

Chapter 20

The Megaproject of Mining: A Feminist Critique

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20.1 Introduction: Mining as a Megaproject

Mining projects are idealized as being large: they are characterized by great size of the physical extent, of capital investments, of production, and of numbers of people involved.¹ Such mega mining projects are also characterized by a masculinity, not only an overt visibility of men but also a taken for granted conflation of men, with institutionalized authority expertise and prestige, institutions, laws and structures of governance that favor these entrenched hierarchies, and technologies that pose to be gender-neutral. The masculinity of megaprojects is interpreted as “natural,” to normalize and legitimize the mechanism of power, a process described as the “discursive invisibility of men and masculinity”.² Size and masculinity work together in mining engineering projects to produce that invisibility that represent power over the weak, the brutalization of nature, and the hegemony of capital and the market.³

Mining as a human endeavor is many thousands of years old; it began during the Middle Stone Age at around 5000 BCE, and gave us Bronze and Iron ages, making human civilization possible. Important milestones in human history were all achieved with minerals providing a major incentive.⁴ Early miners exploited placers and veins which outcropped at the surface, but as these sources were exhausted, they turned to underground mining. The presence of groundwater posed a barrier in going deeper and deeper into the earth, till the technology of water wheels and steam engines was developed to pump out water from underground mines in Cornwall. Mining formed the basis of the technical developments of what Dibner calls “renaissance engineering” (Dibner, 1981). Columbus, landing in the Americas, noticed that the “natives” were wearing gold ornaments, the Portuguese found in Brazil that the fish-hooks were made of gold. The colonies became the source of raw materials, not necessarily bulky products such as iron ore but provided wealth from valuable

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gold, diamonds and gemstones. According to the historian of mining, T. A. Rickard (1933: 4), this history offers no discontinuity from the time our ancestor:

... detached a nodule of flint in a chalk bank to this later day when a series of machine... dig noisily, and effectively, into a mountain of copper-bearing rock. The scale of the operation has been magnified, but the purpose of it is the same: to exploit the mineral resources of nature for the use of man.

Modern, industrialized mining fuelled and sustained the industrial revolution, and the expansion of European imperialism initiated mining in the settlements and colonies. Mining on an industrialized scale has largely finished in Europe due largely to cheaper imports and the shift of heavy industry to other countries, although the United States, Canada and Australia remain major mineral producers amongst the “western nations.” On the other hand the liberalizing economies of Latin America, Africa and Asia have seen recent entry of mining capital. China and India are the second and third largest coal producers and Chinese mining companies are aggressively acquiring shares in well-established multinationals. Given their population sizes and the need for resources, one can assume that mining will expand in these countries. In many of these countries, modern mining has given rise to unfathomable social and environmental problems (noted by Ballard & Banks, 2003; Bridge, 2004), resulting in extreme forms of resistance from local peoples who have put forth a powerful critique of mining. The transformation of traditional societies in these countries into dependent, less powerful, actors has given rise to a complex debate on whether “mining is good for development.” The connections in this troubled relationship with development theories are not yet clear, the neo-liberal developmentalist discourse that mining brings development to poorer countries is the mainstream view put forth by the World Bank personnel. Graulau (2001: 154) observes that mining in these countries produce a powerful myth of *El Dorado Technicum*, where technology apparently brings solutions to problems of rural violence, mercury pollution and the environment.

Mining engineers see the mines as an organism, speaking in terms of the “life of a mine,” from exploration, development, construction, and mineral processing to the completion or closure of operations. Integral parts in this life cycle of mining are engineering and technology; from finding the ore body, planning and constructing the engineering complex, viz., the mine and all its associated works, digging up the ore from underground, and processing it to produce a marketable mineral product. All stages require the use of a range of technology. Drilling and sampling for prospecting, the assessment of mineral deposits and the collection of minerals by means of panning, sluicing, hydraulicking, open cast, underground/shaft or deep vein operations. Modern mining engineers take their job literally (“ingen-ero” – “to create”). They are different from the scientists, and believe in reaching a practical solution to practical problems. “Mining engineering” is the practice of applying engineering principles to the development, operation and closure of mines. In this practice, the environment becomes a subject matter of engineering as much as rock mechanics or the practical business of securing the safety of workers and the efficiency of production.⁵

Lewis Mumford disagreed. He believed that (1934: 77), “The miner’s notion of value, like the financier’s, tends to be a purely abstract and quantitative one.” This is because “The miner works”, not for love or for nourishment, but to “make his pile.” The classic curse of Midas became perhaps the dominant characteristic of the modern machine: “whatever it touched was turned to gold and iron, and the machine was permitted to exist only where gold and iron could serve as foundation.” Mining in his view is seeped with two notions – the economic one that tends to assess, value and measure everything around it in financial terms, and the “machine culture” that represents standardization, uniformity and quantification. For Mumford, neither represent “real” values that can sustain and enhance life. The cycle of mining turns minerals into commodities, controlled by market forces driven by a profit motive that overrules concerns for the nature and the environment, and the engineering project assumes superiority over everything else.⁶

Although early geographers saw the abundance of minerals as nature’s “endowment” as a blessing for the nations and the basis of its economic wealth, to Lewis Mumford mining and war seemed to be closely related twins: the “curse of war and the curse of mining are almost interchangeable: united in death” (1967: 240). Since the advent of metal arms and armor, warfare has become intertwined with mining. It is said that while mining can presumably exist without war, war can hardly exist without mining (Crombie, 1997: 30). Early mining, Mumford considered, was not “a humane art” but “a form of punishment” (Mumford, 1934: 67). This is the essence, for Mumford, of the “megamachine of mining” a machine that has been founded often on a pathological need for centralized control – “The myth of the machine and the divine kingship rose together” (1967: 168).

In a feminist encounter with the megaproject of mining, however, in this paper I move away from the logical corollary to Mumford’s view that western science and technology have acted as tools for the domination of nature as well as women. I reject this dichotomy of hyper-expansionist (HE) future and the sane, humane, ecological (SHE) future (as described by Robertson (1981: 83–84) as being equivalent to the “male system” and the “female system”). The most important reason is that it rests on an essentialist notion of gender, on the belief in universal forms of femininity and masculinity. My argument is neither is the masculinity of mining the natural order of things, nor does it reflect the most desirable and efficient organization of the complex systematic operation of mineral extraction. Rather, mining is and has been discursively, culturally and ideologically constructed as a male domain eliminating women and hiding their productive roles in mining.

The objective of this feminist critique is not to state that the ruthless application of technology as it is embodied in big-scale mining particularly since European industrialization, and its focus on economic goals, has been the motor of crisis for women, subjugating them further by causing an erosion of their livelihood bases. The literature (see Braidotti, Charkiewicz, Hausler, & Wieringa, 1994 for a review) on “impacts of mining on women” seem to be arising out of an equation of “nature’s work” with “women’s work” a la Shiva (1989), and links women with nature both materially and spiritually. This representation is one of the problematics that I will investigate in this paper. Large scale projects are unpopular with feminists; the most

striking examples of how large scale projects negatively impact upon women are commonly cited from large dams, but large-scale mining projects could well fall into this genre. Following Faulkner's (2000) approach of getting "inside the belly of the beast," I ask, how did the mega project of mining come to be seen so closely associated with masculinity? Like my question, my methodology is also feminist. Such a methodology reverses the research gaze to also analyze the more powerful themselves, those who determine mining investments, large projects, plans and the designs.⁷ To question the range of symbolic as well as the material dimensions of power and gender means working on, and recognizing the connections between, not only the personal and the professional, but also the politics of institutions and the global systems. To this end, I will also illuminate mining as a masculine work and workplace, "the miner" as the symbolic masculine icon of the working class, explore the gendered impacts of mining, and show how technology in mining interacts differently with men and women.

For social scientists, mining has been the quintessential "other" as a human endeavor, competing with farming for land, physically remote and less accessible, and representing a "special" kind of human project in its disregard for preserving the nature. Often mining community studies reflect this "distance" or "remoteness" (see Pattenden's (2005) description of her study community in Australia). Similarly, "the miner" has become an archetypal "other" of the comfortable lives of the urban middle classes whose secretly admire the heroism of the blackened face working class man. Whereas farming follows a natural rhythm, each harvest being followed by a new germination, mining is associated with "luck," a matter of chance either for countries in having mineral deposits, or for individuals in striking it (Harvey & Press, 1990: 2). If mining is "the other" of the normal human endeavor, "the miner" is also the other for the normal human being. The naturalization of men in these binary constructions leads to seeing women as the other of mining and the miners. It is easy to think of "mother nature" whose womb is raided by some hard unrefined men in search of personal or corporate profit. Mining also evokes images of pickaxe and shovel, bulldozers and earth movers, board and pillar, longwalls and caterpillars. It suggests sophisticated techniques and processes such as drilling and blasting, cutting and excavating, shafts and pits. Technology plays an important role in extractive industries; mining is entirely dependent on tools and machines which are an integral part of mineral exploration, extraction and processing. The extensive use of technology has also been responsible for attributing the strong masculinity to mining as a human endeavor, and to the jobs and processes therein (Rickard, 1933). I show that mining, with its long history of use of tools, is also an area of work that inscribes gendered meanings onto the bodies of individuals performing it, through an intricate sexually based division of labor. Even where women have entered in small numbers to take advantage of the better pays that are offered by many large mining projects, they tend to remain at the bottom of the company hierarchy. The sexually-based division of labor, seeing certain jobs as more suitable for women's nimble fingers or more docile nature or lesser risk-taking propensities, even while incorporating women into the workforce tends to push women into the lower status and more insecure forms of jobs in mining. This is not the end: once

the masculinity of the enterprise as a whole is well entrenched and widely accepted within the industry and on the mine site, it gets transmitted onto the communities living around it. Either the woman in mining settlements is rendered invisible and stripped of her productive values at home and in the workplace, or the technocentric and hyper-masculine mining industry combined with patriarchy, portrays her purely as a victim without agency.

20.2 A Feminist Critique

In this paper, I attempt to complicate this simplistic picture through a feminist critique of mining as a whole, and similar megaprojects in general.⁸ A “feminist perspective” can shed new light on mining, as there are analogies between mining and feminist social research: both

...intervene in and disturb a landscape by probing and digging for a rich lode of ore or layer of stratum that has hitherto lain covered, or unknown, perhaps until now unvalued. Women’s knowledges and contributions, like untapped mineral wealth, had lain unused simply because the society had no use for them.
(Gibson-Graham, 1994: 206–207)

Unlike mining, there is, however, no accepted and single feminist method, but a distinctive methodological perspective or framework that fundamentally challenges the often unseen androcentric or masculine biases in the way that knowledge is traditionally constructed. Feminist methodology is eclectic, without a single and standard of methodological correctness or feminist way to see things. It critiques knowledge that claims to be universal and objective, but which is, in reality, knowledge based on men’s lives. For example, the androcentric picture that one receives of mining and the social worlds around mines emerges from the testing by men of hypotheses generated by what men find problematic as subjects of enquiry. Again, feminist do not offer “alternative” research methods but illuminates alternative origins of problematics, explanatory hypotheses and evidence, alternative purposes of enquiry, and a new prescription for the appropriate relationship between the inquirer and her/his subject of inquiry (Harding, 1987: vii). A feminist perspective is at once located within a discipline and outside of it; it builds a knowledge outside of disciplinary frameworks and puts forth feminist criticisms of the discipline, with the goal of transforming these disciplines and the knowledge to which they contribute. (For comments on a most unlikely discipline such as International Relations, see Tickner, 2006: 21). As against this eclectic feminist knowledge, mainstream scientific knowledge is portrayed as universal, value-free and neutral in its relentless pursuit of truth that is supposedly valuable for all. Four methodological perspectives guide much of feminist research: *research questions* (which research questions get asked and why); the *goal of research* design that is useful to women and men but less biased and more universal than conventional research; the central question of *reflexivity* and the *subjectivity of the researcher*; and a commitment to knowledge as emancipation. Consequently, following Harding’s proposal to use the term, “feminist epistemologies” to imply that women can be both agents of knowledge in

science, I offer a critical view of mining that is written from the point of view not of men but where women are legitimate actors.⁹

To shift from the universalism inherent in megaprojects, I draw in this paper widely on literature from a range of disciplines and approaches in social science including some development text. The last is also crucial because Mumford's conceptualization may lead us into the quagmire of "domination" of women through the domination of the environment. This domination is perceived as women are constructed as the "other" of men in order to reconfirm his position as more rational, superior and standard, but also are seen as the natural carers of the nature/environment. This approach has the risk of enhancing the masculinity of mining. Following Harraway (1991) who suggested the elimination of the image of "Mother Nature" altogether, because in the current situation it would imply women's collective status as victims, I would examine the discourses around mining, the male control of resources, and the normalization mechanisms, such as protective legislation that represents women primarily as mothers and aims to protect their maternal labor from certain areas of work and at certain times of the day, and in the process illegitimize them and make them invisible.

20.3 A Critique of Mining as Work

Today's mining is generally equated with large companies, mostly privately owned, many of them incorporated in the developed world and with the shareholders' monies operating predominantly in developing countries. This large corporatized form of mining is insignificant as an area of work, employing less than 1% of world's workers, and this figure tends to decline with mechanization (ILO, 2002). Many more people, however, make a living out of extracting minerals out of the earth's surface: in 2002 over 20 million people were estimated as depending on mineral resource extraction for their living (CASM, 2003, 2005). These informal modes of mineral extraction practices collectively known as "Artisanal and Small-Scale Mining" (ASM) (Hentschel, Hruschka, & Priester, 2002) were noted early by mining engineers for their significant contribution to the world mineral production (see for example Argall, 1978; Carman, 1985; Noestaller, 1987). Yet, in general ASM was a less understood area in mining till social scientists pointed out the relationship between poverty, economic reforms and large-small interlinks (Hilson & Potter, 2005; Lahiri-Dutt, 2007). Graulau (2006: 299) put women's labor as the core of capital accumulation in ASM communities such as those in Brazilian Amazon: "Women's labor has been crucial in the expansion of capitalism and the reproduction of its modes of production in the mining frontier." ASM reflects two important global trends in respect of women's work: feminization of the workforce and informalization and casualization of women's work.

Feminisation of informal mining means that the percentage of women can reach up to a high of 80% in actual mining jobs such as panning, processing, transportation and related tasks in the field. This proportion varies from country to country

according to location, nature and value of the mineral, processing techniques used, marketing systems, local social milieu, availability of alternative occupations and other factors. However, the dangerous and physically demanding nature of work leads to a gender division of labor in which men undertake the so-called “heavy jobs” and women do the repetitive chores such as panning, carrying and processing. The proportion of women also increases if mining is undertaken illegally, for example such as in the Ghanaian *galampsey* industry (Hilson, 2001, 2002) or in Mongolian “Ninja” mining of gold (MBDA, 2004). Women are also represented more heavily in lower value industrial minerals, the proportion rising to over 75% in salt mining in India (Lahiri-Dutt, 2007). Even where ASM has traditionally provided livelihood to a large number of people in combination with some shifting cultivation, the numbers of women have been rising (such as observed by Caballero (2006) in the Philippines). In South Asia, like everywhere else there is a rise in the numbers of quarries and decline in alternative occupations (Lahiri-Dutt, 2007).

Casualisation in ASM implies the complete domination of the contemporary space of production and social reproduction by more powerful men. Moretti (2006: 5) in his work in Mount Kaindi in Papua New Guinea has shown that the extractive landscape builds up in accordance with “traditional” principles of land ownership; consequently almost all registered mining leases, tributary rights and customary land are held by men and transmitted patrilineally. Even in matrilineal societies such as the Maroons of Suriname, Heemskerk (2000, 2003: 7) noted the apparent autonomy hides gender inequality in relative access of women and men to political power, money, capital assets and contacts with the outside world. Amutabi and Lutta-Mukhebi (2001: 5) explain this disempowered status in terms of lack of land rights. A similar pattern is seen in Latin American ASM communities; women occupy a number of roles as laborers undertaking the most labor-intensive and informal jobs in Bolivia (as *palliris*). Hinton, Veiga, and Beinhoff (2003: 13) noted that the key factors in determining gender roles and status of women in ASM include:

women’s and men’s access to and control of, resources; their ability to attain knowledge of resources, their decision-making capacity or political power; and beliefs or attitudes that support or impede the transformation of gender roles.

20.4 Critique of Representations of “The Miner”

De-constructing mining as a work needs to be followed by a careful examination of who is represented as “the miner.” Difficult and unsafe working conditions in early industrialized mines of modern times largely produced this image of a toiling man as *the* miner. These male miners are seen as men undertaking a dangerous, dirty and risky work, endowing their manual labor with attributes of masculinity. The frontier nature of mining created its own work culture (Burke, 1993, 2006), which was “unashamedly sexist”. The masculine work culture aroused masculinist analysis (Allen, 1981: 4):

... mining evokes popular images of hard unrefined men, distinct and separate from other workers, hewing in mysterious dungeons of coal: dirty, strange men, in some ways frightening and for this reason repellent, yet attractive because they are masculine and sensuous ...

The masculinist analysis invites powerful visual and metaphorical images:

mining ... is gargantuan, dangerous, heroic and mysterious, involving destruction and penetration of the earth's surface. ... Images of mining as human endeavour incorporates the imperatives of physical strength, endurance and filth, all characteristics of masculinised work.

(Robinson, 1996: 137)

Mining and miners provide a classical case in which physicality is "one of the main ways in which the power of men becomes 'naturalized,' i.e. seen as part of the order of nature" (Connell, 1995: 85). The naturalization of masculinity means that in mining the male miner gets represented as *the* iconic laborer. Once established, the interests of the male miner assume precedence as whose interests are to be protected over those of women workers (Metcalf, 1988). The masculinity is enhanced as life in the mine pits is portrayed as a uniquely male world where the sharing of risks contributes to a particular form of male solidarity (Garside, 1971). The strong sense of occupational identity, often extended to entire mining communities, rendered women and their work in the mines invisible. In her work on women in British collieries during the industrial revolution, John (1980) showed that this solidarity was used to exclude women in the name of protecting them from the risky and hard mining jobs. Popular representations in the media further project the iconic status of the male miner. Burke quotes the words of Beatrice Campbell (1984: 97):

Miners are men's love object. ... It is the nature of the work that produces a tendency among men to see it as essential and elemental, all those images of men down in the abdomen of earth, raiding its womb for the fuel that makes the world go round. The intestinal metaphors foster the cult of this work as dark and dangerous, an exotic oppression ... it constructs the miner as earth-man and earth-man is true man. And it completed the equation between some idea of elemental work and essential masculinity.

The emergent masculinity of the popular images of the miner is revealed in the corporate machismo ingrained in mining industry, in vivid accounts of the first sightings of a famous ore body, turning discoverers into "cultural heroes" who "wander across usually hostile landscapes" until they find the mineral deposit (Burton, 1997: 28). Another aspect of masculinity is best expressed in the politics of socialism in which miners have historically played a central part with their wives supporting their struggles (one example is Stead's (1987) work on women's roles in the 1984–1985 miners' strike in Britain). In Kolar Gold Field, Nair (1998: 101, 119) described the working class culture in mining communities where the exigencies of work in a mine and life in a mining camp engendered new social arrangements where the older hierarchies and divisions lost their meanings.

A flip side of the naturalization of masculinity of mining is that all women in all mining communities come to be represented as being unproductive and isolated,

unable to resist domestic oppression; and staying at home caring and cleaning for husbands and sons who worked tough shifts and came home dirty. This representation of women is important for us to critique as it helps to form the foundation of the sexually-loaded binary in mining. The linkages and associations between power and masculinity of mining and the masculinity of the male miner are rendered invisible in the process. It is worth exploring the category of “miner’s wife,” the figure that overshadows the feminine one in mines.

20.4.1 Mining Wives

Miners’ wife is at times seen as the “pit woman” to (mis)represent the woman miner herself (see the previous critique Lahiri-Dutt & MacIntyre, 2006). Women in mining communities belong to the working class *because* of their men, the “male contoured social landscape” burgeoning with the tacit as well as overt support from the corporate body (the Anaconda Copper Mining Company in Butte, Montana, see Murphy, 1997). Marxist feminist geographers McDowell and Massey (1984) in their research on the colliery settlements of Durham, England, analyzed this phenomenon as one of gender division of labor creating a spatial division between the home and workplace, the mine. Miners’ wives were famously described as “the hewers of cakes and drawers of tea,” relegated to their place at home while men gathered together in union halls or local pubs (study in Australia). Yet, social life in mining communities is characterized by groupings that cut across pure class, individual or family boundaries (Dennis, Henriques, & Slaughter, 1969: 249). Among men, the formal bureaucratic structure of the union is imposed on the informal social relationships developed in the mines. Within the family, the division of labor constrains the full formation of the family as a unit. Gender segregation in the mining industry leading men to view themselves as industrial proletariat while enjoying the ownership of home. Women’s contributions in building the family and the community were and remain invaluable, but do not constitute their only identity in the mining industry.

Nash (1979: 12–13) put women in Bolivian mining communities within the context of home as the wife of a male miner, subjected to the limitations of the house, to the dominance by the man whose needs she must dedicate herself to, and to almost unrestricted childbearing: “Male and female roles are dichotomized in the mining community, and there is still a mystique about women not entering the mine.” On closer look, sociologists have found “anomalies” in this class-based analysis of women (Parnpart, 1986: 141–142). While women supported workers’ struggles against capital and even confronted management directly over issues like food and housing, they also adopted an impressive number of strategies to ensure their own position, strategies that pitted gender against gender and even occasionally transcended class lines.

A critique of the overrepresentation of the mining wives has been presented by Rhodes, based on her personal experience of living as a mining engineer’s wife in “Company towns.” According to her,

Mining wives have no public profile. Outside the resources sector they are an unidentifiable group, unseen and unheard. . . . (She is) a dependent spouse whose willingness to maintain male privileges for husband and company had been taken for granted for many years.

Rhodes shows how the unpaid labor by wives at home and in the community helps to sustain a flourishing social life around the mines. While her perspective emerged from personal experience, Rhodes' work fails to query her own class position within the industry's hierarchy. Robinson (1986) observed that the managers' wives in the mining town of Soroako are expected to take on a leadership and welfare role in the community through involvement in the Association of Inco Families, an organization in which their position parallels that of their husband in the workforce. Company hierarchies are expected to be reproduced within the social spheres and could act as informal instruments of subjugation of women. Moreover, in developing countries, the relative economic prosperity of mining wives creates a disjuncture between "staff wives" and local women who become "envious of their lifestyle" as showed by Robinson (1986) in a remote island in Indonesia.

20.4.2 Revisionist Views

Revisionist efforts have come from feminist historians "uncovering" women's roles in the American West (Fischer, 1990; Zanjani, 2006) or in Central Appalachia (Tallichet, 2006). Labor historians have attempted to correct the pronounced masculinity of mining as a work and the miner as the worker, and how it manifests both in the industry and in the politics of socialism in which miners have historically played a central part. The rapidly increasing literature by feminists whilst helping to remove women's invisibility as productive agents in both the mines and in mining communities, has pointed to the problematic of unchanging gender roles at home. In tracing women's contributions in artisanal mining in preindustrial Europe, Vanja (1993: 102) commented that "strict division of labor for men and women" meant a modern family did not come into existence in mining communities. In my survey of women personnel in a modern colliery in Indonesia, I found that many women truck operators tended to leave the job after around 4 years of service, this resignation largely due to the lack of childcare (Lahiri-Dutt, 2006a, b).

Revisionist views show that women have been in the mines with men, as part of the family labor unit or as individual wage labor, from early times in ancient mines, in the modern mines hastening the industrial revolution, and during the contemporary period. Early treatise such as Agricola's *De Re Metallica* (1556) portray women breaking and sorting ores, hauling and transporting them, smelting and processing, and sometimes even undertaking the physically demanding job of working the windlasses. However, it is during the advent of capitalist industrial mining that women's work in mines fully flourished in Europe. Employment records in British collieries from eighteenth and nineteenth centuries do not reveal the full extent of their participation, because as male mineworkers utilized the labor of their female relatives, women working underground as drawers (pulling sledges or tubs along the pit floor from the coal face to the bottom of the shaft) or as pit-brow lasses

would not be usually recorded in colliery accounts (John, 1980: 20). Feminist labor historians Gier and Mercier (2006) have unearthed the hidden history of women miners in the US and Canada. In the coal mines in Belgium, the numbers of women working underground actually grew during the late nineteenth century. Hilden notes (1993: 89) “Not surprisingly, Belgium’s women coal-miners earned some significant portion of the public respect and reverence elsewhere given so readily to male coal-workers.” Women coal mine workers were known as *hiercheuse*, a proud title connoting the feminine version of *mineurs*, the male miners. The public attention, however, meant that colliery women needed to conform to the dress codes of decent women, and eventually raised the problematic of whether the mining women were specially endowed (or special categories of) women or not. Following Burke (1993) one could posit mining work as one of the areas where women’s “agency” could be located. However, it is also important that women’s work in mining be placed within the broader characteristics of gender socialization in mining, lest women are treated purely as “labor commodity.”

20.5 Critique of Technology in Mining

Technology plays an important role in extractive industries; mining is entirely dependent on tools and machines which are an integral part of mineral exploration, extraction and processing. In mining the use of modern technology has been seen as the key to increasing productivity and safety, and improving working conditions, and is thus at the heart of the way workers engage in with their work in mines. Hacker has shown that such extensive use of machines give rise to a “patriarchal culture of engineering” (1981: 341–342). The extensive use of technology has also been responsible for attributing the strong masculinity to mining as a human endeavor, to the jobs and processes therein.

Feminists have pointed out that the use of technology is heavily gendered in terms of both the impact of technology as well as in making visible women’s contributions in science and technology (see Herring, 1999; Rowbotham, 1995). Early socialist feminists demonstrated that technology equated capitalist industrialization and commonly displaced women from production, that new technology enhanced men’s power, and that gender is the crucial determinant of the context in which technologies are imposed (Rowbotham, 1995). Feminists investigating gender in natural resource management also largely supported this view (see Boserup, 1970; Shiva, 1989). However, a more nuanced and complicated view has now been developed; neither “women” nor “technology” is seen as a unitary category and Wajcman (2004) uses the term “technofeminism” to indicate a complex fusion.

Technology impacts on women’s labor because a sexual division of labor is embedded in the way men and women do things in a factory or shop floor. This is true of almost all cultures and almost all times. Even in Indus Valley civilization, “men delved and women span” (Sengupta, 1960: 1). In mining, men dug the mineral ores and women carried them and processed them. In many manufacturing

industries, “men and women tend to participate in different spaces, shops or sections of the factory,” and they usually operate or set up different “physical technologies that require skills or knowledge defined as male or female” (Sen, 2008: 107). Sexual division of labor, justified as the “natural” complementarity of the roles of women and men, however, is usually accompanied by “a vertical sexual division of labor” or a stratified division that concentrates women into the bottom strata of various low level positions, discriminatory wages and poor working conditions.

In mining there are evidences that technology change, in absolute terms of efficiency and productivity, often worked against the interests of women workers in the industry. Seen as useful in enhancing production and productivity, or as crucial for increasing safety in a most dangerous job, technology has assumed a gender-neutral position. Whilst women as well were an integral part of industrialized mining in Bolivia, participating in labor intensive concentration processes, “their work was lost when machines were installed in the flotation processes for sorting minerals in the sixties” (Nash, 1979: 13–14). In many countries women workers were thrown out as mining became more capitalized. Nakamura (1994: 15–16) has shown that the introduction of new technology destroyed the *naya* (or “stable”) system of work which had made a place, albeit at the bottom, for women in mining production in pre-capitalist revolution coal mines: “a married couple worked as a unit, with the husband (*sakiyama*) digging out the ore and the wife (*atoyama*) assisting him by carrying away the coal.” A technological rationalization accompanied the post World War unprecedented capitalist expansion of coal mining in Japan, and as the industry established new systems of production technology, women were thrown out of work.

In India, women and men usually from indigenous communities such as the Santhals and semi-tribals such as Bauris who worked together in early collieries as part of a family labor unit. Again, women *kamins* carried the coal cut by their male partners, the *coolies* who were their husbands, brothers and sons (Ray Chaudhury, 1966). Within a generation or two of the flourishing of coal mining from the construction of the Indian Railways in 1850s, colonial administrators began to describe some of these local communities as “traditional coal cutters” (Paterson, 1910). Women also worked the engines together, and were called as “gin girls” (Pramanik, 1993). However, the shallow *pukuriya khads* (old-style open cuts) began to change around the late 1920s in favor of shaft mining.

Changes in technology are associated with other institutional changes such as the protective legislation supported by the ILO in early twentieth century. These bans on women’s night and underground work also played important roles in throwing women out of the mines and in India, for example, as early as in 1947, had significant economic consequences to the miner families (Mukherjee, 1947). From a high of 44% in 1900, women’s proportion in coal mines in India in 2000 fell drastically to less than 6%, turning the gin girls into scavengers (Lahiri-Dutt, 1999).

20.6 Critique of Gender-Selective Impacts

It has been emphasized that the introduction of large scale mining affects women disproportionately more than men, and that women are affected both from lack of access to assets and resources, as well as from increased cash flows into local economies and into the hands of men. The gendered impacts often cut across class and race, but those women (and men) beginning from a disadvantaged position are more negatively affected by mining (Griffiths, 2003). Again, the gender-selective impacts have been noted both in better off countries such as Canada, and in less developed countries.¹⁰ In his work amongst the indigenous populations of Canada, Hipwell, Mamen, Wietzner, and Whiteman (2002: 11) put these impacts into three broad categories, health and well-being, women's work and traditional roles, and gender inequalities in the economic benefits from mining activities. My observation in eastern India on gender impacts were related to the depleting subsistence bases with environmental degradation for women were primarily burdened with family's food security (Ahmad & Lahiri-Dutt, 2007). Positioning the problem in the environmental justice framework Bose (2004: 409) observes:

Extensive mining has ushered in myriad problems such as alienation of lands, loss of economic and livelihood opportunities, loss of forest cover accompanied with its diverse impacts, social and cultural changes due to a migrant population coming into the region, degradation in the physical environment due to pollution and contamination of air, dust, and water by the company's extraction and processing activities. However, even more important are the problems faced by adivasi women.

The contexts may be different but similar issues ring through in other studies. These studies describe the loss of agricultural land and livelihood resources for those people living at subsistence level and the decreased ability of women to work on remaining land due to male absenteeism (Bhanumathi, 2002, 2003). In her early ethnographic work on the political economy of development in a mining town in Indonesia, Robinson (1986: 12) says:

The fundamental change in Soroako has been the loss of the village's most productive agricultural land to make way for the mining project. As a consequence, wage labour for the company has become the principal stable form of livelihood. However, a large proportion of village residents do not enjoy regular employment, and they have been reduced to a semi-proletariat, living by occasional waged work and a variety of activities in the informal sector.

Each of these changes can have distinctively gendered effects. In her later (1988: 64) work, Robinson notes that "in the change from peasant agriculture to wage labor the women have been subject to a decline in their economic independence," but at the same time

... women have become more economically dependent on men, changes in cultural forms of the expression of gender have resulted in a decline in some of the restrictions on women's personal freedom which hitherto prevailed in the community.

Byford (2002) observes that sudden influx of mining revenues within local communities may also marginalize women. A new, monetized, economy that the introduction of a new mine brings in tends to put women either in lower status jobs or renders them less active economically by changing the production systems, relations and spatial orientations (Rothermund, 1994). Women can be marginalized through the introduction of different “mining culture” brought in by a new mining project. Often this external culture leads to internal power redistribution within the community, attributing new notions of authority to men. Women tend to get excluded from negotiations between the community and the mining company. The mining company personnel carry with them false assumptions about the identity of the “head of the family” and consider that the household resource allocation is equal for all members. More often than not, men receive monetary compensation because the land belongs to them. It then becomes difficult for women who have little formal political authority to be able to influence how the mine would shape their lives.

The changes often adversely affect women, particularly by devaluing women’s productive work at home, and by undermining their status as decision-makers and resource-users. Physical proximity to the mines leads to the direct experience of noise and vibrations, and the visibility of gigantic machines arouse fear and a sense of insecurity creating a heightened sense of negative impacts among women (Lahiri-Dutt & Mahy, 2007). The entry of a cash-based economy with mining affects women indirectly too; the extra cash being spent on sexual promiscuity, on pubs, karaoke bars and brothels that come up overnight in the most remote places. The lack of direct employment opportunities in the mine for women and resulting dependency on their male relatives and women’s lack of decision-making power at the community level turn women into victims of mining.

The impacts of mining on gender literature has given rise to the convincing figure looming in all social impacts literature of “the prostitute,” yet another subject category that is sweepingly used to indicate to the negative effects of mining on women (see Kunanayagam, nd). Women making a living as “sex-workers” around minesites have been interpreted by the civil society groups as equal to the vandalization of nature, “degradation of women” with the degradation of land caused by mining.¹¹ A common and recurring theme from activist literature and posters is the regret over women’s sex work as one of the gendered consequences of mining expansion. For many local people mining development changes the attitudes towards sexuality as well as towards women (Emberson-Bain, 1994). While many societies in Papua New Guinea incorporated long periods of male sexual abstinence, there is evidence that in mining towns this is being eroded. Communities report a growing incidence of alcoholism, rape and other forms of violence against women and an increasing incidence of teenage pregnancy. These gender-selective impacts have given rise to another stereotypical category, the “contract wife.” The contract wife’s marriage ends when the male mine worker disappears after his contract is up (often to a wife back home). Indeed almost all mine sites report of increased male alcoholism, transitory marriages or relationships, increased prostitution, the spread of sexually transmitted infections, sexual harassment against women and domestic violence.

Such representations of women as “victims of mining” are common throughout studies on social impacts of mining. So much has this figure been set in concrete that it is not uncommon to encounter historical research on sex work mining communities. Vermeer’s research on the archaeological evidence of sex work in the 19th century mining frontier in American West is an example. Historical research now has shown us that in all gold rush situations there was a profusion of sex-work (Higgins, 1999). John Gardener’s interesting story is about Australia where he comments that the state’s position on prostitution was largely one of “non-intervention” In the early days of settling “new frontiers” and the gold rushes in the 19th century, prostitution was unofficially tolerated in most places, but was particularly so in mining areas.¹²

It is important to query the theoretical positions of many of these evidences. One segment of this material is the derivative of highly contested Women, Environment and Development (WED) literature. Broadly, this literature emphasizes the affinity of women with their environments, as exemplified in the work by Dankelman and Davidson (1985): “(t)he indivisible bond existing between women, the environment and development.” Equated largely with ecofeminism, this view is reminiscence of biological determinism and essentialism, and the absence of social, material or historical context. For example, Plumwood (1992) believed: “In the Third World . . . the connection between women’s interests and the health of nature is especially apparent.” Although undoubtedly a gross exaggeration, this view has been wildly popular among many women’s and activist groups, especially through the writings of Shiva as an authentic “Southern’ voice, this view turns all women as an appropriate group to mobilize for conservation.” Shiva (1985) noted, “Women want development that ensures water and food. Men want development that generates cash and contracts.” In mining, this view can be simply translated as “Since men get all cash, women do not want mining development.” Resonance of this genre of work lies in Mies’ (1986) view which equates patriarchy and capitalist accumulation. Sontheimer (1991) pointed out the inherent weaknesses of the WED view through an example; she showed that reports on women working on anti-desertification programs for food conclude that women are committed to nature, but does not notice that women are the poorest and unlike men, work for only food. And although the problematic WED discourse has waned, according to Leach (2008: 82) there is “little evidence of a well-conceptualized gender relations perspective on environmental relations in policy literature.”

The difficulty with these analyses is that they homogenized all women as a single category, and romanticized their special closeness to the environment at the cost of exploring the intersection of race, ethnicity and class relations. Such a homogenization of all women into a single category has inherent dangers, just as the creation of unitary categories like the miners’ wives, of depoliticizing the environmental and community politics in mining. They again lead to a dualism between women and men, separate their spheres and spaces of production, and equate women primarily with biological reproduction. Experts have showed that unlike what Ester Boserup (1970) thought, women in many poor countries are not responsible for a separate feminine subsistence sector as opposed to the commercial production sector

(see for example, Stone, Stone, & McNetting, 1995). Adding their voice to the debate, women from poorer countries have criticized such generalizations while appreciating that in their reproductive role women experience a commonality of functions and responsibilities (Agarwal, 1992). In mining, as noted earlier, women perform a great amount of work in the homes and around the mines, bearing the household subsistence duties that result in the gendered nature of negative social effects. Sachs, following Agarwal (1996), put the blame squarely on women's poor/low ownership of land in context of rural households: "Although women do the majority of work in agriculture at the global level, elder men for the most part, still own the land, control women's labor, and make agricultural decisions in patriarchal social systems" (1996: 16). In mining, the dominance shapes a narrative that overshadows the gender relations and fails to acknowledge that families often survive because of the labor advantages from women. Recent postcolonial feminist literature has critiqued the view of third world or poor women as victims without agency, and Doezema's (2000) work has powerfully questioned the conceptual duality within these representations of women as either "decent" and community wives on the one hand, and as "fallen" sex workers or helpless trafficked without their consent.

20.7 Conclusion

Gendered social life is produced in three main ways: through the symbolism of size and technology use in mining, the structure of the industry and the identities produced and reproduced. In the megaproject of mining, the dualistic gender metaphors to various perceived dichotomies between women and men play an important role in producing gendered social life. As is now well known, such perceived differences between women and men and the assigning of different roles with different status have little to do with sex differences. However, gendered dualisms are used to organize social and production activities, divided between different groups of humans to build a gender structure within the mining industry. In mining gender becomes a form of socially constructed identity of the individual that may often have little relation with either "the reality" or the perceptions of sex differences (individual gender or gender identities). Modern megamining projects embody a power that functions through normalizing mechanisms that reduce heterogeneity. In post-modern forms of mining, in operations where instead of forming a mining community the Fly In Fly Out (FIFO) systems systematically prevent its formation, power is embodied in and expressed through decentralized and highly sophisticated domination. Clearly, there is more to male dominance in mining than power, and that exploring the links between structure, symbolism and identity would be crucial in building a feminist critique of mining. It becomes clear that masculinity too could not be a singular category, but have as many forms and expressions through male and female, corporate and non-corporate actors as femininity.

Following Zwartveen's (2006) critique of the profession of irrigation engineering, I conclude that the masculinity of mining is evident in three different but

intricately linked spheres: the first world of the mining project itself, encompassing an operation and the settlement around it, with people living in and around the mines, and where operators and managers manage the operation, maintain the system and resolve conflicts of interests. The second world is the world of thinking about mining and the world where representations of mining realities are produced. Lastly, the third world is the world of international professional mining that produces a global culture and controls the identities in mining. The first world is masculine because women do not own mines, they are providers of labor in low status jobs in and around the mines, and are typically less represented than men's work. The membership of trade unions tend to be reserved for men, and the participation in consultations and public meetings are often seen as linked with masculinity. The digging of the land is seen as unfeminine and unsuitable for women. Over time, this view of mining as dirty work becomes internalized even by women who are in the industry. The second world, thinking about mining is a man's world because mining narratives have devalued women's contributions and have rendered thinking and speaking about women irrelevant. In mines, greater value is often attached to the activities and experiences that are associated with men or with masculinity. Not only are gender relations invisible, the concerns of women are seen as irrelevant by both trade unions and the mining industry. The third world of mining as a heavily male dominated profession is directly perpetuated by the formulation of restrictive laws and measures such as those by the ILO and indirectly through a host of circumstances in which those women who break through the industry are required to "act as men" in order to fully belong to the domain of men. Re-orienting the masculinity of the megaproject of mining would involve not a focus on men or the individuals, but on the institutions, cultures and practices that sustain gender inequality along with other forms of domination.

Notes

1. Although gold rushes began as individual enterprises, only a handful of mining companies at present control the major share of global mining market today.
2. By Zwarteveen (2008), in her work critiquing large-scale water projects.
3. I use the term "mining" in its broadest sense as encompassing the extraction of any naturally occurring mineral substances, usually solid but also liquid or gas – from the earth for utilitarian purposes. For the semantically inclined: "mine" is an excavation made in the earth to extract minerals, whereas "mining" is the activity, occupation, and industry concerned with the extraction of minerals. The word "mine" comes from an old French verb *mineor*, meaning "to excavate," to make a passage underground, to undermine. The French word came from the Medieval Latin *mina*, which means a point, something that projects, and therefore threatens. Thus, mine came to mean an excavation made in warfare, and had a military significance before it acquired an industrial meaning (Rickard, 1933).
4. Hartman, and Mutmansky (2002).
5. Black (1965: 111, 115).
6. Jomo's (1990: 5) history of the great tin crash leading to the decline Malaysian and Bolivian tin industry quotes a New Internationalist report describing the visit of a Bolivian miner, Higon Cussi, to London: "His first London visit is to the place where the permanent link between Bolivia's poverty and our wealth is forged on the floor of the London Metal

- Exchange. . . Higon is amazed. He can't see any tin. 'I imagined that they would show samples – not that they would just do it by talking.'” Jomo, analyzing the tin crisis of 1985, described the London Metal Exchange as a “private club whose existence is only to serve its own interests”, where young British men wearing suits can control the lives and livelihoods of millions of poor people toiling in the mines of poorer countries.
7. I borrow heavily from Zwartveen's recent (2008) work on men, masculinities and water powers in irrigation engineering.
 8. Although examples of individual projects could be drawn, I will try to refrain from citing such individual megaprojects and instead illuminate mining as one of the megaprojects.
 9. This is not to say that I stop at revealing women's roles in mining. This is one of the early feminist ways against which Harding warns us. She observes (1987: 4–5) that the early feminists used three approaches in their research to rectify the androcentrism of traditional analyses. First, they tried to “add women” to existing modes of analyses, “recovering” and reappreciating women's work. A second concern of feminist research has been to examine women's contributions to activities in the public world. In mining this would involve seeing women as wage earners. In contemporary “Western” civilization a good amount of literature of this genre of “uncovering” or “recovering” women's histories in the mines has flourished. A third genre of research focus on women as victims of male dominance, including those that involve institutionalized economic exploitation and political discrimination. In mining literature, this would imply investigating the gender-specific impacts of mining. My effort is to go beyond these and critically reflect on the masculinities of mining.
 10. A publication arising out of a gathering of community activists at Lake Laberge, Yukon, in September, 2000, titled *Gaining Ground: Women, Mining and the Environment*, describe the impacts of the boom and bust – feast and famine – cycle on women. It states the position through the voice of an elder: “We the women, who are keepers of the hearth and home must . . . take an active role in determining the future of the lands and resources we have. Our job is to see to the well-being for the next generations to come.”
 11. See for example Robinson's “Bitter harvest” reprinted in the New Internationalist page <http://www.newint.org/issue299/women.html> which describes the scratches of the “tiger's claws” in the new tiger economies of southeast Asia are being felt by local women: “But the colonial attitudes of the company also change social roles. Many incoming men are single and have high incomes. Bars and brothels are as inevitable in the company towns and squatter settlements. . . . Companies actively encourage prostitution around the mining towns and at popular destinations for the miners' holidays. Migrant workers expect sexual services to be available near where they live.”
 12. Available from http://www.agitprop.org.au/lefthistory/1989_gardener_tourism_and_prostitution.php

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