Chapter 18

Single Industry Resource Towns

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Why have a chapter on single industry resource towns, the only one in this book that refers to a specific kind of place as opposed to a process or economic entity? The very classification of "single industry resource towns" conjures up a stereotypical image with well-known characteristics. First, they boom and they bust, and in this sense the problem with resource-based towns is that they are not resourceful enough. Second, they are located where resources are found, typically in places where other kinds of economic opportunities are limited. These two related features underpin the stereotype of single industry resource towns as remote, specialized outposts comprising populations with limited social and economic options, and vulnerable to the forces of economic destruction whether originating in globally based restructuring or local resource exhaustion, or both.

Peripheral as places, resource towns are also peripheral in mainstream theories of industrialization. Yet industrialization fundamentally depends on resources. For industrialization is as much a search for resources as markets. Moreover, to a significant degree this search is controlled by one specific form of industrial organization, multinational corporations (MNCs), which integrate operations that circumnavigate the globe. For MNCs, strategies of resource exploitation are not simply about "cost minimization." Rather, these strategies are shaped by: internal motives of security, control and stability, and the need to counter the actual or planned behavior of rivals; strategic as well as economic motivations of the major powers which still provide the homes for most MNCs; and the bargains negotiated with host governments seeking to use resources to meet national and regional development goals. If MNCs bring their resources, expertise, and global connections to these bargains, they simultaneously impose dependence on bulk, specialized exports, and non-local control, further contributing to the vulnerability of resource towns.

Global forces, in the form of the international division of labor, resource dynamics, remoteness, and boom and bust, powerfully shape the evolution of single industry resource towns. The link between resource exploitation and social change in resource towns is not straightforward, however (Landis, 1938). Global forces are complex and their interaction with local populations creates varied outcomes.

Indeed, when global markets no longer need a local resource, people may wish to stay in "their" town and resist the implication of bust.

Resource towns, to return to the question posed in the first sentence, deserve to be highlighted within the inquiry of economic geography because they comprise a type of place that exists on the knife edge of the interactions between global and local forces. Indeed, these towns are one of the constituent forces of long-run industrialization. Their evolution was strongly shaped by the imperatives of Fordism in the three decades after World War II, and more recently by the search for more "flexible" forms of production in the present period of restructuring under "post-Fordism." Following a brief historical introduction, this chapter explores resource towns as they reflect the changing imperatives of Fordism and flexibility.

In this chapter, industry-resource towns are defined broadly as towns whose economic base is dominated by the extraction and primary processing of (non-agricultural) natural resources, non-renewable or renewable. Since "single" industry is only the most specialized type of the "industry-resource town" category, these towns are henceforth referred to as industry-resource towns (IRTs). While precise estimates are not available, IRTs are undoubtedly important within the global economy. Among core industrial countries, such as the USA, IRTs remain an important feature of the economic landscape (Krannich and Luloff, 1991). Auty (1990, 1995) notes that there are over 40 developing countries that derive at least 40 percent of their exports from the resource sector, and Canada and Australia are advanced nations whose global economic roles remain strongly defined by resource exports. In Canada, Randall and Ironside (1996, p. 18) note that in the late 1980s the resource sector accounted for 10 percent of Canadian gross national product (GNP) and 40 percent of export values, and that overwhelmingly these exports stem from numerous, specialized towns, often with populations of 20,000 or less. This chapter draws most of its examples from this Canadian context.

Industrialization and Industry-Resource Towns

IRTs represent "pure" export-based forms of industrialization, whether the "exports" are sales to other "core" regions in the same country or to foreign markets. Thus, from their inception, IRTs are unusually exposed and vulnerable to exogenous (global) forces. The viability of IRTs is also intricately affected by "resource cycles," defined by Clapp (1998a) as inevitable long-run patterns of resource exploitation and collapse. While these resource cycles or dynamics are themselves shaped by processes of industrialization, IRTs are also subject to fundamental forces of change that do not affect secondary manufacturing centers. A basic categorization of natural resources is between renewable (flow) and non-renewable (stock) resources. Non-renewable resources are permanently depleted by exploitation, the duration of which is finite, limited by the size of the resource and the rate of exploitation. These limits can be redefined, but not removed, by technological change. Conversely, renewable resources enjoy either permanently or potentially indefinite resource cycles.

In practice, Clapp (1998a) claims resource cycles that end in resource collapse apply to renewable resources, such as forests, as well as to non-renewable resources. In the case of forests, Mather (1990) has noted the existence of "turnarounds"

when formerly depleted areas are reforested. Yet, industrial logging inevitably changes the forest resource (Graham and St Martin, 1990). Moreover, second growth forests differ from first growth natural forests both qualitatively and quantitatively, and the transition from the latter to the former typically implies a "fall-down effect" in which timber volumes available to industry are reduced because the new, managed forests comprise smaller trees and are not grown in time to compensate for loss of old growth. Indeed, as higher-quality, more easily accessible resources are exploited, there is a general tendency for resource use to incur higher costs over time, thus continually eroding the competitive advantage of IRTs (Freudenburg, 1992).

Historical perspective

The impacts of industrial and resource dynamics vary among resources, renewable and non-renewable, creating highly divergent patterns of booms and busts that can unfold over centuries. Thus, in the Laurium region, 25 miles south of Athens, Greece, mines employed up to 20,000 slaves leased from the Athenian State to provide silver for coinage for the state, as well as lead and marble (Warren 1973, p. 2). Although discovered earlier, the mines flourished in the fifth century BC, and following the battle of Marathon (490 BC), mine revenues were used to build the navy that beat the Persians at Salamis ten years later. The mines then entered a period of decline, revived briefly around 320 BC until silver prices dropped, and then again in the first century until the slaves revolted in 103 BC. The mines were subsequently closed until the late nineteenth century when French and Greek firms worked the mines for lead, manganese, and cadmium.

The European "age of discovery" extended a ruthless robber mentality to the whole globe. For Spanish conquistadores, the search for gold and silver reflected the belief that precious metals were the basis for wealth and power, defining a crude mercantilist philosophy in which one nation's gain occurred through another's loss. Industry-resource towns, such as the Valenciana (silver) Mine, Guanaguato, Mexico, and the Potasi (gold and silver) mine in Bolivia, both founded in the sixteenth century, were centers of pure exploitation. Slaves provided the labor, with local economies literally ransacked.

The Industrial Revolution marked an enormous surge in the demand for resources and the scale of their exploitation. While gold, silver, and diamonds continued to offer tantalizing promises of instant wealth, massive demands for industrial resources, led by iron ore and coal, provided inputs for further processing as well as a new foundation for economic growth and political power. The "new industrial spaces" of the nineteenth century were resource-based as well as manufacturing-based. Virginia City, Nevada, and the Rhondda, South Wales, illustrate contrasting forms of such industry-resource spaces.

Virginia City epitomized the gold and silver rushes that were vital in opening up the American West, shaping the political economy of the entire country (De Quille, 1974; James, 1998). Indeed, after gold was found in nearby Gold Canyon in the 1850s, Virginia City rapidly emerged as an industrial city of the West. Railways were built, and the town reached a population of almost 20,000 (with adjacent Gold Canyon another 10,000). Within the next 50 years gold and especially silver from

the Comstock Lode, mined to depths of over 1000 meters, provided $400 million of wealth that fueled the growth of San Francisco, and kept the Union solvent during the Civil War. President Lincoln expressed his gratitude by granting Nevada statehood within three years of becoming a territory, and without the constitutionally required minimum population. The importance of silver correctly implied to the miners greater permanence than gold mines, a perception reinforced by the California gold rush of 1849. Nevertheless, the bust came within two generations. In 1874 the halt in the use of the silver dollar reduced excavation activity, and in 1875 there was a devastating fire. By 1887 mining effectively stopped. Virginia City had become a ghost town, albeit one destined to become a "living" ghost town.

The Rhondda Valley meanwhile epitomized the "coal rushes" that were vital to British industrialization and hegemony. The Rhondda Valley, a remote "mountainous" area in South Wales, was transformed by the coal mining industry after the 1840s. From just a few sheep farmers in 1830, the population mushroomed to a peak of 160,000 in 1921, distributed among small towns (or villages) such as Penygraig and Tonypandy (Humphreys, 1972). Since then, the Rhondda entered a period of decline in the 1920s from which it has not escaped. The last mines were closed in the late 1960s, and in 1989 the population was 68,000, a level still greater than is justified by local opportunity.

If both were mining landscapes of the same period, Virginia City and the Rhondda are nevertheless worlds apart, culturally and economically, as well as geographically. Virginia City mined "products" prized for their relative scarcity, that contribute to conspicuous consumption, and are a source of wealth and exchange. Prospectors upheld individualism and celebrated capitalism. In the Rhondda, coal was a "commodity" prized for its abundance and low cost – an input and energy source for downstream industrial uses. Socially, the Rhondda communities were working class and deeply socialist, sharing commitments to chapel, family, and union (and, for males at least, the pub). In contrast, the "legend" of Virginia City, christened by a prospector from the State of Virginia during a drinking binge, was of a rowdy, raunchy, and murderous place. The institutions of church, family, and union were not lacking, but their sanctity required strenuous efforts, including not a few hangings organized by a "Vigilance Committee." Even so, to the end, Virginia City retained its reputation for a 24-hour social life.

Cultural differences extended to foodways (Conlin, 1986). In the Rhondda, diets were limited, often insufficient. The miners on the Western frontier, however, received cash windfalls, and their instincts for immediate consumption revealed remarkable tastes for *haute cuisine*, as bacon, beans, and whiskey were quickly replaced by oysters, galantine truffles, and champagne. Conlin (1986, p. 130) claims that "the California gold rush was one of the few booms of its kind in which the hors d'oeuvres were on the scene before the whores." Indeed, the miners' unusual penchant for oysters led to the depletion of the oyster beds in San Francisco Bay, while the subsequent rush to Virginia City helped stimulate Oysterville on the Washington State coast, then considered more important than Seattle (Conlin, 1986, p. 119). Interestingly, refined tastes for food, which contributed to a "bizarre juxtaposition of elegance and rawness" in Western mining towns, did not extend to American logging camps where insistence on plentiful, good food was combined with narrow, traditional "meat and potato tastes" (Conlin, 1986, pp. ix and 129).

In the opening scenes of Charlie Chaplin's classic (silent) film, *Gold Rush* (1925), the image is of an endless line of miners struggling over the Chilkoot Pass on the way to the Klondike gold rush of 1896–7. Likewise, in the Rhondda, miners flooded in from other parts of Wales, England, and Ireland. Virginia City attracted people from Mexico, Europe, China, and many parts of the USA, including miners from the California gold rush which had attracted over 40,000 migrants who had made the journey by sea, either around Cape Horn (especially from Europe) or through the Panama Canal (especially from New York), and by land from Mexico and from easterly directions. Then, and subsequently, resource towns were conceived as migrant towns (Hayter, 1979).

Fordism and Resource Development

In the twentieth century, demands for resources escalated. Between 1918 and 1948, the USA alone consumed more minerals than had the rest of the world in recorded history (Warren, 1973, p. xv). Resource consumption increased even faster during the Fordist long boom from the 1940s to the 1970s. For Western capitalism, Fordism defined a booming, but stable international system anchored by US hegemony and fixed exchange rates, and a general balance between the demand and supply of goods that supported full employment. Fordism also implied a distinct "industrial state" dominated by the related interests of Big Business and Big Government, fully abetted by Big Labor (Galbraith, 1967). Within and among Fordist states, production systems were dominated by horizontally and vertically integrated MNCs exploiting economies of scale to mass produce goods in unionized factories increasingly dispersed around the world. The central thrust of developments in the resource sector during Fordism corresponded closely to this "production template," perhaps even more so than in secondary manufacturing where the model developed. The Fordist model, in turn, had profound implications for the nature of resource towns. First and foremost, resource towns became branch plant towns.

Multinationals and the organization of resource exploitation

As Baldwin (1956) noted, resource exploitation can be organized in two fundamentally different ways: an "entrepreneurial" model and a "plantation" model. These models, which were conceived by Baldwin in different types of agricultural regions, can be readily modified for other resource types. In brief, in the entrepreneurial model, resource exploitation features locally based entrepreneurs (miners, fishers, or loggers), small-scale operations, employees who may become entrepreneurs, strong local linkages, and commitment to local development. In contrast, in the plantation model, resource exploitation is by foreign-owned MNCs, capital intensive, and while labor is well paid (in relation to local standards), job tasks are highly specialized and designed to extract a resource for use in the parent company's operations elsewhere. The business linkages of the plantation model (value-added, services, equipment, profit flows) are primarily international rather than local, and investments in supporting infrastructure, such as transportation facilities and housing, are dedicated to the MNC, rather than publicly available as in the case of the entrepreneurial model.

Baldwin's deductive analysis revealed the superiority of the entrepreneurial model for local development because it offered more hope for local spin-offs and diversification. The plantation model, however, dominated investment throughout the resource sector during Fordism. Thus, in aluminium, coal, copper, diamonds, oil, iron ore, forest products, and other resource activities, MNCs became the dominant form of business organization, and levels of corporate concentration significant. Mines and resource processing mills were created as specialized branch plant operations within integrated corporate strategies, and resource towns were established to house the specialized workforces and their families.

The plantation model took precedence over the entrepreneurial in large measure for economic reasons as resource extraction and transportation exhibited marked economies of scale created by massive fixed costs (in infrastructure as well as plant) and processing efficiencies. In turn, big projects required the expertise, resources, and risk-coping abilities of giant MNCs. At the same time, the calculation of economies of scale is an inexact science, and the plantation model did not dominate solely to enhance efficiency. For MNCs, growth and size were themselves objectives, while governments and global development agencies, such as the World Bank, similarly equated political and social benefits with increasing size. Meanwhile, the "barriers to entry" facing small firms seeking to enter resource sectors became formidable. Moreover, MNCs were better able to locate in remote regions than small entrepreneurial firms. Given government support, notably investments in economic and social infrastructure, and favorable resource rights, MNCs could control branch plants in the remotest of places with all the supporting business services and the necessary coordination from distant head offices.

In general, Fordism witnessed a global dispersal of large-scale exploitation of low as well as high quality resources (Warren, 1973). This dispersal was shaped by spatial variations in cost structures, especially as determined by transportation costs (procurement and distribution) and economies of scale (Hay, 1976). Yet, the dispersal of resource processing activities (and towns) should not be conflated with a simple cost-minimization hypothesis that states that locations that deliver resources to markets at lowest cost are opened first while progressively higher cost sites are opened until revenues fall below costs. In practice, cost (and revenue) structures cannot be assumed as given datum. Readily accessible resources are missed for decades, as was the case for 80 years prior to the discovery of nickel in surface outcrops in Western Australia in a great arc around Kalgoorlie, where gold had been mined since the 1880s (Warren, 1973, p. 22). Indeed, uncertainties about the presence, scale, and quality of resources can feed speculation, including announcements by fraudulent promoters of the discovery of fictitious resources in the hope of obtaining funds from gullible investors.

Moreover, as MNCs emerged to dominate resource sectors during Fordism, powerful institutional forces encouraged the geographic diversification of resource investments while compromising cost-minimizing behavior. Three such forces may be briefly identified. First, the motivations of MNCs to grow while at the same time attempting to spread risks encourage geographic diversification (Vernon, 1971). Further, MNCs often seek to "match" the location strategies of equally large rivals to ensure that they share in newly available resource supplies that may provide

significant competitive advantage. MNCs also may not organize material flows to minimize transportation costs but to maintain the viability of activities they own and to manipulate prices so as to reduce taxes (Odell, 1963, p. 112; see Skúlason and Hayter, 1997).

Second, geopolitics and the interests of national development and security have shaped MNC strategies for accessing resources. European colonization in the nineteenth century provides an important precedent in this regard. During Fordism, and the Cold War, the USA became acutely concerned with raw material supply, identified numerous (over 70) resources as "strategic and critical," and developed investment and trade policies to ensure "stable and secure" access to these resources by US-based MNCs (Clark-Jones, 1987; Haglund, 1989; Hayter, 1992). Canada was regarded especially favorably, and Clark-Jones argues that Canada's resource industries were configured principally to serve the USA to create a pattern of "resource continentalism." Simultaneously, Japan, lacking in domestic resources and having lost its empire in 1945, developed "multi-sourcing resource policies," implemented principally by its giant trading companies, which enveloped the globe (Ozawa, 1980; Edgington and Hayter, 1997).

Third, during Fordism, development politics in the developed and developing world highlighted resources as engines of economic growth – as ways to ameliorate balance of payments problems, create jobs, provide taxes, and promote regional development and economic diversification through a variety of multiplier effects in related activities (Auty, 1990, p. 11; Auty, 1995). Such expectations encouraged governments, and key financial institutions, to offer MNCs various incentives, including subsidized economic and social infrastructure, loans, grants and favorable resource utilization terms. New types of resource town were typically part of the development bargain.

Resource towns during Fordism: the Canadian model

Prior to Fordism, company-dominated IRTs provided precedents for Baldwin's plantation model. In these towns, owners and executives were often locally based, the operations were large scale, and the lives of workers and their families were closely dependent on the company. As Landis's (1938) classic study of three iron-mining towns in the USA revealed, the nature of this dependence could differ even within the same region and sector. In many cases, however, the company literally governed the town, controlling housing and services. Moreover, workers' rights were minimal, and worker exploitation and anti-union attitudes were widespread, modified in some towns by company paternalism. Prior to Fordism, company-dominated IRTs were unstable, poor places, and workers had few rights. During Fordism, however, the global proliferation of the plantation model of resource exploitation witnessed the creation of a new type of IRT, purposefully planned as stable, high-income communities, regardless of the degree of isolation. Canada was on the leading edge of this development as numerous planned, new "frontier" and "instant" towns, housing populations from 10,000 to 30,000, were built across the country at great distances from established, "southern" population centers (Robinson, 1962; Bradbury, 1978). Lucas's (1971) generalized model of Canadian resource town evolution reflects back on the Fordist period.

In Lucas's model, "mine (and mill) town Canada" develops through four main stages: namely, construction, recruitment, transition, and maturity. The first three are temporary, socially dynamic, often unstable periods shaped by intense phases of construction activity, temporary housing, high levels of in- and out-migration, and the uncertainties associated with the "start-up" of new, capital-intensive operations in remote locations. For Lucas, these stages were preludes to the more enduring fourth, "final" stage of maturity in which resource towns enjoy prosperity and stability. Indeed, Canadian resource towns during Fordism were quintessentially Fordist.

Thus, Canada's new frontier towns were formally planned as (relatively) big, permanent, "model" settlements, structured as part of broader collaborations between government and MNCs, fully supported by unions. Remoteness and the scale of development demanded such collaboration in the provision of infrastructure. In the case of Schefferville, Quebec, for example, a new 576-kilometer railroad line was required to link the town to (new) port facilities on the St. Lawrence Seaway at Sêpt Isle (Bradbury, 1979). With respect to social infrastructure, governments, supported by MNCs, desired to move away from the company town model of resource towns where companies controlled the housing, many services, and even retail goods. In some regions, such as coastal BC, accommodation in company towns had also been based on ethnic and gender lines. In contrast, the new frontier towns of Fordism were designed according to (then) contemporary urban planning principles as if they were metropolitan suburbs: owner-occupied, large single-family homes were arranged in landscaped, serviced, residentially zoned neighborhoods at suitable distances from the industrial sites and accessible to schools, hospitals, retail outlets, amenities, and other services. By the 1960s, the planned shopping mall was also a feature of resource towns. These towns also received municipal status to provide for local government. For workers and their families, the new resource towns offered high levels of amenity and living conditions, as well as political responsibilities, while removing the stigma associated with company control of social and political life. For MNCs, unwanted responsibilities of supplying housing and services, often a source of social grievance, were removed.

Simultaneously, the comprehensive, physical planning of frontier resource towns during Fordism defined highly structured social environments, all the more transparent by their newness and isolation. Moreover, resource towns were branch plant towns. To a much greater degree than in the past, when decisionmakers and owners were often local or loosely connected with some distant owner, the mines, oil wells, refineries, and sawmills of Fordism were increasingly directly controlled by closely integrated MNCs with head offices located in relatively few, distant metropolitan centers. In such contexts, decisionmaking functions are highly structured and specialized at the bottom of an international hierarchy, and largely limited to responsibilities for operational matters and workforce supervision.

Moreover, resource activities in Canada during Fordism became comprehensively unionized, and resource towns became union towns. Blue-collar jobs were closely structured by the principles of Taylorism, namely job demarcation and seniority. Job demarcation meant narrowly defined jobs and a sharp separation between (specialized) managers, responsible for designing and directing job tasks, and workers engaged primarily in manual tasks. The vagaries of machinery and extracting and

converting resources, and the need to solve numerous problems, meant that workers could never be entirely deskilled, but this was the intent of Taylorism. Seniority further structured work relations by linking pay scales, job advancement, and firing and re-hiring patterns according to date of entry into the mine or mill. For managers, Taylorism allowed the development of a stable, specialized, and productive workforce while workers gained dignity and protection in the work place as well as bargaining power which through a succession of collective agreements led to rapidly increasing wages and non-wage benefits, including vacation benefits (linked to seniority) and formal, binding, grievance procedures.

Structured labor relations underpinning workplace stability, in turn, implied community stability. Once hired, firms had little discretion in firing employees. Indeed, some resource firms in remote locations put considerable emphasis on recruiting employees perceived to be stable (Hayter, 1979). Seniority also "locked in" workers to particular lines of progression and accumulating wage and non-wage benefits within mills, and thereby to communities. Workers did quit jobs, but typically "quitters" did not have much seniority, apart from a few experienced workers who occasionally left to join new mills starting up in other communities in an effort to leap-frog the seniority ladder.

As union towns, resource town Canada was thoroughly working class, the labor market was male dominated, and local politics could scarcely ignore union values. Union bargaining also raised the income levels of resource towns. The forest town of Port Alberni in BC, for example, with over 5,000 union workers in a population of 18,000, was consistently listed in the "top ten" Canadian towns on the basis of per capita income during the 1960s and 1970s (Barnes et al., 1999). Not surprisingly, the job expectations of youth within towns such as Port Alberni centered on the dominant resource employers. Indeed, Grade 10 students with virtually no qualifications could expect a high income, and a stable job that would support a comfortable family life. School leavers who considered resource towns as stifling enclaves could always go elsewhere, comfortable in the knowledge that "the mill" could offer well-paid summer employment to help fund education or travel plans.

Resource town Canada during Fordism was not without instability or tension. Labor relations were adversarial, and strikes, lock-outs, and sometimes "poisonous" attitudes split communities from time to time. Resource exploitation occupations were often dangerous; poor health, physical problems, injury, and even death provided a dark under-current to resource town life. Recessionary cycles occurred during Fordism, but lay-offs were typically temporary, the laid-off workers soon hired back, and professional ("white collar") managers were never vulnerable. Smaller resource-based operations were often closed, and older resource regions experienced "structural" unemployment. Yet, in Canada during Fordism, these problems were offset by the creation and expansion of IRTs.

By the early 1970s, Lucas's depiction of Canadian resource towns as stable, prosperous and structured, especially when compared to conditions in the 1930s, reflected the reality of many IRTs. The situation was not to last. Energy crises, stagflation, and the removal of fixed exchange rates heralded a more volatile global economy in which radical technological change, centered on micro-electronics, began to drive restructuring across the industrial spectrum in search of more flexible

production structures, work relations, and forms of local development. Indeed, the sources of Fordism's stability – strongly vertically integrated corporations, dedicated production technology, dedicated infrastructure, and structured labor relations – became sources of rigidity and vulnerability. Resource activities and IRTs inevitably became embroiled in this restructuring.

Resource Towns and Flexibility

IRTs during Fordism did not develop exactly the same everywhere. But Fordism celebrates standardization. Thus, Canada's frontier IRTs were collectively shaped by an international division of labor rooted in Taylorism and controlled by MNCs, and shared ideas about model communities. In contrast, the search for flexibility in the contemporary restructuring of IRTs has emphasized themes of vulnerability and differentiation. The experience of Orofino, a timber-dependent community in Northern Idaho, illustrates the implications of the shift from Fordism to post-Fordism in terms of vulnerability (Machlis et al., 1990). Thus, at Orofino, harvest and employment levels have been highly unstable in the 1980s and 1990s, similar to the instabilities recorded in the 1930s, following a period of stability in the 1950s and 1960s. Elsewhere, IRTs have been closed, including model IRTs of Fordism, such as Schefferville, encouraging Bradbury and St Martin (1983) to add a "winding down" stage to the Lucas model of Canadian IRT development (see also Bradbury and Sendbuehler, 1988).

In turn, the expense of creating IRTs, their vulnerability, and the social, political, and corporate costs of downsizing and closure, have stimulated a new model of IRT that reflects the imperatives of flexibility, namely the "fly-in" IRT. As Storey and Shrimpton (1989) document for Canada and Australia, the exploitation of remote resources is increasingly accomplished by the use of temporary workforces that are flown to resource sites, where they live in temporary accommodations for work periods of varying length, separated by trips back to permanent homes elsewhere. Such workforces are typically unionized and well-paid, but flexible; their contracts are closely calibrated with market demands, and their job tasks more broadly defined. Thus the "fly-in" flexible IRT is planned to be temporary and a substantial part of the fixed costs of building permanent settlements (family housing, schools, hospitals, etc.) is saved, thus rendering break-even and profitability thresholds easier to attain. With lower fixed costs, the incentive to maintain production even when prices drop is reduced. The social costs of subsequent closures, resulting from lay-offs, are also dissipated among the communities where workers have their permanent homes.

Admittedly, new instant IRTs, planned and structured along the lines of the Fordist model, have also been built recently. An example is Tumbler Ridge, built in the 1980s in northern BC to house coal miners working mines supplying Japan. Yet, following several profit-deflating price reductions, employment has been reduced substantially and the rumors that the coal mines may close have been confirmed. Tumbler Ridge appears to make the case for the flexible fly-in town.

The causes of resource town closure are complex. Schefferville's iron ore, for example, served iron and steel mills in the USA that were downsizing, and its iron ore faced competition from much lower cost supplies elsewhere, just when its costs

of resource extraction were escalating. Throughout the Pacific Northwest, many timber-dependent towns are facing resource depletion and growing environmental concerns for the forests that remain (Freudenburg, 1992, p. 326). Booms and busts of IRTs have also been related to labor bargaining strategies and to geopolitical considerations (Bradbury, 1985; Bradbury and Sendbuehler, 1988). Tumbler Ridge's problems are rooted in Japan's multiple sourcing strategy which includes new mines in the USA and Australia (Gibson, 1990; Parker, 1997). While the mines are new, they are relatively expensive, and as Japanese steel consumers want less coal than once anticipated, overcapacity among affiliated mines has rapidly emerged, and production and price reductions have already been implemented.

In the context of energy politics in Canada, where there are vested interests in oil and nuclear power, the balance of environmental judgment in favor of oil has helped promote developments in Alberta and Newfoundland. On the other hand, the Atomic Energy Company of Canada Limited (AECL) in 1999 decided to close down Pinewa, 100 kilometers to the north of Winnipeg, Manitoba, an "instant" town created in 1963 to support a nuclear reactor and underground research facility that employed as many as 1,400 people, many with PhDs (Flood, 1999). AECL will have completely closed its facility by 2002. Although ostensibly closed as a cost-cutting move, Pinewa was subject to environmental criticism since its inception. Others believe closure of the facility is short-sighted, given that decommissioning work on nuclear reactors is likely to increase and the potential of nuclear power in the world's energy needs. Highlighting the environmental dilemma of nuclear power, the research center, including its above-ground facilities, will be maintained (and heated) to allow the safe break-down of radioactive materials. IRTs are vulnerable to government policy changes regardless of resource depletion concerns.

Many IRTs have seen their dominant industrial base drastically downsize through rationalization and technological changes, often in association with the introduction of more flexible work arrangements (Hayter, 1997; Norcliffe and Bates, 1997; Rose and Villemaire, 1997). In contrast to Fordism, lay-offs have been permanent, and have affected professional as much as "blue-collar" employees (Grass and Hayter, 1989). Inevitably, unemployment has risen, with its attendant indignities, costs, and knock-on effects throughout the community. In the case of Orofino and Wallace, two IRTs in Northern Idaho, Machlis et al. (1990) claim validity for the hypothesis that resource production drives social change in IRTs. The relationships are complicated, however, exemplified by a decrease in marriage rates and increase in arrest rates as production increased, not vice-versa. The reasons for this are unclear.

Meanwhile, retraining possibilities in IRTs are difficult to define in practical terms, and out-migration is not an easy solution (Halseth, 1999a; 1999b). Female labor market participation has risen, but without reaching the income levels of union jobs lost. Attempts to replace Taylorism with flexible work arrangements at existing mills have been contentious, with divisive effects on communities (Hayter, 1997). Unions are less powerful. Migration has accelerated community aging processes. Downsized mills no longer offer jobs to high-school students who now seek to invest more in their education even as job markets are uncertain. The pressures on IRTs to survive, diversify, and create jobs are therefore considerable. These pressures are also contributing towards differentiated growth among IRTs.

In situ differentiation among industry-resource towns

Hayter and Barnes (1997), based on evidence from IRTs in BC's forest economy, which is increasingly moving towards the flexibility of post-Fordism, identify three sources of differentiation. First, the mass production of a relatively few commodities is breaking down into both flexible mass production and flexibly specialized production. In both cases, product differentiation is an important element although economies of scale are less significant in the flexibly specialized networks. Both trends are contributing to local differentiation as flexible mass production takes on different forms in different communities and flexible specialization is highly geographically uneven. Second, in tandem with these production trends, labor agreements increasingly display local variability. Indeed, there are strong pressures to eliminate industry-wide bargaining, the norm since the early 1950s. Third, as forest industries have downsized, forest towns have increasingly attempted to promote economic development through some form of diversification. These efforts feature different approaches and outcomes (Barnes and Hayter, 1994).

Across the USA, many IRTs, as their traditional economic bases have downsized, have attracted in-migrants looking for alternative lifestyles (Blahna, 1990). As Blahna reveals, such newcomers bring new attitudes to IRTs, creating a "culture clash" with long-time residents, and new dimensions to IRTs. In post-Fordism, many new migrants to IRTs are no longer interested in large-scale resource development. In the case of Youbou, BC, a culture clash has been avoided as, in the absence of formal local economic planning, sawmill workers have left to be replaced by in-migrants who work elsewhere, creating an (unplanned) "bedroom" community. Similarly, Pinewa expects to survive following the closure of its radioactive facility (Flood, 1999). As a model community designed for, and limited to, the scientists employed by AECL, Pinewa provides an unusual level of community amenity as well as access to wilderness. Many AECL scientists have chosen early retirement to stay in Pinewa, and now that the town is open to non-AECL residents, others are happy to buy homes in the town.

Some resource communities actively seek diversification. In the case of Chemainus, BC, successful development of tourism, in association with a revitalization of its center and investments in small-scale manufacturing, was led by individual entrepreneurs (Barnes and Hayter, 1992). In the case of Sudbury, Ontario, once the world's biggest nickel mine, serious cutbacks in production and jobs were experienced in the 1970s (Trist, 1979). In response, various community members organized to generate ideas for development and ways of financing, discussions that led to Sudbury's development as a winter sports center. If Chemainus' success was greatly aided by its accessibility to growing metropolitan areas and tourist pools, Sudbury's experience indicates isolation is not an absolute deterrent to diversification.

For Trist, Sudbury's experience illustrates a basic shift in planning philosophy from a centrist, top-down, hierarchical approach, consistent with Fordism, to a bottom-up, community, and networking approach, characteristic of flexibility (Coffey and Polèse, 1985). Typically, bottom-up initiatives, whether originating in the private sector or local public sector, are highly variegated – or "unruly" to use Sjoholt's (1987) label drawn from his Norwegian experience. Collectively, with the

differentiated paths of development of existing IRTs, along with the emergence of "fly-in" IRTs, which are planned as temporary settlements, the IRT landscapes of the present period reflect a more varied set of forces than associated with Fordism, especially through enhanced possibilities for local action. Meanwhile, the dominant institutions of Fordist IRTs, the MNCs and unions, have become less influential. In addition, as IRTs diversify, they attract new waves of in-migrants whose lifestyles and values may differ from those of established populations (Blahna, 1990).

Moreover, in many parts of the world, including the USA, the restructuring of IRTs faces new complexities, rooted in the values of environmentalism and aboriginal rights, that were scarcely apparent during Fordism (Buttel, 1992). Expansion of resource frontiers assumed the pre-eminence of industrial values, and environmental considerations were subordinate to the goals of economic growth. It was also felt that aboriginal populations were vestiges of ways of life that would soon disappear altogether. In recent years, however, environmentalism and aboriginalism have emerged as powerful institutions – changing the rules of resource exploitation, preventing some projects, modifying others, and changing the nature and fabric of resource towns (Anderson and Huber, 1988; Hecht and Cockburn, 1989; Barker and Soyez, 1994; Reed, 1995; Hayter and Soyez, 1996; Clapp, 1998b and c). Indeed, environmentalism and aboriginalism are global forces, seeking restrictions on resource exploitation on the one hand, and encouraging enhanced local control and participation (including aboriginal participation) in resource development, on the other hand. In turn, these concerns further encourage the fly-in resource town, and add new tensions in established resource towns, while allowing for locally inspired, differentiated developments in others.

Industry-resource towns: addicted, cursed and trapped?

According to the stereotype, IRTs eventually bust, unable to diversify. For Watkins (1963), resource economies within Canada are "trapped;" for Auty (1990, 1993), resource-based developing countries are "cursed;" and for Freudenburg (1992) IRTs in the USA, and elsewhere, are "addicted" to resource dependence, until they fail. The "addiction," rooted initially in isolation and comparative advantage, is progressively reinforced by institutional structures, attitudes, and resource dynamics. Thus, MNCs operate on the lines of Baldwin's plantation model. Their connections are global and internal rather than local and external. Infrastructure is likewise dedicated to this role. Resource MNCs perform R&D, but rarely in resource towns. In short, the resource operations at the beginning of vertically integrated international supply chains provide little opportunity for local spillovers in the form of forward, backward, and final demand linkages. Moreover, the union culture of IRTs is not conducive to local entrepreneurialism and diversification. Well paid, highly specialized workers, locked into the benefits of seniority, and sharing a collective commitment to adversarial (anti-management) bargaining, lack the incentive, attitude, and training conducive to creating their own businesses. Indeed, in resource towns strong union resistance to non-union, low-wage businesses (outside of small, largely female-employing retail activities) may continue after downsizing. A widespread legacy of Fordism in company and union towns is a weak, non-innovative secondary business sector.

Resource dynamics further militate against plans for diversification (Freudenburg, 1992). Over the long run, resource utilization inherently pushes resource towns into a cost–price squeeze as the cheapest, most accessible resources are exploited first, and as costs rise the emergence of cheaper resources elsewhere adds to capacity and puts pressure on prices. Yet, if the cost–price squeeze is a long-term trend, it is consistently masked by sharp price fluctuations. In booms, prices increase, local expectations are optimistic, and the case for diversification recedes. In busts, prices decline, opportunities for diversification recede, and local attitudes, shaped by past experience, are to "sit tight" and wait for the next boom. The possibility that there may be no "next boom" is unlikely to encourage local investment. Local perceptions of resource size and viability are also often unclear, further confused when mines with abundant resources are closed. Resource towns rarely anticipate closure, and local responses are typically reactive. Indeed, according to Freudenburg (1992, p. 317), there are dangers that extractive regions will become increasingly addicted to resources. He notes that new resource spaces are likely to be in regions increasingly remote from established centers. As capital intensity increases, so do the imbalances in power and scale between extractive enterprise and community, and abilities to diversify may be declining.

In addicted, trapped, and cursed IRTs, possibilities for differentiation are a chimera. From this perspective, contemporary proposals to promote local development based on the "flexible specialization model," which centers on the creation of local agglomerations of innovative networks of small firms (Cooke and Morgan, 1993), are not reconcilable with resource town settings. Thus, O'hUallachain and Matthews (1994) argue, based on trends in copper mining in Arizona, integration and economies of scale continue to underpin highly specialized operations in IRTs, not flexible specialization. Moreover, the quintessential IRT of the new age of flexibility is the fly-in town, a model that fully accepts the implications of addiction.

Yet, IRTs survive. Moreover, their inhabitants see IRTs as desirable places to live as well as work, their advantages often contrasting with the problems associated with metropolitan areas (Gill, 1990). Contemporary restructuring has reinforced, as much as undermined, local commitments to development, and IRTs must now broker environmental and aboriginal, as well as economic, values (Reed, 1995; Hayter and Soyez, 1996). IRTs may be strongly addicted to commodity exports, but the possibility of remedies cannot be ignored (Krannich and Luloff, 1991).

Conclusion

This economic geography of industry-resource towns has revealed the variegated forces underlying their classification. IRTs are special places, vulnerable to industrial dynamics, and to resource dynamics. Situated on the geographic frontiers of capitalism, they are buffeted by the changing strategic needs of core regions and the orchestration of MNCs. Diversification and stability in geographic cores is facilitated by specialization and instability in the periphery, and this contradiction is well illustrated by IRTs. They exist because cores want them; they are often closed down when cores do not. They are vital to the economy but are highly vulnerable. They grow because they are specialized, but their survival depends on diversification.

Many IRTs go bust. In the meantime, they play strategic roles for MNCs and for governments. Their remoteness makes them central to global concerns over environmentalism and aboriginal rights. IRTs are also migrant towns that impart unappreciated social and cultural diversity, even experimentation. Against all odds, and without much attention in geographic theory (but see Auty, 1995), IRTs seek to sustain their roles as "local models" within global economic geography (Barnes, 1987). For economic geography, wishing to integrate economic, political, environmental and cultural processes, the IRT is as good a place to start as any.

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