

Lecture 11 - Mining & Metallurgy

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Two main aims:

1. To build on the conversation on music, beer, witchcraft, and healing –human power over forces that might seem at first sight uncontrollable –and see how they figure in technology and innovation in Africa. Does spirituality stifle or inspire/govern the conduct of innovation?
2. Picking on a theme of apprenticeship that has fledged in and out of our discussions so far, to understand its role in technology and innovation, and the family and kinship network as an important institution of “informal(ized)” innovation in Africa.

Trivializing African metallurgical innovations

J. Flint (1974): By 1800, the West African iron mining and smelting industries, upon which the blacksmiths had once had to rely completely for their raw material, were almost at an end, ruined by the competition of cheaper and purer iron bars imported from Europe.

Denis Williams (1974): Denis Williams caricatured traditional African iron smelting in general as a mysterious transformation of earth into metal. To him, the African iron producer was a prisoner of the supernatural world. This, according to him, explains the backwardness and the static condition of African technology, especially vis-a-vis European technology. Nancy Neaher, Leonard Pole, and Merrick Posnansky disagree with Williams’s iron hunger and the alleged changelessness of African practices.

Miller and van der Merwe (1994): In light of the reassessment of evidence for very early smelting in Agadez, it is reasonable to believe that the knowledge of metal working was introduced to sub-Saharan Africa from outside, despite the paucity of archaeological evidence in those areas that might have acted as conduits for the spread of this technological knowledge.

Pre-colonial Mining

More (1974) on “Metal Age People”: Not only did the people of Africa, before the advent of the European, mine and prospect for various metals, but they were also capable of working iron, copper, tin, and gold and of making bronze and brass. It therefore seems to me more appropriate to refer to them as Metal Age peoples rather than as Iron Age peoples, which is the term commonly used.

Candice Goucher: Such a view does not take into account the state of European metallurgy at the time. European imports actually required an expansion in the repertoire of West African blacksmiths, including gun repairs and gunsmithing; expensive, repairs by African blacksmiths.

Spirituality and Metalworking

As Onwuka Njoku has shown with respect to the Igbo, ironworking was “highly ritualized and shrouded in mystique”; “supernatural forces were solicited to participate in and supervise the production process. Therefore, any description or analysis which omits the magico-religious context of the production process is bound to paint an incomplete picture”; “it would be impossible to appreciate the depth and strength of this traditional industry without first understanding the mystical elements associated with it”. Conceptions of the qualities or powers of iron and the ritual acquisition of the means to handle iron by the smith; the production process indicates how Igbo metalcraftsmen forged a working synthesis between technology and

the supernatural; to explore the inner logic of the magico-religious phenomena of the industry; the dearth of written documentation seems to compel reliance on oral information.

Technology and Religion: Traditional Igbo iron technology was embedded in a web of rituals and religious ideas. To the contemporary mind, this is an antithesis, as technology and religion are regarded as opposites. Technology is the application of science and is seen as founded on rationality and tested mastery of the laws of nature. Religious beliefs and rituals, on the other hand, are thought to be symptomatic of a people's inability to comprehend and master nature. They are, therefore, said to be built on ignorance and blind faith. Is this, then, to say that traditional Igbo iron working was not based on rational and scientific foundations; that the iron producers were helplessly controlled by invisible forces in a production process they neither comprehended nor mastered? (Njoku, 1991). I would like us to see the rationale from the ironworker's perspective, not ours.

What is skill in the presence of the spiritual?: Without mystical powers from his deity, the smelter would not be able to perform the mystery of turning earth into iron, nor a smith the mystery of forging iron into tools, weapons, ornaments, or the articles of ritual.

Incoming Technology and African Innovation: As Njoku shows, Ogun (the iron deity of the Yoruba) governs not just iron products of his priesthood, but incoming technology as well. Ogun has become "the patron of taxi, bus and lorry drivers, who hang his emblematic representation in their vehicles. Yoruba drivers reputedly go out of their way to run over dogs as offerings to Ogun. Again, sacrifices to Ogun can be made and oaths sworn upon car engines... When an Igbo person buys a new car, he usually launches it by libation. But the libation is not made to the iron deity or the car technology but to the buyer's *chi*, that is his personal deity and to his *ikenga*, the god of achievement among the Igbo."

Apprenticeship

Marcia Wright (2002), through the story of Mzee Stefano, master smelter in Ufipa, Tanzania, beautifully writes:

"The ethno-archaeologists spearheaded by Peter Schmidt must consequently be challenged on a number of scores, including their erasure of individuals whom they subsume into categories of craftsmen and ritualists rather than regard as men with choices and activities beyond iron-working. Mzee Stefano belonged to the generation that saw Ufipa become overwhelmingly Catholic. Reaching the peak of his life in the 1930s, he was not only a smelter observing the traditional rituals of smelting, he was also an appointed sub-chief, blacksmith, farmer, and Catholic in good standing."

The Ise Hoe: The emblematic tool in Ufipa, the large hoe weighing between 3 1/2 and 4 pounds, was used by men to break up the grasslands into sods that were turned inward, forming green manure mounds, *intumba*. This work usually took place in the later part of the rainy season, in March and early April. The mounds were spread for millet planting in November or early December. It was the *ise* hoe that was a key element in bridewealth assortments and in many ways symbolized manhood. When dedicating a furnace, smelters explained that they spread on its floor bark from the trees that would be cleared for agriculture. This treatment "made the furnace strong" and together with a ritual spreading of millet porridge by an "innocent" child helped to assure that the hoes from the furnace conveyed fertility (Wembah-Rashid 1969). A lighter-weight hoe served as the female tool for weeding the millet fields. Spears, knives, arrow-heads and bells rounded out the repertoire of blacksmiths.

Wright on Mzee Stefano's Apprenticeship: elsewhere in Africa, descent or heredity were critical to re-production of skill within families; in Ufipa, in principle, it was open to all who wanted to practice; in reality, however, followed family lines; The pattern of furnace construction, charging, and carrying out attendant rituals had been handed down to him from his father, who had it from his grandfather. This paternal line

originated in the south, in the Mambwe clan of Sinkambe (Wright). Usually priest-chiefs were identified with iron-smelting and magic; Stefano took over from his father as the master smelter, having been invested with the *ntangala*, the secret medicines necessary to the practice and authority of a master. By that time, he had experience as a *msole*, the principal assistant, was married and had at least one child. He and his wife were baptized Christians, but adherence posed no obstacle to his conduct of the traditional rituals of iron smelting, which were not criticized by the village catechists who were responsible for directing the swelling numbers of Christian adherents in the interwar years. When the time came to rebuild the *ilungus*, Stefano established them close by his year-round residence at Ikumba instead of at Makuzani, a march of several hours. The skill to direct this construction came from observation and participation, not merely in boyhood when his father had last built, but also by volunteering as an assistant when other masters called for helpers in such projects.

Apprenticeship and Graduation: At the end of training, apprentice passed through a ritualized graduation ceremony: *ima otutu* or *ihe otutu*, “the blessing of the hammer”; and a passing out ceremony, required to produce the core tools with which the graduand would start off on his own –an anvil, a hammer and two pairs of tongs; not to be bought on the market. The graduand could also be put through a proficiency test, to produce on the spot any item which one of the assembled smiths might ask him to. it was a standardized practice –standardized by adherence to taboos, ritual procedures, call and response chanting or music, even instrumental play, and “a strong tendency for mastery to descend through families.”

Arming the Tools: Afterward, he and his new tools were presented to the lineage shrine to receive the deity’s blessings. Rules and ethics of the profession and graduand’s rights and responsibilities rehearsed to him by priest, who gave the graduand a drink of water into which a hammer had been dipped. He also made four strokes of native white chalk, *nzu*, on the chest of the graduand, invoking the god of iron to guide “this young bird...about to fly,” to “strengthen his wings,” “sharpen his beak,” and “open his eyes,” so that he could be productive in the places of work he sought. After all, “people will not eat sand,” and by their special gifts, the new smiths would “fend for himself” (Njoku).

Smelters and Smiths: two main phases of iron production, namely smelting and smithing. Iron ore embedded in rocks, and smelting is the process of extracting the ore from its non-ferrous matrix. Smithing is the forging of iron and other non-ferrous metals into items for human consumption. In some communities, smelters were also smiths; in others, they were separate occupations. Smelting was undertaken by lineage-based work groups, not individuals. It was energy-sapping work involving four key stages: wood fuel production, furnace construction, ore preparation, and the loading and firing of the furnace charge. Each of these stages was preceded and sometimes accompanied by magico-religious observances in which the god of iron was fervently called upon to supervise the process to ensure a successful and accident-free smelt.

Abstinence while Smelting: village participation involved helping with the massing of raw materials and giving domestic support to the smelting team. Some women and children participated, although more women remained behind to deal with the female tasks of harvesting the millet. Women normatively did not in any way participate in the active smelting, and their sexual duties were in abeyance owing to the obligation of the leaders, at least, to remain celibate throughout the season. This discipline continued to be a point of professional dignity for Mzee Stefano. The team donned leather singlets, they sweated and were smelly, they enjoyed their ribald jokes and songs [referring to sexual matters in an amusingly rude or irreverent way]. But women’s work, in brewing millet beer and cooking, cannot be eliminated from the equation of labour considerations, and proximity to home lent flexibility in distributing effort among many tasks (Wright).

What motivated people to join in building furnaces and turning out to produce the stockpiles of raw materials also has an initial answer that seems straightforward. A cow was slaughtered when a new furnace was to be build, and beer and food were supplied while the clay from anthills was brought and kneaded and the constructed progressed (Wright). The sacrificing of a chicken and sprinkling of its blood by a pre-adolescent girl, and the burying of protective medicines (*ifingila*) also occurred. The final touches, just short of comple-

tion, entailed decorating the furnace as if it were a bride and singing special (often bawdy) songs. Although everyone helped with this phase, it was exclusively men and usually junior men who moulded and cut the clay for the *tuyeres*, the vents placed in the openings at the base of the furnace (Wright).

Smelting continued in 1936 because demand for hoes remained vigorous, and imported tools tended to be scarce or not appropriate to the heavy work of creating intumba mounds. For all the official projections that duka shop sales would make redundant the blacksmiths who forged indigenous iron, the ranks of iron-workers were actually replenished between 1936 and 1943 (Greig 1937), (Wright).

Given that men were to some extent bottled up in Ufipa and available to make more intumba mounds for greater production of food, the work of women in their gendered tasks of weeding, harvesting, and winnowing increased commensurately. Altogether, establishing furnaces nearer the village at this time made consummate good sense (Wright).

Testimony to the way in which culture responded to the local colonial situation. Notwithstanding major contributions to the migrant labour force on the sisal estates, numbers of the male population remained regionally committed, defining their lives as artisans servicing a complex grassland agricultural system through the production of tools (Wright).

The Christian Onslaught: Wright undertakes a reassessment of five standard published authorities –ethnographers, Adolphe Lechaptois, Albert Wyckaert, and J.M. Robert, and two administrator-observers, R.C.H. Greig and Robert Wise. Where possible, archival sources will figure as a means to expose more fully the observers' assumptions, strengths, and limitations and the ways in which published accounts have been misread by late twentieth-century Africanists. Father Wyckaert arrived in the Tanganyika Vicariat in 1906, just as the apostolic vicar, Bishop Lechaptois, was fully engaged in gathering the materials for an ethnographic study (Wright). Lechaptois speculated that smelters were a residue from a once more advanced civilization. At the same time as conceding that certain young men already preferred porter age or other wage labor to the hard and unprofitable work in iron smelting, he also reported that where the people could compare indigenous and imported iron, they preferred the indigenous. To pluck a few passages from the whole work without assessing a missionary leader and enterprise that looked to take over rather than transform the culture leads to continuous misreading. Wyckaert made the most important contribution to our knowledge of iron smelting and associated crafts. He took every opportunity to follow in Lechaptois's ethnographic footsteps. He had found an ideal setting for studies of iron smelting in the Parish of Mwazye, where he became a missionary priest in 1909 and Father Superior in 1910. In his article "Christian Smiths and Pagan Smiths," published in 1914, the *Mwami*, or master smelter, emerges as a rival priest and moralist.

It became Wyckaert's project to promote smelting by Christian masters who pledged to do without the traditional rituals and medicines. In 1918, Christian villagers departed with the first Christian master to accept the terms, Lui Chawalanga. When the attentive missionaries visited the smelting site to help figure out why several charges failed to produce reducible iron, they dismissed suspicion that failure was caused by the witchcraft of rivals, blessed by the furnace, and point out certain technical reasons for the failures.

The missionaries could smile on harvest festivals that mixed traditional and Christian features. Catechists continually negotiated between strong cultural imperatives, such as widow inheritance, and the influx of the young preparing for confirmation whom, without overt parental opposition, they instructed that monogamy alone was Christian.

Christian Faith and the Demise of Ritual: The young master whom Greig observed as the owner of the furnace under construction was a Christian, who seems to have made asides to the District Commissioner to the effect that the ritual performance was not necessary to the metallurgic process. It was the elder smelters serving as principal councillors, *wasole*, who guarded it as essential (Greig, 1937). When Robert

Wise commissioned the demonstration in the District Commissioner's front garden, the setting was largely artificial. By dividing the articles between the physical steps and the rituals, he contributed to the detachment of smelting from its place in daily life. In doing so, he drew upon Father Robert's recently published work (Wise, 1958).

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