay into pottery.

The Bafia example, and comparisons with other pottery production systems, show that the way the artisan exploits his environment depends on his technological knowledge. Thus, when certain choices are governed by restrictions, these proceed from the system itself and are not imposed upon it by the environment. In practice, although there are many viable options, the artisan is only familiar with a small number, and this situation governs each step of decision-making. Contrary to what might be expected, the production sequence is not totally rigid and predictable. Each stage corresponds with a technological choice, the specificity of which does not necessarily determine that of the next one. This is illustrated among Bafia by individual variations in such matters as the choice of raw material, the plasticity obtained after pounding, the ways of decorating, of drying, firing and sprinkling the pots; but it is even more clear when different technological processes are compared. For sub-Saharan Africa in general, De Crits (1991) has shown that there are no univocal correlations between the different manufacturing stages, whatever the options chosen.

These observations fully justify the stylistic approach to pottery technology, but having shown that culture can potentially occupy an important place in the technological system, if not *the* most important, the relationships between this system and the others need to be assessed. In other words, it is crucial to identify those aspects of culture that influence technological choices, and those stages of the production sequence that are culturally most salient.

The sole example of the Bafia is insufficient to pursue this inquiry very far, nor can we draw much support from cross-cultural comparison, since technological and ethnographic detail is called for of a kind rarely encountered in the literature. Some broad guidelines can, however, be established.

The taboos mentioned by the Bafia potters during clay extraction have revealed three critical stages in the *chaîne opératoire*: obtaining a suitable raw material, drying and firing. On the other hand, each time a new clay is exploited, its capacity to pass through these same stages apparently needs to be tested. As I have shown, these stages are critical since they are not directly controlled by the artisans, either because they depend on external conditions (i.e. the geological and meteorological context) or because they are poorly understood (i.e. firing parameters). We have seen that the artisans nevertheless manage to accommodate to them, but the question remains whether these stages present fewer viable options than others, and consequently whether they allow less scope for cultural

influence. For example, in the absence of a kiln, and in a humid environment, the only possible solutions appear to be either to adopt the operation of pre-heating or to accept seasonal restrictions on the activity. Moreover, if we are to believe Woods (1986), open firing is only possible for coarse pottery, due to its thermometric characteristics. This, in turn, must considerably reduce the options in selecting raw materials.

It is clear, however, whether with regard to Bafia in particular or cross-culturally in sub-Saharan Africa, that the shaping process deserves the most attention because it is completely independent of external constraint. Among Bafia, it is almost the only stage for which there is perfect uniformity among all potters. More generally on the African continent, this stage is also peculiar because it is the only one whose geographical distribution does not appear arbitrary but tends

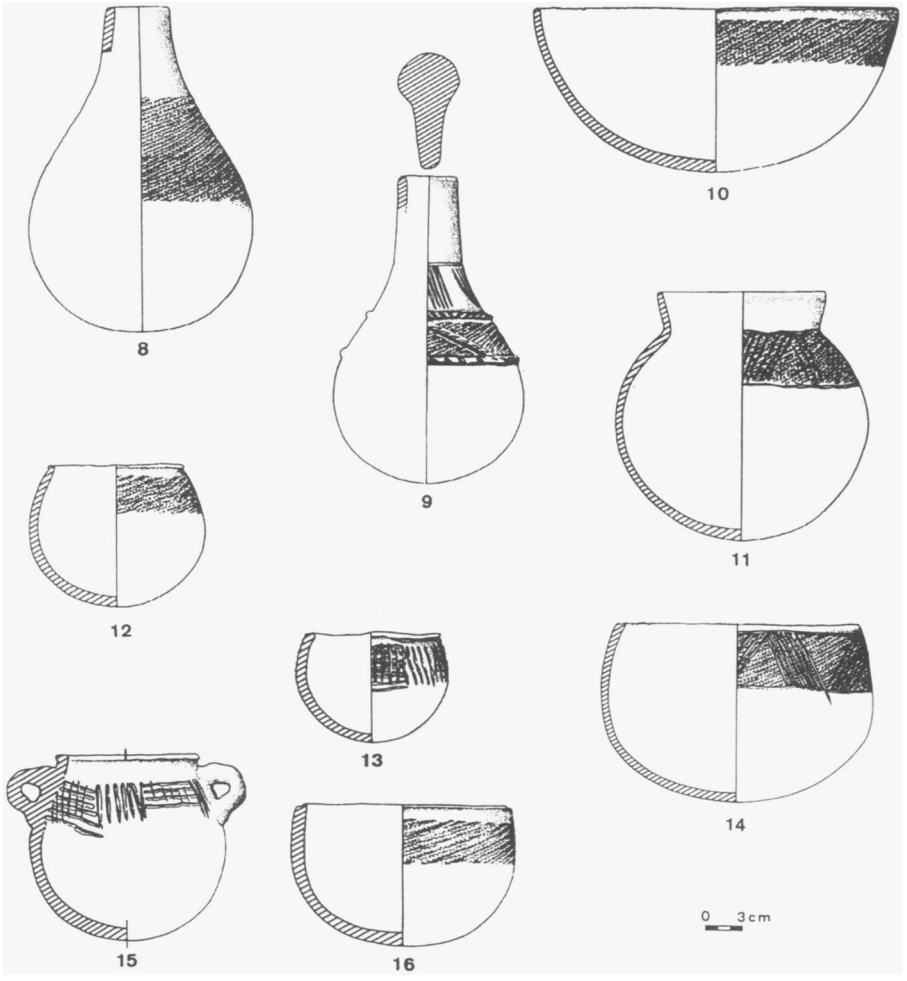

FIGURE 6. Bafia pottery (continued): (8-9) *Béé ɨ márɔ́k, (10) Kíɣə̀ŋ, (11, 15) Máásɨŋ* or *Bɔ́kɔ̀bɔ́kɔ̀* or *Béé*, (12-14, 16) *Cɔ́ɔ́* or *Kpɛ́ 'gə́ŋ*.

to correspond with linguistic distribution, as De Crits has shown (1991). In order to explain this situation, several factors must be considered, but the explanation remains very tentative.

We have seen how the uniformity of gestures during the shaping process relates to patterns of learning which are not peculiar to Bafia but are probably very widespread. Gestural innovation cannot take place during learning, because every gesture that does not fit into the pattern proposed by the teacher is immediately corrected. Through the repeated practice of the activity, these gestures gradually become incorporated as unconscious psycho-motor schemata. At this moment, innovation or the adoption of another technique is virtually impossible because it would require an unlearning compensated by a relearning process, and it is hard to imagine any factor strong enough to provide adequate motivation for such drastic measures. In fact, the importance of motor habits during this stage of manufacture has frequently been invoked to explain its stability through time and space (Nicklin 1971; Rice 1984; Schiffer & Skibo 1987). Even if we have to admit that our knowledge of stability and change in ceramics is still very poor, some stages of the production sequence, such as decoration, finishing, applying decoctions, and so on, are apparently more sensitive to innovation than others, since they do not affect the success of the complete production sequence, nor do they imply new motor habits. These techniques can easily be adopted or modified by people who already know how to make pottery, and the vagaries of fashion and diffusion suffice to explain their arbitrary spatial distribution.

Thus, the analysis of the production sequence from a stylistic point of view indicates that the different stages can be ranked in terms of their salience as indices of cultural variation. Because for some stages there are fewer technological options, and because other stages are more sensitive to technological innovation, it follows that the spatial distribution of techniques appropriate to these stages may be a poor indicator of cultural difference. By contrast, the shaping process, which is neither externally constrained nor sensitive to innovation, provides a much more reliable index of cultural diversity. All studies so far carried out, among Bafia as among a series of other Cameroonian groups, seem to indicate that the shaping process reflects ethnicity (defined here on linguistic criteria); but other sociocultural divisions, such as those of caste, may equally be reflected, as Miller (1985) has shown in his study of Indian potters. If the shaping technique is shared by a number of ethnic groups, as is quite often the case in Africa, its spatial distribution will be more restricted than that of the other stages, and may be expected to have historical implications.

The observations of David and Hennig (1972) in the village of Bé (Northern Cameroon), corroborate, but unfortunately also complicate, the foregoing argument. In this village the potters, all women, come from three different ethnic groups because of slavery or migrations (David, pers. comm.). These three groups of potters show considerable technological differences, even though they know one another and live in the same environment. Through the learning process, each of them will transmit her technique to her direct or indirect descendants, implying that within the same area, several technological traditions can coexist.

Therefore, because of exogamic rules (quite general throughout Africa), and because it is essentially women who produce pottery, we would not expect to

find intra-ethnic technological homogeneity, but rather a heterogeneity related to inter-ethnic marital alliances. Although this case rests on a small sample, the question remains of how to explain the technological uniformity among Bafia. All potters say they are Bafia by mother and father, and that the person having transmitted the activity on to them was likewise Bafia by mother and father.

Would this imply that only Bafia have the right to make pottery, or that marital exchanges only occur with Balom, Bamum and Tikar, neighbouring groups who all share the same technique? Frankly, I have not obtained any information that could answer this question. Nor is any further information forthcoming from the literature on pottery production systems in other African societies, since the problem was never studied and the modes of technological transmission are rarely documented by the authors. To my knowledge, the only explicit African example of a system directed towards technological closure comes from the Luo of Kenya, described by Herbich (1987). In this patrilocal society, each woman will undergo a severe post-marital resocialisation process under the supervision of her mother-in-law. If she is a potter, the new wife will have to follow in her footsteps. If the new wife already knew how to make pottery in her childhood (which is very rare since she knows what will happen), she has to forget, and relearn the technique of her mother-in-law. Unfortunately, Herbich focuses on decorative and morphological patterns, and does not describe in detail the process of technological retraining. Whatever the case may be, this example clearly shows how a society may ensure technological homogeneity even where this concerns only certain 'experts', as in the case of pottery production.

Although many questions remain unsolved, I have shown how culture can express itself as much through a technological system as through the forms of its resulting artefacts. For archaeologists this demonstration is extremely valuable because it introduces a new parameter of style. Up to now, barring some rare exceptions, the stylistic approach to pottery has been limited to morphological and decorative parameters. Since these parameters are precisely those that are most sensitive to change, for instance through the impact of socio-economic stress (Hodder 1979; 1982), a stylistic assemblage identified by morphological or decorative criteria could be indicative of either an ethnic group or a number of ethnic groups, or of socio-economic or socio-political sub-groups. Introducing the technological parameter of style, we have access to a criterion that is less subject to change and that may allow a more refined and reliable cultural approach to the interpretation of past societies.

NOTES

This research was conducted under the direction of Dr P. de Maret and was funded by the Université Libre de Bruxelles. In Cameroon, research permits were issued by the MESIRES and the ISH. My deepest gratitude is to the potters and people of the Bafia villages for their hospitality and understanding. I would like to thank Gladys Guarisma, of the CNRS, for her assistance in the retranscription of the linguistic terms and for all the useful information she provided, and also T. Ingold and P.L. van Berg whose critical comments considerably contributed to the present version. This article also benefited from the assistance of E. Cornelissen and Y. Baele.

[1] To archaeologists studying lithic industries this narrow-mindedness may come as a surprise, and I hope they will forgive me. Although I am not familiar with their literature, I am aware that they were pioneers in developing the study of technological systems in archaeology.

[2] The concept of '*chaîne opératoire*' is used by French anthropologists (see Lemonnier 1976) to designate any series of operations aiming at transforming a raw material into a finished product. The term 'technological process' can also be used but must be understood in a broader sense since a technological process can involve many *chaînes opératoires*.

[3] For reasons of simplicity, the potters mentioned in the text are referred to by their code names given in first column of table 1.

[4] Apparently, potters think of clay as something mobile and alive. During a search for clay at Mouko and after having dug fruitlessly some twelve pits in places where clay was usually found, the potters informed me that we needed to stop searching that day because the clay was hiding, probably because one of the people present had an 'evil heart' or had broken a taboo.

[5] It should be noted that for OUF.01 the prohibition of sexual intercourse lasted until the firing of the pots. This taboo was so important that she urged me to respect it during my enquiry. Moreover, she prevented from coming near to her any persons of whom she did not know where they had spent the night. The matchet prohibition also lasted until the firing, since the potters mentioning it always checked their workplace for any matchet.

[6] G. Guarisma, personal communication.

[7] This is a small circular plate mounted on a calibrated spring, comprised of blades radiating towards the centre. These blades are plunged into the clay, until the clay reaches the plate. A rotating force is then applied on the spring, until the clay ceases to resist. The threshold of resistance, measured by the spring, is expressed in grammes per cm^2. One must bear in mind that shearing strength is not a definition of plasticity in the true sense of the word, it is only one of its numerous aspects (Barna 1967; Bloor 1957). As an index of plasticity, its only value is that it is easily measurable in the field and yields a standard measure of comparison.

[8] Other examples are known from sub-Saharan Africa, but only those for which thermometric data are available have been included in the analysis.

[9] The prefix *máá-* means 'small'.

[10] Only adult men can eat these kinds of meat. They are viper, flying squirrel, hare, snail and catfish.

REFERENCES

Arnold, D.E. 1985. *Ceramic theory and cultural process*. Cambridge: Univ. Press.

Balfet, H. 1973. A propos du tour de potier: l'outil et le geste technique. In *L'homme, hier et aujourd'hui: recueil d'études en hommage à André Leroi-Gourhan*. Paris: Editions Cujas.

Barley, N. 1983. *Symbolic structures: an exploration of the culture of the Dowayos*. Cambridge: Univ. Press.

——— 1984. Placing the West African potter. In *Earthenware in Asia and Africa* (ed.) J. Picton. London: Percival David Foundation.

Barna, G. 1967. Plasticity of clay materials. *Bull. Am. ceram. Soc.* **46**, 1091-3.

Bloor, E.C. 1957. Plasticity: a critical survey. *Trans. Brit. ceram. Soc.* **56**, 423-81.

Childs, S.T. 1986. Style in technology: a view of African Early Iron Age iron smelting through its refractory ceramics. Thesis, Boston University.

Conkey, M.W. 1990. Experimenting with style in archaeology: some historical and theoretical issues. In *The uses of style in archaeology* (eds) M.W. Conkey & C.A. Hastorf. Cambridge: Univ. Press.

Creswell, R. 1972. Les trois sources d'une technologie nouvelle. In *Langues et techniques, nature et société. 2 Approche ethnologique, approche naturaliste* (eds) J.M.C. Thomas & L. Bernot. Paris: Editions Klincksieck.

Culwick, H.M. 1935. Pottery among the Wabena of Ulanga, Tanganyika Territory. *Man* **35**, 165-9.

David, N. & H. Hennig 1972. The ethnography of pottery: a Fulani case seen in archaeological perspective. *McCaleb Module Anthrop.* **21**, 1-29.

——— , J. Sterner & K. Gavua 1988. Why pots are decorated. *Curr. Anthrop.* **29**, 365-89.

De Crits, E. 1991. *Poteries de l'Afrique Sub-saharienne: éléments pour une analyse des styles technologiques.* (Mémoire de Licence). Bruxelles: Université Libre de Bruxelles.

Dietler, M. & I. Herbich 1989. Tich Matek: the technology of Luo pottery production and the definition of ceramic style. *Wld. Archaeol.* **21**, 148-64.

Digard, J.P. 1979. La technologie en anthropologie: fin de parcours ou nouveau souffle? *L'Homme* **19**, 73-104.

Dinsdale, A., J. Camm & W.T. Wilkinson 1967. The mechanical strength of ceramic tableware. *Trans. Brit. ceram. Soc.* **66**, 367-404.

Drost, D. 1967. *Töpferei in Afrika: technologie.* Leipzig: Akademieverlag.

Dugast, I. 1949. *Inventaire ethnique du Sud-Cameroun.* Paris: Institut Français d'Afrique Noire.

——— 1955. *Monographie de la tribu des Ndiki (Banen du Cameroun).* Paris: Institut d'Ethnologie.

Elouga, M. n.d. Sémiologie des motifs décoratifs de la céramique actuelle d'un groupe Bantou du Sud Cameroun: les Beti de la Lekié. Unpublished manuscript, Université de Yaoundé.

Franken, H.J. 1971. Analysis of methods of potmaking in archaeology. *Harv. theol. Rev.* **64**, 227-55.

Gosselain, O.P. 1991. Technologie céramique et ethno-archéométrie: résultats préliminaires de la mission 1990 au Cameroun. *Nsi* **8-9**, 6-15.

——— in press. Bonfire of the enquiries. Pottery firing temperatures in archaeology: what for? *J. archaeol. Sci.*

——— & P.L. Van Berg in press. Style, individualité et taxonomie chez les potières Bafia du Cameroun. *Bull. Cent. génév. Anthrop.*

Guarisma, G. 1967. Esquisse phonologique du Bafia. *Bull. SELAF* **1**, 1-55.

——— 1973. *Le nom en Bafia.* Paris: Bibliothèque de la SELAF.

Guthrie, M. 1948. *The Bantu languages of Western Equatorial Africa.* London: Oxford Univ. Press.

Henrickson, E.F. & M.M.A. McDonald 1983. Ceramic form and function: an ethnographical search and an archaeological application. *Am. Anthrop.* **85**, 630-43.

Herbich, I. 1987. Learning patterns, potter interaction and ceramic style among the Luo of Kenya. *Afr. archaeol. Rev.* **5**, 153-204.

Hodder, I. 1979. Economic and social stress and material culture patterning. *Am. Antiq.* **44** (3), 6-54.

——— 1982. *Symbols in action.* Cambridge: Univ. Press.

Impedovo, V.R. 1991. *Simulation de la technologie des céramiques anciennes* (Mémoire de Licence). Bruxelles: Université Libre de Bruxelles.

Kanimba, M. & R.V. Bellomo 1990. Methods of pottery construction and firing techniques observed in the village of Bukokoma III, Zaïre. In *Evolution of environments and hominidae in the African Western Rift Valley* (ed.) N.T. Boaz. Martinsville: Virginia Museum of Natural History.

Kempton, W. 1981. *The folk classification of ceramics: a study of cognitive prototypes.* New York: Academic Press.

Kramer, C. 1985. Ceramic ethnoarchaeology. *Ann. Rev. Anthrop.* **14**, 77-102.

Kuete, M. 1989. Evolution des paysages et facteurs de réapparition des formations végétales dans le golfe de Bafia (Cameroun). In *Savannization processes in Tropical Africa* (ed.) H. Kadomura. Tokyo: Department of Geography, Tokyo University.

Lechtman, H. 1977. Style in technology. Some early thoughts. In *Material culture: styles, organization, and dynamics of technology* (eds) H. Lechtman & R. Merrill. St Paul: West.

——— & A. Steinberg 1979. The history of technology: an anthropological point of view. In *The history and philosophy of technology* (eds) G. Bulliarello & D.B. Doner. Chicago: Univ. of Illinois Press.

Leiderer, R. 1982. *La médecine traditionnelle chez les Bekpak (Bafia) du Cameroun.* 2 vols. Sankt Augustin: Haus Völker und Kulturen.

Lemonnier, P. 1976. La description des chaînes opératoires: contribution à l'analyse des systèmes techniques. *Techniques Cult.* **1**, 100-51.

——— 1983. L'étude des systèmes techniques, une urgence en technologie culturelle. *Techniques Cult.* **1**, 11-26.

——— 1991. De la culture matérielle à la culture? Ethnologie des techniques et préhistoire. In *XIe Rencontres Internationales d'Archéologie et d'Histoire d'Antibe: 25 ans d'études technologiques en préhistoire.* Juan-les-Pins: APDCA.

Leroi-Gourhan, A. 1943. *L'homme et la matière: évolution et techniques.* Paris: Albin Michel.

——— 1945. *L'homme et la matière: milieu et techniques.* Paris: Albin Michel.

Miller, D. 1985. *Artefacts as categories: a study of ceramic variability in Central India.* Cambridge: Univ. Press.

Mpika, L. 1986. *La céramique traditionnelle des Kongo de la région de Boko, XVIIIe-XXe siècle* (Mém. D.E.S.). Université Marien Ngouabi.

Nicklin, K. 1971. Stability and innovation in pottery manufacture. *Wld Archaeol.* **3**, 13-98.

——— 1981. Ceramic pyrometry: two Ibibio examples. In *Production and distribution: a ceramic viewpoint* (eds) H. Howards & E.L. Morris (BAR 120). Oxford: BAR.

Pinçon, B. 1984. *La céramique Teke de la région de Zanaga (XIXème-XXème siècle).* (Mémo de D.E.S.) Université Marien Ngouabi.

Plog, S. 1983. Analysis of style in artefacts. *Ann. Rev. Anthrop.* **12**, 125-42.

Quarcoo, A.K. & M. Johnson 1968. Shai pots. *Baessler Archiv.* **16**, 47-97.

Rice, P.M. 1984. Change and conservatism in pottery producing systems. In *The many dimensions of pottery* (eds) S.E. Van der Leeuw & A.C. Pritchard. Amsterdam: Univ. van Amsterdam.

——— 1987. *Pottery analysis: a sourcebook.* Chicago: Univ. Press.

Sackett, J.R. 1977. The meaning of style in archaeology: a general model. *Am. Antiq.* **42**, 369-80.

——— 1990. Style and ethnicity in archaeology: the case for isochrestism. In *The uses of style in archaeology* (eds) M.W. Conkey & C.A. Hastorf. Cambridge: Univ. Press.

Schiffer, M.B. 1990. The influence of surface treatment on heating effectiveness of ceramic vessels. *Journal of Archaeological Science* **17**, 373-81.

——— & J.M. Skibo 1987. Theory and experiment in the study of technological change. *Curr. Anthrop.* **28**, 595-622.

Smith, M.F. Jr. 1985. Toward an economic interpretation of ceramics: relating vessel size and shape to use. In *Decoding prehistoric ceramics* (ed.) B.A. Nelson. Carbondale: Southern Illinois Univ. Press.

Soper, R. 1985. Roulette decoration on African pottery: technical considerations, dating and distribution. *Afr. archaeol. Rev.* **3**, 29-51.

Spindel, C. 1989. Kpeenbele Senufo potters. *Afr. Arts* **22** (2), 66-73.

Sterner, J. 1989. Who is signalling whom? Ceramic style, ethnicity and taphonomy among the Sirak Bulahay. *Antiquity* **63**, 451-9.

Swartz, B.K. 1989. The Eton pottery industry of Nkol-Nguele village, Central Province Cameroon. *W. Afr. J. Archaeol.* **19**, 117-37.

Wiessner, P. 1984. Reconsidering the behavioral basis for style: a case study among the Kalahari San. *J. anthropol. Archaeol.* **3**, 190-234.

Wobst, M. 1977. Stylistic behaviour and information exchange. In *Papers for the director: research essays in honor of James B. Griffin* (ed.) C. Cleland (Mus. Anthrop. Mem. **13**). Ann Arbor: Univ. of Michigan Press.

Woods, A.J. 1984. Methods of pottery manufacture in the Kavango Region of Namibia: two case studies. In *Earthenware in Asia and Africa* (ed.) J. Picton. London: Percival David Foundation.

——— 1986. Form, fabric, and function: some observations on the cooking pot in antiquity. In *Ceramic and civilization. 2, Technology and style* (ed.) W.D. Kingery. Columbus: The American Ceramic Society.

Technologie et style : poterie et potiers chez les Bafia du Cameroun

Résumé

En archéologie, l'approche stylistique des artefacts ne prend le plus souvent en considération que les paramètres jugés indépendants de toute contrainte non-culturelle. La poterie n'échappe pas à cette tendance, puisque les critères stylistiques traditionnellement retenus sont la décoration et la morphologie. Les processus technologiques mis en oeuvre pour élaborer les pots seraient, quant a eux, régis par un tel nombre de contraintes environnementales et fonctionnelles qu'il resterait peu de place à l'expression stylistique. Dans cet article, j'essaie de démontrer le contraire, en analysant dans le détail la production de la poterie chez les Bafia du Cameroun, et en comparant leur chaîne opératoire à celles de groupes voisins et distants. Les résultats montrent bien que la technologie peut être le siège d'une expression stylistique. De plus, certaines étapes de la chaîne opératoire, parce qu'elles sont peu sensibles aux innovations et dépendent essentiellement des modalités d'apprentissage, sont des paramètres stylistiques extrêmement utiles aux archéologues.

Musée Royal de l'Afrique Centrale, Section de Préhistoire, B-3080 Tervuren, Belgium