

Resource Community Formation and Change

The Nature of Work in Natural Resource Dependent Industries

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TABLE OF CONTENTS

Introduction	1
Categories of Work	2
Working Practices and Conditions	3
Technological Innovation and its Effects on Work Practices and Skills	4
Outsourcing, Contracting, and the Casualisation of the Workforce	8
Occupational Identity	9
Occupational Community	10
Occupational Identity and Non-work Behaviour	13
Occupational Identity and the Family	13
Occupational Identity and Attachment to Place	16
Adaptations to Seasonal Changes of Income, Job Loss and Restrictions on Access to A Natural Resource	17
Conclusion	18
References	19

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INTRODUCTION

“Resource Community Formation and Change” is a research programme funded by the Foundation for Research, Science and Technology¹ which seeks to understand the relationship between communities and their natural resource base. Over the last four years the programme has focussed on a comparative analysis of communities that are dependent on forestry, agriculture, mining, energy (oil and natural gas, hydro-electric power generation), fishing and tourism industries. It is providing a substantial base of information about these types of communities and the change that has occurred in them. The research has moved beyond a boom-bust model of resource cycles in localities, by adding an understanding of the interconnections between resource sectors at local and sub regional levels. The information and understanding generated by the research will be useful for future impact assessments and local social and economic development strategies.

Over the next two years (2000-2002) the programme is broadening the focus of its analysis by:

- examining the changing nature of work and technology in natural resource based production and processing industries, and the processes by which skills are developed and transferred by individuals and groups through families and community structures;
- identifying changes in the ownership of businesses involved in the production and processing of natural resources, including new business formation and inter-generational succession of family businesses; and
- providing models and decision support scenarios for use by natural resource decision makers and communities in regional economic and social development.

As part of the current programme (2000-2001) we reviewed the international and New Zealand literature and examined the nineteen case studies of resource communities conducted during previous phases of the programme to identify significant changes in the nature of work that have occurred in the six resource industries noted above.

The literature search was conducted at the library of the University of Canterbury, and used three main data bases - Infotrac², Index New Zealand and the Social Science Index. The search was made for the following countries:

- New Zealand, Australia, Canada, United Kingdom and the United States for the forestry, mining, agriculture, energy (oil, natural gas, hydro-electric power generation) and fishing industries; and
- the first three countries listed above and the islands of the South Pacific for the tourism industry.

The search across these countries and six sectors was further narrowed by using a number of keywords; i.e. *technology, skills, contractor, occupation, occupational culture, occupational community, occupational identity, family, and community*; to help identify specific items for review.

The review has been organised according to the following themes:

- categories of work;
- working practices and conditions;
- technological innovation and its effects on work practices and skills;
- outsourcing, contracting and the casualisation of the workforce;

¹ Resource Community Formation and Change, Contract TBA X0001. For further information on the research project contact Taylor Baines & Associates (PO Box 8620, Christchurch or by email: n.taylor@tba.co.nz).

² A multidisciplinary data base that provides on-line text and abstracts from throughout the world.

- occupational identity;
- occupational community;
- occupational identity and non-work behaviour;
- occupational identity and the family;
- occupational identity and attachment to place; and
- adaptations to seasonal changes of income, job loss and restrictions on access to a natural resource.

CATEGORIES OF WORK

People working in natural resource dependent industries are now only a small proportion of the workforce in industrialised countries. As the global economy has developed from a system of simple commodity exchange to one where the provision of sophisticated goods and services has become increasingly important, so other categories of workers have emerged to add value to those goods and services.

Reich (1992) identified three broad categories of work that had emerged by the end of the last millennium. They correspond to three different competitive positions in which workers find themselves. These categories are routine production services, in-person services, and symbolic-analytic services. The three functional categories comprise more than three-quarters of American jobs. Among the rest are miners, farmers and other workers who extract natural resources, representing less than five per cent of the United States workforce. The remainder include government employees, and workers in regulated industries (Reich, 1992: 180).

Routine production services involve repetitive tasks. They include traditional blue-collar jobs and routine supervisory tasks performed by lower and mid-level managers who check their subordinates' work and enforce operating procedures. Apart from heavy industry, routine production services are found within high technology industries, and information processing. Routine producers usually work in large enclosed spaces with other people who carry out the same task. Their tasks are guided by rules and standard procedures, and supervised by people who monitor their performance. Their wages are based on the amount of work they do or the amount of time they are engaged in their task. They must be able to read and perform simple calculations, and be loyal and reliable. In 1990 about a quarter of jobs performed by Americans was routine production work (Reich, 1992: 174-175).

In-person services also involve simple, often repetitive, tasks, although the focus is on direct contact with people rather than the processing of metal, fabric or data. The pay of workers in this category is also a function of the hours worked or the amount of work performed. In-person servers are closely supervised and do not require much education. They are in direct contact with specific customers, and usually work alone or in small teams. They are expected to be reliable, punctual, tractable, and have a pleasant demeanour. Included in this category are waiters, cleaners, cashiers, hospital orderlies, home aides, taxi drivers, hairdressers, flight attendants, and security guards. In-person services comprised about 30 per cent of all jobs in America in 1990 (Reich 1992: 176-177).

Symbolic-analytic services include the activities of problem identifying, problem solving, and strategic brokering. These services, like routine production services, can be traded globally. They are not standardised products or services however. Rather they are traded as the manipulation of symbols - data, words, and visual representations. These manipulations show how to save time and energy, reveal how resources may be deployed and produce new technologies or services. Symbolic analysts, like routine producers, are rarely in direct contact with the people who ultimately benefit from their work. Their income depends on the originality, quality and speed with which they solve, identify or broker problems. They often work alone or in small teams. The bulk of the time and cost of their activities comes from conceptualising the problem, finding a solution, and planning its execution. Most symbolic analysts are university graduates, and they include research scientists, engineers of various kinds, public relations executives, lawyers, real estate developers, investment bankers, management and financial consultants, information specialists, university

professors, writers, and television producers. They comprised about 20 per cent of American workers in 1990, but probably were not more than eight per cent in 1950 (Reich, 1992: 177-179).

It is within this context of a growing gap between workers who provide routine services and those who supply analytical services that people employed in natural resource industries have adjusted their work practices to the changing demands of the global economy. Even though some workers in natural resource industries (e.g. fishers, miners and farmers) continue to exercise traditional skills, many others have found that their work has increasingly assumed the character of a mass production system (e.g. open cast mines, deep sea processing vessels, contract farming) as technological innovations, the application of scientific knowledge, and the reorganisation of the workplace has transformed the nature of their work.

WORKING PRACTICES AND CONDITIONS

The nature of work in a particular occupation changes as new technology, management styles, and organisational structures are adopted by an industry. The copper industry in the western United States provides an excellent example of how scientific mining changed the nature of a miner's activities not only in that industry, but also in other forms of mineral extraction. The critical element in the reorganisation of the copper mines was the redesigning of the systems in which workers and machines operated. This reorganisation began in the 1880's, but did not build up momentum until the first decade of the 20th century. New methods that brought higher volumes of low-grade ore to the surface replaced the selective mining of high-grade ore. Under the selective approach skilled miners had used machinery to perform their traditional tasks, but as the change was made to mass mining methods a new generation of engineers redesigned the work process and restructured the workforce in a manner similar to other industries of mass production. The responsibilities of miners at the work face were reduced to drilling and blasting, and the success of a mining venture became the responsibility of technically trained personnel (Hovis and Mouat, 1996: 434-435, 441).

Working practices and conditions on deep water fishing vessels are broadly similar to those operating in large scale industrial firms onshore. The larger vessels combine catching activities with processing. Trawlers operating in Alaskan waters, for example, are known as 'catcher-processors' as they harvest, behead and pack commercially viable portions of fish into the large freezers onboard. The company owning these trawlers regards the harvesting and processing of the catch as factory work, and refers to its workers as 'processors' rather than fishermen. The processors are hired for 90 days, and are paid a daily guaranteed rate and a crew share of the catch. Most of a processor's income is derived from the crew share. New workers may be promoted to full crew after 90 days and to lead crew after 180 to 270 days. Promotion beyond lead crew is difficult because additional skills are required that are not taught in the workplace. Higher positions on these trawlers include those of cook, engineer, first mate, and captain. Those workers interested in these positions must seek their own training (Bourassa and Ashforth, 1998: 173, 175).

Sealord Ltd, a New Zealand company, has two Norwegian-built factory trawlers with on-ship processing facilities. Work on these trawlers is "a relentless, high pressure experience" with factory staff working six hours on, six hours off for a period of seven weeks. The crew receive a variable salary: half is paid as a retainer, and the balance is based on the value of the catch for each voyage. About half of the crew work in the factory, while the remainder catch the fish and operate the vessel (Maritz *et al.*, 2001: 106, 111). On smaller deep water vessels, however, working conditions are less like that of an industrial firm. Judd's (1989: 84-85) account of a 57 metre New Zealand boat operating on the North Chatham Rise portrays life on the vessel as "something between being a family and a gang". He describes how the crew of nine deckhands caught and stowed 200 tonnes of orange roughy in 43 hours with only a five hour break. The rhythm of work is uneven, however, with the crew working rotating watches on the voyage to and from the fishing ground. A deckhand's pay consists of wages and a bonus based on the boat's productivity.

Large-scale production has also changed the nature of work on dairy farms with herds of over 500 cows. Much of the work on dairy farms in New Zealand is of a routine nature with daily tasks such as milking and seasonal activities such as mating and calving. Work of a more variable nature on dairy farms with herds in excess of 500 cows may be managed in two main ways: owners may either closely supervise their employees, or employ managers, contract milkers or sharemilkers to take the responsibility for the day-to-day operations of the farm. In many cases workers receive some form of financial incentive in addition to their annual wage. Those incentives may be based on milk production, the quality of work and the absence of cow deaths. Farmers and employees on properties with large herds regularly have time off; with a weekend off every three or four weeks being common practice. Some farms have other work schedules such as ten days on and two days off and twelve days on and four days off. There is less scope for family members to work on dairy farms with large herds. With more employees there is less need to rely on the labour of a spouse or child. Furthermore, it is not as easy to integrate a family member into the farm's labour force on an occasional basis. The equipment is usually sophisticated and expensive and less able to be operated by children (Fairweather, 1994: 19-21 & 23).

Rotating shifts, and remuneration packages comprising wage and bonus components also characterise working conditions in other industrial facilities in New Zealand such as medium density fibre plants, pulp mills and dairy factories.

TECHNOLOGICAL INNOVATION AND ITS EFFECTS ON WORK PRACTICES AND SKILLS

Technological innovation has significant effects on the work practices of business organisations and the skills of individual workers. While most social analysts would agree that the adoption of new equipment, techniques, and processes, often increases a firm's productivity and profitability, they are more likely to debate the effects of such innovation on the welfare of workers. Callister and Rose (1996: 105) note that there are two schools of thought regarding the skills required by workers. One school of thought contends that there is an increasing level of skill required by New Zealand workers, while the other claims that the trend of technological change has led to the de-skilling of the workforce. Zuboff (1988), for instance, argues that new technologies require workers not only to manipulate tools and other objects, but to respond to abstract electronic information. Thus he views information technology as creating more skilled jobs in workplaces where learning is rewarded. Couchman *et al.* (1988), on the other hand, maintain that technological change reduces demand for middle- and low-skilled labour, and is likely to polarise the workforce as a small proportion of workers will become more skilled and a much larger proportion less skilled. This polarisation may occur in a single enterprise or the whole economy.

Forestry

In forestry, mechanisation has played an increasingly important role in the harvesting and transporting of trees over the last 50 years. The capital required for setting up a logging enterprise was relatively modest until the 1970's. Nowadays an operator in Alabama, for instance, may have to invest between \$250,000 and \$750,000³ in equipment: one or more feller-bunchers to cut and set down trees, one or more skidders to drag the trees to the loading area, and several tractor-trailers to take the logs to the mill. These new technologies have significantly reduced the amount of labour required to harvest and transport a unit of wood. Unskilled labour is no longer in demand as physical strength has been replaced by hydraulic power. The key skills for workers are those associated with the operation of complex machinery (Bailey *et al.*, 1996: 489-491). Similar skills are required by loggers in New Zealand where highly sophisticated equipment has also transformed the harvesting of timber into a capital intensive activity (McClintock and Taylor, 1999: 33).

³

United States dollars.

Changes have also occurred in the processing of forest products. Fletcher Challenge Forests made large investments in plant at both the sawmill and pulp and paper mill at Kawerau during the 1980's and 1990's. As new technology was introduced the workforces at these plants were reduced substantially; with the number of persons employed at the pulp and paper mill declining from around 2,000 in the mid 1980's to 1,200 in 1997. When new equipment was installed on the pulp baling line in 1992, for example, the number of workers employed on each shift fell from 13 to 9. Workers who were performing non-production tasks also lost their jobs. Tradesmen, such as electricians and maintenance engineers, who had been laid off by the company, returned to work at the pulp and paper mill as employees of contracting firms. New recruits for the production workforce are now required to have at least school certificate qualifications, whereas previously jobs had been available to people who held no school qualifications. There have also been changes in working practices. Workers are organised into teams of six or seven, with each member of a team having a particular responsibility for some aspect of the work such as quality control or safety (McClintock, 1998: 6-7).

Agriculture

The introduction of new technologies to agriculture often requires farmers to extend their range of skills. Irrigation, for instance, can provide the impetus for a change of land use from traditional pastoral farming to activities such as dairying, horticulture and cropping. Alongside the irrigation technology a new management system is essential for the benefits of this innovation to be fully realised. The management of irrigation demands a wider range of skills from farmers and their families and employees. Moreover, the nature of work under an irrigated regime may change to such an extent that it increases the number of roles performed by the farm family. It may also require a different set of skills from the service providers of farming: contractors, labour, and small business firms (McCrostie Little, 2000).

The use of computers and the internet assists farmers who are geographically isolated to acquire new skills. South Australian farmers, for instance, are increasingly viewing the internet as beneficial to the productivity of their farms. Several factors, including poor quality phone lines, cost, the perceived complexity of access and a lack of training, constrain the adoption of the internet on farms however (Easdown, 1999: 585-587). Poor quality lines also prevent greater use of the internet on New Zealand farms.

Dairy farmers in New Zealand have reaped substantial economic benefits from the increasingly sophisticated technology that has been introduced to their industry over the last twenty years. Innovations in breeding, feeding and strip grazing practices, together with the use of rotary milking sheds and central pivot irrigators, have allowed farmers to increase the size of their herds and volume of milk production, while simultaneously reducing the amount of labour required per unit of output. Other technological changes common to all types of farming, such as hydraulics, aerial topdressing and spraying, electric fencing, round bales and the four-wheel farm bike, have also reduced the amount of physical labour required on the country's farms (Taylor *et al.*, 1998: 8).

Fishing

Echo sounders, fish finders and geographical position systems (GPS) were standard pieces of equipment on almost all fishing vessels operating in New Zealand waters by the end of the 20th century (Guardians of Fiordland's Fisheries, 1999: 26). The introduction of these electronic devices broke the traditional pattern of fathers transmitting their skills to their sons as these technologies diminished the importance of local knowledge and experience in locating a catch. Thus newcomers to a fishery who have these devices can now map the areas where other fishers harvest their catch (Baines and McClintock, 2000: 8). Other electronic equipment on deep water vessels may be used to monitor the performance of crew members. Bourassa and Ashforth (1998: 180), for instance, describe how a captain of an Alaskan trawler used a system of six video cameras to supervise the activities of crew members processing the catch.

Catch technologies vary according to the species being harvested. Before the 1980's fishers operating in New Zealand waters used handlines to catch blue cod. Since then they have used specially designed pots to harvest this species. Pots are more efficient as they require less labour and are lifted at regular intervals of time. Unlike pots, lines were always secured to the vessel. In the case of rock lobster, fishers began by using wooden frame pots, but later introduced steel pots, plastic buoys, and synthetic ropes to overcome the difficulties of fishing in rough waters. These technological changes freed up deck space and allowed more pots to be set. Fishers catching cod or rock lobster must know where, when, and how, pots should be placed at the bottom of the sea. They also need to understand the tide and current patterns in their fishing grounds (McClintock, 2000B: 7-8).

Over the last twenty years fish processing companies in New Zealand have become more consumer-oriented. Their current goal is to add more value to the catch by providing high quality products to overseas markets. This goal has been assisted by the introduction of new processing and storage technologies. A recent innovation in harvesting paua, for instance, is the use of holding pots and wet wells in boats to keep the paua alive until they are landed. Rock lobster were exported as frozen tails until the late 1980's, but nowadays they are cryogenically frozen in a live state for despatch to Asia, North America and Europe (McClintock, 2000B: 8-9). In the early days hoki fillets were prone to splitting open. A researcher discovered that rapid chilling overcame this problem of splitting. Catches of hoki are now sprayed with chilled water as soon as they are landed on the deck of a factory vessel. They are insulated with a thermal blanket, filleted and frozen within a hour or two of harvest. The result is a much higher quality product suitable for restaurants, with very little of the hoki catch being used for low value whitefish block and surimi compared with a decade ago (Judd, 2001: 119). Nothing is wasted from this process as the leftovers of the hoki - bones, guts, fins and so forth - are ground into fishmeal for use in animal feed (Maritz *et al.*, 2001: 111).

Aquaculture has also benefited from the productivity benefits of technological innovation. Mussel farms in the Marlborough Sounds have experienced higher yields per hectare over the past decade, as the result of better management techniques and the greater levels of mechanisation in seeding and harvesting tasks associated with large-scale commercial operations. The major companies have also invested in a new generation of harvesting vessels (Baines *et al.*, 2000: 7).

Mining

In mining, the recovery of coal, gold, silver, copper and other ores has evolved from underground to open pit (cast) operations. Hovis and Mouatt (1996: 444) note that the open pit mining of copper provided a growing proportion of production in the United States between 1907 and 1936. The success of this form of excavation was largely due to its greatly reduced labour costs when compared to underground mining. Most workers in open pits had less skilled jobs transporting ore and waste rock, while the use of steam shovels and railway cars required fewer people to load and transport the ore.

There has been a similar shift from underground to open pit mining in New Zealand. Open pit mining at Waihi, for instance, is essentially large scale quarrying. Open pit miners are experienced equipment and transport operators, rather than people with traditional mining skills (Fitzgerald, 1998A: 18). Underground miners typically have a strong sense of occupational identity, however, that is often transmitted from father to son, and traditionally they were strong trade unionists.

Underground and opencast mining methods and technology began changing at the Ohai mines in western Southland during the 1940's. Various measures including hard hats, electric lighting, personal breathing apparatus, improved ventilation, the control of coal dust, and safer methods for extracting pillars were introduced to improve safety. Compressed air drills, winch-powered scraper loaders, conveyors, roof bolting, electrically-powered remote-controlled continuous mining machines, and high capacity shuttle cars made the job of extracting the coal easier. The biggest change in open cast mining came with the introduction of mechanical diggers and earthmoving equipment in the 1940's. There have also been improvements in drilling

and civil engineering. Moreover, coal handling was mechanised by computer controlled screening, and automated bagging (Fitzgerald, 1998B: 10). The adoption of continuous mining technology by state and private-owned underground mines has shifted the emphasis from the practical experience and physical strength of the miners to their skills in operating automated equipment (McClintock *et al.*, 1998: 9). Yet their use of heavy machinery has made them more dependent on the skills of trades persons to maintain coal production. These innovations have sustained production volumes while reducing the size of the workforce (Fitzgerald, 1998B: 9-10). Similar technological changes in the state-owned mines of the West Coast have also been associated with greater labour productivity. The production in those mines increased from 534,342 tonnes in 1986 to 613,137 tonnes in 1991, while the workforce declined from 378 to 170 persons over the same period (McClintock *et al.*, 1998: 7).

Energy

The offshore facilities and production station of the Maui gas field in Taranaki require a relatively small workforce that is capable of operating very sophisticated and heavily capital intensive technology. Oil production from the field is controlled by staff on a Floating Production and Storage Offloading Facility, while gas production is managed from a control room at the onshore production station by using a sophisticated computer system with five monitors. Three of the monitors control production offshore on the Maui A platform, and the other two regulate the plant at the production station and the flow through the three pipelines to downstream processing facilities. Operators working in the control room at the production station need a good knowledge of the production process and experience high levels of stress (McClintock, 2000A: 6-7).

Other sectors of the energy industry in New Zealand are similarly reliant on heavily capital intensive technology. The construction and operation of hydroelectric generating facilities at the Manapouri and Waitaki power schemes exemplify some of the changes in technology and work practices that occurred during the closing decades of the 20th century. The second tail race tunnel for the Manapouri power station, for instance, was excavated by a tunnel boring machine manned by 25 workers (Meridian Energy, 2001). This huge machine, which weighs about 1,500 tonnes, replaced the drill and blast methods used to construct the first tail race tunnel during the 1960's. The operator of the tunnel boring machine works inside a cabin equipped with remote controls, video and computer monitors. Construction is continuous with crews working eight hour shifts on a roster of 15 days on and 5 days off. About 150 workers are employed on the second tail race project, substantially less than the 1,000 workers employed on the construction of the Manapouri power scheme some thirty years before (Fitzgerald, 2000: 11-12).

The power stations at Manapouri and the Upper Waitaki Valley have computerised controls, switches, and monitoring sensors, which are linked by fibre optic cable to a control centre at Twizel and to Meridian Energy's office in Christchurch. The controllers receive information on each station's equipment and performance, and manage the necessary switching, via computers. This automatic remote control system enables the generating plant to be operated unattended. Automation increases productivity through improved monitoring, and a reduction in maintenance costs. The workforce operating and monitoring the power stations has been dramatically reduced. Staff now must have a greater degree of technical skill, and different personal aptitudes than was previously the case. There is less opportunity for social interaction with other staff, and the job is more stressful because of the greater responsibility borne by staff for the operation of the plant. Before 1988 the power stations of the Waitaki system were operated on-site by staff who actively controlled the facilities in real time. Each power station had three operators (Fitzgerald, 2000: 13-14; Fitzgerald and Taylor, 2000: 11, 13).

Tourism

Technological innovations that have changed the character of the tourism industry in New Zealand include faster and more fuel-efficient transport (aeroplanes, trains, buses, cars); electronic money (credit cards etc);

and improved communication and information systems (Warren, 1999: 15). Mass tourism is the product of advances in transport and communications technology during the latter half of the twentieth century. Long-range jet aircraft were the key to the rapid growth of international travel. Together with the construction of airports capable of handling large numbers of passengers in a short time, and the development of electronic systems to expedite bookings and funds transfer, they have brought a steadily growing number of overseas tourists to New Zealand (McDermott, 1998: 325). Changes in communication and information systems have also influenced the operations of tourism enterprises at local destinations. At Te Anau, for instance, tourism operators are marketing their products on the internet through web sites and email. Many nature based tourism enterprises based there require employees with specialised and relatively rare skills. These operators recruit multi-skilled people who have specialist skills such as guiding, commercial driving, diving and kayaking, as well as the ability to entertain tourists (Warren *et al.*, 2000: 6, 8).

OUTSOURCING, CONTRACTING, AND THE CASUALISATION OF THE WORKFORCE

In the United States there was a shift to a “contingent” labour strategy during the 1980's as full-time jobs with benefits were replaced by contracting arrangements that maintained the same job activity without benefits or the security of employment. This shift was a response to a global market characterised by increased competition, low profit margins, and rapid changes in consumer demand and technology. Contingent labour generally results in lower wages, a loss of benefits and pensions, reduced job security and reduced solidarity between firms, workers and communities. Outsourcing cuts a firm's costs by lowering effective wage rates, eliminating payments for unproductive time and benefits (e.g. health insurance, workers compensation), and reducing administrative expenses. Firms have greater flexibility in organising the skill composition and quantity of their labour force. They may also use the fear of unemployment to discipline their workforce. Furthermore, the use of contract labour transfers the risks of overcapitalisation and unstable demand from the firm to the contractor (Kusel *et al.*, 2000: 117).

Bailey *et al.* (1996: 478-479, 493) explain how this shift to a contingent labour strategy by pulp and paper mills in Alabama has occurred in the context of a segmented labour market. Primary labour markets exist for managers, engineers, and skilled workers who are employed in the pulp and paper industry. These skilled workers have relatively secure and well compensated jobs. Supporting this core industry are independent contractors, providing non-core services such as logging, tree planting, trucking, security etc, that employ workers from a secondary labour market. The workers employed by these independent contractors receive lower wages, fewer benefits and have less job security than their counterparts in the mills. The fortunes of the independent contractors are closely linked with the mills they serve.

“It is in the interests of the pulp and paper companies, or the brokers who supply their mills, to maintain a stable group of productive logging operations rather than to face a situation of excessive turnover with the consequent uncertainty and need to supervise the quality of work done by new producers.Nonetheless, these entrepreneurs are tied to an asymmetrical relationship with pulp and paper mills, for these mills set prices and quotas, and often they control access to standing timber (*ibid*: 490).”

Although the owners of highly capitalised logging firms earn relatively high incomes they are subject to partial shutdowns when a pulp and paper company restricts the supply of timber to its mill. Independent contractors also compete for business with other firms to provide the same non-core service at the mills (Bailey *et al.*, 1996: 492).

A contingent labour strategy has also been adopted by companies in New Zealand; particularly in the mining, forestry, and energy industries. At GRD Macraes' gold mine in Otago, for instance, the open pit operations (e.g. drilling, blasting, ripping and transfer of the rock to the crusher) are performed by contractors, while company employees process the ore and manage the mine (Taylor *et al.*, 2000: 10). Major forest companies,

such as Carter Holt Harvey and Fletcher Challenge Forests, hire contractors to plant and log their forests, and employ workers for their mills. Furthermore, some non-core functions at the Tasman mill in Kawerau (e.g. maintenance) are also undertaken by contractors (McClintock and Taylor, 1999: 32-33). Shell Todd Oil Services Ltd operates drilling platforms offshore from Taranaki and a production station at Oaonui. The company's workforce extracts and processes the oil and gas at these facilities, while contractors provide maintenance, cleaning, catering and security services (McClintock, 2000A: 8). Meridian Energy, a state-owned electricity generator, contracts out its finance and accounts functions to an international accounting firm which has engaged former staff of the Electricity Corporation of New Zealand (ECNZ). ABB Alstom, a multinational power technology company, performs the electrical and mechanical maintenance for the Manapouri power station, while its operation is managed by Hycon Tech Ltd, a local company comprised of former employees of ECNZ (Fitzgerald, 2000: 10). Meridian Energy also contracts out plant repairs and cleaning for the Waitaki power stations to Zelco; a company based in Alexandra that was also established by former employees of ECNZ. Zelco also operates the visitor centre and tours of the Benmore Dam (Fitzgerald and Taylor, 2000: 11).

OCCUPATIONAL IDENTITY

Occupational identity and occupational community are two closely related concepts useful for better understanding the nature of work for people employed in natural resource dependent industries. Pursuing a particular occupation provides workers with a self-image, a sense of values, and a reference group which influences the relationship between their work and the rest of their lives (Salaman, 1974: 19, 25).

The major criterion for being identified as a logger in northern California is that a person must "be involved in the process of moving logs from the stump to the mill (Carroll, 1989: 97)". Logging has historically been an extraction activity that moves the wood from the forest to the mill, and Carroll (1989: 96) notes that there has been a "remarkable continuity in beliefs, action, and social organization [*among loggers*] despite continued or perhaps even accelerated technological change in the woods from 1944 to 1983". It is a way of life with a set of traditions and values that have been passed down through multiple generations. The loggers of northern California and western Oregon have a strong attachment to a rural lifestyle. They regard themselves as rugged individualists whose prosperity is based on individual skill and hard work (Carroll and Lee, 1990: 144, 148; Dumont, 1996: 283-284).

Work in the forest contrasts with work in the mill. Kusel *et al.* (2000: 116, 118-120) interviewed 60 of the 65 woods workers laid off by a timber company in northeastern California in the early 1990's. The company subcontracted, or outsourced, logging work to independent companies. Sixty of the displaced workers were given the option of transferring to the company's mill, but only eight took that option. "The limited number of workers who transferred into the mill and their comments about mill work make it clear that most woods workers view mill work unfavourably, particularly compared to forest work. Reasons cited for not taking jobs in the mill included their desire to work outdoors and their feeling that a job in the mill was confining and repetitious compared to the freedom they felt in the woods (*ibid*: 121)." Many of the displaced workers who had found another job (32 of 41 or 80%) at the time of the interview had woods work. They were working for independent contractors. Nineteen of the 32 had the same type of job they had with the timber company (*ibid*: 122). The workers employed by independent loggers were working up to 10-12 hours a day for six days compared with an eight hour day, five day week with their former employer. No union jobs existed with the contract loggers. Few of the contract loggers provided health insurance, and none offered other benefits (*ibid*: 126-127).

Farmers in Australia, like the loggers of California, value individual skill, hard work and an agrarian way of life. They each have a distinctive way of operating their farm that is based on indigenous technical knowledge. Furthermore, farmers practice occupational succession by transferring skills as well as property from one generation to the next. They have a system of symbols and stories which distinguishes between

‘good’ and ‘bad’ farming for judging the worth of their peers. Their work follows a seasonal cycle, and they experience a degree of social isolation as some of their activities (e.g. ploughing) are performed in solitude (Gray, 2000: 332-335).

Fishers have traditionally ascribed great importance to their occupation as a means of constructing their identities as individuals (Mederer and Barker, 2000: 71). The fishers of Stewart Island, for instance, stress that it is their commitment to the lifestyle which keeps them on the island and harvesting rock lobster. All the men interviewed by Levine (1985: 296) affirmed that they enjoyed being their own boss, living in such a beautiful environment and engaging in a rugged occupation that tests their abilities. The main difference which exists among the fishers of Stewart Island is between those who regard the resources of the ocean as limited, and want only enough rock lobster taken from the fishery to make a sustainable income, and others who are orientated towards expansion, competition, and the use of new technology to increase their share of the catch. Although both groups of fishers are committed to the lifestyle, the latter group is entrepreneurial in its fishing practices and relatively isolated from other islanders. Knowledge of local grounds, and of fish habits and movements, are jealously guarded resources among the fishers of Stewart Island. This knowledge is not for sale, but may be exchanged in the context of a close affective relationship such as that between a father and son (Levine, 1985: 297).

For many people fishing has been a family occupation for several generations (Mederer and Barker, 2000: 71; Judd, 1989: 87). Often the occupation is inherited by a son from his father, but occupational identity among fishers in Newfoundland is passed through families by both parents to their children (Davis, 1986: 137).

Loggers, farmers and fishers are just three examples of occupational groups that provide a strong sense of identity for workers employed in natural resource dependent industries. Other examples, which are discussed in later sections of this review, are miners, workers on offshore drilling platforms, and certain types of workers at tourist resorts. These occupational groups are also evident in New Zealand.

OCCUPATIONAL COMMUNITY

Although many different occupational groups have a strong sense of identity, only some of them are isolated enough from the rest of society to constitute occupational communities.

Blauner (1960) maintains that an occupational community develops when people employed in a particular occupation are isolated from the wider community by the physical location of their place of work or by the scheduling of their working hours. These spatial and temporal factors isolate them from people employed in other occupations, and result in them spending their leisure time with their workmates. These occupational groups become ‘little worlds in themselves’; with members of the occupation being measured in terms of the occupation’s system of status and rank instead of the social structure of society.

These structural reasons for the existence of occupational communities are endorsed by Bulmer (1975). In some cases the nature of the work separates people from their residences (e.g. fishermen), and brings them together in their leisure time with other people pursuing the same occupation. In other instances people working shifts as a condition of employment (e.g. firefighters, railway workers) may also spend their spare-time together. Moreover, the domination of a single industry in an isolated locality may also result in the creation of an occupational community (Bulmer, 1975: 79).

An occupational community, however, should be carefully distinguished from a residential community. Cramer (2000: 58), for example, describes the fishing community as an “occupationally defined group associated with commercial fishing” and the residential community as “the town or city where people live”. She adds that residential communities are “natural resource-based communities where people’s social and

cultural identities are intertwined with the production of a natural resource”. Given an attachment to place, she suggests that there is likely to be a symbiotic relationship between commercial fishers and non fishers within a particular residential community (*ibid*: 58).

The loggers of northern California, according to Carroll (1989: 103), “constitute an occupational community complete with highly developed occupational role identities, a strong intracommunity reference group, and the tendency to spend free time in each other’s company.” He explains that there are several important subgroups or categories within the community of loggers. These subgroups can be located on a continuum and range from those which are central to the social organisation of the loggers to those which are on the periphery. The most fundamental distinction is between company and gyppo loggers. Gyppo firms are independent operations, and their loggers are paid on the basis of individual production. Gyppo loggers value independence and freedom from the rules that constrain workers in large companies. Unionised company loggers distance themselves from mill workers. Other major distinctions in the logging world relate to job function. The major subgroups are fallers, rigging crew members, logging truck drivers and road builders. Fallers, who cut down the trees, are the elite group of the logging world. The rigging crew move the logs to the place where they are loaded on trucks. Truck drivers and road builders are regarded as more peripheral positions within the occupational community. Drivers’ skills are closer to those of highway drivers than those of loggers, yet their identities are closely tied to the latter group. Road builders are a more ambiguous case, however, as they rarely interact with the other three groups as the roads are usually finished before the loggers and drivers arrive (Carroll, 1989: 98-100).

Lummis’s (1977) study of East Anglian fishermen focussed on the decade and a half before the first world war. The majority of owners and employers began their working lives as fishermen. They became materially successful because of their expertise in fishing so there was little difference between the background of employers and employees. Fishermen were away for up to five months from their home port.

“During these spells, the boat was their only home and the crew their basic social unit. Their lives were job-orientated and male-dominated to an exceptional degree.Crew members were frequently neighbours and sometimes kin. While they were away from home most leisure activity seems to be shared with other crew members and these associations were continued at home. The majority of the driftermen would be unemployed from the end of December until sometime in May. These alternate periods of complete absence from their home area and long periods of ‘leisure’ when other members of society were working, impeded any sustained leisure involvement with non-fishermen.” (Lummis, 1977: 58)

Fishermen were independent of the social hierarchy ashore, and they simply ceased to acknowledge it. Relationships in the fishing villages between boat-owners and their employees were open and demonstrated a degree of ‘individualistic egalitarianism’ compared to the deference paid to traditional authority by non-fishermen (Lummis, 1977: 61, 64).

Miller and Johnson (1981) endorse this concept of occupational community in their study of the Bristol Bay salmon fishery in Alaska. However, they recognise that the image of the fishermen of Bristol Bay as being a homogeneous group is inadequate as they represent a number of occupational communities. They contend that the fishery can best be described as a heterogeneous group of fishermen, many of whom are members of more than one occupational community. The fishery has the allure of a gold rush, but serious conflict seems to be the exception rather than the rule in the fishery as the tension is mediated by two opposing socialisation processes. The first process promotes unity and cohesion among fishermen at the most general level by encouraging them to view themselves as a single occupational community known as “Bristol Bay fishermen”. The second, opposing process, allows the fishermen to subdivide themselves into smaller units on the basis of a variety of social criteria. These criteria include ethnicity, port or place of residence, tenure in the fishery, competence and commitment to commercial fishing (Miller and Johnson, 1981: 132-134).

Economic criteria also differentiate between various groups within an occupational community. Barrett and Apostle (1989: 5), for example, distinguish four classes of fishers in the Maritime Provinces of Canada. The first tier of this class structure is a proletariat of crewmen employed on large company-owned vessels. Second, is a class of dependent commodity producers comprising fishers on small-scale boats who own their vessels and depend on capital for inputs and outputs. The third tier is an independent commodity producer class consisting of small-boat fishers who sell their catch in a competitive market and are largely free of any contractual obligations to capital. At the top of the structure is a petty capitalist class comprising the captains of intermediate-scale vessels whose social position is defined by the scale and ownership of their vessel, the exploitative relationship to their crew, and a dependent market relationship to capital.

In the case of mining there are several conditions which favour the formation of an occupational community. Miners often reside in isolated settlements that reduce their contacts with members of other occupations, and work is a constant topic of conversation during their leisure hours. The practice of mutual aid that is a feature of the working lives of underground miners is also extended to their neighbours at times of crisis. Differences between the various grades of miner (e.g. face worker, craftsman, under official), and among miners with different attitudes to management (e.g. antagonistic, compliant) may spill over into the world outside the pit as a source of social cleavage (Bulmer, 1975: 80, 83).

For most of the 20th century there was well defined occupational hierarchy in the coal mining industry. Dublin (1998), for instance, analysed the changes in the industry in Pennsylvania since 1920. He notes that young men, aged 18 or older, invariably sought work around and in the mines during the 1920's and 1930's. They often needed help from their fathers or uncles to get their first job in the mines in this period when employment in the industry was declining. Typically they worked as coal breakers or outside labourers before obtaining better-paid and more prestigious work underground. After some years in a breaker or bagging plant, they took on jobs as mule drivers, door tenders and loaders in the mines. When they had been employed in these auxiliary positions for a significant period of time, these men could get their mining papers and take up more lucrative employment as contract miners. Contract miners were at the apex of the occupational hierarchy (Dublin, 1998: 47-48).

A similar occupational hierarchy exists in New Zealand's underground coal mines where miners make status distinctions among themselves based on their different skills. Hewers, who have the highest prestige, operate in pairs at the coal seam. Truckers, who also work underground, are ranked next in the hierarchy, while workers operating the outside bins and screening plants on the surface have the lowest status. Miners usually begin their career on the surface. They move up the hierarchy initially by working underground as a trucker, and later by teaming up with a more experienced miner as a hewer (McClintock *et al.*, 1998: 6-7).

The tourism industry has some occupational groups that constitute distinct communities because of their transient lifestyles. Adler and Adler (1999) recorded the history of over four hundred workers at Lukane Sands, a luxury tourist resort in the Hawaiian Islands. They sorted the workers into four categories: locals, new immigrants, seekers and managers. They focussed their research on the latter two categories of workers due to their highly transient lifestyles.

Seekers identified with their recreational activities rather than their work lives. They are attracted to the leisure pursuits and/or natural beauty of Hawaii. Seekers exhibited different transient patterns. Some of them only stay in Hawaii for a short time ("time-outers"), while others ("temporary relocators") work there for several years before returning home. A third group ("circuit-travelers") become more committed to the experience of water sports and nature with each destination at which they work. The fourth group are "seasonal workers" who join the resort's workforce during the peak season. Seekers reject the material values of North American culture and pursue experiential goals by forgoing traditional careers (Adler and Adler, 1999: 34-37, 41-42).

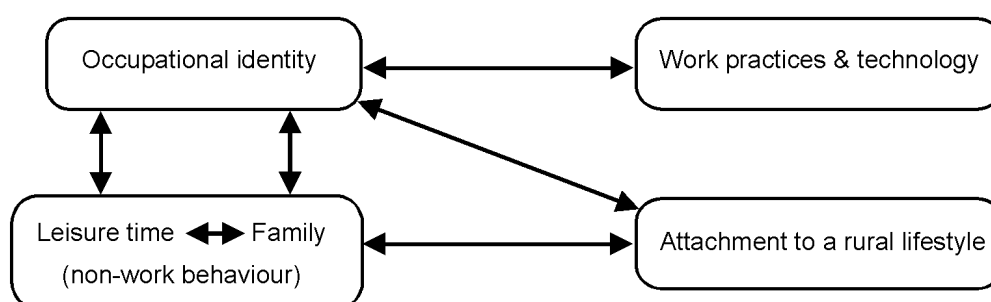
Managers are resort professionals whose transient lifestyle is due to their occupation. They move between hotels as part of their career in the hospitality industry. By integrating their work and leisure interests, and forming friendships with other professionals, managers are an occupational community. They are more orientated towards material goals than seekers, and career advancement is the primary factor for their moving between hotels (Adler and Adler, 1999: 37-38, 42).

Thus occupational communities continue to exist in many natural resource sectors despite changes in technology, capital structure and ownership. They are still evident in New Zealand, but often as sub components of residential communities which now depend on a multi-sector resource base.

OCCUPATIONAL IDENTITY AND NON-WORK BEHAVIOUR

People employed in natural resource dependent industries often have a strong sense of occupational identity, and belong to occupational communities that not only influence the way they work but also shapes the nature of their leisure activities and family life (see Figure 1). The extent to which these workers participate in leisure activities with other members of their occupational group relates to the degree the nature of their work separates them from the rest of society by temporal and spatial factors. There are also implications for relationships within the family as the work schedules of some occupational groups employed in natural resource dependent industries limit their opportunities for interaction with their spouses, children and other relatives. Furthermore, the occupational identity of workers in these industries is often associated with an attachment to a rural lifestyle that may inhibit them from moving their residence to take up a job in another locality. These issues are discussed in the following two sections.

Figure 1. Relationship between occupational identity, leisure activities and family life



Separated from the rest of society by temporal and spacial dimensions.

Integrated

For example:

Weak occupational community
Leisure activities with diverse occupational groups
Work hours in standard working day
Work activities close to place of residence

Separate

For example:

Strong occupational community
Primarily with own occupational group
Shift work outside standard working day
Work remote from place of residence

OCCUPATIONAL IDENTITY AND THE FAMILY

Occupational identities evolve over long periods of time. They are influenced by the introduction of new work practices and technologies as firms respond to the competitive pressures of the global economy. Changes in work practices and technologies transform the nature of particular occupations. In the case of many practices associated with natural resource dependent industries, insofar as they have temporal and/or spacial dimensions, they may also have significant effects on family relationships and behaviour.

Hayner (1945) has recorded the changes in logging technology that transformed the typical logger from an “uncivilised” individual to a family man. He identified three phases in this transformation: the ground skidding of logs to railroad spurs (1895-1915) and single men’s camps; overhead railroad logging (1915-1920’s) and family camps or company towns; and tractor logging (1920 onwards) and communities of independent families (Hayner 1945: 218). In his 1944 field study he found that many married loggers preferred to locate their homes separately from either the camp or the company town (Hayner 1945: 220).

A similar process occurred in the hydro construction towns of New Zealand. Housing in those towns evolved from tents for single workers before the second World War, to temporary dwellings that were not designed to outlast the projects at Mangakino and Otematata, and ultimately to better quality houses for families at Turangi, Twizel and Cromwell during the 1970’s and 1980’s. In the earlier hydro towns the different types of housing for staff and wage workers were segregated, but in later towns, such as Turangi and Cromwell, the higher quality dwellings of staff were dispersed more evenly throughout the settlement (Taylor and Bettesworth, 1983: 46-53).

Fishing is an occupation which requires some of its practitioners to be absent from their homes for long periods of time. These lengthy absences from home shape the nature of family life in fishing dependent communities as is recalled by the skipper of a deep water vessel:

“In Hull there were about 5,000 fishing families like mine. My wife comes from another. There all the men spent 340 days at sea each year. It didn’t seem especially harsh or unnatural. We were fishermen and that’s just how all fishermen lived. You adapted to it, and when you were courting the women accepted it. I never knew my kids until they were teenagers, and I was just a fella who appeared occasionally. I was sea when all but one were born, and that time I sailed two days later, just on Christmas (Judd, 1989: 85).”

Mederer and Barker (2000) conducted a study of 23 fishing families in New England. They report that before amendments were made to the New England Fishery Management Council’s (NEFMC) Multispecies Groundfish Plan in 1994, families traditionally relied upon a division of labour where husbands were the bread winners and wives maintained the home and family. Wives, however, managed two distinct adaptations to the fishing way of life. The first set of routines occurred during the fishermen’s absence and was described by wives as the “normal” pattern of family life. The second set of routines involves reintegrating the fisherman into the family after his return home (Mederer and Barker, 2000: 72-73). With the introduction of amendments to the Multispecies Groundfish Plan, however, not only do fishers have less control over where, what, when and how they fish, and have declining incomes, but there is also less certainty about the presence or absence of the fisher within the home which adds more stress to marital and family relationships (Mederer and Barker, 2000: 74-75).

Oil and natural gas deposits occur under coastal waters in many parts of the world. Workers move by boat or helicopter to offshore drilling platforms from support bases. Their stay offshore varies by company and region, but is typically for 7, 14 or 21 days. After this period offshore the workers have a period onshore which is usually of the same length as that offshore. The offshore crew is typically divided in two shifts - one of which is working and the other resting. Offshore workers, eat, sleep and work at their place of employment (Gramling, 1989: 50).

This temporal scheduling of offshore work allows people to be employed at locations which may be considerable distances from the places where they live. A 14 day on/off shift, for instance, means that workers only have to make a round trip between their residence and place of work once every 28 days. Thus concentrated work scheduling attracts employees from a wider area, and reduces the geographic concentration of settlement around the economic activity. Furthermore, it enables the sites for economic activities to be selected with less regard to existing settlement patterns as companies can employ the services of long-distance commuters. By increasing the period of intensive work, and also the time off, offshore drilling can be located

in any coastal region of the world, and the workforce to operate the platform can be transported from any other region of the world (Gramling, 1989: 50-51).

Long distance commuting and concentrated work scheduling have become popular options for resource dependent industries as the development, construction, and maintenance costs of accessing resources in remote areas are less than the costs of establishing single industry towns (Gramling, 1989: 52; Storey and Shrimpton, 1991: 8). The construction of the second tail race tunnel at Manapouri, for example, employs over 150 workers many of whom return home to their family homes in other parts of New Zealand for 5 days at the end of 15 days of 8 hour shifts (Fitzgerald, 2000: 12). Yet the choice of these options means that at least two complete shifts must be employed for all positions in a corporation's hierarchy. There may also be logistical difficulties in ensuring that both personnel and materials are in the right place at the appropriate time (Gramling, 1989: 53-54).

Work rotations in Canadian mines range from four days on/three days off, seven days on/off, 14 days on/off, to 63 days on/21 off cycles. Most workers prefer shorter cycles, with seven days on/off being the most common rotation. The rotation period is correlated with the location and accessibility of the work place; the more remote the location, the longer the rotation. Australian mines, by contrast, have adopted asymmetrical patterns of rotation (e.g. 17 on/11 off, and 21 on/7 off). Many companies which practice concentrated work scheduling also have longer working days than eight hours; with the result that employees experience greater levels of fatigue and performance suffers. Furthermore, workers may find it difficult to sleep when they change from day to night shifts (Storey and Shrimpton, 1991). Concentrated work scheduling helps individuals compete in a much larger labour market, without having to change their place of residence. Thus they can change their jobs, or job locations, frequently without disrupting their family and social networks. Concentrated work scheduling, however, restricts their participation in family activities. The long periods at home do not allow workers to catch up with what has happened there during their absence. First, because other members of the family and friends have a more traditional schedule of time, and second because absent members may not understand decisions made while they were away from home and therefore may disagree with them or act in an inappropriate way. Another constraint concerns the individual's interaction with other workers. It is difficult for employees to organise in their common economic interest as the workforce is widely dispersed. Although offshore workers in Europe are largely unionised, the offshore industry in the United States evolved as an extension of onshore practices and has avoided unionisation (Gramling, 1989: 54-57).

Forsyth and Gauthier (1991) investigated how the families of offshore oil workers adapted to the cycle of the fathers' absence and presence in the home. Oil workers usually stay off-shore for periods of seven days or more, and typically have the same period of days off. Their families have to adjust to many departures and reunions - typically they experience 26 of both every year. The wife of an offshore oil worker assumes some of his responsibilities during his absence, but may have difficulty surrendering her authority to him on his return. The oil worker not only must cope with the pressures of his job, but he must meet the expectations of his family when he returns home exhausted. Other problems associated with offshore oil work are (1) the workers's need for sleep on his return, while his wife may need to discuss events during his absence; (2) many wives do not attend social activities without their spouses and endure periods of loneliness while he is away; (3) a lack of communication between spouses, partly due to the isolation of the workplace; and (4) the need for the wife to achieve independence that may create resentment by both partners (Forsyth and Gauthier, 1991: 182-183). Forsyth and Gauthier (1991: 198) note that the majority of offshore oil workers do not have the luxury of changing their work schedule to accommodate their families so "work scheduling typically alters [the] family and not vice versa".

Families of offshore operational staff on the Maui A platform off the Taranaki coast also have to adjust to the cycle of the father's absence and presence at home. Some families whose fathers initially worked on the platform had no previous experience of the peculiar work and domestic routines required by the seven days

on/off pattern.⁴ They were used to having ‘Dad’ at home every night, and a number of marriages ended in divorce as families were unable to adapt to this change in their domestic life (McClintock, 2000A: 20).

Collis (1999) examined how the wives of shift workers in a small mining town in Australia dealt with conflicts arising from their partners’ use of leisure time. She interviewed 22 women about the positive and negative effects of the 12 hour shifts and the eight day - four on/four off - pattern of the men’s work/leisure routine on them, their children and the family. Solidarity within the work crews develops from the group’s responsibility for work below ground and isolation from other members of the community above ground. The nature of mining operations and a system of shift work that puts workers out of synchrony with the leisure activities of other people in the community, including their own families, intensifies this isolation. Associating with other crew members is an integral part of the lives of shift workers and takes precedence over time with family. Miners are also the subject of considerable peer pressure to conform to the norms of crew solidarity. A miner’s leisure time with his work mates may be a major source of conflict with his wife; particularly if she believes his relationships with other crew members have taken priority over the marital relationship (Collis, 1999: 5). Similar pressures on family relationships are associated with the patterns of shift work in some of New Zealand’s natural resource industries. Process workers at the Tasman and Caxton mills at Kawerau, for instance, are employed on rotating shifts which directly impacts their “family life by altering domestic routines and limiting interaction between family members” (McClintock and Taylor, 1999: 32).

Resort workers also pursue an occupation that influences the nature of their family relationships. The transient nature of their lifestyle complicates the commitments of conventional family life. Those workers (‘seekers’), who value the experiential dimension of their lifestyle, keep their relationships casual and try to avoid having children of their own. Resort professionals, by contrast, struggle to maintain some vestiges of conventional family life as they follow a transient career path. They try to achieve this goal in three different ways: (1) by refusing to accept transfers that may damage their family relationships; (2) by arranging with their spouses that families accompany them as they move between locations; and (3) by moving with their jobs and leaving their families at a permanent home which they can regularly visit (Adler and Adler, 1999: 43-46).

OCCUPATIONAL IDENTITY AND ATTACHMENT TO PLACE

The interactions between family and occupation raise important issues for New Zealand research to consider. Some occupations in natural resource dependent industries are associated with an attachment to a place that hinders the mobility of workers and their families. Many of them prefer to remain in the rural community where they reside even though they have lost their job and the availability of alternative employment in the district is very limited.

Kusel *et al.* (2000) interviewed 60 displaced timber workers in northern California. They report that the commitment to community was a powerful force that kept workers and their families in place despite the loss of jobs, lower incomes and restricted employment opportunities. For these workers, community is not only a place they know, but includes people, the forest, and associated work and recreational activities. This community helps them understand themselves, and their relationship to the world, and it is a place that they find difficult to leave (*ibid*: 128-129).

Dublin (1998: 48-49) notes that the coal mines in Pennsylvania began to be permanently closed in the 1950's. The relationships that the men had formed with other miners enabled them to adjust to the effects of the closures. Residents of the area had friends and kin in Philadelphia and northern New Jersey who had found

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The present work pattern on the offshore platform is 14 days on/off.

work in the shipbuilding and defence industries there. These connections helped unemployed miners find jobs and houses in those places. Many former miners and their families remained in the area, however, because of their strong family, ethnic and religious ties, ownership of a home, a close knit community, and love of rural life. Furthermore, other jobs had little appeal for the men after a lifetime of mining:

“In the mines, men worked at their own pace, commonly set their own hours, were rarely supervised, and enjoyed a camaraderie that carried over into the bars, churches, and fraternal organizations of their hometowns. Work on an auto assembly line, in a lamp factory, or a garment factory - some of the jobs that former miners described in their interviews - compared poorly with work in the mines.” (Dublin, 1998: 51)

Some workers and their families resident in rural New Zealand are also reluctant to leave their residential community when made redundant. Conradson (1996: 116-118) conducted a longitudinal study of 125 people employed by state agencies at Reefton in 1987. Many of those agencies laid off staff during the next seven years as they restructured their operations, and by 1994 only 21 of the original group of workers were still employed by state agencies. Forty-five had left Reefton, while the other 58 continued to reside locally⁵. Twenty-one of those resident in 1994 had either retired, left the workforce, or were unemployed. Moreover, some construction workers based at Twizel, and coal miners resident in Ohai, chose to stay with their families in those towns when their employment ceased (Fitzgerald and Taylor, 2000: 16; Fitzgerald, 1998B: 17). Sometimes redundant workers are unable to leave their residential community (e.g. Ohai) as their entire savings are invested in houses whose values have plummeted following the closure or restructuring of a natural resource dependent industry.

Attachment to place, as the above examples illustrate, is linked to many other factors such as commitment to a specific occupation, family relationships and home ownership, which together inhibit some workers and their families from moving to other localities to obtain employment. A key issue to consider in the New Zealand context is the ability of workers who have lost their jobs in a natural resource dependent industry to take on similarly structured work in other industries while remaining in their place of residence.

ADAPTATIONS TO SEASONAL CHANGES OF INCOME, JOB LOSS AND RESTRICTIONS ON ACCESS TO A NATURAL RESOURCE

Some occupational groups are better prepared than others in the same industry to adapt to the fluctuations in the demand for a natural resource, and any restrictions on its supply. Loggers in Oregon, for instance, develop coping strategies to supplement their income with odd jobs or unemployment insurance, or organise their leisure activities, to cope with cyclical and seasonal changes in the demand for labour. While mill workers are more accustomed to year round employment, and are often unprepared for the loss of work and disruption to their routine when they are laid-off (Daniels *et al.* 1990: 139). Job switching is a common practice among loggers in northern California. When jobs are plentiful an individual may quit a operation for no specific reason, and be rehired at a later date. Moreover, gypso operations expand and contract from year to year, and thus there may be no job available for a logger who has performed satisfactorily during the previous year (Carroll and Lee, 1990: 149).

The same values and behaviour that have maintained the loggers' occupational community, however, appear to prevent them taking up alternative employment:

“The intergenerational transmission of values and shared meanings, the group influences, the tradition of hard physical work, the attachment to rural life, and the job information networks

⁵

One person's destination was unknown.

all seem to have evolved under conditions of reasonable levels of demand for labor. These strategies have not prepared loggers to look outside the occupation for work. Rather, the net effect seems to have been that of fostering and encouraging attachment to an occupation and a way of life that at least for some is no longer viable (Carroll and Lee, 1990: 151).”

The highest status individuals who are closest to the centre of the occupation (i.e. fallers, buckers, and rigging crew members) find it most difficult to take up other employment due to their higher degree of attachment to the occupation and the relatively lower transferability of their skills to other jobs. Builders of logging roads and truck drivers, however, are better prepared to make this adjustment as their skills are more easily transferred to other jobs, and they identify less strongly with the occupational community (Carroll and Lee, 1990: 151).

Carroll *et al.* (2000: 99-100) conducted a longitudinal study in which a panel of 84 woods workers laid off by the Potlatch Corporation in northern Idaho were interviewed on two occasions a year apart during 1992 and 1993. Four basic reasons for workers remaining in logging emerged from this study. Income was a major factor as timber jobs provide more income than most other blue-collar jobs in the area. Panellists also expressed a strong attachment to the community and area. A third reason was that people preferred a rural lifestyle and did not want to move to the city. The final reason was that logging was a source of identity for many workers (*ibid.*: 108-109).

Workers may also have to adopt new modes of behaviour when access to a particular natural resource is restricted by government regulation. Binkley (1996), for example, describes how fishermen and their wives have responded to the crisis faced by their industry when the Canadian government imposed a management plan limiting the fishing of northern cod in the grounds offshore from the Maritime Provinces. The fishermen employed three strategies to adapt to the decline in the inshore fishery by: (1) staying at sea longer and harvesting fish further offshore; (2) catching as many species as possible; and (3) employing as much family labour as possible. Whereas their wives responded by (1) undertaking tasks for their husband that were normally performed by paid labour; (2) becoming the main income earner while their husband awaited a return to fishing; and (3) taking more responsibility for household decisions when their husband fished further offshore (Binkley, 1996: 205, 207-208).

CONCLUSION

The international and New Zealand literature reveals that work in natural resource dependent industries is gradually assuming the form of the production of routine services as occupations such as mining, logging, and fishing, are being transformed by changes in work practices, management styles, and technology. Although technological changes in natural resource dependent industries often increase the productivity and profitability of individual firms, their effects on the welfare of workers are more complex. Work practices have generally become less physically arduous, while demanding higher levels of skills, and sometimes greater levels of stress, from employees as they have been called upon to operate increasingly sophisticated and expensive equipment. Similarly, some major companies have adopted a contingent labour market strategy that has allowed them to reduce effective wage rates and administrative expenses while transferring the risks of overcapitalisation and unstable demand to contractors. The result has been the loss of many permanent jobs in the mining, forestry and energy industries in New Zealand. The displaced workers in these sectors have either sought jobs outside their industry, been re-employed by contractors at lower rates of pay and with less job security, or remain unemployed.

Occupational identity enables workers in natural resource dependent industries to define themselves in the context of social and economic change. It provides individuals with a sense of community, a means for socialising with work mates outside the workplace, and a vehicle for mutual support in times of crisis. Thus

it is often difficult for members of occupational groups associated with natural resource dependent industries to leave the security of their occupational and residential communities when they lose their jobs.

The organisation of work practices in a particular natural resource dependent industry has significant effects beyond the workplace. The geographical remoteness and the work schedules of an industry may prevent its workers from developing relationships with other members of their residential community. They may also result in stress and conflict for workers' families as they adjust their behaviour to prolonged absences of the father from home or to shifts that prevent spouses and children from spending their leisure time together. Moreover, when workers experience economic difficulties because of the restructuring of the industry or reduced access to a resource, their spouses may be forced to sustain the family's income by taking a job or providing unpaid labour.

This review has provided important insights for the development of an interview schedule which is to be used in the compilation of individual and family work histories of people employed in natural resource dependent industries. It has also identified a number of factors, influencing the social and economic well-being of workers and their families, that will become part of the models and scenarios this project is preparing for decision makers and communities to use in regional development programmes.

REFERENCES

- Adler, P. A. and Adler, P. (1999). Transience and the post-modern self: the geographic mobility of resort workers. *Sociological Quarterly*, 40(1): 31-58.
- Bailey, C.; Sinclair, P.; Bliss J. and Perez K. (1996). Segmented labor markets in Alabama's pulp and paper industry. *Rural Sociology*, 61(3): 475-496.
- Baines, J. and McClintock, W. (2000). A case study of Moeraki. Working Paper 25, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- Baines, J.; Taylor, N. and McClintock, W. (2000). A case study of Havelock. Working Paper 26, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- Barrett, G. and Apostle, R. (1989). Formal and Informal economic ties between fishing boat captains and fish buyers in Nova Scotia. *Canadian Journal of Sociology*, 14(1): 1-23.
- Binkley, M. (1996). Nova Scotian Fishing Families Coping with the Fisheries Crisis. *Anthropologica XXXVIII*: 197-219.
- Blauner, R. (1960). Work satisfaction and industrial trends in modern society. In Galenson, W. and Lipset, S. M. (eds). *Labour and Trade Unionism*.
- Bourassa, L. and Ashforth, B. E. (1998). You are about to party defiant style: socialization and identity onboard an Alaskan fishing boat. *Journal of Contemporary Ethnography*, 27(2): 171-196.
- Bulmer, M. I. A. (1975). Sociological models of the mining community. *Sociological Review*, 23: 61-92.
- Callister, P. and Rose, D. (1996). Up-skilling and de-skilling. In Le Heron, R. and Pawson, E. (eds), *Changing Places: New Zealand in the Nineties*, Longman Paul Limited, Auckland, pp.105-108.
- Carroll, M. S. (1989). Taming the lumberjack revisited. *Society and Natural Resources*, 2(2): 91-106.
- Carroll, M. S. and Lee, R. G. (1990). Occupational community and identity among Pacific Northwestern Loggers: implications for adapting to economic changes. In Lee, R. G., Field, D. R. and Burch W. R. Jr (eds), *Community and Forestry : Continuities in the Sociology of Natural Resources*, Westview Press, Boulder, Colorado, pp.141-155.
- Carroll, M. S.; Blatner, K. A.; Alt, F. J.; Schuster, E. G. and Findley, A. J. (2000). Adaptation Strategies of displaced Idaho woods workers: results of a longitudinal panel study. *Society and Natural Resources*, 13 (2): 95-113.
- Collis, M. (1999). Marital conflict and men's leisure: how women negotiate power in a small mining community. *Journal of Sociology*, 35(1): 60.
- Conradson, D. (1996). The small town experiencing of restructuring. In Le Heron, R. and Pawson, E. (eds), *Changing Places: New Zealand in the Nineties*, Longman Paul Limited, Auckland, pp. 116-118.

- Couchman, P.; Fitzgerald, G. and Warren, J. (1988). Technological change and social policy. Unpublished working paper, Royal Commission on Social Policy, Wellington.
- Cramer, L. A. (2000). Community infrastructure and the development of human capital. In Hanna, S. and Hall-Arber, M. (eds.), *Change and Resilience in Fishing*, Oregon Sea Grant, Corvallis, Oregon, pp. 57-66.
- Daniels, S. E.; Gobeli, C. L. and Findley, A. J. (2000). Re-employment programs for dislocated timber workers: lessons from Oregon. *Society and Natural Resources*, 13 (2): 135-150.
- Davis, D. L. (1986). Occupational community and fishermen's wives in a Newfoundland fishing village. *Anthropological Quarterly*, 59(3): 129-142.
- Dublin, T. (1998). Working-class families respond to industrial decline: migration from the Pennsylvania Anthracite Region since 1920. *International Labor and Working-Class History*, 54: 40-56.
- Dumont, C. W. Jr. (1996). The demise of community and ecology in the Pacific Northwest: historical roots of the ancient forest conflict. *Sociological Perspectives*, 39 (2): 277-300.
- Easdown, W. (1999). The social infrastructure needed to develop rural internet use in Southern Australia. *Rural Society*, 9(3): 585-599.
- Fairweather, J. R. (1994). Social organisation of large herd dairy farms in New Zealand. *Research Report No. 222*, Agribusiness & Economics Research Unit, Lincoln University, Canterbury.
- Fitzgerald, G. (1998A). A case study of Waihi. Working Paper 9, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 601), Taylor Baines and Associates, Christchurch.
- Fitzgerald, G. (1998B). A case study of Ohai. Working Paper 11, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 601), Taylor Baines and Associates, Christchurch.
- Fitzgerald, G. (2000). A case study of Manapouri. Working Paper 21 prepared for the Foundation for Research Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- Fitzgerald, G. and Taylor, N. (2000). A case study of Twizel. Working Paper 22, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- Forsyth, C. J. and Gauthier, D. K. (1991). Families of offshore oil workers: adaptations to cyclical father absence/presence. *Sociological Spectrum*, 11 (2): 177-201.
- Gramling, R. (1989). Concentrated work scheduling: enabling and constraining aspects. *Sociological Perspectives*, 32 (1): 47-64.
- Gray, I. (2000). The contrasting traditions of farming and railway work in Australian rural communities. *Rural Society*, 10 (3): 329-340.
- Guardians of Fiordland's Fisheries (1999). *Beneath the Reflections: A Characterisation of Fiordland's Fisheries*. Ministry of Fisheries, Dunedin.

- Hayner, N. S. (1945). Taming the lumberjack. *American Sociological Review*, 10(2): 217-225.
- Hovis, L. and Mouat, J. (1996). Miners, engineers and the transformation of work in the Western mining industry, 1880-1930. *Technology and Culture*, 37(3): 429-456.
- Judd, W. (1989). Deep water fishing. *New Zealand Geographic*, 4:76-99.
- Judd, W. (2001). Fishing in the 21st century: new owners, bigger boats, higher quality. *New Zealand Geographic*, 50: 118-119.
- Kusel, J.; Kocher, S.; London, J.; Buttolph, L., and Schuster, E. (2000). Effects of displacement and outsourcing on woods workers and their families. *Society and Natural Resources*, 13 (2): 115-134.
- Levine, H. B. (1985). Entrepreneurs and social change: implications from a New Zealand case study. *Human Organization*, 44 (4): 293-300.
- Lummis, T. (1977). The occupational community of East Anglian fishermen: an historical dimension through oral evidence. *British Journal of Sociology*, 28(1): 51-74.
- Maritz, F.; Bathurst, M. and Judd, W. 2001. Deep harvest. *New Zealand Geographic*, 50: 102-117.
- McClintock, W. (1998). A case study of Kawerau. Working Paper 6, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 601), Taylor Baines and Associates, Christchurch.
- McClintock, W. (2000A). A case study of Opunake. Working Paper 23, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- McClintock, W. (2000B). A case study of Riverton. Working Paper 24, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation & Change (TBA 801), Taylor Baines & Associates, Christchurch.
- McClintock, W.; Fitzgerald, G. and Taylor, N. (1998). A case study of Runanga. Working Paper 10, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 601), Taylor Baines and Associates, Christchurch.
- McClintock, W. and Taylor, N. (1999). Forestry communities in transition. *New Zealand Journal of Forestry*, 44(1): 29-34.
- McCrostie Little, H. M. (2000). Study of regional benefits of water enhancement in Canterbury: social impact of irrigation. Prepared for Taylor Baines & Associates, Ruris Consultancy Limited, Cust.
- McDermott, P. (1998). Tourism. In Pickford, M. and Bollard, A. (eds.). *The Structure and Dynamics of New Zealand Industries*, The Dunmore Press Ltd, Palmerston North. pp. 323-356.
- Mederer, H. J. and Barker, C. (2000). Reconstructing identities, families, communities and futures in the wake of fisheries regulation. In Hanna, S. and Hall-Arber, M. (eds.), *Change and Resilience in Fishing*, Oregon Sea Grant, Corvallis, Oregon. pp. 69-81.
- Meridian Energy (2001). *Second Manapouri Tailrace Tunnel*.

- Miller, M. L. and Johnson, J. C. (1981). Hard work and competition in the Bristol Bay salmon fishery. *Human Organization*, 40(2): 131-139.
- Reich, R. B. (1992). *The Work of Nations: Preparing Ourselves for 21st-Century Capitalism*. Vintage Books, New York.
- Salaman, G. (1974). *Community and Occupation*. Cambridge University Press, Cambridge.
- Storey, K. and Shrimpton, M. (1991). Long distance commuting: mining and hydrocarbon industry management issues. Paper presented at the Australian Mines and Metals Association Conference, Glenelg, South Australia, June 19-20.
- Taylor, C. N. and Bettsworth, C. M. (1983). Social characteristics of New Zealand hydrotowns: a case study. *Information Paper No.1*, Centre for Resource Management, Lincoln College and University of Canterbury, Christchurch.
- Taylor N.; Houghton R. and McClintock, W. (1998). A case study of Otautau. Working Paper 15, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 601), Taylor Baines and Associates, Christchurch.
- Taylor, N.; Fitzgerald, G. and McClintock, W. (2000). GRD Macraes Limited - Globe Progress Mine Reefton: updated assessment of social-economic effects. Taylor Baines and Associates, Christchurch.
- Warren, J. (1999). Global tourism trends and their implications for NZ tourism. Working Paper 18, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- Warren, J.; Taylor, N. and McClintock, W. (2000). A case study of Te Anau. Working Paper 27, prepared for the Foundation for Research, Science and Technology Project - Resource Community Formation and Change (TBA 801), Taylor Baines and Associates, Christchurch.
- Zuboff, S. (1988). *In the Age of the Smart Machine*. Basic Books, New York.