

94/08/03 – 20/07/06

**CONSTRUCTING A HISTORICAL ETHNOGRAPHY OF SUKUR (ADAMAWA STATE),
PART II: IRON AND THE CLASSLESS INDUSTRIAL SOCIETY.**

Nicholas DAVID and Judith STERNER, *University of Calgary*

Prefatory note

This paper was originally published as David, N. and J. Sterner, 1996. Constructing a historical ethnography of Sukur (Adamawa state), Part II: Iron and the classless industrial society. Nigerian Heritage 5:11-33. It is reproduced here with no substantive changes to the content. Typos have been corrected and the spelling of sakun words updated to conform as closely as possible to that used by linguist Michael Thomas in his forthcoming dictionary (see <http://sukur.info/Lang/langindex.htm>)

Introduction

In Part I of this paper (David and Sterner 1995), we explained and disposed of three myths regarding Sukur that had developed during the colonial period. These were: that Sukur had once been a militaristic regional power; that its ruler was a divine king; and that its political structure and organization were those of a 'state.' This achieved, we are free to enquire into the real nature of Sukur society in the late 19th century before its successive (and largely theoretical) incorporations into three colonial systems, and its simultaneous (and only too real) ravaging by Hamman Yaji, Fulani ruler of Madagali from 1902-27. We shall argue that Sukur was a community specialized in the production of iron that it exported in large quantities to Borno, and that this industry and trade were major factors in shaping a Sukur polity that, uniquely in Africa and perhaps the world, can be categorized as a classless industrial society. Nonetheless Sukur's cultural similarities to other montagnard social formations were and remain very marked, and it was largely this that led to its misrepresentation by outside observers. It can indeed be argued that Sukur's representation of itself as one among many Mandara highland societies was an essential element in its political and economic strategy.

Iron production

Smelting technology

The iron smelting technology of the Mandara highlands is unique in utilizing bellows-driven down-draft furnaces to smelt sand-sized particles of magnetite ore (Fig. 1) (David et al. 1989 and references cited therein). Two processes can be distinguished. The continuous smelt practiced by the Mafa but few other peoples produces, after many hours work, a large, heterogeneous, bloom mass consisting of cast iron droplets, steel, ferrite (low carbon iron), charcoal and slag (ibid.; David and Le Bléis 1988), while the more common batch process yields in a day's work several smaller and more coherent blooms. The Sukur practised the batch process (Sassoon 1964), and, like many, perhaps all, of the Mandara iron producers, appear to have recognized and desired the production of cast iron, produced in droplets and later fined in the forge with lower carbon ferrite and steel bloom fragments for the manufacture of tools, ornaments and weapons. [It would now appear that the Sukur type batch process does not produce cast iron. ND 2020]

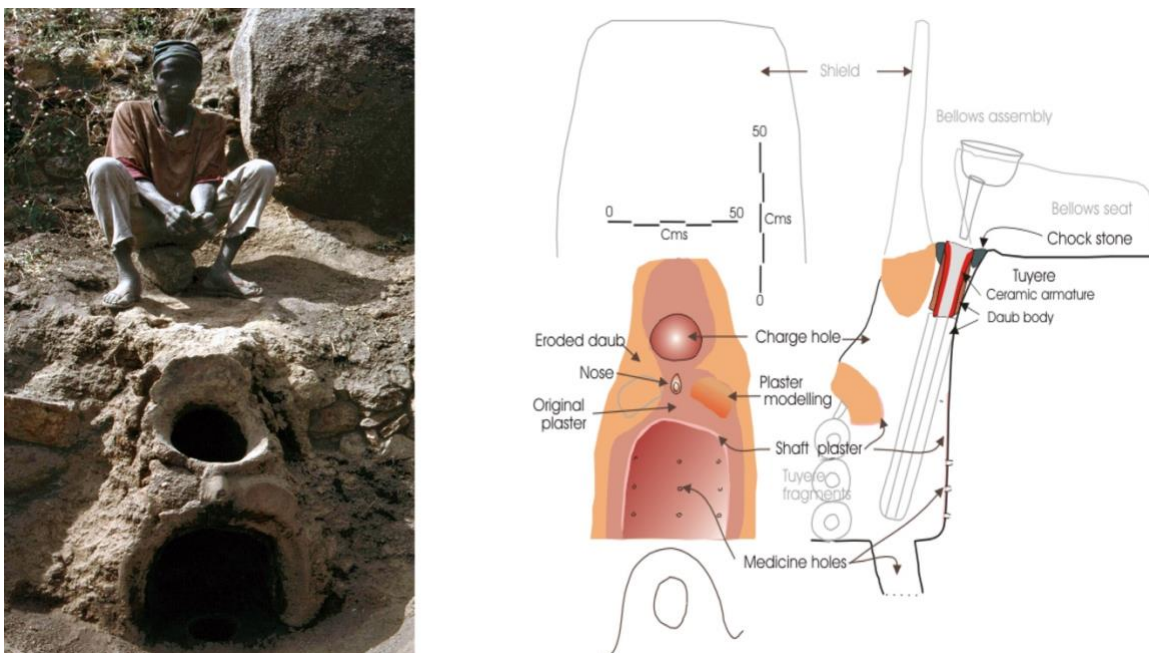


Figure 1. Remains of a 'female' furnace in Goeri (Gwassa ward), said to have been that of the Dai Kərba, and a diagram with cross section of the same furnace.

While details of the form of Mandara furnaces (cf. Gardi 1954, 1955, 1959; Hinderling 1953, 1955; Sassoon 1964; Vaughan 1973; Seignobos 1991a; David et al. 1989; Killick et al. 1994) varied considerably, expressing to various degrees personal, familial, clanic or ethnic identity, they functioned in essentially similar ways. In Sukur, a distinction is made between persons whose 'sign' (*gwat*), dependent on the sex of their first child, is male (*gwat madlah*) or female (*gwat dām*), and, extraordinarily given the complexity of the smelting process, this distinction was extended to furnace construction, furnace masters of *gwat madlah* building furnaces that were taller, though no different, we believe, in cross-section, than those constructed by persons of *gwat dām*. These two varieties of furnaces performed, we are told, identically, there being no differences, for example, in the size or nature of the bloom. Sukur furnaces were unlike others on which we have details in that the tuyère hung not vertically down the shaft but tilted forwards at a slight angle (*ca* 14° in one measured example) (and see Sassoon 1964: 177, Fig. 6).

History, iron production and the end of smelting

At Sukur, unlike the majority of other Mandara casted societies (Sterner and David, 1991), blooms were produced by members of both the farmer (*mbəlim*) and the smith/potter (*dai*) castes. The subsequent fining and forging of iron was however the monopoly of male smiths, often working for *mbilim* clients. When Sassoon (1964: 174) visited Sukur in April 1962 he gathered the following approximate figures:

Number of smelters working in 1954	50
Number of smelters working in 1961	15
Number of smelters working in 1962	19
Number preparing to smelt in 1963	30

However, the situation was by no means normal; smelting had been declining for some time as imports of iron stock from Europe and metal scrap became increasingly cheaply available. At the time of his visit, 'the people of Sukur had decided that the iron imported from Europe and

available in markets made such poor-quality tools that it would pay them to revive the smelting of their locally produced ores.' It is in fact improbable that many of the thirty smelters planning to work the year after his visit actually did so. Around the mid-fifties prospective fathers-in-law were becoming unwilling to accept more than token numbers of iron bars as part of marriage payments and demanding cash instead. Thus the figure of 50 smelters working in 1954, besides being a suspiciously round number, is very unlikely to reflect the intensity with which the industry had been practiced before imports had become a factor. Many Sukur in their early thirties (in 1992) never saw smelting. We are fortunate that Sassoon took the initiative to visit Sukur, but should recognize that he saw the 'last blasts' of its industry.

Sukur's recent history has been such that it is doubtful whether smelting was ever practised during the twentieth century under what passed in the Mandara for 'normal conditions.' As Beauvilain (1989) has demonstrated, during the nineteenth century and as far back as there are records, the peoples of north Cameroon, and by extension their Nigerian neighbours, were beset by and courageously overcame droughts, plagues of locusts and other insects, epidemics and epizootics. Besides natural disasters, there was also raiding and slaving that, by the nineteenth century, was mainly targeted against montagnards. Even so, the twentieth century was exceptional, largely because of the guns and rifles that were now the basic weaponry of the dominant powers, whether indigenous or imperial. From 1912 and probably before, Hamman Yaji of Madagali was one of several lords waging predatory warfare against the montagnard polities of the Mandara. Many Sukur were killed or enslaved and at one time a large part of the population took refuge with the Kapsiki at Rhoumzou, Mogode and other settlements. While, such is the nature of trade, iron exports may not have ceased, they must have greatly diminished. Sukur capitulated to Hamman Yaji and to British colonial rule in the 1920s [*ca* 1923], but before population could have rebounded to earlier levels, in the early to mid-1930s the area was hit by plagues of locusts and ensuing famines. We should therefore not be unduly surprised that Sukur's iron industry almost escaped colonial notice -- nor that iron, a fundamental factor of production, is not mentioned in a contemporary colonial inquiry into regional trade (Yolaprof ACC54. Trade in North Cameroons 1928).

If then we wish to understand the interaction between Sukur's iron trade and its society, and its impact on the economy of northeastern Nigeria, we should reconstruct it as it was in the last half of the nineteenth century when the fame of Sukur's chief reported by Heinrich Barth (1965 [1857], vol. 2: 100) may be taken as a measure of the prosperity of the society as a whole. But to arrive at a global estimate of annual exports, it will be necessary to marshal evidence of various kinds regarding the organization of production, productivity and population. The chain of reasoning is long and tortuous, but different lines of argument are mutually supportive, creating a web of inference that is strong and resilient. We make no immodest claims about the accuracy of our final estimate, except that it is of the right order of magnitude. And that is sufficient for further argumentation regarding the nature of Sukur society and its ruler.

Production: organization and process

Five men in their late 60s and 70s gave us lengthy interviews about iron production and several others offered further information. In the course of the main interviews we attempted, amongst other things, to elicit standardized information that would allow extrapolation to the annual production of Sukur as a whole, and to quantify its exports. In the event, the information regarding productivity and production is extremely difficult to compare from one informant to another. Each interview taught us more about the process of smelting and the organization of

production, and enabled us to ask more appropriate questions in the next. There are many other reasons for the lack of comparability between data sets quite apart from gaps in respondents' memories: difficulty in applying standard measures to behaviour that changed from year to year, different kinds of pots used to store ore and fragments of bloomery iron, varying sizes of pots of the same named type, and so on. Varying choices were also made by iron workers as to the proportion of their output that would be made into and sold as *dābāl*, the bars with slightly expanded ends (Fig. 2) in which a considerable portion of the metal was exchanged and traded. Sassoon (1964:176) also indicates that there was variation in smelting practice, one furnace master producing a bloom in 40 minutes after five charges of ore, another charging seven times and removing the bloom after about an hour. This would presumably affect the size of the bloom and the number of small bars -- which we have attempted to use as a standard of comparison -- that could be made from each.

Sassoon's description of furnaces and smelting practice (Ibid.:176) is excellent and is confirmed by Vaughan (1973) and by our work in almost all details,¹ though his attempts at measurement of inputs and outputs were aborted by a storm (Sassoon 1964: 177-78). His estimates of production are therefore impressionistic and based upon a combination of his observations and measurements and one smelter's statements. He suggests that in a day's work a furnace would expend 102 kg of charcoal and 91 kg of ore to produce nine blooms weighing about 2.25 kg apiece, each sufficient to manufacture two *dābā* /bars, or three if the bloom was particularly rich.

The charcoal : ore : bloom weight ratios he suggests are thus about 5 : 4.5 : 1. We may assume that the dry blooms (number unknown) weighed by Sassoon had any adhering slag and charcoal knocked off them, but that they still contained considerable slag and charcoal, approximately one third by weight. The charcoal : ore : bloomery *iron* ratio

¹ Sassoon's (Ibid: 175) statement that the lower end of the tuyère reaches down to somewhere near the middle of the shaft refers to a tuyère the tip of which has already melted some way back in the course of smelting. At the start of a day's work the tip of the tuyère would reach down to a few centimetres above the base of the shaft. Tuyères were replaced daily. Vaughan (1973:175), who observed blooms being removed 90-120 minutes after 'the making of the fire' doubts that nine blooms could have been produced in a day. This 'would undoubtedly require several bellows operators'. There is no doubt that the interval between first firing of the furnace and removal of the first bloom would be significantly longer than that between subsequent blooms. Sukur furnaces were generally serviced by three bellowsmen, with women also participating.



Figure 2. Left: Bälama Makandau Mamanda of Mədləŋ neighborhood on the plains below Sukur poses with two spears, two jars containing bloom fragments, against which *dəbəl* bars lean, a tuyère and a number of blooms; right: three of his blooms (note the “horns”) and a sample of *dəbəl*.

would then be about 7.6 : 6.7 : 1. Comparable estimates for Mafa smelting have been calculated as 8 : 2.4 : 1 (David et al. 1989: 199). Although the process differs -- Mafa continuous versus Sukur batch smelts -- these data suggest that Sassoon overestimated the amount of ore required to produce a given quantity of bloomery iron. This is in part because the blooms he weighed are likely to represent only part of the iron produced in each smelting episode. When a Sukur bloom (Fig. 2) was prised out of the furnace, some of the upward projections from the body of the bloom, the ‘horns of iron’ (*tom cukuri*) were likely to break off, and were considered the perquisites of the assistants. Other fragments of iron, including droplets of cast iron, did not form part of the bloom but were recovered either from the redhot charcoal removed with it, or at the end of the day’s work from the ash and other material left in the base of the shaft. Such droplets accrued to the furnace master. Any fragments of iron that fell off the bloom into the bowl of water in which it was doused and cooled were kept by the women of the team. Other projections might be broken off later and kept for family use. Very likely they could be forged directly. While it is impossible to estimate the contribution of these various detached fragments to the total iron produced in one episode of smelting, more than one informant indicated that they were sufficient to satisfy the household’s own needs, and that the majority of the metal in the bodies of the blooms was destined for the market.

Estimates of daily bloom production by our informants are in excellent agreement with Sassoon’s, ranging from seven to eleven with nine as the median value. We shall use nine as the basis of estimates. Once the blooms had been removed from the smelting enclosure to the

house, they were usually broken up into fragments and stored in pots.² They were always broken up before being fined in the smithy and forged either into *dābəl* or into tools, weapons or ornaments. Thus the question of how many *dābəl* could be made out of each bloom does not fit with Sukur practice -- and our attempts to use the number of pots of iron converted into litres as the basis of estimates gave, as might be expected, divergent and unreliable results.³

Dābəl

Sassoon and his informant estimated that blooms contained enough iron to make between two and three *dābəl* bars. *Dābəl* were produced in three size classes. The small (*dābəl dlui*) or meat bar could be exchanged for a lump of meat; the medium (*dābəl 'wai* or *d. mǎpadlǎ*) was worth a joint of neck meat or a jar of beer; and the large bar (*dābəl takur*) was valued at two chickens. These are notional equivalents. *Dābəl* sizes were not closely standardized, in part because of the technique of production. The smith puts bloom fragments into the firebox, perhaps adding some droplets of cast iron [no! 2020]. The metal was then welded together by hammering with a heavy stone hammer, a process resulting in the expulsion of slag and other impurities, and drawn out into a thick bar. The smith could not predict exactly how much iron would be present at this point, but had, depending also upon on the wishes of the client, several options open to him. He might divide the iron into two *dābəl*, perhaps of different sizes. He might decide instead to make one large or one medium *dābəl*, and might cut off part of the metal and reserve it for some other purpose. The results, from smith to smith and from client to client, were such that there is considerable variation in *dābəl* attributed to the same class. (Of course not all bloomery iron was made into *dābəl*; some was fined and forged directly into tools and other articles.⁴)

There seems to be disagreement as to the notional relative sizes of large, medium and small *dābəl*. A ratio of 2 : 1.5 : 1 appears generally accepted, but 3 : 1.5 : 1 has also been suggested. *Dābəl* are still kept by Sukur and are used in marriage payments, now more for sentiment than any other reason, and are occasionally forged into tools. Our measurements (mainly of size rather than weight since we lacked an accurate scale in the field) indicate

- a) that a 2 : 1.5 : 1 ratio is the best approximation, but that
- b) there is considerable variation within categories, and perhaps between the products of different smith-client pairs, although
- c) the small bars, with a mean weight of about 270 g, appear more standardized than the medium and large classes, even though this is not apparent from Table 1.

Table 1. Weights of individual *dābəl* as classed by two older Sukur men.

² We have seen such pots still containing fragments of iron of various sizes. Some Sukur still keep numbers of old blooms, over 50 in one case, and the fact that they are kept as blooms rather than as fragments is perhaps indicative of the very rapid collapse of the industry. According to Terry Childs (pers. comm. 1994), in western Uganda, iron working families kept blooms, even 'blooms' that were largely slag, when the British, in an order that was rapidly enforced, told them to stop mining and smelting iron. They hoped that someday they would be able to use them; their retention of blooms may also have been a statement of resistance to change.

³ Though, if we ignore pot type and its volume (estimated from modern vessels of the same named type) and accept informants' estimates of number of small bars that could be made out of each pot of fragments, the estimates approximate those reached through other calculations.

⁴ According to David Killick (pers. comm. 1994) *dābəl* from the Mandara tend to be of wrought iron with very low carbon content and thus to be unsuitable for the manufacture of tools such as hoes or axes that are preferentially made of higher carbon steel. On metallurgical grounds, blooms and bloom fragments are therefore more likely to have been traded than *dābəl*. We have inadequate data on this point.

	Small	Medium	Large
Weights (g)	300	436	659
	294	428	501
	209	346	500
			461
Means (g)	268	403	530

Table 2. Estimates of production of blooms and small bar equivalents per annum by selected iron workers.

Iron worker	Blooms per annum (worker's or calculated estimate) ¹	Calculated small bar equivalent (range)	Iron worker's estimate of small bar equivalents produced per adult male worker per annum	Other estimates of small bar equivalents produced per adult male worker per annum ²
Bəhə Besanba	80-120	160-360	200-250	---
Makandau	90	180-270	150-300	225-300
Mamanda				
Gəzik Po	54-81	108-241	200	180-210
Besanba Vigu	35-70	70-210	---	---
Kwajimtə Dleku	---	---	---	133-170

Notes.

1. Days of smelting multiplied by nine blooms/day.
2. Calculations based on the number of pots filled with bloomery iron per annum and the number of *dəbəl* that could be made from the iron in each pot.
3. Besides their use in commercial exchanges, *dəbəl* also formed part of marriage payments, 100 to 200 small bars formerly being offered by young men to their prospective fathers-in-law. The stock of bars accumulated for this purpose may also be considered as a reserve that could be used to balance supply and demand in the commercial sector.

Three blooms we collected weighed 2.31, 2.04 and 1.47 kg (Fig. 2). Although they contained significant quantities of slag, chacoal and other impurities, they should have contained sufficient iron to make between two to three small *dəbəl*/totalling *ca* 540-810 grams of iron. We can therefore accept the estimate of two to three *dəbəl*/per bloom arrived at by Sassoon and his smelter informant. A very rough estimate of the numbers of small *dəbəl* (or their equivalent) each producer would have had available for export would thus be between two and three times the number of his blooms.

In Table 2 we provide estimates of blooms and small bar equivalents produced per annum by a number of iron workers. The estimates vary but within a limited range, and the overall ranking agrees with the reputations of these men as former smelters. Given these data and in the light of the foregoing discussion, the average Sukur adult male iron worker in an average year may be supposed to have had between 100 and 200 small bar equivalents to dispose of in trade.

Women's contributions to iron production

In practice men with several wives and/or healthy adolescent children could produce and sell far more than men without or with only one wife. This was due to the very great importance of women in iron *production* and their lack of significant participation in the iron *trade*. Wives carried charcoal for long distances and were expected to collect and wash at least a large pot (*daguzwa*) of magnetite ore, for their husbands; it was in part for this service that their husbands had made marriage payments to their future fathers-in-law. Women who gathered over one and half pots could generally sell or otherwise dispose of the excess; thus there was ore available for men without wives to participate in smelting. Besides supplying food and drink during the work, women would also take spells blowing the bellows. Some are remembered as having pumped throughout the making of a bloom, that is to say for forty minutes or more, a remarkable but credible achievement.

Despite the scale of their inputs, women received very little iron from their husbands, though they received other 'presents' in recognition of their work; they seem never to have sold iron in the market. What iron they got, they kept, later commissioning a smith to make articles for them. This being the case we may estimate the average number of small bar equivalents available for trade as 100 to 200 times the number of adult males participating in smelting.

Production teams

Although it is said that a furnace required three men to work the bellows, Sukur smelting teams varied within limits, changing as families developed individually and as parts of neighbourhood clusters (*tugiwa*). Bəhə Besanba described working in the 1930s as an unmarried youth with his father, who had six wives at the time, a married brother and four of their neighbours, also married. His father, a noted iron master who sometimes built furnaces for others, used at this time to direct simultaneous smelts in two furnaces located in separate enclosures a few metres apart. It is reported that Hidi (chief) Matlay also operated a pair of furnaces. Teams were composed as often, it seems, of near neighbours as of close agnatic kin, together with their wives and children. Among our five respondents the adult male team size per furnace varied between three and five with a mean of three and a half, representing three bellowsmen and half a furnace master. It seems that if there were more than five in a team they might well build two furnaces and operate them either simultaneously or in sequence. A team of three, with one member acting as bellowsman and furnace master, appears to be the smallest viable, though here again the contribution of women might exceptionally have allowed a team with a complement of only two adult males to operate a furnace.

Bəhə Besanba's team would work for about 40 days a year during the April-May smelting season. After working on the furnace master's (*fa ka dlya*) ore for a fortnight or so, they would smelt some or all of each neighbour's before continuing with that of the master. It took four days with two furnaces to smelt a large *duguzuwa* of ore, three days for a smaller pot. If the ore in a *duguzuwa* (75 - 100 litres or 187.5 - 250 kg) required eight furnace days to smelt, this at 9 blooms/diem would mean 72 blooms. Each bloom would therefore require 2.60 - 3.47 kg of ore. Bəhə Besanba's information would suggest about 10 *duguzuwa* of ore smelted as against the 12 or more expected, i.e. six in all for Bəhə and his father, and one to one and a half for each of the other five participants. This is not a major discrepancy, although other informants suggested much shorter times of 3-4 days to smelt a *duguzuwa* of ore in a single furnace.

The intensity of smelting at Sukur

Oral traditions: numbers of furnaces

Sukur traditions speak with one voice. Everybody of both castes was involved in smelting. We neither met nor heard of any family that did not participate. Furnace enclosures were usually close to the house, and elders can point to their former sites and name their owners, but the furnaces themselves have for the most part been destroyed by cultivation and rebuilding of terraces. Thus Bəhə Besanba told us that when he was a small boy 10-12 years of age there were five furnaces in the part of Dzuwok ward in which he lived; by the time he married there were eleven. As he was almost certainly born when Ndushəkən was chief, the number of furnaces he remembers as a small boy -- in the late 1920s -- would have been well below the norm as a result of Hamman Yaji's depredations. By the time he married in 1936, two years after Matlay had become Hidi, smelting would have been returning towards normal levels. As Bəhə named the furnace masters, his estimate is likely to be accurate or an underestimate. In 1992 that same part of Dzuwok ward had 14 households, 6.5% of a total of 215 in the Sukur plateau settlement. If this proportion of households in 1992 is applied to furnaces in 1936, we arrive at an estimate of 169 furnaces. However, greater emigration to the plains from certain other parts of Sukur implies that this figure is likely to be an underestimate. Other, in our view less trustworthy, estimates extrapolated to the settlement from respondents' information on their neighbourhoods or wards are: considerably over 133, 230 and 325. It would not be unreasonable to suggest that in 'normal' years between 170 and 200 furnaces used to operate in Sukur.⁵

Field archaeological evidence

Although we did not carry out a survey or census of furnace remains, there is a far wider distribution and greater density of slag and other smelting debris in the Sukur plateau settlement, especially around areas presently occupied, than anywhere else we have seen in the Mandara. While, as noted above, agricultural activities have everywhere been destructive of furnaces, in a now unoccupied part of Dūngom ward there are, within a few tens of metres, the remains of no less than six aligned along a small ridge where they might catch any breeze coming up from the deep Nawu valley to the west. These and other field archaeological observations are entirely consistent with elders' testimonies as to the general commitment of the community to the iron making industry.

Oral traditions: ore and charcoal supply

As noted above, one of the tasks of women during the rainy season was to collect and clean ore for their husbands and for sale. They did so over an area far greater than the home territory of Sukur. Similarly men went considerable distances into neighbour territories to cut and burn suitable trees for charcoal. Ore and charcoal supply were the subjects of institutionalized arrangements between the Hidi and neighbour chiefs, and it seems between the Hidi and his people. The Sukur, according to one informant,⁶ repaid their Hidi for arranging their access to raw materials by supplying him with sufficient charcoal, ore and labour to run three pairs of

⁵ K. Duku claimed that there had been 30-33 furnaces in two subwards of Dalak (Interview 921205 (3:17) and named eleven in the vicinity of his house. Ganəva Zavacera, Bulama of Daza ward (Interview 921025 (2:25)), told us that in the early 1940s there were '50' furnaces in Daza. Dai Kəɾba remembered 13 furnaces in parts of Gwassa ward now occupied by less than a third of the ward's 21 families. Using the same procedure, Kwajimtə's estimate suggests that there were more than 230 furnaces in Sukur, the Dai Kəɾba's considerably more than 133, possibly three times that number. Using Ganəva's estimate we arrive at a total of 325 furnaces.

⁶ Kwajimtə Duku (i/v 921126)

furnaces. Other testimony suggests that one of these pairs was worked directly by the Hidi and his family. However this may be, the Hidi would have been a major supplier of *dābəl* to the iron market.

In an interview with the chief of (Higi) Kamale, Vandi Arnado Slatu and his wakili, Garba Koji Tizhe, that may serve as an example, we were informed that relations with Sukur were long term and very friendly, and focussed on the iron trade. Sakun women would come and spend two to three weeks or more collecting and washing ore in the streams near the foot of the mountains, and would stay with women friends in Kamale while they did this. The friend would provide her guest with a large pot to store her ore until ready to return home. Meanwhile Sakun men burnt charcoal in the area. In exchange the Sukur women brought *dābəl* for their friends and the Hidi sent 4 to 6 blocks of iron (each may have represented three blooms) to the chief of Kamale through a representative known as the *cama*, a respected messenger. When Kamale men and women went to Sukur, their friends and partners would give them hoes. More generally the Higi supplied themselves with iron from Sukur, exchanging it for sorghum, chickens and money. They made no iron themselves.

Similar arrangements were made with the chiefs of Mildo Vapura and Mildo Shelmi, Hyambula (Sabon Gari), and possibly with Gulak and Duhu. The Margi of Maiva Palam and Dzu also allowed Sukur iron workers, some of whom resided in their territories, to supply themselves with iron and charcoal, though this does not appear to have been mediated by the Hidi but by individuals. A similar situation, again confirmed by their chief, obtained among the Waga. Ore was collected in the mountains and at their feet over an area extending north 20 kms to the Waga beyond Madagali, west 10 kms to Waanu near Duhu, and south 12 kms to Kamale and beyond. To the east, since the neighbouring Wula were themselves producers of iron, ore gathering was limited to the Sukur side of the Təcini valley. Men would go off in November/December to cut trees suitable for smelting charcoal over an area of some 500 sq. kms that extended out onto the plains.

The very large area exploited by Sukur for ore and charcoal and the formal enabling arrangements between Sukur and other polities are convincing evidence both of the degree of specialization in iron making by Sukur and of the scale of the industry that required such inputs.⁷

The distribution and numbers of Sukur past and present

Sukur now live on the Sukur plateau, on the plains to the north and south, on Mədləŋ mountain to the west across the Nawu valley, and as a component of the population of Madagali, Hyambula/Sabon Gari, Gulak and other settlements in Madagali and Shuwa Local Government Areas. In 1992-93 persons with Sukur (*sakun*) as first language are likely to have numbered between eight and ten thousand, including some 729 living in Damay and Damay Kasa who, although *sakun*-speaking, consider themselves Damay. However, we are here concerned to

⁷ A final, less obvious, source of evidence regarding the intensity of smelting will be mentioned here only in passing. It is quite clear from Sukur informants' accounts that the ritual associated with smelting is considerably less elaborate and much more routinized among the Sukur than N. David (unpublished research) has found among the Mafa, where the smelters are all of the smith/potter or 'transformer' caste. This is to be expected since, with the generalization of the technology to the entire community, its control was no longer the monopoly of a small subset and there was less concern with its transmission between generations.

rather to estimate, again using a variety of sources and arguments, the numbers of Sukur in smelting's heyday.

Population present

Official Nigerian census data are not easily obtainable nor, reputedly, are they reliable. Information on Sukur's 1992-93 population came from a variety of sources. In October-November 1992 we carried out a census of households in the seven Sukur plateau wards, the seven wards primarily occupied by Sukur on the plains, the hill settlement of Damay and its daughter settlement on the plains, and of Kurang, a mixed Kapsiki-Sukur settlement. Each ward head (Balam), or the chief in the cases of upper Damay and Kurang, was questioned, generally with other residents present, as to the numbers of household heads by clan. We will refer to this as the household census. It was modified in December 1992 by some reassignment of households from one ward to another. The second census, carried out in January 1993 by Philip Sukur, one of our assistants, on behalf of the Sukur Development Association counted 763 individuals by household in Jira, the three upper wards of Sukur. This was carried out by interviewing people in each tightly knit cluster of houses and families known as a *tugiwa*. As some households were missed or refused to respond, we use the following statistics and those shown in Table 3 calculated from this census as a basis for extrapolation:

Mean residents/household =8.38

Mean males/household =3.75

Mean females/household =4.64

Ratio males:females = 1:1.24

Table 3. Percentages of males and females by age in the Jira census of Sukur in 1992-93 (N=763).

	Males	Females	Totals
Old (>70 years)	2.2	1.8	4.1
Adult (15-70)	21.4	29.2	50.6
Children (0-14)	21.9	23.5	45.3
Totals	45.5	54.5	100.0

While the figure for mean residents/household is reliable, other statistics require comment. The ratio of males to females is low, in part because of the greater tendency of boys and young men to move away on a permanent or temporary basis, and does not reflect precolonial conditions. Although Philip Sukur made an effort to include all the young men who were temporarily absent making mats in the towns of northeastern Nigeria and northern Cameroon, others whose families remain on the mountain have moved away for schooling or to seek employment or other advantages on the plains below or in the towns. Therefore it is to be expected that there would be a deficit of men in the 15-70 age group, in fact concentrated in the 15-30 year range. The numbers of adult women may on the other hand have been a little exaggerated by male respondents claiming as wives some women who have in fact left them for others. We suspect that a truer ratio of males to females would be 1:1.1.

Estimates of ages are untrustworthy for complex reasons that need not be considered here. However, the vast majority of persons categorized in Table 3 as being of 15 to 70 years of age

are persons capable of putting in a full day's work and can be regarded as adults in the restricted sense that in the past they would have played the full part in smelting appropriate to their sex. The numbers of males in this age class are thus those taken into consideration in estimates of iron production. We can accept the element of systematic underestimation of the numbers of adult males in our extrapolations as, in any one year, some small proportion of adult males would, due to illness or for some other reason, find themselves unable to smelt.

Applying the more detailed information of the Jira census to the household census, we arrive at the following figures:

Jira wards of Sukur: 99 households; population 830

Təka wards of Sukur: 116 households; population 972

Total for Sukur mountain settlement = 1802

Similar calculations give other total estimated populations:

Sukur-dominated wards (7) on the plains: 2154

Damay hill settlement : 218

Damay plains settlement: 511

Kurang : 863.

The total population of the Sukur plateau, including the Damay hill settlement and Kurang, is therefore estimated at 2883 with a mean population density of about 93.3 per square km. Actual densities are in fact lower since the inhabitants of the plateau also exploit land in adjoining valleys and plains as part of their home territories.

Archival evidence on population

The settlement of Sukur on the plains north and south of the plateau is recent. MacBride (1937:2), who visited Sukur in 1933 and 1934, makes it clear that at that time there were only two Sukur settlements on the plain: Mədləŋ at the foot of the northeastern part of Mədləŋ mountain near to modern Mefir Suku and 'Blama Zugorio's.' On Mədləŋ mountain itself there was a recent settlement at 'Tukhum' (the modern Təghum, although its boundaries were not the same), subject to the Hidi and under the immediate authority of 'Mbakanyima,' (Mbaknyema of Bakyang clan who had migrated there from Sukur). 'Small colonies of Sukur emigrants' were at that time, he says, 'to be found as integral parts of Duhu, Maiva-Juyal (Palam) [i.e. Maiva-Palam and Dzu] and Mildu [we suspect the present Mefir Suku for the most part].' Thus sixty years ago the Sukur were largely restricted to the plateau. The move down to the plains had scarcely begun in the north and apparently not at all to the south, where Tokiya and Təkassuw are today Sukur settlements administered as part of Shuwa district. This is consistently confirmed by older informants who told us that, half a century ago when smelting was still being intensively practised, there were many more people living on the mountain in houses that were packed densely together. The valleys and plains below were heavily vegetated and much that has now been opened up by cultivation was then forest. Leopards were still a threat.⁸

⁸ If in the 1930s and early 40s the vast majority of Sukur lived on the Sukur plateau, this was not necessarily the case at all periods. We cannot entirely exclude the possibility that at some time or times in the past Mχldχng mountain and parts of the plains could have been occupied by Sukur. However we have walked these areas sufficiently to be sure that their relative poverty in occupational and smelting debris, which stands in such marked contrast to the richness of such remains on the plateau, must indicate that any such occupations, if they took place at all, were of very short duration.

MacBride continues, 'As a result of much emigration and the raids of Hamman Yaji during the period 1915-23 the population of Sukur itself is [in 1933-34] much diminished, and many of its compounds are ruinous and deserted.' The 1930s, the first half more than the second, were also a period of locust plagues and famine, so that population would not have begun to rebound until the late 1930s and 1940s. Unfortunately, on the question of population numbers, 'The District records are absurd,' as H.H. Wilkinson, then Assistant District Officer, noted in 1927. Until that year, Hamman Yaji had successfully kept several villages, including Damay and Sukur, off the tax rolls, and had concealed from the British the very existence of 'Arnado Sukur, an important pagan head.' Twenty years later, the annual report on the northern part of what was then Trust Territory (NAK Yolaprof 4747) gives the adult population of 'Kapsiki-Sukur,' which a pencilled marginal note indicates meant Sukur, Wula and Kojiti, as consisting of 1595 men and 1615 women in 1942-43, but these figures can scarcely be taken seriously, those of women falling to 1305 in 1944-45 only to rise to 2110 the next year! According to Kirk-Greene (1960:68) the population of the 'original village' of Sukur was 5033 in 1953. As will be seen, this estimate accords very well with our own.

Other estimators of past population

Carrying capacity

In view of the overall inadequacy of the archival materials, estimates of past population must make use of other approaches: extrapolations from characteristics of the present population, the study of abandoned houses, and evaluation of the carrying capacity of the Sukur plateau. Taking the third first, we must take into consideration overall inputs and outputs into and from Sukur, besides changes in production and productivity consequent upon the adoption of new crops, for example groundnuts in the 1940s, or changes in productive arrangements, or changes in the standard of living. The standard of living has improved in past decades as measured by increases in consumption of consumer items, besides improved access to education, health care and regional markets. Consumption of locally brewed beer has by all accounts increased, but although nutritious it is less so than food, requiring greater acreages of millet per person.

The single most significant change in production that has occurred over the last 40 years has been the collapse of the smelting industry and its replacement as a source of income by the making of zana matting by males and the cash-cropping of groundnuts by women. The Sukur produce almost all their own food. Groundnuts are the main and for women the major cash crop. Women also raise money by selling chickens; some are active as porters in cross-border trade or carry cases of bottled beer up the mountain to sell for a small profit. Men sometimes sell goats, sheep and, exceptionally, cattle. Older men cultivate tobacco, cure it and sell it as snuff. As previously mentioned, many young men go off for several months a year to earn cash by making mats. Many of both genders and all ages above eight or so are involved in petty trading, but there is no shop on the mountain and no industry other than agriculture and some mat-making.

Tillage is by hand. There is only one one ass plough in the Sukur plateau settlement. Almost all the land that is arable is either cultivated or in short fallow -- and here as elsewhere in the Mandara the definition of arable is stretched to include boulder-strewn hillsides and colluvial fans on steep slopes of major valleys. Several tens of hectares towards Damay appear to have been left uncultivated for a considerable number of years, either as a very long fallow or a result of abandonment associated with the movement of Damay down to the plain. This is the only

area of any size that appears underutilized at prevailing exploitation levels -- which must of course take account of the need for cash income, animal fodder, thatching and basketry. Off the plateau, the central sector of the Nawu valley bottom is also cultivated by people from upper Sukur. They also farm, as do Wula, in the Təcini valley that separates the two communities.

Cultivation is adapted to topography and soils. These are highly varied, ranging from skeletal soils on steep slopes, used mainly for beans and millets, to deep, moist soils in internal basins and along streams where sugarcane, bananas, rice, and other crops are grown. Crop rotation is practised. Around the houses, fertilized by household, animal and human wastes, maize and many minor crops are grown. Arboriculture is practiced on a small scale, and as much if not more for fodder and lumber than for fruit. Except on rocky slopes and in groves associated with spirits, almost every tree that grows is protected, trimmed, and exploited for one purpose or another. Among the most important is mahogany (*Khaya senegalensis*), an important source of oil, charcoal and fodder.

Firewood and good lumber are difficult to obtain; long posts now come from Mədləŋ mountain or places equally distant, requiring an hour and a half's one way journey. Women farming distant fields take the opportunity to bring back a headload of firewood, bark stripped to prevent rotting. Sorghum stalks are utilized for fuel. The existence, and not only on steeper slopes, of some extremely poor fields of millet⁹ also suggests that there is some pressure on land. It would appear therefore that, given the present economic adaptation of the population of the Sukur plateau, it is at or near its carrying capacity. Population density has never, it seems, been so great as to require, for lack of grass, the use of millet stalks for roofing as often among Mafa and Hide in Cameroon. Nonetheless we will argue that in the past the Sukur plateau was capable under a different, industrial, economic regime of sustaining a much larger population than it does today.

Although actual smelting took place mainly in April-May, preparations for smelting including ore collection and washing and some tree felling took place at about the same time of year as mat-making today, that is to say for the most part in September through November between second weeding and harvest. Since smelting ended there has been considerable rescheduling of activities and transfer of agricultural responsibilities between the genders. Of more immediate relevance here, Sukur and informants from neighbouring communities are unanimous in stating that during the smelting era Sukur was an *importer* of foodstuffs, exchanging iron for grain, chickens and other livestock with the Kapsiki and Higi, and for dried fish with northern traders. Sukur is now certainly a net exporter of foodstuffs.

In spite of possible increases in agricultural productivity, for example the replacement of sprawling by erect varieties of groundnuts, it seems certain that the need for cash to support an increased standard of living has resulted in increasing amounts of land being required per person. Thus carrying capacity has, given the increase in the standard of living, actually decreased over the years. While it is impossible, without detailed quantitative enquiries that we are unqualified to undertake, to estimate the change at all precisely, it seems extremely unlikely that, even when smelting was at its height and considerable amounts of food were being

⁹ The term 'millet' is used here to refer to sorghum (*S. bicolor*), commonly referred to in this part of Nigeria as guineacorn, and to pearl (bulrush) millet (*Pennisetum typhoideum*). At Sukur the main varieties of both millets are grown together in the same fields, and are harvested, threshed and stored together.

imported to pay for iron, Sukur territory could ever have supported more than three times its present population.

In the Cameroonian Mandara the 1968 census showed population densities of about 130 per sq. km. among the Mafa living north of Mokolo and the Mofu-Diamaré of some eastern massifs, with over 200 per sq. km. being attained in the north by the Podokwo (Boulet in Boutrais 1984:110). At around the turn of the century, the home territory of Sukur appears to have comprised its portion of the plateau, a small part of the plains to the north and south, the Nawu valley to the west and the western half of the Təcini valley to the east. This represents an area of approximately 46.3 sq km, Damay holding 5.7 sq. km. and Kurang 7.4.

The present populations of these areas can be calculated only approximately as there are differences between Sukur home territory as defined above and the areas of the plains wards covered by the 1992-93 household census. Nevertheless the following statistics give a reasonable indication of present densities:

	Population	Area (sq. km)	Density /sq. km
Sukur	3956	46.3	85.4
Damay	729	5.7	127.9
Kurang	863	7.4	116.6
Totals	5548	59.4	93.4

At Mafa density levels of 130 per sq. km. comparable to those of the Mafa in 1968, these areas would support 6019, 741 and 962 people respectively. These data indicate that, for the turn of the century, a Sukur population of 6000, resident on the plateau but exploiting the nearby plains and valleys, is quite possible.

Areas of former habitation

The physical evidence for a once larger population consists of occupation debris in areas now fields or bush and abandoned houses in the main area of settlement. Oral traditions hold that a long time ago people used to live on top of Muva hill, at its southwestern foot in the area called 'Wai and on nearby Tukutl hill. They are confirmed by the presence of potsherds, grindstones and smelting debris. Remains of structures have been largely incorporated into agricultural terraces and are only rarely recognisable as parts of houses. There are house remains elsewhere on the plateau where people no longer reside today, for example on Rwa Tliđi hill and in Manjam, and north of the Rak gateway where the northern paved way begins its steep descent to the plains.

Over the past half century there has been a tendency for settlement either to converge on the central core of Sukur or to move off the plateau entirely. Thus much of the area called Kiggi at the southeastern foot of Muva was abandoned some 20 to 30 years ago, with families moving either centripetally to Futu, east of the north end of Muva mountain, and Dujgom, south and west of the Hidi's residence, or down from the plateau to Madagali.

Abandoned houses

Sukur houses (or compounds) consist of an outer dry stone wall and a variety of inner stone and daub rooms (or huts). When we speak of abandoned or reoccupied houses, we really mean the sites delimited by the more permanent outer walls. The rooms are built and rebuilt to suit the family's needs. In Dũngom ward and in an area called Təmbutə that was transferred in late 1992 from Dũngom to Dalak, there are at present 34 houses occupied by families and three by widows. There are also the remains of 39 houses, of which at least 36 were abandoned this century. Of these, 22 were abandoned when their occupants emigrated, in an early phase to Tawla and other settlements on Mədləŋ mountain, and in a larger, later, movement to the plains. The first emigration is that recorded by MacBride and is associated with the opening up of the area following the establishment of the *pax Britannica* and with the famines of the 1930s. The second is related to the economic developments initiated by the collapse of the iron industry in the 1950s; many families chose to move down to settle and farm the plains where land was then freely available. The bleeding away of the mountain population now appears to have ceased. Of the remaining abandoned houses, three had been allowed to collapse after the death of the owner, four as a consequence of their owners' moving within Sukur settlement, and six, four of these being very old abandonments, for unknown reasons.

Unfortunately we failed to obtain evidence on the dates that the *occupied* houses were first built, and thus cannot produce an elegant equation relating present to past settlement in Dũngom. However it is certain that the vast majority of the occupied houses in the area under consideration have been occupied and reoccupied for generations (although not always by kin of their original builders). It would therefore seem reasonable to infer that in the past, at a time when population was neither very high or very low, Dũngom might have had about twice its present population. It should be noted that this part of Sukur has probably seen less emigration than any other. In the upper part of Gwassa ward we counted 29 abandoned houses in an area in which only eight are presently occupied.

The evidence of formerly occupied areas and of abandoned houses thus combine to indicate that a population two to three, if not more, times that of the present could have been supported in the past, especially if at that time Sukur was a net importer, rather than as now an exporter of foodstuffs.

Estimate of late 19th century population

In recent decades the Sukur have benefited from government programmes of vaccination and subsidized healthcare, and larger scale campaigns against locusts that have certainly resulted in decreased mortality, although this is still very high in the first five years of life. These factors, together with the cessation of raiding and warfare in the early 1920s, must have substantially damped down the amplitude of swings in population numbers. There has been hunger but no famine since the 1930s, and no epidemics causing catastrophic loss of life. We would therefore expect the present population to be greater than that of the past, and indeed it almost certainly is if our very tentative estimate of 8000-10,000 Sukur speakers today is even approximately correct. But they live over a much larger area than the Sukur of the turn of the century.

Our limited archaeological and archival evidence indicates that the settlement of Sukur away from the Sukur plateau postdates the fall of the polity to Hamman Yaji in the early 1920s and quite possibly his deposition in 1927. Kirk-Greene specifies that in the mid-1950s the population of the Sukur plateau settlement was in excess of 5000. A consideration of carrying capacity, taking into account changes in economy and standards of living, indicates that a turn of the

century Sukur population of 6000, resident on the plateau and heavily engaged in smelting, is consistent with both the Sukur and comparative data from elsewhere in the Mandara highlands. Qualitative assessment of areas of former habitation on the plateau, and quantitative study of abandoned houses in a Sukur ward are not at variance with a population two, three or even more times higher than that of the present. These different but mutually supportive lines of argument allow us conservatively to conclude that, as a correlate of a different economy, a lower standard of living, of the importation of food, and despite a likely higher mortality rate, Sukur populations on the plateau could in the second half of the 19th century have averaged at least twice to over three times their present size. We may retain estimates of Sukur population for this period in the 4000 and 6000 range, equivalent to population densities of 86.4 to 129.6 per sq. km. At these densities combined population estimates for Sukur, Damay and Kurang would be from 5132 to 7698 persons.

Estimates of annual iron production at the turn of the century

Estimates of Sukur average annual production of iron for export may now be calculated using statistics generated in previous sections as follows:

a) Estimate by number of male adult smelters times average production for export:

N adult male smelters = Estimated population of Sukur x percentage of adult males =
4000 to 6000 x .214 = 856-1284

Average adult male's annual production for export = 100-200 small *dəbəle* equivalents.

Estimate of small *dəbəl* equivalents produced for export per annum = 856 x 100 to 1284
x 200 = **85,600 - 256,800**

b) Estimate by furnaces and teams:

Estimated number of furnaces: 170 to 200

The average furnace team includes 3.5 workers and thus will produce 3.5 times the average export production of an iron worker = 3.5 x 100 to 3.5 x 200 small per annum.

N furnaces times average team production range = **59,500 - 140,000** small *dəbəle* equivalents per annum.

We may crosscheck the above estimates in the following manner. If average adult male team size per furnace was three and a half, then the number of furnaces that could be manned by the estimated population of adult males = 856/3.5 to 1284/3.5 = 245 to 367 furnaces. These numbers are slightly higher though in the same range as those estimated by other means, and lower estimates have been used in the calculations above. This gives us some confidence that our estimates of annual exports are indeed conservative.

The figures for exports gain immediacy when we reflect that the weight of 100,000 small *dəbəl* is approximately 27 metric tonnes, and when exports are converted into hoe equivalents, the hoe being the most basic farming tool of all in this part of Africa. In 1986, Ian Robertson, a member of the Mandara Archaeological Project team, made collections of hoes forged by different smiths for different markets. A set (small planting hoes excluded) manufactured by Wandala and other plains smiths for use by plainsdwellers has an average hoe weight of 353 g (n=18; range = 221-520 g.). A plains Muslim smith also provided Robertson with two specially-made hoes, weighing only 211 g. and 215 g. but otherwise indistinguishable, that he said were of 'old' type. At the time Robertson was uncertain whether this was because they were smaller or because they were made of old, locally smelted, iron, which appears not to be the case. Oral

traditions regarding iron that we have collected in the Mandara over the past decade are consistent in stating that in the earlier part of this century iron was a relatively expensive metal - not every household could afford an axe -- and that it was carefully recycled (David and Robertson 1996). We suggest that the 'old'-type hoes given to Robertson were characterized as such because of their small size, which reflects the formerly much higher cost of iron stock. If this is the case, then, even with the loss of metal to oxidization that is an inevitable part of forging, a single small *dəbəl* weighing 270 g. would have been sufficient to make a plains hoe.

If that is the case and if our estimates of iron exports are reasonably accurate, then Sukur's impact on the economy of northeastern Nigeria must have been enormous, supplying every year the metal for between 60,000 and 255,000 small plains hoes or very approximately 40,000 to 180,000 hoes of modern average weight.¹⁰ Similarly, Sukur's demands for ore and charcoal were very substantial. Using the statistics developed above and reckoning an average bloom weight of 2 kilograms, we may calculate that a *day's* smelting by Sukur's 170-200 furnaces would have required from 4.9 - 5.6 tonnes of ore and 16.3 - 19.2 tonnes of charcoal. In the course of a year's production, Sukur would have used 77 - 328 tonnes of ore and 255 - 1093 tonnes of charcoal to produce the 24,000 - 102,720 blooms required for export purposes alone. These figures underscore the importance of maintaining friendly relations with those neighbours whose lands produced surplus magnetite and hardwoods suitable for smelting charcoal.

The iron trade

Although the role of the Wandala in the traffic of Mandara montagnard iron north to Borno is well known (Hunwick 1971), and Denham (1966:336), in 1823 the first European to visit the Wandala capital of Mora, commented on the abundance of iron in the region, we are aware of no comparable external evidence regarding the Sukur iron trade. Oral traditions collected in 1992-93 do, however, allow us to build up a fair picture of smelting in the region and of the flows of iron within and beyond it.

In 1992-93 we failed to obtain information about smelting from residents of Damay, the independent but Sukur-speaking settlement on the northern part of the Sukur plateau. It is our impression that smelting debris is much less densely distributed in that settlement than at Sukur. This suggests either a shorter span of occupation -- indicated by oral traditions -- or a lesser commitment to the iron industry, or both. Two Sukur title holders told us that a tax, *budə*, had been collected by the Hidi before the whites came and that it was also collected from Damay and Kurang, but not from the Wula.¹¹ If this is true, it was presumably because Damay and Kurang participated in the iron trade and made use of the Sukur market.

Njing Tsoda, the chief of Kurang, told us that smelting used to be practised there by men of the farmer caste.¹² The smiths stuck to their forges. Some of their iron was sold into Cameroon,

¹⁰ The weight of the modern average plains hoe plus 10% (for loss in the forging) is approximately 390 g., requiring 1.44 small *dəbəl* for their manufacture. Estimated exports (from Sukur itself) have been estimated above as equivalent to between 59,500 and 256,800 small *dəbəl*. The hoes used by the Sukur are today, and were probably also in the past, larger and heavier than many plains hoes. Informants agreed that two small *dəbəl* were required to make one such hoe.

¹¹ 930128 (3:97) Tlagama and Tlisuku .

¹² 921028 Njing Tsoda, Mazɣ Kurang 55-60 yrs (2:44).

though not to the Mafa, and the proceeds used to buy cattle. The Fulani of Sir and the Kapsiki of Mogode were their main trading partners, and they also sold to the Higi of Mayo Wandu in Nigeria. Despite the presence of Sukur at Kurang, the settlement appears to have been less committed to iron manufacture than Sukur itself. We doubt that significant quantities of iron were exported from Kurang via the Sukur market; if any tax was paid, it is likely to have been nominal.

Vaughan (1973:171-2) states that among the Margi Dzirngu, who had ceased to smelt about 1955, both smiths and non-smiths made iron, and that 'Each family -- more properly each compound head -- had its own furnace.' However it would seem that communities differed in their commitment to smelting, that of Ghumbili, where Vaughan found the remains of over two dozen furnaces in a valley not more than a mile long, being more active than most. Aji B. Medugu of Gulak informed us that only men of the smith/potter caste were furnace masters, although others were often members of smelting teams.¹³ According to him, the Margi of Gulak were not big producers of iron; they made it for their own use and were not even fully self-sufficient. Tools were bought from Higi smiths.

Among the Margi of Mildo, non-smiths made iron; smiths only forged it. Women were not involved in actual smelting but collected ore with the help of men who prepared the sluices for cleaning it. Ore came principally from Yibango towards/below Muduvu. Charcoal was obtained locally, and it will be remembered that Sukur purchased the right to cut in their territory. These Margi can hardly have been more than self-sufficient in iron.¹⁴

The Mazhinyi Margi of Hyambula-Sabon Gari did not, according to their chief,¹⁵ make iron themselves but obtained their iron from Sukur. Some went to the Sukur market to buy *dabal* and tools. They also, he said, got tools from Gulak.

The Waga made their own iron, non-smiths being active in smelting. According to their chief, they sold iron to the Margi of Gulak and the Higi of Michika and to Kanuri.¹⁶ This is quite unlikely, except on a very *ad hoc* and occasional basis, especially as, again according to the chief, Sukur came to cut charcoal and collect ore in Waga territory, Sukur even staying with Waga friends. Mabas-speakers from Vemgo were also permitted to collect charcoal and ore. Given that they allowed others to exploit critical raw materials in their territory, the Waga can not have been big players in the iron trade. Nor indeed were the Fulani of Mdagali, who are not known to have practised smelting and whose smiths were almost certainly largely drawn from other populations.

Mabas, just across the Cameroonian border, is well-known for its smelting, but on a scale much smaller than Sukur. (Preliminary 1987 census results made available to N.D. in 1989 give its population and that of its daughter settlement Maksi as only 586.) Its chief informed our assistants that everyone made iron, and they noted the presence of smelting debris from the

¹³ 921103 Aji B. Medugu of Gulak ?65 yrs (3:21)

¹⁴ 930214 Ptil Jildawa Zabagawa of Vapura (4:35)

¹⁵ 921215 Lawan Abarri of Hyambula-Sabon Gari (3:45)

¹⁶ 930105 Lawan Idirisa Ndurwa of Waga 3(79)

(Nigerian) foot of the mountain up the slope to the (Cameroonian) top.¹⁷ Iron was made into *dəbəl* and exchanged with the Mafa, and, he said, with Higi. It is likely that this was through the Sukur market to which Mabas went to buy cattle, fish, salt and natron from northern traders. Thus the Mabas made use of the Sukur market and sold some of their iron through it.

Among the Wula, all could, and many did, smelt iron.¹⁸ Women collected the ore and assisted in pumping the bellows at the smelt. Ore was collected in the Təcini valley and other streams, but essentially locally. Charcoal burning by men on the other hand involved both local cutting and expeditions eastwards as far as Gawar. Clearly a lot of iron was smelted, of which some was converted into *dəbəl* and was used for buying animals (cattle, chickens) especially from their close linguistic neighbours, the Kapsiki who did very little smelting of their own (van Beek 1992: 41). Iron was also sold to both Mafa and 'Bulahay' settlements further east, whose inhabitants apparently made their way to Wula to purchase it. The chief also said that the Wula did not sell iron at the Sukur market, even denying its existence! He claimed that 'Vuwa' northern traders came directly to the Wula to purchase iron. However, the Wula population is significantly smaller than that of Sukur -- there are about five sevenths the number of taxpayers¹⁹ -- and the scale of Wula production is unlikely to have attracted long distance traders, especially since a significant proportion of its commercial flow was to the east and south. It is of interest that van Beek (1992: 41) states that the Kapsiki -- by which we should understand in particular the Kapsiki of Mogodé, where most of his work was done -- relied on Sukur for their iron supply.²⁰ Livestock and sorghum were the main items said to have been offered in exchange. The Kapsiki were very probably also the main suppliers of a small volume but socially significant trade item, the brass ornaments important in especially Sukur women's but also men's ceremonial costume (Wade 1986 and unpublished 1984 fieldnotes on Sukur; see also van Beek 1991).

The Higi of Kamale, as noted above, also obtained their iron from Sukur, despite the presence on their territory of both ore and charcoal. Sukur does not appear to have maintained such a close partnership, which also involved the indirect participation of Hidi Sukur in the installation of the chief of Kamale, with any other Higi polity. Higi came to the Sukur iron market and exchanged foodstuffs and craft items, including cloth strips (and later cash) for iron. Neither did the Margi of Maiva-Palam and Dzu smelt themselves. Although families of Sukur smelted in Dzu, where they had settled since the turn of the century if not before, their iron was insufficient to satisfy local demand. These Margi would take guineacorn, chickens, ochre and pottery to exchange for iron at the Sukur market.²¹

To summarize, Sukur was by far the largest producer of iron in the region, supplying a substantial part of the needs of the northern Kapsiki and northern Higi. The Bana of Bourha seem to have played a similar role in servicing more southerly settlements (N. David fieldnotes

¹⁷ 921211 Chief of Mabas (3:38) as told to John and Philip.

¹⁸ 930121 Lepɣda, Arnado Wula (3:85)

¹⁹ According to information kindly supplied by the then Ag. District Head, Buba Musa, in February 1993, there were 710 Sukur as against 515 Wula taxpayers.

²⁰ van Beek includes the Wula among the Kapsiki. We suspect that they are the only speakers of a *psikye* dialect who smelted iron in any quantity. The presence of basalts and other volcanics on the Kapsiki plateau presumably results in lower availability of magnetite ore.

²¹ 930202 Ptil Abadija Abarri of Maiva-Palam (3:102), 930214 Ptil Cinda Buba of Dzu.

1990; S. H. P. Vereker's Uba District Asst. Report of January 1914 [NAK SNP17/1 (1412)] probably refers.)

The Margi of Maiva-Palam and Dzu were also dependent upon Sukur, other Margi neighbours varying in their productivity but, as a grouping, being no more than self-sufficient, as appears also true of the Waga. Sukur-speaking Damay no doubt exported iron through Sukur, and if their population in the late 19th century was about the same as today and they smelted even half as intensively as the Sukur proper, may have contributed between 7500 and 15,500 small *dābəl* equivalents to the market.²² The Mabas probably did smelt as hard as the Sukur but were many fewer in numbers. Nevertheless, despite a considerable flow of their iron eastwards to the Mafa, some of their output was sold on the Sukur market. The Wula, despite their close ties with Sukur, appear to have concentrated on servicing their eastern and southern neighbours, but not to have marketed significant quantities through Sukur.

*Trade with the Vuwa*²³

Within the region, the Higi and Kapsiki were Sukur's main clients and the only ones to have consumed significant quantities of its output. According to van Beek (1978: 455) they number over 150,000. Let us assume for purposes of argument that about one third, or 50,000, were supplied with Sukur iron. This figure seems reasonable since they did some smelting of their own and were also supplied by the Wula in the north and the Bana in the south. Let us further assume that their households as at Sukur averaged 8.38 persons, and that annual consumption of hoes stood at two per household, plus one small *dābəl* or its equivalent for all other tools, weapons and ornaments. This level of local demand would still have left something of the order of between 36,000 and 234,000 small *dābəl* equivalents available for longer distance trade ²⁴ -- plus a portion of the output of Damay and Mabas. While we can have very little confidence in what is no more than informed guesswork, it does suggest that there was a substantial supply of Sukur iron that was available for export beyond its immediate region, and that the volume was sufficient to support regular long distance trade.

Once again, Sukur oral traditions, referring to the 1930s and 1940s rather than to the nineteenth century although the overall pattern of commerce is unlikely to have changed, are consistent in that there was such a long distance trade, and that it was conducted primarily by 'Vuwa' traders from the north. These we may regard as Bornoans, though not necessarily as ethnic Kanuri. Fulbe also came to the market to obtain iron, and jewelry was mentioned by one informant as sold by them. Except in the rains when travel was difficult, the traders arrived with loaded donkeys and camels, and ascended the mountain via the northern paved way (Fig. 3) to the market, 1.7 km from and 300 m above its base. Next to the house of the Hidi, some 850 m beyond, the traders spent the night and were looked after through his good offices.

²² $719 \cdot .214 = 153.9 \cdot 50$ to $153.9 \cdot 100 = 7695$ to 15390

²³ The very name 'Sukur,' 'Kasukur' in Kapsiki ('ka' being a prefix meaning 'people of'), by which Sakun is known to its neighbours, may be evidence of its primacy in regional trade. It seems likely to derive from Arabic *suq* meaning market, probably through Kanuri *kasugu*, and a Kanuri suffix *-ri* meaning 'the place of,' as in Maiduguri, the place of the Maidugu (junior royals). This is a guess, and we hope that the argument of this paper will not stand or fall by its accuracy. The Kanuri word for iron is *su*!

²⁴ $50000/8.38 = 5970 \cdot dābəl$ required per family = $2 \cdot 1.44 + 1 = 3.88$. $5970 \cdot 3.88 = 23150$ small *dābəl*. Remainder for export thus between $59,500 - 23,150 = 36,350$ and $256,800 - 23,150 = 233,650$.



Figure 3. A section of the northern paved way below the turnoff to the former iron market.

The market was held on Mondays. Neither the Vuwa nor anyone else appear to have paid a market tax, though we may suppose that they repaid the Hidi's hospitality in various ways, and in part by offering him favourable rates of exchange for his iron and first choice of their goods. It may have been one of the responsibilities of the Dzrma, a title holder who also acted as herald, to act as the Hidi's sales manager. One informant stated that another title holder, the Tlagama, a man of the smith/potter caste and one of the Hidi's drummers, was responsible for maintaining order and cleaning up the market, but this was denied by the present holder of that office. Indeed we have learned very little about the organization of the market, though information regarding imports appears quite reliable. Salt, natron, dried fish, onions, clothing, cattle, beads, large northern sheep, goats (?), the occasional horse, and, curiously, snacks made of groundnut paste were, in order of the frequency of their mention, the prime items brought by the Vuwa. The traders returned north with *dəbəl*, other iron manufactures and a special kind of chilli pepper grown only in the hills.

Even if our upper estimate of 234,000 small *dəbəl* equivalents was carried away by the Vuwa, that quantity of *dəbəl* weighs approximately 63,180 kg or 903 donkey loads a year, perhaps 23 a week for nine months of the year.²⁵ However vital the iron for farming the firki of the Lake Chad plains, it is not surprising that such a relatively small volume of trade should have escaped the official notice of early colonial administrators. Nonetheless we shall attempt to demonstrate

²⁵ Raymond Mauny (1967:396) gives 70-80 kg as the normal load of a donkey in West Africa; Hopkins (1975:72) suggests 'about 100 lb' but this seems far too little. We have used 70 kg as the basis of estimate. If the Vuwa used camels, their normal load was 125-150 kg. (Mauny 1967:395).

below that its impact on Sukur society, for whom the northern traders were the main suppliers of cloth and beads among other luxury items, was very great.

We cannot as yet date the beginnings of the iron trade at all accurately. A [midden](#) close to the Hidi house and we believe associated with this phase in Sukur history appears unlikely to have begun to form before the sixteenth century. In the mid-nineteenth century, Sukur's reputation reported by Barth (1965 (1857), vol. 2: 100, 117fn.) as 'a powerful and entirely independent pagan chief' who 'overawes all the petty neighboring chiefs' can surely only be accounted for in terms of the iron trade, especially since that perspicacious traveller realized 'what a small province it must be, comprehending little more than the capital and a few hamlets lying close around.' (David and Sterner 1995: 1). Another indication of the age and importance of the iron trade is the northern paved way, with its spur leading to the iron market. Now attributed by the Sukur to supernatural beings, this major public work was built, we suggest, by *corvée* labour and at the Hidi's behest to service that trade and to impress the Vuwa and other visitors.

Classless industrial society

In smelting, the critical force of production was neither capital nor labour but rather the raw materials, ore and charcoal. Given access to a large enough area, both could be obtained by familial production teams of small groups of kin and neighbours. While smelting seems only to have taken place in April and May, both men and women spent a substantial (but unquantifiable) part of their time accumulating raw materials in during and following the rains (Table **!!at end**). The most we can say is that men's labour was involved with activities directly related to smelting for at least four months of the year, and women for five. Men's and women's contributions were complementary; there was no institution of wage labour, nor, unlike on the plains, any significant slavery. There was therefore no development of a class of capitalists (far less of state capitalism), nor of a proletariat, nor was any managerial expertise required beyond that of the Hidi. His role within Sukur society was one of coordination and facilitation, not of implementation or control. His role *vis à vis* the exterior can be characterized as primarily diplomatic, in that he maintained relations with local rulers that both ensured supplies of raw materials and guaranteed neighbouring communities and the northern traders access to an orderly market. In a subsequent publication we shall attempt to show how, in order to fulfill these roles, he had to be a Janus among rulers, operating by different cultural codes according as to whether he was dealing with his montagnard kin or representatives of the larger world of Muslim plainsmen. This dual exposure has wider implications for the shaping of Sukur society, but we are here concerned more with its constitution and organization than its culture.

Sukur of both castes produced the iron blooms and the smiths fined and forged them into *dabəl* and other items. This was a major task that must have engaged the smiths throughout the year, denying them the opportunity to farm on any but the smallest scale. Smith/potter households were clearly welcomed as immigrants and sometimes sponsored by farmer clans (the Kwasha by Yanna and the Kwazhuwa by Shagwam). Today they represent (according to our household census of the plateau and plains wards) 9.4% of the community, about twice to nearly four times their numbers in other casted Mandara social formations.²⁶

Indeed Sukur, because less dependent on agriculture and thus less sensitive to pressure on land than many other Mandara groups, could afford to welcome immigrants whether smith/potters

²⁶ Djimi!! check

or of the farmer caste. Their labour increased iron production and thus the importance of its market. Individuals and very probably small families of *cirmuyim*, a term that can be glossed as 'persons found among the rocks,' were incorporated into existing clans, in at least one case founding a named section. The related Kiggi and Zwahai clans may serve as examples of larger groups of immigrants, in their case coming from Higi territory, that became part of Sukur society without their kin identities becoming merged with those of their hosts. In 1940 Sukur had at least 22 of the exogamous patrilineal descent groups (*səɔ*) that we gloss as clans. This requires explanation inasmuch as many fewer such units are found in most other Mandara polities of comparable size. The Mafa of Vuzai-Krbai appear fairly typical, with only seven represented among 573 households (surely over 4000 persons) (Müller-Kosack 1991). In more complex societies such as the Mofu-Diamaré princedoms, clans are more numerous, 18 for a population of 5150 at Duvangar for example, with 15 for 10,230 at Durum perhaps because, being further from the plains, it received fewer refugees (Vincent 1991:44, 123).

Within Mandara highland societies, the number of exogamous descent groups in a polity seems to be positively correlated both with political complexity and population size. This correlation could be reached by different routes. Among the Mofu-Diamaré, it was the pressure of the Fulbe state of Adamawa -- and no doubt previously of the Wandala -- that stimulated a flow of refugees from plains to mountains and the emergence of the princedoms so well described by Vincent (1991). We would argue that in Sukur, situated beyond the limits of Wandala or Bornoan predation, the process of industrialization attracted immigrants and led to political developments that, while anomalous in the Mandara, are yet elaborations of a common montagnard cultural heritage.

To return to the question of clans; wherever they lived before coming to Sukur, all claim and are accorded by others an ultimate origin in Mpsakali (equated with Gudur, in Cameroon), a centre important for the magical protection its chief could provide against locusts and other plagues (Jouaux 1989, 1991; Seignobos 1991b). Claims to Mpsakali origins are by no means unusual in the Mandara; what is exceptional is that an entire political community should maintain them. In Sukur the myth serves, we contend, as a convenient mechanism of societal integration.

This is furthered by a great elaboration of title holding, such that all but two clans resident today holds at least one title (David and Sterner, in press b).²⁷ The title holders do not constitute a formal council, and behave in practice very like the untitled senior elders of clans in more typical, relatively unhierarchized, montagnard groups (cf. Martin 1971, von Graffenried 1984, and Vincent 1991 on the northern Mofu-Diamaré). The major difference that we have so far determined is that there is an increased division of ritual labour in Sukur, less self-sufficiency and more delegation of religious duties to part-time priests, the *mbazafwai*. Since there are only three or four titles besides that of the ruler even in the Mofu-Diamaré princedoms (Vincent 1991), it would seem that Sukur has gone out of its way to create and distribute titles among the clans, in part as another integrative mechanism. The institutions of the Hidiship and other titles

²⁷ Also significant are the sources of the twenty different titles that we infer go back to the turn of the century. Three or four are of Kanuri origin; one comes from Wandala (perhaps by an indirect route); one was borrowed from the Fulbe; two or three are Sukur renderings of common montagnard concepts; two are shared with neighbours and may have originated in Sukur; nine or ten appear to be peculiar to Sukur (see David and Sterner 1995). Thus the major exterior source of titles, and very possibly the stimulus for elaboration of title-holding, is precisely the one implicated in the iron export trade.

certainly constitute complexity, but here this is not to be construed as implying the existence of classes or even a notable degree of ranking. The Hidi apart, complexity is rather a facade, a veil thrown over a remarkably egalitarian society, in which the hierarchic principles of seniority of age and of the male gender operated very much as they did in the simplest Mandara societies, and in which the theoretical seniority of first settlers over later comers was a principle as frequently set aside or overtaken by political events.

The relative egalitarianism of Sukur society be best seen through comparison with the Mofu-Diamaré princedoms. There the members of the chiefly clan, the 'gens du prince,' as Vincent (1991: 230-243) terms them, had various significant economic and other advantages over members of other clans, the 'gens du rien.' Even among the Mafa of Gousda there is a degree of stratification between members of the chiefly clan, respected clans (*sasak*) and the *kda*, literally 'dogs' (Müller-Kosack 1987: 47-65). This is and was much less the case at Sukur, where the importance of access to land as a source of wealth seems to have been no more and perhaps less important than access to technological expertise, passed down in the male line but very widely distributed in the community, and a large family. Nor were women, whose contribution to iron making was so important to their husbands' production, monopolized by a male gerontocracy. On the contrary, it was expected that when young men were initiated in their late teens or early twenties, they would marry in the same year.

Although advantages must surely have accrued to close kinsmen of the Hidi and to his immediate supporters, it appears that the Hidi was the only personage with special opportunities to accumulate wealth, most notably the estates worked by *corvée* labour, an iron tax and his links with the northern traders. The relatively large numbers of wives and children of a successful Hidi²⁸ seems not to have been important in cementing political alliances -- although in the longer term their numbers contributed to the success of his line -- nor, as among the Mofu-Diamaré, to have been a celebration of the chief's life force. Wives and children would on the other hand have contributed directly to the amount of iron produced by the Hidi as furnace master.

In precolonial times simpler Mandara polities had no formal mechanisms for the conduct of foreign relations. What passed for wars might erupt at the death of an esteemed elder, or an insult passed across a boundary stream. Trade and exchange between groups was a matter of individual initiatives that often capitalized on bonds of kinship. Among the Mofu-Diamaré the princes exercised greater control over foreign relations, including warfare, slaving and the paying of tribute, but a substantial measure of informality still existed (Vincent 1991: 99, 101, 287, 394). Hidi Sukur's roles in the installation of several neighbour chiefs, in obtaining access to raw materials, and in guaranteeing the market have already been mentioned. He also mediated on behalf of his people for rain with the Wula rainmaker (David and Sterner 1995, 1997). Smith and David (1995) have argued that the Hidi's former power, unlike that of the Mofu-Diamaré princes and even of some petty montagnard chiefs, can not be seen as 'emerging from politically neutral origins [such as identification with the godhead] that claim to transcend specific political contexts through their universal validity,' but rather had to be continuously negotiated and reinforced, in part through the manipulation of space. In practice Hidis were often unable to hold on to power and there were frequent coups (David and Sterner 1995), but the institution

²⁸ Matlay is reputed to have had twelve wives (Interview 921206 with Tlisuku and Tlagama), and Kuraatχ some 30, but such figures can only be considered generally indicative, since there is considerable divorce and remarriage.

was of such vital importance to a community that made its living by manufacture and trade, that it was to the advantage of all that it be maintained. However violent the overthrow of a Hidi might be, it seems that the process affected the majority of Sukur society very little, and that, even within the chiefly clan, the seizing of power by one line was accompanied by political realignments of others that allowed for reintegration of the community.

Sukur, committed to industry, dependent upon peace with its neighbours for supply of essential materials²⁹ and within itself to achieve levels of production sufficient to attract foreign trade, constituted a classless industrial society that may well constitute a hitherto unknown political form.

Acknowledgements

This research was funded by the Social Sciences and Humanities Research Council of Canada and was authorized by the National Commission for Museums and Monuments, Nigeria. We wish to thank Barrister T. Sirimtu, Chairman, and Mr Denis Afkawa, Secretary, for generous logistic and other support provided by Madagali Local Government authority. Hidi Gezik Kanakakaw, the Sukur Development Association, and the people of Sukur gave us all possible assistance and our gratitude to them is profound and deeply felt. This paper could not have been written without the contributions of John Tizhe Habuga and Philip Emmanuel Sukur, our much appreciated assistants. We thank James Wade for permitting us to use his unpublished 1984 fieldnotes on Sukur smiths and metal-working.

References

- Barth, Heinrich 1965 (1857). *Travels and discoveries in north and central Africa*, 3 vols. London: Frank Cass and Co. Ltd (Centenary edition).
- Beauvilain, Alain 1989. *Nord-Cameroun: crises et peuplement* (2. vols). Privately printed (Thèse de Doctorat ès Lettres et Sciences Humaines, Université de Rouen, 1989).
- Boulet, J. (with A. Beauvilain and P. Gubry) 1984. Les groupes humains. In J. Boutrais ed., *Du politique à l'économique. Études historiques dans le bassin du lac Tchad*, Paris: Editions de l'ORSTOM III, 103-157.
- David, N., D. Killick, R. Heimann and M. Wayman. 1989 Between bloomery and blast furnace: Mafa iron smelting in North Cameroon. *African Archaeological Review* 7:183-208.
- David, N. and Y. Le Bléis. 1988 *Dokwaza: last of the African iron masters*. Videotape (50 mins). University of Calgary: Dept of Communications Media (or view [here](#)).
- David, Nicholas and Robertson, Ian 1996. Competition and change in two traditional African iron industries. In *The African Iron Age: past and present*, P. Schmidt (ed.), pp. 128-44.. Gainesville: U. of Florida Press.
- David, Nicholas and Sterner, Judith 1995. Constructing a historical ethnography of Sukur (Adamawa State), Part I: demystification. *Nigerian Heritage* 4: 1-33

²⁹ This not to deny a certain amount of livestock rustling and small scale fighting with Kurang and nearby Kapsiki settlements, and even with Damay.

- David, Nicholas and Sterner, Judith. 1997. Water and iron: phases in the history of Sukur. In *Mensch und Wasser im Tschadseeraum* (Proceedings of the Seminar des Internationalen Forschungsnetzes Mega-Tschad, Frankfurt am Main, May 1993), H. Jungraithmayr, D. Barreteau and U. Siebert (eds), pp. 255-70. Paris: Éditions ORSTOM.
- Denham, Dixon 1966. Major Denham's narrative. In *Missions to the Niger, volume III, The Bornu Mission 1822-25*, E.W.Bovill (ed.) pp. 317-536. London: Cambridge University Press.
- Gardi, René 1954. *Der schwarze Hephästus*. Bern: privately printed..
- Gardi, René (with accompanying sections by G. Spannhaus and H. Thede) 1955. *Eisengewinnung bei den Matakam (Mandara-Bergland)*. Göttingen: Institut für den wissenschaftlichen Film.
- Gardi, René 1959. *Eisengewinnung in den Mandarabergen*. Film, 19 mins. Göttingen: Institut für den wissenschaftlichen Film.
- Hinderling, Paul 1953. *Eisengewinnung und Eisenverarbeitung in den Mandarabergen*. Film, 17 mins. Basel: Museum für Volkskunde.
- Hinderling, Paul 1955. Schmelzöfen und Eisenverarbeitung in Nord-Kamerun. *Stahl und Eisen* 75: 1263-66.
- Hopkins, A. G. 1975. *An economic history of West Africa*. London: Longman Gp Ltd
- Hunwick, J. 1971. Songhay, Bornu and Hausaland in the Sixteenth Century. In *History of West Africa*, J. F. A. Ajayi and M. Crowder (eds), vol. 1: 202-39. London: Longman.
- Jouaux, Cathérine 1989. Gudur: chefferie ou royaume? *Cahiers d'Études africaines*, 114: 259-88.
- Jouaux, Cathérine 1991. La chefferie de Gudur et sa politique expansionniste. In J. Boutrais, ed., *Du politique à l'économique. Études historiques dans le bassin du lac Tchad*. Paris: Editions de l'ORSTOM III, pp. 193-224.
- D. Killick, N. David and A. S. MacEachern. 1994. 'Ethnographic studies of iron smelting in North Cameroon.' Paper presented at the 29th International Symposium on Archaeometry (Ankara, 9-14 May 1994)
- Kirk-Greene, A. H. M. 1960, The kingdom of Sukur -- a Northern Nigerian Ichabod. *Nigerian Field*, 25: 67-96.
- MacBride, D. F. H. 1937. 'Mandara district: village histories'. File Yolaprof J21. National Archives, Kaduna, Nigeria.
- Martin, J.-Y., 1970. *Les Matakam du Cameroun: essai sur la dynamique d'une société pré-industrielle*. Mémoires ORSTOM 41. Paris: ORSTOM.
- Mauny, Raymond 1967. *Tableau géographique du l'ouest africain au moyen âge d'après les sources écrites, la tradition et l'archéologie*. Mémoires de l'Institut français d'Afrique noire, no 61. Amsterdam: Swets & Zeitlinger N.V.
- Müller-Kosack, Gerhard 1987. *Der Weg des Bieres: Siedlungs- und Sozialstruktur in fünf Mafa-Dörfern (Nordkamerun)*. Master's thesis, Johann Wolfgang Goethe - Universität, Frankfurt-am-Main.
- Müller-Kosack, Gerhard 1991. Zum Siedlungsstruktur der Mafa (Nord-Kamerun), *Paideuma* 37:105-40.

- Sassoon, Hamo 1964. Iron-smelting in the hill village of Sukur, north-eastern Nigeria. *Man* 64: 174-78.
- Seignobos, Christian 1991a. Les Murgur ou l'identification ethnique par la forge (Nord Cameroun) In Y. Monino (ed.) *Forge et forgerons*. Actes du IVe colloque Méga-Tchad, vol. 1, CNRS/ORSTOM, pp. 42-225. Paris: Éditions de l'ORSTOM
- Seignobos, Christian 1991b. La rayonnement de la chefferie théocratique de Gudur (Nord-Cameroun). In *Du politique à l'économique. Études historiques dans le bassin du lac Tchad*, J. Boutrais (ed.), pp. 225-315. (Actes du IVe Colloque Méga-Tchad, 1988, vol. III.) Paris: Éditions de l'ORSTOM.
- Smith, Adam and David, Nicholas 1995. The house of Xidi Sukur: the production of a landscape of power. *Current Anthropology* 36 (3): 441-71.
- van Beek W. E. A. 1978. 'Bierbrouwers in de Bergen'. Doctoral Thesis, Rijksuniversiteit te Utrecht.
- van Beek, W. E. A. 1991. Iron, brass and burial: the Kapsiki blacksmith and his many crafts. In *Forge et forgerons*, Y. Monino (ed.), vol. 1, pp. 281-310. Actes du IVe colloque Méga-Tchad (Paris, Sept. 1988). Paris: Editions ORSTOM.
- van Beek, W.E. A. 1992. The dirty smith: smell as a social frontier among the Kapsiki/Higi of north Cameroon and north-eastern Nigeria. *Africa* 62 (1): 38-58.
- Vaughan, James H. 1973. əŋkyagu as artists in Marghi society. In *The traditional artist in African societies*, W.L. d'Azevedo (ed.), pp. 162-193. Bloomington: Indiana University Press.
- Vincent, J.-F. 1991 *Princes montagnards du Nord-Cameroun. Les Mofu-Diamaré et le pouvoir politique*. Paris: Editions l'Harmattan.
- von Graffenried, Charlotte 1984. *Das Jahr des Stieres. Ein Opferritual der Zulgo und Genjek in Nordkamerun*. Studia ethnographica Friburgensia 11. Universitätsverlag Freiburg Schweiz.
- Wade, James 1986. 'A reappraisal of brass casting in northeastern Nigeria.' Paper prepared for the Seventh Triennial Symposium on African Art, Museum of Cultural History, University of California Los Angeles (April 1986).