In Her Image: Some Reflections on Gender and Power in Mining History

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In this paper I shall explore an area of inquiry that my colleagues and I normally avoid—namely, the interface between history, folklore, and myth. I do so in hopes of answering some questions that have long been asked about mining in relation to gender. Specifically, why has mining tended to be man's work, often to the exclusion of women even though, paradoxically, female names and images are often invoked by men in the processing of metals? Answering such questions about mining and gender requires that we go back deeply into the written record and even beyond it into the area of folklore and myth that would seem to predate our modern age, but probably deeply influence it. By way of introduction, mining history as a discipline is solidly based in the tradition of the written record, and is also closely tied to, and in fact celebrates, the logical positivism of science. This was apparent as early as 1556, when Georgius Agricola's pivotal work *De re metallica*[1] described in detail the processes of mining and smelting in a straightforward manner that helped put the industry on a scientific footing and separate it from its folkloric roots and superstitions.

However, as we recognize and even celebrate the increasingly sophisticated and efficient methods of prospecting, mining, smelting, and refining of metals that have transformed the industry over the last several centuries, I urge that we not forget the inherently magical quality of what we study: miners engage in deeply symbolic acts as they transform the natural world into artifact, and they do so by harnessing the elemental forces and substances that the ancients recognized as earth, fire, air, and water. Although one of the very earliest written references to mining—Chapter 28 of the Book of Job—cautions that mining as a metaphor for knowledge (i.e., bringing things from darkness to light) is flawed, I would like to further pursue Job's allegorical example, and will suggest that mining and its companion metallurgy can be viewed as a richly resonant metaphor for the creation of life itself.

As a metaphor, mining has an interesting and contradictory history, for it is characterized both as a destroyer (or despoiler) and a creator. Historically, mining is indeed associated with brute power and is, by some accounts, considered the opposite of life-giving agrarian pursuits. John Stilgoe built upon this deep binary distinction between agriculture and mining when he noted that "husbandry caresses the soil, urging it to bear fruit in its own time, at the proper season." By contrast,

> artifice embodies rape, and abortion and transmutation too. Artifice thrusts into the very womb of mother earth, into infernal dark, and wrenches living rock from living rock. Smelting, forging, and casting torment the aborted fetuses with fire. Earth, air, fire, and water combine in an unholy alchemical alliance from which husbandmen stand away, shielding their eyes. Embryo becomes artifact.[2]

Stilgoe's words are powerful enough to make one wince, and they are constructed from a rich literary tradition that associates mining with violence. In some accounts, mining represents a watershed of sorts, because before its widespread practice supposedly life moved at a different pace and had a different quality: Vannuccio Biringuccio wrote, in *Pyrotechnia* (1540), of a pre-industrial age when ". . . men thought it cruelty by breaking the bones of our mother the earth, to open a way to the court of infernal Pluto from thence to get gold and silver."[3] This

passage refers to a supposed age of agrarian peace that was, we are told, permanently shattered by mining and the industrial age that was ushered in by it. As inheritors of the world view of the Renaissance and the Enlightment, we seem to be doomed to search for a golden, pre-industrial age before mining and its ancillary industries sullied the earth.

But there is another side to this discourse uniting mining to epochal history. As suggested by Stilgoe's passage above, the dichotomy between mining and agriculture—or artifice and husbandry—embodies a deep binary tension between humankind and nature that, at the most fundamental level, also involves mining as a metaphor for procreation. Permit me to explore this metaphor in some detail in hopes that it will shed light on both the actual and allegorical role of gender in mining. My doing so requires a recognition of the interpretation that the earth is ultimately female, and more specifically maternal (that is, capable of bearing and nurturing children), as in the familiar "mother earth" analogy. This mythology is deeply imbedded in our cultural history: Although biblical sources are somewhat vague about the actual genesis of minerals, ". . . evidence suggested that stones and ores developed gradually out of seed-beds stimulated by sunlight, or else from some central womb-like molten core."[4] In *The Primitive Origination of Mankind Considered and Examined According to the Light of Nature*, Matthew Hale (1677) wrote that "It is evident that diverse minerals are bred in the earth from an earthy consistence. . . ."[5] Half a century later, in *A Compleat Body of Divinity* (1726) Samuel Willard stated that ores ". . . were first made in the earth," and that ". . . its womb was then impregnated, and made fruitful of them, which are continually generated by the influence of the sun, at the places naturally adapted for them."[6] This perception of mineral formation/creation as the result of impregnation is akin to Spanish concepts of the sixteenth and seventeenth centuries, which considered ore deposits, especially those of gold, to be generated by the sun, but gestated, as it were, in the earth; ore bodies were), tellingly, called "criaderos" in Spanish (literally, breeding places), that is, the places where minerals "grow."

The age-old tension between agriculture and mining also characterized colonial British America, where farming and iron mining co-existed. According to Stilgoe, mining and agriculture remained distinctly separate, and, as a consequence, "only rarely did husbandmen work in the mines or at the smelter."[7] At this time, the 1700s, the forces within the earth capable of sustaining mineral growth were also potentially destructive. John Grammer's "Account of the Coal Miners in the Vicinity of Richmond Virginia" (1718) revealed that the miners had seemingly released nefarious chthonic phenomena, such as sulphurous gasses. They tampered with the forces that created the brimstone of ancient lore, a material that symbolized the dangers of the underworld. The fire reference in "fire and brimstone" of fundamentalist religion is apt, and it, too, reveals the structural differences between husbandry and artifice: Whereas the controlled hearth fire of the agriculturalist signified cooking and warmth, its counterpart, the miners' smelting furnaces, "connoted the torments of Hell."[8]

I should like to look more closely at colonial British iron furnaces in America, and what William Byrd of Westover Plantation, Virginia called the "mystery of making iron" in a report that he titled *A Progress to the Mines in the Year 1732*. Byrd, who described the ores and operations in some detail (even comparing the reddish colored iron ore to the "wanton temperament" of women who possess similarly-colored red hair)[9] left a detailed account of the design and operation of furnaces, which were located quite close to the ore bodies, and were dependent on charcoal for fuel. These operations, in fact, soon consumed hundreds, then thousands, of acres of trees and further emphasized the contrast between agrarian and industrial activity. The typical iron furnace during the colonial era was constructed of stone and dominated the surrounding landscape as its smoke and orange glow was visible for quite a distance. More to the point, the furnaces' design and operation was so different from agrarian enterprises that it resulted in a specialization of the work force by requiring skilled workers who specialized in mining. To meet the challenge of the industry, a labor force was brought in from the Sieg Valley in Westphalia in 1714 by Governor Sportswood of Virginia.

According to Stilgoe, "a typical eighteenth-century furnace tapered from about twenty-two feet square at its base to eleven feet square at its top; it stood about thirty feet high, set against a hillside and connected to it by a 'bridge house' or 'casting house'

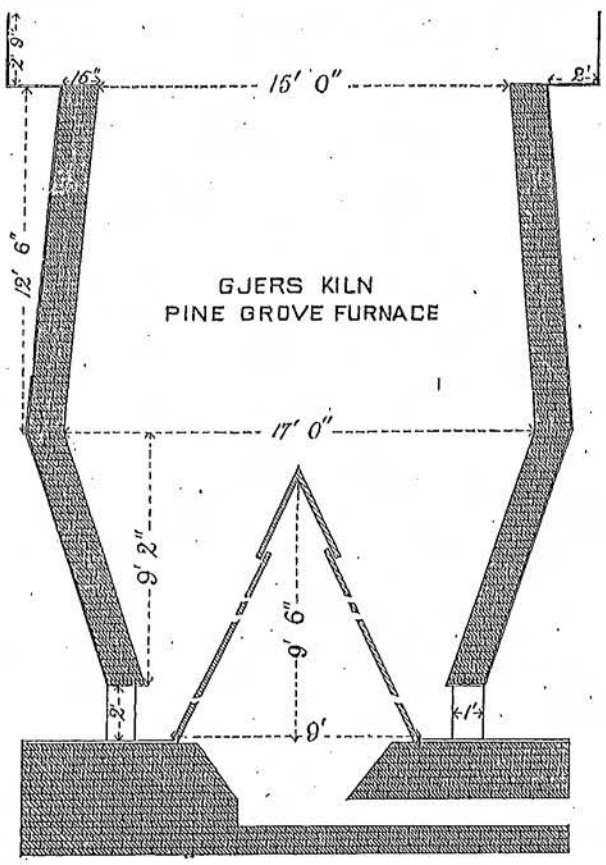

Figure 1. Gjers Kiln, Pine Grove Furnace (Ohio) reveals the masonry construction and the gravity-aided design whereby molten metal flows to the base of the furnace. (from N. W. Lord, "Iron Manufacture of Ohio" in *Economic Geology*, 1884)

from which the charge was dumped," and "at one side of the furnace was the bellows," one of which "produced consecutive blasts," while "a pair operating alternatively created a continuous roar and even hotter temperatures."[10]

That little had changed almost a century and a half later is seen in the description of iron furnaces of Ohio by geologist N. W. Lord, who noted that "the charcoal furnaces of this district [viz, Hanging Rock] are mostly small, usually provided with stone stacks, and are large square piles of masonry built against the side of a hill, and so located that the top of the furnace is on a level with the bank in which the ore is burned, the charcoal stored, and in some cases the buildings of the company located." By this time, however, steam power had been introduced, and geologist Lord went on to note that many of the furnaces were equipped with steam-powered blowing engines that functioned like bellows to increase the draft.[11] (Figs. 1 and 2)

But to return to furnaces of the 18th century, which also appeared to be based on English or European prototypes, Stilgoe weaves their presence into the folklore. He notes, for example, that "colonial furnaces had personalities; they were named and very often had dates and mottoes chiseled into their stones." Significantly, Stilgoe adds that "very often furnaces were called by women's names, and the fires within them, whenever possible, were kindled by women and often tended by men."[12] Stilgoe elaborates by noting that:

> when a bride visited a furnace, the artificers pulled off one of her shoes and held it until she promised them a 'treat," perhaps a kiss or fancy baked goods. The web of custom indicates a half conscious wish to make the furnace fertile and to keep it so. Like a mine, a furnace was somehow a womb, and excellent smelters found satisfaction in age-old tradition.[13]

This evocative passage links female fertility to mining—an activity ostensibly long associated, in fact most often exclusively associated in the literature up until very recently, with males.

I should like to digress here from iron furnaces for a moment and note that the issue of gender and mining has been little explored; although more evidence coming to light suggests that women have played a role in mining at various times in history (notably as forced labor in indigenous mining in the Americas historically, and in wartime mining efforts in the more recent past), it has, in the balance, usually been a relatively minor role when viewed comprehensively. Whereas mining may employ female labor, it appears to have been orchestrated and controlled by men. I noted this in *Hard Places: Reading the Landscape of America's Historic Mining Districts* (1996;1997) when I stated that mining landscapes perhaps exemplify the male tendency to aggressively reorient and reshape what is commonly thought of as mother earth. This interpretation was made with the aware-

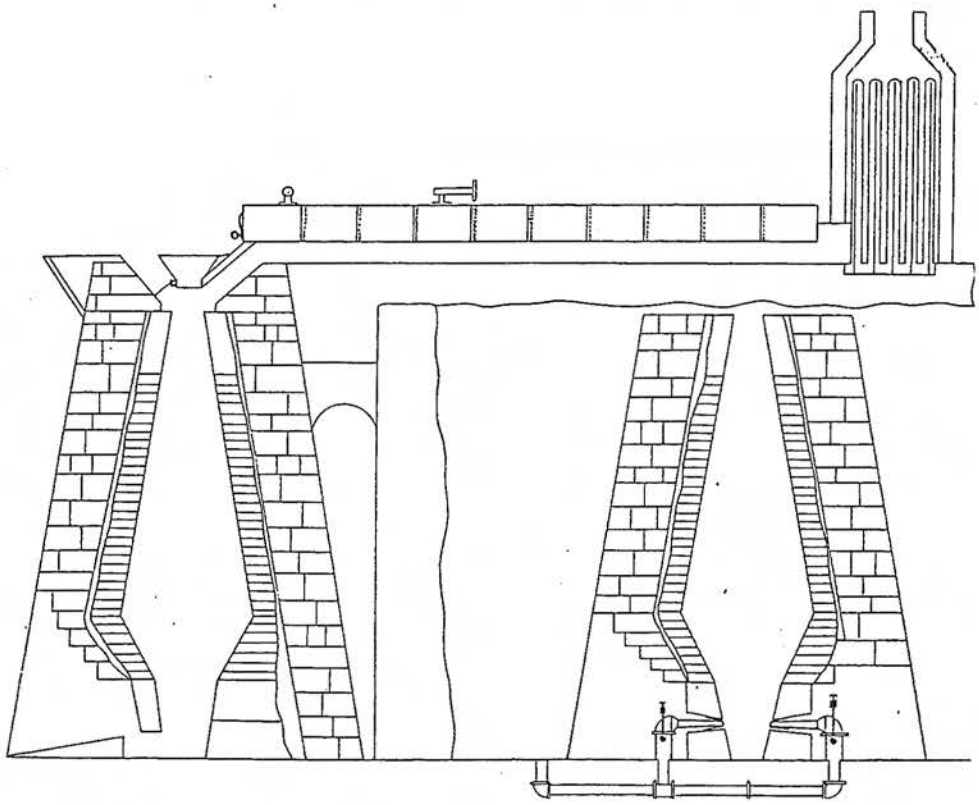

Figure 2. Diagram of Howard Furnace (Ohio) reveals the system of tuyeres introducing blasts of air into furnace to increase the t emperature. (from N. W. Lord, "Iron Manufacture of Ohio" in *Economic Geology, 1884)*

ness that the spectre of the female permeates mining (after all, the Patron Saint of mining is a woman, Saint Barbara) but that it is most often men who engage in, or oversee, the activity of mining and especially metallurgy. I do not find it surprising that women's names give identity or personality to metallurgical furnaces; rather, it simply underscores the persistent subtext of mining and metallurgy as embodying a female mystique based, in part, on the mother earth analogy.

We may be able to better understand issues of gender in mining by investigating another almost untouched area of research—the role of Africa and African peoples in mining history. Returning to the iron mines of colonial America and the historical records, it should be recalled that the Virginia iron mines, like their counterparts elsewhere, demanded both effective fuel (charcoal) and experienced labor. Virginia Governor Spotswood was convinced that the slave labor of Africans, who "seemed to learn ironmaking very quickly," could be employed effectively. To use William Byrd's analogy, Africans could indeed be taught the "mysteries" of ironmaking. What Spotswood and William Byrd did not know, however, was that the African slaves, especially those from the Niger River villages, had a long and sophisticated iron and steel making tradition that Arab observers and historians had commented on earlier. A reading of Byrd's accounts of the Virginia iron plantations hints at a strong African influence on American mining that has been underappreciated and virtually undocumented.

To further explore this connection, I should like to next reference the brilliant archaeological and anthropological work of Eugenia Herbert, notably her recent book *Iron, Gender and Power: Rituals of Transformation in African Societies*, which is clearly one of the most important cultural histories of mining. Herbert convincingly demonstrates that mining, smelting, and smithing as industries are nothing less than metaphors for the biological processes of conception, gestation, and birth. Moreover, she then shows how mining, smelting, and smithing fit into broader patterns of African culture.

In so doing, Herbert dispels one myth that has characterized African mining ever since, and perhaps

before, anthropologist and philosopher of religion Mircea Eliade argued that mining is largely women's work there. Noting that Eliade was not an Africanist, and that his treatment of Africa was limited by the material available, Herbert convincingly demonstrates that mining may seem to be women's work, but that in fact women are often excluded from African tribal mining. Herbert cites informant Murray Armor, who related:

> an occasion when a European woman, on a visit to Kalabo (Barotseland, Zambia) while Luchazi smelters were building a furnace, insisted on going to see the site after being asked not to. The smelters were so upset that they stopped working entirely for a time, then rebuilt the structure several yards away. The problem was not that she was European but that she was a woman, although had she been African she probably would have had the good sense to stay away. For all their variability, accounts of smelting are almost unanimous on two points: the exclusion of women, and menstruating women in particular, and the prohibition of sexual relations for those participating in the smelt and sometimes in related operations.[14]

The exclusion of women from mining operations has a familiar ring, even though many observers thought it to be associated only with Western civilization. How, one wonders, can this male domination of mining and smelting be practiced in Africa, where women are/were supposed to be more actively involved in mining operations than the Americas? That women are excluded from much of mining/smelting in Africa is further confounded by the ubiquity of several of the major types of iron furnaces which are anthropomorphized as women: many in fact quite graphic or explicit in featuring female breasts and genitalia as part of their design and ornamentation. (Fig. 3) Herbert answers these questions by arguing that metallurgy—"an arena where gender concepts seem often to be writ large"[15]—is intricately tied to cosmology. She notes at the outset the "curious asymmetry when one compares metalworking to pottery. Pottery is often seen as the female analogue of metallurgy since it is usually women's work."[16] Herbert suggests that the relationship between women and pottery, and men and mining/smelting, appears

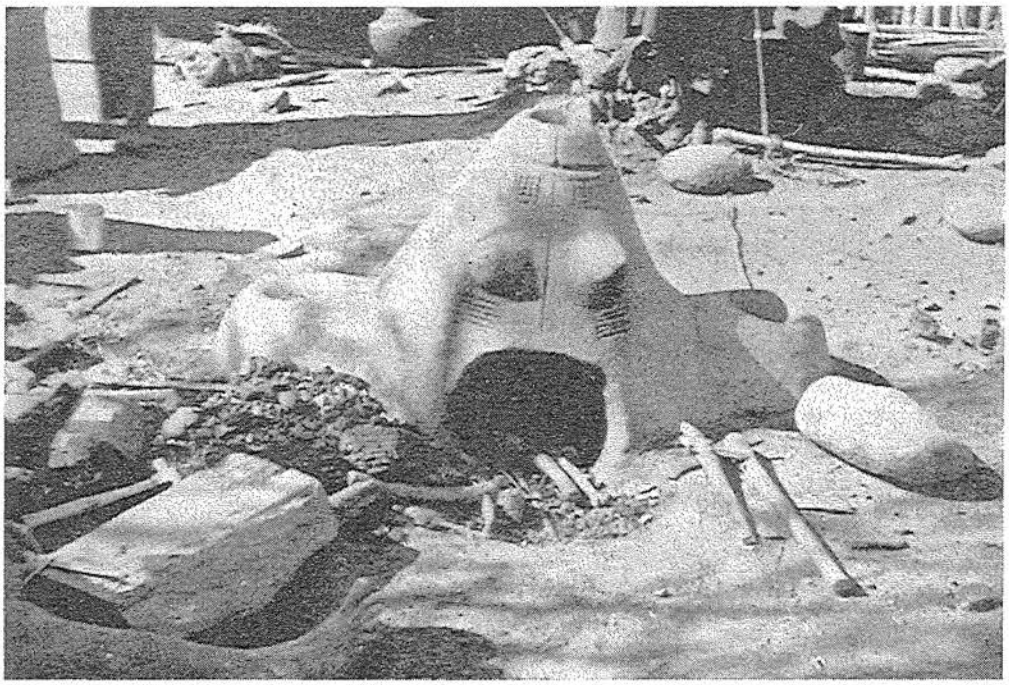

Figure 3. Photograph of African Shona iron -smelting furnace, showing sexual symbolism and female anatomical details. (Photograph ed by Thomas Jacob; from Eugenia Herbert, *Iron, Gender, and Power*, 1993)

to be nearly universal, and further suggests that a structural anthropological construct (that is, exhibiting universal human traits) may be at work here.

Looking more closely at the iron smelters or furnaces of sub-Saharan Africa, Herbert notes that "Female sexual characteristics may be modeled directly on the exterior of the furnace; posture, too, may underscore the image of birth." Herbert continues with an important observation that ". . . gender is more than physiology: hence the addition of scarification patterns and other forms of adornment that give the furnace a social, not simply a sexual, identity and at the same time enhance its fertility, just as they do with women themselves."[17] These gendered smelters or furnaces are thus not simply female, but depict female fertility at a particular stage in the life cycle.

That these smelters are actually the production of males is perhaps less confounding than it first seems, for Marina Warner has noted that the naked or seminaked female form, sometimes debased and sometimes exalted, is often used by those in power to convey the concept that women are somehow closer to nature than men.[18] Stated even more succinctly by T. W. Adorno, "The feminine character, and the ideals of femininity on which it is modeled, are products of masculine society."[19] This replication of the female form is reminiscent of the mother-goddess mystery cult which centers on the "mystery of birth and generation, of life issuing from life."[20] It may be appropriate to note here that this tendency for men to control or influence female fertility is not confined to African villages, for it can be seen even in contemporary American politics, as in debates on abortion.

Recalling that mining and metallurgy can be a metaphor for procreation in general, it is thus not surprising also to see male imagery associated with the female: Rather than being purely female, the iron furnaces of Africa thus also incorporate male elements as they symbolize conception as well as gestation. Herbert notes that the bellows, which are occasionally graphically phallic, symbolically link male and female in the process of conception. (Fig. 4) They are therefore sexual on one level but always social, that is, indicative of genderization and broader social themes of roles in the perpetuation of society.

Here I should like to return to the basic concept of *fire* in the process of smelting for its deeper significance; it, like human sexuality, is both a potentially beneficial and a potentially dangerous force that requires control. This gives new meaning to Stilgoe's reference to women kindling the fire, which is tended (i.e., controlled) by men. Significantly, control of the fires of the smelter is associated with both sexual and social power, and both types of power are ultimately related to social structure via kinship: according to Herbert, "The smelter or smith, then, depending on

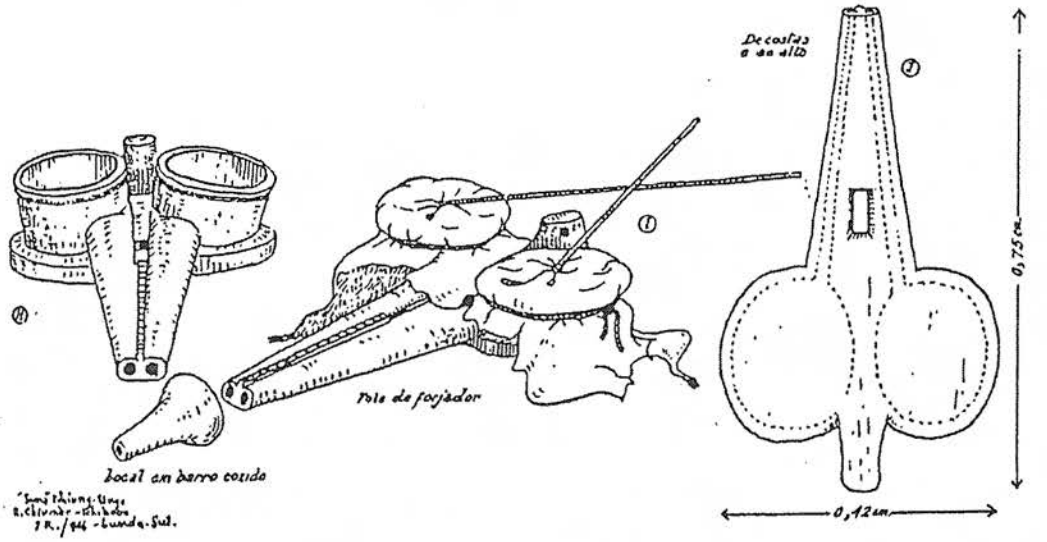

Figure 4. Diagram of Chokwe bellows used in smelting iron in Africa, showing similarities to male sexual anatomy. (from Redinha, 1953, as reprinted in Eugenia Herbert, *Iron, Gender, and Power*, 1993)

the culture, shares his exceptionality with the chief or king."[21] Prowess in metallurgy is also often linked to prowess in hunting, and it is probably not coincidental that smelting results in weapons that sustain the group against the twin enemies of intruder and hunger. It may, of course, also be used for more purely offensive or expansionist military purposes.

On one very abstract level, it is indeed natural that mining and smelting can be viewed metaphorically as conception, gestation, and birth, for a substance with vague form is transformed into the recognizable and useful by these processes. Men are in control of these activities because they have, in essence, appropriated them by virtue of their physical and/or social power, which is to say their ability to manipulate and direct outcomes either by the brute force or cunning inherent in patriarchies. That they exclude women is at once paradoxical but understandable inasmuch as men are imitating mysterious processes over which they actually have little or no control at all—processes that in every society are used to define both sex (and sexuality) and its more socially-prescribed corollary, gender.

Anthropologist Eugenia Herbert makes a startling statement when she notes that "smelting is not simply 'like' gestation and birth: it <u>is</u> gestation and birth."[22] A smelter or furnace reproduces at a most basic level the transformation of something by heat, time, and gravity; furnaces in essence give birth to products that will sustain and even enlarge society; that the forms of early smelters replicate the female form in this symbolically procreative endeavor is thus not surprising.

That concept—of mining and smelting as "organic processes"—should give even the most insensitive of miners pause for thought: in the mining industry we not only create products but essentially re-enact magical processes. The production of metals has a corollary in the refractory industries of pottery and ceramics. Here, however, Herbert notes that women as potters also use a product of the earth, clay, but that considerably less transformation occurs—that is to say the process is rather less violent—in the production of pottery. Nevertheless, the two industries are symbolically related as seen in the fact that, as Herbert notes, "the potter in Africa is frequently the wife of the smith."[23] Significantly, both have higher status (though pottery is lower than smelting) than other occupations.

The binary distinctions between male and female, hunter and farmer, miner and potter, ore and clay, are cosmological and may serve other purposes as regards social organizations and group sustenance. According to Herbert, "the propensity to genderize the world—as part and parcel of an even more fundamental and pervasive anthropomorphism—serves a number of ends," for "it provides a coded statement of what men and women do."[24] Tellingly, much of what was conveyed about the iron-making industry in Africa was often "a male's view of the world—often in fact a senior male's view," and, according to Herbert, "if there were, in fact, more information on how women genderize the world, it would be interesting to see if it reflects the same ambivalence as men's beliefs."[25] As to why women potters do not have the same high status as male smelters, Herbert hazards a guess that it relates to the technology of violence—violence in hunting and war. Herbert thus concludes that "only the potter resolves the riddle of regeneration without violence."[26]

In an earlier book—*Red Gold of Africa*—Herbert noted the close relationship between gender and metals (copper and its alloy with tin bronze) as regards their use both as weapons and as ornamentation; clearly, metals are linked to one's gender and social status as well as to one's stage in the life cycle,[27] and their meaning may thus be far deeper than has been traditionally believed: This suggests that more study is needed on the social significance of mining and its products. As I have suggested here, Herbert's two books make a great place to begin and may serve as models for the type of anthropological study needed of even more "modern" mining cultures.

Conclusion

In speculating about the role of gender and mining, it is instructive to consider the outcome of mining and its related metallurgical processes. Metals mining traditionally yields objects either for currency, commerce, or warfare. Historically, males have wielded the greatest power in these arenas, and have thus dictated the direction of societies either by military force or by economic intercourse/coercion. That mining has worked hand in hand to supply the engines of industry and war, as well as to dictate if not reflect the internal structure of society, is apparent

when one studies metals historically. The connections between mining and power may help better to explain why mining has traditionally been in the hands of men who, revealingly, may name mines and smelters in honor of women to whom they return triumphant.

I shall conclude by also noting that gender and race are somewhat interconnected as mining and power are so inextricably tied. As described by Michael Adas in *Machines as the Measure of Men*,[28] perceptions of a people's technology (and technological prowess) rather than their skin color, appear to lie at the roots of racism. Adas notes that modern racism corresponded with the flourishing of western technology in the 18th century, and that "since it was in this period that Europeans first were able to travel to the gold mines in the interior, commentaries on African mining techniques provide the best expressions of an emerging European conviction that the Africans had been unable to exploit the resources of the lands they occupied because they lacked the proper machine technology." Adas observes that, as an outcome of such reasoning, the Dominican friar Jean-Baptiste Labat concluded that "because Africans had neither the technology nor the intelligence to develop this technology, it was incumbent on the French to seize these resources and see that they were exploited."[29] Labat at least had faith that Africans could develop technology that was transforming the world, but others subsequently argued that Africans were unable to do so on the basis of their race alone. Their increasingly strident racism ultimately resulted in Cecil Rhodes' spectacle of a white owned and operated mining economy based on the physical labor of black Africans—a scenario only recently undone with the dismantling of apartheid in South Africa.

Ironically, thus it may be that the very technological prowess that internally stratifies one society may in turn be the very factor that internally permits another more aggressive society (such as those of the West) to in turn place the conquered society on a lower, subservient level. It would be an immense loss for scholarship if, in the process of such conquest, the voices of those less technologically empowered—which has included women and peoples of color—went unheard. If, as theologian Paul Avis noted, ". . . anthropologists are quite emphatic that we find women subordinated to men in every known society; the search for a genuine matriarchal culture has proved fruitless"[30] then that may help to explain why women have been scarce in that most power-oriented of all realms, industrial technology (and its related fields, mining and metallurgy), until very recently.

That women have historically been excluded from mining may now be historically understandable, but that does not make their exclusion from the industry justifiable today. Often absent from the mining force historically, but symbolically always central to it as metaphor, women are structurally a part of mining history. I should like to close by noting that it is the powerful symbolic role of women in mining that should be seen in a holistic rather than eclusionary light. When viewed comprehensively, rather than from the perspective of one pole in a binary dichotomy, woman's role in mining becomes more clear. Mining can then be seen as an activity that obscures and denies—yet, at the same time, celebrates and enshrines—the symbolic and real role of the female in the process of creation.

NOTES

1. Georgius Agricola, *De re metallica*, 1556; translated from the Latin by Herbert Clark Hoover, editor. (New York: Dover Publications, 1950).
2. John Stilgoe, *Common Landscape of American 1580 to 1845*, (New Haven: Yale University Press, 1982), 267.
3. *Ibid.*, 275.
4. *Ibid.*, 268.
5. *Ibid.*, 269.
6. *Ibid.*, 270.
7. *Ibid.*, 288.
8. *Ibid.*, 299.
9. *Ibid.*, 284.
10. *Ibid.*, 294.
11. N. W. Lord, "Iron Manufacture of Ohio" in *Report of the Geological Survey of Ohio*, Vol. V, Economic Geology (Columbia: G. J. Brand & Co., 1884), 503, 508.
12. *Ibid.*, 294.
13. *Ibid.*, 294.

14. Eugenia Herbert, *Iron, Gender, and Power: Rituals and Transformation in African Societies* (Bloomington, Indiana: Indiana University Press, 1993).
15. *Ibid.*, 14.
16. *Ibid.*, 21.
17. *Ibid.*, 39-40.
18. Maria Warner, *Monuments and Maidens: The Allegory of Female Form* (London: Picador, 1987).
19. T.W. Adorno, *Minima Moralia* (London: NLB, 1974).
20. E.O. James, *The Cult of the Mother-Goddess* (London: Thames and Hudson, 1959), 179.
21. *Ibid.*, 163.
22. *Ibid.*, 117.
23. *Ibid.*, 200.
24. *Ibid.*, 225.
25. *Ibid.*, 225.
26. *Ibid.*, 238.
27. Eugenia Herbert, *Red Gold of Africa: Copper in Precolonial History and Culture* (Madison: University of Wisconsin Press, 1984), 266-288.
28. Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca: Cornell University Press, 1989).
29. *Ibid.*, 112-113.
30. Paul Avis, *Eros and the Sacred* (Harrisburg, Pa: Morehouse Publishing, 1989), 3.