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## 6 Scaled Geographies: Nature, Place, and the Politics of Scale

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Nature, Place, and Scale:  
A Historical-Materialist Perspective

In early 1998 (*Le Monde*, 17 January), controversy arose in the Paris region about IBM's continuing tapping of ancient underground aquifers. The production of new generation computer chips requires large volumes of water of the highest purity to cleanse micropores. Environmentalists, seeking to protect historical "natural waters," were outraged. The water company, Lyonnaise des Eaux, was worried about the potential loss of water and, consequently, future dividends. The state at a variety of scales was caught up in the myriad of tensions ensuing from this: protection of the natural environment versus economic priorities, the competing claims of different companies, etc... The ancient underground waters fused with politics, economics, and culture in intricate ways.

This is just one example from a proliferating number where the traditional distinction between environment and society, between nature and culture, becomes blurred, ambiguous, and problematic. The contested "making" of "Dolly," the cloned sheep, the outbreak of BSE (mad cow disease), the built-up of CO<sub>2</sub> in the atmosphere, and the depletion of ozone in the stratosphere similarly fuse physical-environmental metabolisms with sociocultural and political-economic relations. These all suggest how nature and society are constituted as networks of interwoven processes that are human and natural, real and fictional, mechanical and organic. They also suggest how the social and physical transformation of the world is inserted in a series of scalar spatialities. "Dolly," Ozone, or Parisian aquifer waters all embody and express physical and social processes, whose drivers operate at a variety of interlocked and nested geographical scales.

This chapter addresses the scalar construction of socionatural processes and the centrality of a politics of scale in the production of particular geographical configurations. This problematic will be approached from a historical-geographical materialist perspective. First, I examine the question of nature, place, and scale. Second, two examples of the contested construction of spatial scales, in which the social and natural operate in inseparably intertwined manners, are presented. Finally, the importance of a radical politics of scale in the construction of emancipatory political agendas and strategies is discussed.

#### *On nature*

In recent years, there has been a resurgence of historical-materialist thought on nature (Benton, 1996; Castree, 1995; Grundman, 1991; Harvey, 1996; Hughes, 2000; Smith, 1984; Swyngedouw, 1999a). Historical-geographical materialism is founded on the ontological principle that living organisms, including humans, need to transform (metabolize) "nature" and, through that, both humans and "nature" are changed. Marx hastens to add that this metabolic transformation of nature (environmental change) is always a social and historical process. Put simply, in order to live, humans transform the world they live in, and this takes place in interaction with others; that is under specific "social relations of production." This metabolism is necessarily a social process. Both nature and humans, materially and culturally, are profoundly social and historical from the very beginning (Smith, 1996; 1998; Castree, 1995; Haraway, 1997). Although early Marxists tended to focus on questions of distribution and power among and between humans and social groups, the inevitable physical transformation of nature and the production of new "natures" (both materially and socially) remained as a presupposition. The social appropriation and transformation of nature produces historically specific social and physical natures that are infused by a myriad of social power relationships (Swyngedouw, 1996a). Social beings necessarily produce nature; nature becomes a sociophysical process infused with political power and cultural meaning (Haraway 1991; 1997). In addition, the transformation of nature is embedded in a series of social, political, cultural, and economic constellations and procedures (i.e., social relations) that operate within a nested articulation of significant, but intrinsically unstable, geographical scales.

#### *On place and space*

The process of perpetual metabolic transformation of social and physical nature and the transformation of social life are part and parcel of the same process. Everyday life is necessarily "placed" or "situated" by virtue of the need to transform and metabolize (produced) nature. The material and social conditioning of life and of the metabolic transformation of nature is constituted in and through temporal/spatial social relations that operate over a certain scalar extent. Engaging place as "produced" nature is essential for human existence (Swyngedouw, 1997a). Under capitalism, place as (produced) nature (socially transformed or given) becomes a central element in the forces of production that shape and partly condition accumulation trajectories and strategies (Swyngedouw, 1992). At the same time, place embodies a historical layering of crystallized social relations.

The process of the production of place/nature is inevitably a contradictory one as it necessarily implies a process of "creative destruction" of nature/society. The conflicting (capitalist) social power relations (along class, gender, or other social cleavages) through whom this transformation is organized perpetually destroy existing conditions to replace them with new configurations and characteristics. "Creative destruction" is always an already social process: the process of metabolic transformation of produced nature takes place in association with others. The thing that is transformed and the thing that arises out of the transformation process is always already part of and embodies the social relations through which nature/society is transformed. The world's historical geography can, consequently, be reconstructed from the vantage point of this perpetual socioecological transformation process. These social relations are always constituted through temporal and spatial relations of power with respect to the social and physical ecology that is being transformed. Indeed, these social relations are "grounded" in the sense that they regulate (but in highly contested or contestable ways) control over and access to transformed nature (place), but these relations also extend over a certain material/social space. They produce what Massey (1993) refers to as a "geometry of power." It is also here that the issue of geographical scale emerges as central. Socio-spatial relations operate over a certain distance and produce scalar configurations.

#### *Scaled geographies: scaling nature – scaling the social*

I insist that social life is process-based, in a state of perpetual change, transformation and reconfiguration (see Harvey, 1996). Starting analysis

from a given geographical scale seems to me, therefore, to be deeply antagonistic to apprehending the world in a dynamic, process-based manner. This has profound implications for what scale means. I conceive scalar configurations as the outcome of sociospatial processes that regulate and organize social power relations. As a geographical construction, scales become arenas around which sociospatial power choreographies are enacted and performed (Swyngedouw, 1997a; 1997b; 2000b). Over the past few years, a plethora of research has been published on the social construction of scale and the deeply contested scalar transformations of the political-economy of advanced capitalist societies (Dicken et al., 2001; Howitt, 1993; Smith and Dennis, 1987; Swyngedouw 1997a; 1997b; 1998). Emphasis has been put on the making and remaking of social, political, and economic scales of organization (Brenner, 1998; Collinge, 1999; Cox, 1998; Delaney and Leitner, 1997; MacLeod and Goodwin, 1999; Marston, 2000; Marston, this volume; Silvern 1999), of regulation (Boyle, 2000; Berndt, 2000; Brenner, 1997; Leitner, 1997; Swyngedouw, 1992), of social and union action (Herod, 1991; Sadler, 2000; Walsh 2000), and of contestation (Castree, 1999; Miller, 1997; Towers, 2000). In addition, attention has been paid to the significance of differential scalar positionings of social groups and classes in the power geometries of capitalism (Kelly, 1999; MacLeod, 1999; Swyngedouw, 2000a; Leitner, this volume), and on scalar strategies (the jumping of scales) mobilized by both elites and subaltern social groups (Brenner, 1999; Herod, 1991; Swyngedouw 1996b; Zeller, 2000; Smith, this volume).

With a few notable exceptions, the question of nature has remained largely outside this analysis (Escobar, 2001; Grainger, 1999; Zimmerer, 2000). I insist that nature and environmental transformation are also integral parts of the social and material production of scale. More importantly, scalar reconfigurations also produce new sociophysical ecological scales that shape in important ways who will have access to what kind of nature, and the particular trajectories of environmental change. The examples in the next section attempt to substantiate and elucidate how the "scaling of nature" is deeply intertwined with the scaling of social life and of the power relations inscribed therein. Before we embark on this, I recapitulate my perspective on the social and material production of scale and scalar gestalts:

- 1 Scalar configurations, whether ecological or in terms of regulatory order(s), as well as their discursive and theoretical representation, are always already a result, an outcome of the perpetual movement of the flux of sociospatial and environmental dynamics. The theoretical and political priority, therefore, resides never in a particular geographical

- scale, but rather in the process through which particular scales become constituted and subsequently transformed.
- 2 Struggling to command a particular scale in a given sociospatial conjuncture can be of eminent importance. Spatial scales are never fixed, but are perpetually redefined, contested and restructured in terms of their extent, content, relative importance and interrelations. The continuous reshuffling and reorganization of spatial scales are integral to social strategies and an arena for struggles for control and empowerment.
- 3 A process-based approach to scale focuses attention on the mechanisms of scale transformation through social conflict and political-economic struggle. In many instances, this struggle pivots around the appropriation of nature and control over its metabolism. These sociospatial processes change the importance and role of certain geographical scales, reassert the importance of others, and on occasion create entirely new scales. These scale redefinitions in turn alter the geometry of social power by strengthening the power and the control of some while disempowering others (see also Swyngedouw, 1989; 1997b; 2000a).
- 4 Smith (1984) refers to this process as the "jumping of scales," a process that signals how politics are spatialized. That is, scalar political strategies are actively mobilized as parts of strategies of empowerment and disempowerment. As the scalar "gestalt" changes, the social power geometry within and between scales changes.
- 5 There is a simultaneous, "nested" (like a Russian doll), yet partially hierarchical, relationship between scales (Jonas, 1994: 261; Smith, 1984; 1993). Clearly, social power along gender, class, ethnic or ecological lines refers to the scale capabilities of individuals and social groups. Engels (1844) already suggested how the power of the labour movement, for example, depends on the scale at which it operates, and labour organizers have always combined strategies of controlling place(s) with building territorial alliances that extend over a certain space.
- 6 Scale configurations change as power shifts, both in terms of their nesting and interrelations and in terms of their spatial extent. In the process, new significant social and ecological scales become constructed, while others disappear or become transformed.
- 7 Similarly, ecological scales are transformed as and when the socioecological transformation of nature takes new or different forms. For example, the multiscale configurations of monocultural cash-cropping agriculture are radically different the socioecological scales of peasant subsistence farming.
- 8 Scale also emerges as the site where cooperation and competition find a (fragile) standoff. For example, national unions are formed through alliances and cooperation from lower scale movements, and a fine

balance needs to be perpetually maintained between the promise of power yielded from national organization and the competitive struggle that derives from local loyalties and interlocal struggle.

- 9 Processes of scale formation are cut through by all manner of fragmenting, divisive and differentiating processes (nationalism, localism, class differentiation, competition, and so forth). Scale mediates between cooperation and competition, between homogenization and differentiation, between empowerment and disempowerment (Smith, 1984; 1993).
- 10 The mobilization of scalar narratives, scalar politics, and scalar practices, then, becomes an integral part of political power struggles and strategies. This propels considerations of scale to the forefront of both ecological and emancipatory politics.

In sum, the condition of everyday life resides in the twin condition of the essential transformation of nature (place) on the one hand and sociospatial relations through which this transformation is organized and controlled on the other (Swyngedouw, 1992). It is exactly this process that Lefebvre (1991) refers to as "The Production of Space" and it involves the production of scalar or scaled geographical configurations. The geometries of power, of course, fragment and differentiate them in multiple ways as I attempt to illustrate below.

#### The World in a Cup of Water: Scalar Processes and the Contested Politics of the Rescaling of H<sub>2</sub>O

I briefly examine two cases, which use water as the conceptual and material entry into a particular aspect of the social and material production of scale, the making of scalar articulations, and the politics of rescaling. Life is hardly imaginable without water. The multiple temporalities and interpenetrating circulations of water (the hydrological cycle, canalization, and distribution networks of all kinds, dams, etc.) illustrate its perpetual physical and social metabolism and mobilization. Water relates all things/subjects in a network, or rhizome, connecting the most intimate of sociospatial relations; and inserts them in a complex political-economy and political-ecology of bodily, local, urban, regional, national, and international scales. Circulating water also is part of a chain of local, regional, national and global social and ecological flows of H<sub>2</sub>O, money, texts, and bodies.

We can use water as an entry-point to reconstruct, and hence theorize scalar transformations as a political-ecological process. Water embodies, simultaneously and inseparably, biochemical and physical properties,

socioeconomic and political characteristics, and cultural and symbolic meanings. These multiple metabolisms of water are structured and organized through relations of power, that is relations of domination and subordination, of access and exclusion, of emancipation and repression. This circulation of water is embedded in and interiorizes a series of multiple power relations along ethnic, gender, and class lines. These situated power relations, in turn, swirl out and operate at a variety of interrelated geographical scale levels, from the scale of the body upward to the political-ecology of the city and its hinterland, and to the global scale of uneven development. The struggle over nature and the uneven access to water turns the issue into a highly contested terrain that captures wider processes of political-ecological change.

My first example demonstrates how urbanization itself involves the continuous reconstruction of social and ecological scales, while producing new scalar configurations. This will be developed through a brief historical geography of the urbanization of water in Guayaquil, Ecuador (Swyngedouw 1995; 1997c). The second example illustrates how the mobilization of a particular scientific discourse on a specific physical scale (the river basin) becomes an arena for staging political power choreographies that were decisive in shaping processes of modernization in Spain (Swyngedouw, 1999b). This shows how "scales of nature" become incorporated into particular political projects.

#### *Conflict, scale, and the urbanization of H<sub>2</sub>O in Guayaquil, Ecuador*

Guayaquil, Ecuador's largest and most powerful city located on the Pacific coast, suffers from a seriously socially uneven access to potable urban water, like many other cities in developing countries. Of its two million inhabitants, 38 percent do not have access to piped potable water, and depend on private vendors who sell water at a massively inflated price. Publicly supplied water costs approximately three cents for 1000 litres, while private water vendors charge three dollars. As a result, an intense social and political struggle, enacted at bodily, neighbourhood, urban, regional, national, and international scales, unfolds over access to and control over the city's water resources. The uneven power relationships that have shaped Guayaquil's urbanization process are thus etched into the circulation of urban H<sub>2</sub>O. The historical geography of the urbanization of water suggests how particular physical-ecological, political, and economic scales are constructed and perpetually reconstructed. It also shows how the resulting scalar configurations become nested arenas for further social and political struggle over access to water.

Clearly, the urbanization process itself is predicated upon the mastering and engineering of nature's water. The ecological conquest of water is therefore, an integral part of the expansion and growth of the city. At the same time, the capital required to build and expand the urban water landscape itself is, at least in the case of Guayaquil, generated through the political-ecological transformation of the city's hinterland and the successive incorporation of both expanding water volumes as well as new forms of socioecological metabolism. The city's growth has required a progressive geographical expansion of its water footprint. As more migrants flocked to the city, water systems had to move further away from the city in search of new or additional water resources. Simultaneously, the financing of these capital-intensive projects, whose technology was invariably imported from abroad, necessitated the generation of sufficient foreign currency and, consequently, a sound export-based economy. These capital flows were generated initially on the basis of cocoa (circa 1890-1930), followed by bananas (circa 1950-1970) and oil (after 1972). With each successive phase, the scalar configurations of power at the local, regional, national, and international level became transformed and rearticulated. In what follows, we shall explore the historical dynamics of the urbanization process through the lens of this double ecological conquest.

At the turn of the twentieth century, the city's elites mobilized around a growing preoccupation with the presence and role of water in the city. This paralleled a changing sociospatial class position and a reconfiguration of the state apparatus. After independence (1830) and particularly after 1850, the early postcolonial society underwent significant sociospatial changes as Ecuador was gradually transformed into an agro-export economy. This Ecuadorian accumulation model originated with the expansion of world demand for and trade in cocoa around 1860. Cocoa accounted for 90 percent of total exports by 1890, and in 1904 Ecuador became the world's leading cocoa exporter (Aguirre, 1984; Chiriboga, 1980: 261). The coastal socioecological complex, originally mainly characterized by small-scaled and a largely self-contained peasantry, had given way to immense cocoa plantations involving a variety of forms of waged work. The forced and rapid formation of a wage-dependent class, combined with a fast depeasantization process, fed growing demands not only for wage labour in the coastal plantations, but also for auxiliary waged functions in the city. Between 1896 and 1920, Guayaquil grew from 50,000 to 100,000 inhabitants (Rojas and Villavicencio, 1988: 22).

The rise of the emergent Guayaquileño metropolis was predicated on the transformation of nature and the integration of a new cocoa-based agricultural ecology in the process of commodity production and rent extraction. Countryside and city were both restructured through this socioecological

conquest, which inserted the central coastal region of Ecuador squarely into a worldwide money-circulation process and produced the city as the nexus for rent appropriation and distribution. At the same time, the spatial scaling of political power was also redrawn. Through these political-economic and ecological shifts, the urban merchant bourgeoisie, in alliance with coastal landowners and cocoa producers, now controlled the city and the countryside and began to aspire for more national political influence. The coastal political elite increasingly challenged the hegemony of the traditional highland (Serrano) landed "aristocracy" (Guerrero, 1980). Eventually, the coastal "cocoa" elite managed to "jump scale" and displace the highland aristocracy from the helm of the national state apparatus.

In 1900, Eloy Alfaro, Guayaquileño politician and president of Ecuador, declared the urban water project and other sanitary infrastructure a work of national importance, to be financed largely by the national state on the basis of taxes levied on cocoa exports. Between that moment and the 1930s, the urban water system was gradually extended, following, but lagging behind, the pace of urbanization. It became evident that the water frontier needed to be pushed outward in search of new exploitable water reserves, in order to redress the imbalance. The growth and expansion of the city could only be sustained by incorporating ever-larger parts of nature's geography into the circulation of money and profit upon which the city's continuing prominence crucially depended. This incorporation of new "natural" waters into the urban water circulation process then enabled the extension of the material scale of the urban network.

This successful watering of the city was very short lived however. The urbanization of water slowed down dramatically as political power relationships began to shift in decisive new ways, particularly after the crumbling of the cocoa economy. By the end of the 1930s, the highly successful and hegemonic bourgeois growth coalition that had launched Guayaquil on a path of dependent modernization had fallen apart. The collapse of the cocoa economy produced the first cracks in the hitherto firmly allied coastal-regional elite alliance of cocoa producers, merchants, and financiers. The socioecological opening up of Africa for world cocoa production, phytosanitary problems resulting from monocultural practices, and a dwindling demand for cocoa from Europe during the World War I negatively affected prices, productivity, and production. Cocoa revenues fell by 21 percent between 1917 and 1926, and cocoa output fell by 45 percent, from 1,008,000 to 447,000 quintals (Bock, 1988: 60). The urbanization of water stuttered during this period. Changing socioecological processes in the urban region were thus, in a myriad of intricate ways, related to and expressive of fluctuations on the New York commodities exchange market and the vagaries of the international monetary system.

The disintegration of the cocoa economy threw many agricultural semi-proletarian workers into unemployment and poverty, fuelling a mass migration to the city. The city experienced rapid population growth (182 percent between 1925 and 1950), mainly through urban land-invasions and the construction of informal settlements by impoverished former cocoa workers.

While the urban population expanded, the urbanization of capital dried up, including investments in collective infrastructure. The resulting slowdown in the urbanization of water in the context of an expanding population led to an acute water crisis by the end of the forties. Water problems would never really go away again. On the contrary, exclusionary water politics and water speculation by vendors would increasingly characterize urban struggles, becoming integral to the rituals of everyday urban life.

The turbulent but lean years of the 1940s were followed, however, by the banana bonanza decade of the 1950s. The United States' fruit corporations, their plantations devastated by Panama disease, moved their centre of operations from Central American and Caribbean exporters to Ecuador. It was a cheap location, and the Panama disease had not moved that far South. The subsequent spiralling demand for bananas converted the coastal area of the country (La Costa) into large banana plantations with their associated socioecological relations (Armstrong and McGee, 1985: 114; Larrea-Maldonado, 1982: 28-34; see also Schodt, 1987). Banana export receipts exploded from US\$ 2.8 million in 1948 to \$ 88.9 million in 1960, accounting for 62.2 percent of Ecuador's total exports (Hurtado, 1981: 190; Grijalva, 1990; Cortez, 1992). This manufactured "banana-bonanza" was organized through a new political-economic and ecological transformation. The ecological frontier for agricultural export production around Guayaquil was pushed further inland (León, 1992; Trujillo, 1992), radically altering the scalar social and physical ecology of the urban-rural complex and incorporating ever-larger areas into the global circulation of money. Although smallholdings predominantly organized actual production, its commercialization was concentrated in very few hands, combining a tiny regional-national comprador elite with US global fruit-trading companies (Báez, 1985). This banana colonization prompted mass migration to the coastal areas, catalysing further rapid growth of Guayaquil, whose banana-dependent financial and service economy expanded rapidly (Carrión, 1992). Between 1950 and 1974, the city's population grew from 200,000 to over 820,000.

Banana rents were ploughed back into the urban realm, either directly or indirectly through the state (Báez, 1992). The backbone of Guayaquil's accelerated urbanization process was rooted in the expanded and reworked ecological conquest of the coastal region, and nested in an expanding

metropolitan and global agro-business complex. Economic growth improved Ecuador's credibility and, helped by the efforts of the newly established international financing organizations, foreign capital again began to flow into Ecuador. This fine-grained texture of economic, political, social, and ecological transformations produced a ferment from which the postwar expansion of the urban water frontier to new and hitherto unexploited water reserves would emerge. Banana rents were combined with international loans to finance rapid urbanization (and peripheral modernization) of the country. This new ecological conquest combined with a reinvigorated quest for control over and domestication of nature's water.

In 1947, a new source for drinking water for Guayaquil surfaced as the next target to harness, the river Daule, but it would take until the 1950s banana boom before these plans could be realized. Together with its expanding role as a water source for irrigation projects in the region, the flow of the Daule was to be diverted, transformed, and commodified. Banana export earnings, combined with a reverse flow of money from the US, were welded together with the flow of Daule water to circulate through the veins of the city, reshaping its landscape. But this material flow of H<sub>2</sub>O, combined with and running through physical and social urban space, was just one node in an articulated whole of processes operating on a regional, national, and, indeed, world-wide scale: flows of transformed nature, commodities (bananas), and money; transfers of capital; and the buying and selling of labour power (see Merrifield, 1993). The city would be transformed once more, with the political-economy of urbanization deeply caught up in the progress of the urbanization of water.

This new scalar configuration of the water/banana nexus came to an early end beginning in the early 1960s. In the 1950s, a new and more resistant banana variety, the Cavendish, was developed, allowing the fruit companies to switch their operations back to the more favourably located Central American locations, closer to "home," more reliable and under greater direct control of the US state. This bioengineered and phyto-technologically more demanding "Chiquita" banana (León, 1992) was heavily commercialized internationally and undermined the economic position of the traditional Ecuadorian "Gross Mitchel" banana type. Only large Ecuadorian producers, connected to international merchants and fruit companies, were able to adjust ecologically and socioeconomically to the requirements of the new cultivation, production, and marketing techniques. Output continued to grow until by the early 1960s production was twice the exported volume. International merchants could be more selective and demanding. Total banana export value fell from US\$ 88.9 million in 1960 to \$ 51.5 million in 1965, recovering (nominally) to \$ 94.3 million by 1970 (Tobar, 1992: 238). This overaccumulation of bananas wiped out

thousands of small and medium sized producers, who joined the ranks of the urban underclass (Báez, 1985: 554). The banana crisis again broke the coastal elite's partially restored power position. The state, in turn, was pushed to face the stagnant export position of Ecuador, as external debt rose rapidly.

The exploitation of Amazonia's huge oil reserves in eastern Ecuador after 1972 signalled a new wave of rent extraction and redistribution. Existing sociospatial and scalar relations were overhauled once more, as the actors organising the petroleum boom produced a new set of scalar configurations. The ecological conquest of fossilized nature beneath the Ecuadorian Amazonian rainforest was, and is, exclusively based on international petro-capital. In contrast to the two earlier waves of agro export-based integration into the international market place (cocoa and bananas), mainly organized through the intermediation of a domestic commercial and financial oligarchy, this time the national state assumed the role of key interlocutor in organising the global-local articulation of oil. Indigenous Amazonian peoples were legally dispossessed, as the state became the *de facto* and *de jure* owner of the country's "natural" resources (Báez, cited in Farrell, 1989: 146). This would, of course, put the state in the pole position in terms of organising the insertion of Ecuador into the global political economic framework, inevitably also turning the state apparatus into a major arena for social struggle. Oil revenues, partly monopolized by the state, triggered continuous political power conflicts over the control, appropriation, and direction of the new investments that now became possible. In addition, the oil boom attracted considerable attention from foreign investors (mainly in services and banking). The majority of this private investment was increasingly attracted to the inland capital city of Quito, rather than Guayaquil, which had the advantage of proximity to key national and international power brokers.

This time, the expansion of the ecological rent frontier was directed eastward into the Amazon basin rather than in the coastal regions. Oil, quite literally, flowed to the coastal port (for export) over the Andes through a newly constructed oleoduct, becoming transformed into money and capital. Quito became the country's leading political and now increasingly international financial centre, leaving Guayaquil behind in its past, but now dimmed, glory. The oil rents appropriated by the state were reinvested, in turn, with an eye toward domestic industrialization (Bocco, 1987), mainly in all sorts of infrastructure, from expanding port facilities, new freeways to airports, and a military built-up. Oil rents also served to augment the ecological basis on which the city's sustainability was predicated, including widening the scale and scope of water control. The pumping, treatment, and conduction capacity of Guayaquil's water system

was increased substantially (reaching 1,500 million m<sup>3</sup> in 1995), taking over more water from the Daule river and its tributaries. The expansion of the water system was largely financed from international loans, secured by promises of a continuing oil boom, but a significant part of the urban population was deprived from easy access to potable water. The socio-economic crisis of the 1980s had led to a massive explosion of the city to over two million people, particularly in marginal estuary settlements and on the hills surrounding the old city. The lack of attention to water distribution and the absence of a piped network resulted in chronic problems of access to water for the urban poor and fostered a thriving private water economy.

To summarize, the city of Guayaquil grew on the basis of successive ecological conquests and the appropriation of rents, from agricultural produce or the pumping of oil, through which money was continuously recycled and nature became urbanized. The harnessing and urbanization of water inserted water circulation squarely into the circulation process of money and its associated power relations and class differentiations. With each round of accumulation, the territorial scale of the socioecological complex changed and the scalar geographies of political power became rearticulated. The socioeconomic, political, and institutional scalar nesting (from the local to the global) through which cocoa, bananas, and oil (either in a commodity or money form) flowed took new forms. In addition, the scalar choreography of water circulation became transformed and restructured, and expressed and reflected the changing social, political, and economic power relations at a variety of nested and articulated geographical scales; urban, regional, national, and international.

#### *Modernity, fascism, capitalism and the contested scaling of H<sub>2</sub>O in twentieth-century Spain*

Spain's history of modernization has been one of altering, redefining, and transforming the physical characteristics of its landscape and, in particular, its waterscape. Today, the country has almost 900 dams, more than 800 of which were constructed during the second half of the twentieth century. Every single river basin has been altered, managed, engineered, and transformed. Water has been an obsessive theme in Spain's national life during the last century and the quest for water continues unabated (del Moral Ituarte, 1996; 1998). Understanding the construction of a particular set of nested scales, and the mobilization of specific spatial scales by particular social groups, is necessary to grasp the choreographies of power and the strategies deployed to push through this modernising project. This process

was rife with intense conflict: socioeconomic and political disintegration during the first decades of the twentieth century, a bloody civil war placing modernization under the control of a fascist dictatorship until 1974, and subsequent rapid transformation into a liberal democracy. In this example, we shall show how the conflict between modernizers and traditionalists took the form, among others, of a struggle over making and controlling the scale of river basin authorities.

Beginning in the late nineteenth century, the modernising desires of an emerging intellectual elite of "regeneracionists" crystallized around the transformation of Spain's hydrological structure, in an attempt to harness Spain's waters as the foundation for its economic and political revival (see Swyngedouw, 1999b). Water rapidly became a prime consideration in national political, socioeconomic, and cultural debates. Spain found itself in a traumatic condition at the turn of the twentieth century, having lost its last colonial possessions (Cuba and the Philippines) exactly when other imperial countries were consolidating their empires, and its internal political, economic, and social conditions were rapidly deteriorating. Unable to found Spain's modernization on an external geographical project of scale-enlargement, Spanish modernising elites concentrated on an equally geographical national program, but founded on the radical transformation of Spain's internal geography – particularly its water resources (Gómez Mendoza and Ortega Cantero, 1987). As Joaquin Costa, a regeneracionist intellectual, argued in 1880: "[I]f in other countries it is sufficient for man to help Nature, here it is necessary to do more; it is necessary to create her" (Costa, cited in Driever 1998: 40, author's emphasis).

This concern was also voiced by others (like Lucas Mallada (1890) or R. Macías Picavea (1899)). This program of producing a new sociophysical space embodied physical, social, cultural, moral, and aesthetic elements, fusing them around the dominant and almost hegemonic ideology of national development, revival, and progress.

The hydraulic intervention to create a waterscape supportive of the modernising desires of the regeneracionists, and of the social and political foundations of the existing class structure and social order, was very much based on a respect for "natural" laws and conditions. The latter were thought to be intrinsically stable, balanced, equitable, and harmonious. The hydraulic engineering mission thus consisted primarily in "restoring" the "perturbed" equilibrium of the erratic hydrological cycles in Spain. Of course, this endeavour required significant scientific and engineering enterprise, in terms of understanding and analysing nature's "laws," and in using these insights to work toward a restoration of the "innate" harmonious development of nature. The moral, economic, and cultural "disorder" and "imbalances" of the country at that time were seen as paralleling the

"disorder" in Spain's erratic hydraulic geography, and both needed to be restored and rebalanced.

Two threads need to be woven together in this context: the pivotal position of a particular group of scientists, the Corps of Engineers (Villaneuva Larraya, 1991), and changing visions about the scientific management of the terrestrial part of the hydrological cycle. Both were linked to the rising prominence of hydraulic issues on the sociopolitical agenda at the turn of the century. The Corps of Engineers, founded in 1799, remains the professional collective responsible for the development and implementation of public works. It is a highly elitist, intellectualist, "high-cultured," male-dominated, and socially homogeneous and exclusive organization that has taken a leading role in Spanish politics and development (Mateu Bellés, 1995).

In line with the then emerging scientific discourse on orography and river basin structure and dynamics, the engineering community argued for a technical, political, and managerial intervention on the basis of the "natural" integrated water flow of watershed regions, rather than on the basis of historically and socially formed administrative regions (see Figure 6.1). This plea for an orographic regionalization overlaid the traditional political-administrative divisions of the country, forcing a reordering of the territory on the basis of its river basin structure. The engineers portrayed the latter as the crucial planning unit and political scale for hydraulic interventions. Cano García (1992) succinctly summarizes this scientific perspective:

To revert to the great orographical delimitation for organising the division of the land represents a contribution made from within the strict field of our discipline [engineering] and at the same time, at least initially, it shows the abandoning of traditional political divisions and the importance of other perspectives and concepts. (Cano García, 1992: 312, author's translation)

As T. Smith (1969: 20) argues, ... "the identity of the drainage basin seemed to offer a concrete and "natural" unit which could profitably replace political units as the areal context for geographical study." Brunhes (1920: 93) insisted on the water basin as the foundation for the organization of the land since "water is the sovereign wealth of the state and its people" (see also Chorley, 1969). Such a view was widely recounted in Spain at the time, and its arguments were rallied in defence of a new orographic-administrative organization of the territory.

This "scientific" and "natural" division, based on the spatial scale of the river basin, provided an apparently enduring and universal scale for territorial organization in lieu of the historically more recent and "constructed"



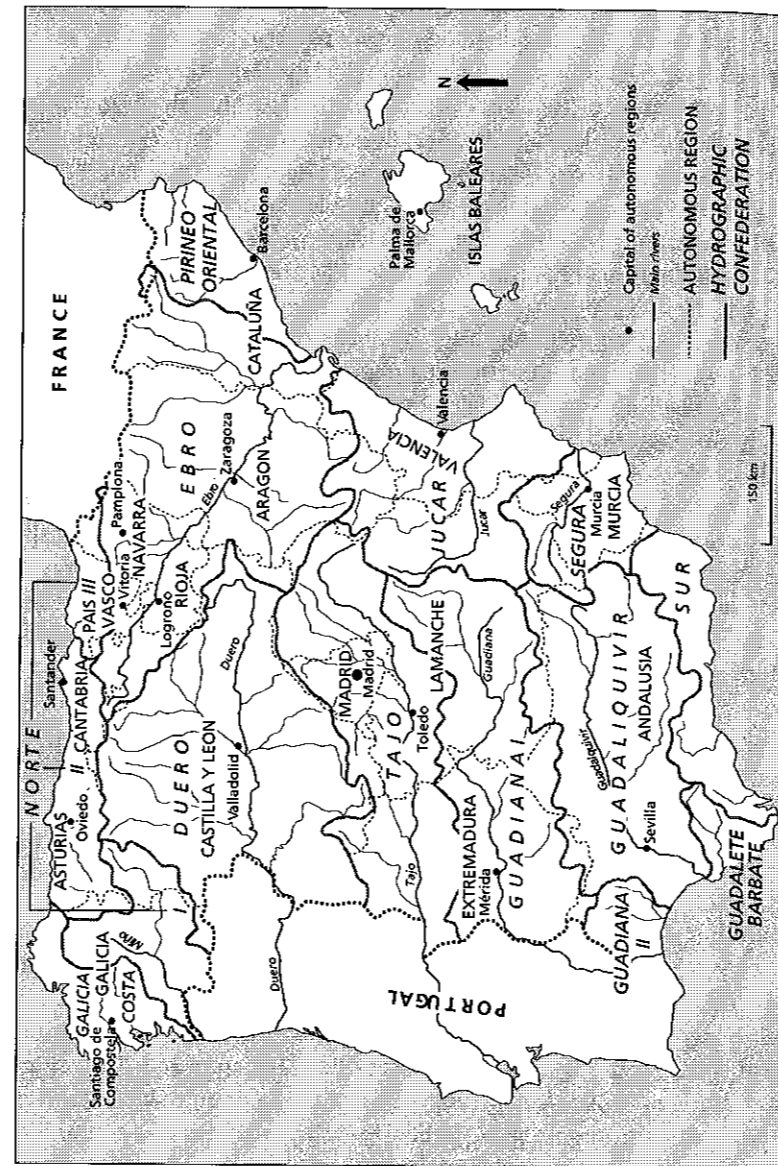


Figure 6.1 Watershed regions in Spain.

political scales associated with politico-administrative boundaries. The history of the delimitation of Hydrological Divisions based on the river basin is infused with the influence of the modernising hydraulic discourse, on the one hand, and the “scientific” insights gained from hydrology and orography on the other. The attempt to “naturalize” political territorial organization was part and parcel of a strategy of the modernizers to challenge existing social and political power geometries. The construction of and command over a new territorial scale might permit them to implement their vision and by-pass more traditional and reactionary power configurations. Indeed, the older and historically constructed administrative political scales (municipality, province, and nation-state) were firmly under the hegemonic control of traditional semifeudal elites who held a tight grip over society and resisted the structural transformations called for by modernizers.

Capturing the scale of the river basin as the geographical basis for exercising control and power over the organization, planning, and reconstruction of the hydraulic sphere was one of the central arenas through which the power of traditionalists (and the scales over which they exercised control) was challenged. River basins became the scale par excellence through which the modernizers tried to erode the powers of the more traditional provincial or national state bodies, while traditional elites held to the existing administrative territorial structure of power. The bumpy history of the hydrological divisions records this struggle (Gómez Mendoza and Ortega Cantero, 1992).

This negotiation of scale and the science/politics debate around the scaling of hydraulic intervention and planning raged for almost a century, before the current structure of river basin institutions was put into place (Cano Carcía, 1992; Mateu Bellés, 1995). The Water Act of 1879 had established that all surface water was common property, managed by the state. This also implied the need to create administrative structures to perform these managerial tasks (Giansante, 1999). The first Hydrological Divisions (ten in total) were established by Royal Decree in 1865, and were considered from the beginning to be major instruments for economic modernization. Some of these divisions more-or-less coincided with major river basins (Ebro, Tajo, Duero), others (particularly in the South) had a much closer correspondence to provincial boundaries. All were named after the provincial capital city where the head-office was located (Mateu Bellés, 1994). Their basic merit in those early days was to serve as an institutional basis for collecting statistical data to assist research into the hydrological cycle. These surveys could then be used as inputs to the real power holders: provincial head offices for public works, special ad hoc commissions, or private industry (del Moral Ituarte, 1995). The ten hydrological divisions

were abolished in 1870, partly re-erected a few months later, reduced to seven, abolished again in 1899, and re-established in 1900 when their tasks extended to include the detailed study and planning of, and the formulation of proposals for hydraulic interventions. However, the ultimate decision-making power would remain with the traditional provincial level, which supervised and executed hydraulic works, and with the central state, for financing and controlling the infrastructure programs (Mateus Bellés, 1994). Control by the conservative local and national state fatally stalled implementation of these projects.

The complex and perpetually changing administrative organization and power structures associated with the successive attempts to establish river basin authorities, and their relative lack of power until the 1930s, reflect the failure of the early modernizers to successfully challenge traditional power lineages and scales (Mateu Bellés, 1994; Mateu Bellés, 1995). Only after 1926 were the current Confederaciones Sindicales Hidrográficas gradually established as quasi-autonomous organizations in charge of managing water, as stipulated by the 1879 Water Act (Giansante, 1999). The last of these ten Confederaciones was finally established only in 1961 (see Figure 6.1). What had proven impossible to achieve during the first decades of the century was finally fully implemented during the Franco dictatorship. Franco's fascist rule permitted the final formation of powerful river basin authorities, and aligned the national state more closely with the interests of the engineering community in reorganising the hydraulic geography of the country. The Confederaciones acquired a certain political status with participation from the state, banks, Chambers of Commerce, provincial authorities, etc. At each stage engineers took leading roles and became the activists of the regeneracionist project through a combination of their legitimization as holders of scientific knowledge and insights, and their privileged position as a political elite corps within the state apparatus.

By the end of Franco's rule, in 1974, Spain's hydroscape had been overhauled profoundly. Every single river basin is now fully managed to the "last drop" of available water. With the advent of democracy, however, the politics of scale around the water nexus took a new twist, as the ongoing desire to modernize the Spanish economy required ever-greater control over and management of the country's available water resources. As limits to river basin-based water management became evident, the water engineering community and its socioeconomic allies "jumped scales" and began to argue and lobby for the material construction of a national water-grid. The latter would produce a national water system, connecting every river-basin to form a national managerial and material (infra)structure. This would permit significant interbasin water transfers and a more "efficient" use of the available water resources. Over the past twenty years, this national

water project has become a major domain of political conflict, in what is now a liberal-democratic polity. Various spatial scales, such as regional interests, localist strategies, and national projects, have faced-off against each other. Different social groups, such as ecologists, the agricultural lobby, the tourist industry, the energy sector, and regionalists also mobilize different scales in their quest for political clout in a process that once again is remaking the political and ecological landscape of Spain.

### Conclusion: Recentring Scale and the Contested Politics of Rescaling

The production of spatial configurations as socioenvironmental cyborgs, part social part natural, excavated through the analysis of the circulation of hybridized water (water that is simultaneously physical and embodies deep sociocultural and political-economic meaning) opens up a new arena for thinking and acting. This arena is neither local nor global, but weaves a network that is always simultaneously deeply localized and extends its reach over certain scales, and certain spatial surfaces. The tensions, conflicts, and forces that flow with the water through the body, the city, the region, and the globe shape a continuously shifting power geometry, organized in a perpetually shifting and contested scalar configuration.

The examples illustrate how the production of socioecological scales is centred on the social transformation of nature and the construction of socioecological and political-ecological scalar gestalts. Concrete geographies, with choreographies of uneven and shifting social power relations, are etched into these ecological, social, political, or institutional scalar configurations. These processes are infused with contested and contestable strategies of individuals and social groups, who mobilize spatial scales as part of struggles for control and empowerment, and contest the power geometries of extant scalar gestalts. Needless to say, the mobilization of scale, the occupation of geographical scale, and the production of scale are central moments in such processes of sociospatial change. Struggling for the command of scale, or strategizing around excluding particular groups from the performative capabilities of certain scales, shapes social processes, defines relative empowerment and disempowerment, and gives rise to very specific sociospatial relations.

The politics of scale, then, although pivotally focused on the mobilization and appropriation of (metabolized) nature, necessitates a careful negotiation of the tensions, conflicts, and contradictions within and between scalar formations. Everyday bodily struggles for accessing water in Guayaquil's suburbs fuse with local politics, national economic processes, and

international lending mechanisms, in ways that are often very contradictory and extremely difficult to negotiate or reconcile. Similarly, the up-scaling of Spanish water politics and engineering to the national scale mobilizes scalar politics that range from the reaffirmation of regionalist claims for autonomy and demands from ecologists for a radical transformation of water practices to the mobilization of the European Union as possible political ally or financial donor. Forging scalar alliances may be a tortuous and extremely difficult process, particularly for subaltern groups, for whom loyalty to and an insertion into a local social and physical ecology is of prime importance, and who are faced with the scalar mobilizations commanded by hegemonic global projects (such as global deregulation and free trade). The historical geography of capitalism is littered with examples of how sociospatial conflicts prevent the formation of "scaled" alliances, particularly by those that are already disempowered. Yet, a progressive politics of scale and the mobilization of scale are rapidly becoming key components in strategies to produce the democratic and inclusive social and ecological spaces that many of us dream of inhabiting.

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