“Histórias do Trabalho no Sul Global”
“Historias del Trabajo en el Sur Global”
“Labour Histories from the Global South”
I Seminário Internacional de História do Trabalho
V Jornada Nacional de História do Trabalho
Universidade Federal de Santa Catarina, Florianópolis
25-28 de Outubro de 2010

Environmental and Social Impacts of Aluminum Production at Two Entangled Towns in the Global Aluminium Network. The Mining Town of Porto Trombetás, Brazil, and the Industrial Town of Årdal, Norway

Frank Meyer[1]

Since 1974 and until the present, the two small towns of Porto Trombetás, Brazil, and Årdal, Norway, have been linked together in a transnational commodity chain. For more than 35 years, mine workers in Amazonian Brazil have dug bauxite from the Trombetás deposits, loaded the ore on bulk carriers, which then transported it across the Atlantic Ocean to either North-America or Europe. There it was refined into Alumina at various facilities before being transported to Norway and into the Sogne Fjord, where it was unloaded and melted into aluminium by workers in Årdal, Norway.

[1] Frank Meyer, Professor of Multicultural Studies, Faculty of Social Science, Oslo University College, postbox 4, St. Olavs plass. N-0130 Oslo, Norway, frank.meyer@sam.hio.no. I am deeply indebted to Professor Michael Seltzer who helped me to enhance the quality of this chapter.

The reason for transporting the ore over a distance of more than 4,500 nautical miles lies in the geological fact that the world's richest bauxite deposits found in flat areas in the humid tropics, while it is cheapest to generate the enormous quantities of hydroelectric power needed to produce aluminium by building dams in steep valleys. To locate an aluminium smelter in the world's bauxite producing areas makes limited economic sense.[2]

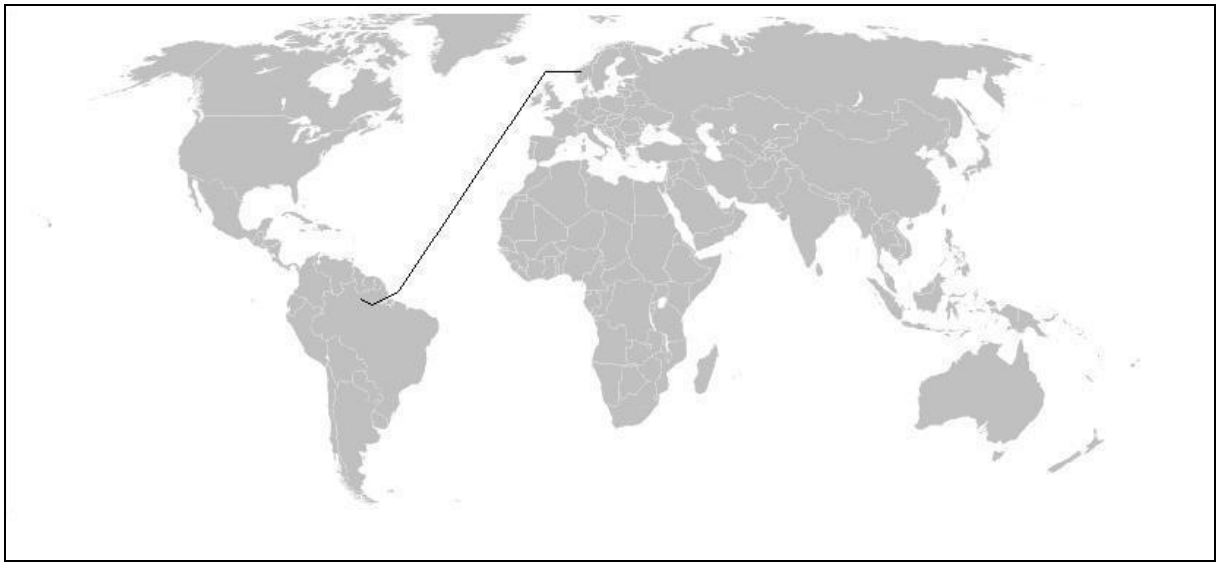

Figure 1: The transnational and transatlantic commodity chain Porto Trombetás – Årdal. Source: http://commons.wikimedia.org/wiki/File:BlankMap-World6,_compact.svg

Both the company towns of Porto Trombetás and Årdal are only two out of many such towns found throughout the world, connected in a web of commodity chains. In the aluminium industry, this web was developed and administered by only a handful of multinational trusts during the past. The key elements of the chain, which has existed between Porto Trombetás and Årdal since 1974, have been Canadian, Norwegian and Brazilian capital linking Brazilian bauxite with Norwegian hydroelectric power. The main constant in the web has been the flow of bauxite from the deposits to aluminium plants.

[2] Stephen G. Bunker & Paul S. Ciccantell, *Globalization and the Race for Resources*. Baltimore: The Johns Hopkins University Press, 2005: 66.

The communities of both Porto Trombetás and Årdal are small, counting about 6,000 inhabitants each at present. Despite their small populations, both the mining community and the factory town possess well-defined global dimensions. In 2003, the mine of Trombetás had a production capacity of 16.3 million tons which is larger than any other bauxite mine in the world. Current production of the mine accounts for nearly 10% of the world's consumption of bauxite,[3] and holds reserves of approximately 0.8 to 1.5 billion tons.[4]

In 2001, Brazil was the third largest producer of bauxite in the world with 13.2 million tons/year. The mine at Porto Trombetás contributed approximately 81 percent of this total (about 10.7 million tons a year), and was ranked to be the third biggest mine in the World.[5] In 2003, after an expansion of the mine, its production capacity had increased to 16.3 million tons/year, which is larger than any other bauxite mine in the world. Current production of the mines of Trombetás accounts for nearly 10% of the world's consumption of bauxite. In addition, the mineral deposits are of particularly good quality, in fact, they are the best in the world.[6]

On the other side of the Atlantic, the aluminium plant at Årdal was ranked as the largest aluminium plant in Western Europe in 1964. The available power was 2.3 billion kWh, and the plant had facilities to produce 110.000 tons of aluminium annually.

---

[3] http://www.hydro.com/no/Pressesenter/Nyheter/Arkiv/2002/Mai/15888. Ozair Pereira de Siqueira, *Mineracão Rio do Norte. Tells its Story from the Beginning*, Porto Trombetás: MRN, 2002 (http://issuu.com/studiorb/docs/mrn): 13.

[4] William F. Flanagan & Gail Whiteman, Ethic Codes and MNCs as Minority Shareholders: The Case of a Bauxite Mine in Brazil, in: Wesley Cragg (ed.), *Ethic Codes, Corporations, and the Challenge of Globalization*, Cheltenham, UK/Northampton MA, USA: Edward Elgar, 2005: 216. Siqueira 2002: 24, 67.

[5] Cornelia Girndt, Bergbau in Brasilien. Die Bauxitmine von Porto Trombetas, *Quetzal. Politik und Kultur in Lateinamerika*, June 2008: 1.

[6] http://www.hydro.com/no/Pressesenter/Nyheter/Arkiv/2002/Mai/15888.

The nature of production, the characteristics of local communities and the socio-political context in both countries have also contributed to creating interesting patterns of similarities and differences of the company town development. The primary aim of this chapter is to sketch the history of these globally interconnected two company towns, thereby comparing empirically modes of production and reproduction at two nodes of a transnational commodity chain. According to Marcel van der Linden this kind of empirical exploration has only rarely been attempted in research on transnational labour history.[7] The main focus of the analysis presented here will be on the living and working conditions of the local populations and the social and ecological impacts of being incorporated into this commodity chain.

One striking similarity of the two towns is that both at times were and still are part and parcel of the realm of the very same multinational aluminium trusts. The composition of the shareholder conglomerate of the mine and the aluminium plant changed over time, and it can be difficult to see the connection between the mine in Brazil and the aluminium plant in Norway. However there were three different business ties. First, in the period 1974-1979 the Årdal aluminium plant (ÅSV) held 5% of the shares of the mine. Second, and partly overlapping, from 1966 to 1986, the Canadian multinational Alcan held shares in both the mine (12-19%) and the aluminium plant (50% until 1969 and 25% in 1969-1986. Third, after 1974 Norsk Hydro AS held 5% of the shares of the mine either directly or indirectly, through a Brazilian daughter business, and bought the Årdal aluminium plant in 1986.[8]

A second similarity is that, even though the aluminium plant in Årdal developed earlier, in a pre-existing town and for most of the time in the political context of democracy, both company towns made their biggest leap forward towards industrialisation in times of dictatorship. On the on hand the mine and company town of Porto Trombetás was completely established in a few years in the 1970s, when Brazil was ruled by a military dictatorship. On the other hand the development of Årdal began much earlier, but no aluminium plant was

[7] Marcel van der Linden, *Globalizing Labour Historiography: The IISH Approach*, Amsterdam: International Institute of Social History, Amsterdam 2002, http://www.iisg.nl/publications/globlab.pdf, 9-10. Frank Meyer, Expanding the frontiers of labor history: Kjartan Fløgstad's synthesis of local, global, and environmental history, in: *International Journal of Social History*, 54 (2009): 95–109.
[8] Siqueirra 2002: 38-39, 181.
http://www.hydro.com/no/Pressesenter/Nyheter/Arkiv/2002/Mai/15888

established before the German occupation of Norway, 1940. During the five years of German military rule in Norway the aluminium plant was erected. At both places the pace and intensity of industrial development were extraordinarily high at these times, and both natural and human resources were exploited ruthlessly.

In times of democracy, limits were put to the exploitation of workers and the severe pollution of the environment, both in Brazil (since 1985) and in Norway (since 1945). This is so far most obvious in the case of Norway where (for most of the time) social democratic governments forced the aluminium conglomerates to restrict to certain degrees their exploitative and polluting policies. Thus in the eyes of the Norwegian government, the aluminium plant and the town of Årdal were also framed as paramount symbols of the taming and steering of uncontrolled capitalism by a social-democratic nation. Policy makers and politicians looked to Årdal as a prime example of the Norwegian welfare state: one combining heavy industry with social democratic values.[9]

In spite of such similarities there are substantial differences as well. The most important difference is that only Porto Trombetás can be regarded as a typical *company town*, while Årdal rather and more appropriately should be called an industrial town. In Årdal, the aluminum company could rely on a preexisting community as a labor resource. The aluminium plant's role as a provider of housing for its workers - one of the defining characteristics of company towns - was limited to periods of increased economic activity that spur the arrival of new laborers to the area. The presence of the aluminum industry became dominant, but never exclusive. By contrast, as discussed earlier, the mining company built the company town in Porto Trombetás and provided housing for its workers and so to speak any other services. This distinction between company town and industrial town is significant, because it defines the degree of political autonomy for the local populations. The relative autonomy of the town of Årdal vis-à-vis the aluminum company was probably an important

[9] Rolv Petter Amdam, Dag Gjestland & Andreas Hompland (eds.), *Årdal. Verket og bygda 1947-1997*, Oslo: Det norske samlaget 1997. Even Lange, *Samling om felles mål, 1935-1970*, Oslo: Aschehoug, 1998.

contributing factor to the possibility its inhabitants had on setting limits to the industry's impact on the local environment.[10]

Before incorporation

Before the time of incorporation, conditions differed widely at Porto Trombetás and Årdal.[11] The area where the company town of Porto Trombetás was established was far less populated and far more isolated from the outside world than the area at Årdal. On the banks of the Trombetás River, communities based on sustainable fishing, gathering and hunting, lacking written language and market economies lived on a technological level giving them little command of the natural environment. The tribal communities along the river were only loosely connected to people outside the locality.

In the Årdal area, two twin villages (the harbour community at the Fjord, Årdalstangen, and the administrative centre of Upper Årdal, a few kilometres into the mountains), based on herding, fishing and farming, already developed long time before industry arrived. At the time of incorporation the municipality of Årdal resembled a well-established modern community inside the political framework of democracy.

Porto Trombetás

The area that later became the site of the company town of Porto Trombetás was originally called Sitio Conceição.[12] It was situated in the Brazilian State of Pará, 880 kilometres west of Belém and 400 kilometres from Manaus at the Trombetás River, one of the main tributaries of the Amazon River. The Rio Trombetás, as it is called in Portuguese, has its source in the Guyana Mountains, and flows into the Amazon River just north of the city of Óbidos, in the

[10] Marcelo J. Borges and Susana B. Torres, Introduction, in: Marcelo J. Borges and Susana B. Torres (eds.), *Company towns: Historical Studies in Global Perspective*. New York: Palgrave (forthcoming).
[11] As for the structure of the following see: Thomas D. Hall, Incorporation in the World-System: Toward a Critique, *American Sociological Review*, 51 (1986), 390-402.
[12] This is of course a Portugese name. We do not know what earlier populations called the place.

Brazilian state of Pará. The Trombetás River has very strong currents, furious rapids and waterfalls in its upper course; but approximately 200 kilometers from its mouth and northwards, the river is navigable. Through this part of the river and further on in the Amazon River, the banks of the Trombetás River became connected to the globe.[13]

Although the commissioned history of the company town at times underlines that "previously nothing ever existed but the jungle" where "an urban and operating infrastructure would be implemented to permit bauxite production"[14], this is not true. Before the establishment of the company town a mixed population inhabited the area along the Trombetás River. This consisted of native South American Indians and the descendents of runaway or liberated Afro-American slaves from Guyana, Surinam and Venezuela, the Quilombo communities. The different population groups coexisted peacefully at times, and at other times they were engaged in conflicts with one another.

Archeological evidence indicates that there were settlements of the Conduri indigenous communities from 205 A.C to the post-Colombian period in the region between the Low Trombetás and Faro Lake. After the Portuguese conquest of this area, these communities were driven deeper into the heartland and lived on the banks of the Trombetás River. Between the 16th and 17th centuries the river area was called Cahu, and inhabited by the Kaxuyana (Purehno) indigenous people. These groups, like other South American natives, were nearly wiped out by the spread of diseases that arrived with the newcomers to the area. In addition, violent conflicts between different groups of these indigenous peoples led to a shrinking size of population. At the end of the 19th century, the survivors banded together in an attempt to live on.[15]

By 1960, only one of the different groups of the Kaxuyana community lived within a 100-kilometer radius of the area where the mine was established. This community was a tiny one whose population had declined from 300-500 in the 1920s to around 60 in the 1960s, thus there were not enough marital partners for its members. In order to prevent complete extinction, the survivors decided to move together with another native tribe, the so-called

[13] Siqueira 2002: 29-31. http://www.mrn.com.br/english/quem_somos/portotrombetas.html
[14] Siqueira 2002: 29, 19.
[15] Siqueira 2002: 32.

Tirios tribe. In February 1968, Brazilian military planes flew the survivors to an area 500 kilometers further north in Brazil, where the Tirios lived in an indigenous territory close to the border of Surinam.[16]

The second ethnic group that lived on the banks of the Trombetás River area consisted of a few hundred families living in Quilombo communities. As already mentioned these families were the descendents of runaway slaves, thus representing an earlier connection to the international world. The Quilombo families began to settle alongside the riverbanks in the 1820s, and since expeditions were sent out in order to capture and repatriate the runaway slaves, they avoided contact with the outside world. Contact with indigenous peoples living in the area occurred and it is likely that the runaway slaves spread contagious diseases that contributed to the demographic decline of the Kaxuyana.

In the course of time the Quilombo communities involved to a certain degree in a barter economy with the outside world, exchanging tobacco and forest fruits against for coffee, sugar, tools and cloth.[17]

Similarly to the Indian tribal communities, the Quilombo communities were primarily based on fishing, hunting, and gathering of Brazilian nuts and bananas. To a minor degree, the communities also cultivated sugar, coffee beans, manioc, and certain vegetables. At the risk of creating an idyll of the lives of these families, there is reason to believe that their indigenous economy was ecologically sustainable. The tribal communities produced so to speak solely for their own consumption, and families moved regularly when lack of nourishment made this necessary.[18]

---

[16] Dan Børge Akerø, Per Erik Borge, Helge Hveem, Dag Poleszynski, *Norge i Brasil. Militærdiktatur, folkemord og norsk aluminium*, Oslo: Aschehoug, 1979: 21-26. http:/www.pib.socioambiental.org/en/povo/kaxuyana.
[17] Slater 2002: 161.
[18] Lucia M.M. Andrade, *The Quilombos of the Trombetas River Basin. Brief History*, São Paulo: Comissão Pro-Indio, 1993. Candace Slater, *Entangled Edens. Visions of the Amazon*, Berkeley: University of California Press, 2002: 161. Stephen G. Bunker, *Underdeveloping the Amazone. Extraction, Unequal Exchange, and the failure of the Modern State*, Urbana and Chicago: University of Illinois Press, 1985. At times some of the riverine indigenous people worked at a local Brazilian nut farm near to Oriximina and Obidos, at the mouth of the Trombetás River.

Årdal

Årdal is situated on the west coast of Southern Norway, about 300 km northwest of Oslo, and northeast of Bergen at the innermost part of Sognefjord, the world's longest and deepest fjord. Traditionally, the municipality of Årdal consisted of two centres. The first was Årdalstangen, which is situated at the shore of the Fjord and which is the location of the harbour; and Upper Årdal (Øvre Årdal), where the melting plant was raised and extended beginning in the 1940s.

Throughout its history, those living in this area lived as gatherers, shepherds, fishermen, and farmers. However in the early 18th century, the *Gottes Gabe* [*God's Gift*] copper mine was established in the town. The mine was not a success and was closed down soon after it was established, and was again closed down after it was re-established in the middle of the 18th century. The only thing that increased was its deficit, according to its historian Finn Erhard Johannessen. Even so, Årdal was first a part of a transnational network, with financial and personnel connections to Copenhagen, where the King ran his businesses, Amsterdam, which was at that time the centre for the copper trade in Europe, and Germany, where skilled workers were recruited.[19]

In the 150 years that followed until 1900, Årdal became disconnected from international networks, while the local community of farmers and fishermen developed. In contrast to the communities on the banks of the Trombetás River, the Årdal community was connected for several centuries to a regional economy based on trade with fish and agricultural products. Since 1814, governmental officials, townspeople and farmers of the community had the right to vote for the national elections, and since 1838 the community enjoyed self-government rights. This democratic framework was extended and modified, but (apart from the years of the German occupation 1940-45) never abandoned.

Incorporation: Social and environmental impacts

The process of incorporation involved at both places the state, and national and international

[19] Finn Erhard Johannessen, Mykje skrik og lite gull, in: Amdam et al. 1997: 24-37.

corporations, in addition to the local people and migrant workers. As already mentioned, the erection of the plant in Årdal began much earlier than the development of the mine in Porto Trombetás. In the initial phases of the industrial enterprise Norway was a democracy (1900-40), while Brazil was a military dictatorship (1974-85). However the big leap of industrialisation in Årdal also occurred in a time of dictatorship, namely the German occupation of Norway 1940-45.

Porto Trombetás and the rapid development of the Amazon

The company town of Porto Trombetás emerged rapidly through three stages. In the first stage (1961-1967) the Canadian aluminium multinational Alcan equipped a small group of geologists and mining engineers and 35 inhabitants of the region – so called *Caboclos* – in order to explore the jungle in the Trombetás region for bauxite occurrences. At that time Alcan were interested in finding a replacement for the raw products that were obtained from mines in Jamaica and Guinea (Africa). Also the newly independent ex-British colony of Guyana threatened ALCAN's longstanding control of bauxite mines there and acted as a stimulus to expanding bauxite production in the Amazon.[20]

The group established their headquarters on the riverboat «Gaivota» that anchored at the small river community of Terra Santa in the Amazon River. Accessing the area by boat and by feet, the men established base camps and more primitive and temporary camps. In 1965 a camp was established on the Saracá Plateau, where the mine was to be developed. The men worked in the field for 90 days a time, suffering from loneliness, a dump and forsaking climate, insects and wild animals, such as for instance venomous snakes.[21]

In 1967 laboratory analysis confirmed that large deposits of bauxite existed on the Saracá Plateau. At that time, foreign mining companies were not allowed to have tracts that were larger than 500 hectares. Due to the pressure applied by several multinational companies, including US Steel, this limitation was removed by changes in Brazilian law in 1968 and

[20] Siqueira 2002: 19. Åkerø et al. 1979: 158.
[21] Siqueira 2002: 18-25.

1969. Thereafter exceptions were to be permitted for companies operating in so-called difficult territories, for example, the Amazon region. By the end of 1969, Alcan purchased or received priority-prospecting licences for 63,000 hectares of crown lands.[22] In 1970, the Terra Santa headquarter was moved to Sitio Conceição, and the construction of a port and a small airport began. A work force of 550 men, and machines were flown inn, in order to clear forest and start the construction of the camp, railway, port, and site installations. This work was accomplished by May 1972.[23]

A third phase of reorientation began in May 1972, when Alcan discontinued the project temporarily due to falling aluminium prices. Negotiations to resume the project under a new shape began, and on June 11, 1974, two Brazilian and seven foreign companies agreed on developing the Trombetás bauxite deposit as a joint venture, with 51% participation of domestic shareholders. The company was named *Mineracão Rio do Norte* (MRN). Simultaneously, the development of the Trombetás mine became part of the governmental program «Polamazonia». The programme aimed at developing the Amazon by strengthening of urban nucleons, development of river navigation, support of bauxite exploration and other activities. In October 1974 the governmental authority to develop the Amazon, SUDAM, approved the mining project for ten years of Income Tax exemption. In addition the Brazilian government guaranteed financing funds.[24]

In 1977, a fourth phase begun, characterised by project implementation. It ended in 1979, when the first load of bauxite was shipped from the port of Trombetás. In this period even larger areas of forest were cleared, and - among others - industrial installations for crushing, beneficiation, loading, water and oil reservoirs, a 30 kilometre railroad line between the mine and the port, a 30-meter wide and 1.250 long runway for small airplanes, a bauxite terminal, and a deep water harbour, with a wharf and loading cranes, and a power station were built.[25]

---

[22] Siqueira 2002: 29. Cf. Åkerø et al. 1979: 28

[23] Siqueira 2002: 35. Lúcio Flávio Pinto, *Amazônia . O século perdido. (A batalha do alumínio e outras derrotas da* globalizaçao.) Belem: Edição Jornal Pessoal. 1997: 89.

[24] Alexander López, *Environmental Change, Social Conflicts and Security in the Brazilian Amazon: Exploring the links*, Oslo: Department of Political Science, University of Oslo, 2000. University Bunker 1985. Bunker & Ciccantell 2005: 33-77. Åkerø et al.1979: 160. Siqueira 2002: 25, 40. Slater 2002: 162.

[25] Siqueira 2002: 69.

Since 1979, the mine has expanded and increased the annual production of bauxite from 3.35 million tons to a present day total of 11 million tons.

Also the building of housing facilities went through different stages. Throughout the first years, the development of the technical installations was highly prioritised. Thus in the early construction phase, only the geologist's camp existed. Hundreds of workers had to commute two hours daily by boat to the construction site from Cachoeira Porteira, a small town that had developed while building the Northern Amazonian highway. In addition, there was continuous ferry communication to Santarém. According to MRN's commissioned history, each two days a boat left Santarém (a 20 hours boat trip from Porto Trombetás) carrying 300 persons. On the construction peak the average number of boats and barges to carry both passengers and load reached 14 and 21 daily.[26]

By and by twenty-four PVC and wood pavilions were erected close to the industrial area in order to house more than 6.000 workers. Commuting diminished at the same pace as barracks were constructed. At this time, houses were a scarce item and regularly became a source of dispute. Six standardized types of houses were available, in seize and comfort reflecting the social stratification of the company town. For the top segment of senior engineers, 11 houses with 278 m^2 were available; for junior engineers and personnel with university grades and equivalents 196 houses with 197 m^2 were provided; technicians were lodged in 80 houses with 82 m^2, and skilled workers in 120 houses with 70 $m^{2.}$ In addition there were 400 prefabricated houses and pavilions for unskilled workers. Only symbolic rentals were charged.[27] However, a group of 70 workers who were homeless in Porto Trombetás lived in the satellite town of Caranã, a site of "formless crates" made out of "planks, tin and cardboard"[28] where unemployed people settled hoping for a better life in close to the emerging industrial nucleus.[29]

[26] Siqueira 2002: 72. Pinto 1997.
[27] Siqueira 2002: 96.
[28] Åkerø et al. 1979: 42. In addition to the Quilombos, migrants mainly from the northeast of the country, have settled in the satellite town. Flanagan & Whiteman 2005: 218. Steen 1996.
[29] Pinto 1997.

In the time of project implementation, working and living conditions were miserable for most of the workers. Work lasted for 10-15 hours a day, seven days a week. Accordingly, no leisure time activities existed, and no alcohol was available for the lower groups of workers at the site. Numerous employees looked for pleasure in the impoverished satellite town. Despite the poverty, it turned out to be more busy, and have more spontaneous life than their residential village.[30] No trade unions were tolerated (apart from organisations of the technicians and engineers), workers were neglected contracts, they often experienced to be paid worse than agreed upon in advance, and to work under their level of qualification. The barracks where 4-5000 workers slept were fenced off by barbed wire. A private company guarded the camp and a camp prison existed. On average, 6-8 workers had to share one room. Food quality was lousy, and queues long. Spirits were low, as turnover was high. In autumn 1978 a riot broke out. A crowd of 2000 workers started throwing stones on guards who had denied a sick worker to jump the food queue, and barracks were set on fire. The management called for armed guards, and the riot was put down. 30 out of the 2000 rioters were sent to jail.[31]

The halting industrial development in Årdal

As already mentioned, the process of incorporation into the global economy and global commodity chains began earlier and, for most of the time, at a considerably slower pace in Årdal, compared to Porto Trombetás. At times the process haltered and even stopped; at other times – particular during the years of the German occupation – the pace of industrial development accelerated and became comparable to the pace of the development in Porto Trombetás. Roughly the process of industrial development in Årdal can be divided into five sequences.

First, there was the discontinued mining enterprise already mentioned above. Second, there was a forty years period dedicated to the development of hydro-electricity. In Årdal, the development of hydro-electricity began when the Christiania lawyers Jens P. Heyerdahl and Ch. C. Platou applied on behalf of a German-Norwegian joint venture for the license to build the watercourse in 1907, arguing that the project would provide “the tiny and poor

[30] Pinto 1997.
[31] Åkerø et al. 1979: 38-50. Girndt 2008.

municipality of Årdal" with benefits in the form of tax income, better communication lines and markets for farm products.[32] In Årdal, the local residents supported the idea of building the plant. When the two lawyers applied for the license to build the hydro-electric plant, the County Council of Årdal supported the application, as well as 323 residents who attached their names to a «Statement from the Inhabitants of Årdal» in support of the application.[33] These residents were aware democracy and the rule of law in Norway would provide them with some say concerning the developments in their area.

The crucial factor in this respect was the ownership of the water resources that produced the enormous quantities of hydroelectric energy for the smelting process. In contrast to Trombetás, the law governing the distribution of concessions in Norway guaranteed from the very beginning of the industrial development that the natural resources at Årdal were only on loan – not for sale - to international concerns. A complete sale of these resources was never under consideration. There is consensus among Norwegian historians that the laws regulating the ownership of hydropower («Konsesjonslovene») assured that Norway maintained control over production, and that this set of laws has played a vital role in protecting Norwegian economy from dependency of foreign agents.[34]

The Norwegian Parliament approved the conditions that were agreed upon for the license for building the hydroelectric plant on the 20th of August 1908, and by Royal resolution, a month later, the stock company Tyinfald was awarded the license. Work began in February 1910 to build the plant, and 200 labourers worked to create the roads and harbours that would be needed. The work stopped temporarily in the autumn of 1911, when the German owners abandoned the project because of conflicts regarding the production technology that would be utilized at the plant. The German shareholders sold their shares to the Norwegian owned fertilizer company Hydro.[35]

---

[32] Rinde 1997: 63. Christiania was the name of the Norwegian capitol until 1923, when it changed its name to Oslo.
[33] Rinde 1997: 63.
[34] St. meld. Nr. 67 (1974-75), Norsk industris utvikling i fremtid. Industridepartementet, Oslo, 4. april 1975, 106.
[35] Rinde 1997: 64.

Hydro did not want to complete the plant as it had been planned and time after time found reasons for delaying its completion. Before World War II plans were frequently changing about what was to be produced at Årdal. The number of employees also varied. During the summer of 1914, the entire work force was fired without notice because of the difficulties in financing the plant. However, Hydro had to keep a minimum number employed due to the conditions set by the license. During the period 1921–1932, between 80 and 145 men were more or less employed.[36] In contrast to Porto Trombetás, most of the construction workers, particularly after 1920, were recruited locally. Workers in the plant grew up on farms and in peasant cottages, and politically allied themselves with cotters and farm workers. In the early years, Swedish citizens worked at the plant and trained local residents recruited by the plant how to do the work. However the foreign workers were the first to be fired when Hydro had to cut back.

The third, and most accelerated sequence of industrialisation occurred after the German occupation of Norway in 1940. At this time Germany was in a desperate need of aluminium, particularly for the production of airplanes. According to German plans, bauxite should be provided from (at that time part of the Soviet Union) Ukraine and production should six-fold until 1944. Due to occupation conditions, the Norwegian company Hydro had to sell the enterprise to a German owned company called Nordag in spring 1941. Under command of the German occupational forces, the street between the two community centres was accomplished, and the erection of the power station, as well as parts of the oxide hall and the melting hall were effectuated.

In this period the town of Årdal became overpopulated. In 1920 there were about 1,600 inhabitants. In 1942, when the peak of activity was reached, almost 5,000 workers lived in Årdal. Most of these were Norwegians, followed by a few Germans and Danish. Workers lived in barracks, and waste was floating along the streets. However at any given time, 20% out of the 5,000 workers were sick, on holiday or on leave of other reasons. Similar to Porto Trombetás, nutrition was insufficient and bad, houses were cold, and there were food queues. In 1942, the Germans needed all available resources at the Eastern front. The work force was demobilised and the construction of the technical installations in Årdal discontinued. In June

[36] Rinde 1997: 67 ff.

1943 increased work started, this time with substantial usage of forced labour. In 1943 1,200 Russian Prisoners of War were forced to work at the site, in addition to about 150 Frenchmen, and 1,200 Norwegians (who were not Prisoners of War, but volunteers). There was a German guard called *Werkschutz* (*Work protection*) that should keep the prisoners from committing acts of withdrawal and resistance.[37] When the Germans capitulated, the hydro-electrical power station so to speak was completed and three out of the five aggregates were assembled. At the smelting plant, all of the ovens in one hall had been constructed and the second hall was fully constructed.[38]

After World War II, the production of hydroelectric energy became the basis for the efforts at industrialization in Årdal. However the decision to establish industry requiring enormous quantities of electrical energy in the town was not uncontested. A national policy was needed to sufficiently subsidize the price of electricity, so that it would be profitable to run a smelting plant. (Alternatively unsubsidised electrical power could have been used to build up more widespread industrial development on the Western coast of Norway, and some of the power could be channelled for use in Eastern Norway.) It was the Norwegian Labour Party's ideological commitment to major industrial development projects especially those aimed at producing for international markets that ultimately decided the matter.[39]

Since Årdal began as a community of farmers and fishers, which then gradually became a company town, there was a clear distinction between the plant and the local community for most of the time. The plant itself was never confused with the town. Work places and residences were separated and a significant part of the local community worked in occupations that were not related to the industrial plant. There was social intercourse between workers at the plant and the other residents of the community. In Årdal, industrial activity of the aluminium company was never great enough to defend the establishment of its own institutions.

[37] Rinde 1997: 72-77.
[38] Rinde 1997: 77 ff.
[39] Lange 1998: 156-158, 169-170. Trond Bergh, *Storhetstid (1945-1965)*. Oslo: Tiden, 1987: 165-166, 197.

In 1950, 1,400 workers were employed at the plant, out of which only 300 had their origin in Årdal. Regional migration to Årdal increased the number of inhabitants dramatically by 1,600 in the four years period of 1946 to 1950, and until the middle of the 1970s there was a constant (but much slower) increase in the number of inhabitants. In the period after World War II the company developed areas and built houses for workers, particularly in Årdalstangen and Farnes. The plant covered two thirds of the costs of constructing homes for its workers. Until 1959 the company had constructed more than 300 houses or flats, which is equivalent to 30% of all accommodations in Årdal.[40]

Another result of the slow-paced transformation of a pre-existing community into a company town was that the proportion of men and women living in Årdal was well balanced. This balance may have worked to help make the changes in Årdal more acceptable for the established farming community. In Porto Trombetás, industrialization led to a considerable higher proportion of men than women. Since only male, migrant workers were hired at the industrial enclave, a men's world on the river was the result. The number of migrant workers who moved to Årdal to find work was considerably lower than in Porto Trombetás.[41] The fact that the residents of Årdal and its surroundings dominated the plant may contribute to explain that the work force was much more concerned about the environmental impacts of production than the (migrant) work force at Porto Trombetás.[42]

Environmental impacts of the incorporation of Porto Trombetás

The environmental costs of industrial production were considerable at Porto Trombetás as they were in Årdal, and the problems created by mining and transport, are far from being solved at the present day.[43]

[40] Oddbjørn Bukve, Årdal – Verket og bygda, in: Amdal et al. 1997: 166-170 (164-183).
[41] Rinde 1997: 68 f.
[42] Rinde 1997: 68 f.
[43] Flanagan & Whiteman 2005. Pinto 1997: 89. See also Slater 2002: 162-163, 270. Cf. The Norwegian journalist Roar Nerdal's articles on Hydro's investments into Alunorte and environmental problems for local fisheries in Barcarena, *Dagens Næringsliv*, 24.4., 25.4., 30.4.2008.

In particular there were three main types of environmental consequences resulting from mining activity in the Trombetás area. Firstly, large areas of former rain forest were cleared. Observers wrote about "red soil as far as the eye can see"[44] – in the middle of the Amazon. "Even if topsoil is restored after mining, the soil loses its ability to retain water making it unfit for annual crops."[45]

Secondly, the ore was washed with fresh water, and the waste materials from this process were then pumped into a local fresh water reservoir, the Lake Batata. Since the washing did not imply any use of toxic substances, the main problem was a considerable sedimentation and extreme degradation of the lake. During the first five years of production, 10 million tonnes of mud were pumped into the lake that reduced the lake's surface by 15% and led to the disappearance and dead of local vegetation and animals.[46]

Bauxite waste (residues from washing and bauxite powder in the air) also polluted other fresh water reservoirs such as the Agua Fria area as well as creeks and even the Trombetás River. In addition, fresh water wells built by the mine failed to provide adequate water supplies, leaving the Quilombo communities with the task of collecting drinking and washing water from remote sources.

Thirdly, ships came in carrying salt water for ballast, which was then discharged, into the fresh water river prior to loading bauxite. This process impacted heavily upon the local fresh water ecology and fishing activities in the form of invasive plant and animal species.

In addition there were some minor consequences of the mining activity, such as poor sewer treatment system with discharge going directly into the river; sonorous pollution which drives away animals and disrupts community life and, together with other forms of air and water pollution, this lead to a scarcity of the wild animals and fish; and, particularly in the summertime, indiscriminate fishing by mine employees often using pressure guns to catch the large fish.

---

[44] http://www.hydro.com/no/Pressesenter/Nyheter/Arkiv/2002/Mai/15888/ . Cf. Siqueira 2002:153-155.
[45] Switkes 2005: 5.
[46] Pinto 1997: 89, 96-97. Switkes 2005: 5. Cf. Siqueira 2002: 155-159.

Environmental impacts of incorporation in Årdal

The production of aluminium also entailed substantial negative impacts on the natural environment in the community of Årdal. The quantity of pollution in the Årdal region was successively reduced owing to the existence of a pluralist democracy, enabling the local population to protest against undesired consequences of production, and the relative autonomy of the town inhabitants, that enabled the local population to appeal to - and be heard by - national authorities. However improvements materialized very slowly, due to the development and acceptance of methods, results and standards in work health, and political commitment to give priority to issues of natural and work environment at the expense of the plant's owners.

The Årdal plant released sulphur-dioxide and other hothouse gases. The greatest problem, however, was the pollution resulting from the release of great amounts of fluorides. These chemicals were contained in the smoke released from the smelting baths in the furnaces of the plant. The ovens were not covered and the smoke spread throughout the narrow valley between the high mountains, ranging up to more than 2,400 meters. Ordinarily, the prevailing weather conditions did not allow ventilation of the air masses. In 1949, after the plant was running for 18 months, the local residents began to register the effects of pollution. This was first evidenced in the knuckles and urine of the cattle in the area where it was found that the amount of fluorine was 50 times that which was usual in cattle. The farmers complained and the courts agreed. By 1952, the first settlements for legal suits claiming damages were made. The Årdal plant was required to pay farmers for damages amounting to 500,000 Norwegian Crowns, plus court costs.[47] In this instance, the rule of law worked in favour of the local residents and against capital.

Not only farmers, but also labourers and their families – and particularly housewives – keenly experienced the consequences of the polluting smoke. In the aluminium industry in general, factory-induced asthma is a well-known phenomenon and illness-affecting workers. The Norwegian Institute to Promote Health in Industry declared in 1960 that the pollution in the

[47] Byrkjeland 1997: 114. Lange 1998: 201.

factories was the cause of the asthma afflicting workers. In addition, the Institute claimed that the workers in those factories had a greater risk of getting cancer.[48]

Pollution increased in pace with the extension of the plant at Årdal. In the beginning of the 1960s, factories ÅII and ÅIII were put into action. In the winter of 1962/63, problems began due to the soot emitted from the ovens. Weather conditions forced the soot to settle in the housing located near the plant. "A cloud of soot has settled upon everything like a veil", the local newspaper wrote, and it continued: "A few days after a snowfall, all the snow turns black. The children who play outdoors are as dirty as the workers who return home after their shifts at the factory." The dusty soot also dirtied all clothes that hang outside to dry, in addition to windows and floors of the worker's houses. Local businesses increased their sales of soap and detergents that winter.[49]

Given the effects of soot on clothing and houses, it is not surprising that the Labour Party Women's Club of Upper Årdal was the first to address the problem of pollution. "The general opinion amongst housewives is that the menacing smoke and soot is getting worse and worse" is a statement found in a letter the club sent to the Årdal branch of the Labour Party. On several occasions the Labour Party complained about the problems of pollution, but it encountered resistance locally because the smoke and soot was generated by the workplace that put food on the table for most families in the community.[50]

By the end of the 1960s environmental movements and institutions began to fight the industrial pollution of the environment. A local ancient fir tree forest close to Årdal was badly damaged by pollution and it was placed in an area that was to be included into the National Park at Jotunheimen. Agricultural authorities were the driving force behind the development of institutions to protect the environment, for example, the Local Committee at Årdal to Investigate Smoke Damage was established in 1956[51], and the Central Council against Smoke Damage was established in 1962. These authorities contributed to the licensing requirements

[48] Byrkjeland 1997: 114-118.
[49] *Sogn Folkeblad*, 26 March 1963, quoted in Byrkjeland, 1997: 118.
[50] Byrkjeland 1997: 118-120.
[51] The executive committee was comprised of representatives from local farms, the district veterinarian, the agricultural consultant and the plant itself. Byrkjeland 1997: 116.

for all new companies that polluted the environment. In addition, these authorities also established the requirements for rebuilding existing factories so that pollution would be reduced. The Council's requirements forced the Årdal plant to reduce its pollution in the course of a 10-year period from 80 kilos of fluorides to 40 kilos of fluorides per hour. In 1976, The Norwegian State Authority for the Control of Pollution (SFT) was established, replacing the Council and assuming its functions. The Norwegian Law to Combat Pollution provided SFT with the power to fine polluting factories, and when ÅSV in the mid 1980s exceeded the amount of pollutants it was licensed to release by 25%, SFT threatened to fine the factory 8 million Norwegian Crowns for every kilo of fluorides that exceeded the limits of their license.[52]

Reacting to these measures, the plant's Board of Directors decided to close the factory ovens. In 1970, the eldest ovens were closed down and this led to a dramatic reduction in the emission of fluorides. Furthermore, a cleansing facility and process steering resulted in even lower emissions.[53] This was the only operable procedure because it was impossible to water down the poisonous materials.

When compared to developments at Porto Trombetás in Brazil, an important advantage that the people of Årdal had was the fact that Norway was a pluralist democracy. From the very beginning, the political opposition followed the pollution problems vigilantly. Pollution in Årdal became a political issue because it clearly pictured the conflict of interests between agriculture and industry, and also the conflict between private and state-owned businesses. "ÅSV was the industrial flagship of the Labour Party government, the very symbol of industrial policies after World War II [...]. The problem of pollution was the *Achilles heel* to which criticism could be directed. Matters were not made any better by the fact that the pollution problems in Årdal were much worse than at privately owned aluminium plants."[54]

[52] Byrkjeland 1997: 126.
[53] When the plant was bought by Hydro in 1986, the management wholeheartedly agreed to reduce the pollution. Moreover, Hydro wanted to exceed the minimum requirements of the SFT and directed attention to other forms of pollution, in addition to fluorides.
[54] Byrkjeland 1997: 121.

Transnational Capital and the Future of Årdal and Porto Trombetás

After Brazil's return to democracy in 1985, and as a result of increased collaboration of the Quilombo communities with national and international networks of environmental and minority rights organisations, as well as international monitoring of corporate environmental and social responsibility, working and living conditions of the local populations at both places have become more similar. In particular the standards of living in Porto Trombetás have been improved considerably.[55]

Present challenges to and future prospects for Porto Trombetás

In the period of project implementation, cleavages between management, technicians, and engineers on the one hand, and skilled and unskilled workers on the other hand created most of the tensions and conflicts. After the end of the project implementation period, the ethnic cleavage between white workers and the members of the Quilombo communities became more important.

When construction work ended in the end of the 1970s, most of these workers were dismissed. A certain group of qualified stuff was kept, and new employees recruited from other areas of Brazil.[56] The demand for houses fell accordingly.[57] Today the town still mainly consists of the bauxite terminal, the deepwater harbour, with wharves and loading cranes; and the residential village for the company's employees. The latter contained roughly 1,000 houses and barracks for more than 1,500 single employees. In 2002 over 6,200 inhabitants lived in Porto Trombetás.[58]

In the course of the 1980s, when all technical installations were in place, the mine also developed the social and cultural infrastructure of Porto Trombetás considerably. This was necessary in order to avoid high turnover among skilled workers.[59] The community's infrastructure was supplemented by a school that provided education up to secondary level and a capacity to handle more than a thousand pupils;[60] a hospital with 32 beds and full laboratory services; leisure clubs; a cinema and theatre called Memory House; a commercial centre; an airport and national/international communication system.[61]

---

[55] Francisco Vidal Luna & Herbert S. Klein, Brazil since 1980. Cambridge: Cambridge University Press, 2006. Robert N. Gwynne, Christóbal Kay (eds.), Latin America Transformed. Globalization and Modernity. 2. Edition. London: Edward Arnold/New York: Oxford University Press, 2004.
[56] Girndt 2008.
[57] Siqueira 2002: 72.
[58] http://www.mrn.com.br/english/quem_somos/portotrombetas.html
[59] Siqueira 2002.
[60] For the children of Quilombo communities, attendance at the village school is free, however school materials are very expensive and consequently many pupils from poor families have to drop out of school.
[61] http://www.mrn.com.br/english/quem_somos/portotrombetas.html. Siqeira 2002: 69.

First and foremost, the regular, white, skilled mine workers, and their families, have benefited from what the company calls the welfare community. Their standards of living are seemingly on a level comparable to that of workers in OECD countries.[62] In particular the white mine workers enjoy the absence of all the problems that exist in the majority of Brazilian cities, such as for instance criminality and drugs. Immediately after arrival workers often experience the company town as a paradise; but after a few months isolation, loneliness and the lack of a meaningful life after working hours become difficult to bear for many workers. There was little to do in leisure time. The surrounding jungle was the habitat of Anacondas, tarantulas and caimans, which also was the reason why inhabitants were not allowed to keep pets. Santarém was about 15 hours away by boat. A plane ticket to Belém costed about €400, equivalent to a month's earning. The mine paid for a six weeks vacation once a year. Many workers drank regularly on a daily basis, and even more in the weekends. Glass recycle bins in front of the bungalows were filled to the top with emptied *Cachaça*-bottles.[63]

A second group of workers in Porto Trombetás were the white, temporary and contract workers. For this group wages were significantly lower and living conditions much less pleasant. Turnover was high. The world's third biggest bauxite mine worked 360 days a year, 24 hours a day. At nighttime work continued in floodlight.

A third group of workers at the mine were the members of the Quilombo communties. Those who were employed at the mine represented the lowest class of workers. For the Quilombo workers only unskilled and badly paid work was available at the mine. Male workers from the Quilombo communities, who worked full-time at the mine site, received less than 60% of a white, skilled worker's wage. Very few female members of the Quilombo communities were accepted as mine workers. Those who were able to obtain employment worked as part-time workers or housekeepers and were paid lousily.[64]

In this respect, a form of ethnic inequality has developed, between a white, permanent and skilled mine worker elite on the one hand, and a proletariat of low-paid mine workers of

[62] Traveller's photo material from the village show well-dressed people in front of small bungalows, in small gardens with garden furniture and garden elves, in front of modern cars, pickups and children's bicycles. Other photographic material shows the village's public open-air swimming pool, and a harbour for small boats at the river. This material it available on Google's pictures search and on www.flickr.com. http://www.youtube.com/watch?v=FU4v9aB1ofE. Cf. Girndt 2008.

[63] Não temos aqui os problemas existentes na maioria das cidades, *Gazetta Mercantil* (São Paulo), 28 March 2002 (www.amazonia.org.br/noticias/print.cfm?id=8879). Girndt 2008: 2. Taken into account that bauxite mining destroys the rain forest, pollutes fresh water lakes and reservoirs, and the Rio Trombetás, it is ironic that the recyclable rubbish is sorted according to their source material/sorting of recyclable rubbish. All glass waste is collected pedantically and recycled. This might be regarded as one of the strategies chosen in order to meet the environmental demands of shareholders from developed countries such as Norway. The work environment at Porto Trombetás is certified and well-organised.

[64] Flanagan & Whiteman 2005: 228-230.

members of Quilombo communities on the other hand. According to Slater, this ethnic cleavage is accompanied by and reinforced by racist attitudes.[65]

In addition, also the Quilombo community was divided into two different groups, according to if the Quilombo members were employed at the mine, or if they were not. The households of the latter only gained income from products they were able to sell at the local market. Thus increased economic disparity, which in its turn caused social imbalance and conflict, was a result of the mining activity.

The incorporation of the Trombetás area by the bauxite industry had also a few additional social, economic and occupational impacts on the Quilombo community. Due to the introduction of a cash market for local products, the traditional subsistence economy was in decline while economic relations were increasingly commercialised. In addition it was difficult for the members of Quilombo communities to get access to the local market at the mine. They were prohibited from having tables from which to sell because – due to information from mine officials – they could not guarantee production. Thus most entrepreneurs at the mine market were not members of the local Quilombo community but came from remote places such as Santarem and Oriximiná.

Finally, the Quilombo communities recently experienced that their traditional areas for economic activity were greatly limited. This is because national authorities declared large areas close to the mine as Biological Reserve (1979) and National Forest (1989) respectively. Both were established as a compensation for the mining activities in the area. This was a worthy initiative but it also impacted upon the local community negatively. For the Quilombo communities, these changes have meant that raw materials previously available in the forest such as wood for building and maintaining houses as well as for heating and cooking now have to be bought. In addition, they are prohibited from using these two protected areas for harvesting Brazil nuts and fishing commercially.[66]

As a consequence of the water pollution, numerous members of Quilombo communities suffer from worms and diarrhea. Purification systems provided by the mine were malfunctioning and were removed but never replaced. In addition, there was no medical assistance in the mine to those who are not registered as members of the mining community. The Quilombo communities, however, have never been properly informed about how to register. Consequently, many were unregistered and today it is still difficult for them to register. Lastly, there is no emergency or ambulatory medical first aid in the community as a whole. The doctors do not always help those who are registered, and often waiting time is long (two plus days plus). There are also particular health disadvantages for the female members of Quilombo communities. Some women cannot get adequate access to health care for

[65] Slater 2002: 164. In Årdal, on the other hand, there has been only a slight ethnic division of labour, limited to the case of Swedish migrant workers in the initial phase of construction work. Consequently, the work force there has been an ethnically homogeneous one.
[66] Antonio Carlos Diegues, Social Movements and the Remaking of the Commons in the Brazilian Amazon, in: Michael Goldman (ed.), *Privatizing Nature. Political Struggles for the Global Commons*. London: Pluto Press, 1998: 70-71.

themselves and children. In particular, unmarried woman encounter difficulties in registering their children at the health care centre.[67]

Still another health consequence of the mining activity in the area is that alcohol is easily accessible. The Quilombo communities complain about increased alcohol consumption, even among youngsters under the age of 12. In addition to the increased number of adult members of the communities frequenting the bars in Porto Trombetás on the weekends, there are also youths who frequent the bars on weekdays. Some girls drop out of school and go into prostitution. Recent reports show that there is an increase in prostitution in girls of the Quilombo communities as young as 13. And there is an increase in female alcohol consumption.[68]

However contacts with the outside world were not only negative for the Quilombos. Since Brazil ceased to be a military dictatorship in 1985 and adopted the new constitution of 1988, the development of effective strategies to respond to the violations of their traditional rights and major challenges to their economy and their value systems became possible.

In 1989, the inhabitants of twenty-one Quilombo communities in the greater Trombetás area founded the *Association of Descendants of Former Quilombos of the Municipality of Oriximiná* (ARQMO). ARQMO managed to become cooperating member of larger regional associations and foundations working nationally and even internationally with environmental and indigenous issues. As a result of this kind of networking, the Quilombo communities have been able to launch legal actions preventing multinational corporations from buying up individual properties.[69]

Apart from the indigenous populations of Brazil, the Quilombo community of Boa Vista, close to Porto Trombetás, was the first to be entitled land rights under the 1988 Constitution of Brazil. In 1995 the ownership over 790 hectares of land was formalised.[70] Sixteen other Quilombo communities in the area experienced a similar success in the time to follow. Apart from the transformation to a pluralist democracy and the prospects of political participation, also international monitoring of the environmental and minority development had positive impacts on the Quilombo community and the local environment.[71]

Thus MRN introduced advanced measures in order to compensate for environmental damages. In order to compensate for the clearing of large areas of rain forest, MRN employed an ecologist working with reforestation. The process of rehabilitation implies that the thin layer of topsoil was removed carefully from the mining site, preserved while mining proceeded, and returned after the extraction of the ore. Tree nurseries were growing native

[67] Flanagan & Whiteman 2005: 228-230.
[68] Flanagan & Whiteman 2005: 228-230.
[69] Slater 2002: 163.
[70] Siqueira 20002: 33.
[71] Antonio Carlos Diegues, Social Movements and the Remaking of the Commons in the Brazilian Amazon, in: Michael Goldman (ed.), *Privatizing Nature. Political Struggles for the Global Commons*. London: Pluto Press, 1998: 56.

trees for replanting.[72] Also the Quilombo settlements have been provided with small machines to clean the water. In addition, the company started a partial cleanup of Lake Batata. And even before Brazil's return to democracy, in December 1982, the company installed filters for dust removal worth US$15 m.[73] Most recently, MRN has started a program for environmental monitoring. This, however, does not provide the Quilombo communities with environmental monitoring information.[74]

Present challenges to and future prospects for Årdal

Due to the legal and socio-economic framework of the Norwegian welfare state, income disparities traditionally have been relatively low and the level of public health in the community good. Norwegian workers in Årdal enjoy a high living standard, well cushioned by generous unemployment benefits, old age insurances and good health care.[75]

In 2006, however, this safe and confident situation changed dramatically when the aluminium multinational Hydro decided to close down the Söderberg potroom the following year. At one fell swoop, this closure in June 2007 made 134 of the plant's workers redundant.[76] The reason given for this reduction of aluminium production in Årdal was linked to insecurity about the future electric power regime in Norway. Earlier, aluminium industries in Norway were granted long-term contracts of cheap energy. This changed however in the early years of the 21st century when long-term contracts, which long had guaranteed power supply at cheap prices to aluminium producers, were replaced by short-term contracts with less favourable energy prices. Because aluminium production is highly dependent on cheap energy, this was the straw that broke the camel's back. Hydro determined that the Söderberg potroom of the Årdal's aluminium plant was no longer profitable, and it began looking for greener pastures.[77] This pattern of corporate conduct is one well known by business and labour historians. There are numerous internal and external variables that can affect decisions about relocation of production, such as projections about future expenses and profits. In effect, these kinds of projections often lead to the relocation of the sites of productions. Thus in the course of time, capital has moved farther and farther across the globe, and industrialization and de-industrialisation have become two sides of the same coin.[78]

De-industrialisation in Årdal has led at least to two different types of re-industrialisation. First, the plant closing led to unrest and uncertainty among the locals and about the future of

---

[72] Ghillean T. Prance, The Amazon: Paradise lost? In: Les Kaufmann & Kenneth Mallory (eds.), *The Last Extinction*. Boston: MIT, 1993 (69-114) 97.
[73] Pinto 1997: 99.
[74] Flanagan & Whiteman 2005: 228-230.
[75] Berg 1987. Lange 1998. Knut Halvorsen & Steinar Stjernø, *Work Oil and Welfare. The Welfare State in Norway*, Oslo: Universitetsforlaget 2008.
[76] http://hydro.no/no/Pressesenter/Nyheter/Arkiv/2006/Mars/15461/
[77] Hans Otto Frøland & Asbjørn Karlsen, Innledning: Globalisering gjennom et århundre: langsiktige trekk ved norsk aluminiumindustri, in: Johan Henden, Hans Otto Frøland & Asbjørn Karlsen (eds.), *Globalisering gjennom et århundre. Norsk aluminiumindustri 1908-2008*, Bergen: Fagbokforlaget, 2008: (7-32): 22.
[78] Altena & van der Linden 2002: 2. Christopher H. Johnson, Introduction: De-industrialization and Globalization, in: Altena & van der Linden 2002: 25. Jefferson R. Cowie, *Capital Moves: RCA's Seventy-Year Quest for Cheap Labor*, Ithaca, NY, 1999.

Årdal community. At the same time the newly elected national government made up of a coalition of the Norwegian Labour Party, Socialist Left and Centre Party began a discussion of state industrial policy and industrial development in the Norwegian periphery. Most important for the workforce in Årdal was the move by the government to make available resources from a readjustment fund (*Innovasjon Norge*). This led to the establishment of new industries for door production and solar/sun cell panels in Årdal.[79] In addition the municipality of Årdal worked to convince Hydro to invest heavily in the development of new technologies in Årdal. According to commissioned evaluations, public and private investments have more than compensated for the loss of jobs and turned the public opinion from pessimism to optimism. The main problem of Årdal is not the lack of industry, but a work force greatly limited in numbers.[80]

Secondly, there was re-industrialisation in other parts of the world. Already in advance of the closing of the oldest parts of the aluminium plant in Årdal, the multinational Hydro had developed plans to establish aluminium production in other countries in order to compensate for the production facilities in Årdal. At the end of 2006 – the very same year Hydro decided to close down parts of the plant in Årdal – a site team of Hydro arrived in Qatar in order to "to liaise with the statutory Qatari authorities, and other interfacing entities, and to monitor site preparation and jetty construction"[81]. Construction work began in 2008, and involved more than 56,000 workers from more than 200 companies directly, spending 90 million working hours at the construction site.[82] On April 12, 2010 the Qatari Emir, accompanied by Norway's Crown Prince Haakon, inaugurated the accomplishment of the largest aluminium plant ever launched.[83]

De-industrialisation, too, seems destined to play a role in the future of Porto Trombetás. New mines are planned at Paragominas (CVRD) and Juriti Velho (Alcoa), also in the Amazon.[84] When the Rio Trombetás mine was established, it was estimated that mining activities could last for 150 years. These optimistic estimations recently have been revised, and it seems likely that the multinational aluminium conglomerate currently running the mine will close down all activities within the coming 20 years. Since there are no other commercial activities in the area, the village most probably would be turned into a ghost town.[85]

---

[79] http://no.wikipedia.org/wiki/%C3%85rdal . To quote Johnson 2002: 9: "Competition is always modified by politics."

[80] Roald A. Johansen, *Omstillingen i Årdal. Sluttrapport*, Lysaker: ifo-Institutt for organisasjonsutvikling, 2008. Oddbjørn Bukve, Øyvind Glosvik, Harald Mundal, Jon Gunnar Nesse, Veronika Trengereid, Åge Vebostad, Omstillingsprogrammet i Sogn og Fjordane - resultat og erfaringar, Sogndal: Høgskolen i Sogn og Fjordane, 2009.

[81] http://www.qatalum.com/en/About-Qatalum/. Meanwhile aluminium production in Michigan and Sunndal, Norway, also has been reduced or concluded. http://www.hydro.com/no/Pressesenter/Nyheter/Arkiv/2009/

[82] http://www.qatalum.com/en/Media-room/News/2010/Royal-inauguration-of-Qatalum-a-world-class-smelter/

[83] http://www.qatalum.com/en/About-Qatalum/

[84] Switkes 2005: 6.

[85] Girndt 2008: 4. Bunker 1985. Cf. Greg Grandin, *Fordlandia. The Rise and Fall of Henry Ford's Forgotten Jungle City*. New York: Metropolitan Books/Henry Holt and Company, 2009.

In the short term, the aluminium multinationals will use the alternative sites of production in order to undermine the relative power of trade unions at Porto Trombetás. Due to the isolation of the mine in the Amazon, the corporate leadership was willing to pay higher wages and meet the workers' social welfare and health demands (school, hospital, one paid vacation a year etc.).[86] In the uncertain case of an escalating conflict, the mineworkers would in fact have the power to close down the airport, harbour and production at the village. Considerable profit losses would be the result for the shareholders.[87]

As long as solidarity between the workers at the different productions sites can be hindered or suppressed, it seems likely that the establishment of mines at the sites of Paragominas and Juriti Velho will result in even greater unequal power relationships between capital and labour and in higher profits for shareholders. It is likely that the people as well as the environment at the planned production sites will be treated in a similar way, as was the case at Porto Trombetás. The planned mine at Juriti Velho, also in Pará, is estimated to have bauxite reserves of 350 million tons. The 20 communities living locally survive through sustainable extraction of forest resources for medicines, oils, and fruits, and by fishing. They already have filed complaints regarding Alcoa's clearing of the rainforest and threats from armed guards who have restricted the access of community members to an area of 65,000 hectares that Alcoa claims to own. In the plans for the new ALCOA mine, 8,000 hectares of forest are to be cleared. In a statement, Juriti Velho community leaders say that 1,800 families live near the Great Lake (site of Alcoa's proposed mine and alumina plant) where extensive areas of virgin forests and various endangered animal species can be found. Once deforestation spreads, the area is in danger of becoming a desert.[88]

History does not need to repeat itself necessary in this case. The chances of mobilising international environmentalist networks in order to protect the environment can be regarded as better than ever.

Entangled towns in the global aluminium network

Research on company towns such as Porto Trombetás and Årdal resembles in some respects psychological research on twins, who co-exist and grow up at different places, but share the same origin. In this article, I have tried to sketch the very different fates of the twin towns in Brazil and Norway.

As mentioned above, only Porto Trombetás was a classic company town, while Årdal rather should be seen as an industrial town. In Årdal, the aluminum company could rely on a

[86] In contrast to what was the case elsewhere in Brazil, there were numerous protective measures for the workers at Porto Trombetás. The area is covered with all sorts of warning, protective and caution signs.
[87] Girndt 2008: 4. Ten years after the start of commercial extraction in Porto Trombetás, in 1989, the first strike broke out. The local trade union was founded half a year in advance. The strike lasted for eleven days and it was ended when Brazilian army helicopters with armed soldiers landed at the village. The strike nearly ended up as a bloodbath.
[88] Switkes 2005: 6.

preexisting community as a labor resource. Its role as a provider of housing for its workers - one of the defining characteristics of company towns - was limited to periods of increased productivity that spur the arrival of new laborers to the area. The presence of the aluminum industry became dominant, but never exclusive. By contrast, MRN built the company town of Porto Trombetás, providing housing and all facilities for its workers.

The analysis above indicates that the role of the state differed considerably in both cases, and that this had considerable impacts on the pace and degree of industrial development and exploitation. In periods of dictatorship (in Brazil 1964-1985, in Norway 1940-1945) the pace of industrialisation was much higher than in times of democracy (in Brazil after 1985, in Norway after 1945). In addition, the human and environmental costs of industrial development were largely ignored under military rule.

In the course of a few years in the 1970s, Porto Trombetás was established as a mining community from bare beginnings in a heavily forested region. In Årdal, hydroelectric power and the aluminium plant were established in a process that lasted for decades, from the beginning of the 20th century until the end of World War II. However the big leap of industrialisation in Årdal also occurred in the time of the authoritarian German rule in Norway, 1940-45. At the end of the war, so to speak all facilities were available to start aluminium melting at Årdal.

While Årdal to a considerable degree enjoyed autonomy for most of the time, the population of Porto Trombetás was much more dependent of the multinationals. However the Quilombo community of Porto Trombetás managed to improve their living conditions after Brazil's return to democracy in 1985. Also increased collaboration with national and international NGOs on issues of environment and minority rights contributed to improvements for the members of that community.

Even though the population of Årdal had possibilities to work for a reduction of pollutive emissions from the aluminium plant, through the political channels of representative democracy, the struggle for environmental corporate responsibility lasted for decades in Årdal, while the mining company in Porto Trombetás introduced measures to reduce the environmental damages almost immediately after the end of the construction period. In this respect Porto Trombetás might have had a certain advantage of the latecomer.

The commodity chain linking Porto Trombetás with Årdal is merely one isolated sequence in the history of the multinational aluminium trusts. There are of course many other examples of company towns linked in aluminium and other commodity chains elsewhere in the world.

It seems difficult, if possible at all, to generalise from the cases of these two particular company towns, connected by a particular commodity chain. To a certain degree the story of the two small towns may serve as a case of uneven development in an age of global connectivity: one characterised by global commodity chains, where commodities are manufactured by using elements produced in three different continents of the world.[89]

[89] Marcel van der Linden, Sattelzeit: Strategien von oben, Lernprozesse von unten, in: Marcel van der Linden & Christoph Lieber (eds.), *Kontroversen über den Zustand der Welt. Weltmarkt – Arbeitsformen – Hegemoniezyklen*, Hamburg:VSA, 2007: 25. Bert Altena &

However it is for instance far from clear what type of development theories the two entangled towns can be related to, and how theory can explain the varieties of company and industrial towns that have emerged, transformed and at times disappeared in the course of global industrialisation? It is neither obvious what type of cases of cases Porto Trombetás and Årdal represent. Can they be regarded as typical, deviant or other type of case? Thus these and many similar towns need further investigation to identify similarities and differences of living and working conditions of the families living at those places.[90]

References

Akerø, Dan Børge, Per Erik Borge, Helge Hveem, Dag Poleszynski, *Norge i Brasil. Militærdiktatur, folkemord og norsk aluminium*. Oslo: Aschehoug, 1979.

Altena Bert & Marcel van der Linden, Introduction, in: Bert Altena & Marcel van der Linden (eds.), De-industrialization: Social, Cultural, and Political Aspects. *International Review of Social History, Supplement 10*, 47 (2002): 1-2.

Amdam, Rolv Petter, Dag Gjestland & Andreas Hompland (eds.), *Årdal. Verket og bygda 1947-1997*. Oslo: Det norske samlaget 1997.

Andrade, Lucia M.M., *The Quilombos of the Trombetas River Basin. Brief History*. São Paulo: Comissão Pro-Indio, 1993.

Bergh, Trond, *Storhetstid (1945-1965)*. Oslo: Tiden, 1987.

Borges, Marcelo J. & Susana B. Torres, Introduction, in: Marcelo J. Borges and Susana B. Torres (eds.), *Company towns: Historical Studies in Global Perspective*. New York: Palgrave (forthcoming).

Bukve, Oddbjørn, Årdal – Verket og bygda, in: Amdal et al. 1997: 164-183.

Bukve, Oddbjørn, Øyvind Glosvik, Harald Mundal, Jon Gunnar Nesse, Veronika Trengereid & Åge Vebostad, *Omstillingsprogrammet i Sogn og Fjordane - resultat og erfaringar*. Sogndal: Høgskolen i Sogn og Fjordane, 2009.

Bunker, Stephen G., *Underdeveloping the Amazone. Extraction, Unequal Exchange, and the failure of the Modern State*. Urbana and Chicago: University of Illinois Press, 1985.

Bunker, Stephen G. & Paul S. Ciccantell, *Globalization and the Race for Resources*. Baltimore: The Johns Hopkins University Press, 2005.

Byrkjeland, Martin, Kampen mot fluoren, in: Amdam et al. 1997: 110-132.

Cowie, Jefferson R., *Capital Moves: RCA's Seventy-Year Quest for Cheap Labor*, Ithaca, NY, 1999.

Diegues, Antonio Carlos, Social Movements and the Remaking of the Commons in the Brazilian Amazon, in: Michael Goldman (ed.), *Privatizing Nature. Political Struggles for the Global Commons*. London: Pluto Press, 1998: 54-75.

Flanagan, William F. & Gail Whiteman, Ethic Codes and MNCs as Minority Shareholders: The Case of a Bauxite Mine in Brazil, in: Wesley Cragg (ed.), *Ethic Codes, Corporations, and the Challenge of Globalization*, Cheltenham, UK/Northampton MA, USA: Edward Elgar, 2005: 212-241.

Marcel van der Linden, Introduction, in: Bert Altena & Marcel van der Linden (eds.), De-industrialization: Social, Cultural, and Political Aspects, *International Review of Social History, Supplement 10*, 47 (2002): 1-2.

[90] In May 2010, Hydro bought 30 per cent of the Brazilian company Vale, which holds a majority of the shares in Paragominas. Thus new potential commodity chains can be foreseen in close future.

Frøland, Hans Otto & Asbjørn Karlsen, Innledning: Globalisering gjennom et århundre: langsiktige trekk ved norsk aluminiumindustri, in: Johan Henden, Hans Otto Frøland & Asbjørn Karlsen (eds.), *Globalisering gjennom et århundre. Norsk aluminiumindustri 1908-2008*, Bergen: Fagbokforlaget, 2008: 7-32.

Girndt, Cornelia, Bergbau in Brasilien. Die Bauxitmine von Porto Trombetas, *Quetzal. Politik und Kultur in Lateinamerika. Online-magazin*, June 2008.

Grandin, Greg, *Fordlandia. The Rise and Fall of Henry Ford's Forgotten Jungle City*. New York: Metropolitan Books/Henry Holt and Company, 2009.

Hall, Thomas D., Incorporation in the World-System: Toward a Critique, *American Sociological Review*, 51 (1986), 390-402.

Halvorsen, Knut & Steinar Stjernø, *Work Oil and Welfare. The Welfare State in Norway*, Oslo: Universitetsforlaget 2008.

Henden, Johan, Hans Otto Frøland & Asbjørn Karlsen (eds.), *Globalisering gjennom et århundre. Norsk aluminiumindustri 1908-2008*, Bergen: Fagbokforlaget, 2008.

Johannessen, Finn Erhard, Asle Rønning & Pål Thonstad Sandvik, *Nasjonal kontroll og industriell fornyelse*. *Hydro 1945-1977*, Oslo: Pax, 2005.

Johannessen, Finn Erhard, Mykje skrik og lite gull, in: Amdam et al. 1997: 24-37.

Johansen, Roald A., *Omstillingen i Årdal. Sluttrapport*. Lysaker: ifo-Institutt for organisasjonsutvikling, 2008.

Johnson, Christopher H., Introduction: De-industrialization and Globalization, in: Bert Altena & Marcel van der Linden (eds.), De-industrialization: Social, Cultural, and Political Aspects, *International Review of Social History*, *Supplement 10*, 47 (2002): (3-33)

Joshi, Chitra, De-industrialization and male identities, in Bert Altena and Marcel van der Linden (eds.), De-industrialization: Social, Cultural, and Political Aspects, *International Review of Social History*, *Supplement 10*, 47 (2002): 159-175.

Kjeldstadli, Knut, Lokal internasjonalisme, in: Amdam et al. 1997: 38–55.

Krätke, Michael R., Eine Globalisierung oder viele? In: Marcel van der Linden & Christoph Lieber (eds.), *Kontroversen über den Zustand der Welt. Weltmarkt – Arbeitsformen – Hegemoniezyklen*, Hamburg: VSA, 2007: 131-152.

Lange, Even & H.W. Nordvik, Economic History, in W.H. Hubbard, J.E. Myre, T. Nordby & S. Sogner (eds.), *Making a Historical Culture. Historiography in Norway.* Oslo 1995.

Lillehammer, Arnvid, *Fra jeger til bonde – inntil 800 e.Kr*. Oslo: 1994.

López, Alexander, *Environmental Change, Social Conflicts and Security in the Brazilian Amazon: Exploring the links*, Oslo: Department of Political Science, University of Oslo, 2000. University Bunker 1985.

Meyer, Frank, Expanding the frontiers of labor history: Kjartan Fløgstad's synthesis of local, global, and environmental history, in: *International Journal of Social History*, 54 (2009): 95–109.

Nerdal, Roar, Articles about Hydros investments in Alunorte and fishery at Barcarena, *Dagens Næringsliv*, 24.4., 25.4., 30.4.2008.

Pinto, Lúcio Flávio, *Amazônia . O século perdido. A batalha do alumínio e outras derrotas da globalizaçao.* Belém: Edição Jornal Pessoal, 1997.

Prance, Ghillean T., The Amazon: Paradise lost? In: Les Kaufmann & Kenneth Mallory (eds.), *The Last Extinction*. Boston: MIT, 1993: 69-114.

Rinde, Harald, Den lange ventetida, in: Amdam et al.1997: 56-83.

Rinde, Harald, Alcan tur – retur, in: Amdam et al. 1997: 132-163.

Roth, Karl Heinz, *Der Zustand der Welt. Gegen-Perspektiven*. Hamburg: VSA, 2005.

Siqueira, Ozair Pereira de, *Mineracão Rio do Norte. Tells its Story from the Beginning*. Porto Trombetás: MRN, 2002 (http://issuu.com/studiorb/docs/mrn).

Slater, Candace, *Entangled Edens. Visions of the Amazon*. Berkeley: University of California Press, 2002.

St. meld. Nr. 67 (1974-75), Norsk industris utvikling i framtid. Industridepartementet, Oslo, 4. april 1975.

Switkes, Glenn, *Foiling the Aluminium Industry. A Toolkit for Communities, Activists, Consumers and Workers*. Berkeley, CA: International Rivers Network, 2005.

van der Linden, Marcel, *Globalizing Labour Historiography: The IISH Approach*. Amsterdam: International Institute of Social History, Amsterdam 2002, http://www.iisg.nl/publications/globlab.pdf., 9-10.

van der Linden, Marcel, Sattelzeit: Strategien von oben, Lernprozesse von unten, in: Marcel van der Linden & Christoph Lieber (eds.), *Kontroversen über den Zustand der Welt. Weltmarkt – Arbeitsformen – Hegemoniezyklen*. Hamburg: VSA, 2007: (15-44).

Zöller, Rüdiger, Präsidenten – Diktatoren – Erlöser: Das lange 20. Jahrhundert, in: Walther L. Bernecker, Horst Pietschmann & Rüdiger Zoller, *Eine kleine Geschichte Brasiliens*. Frankfurt: Suhrkamp, 2000: 215-320.

Web resources:

http://www.hydro.com
http://www.mrn.com.br/english/quem_somos/portotrombetas.html
http://www.quatalum.com
http://www.ssb.no/