

Knut Kjeldstadli. Immigration and industrialisation, Norway c.1840-1940.

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Essays on Industrialisation in France, Norway and Spain

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9. Immigration and Industrialisation, Norway c. 1840–1940

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Abstract

What part did immigrants play in industrialisation processes in Norway from ca. 1840 onwards? Three types of migrants are discussed – the entrepreneur, the career migrant, including the skilled worker, and finally the labour migrant, including the seasonal worker.

Immigrant entrepreneurs were never numerous. Their importance peaked during the first industrial revolution. Several were self-made men, sometimes beginning as managers, before striking out on their own. Few were fully-fledged industrial capitalists when they arrived. The textile industry represents an exception, containing several entrepreneur, immigrant family dynasties. During the second industrial revolution demand for capital and theoretical knowledge worked against individual entrepreneurs. Representatives of corporate capital, managers, among them Frenchmen, constituted a new social type.

Skilled – Swedish, German and British – masters, foremen and workers helped to transfer technology, crucial in the days of 'embodied knowledge'. Indigenous workers learned from them by observing and copying. Such mechanisms have been explored in several branches.

Immigrant general labourers contributed to the pool of labour. Although there was no direct replacement of the huge number of Norwegian emigrants, Swedes in particular did play a role as general workers in Norwegian industrialisation.

A rough evaluation of the impact of immigration on industrialisation suggests the following conclusions: it was *necessary* in the initial phase, from the first industrial revolution, starting in the 1840s. It was *useful* during the phase of the second industrial

revolution – before and during World War I. Immigration relatively *lost importance* in the phase of economic transformation and trends towards autarchy after the war.

Résumé

Quel rôle ont joué les immigrants dans le processus d'industrialisation de la Norvège depuis 1840 ? Trois types de migrants sont analysés: l'entrepreneur, le migrant professionnel, y compris le travailleur qualifié, et finalement la main d'œuvre migrante, à laquelle il faut rattacher le travailleur saisonnier.

Les entrepreneurs ne furent jamais très nombreux. Leur importance culmina pendant la première révolution industrielle. Plusieurs étaient des *self-made-men*, parfois managers à leurs débuts, avant de se mettre à leur compte. Ils étaient rarement des entrepreneurs expérimentés à leur arrivée. L'industrie textile représenta une exception avec plusieurs dynasties d'immigrants. Pendant la seconde révolution industrielle, la demande en capitaux et en savoir théorique joua en défaveur des entrepreneurs isolés. Représentatifs des sociétés de capitaux, des gestionnaires, parmi eux des Français, constituèrent un type social nouveau.

Des patrons, des contremaîtres et des ouvriers – originaires de Suède, d'Allemagne et de Grande-Bretagne – tous qualifiés, aidèrent au transfert de technologie, crucial à l'époque de « l'incorporation du savoir ». Des travailleurs locaux apprirent beaucoup d'eux en les observant et en les copiant. De tels mécanismes se reproduisirent dans plusieurs branches.

Les migrations du travail contribuèrent à la constitution d'un savoir-faire commun. Toutefois, il n'y a pas eu de remplacement direct du nombre considérable d'émigrants norvégiens; des Suédois, en particulier, jouèrent un rôle essentiel comme simples travailleurs dans l'industrialisation norvégienne.

Une évaluation globale de l'impact de l'immigration sur l'industrialisation suggère les conclusions suivantes : elle était « nécessaire » dans la phase initiale, lors de la première révolution industrielle commençant dans les années 1840. Elle s'avéra « utile » lors de la seconde révolution industrielle, avant et pendant la Première Guerre mondiale. L'immigration perdit ensuite de son importance pendant la phase de transformation économique et de marche vers les régimes autoritaires après la Guerre.

Introduction

How was Norway industrialised? All historians agree that both external impulses and internal preconditions were necessary, but the relative importance of foreign and national factors has been a contested theme in the historiography. On the one

hand, scholars like Francis Sejersted or Even Lange have stressed the growth of an internal market opening for national production based on import substitution, or the ability to imitate economies that were more technologically advanced, an ability due to for instance high levels of literacy. On the other hand, scholars like Fritz Hodne have stressed foreign demand. Kristine Bruland has highlighted the importance of technology transfer to Norway, both in an excellent doctoral thesis and in later subsequent anthologies, immigrants being one channel of free transfer.¹ My objective here is to recapitulate and supplement some of Bruland's points on whether immigration mattered in the industrialisation process.

Types of Immigrants

First, what kinds of immigration are relevant? There is a varied typology, based on direction, permanence, cause, mechanism etc. Here I will focus on the kind of contribution immigrants brought to the receiving country. Bruland has warned us against the approach of Alexander Gerschenkron in explaining industrialisation, i.e. to list necessary prerequisites for industry and check whether these factors were present. Instead she has advocated a more micro level analysis to unfold the mechanisms of the real process, how for instance, the necessary technology was brought to work in a particular location. Nevertheless, in this context I find it useful to discuss types that each in particular can be said to impact on the production factors – capital, skill or technology and general labour. Hence I will concentrate on the entrepreneur, the career migrant and the skilled worker, and finally on the labour migrant and the seasonal worker. In each case I will pose questions that are simple, but not always easy to answer: How many? When? Why did they come? How were they recruited? What were their contributions?

Entrepreneurs and Employers' Representatives

Such elite migrants within industry were few both relatively speaking and in absolute numbers. In fact, the examples of foreigners who established an industrial firm are so scattered that they do not show us much more than that such undertakings were in fact possible. They did not constitute an important factor numerically. Neither can one say that they represented one particular, fixed pattern of migration. In sheer numbers the Swedes were foremost due to their huge proportion of all immigration. But on an 'upper

¹ See e.g. K. Bruland: *British Technology and European Industrialisation. The Norwegian textile industry in the mid-nineteenth century*. Cambridge: CUP, 1989/paperback 2003, and K.Bruland (ed): *Technology Transfer and Scandinavian Industrialisation*, Oxford, 1991. New York: Berg.

mid-Norway.⁵ However, few capital owners moved with their capital. And as firms grew relatively bigger and more bureaucratised, the opportunities for the individual entrepreneur were more limited. In the business crises after 1920 the incentives to move your capital or firm to Norway were weak. In this phase another type of immigrant became more prominent within industry, the hired manager, representing a mother company or corporation. The French and even more the British were well represented in this group, far more here than among immigrants at large. *Compagnie Francaise de Mine de Bamble* ran an apatite mine in Telemark, in the southern part of eastern Norway from 1872. While the first director, Auguste Daux, never learnt Norwegian, his successor Charles Antoine Delgobe, not only learned the language, but became a genealogist, a family historian of some reputation in Norway. Pechiney owned 90 per cent of the aluminium producing plant in Tyssedal in one of the fjords in western Norway from 1912 and onwards. The leading employees formed a local branch of Alliance Francaise, among steep ravines polite French conversation was kept up. According to an internal report from 1914 the war disrupted this: 'Mais tout est alors gravement perturbé par la declaration de guerre. Le president et tous les ingénieurs et contremaitres francais sont mobilises, privant la société de l'expérience qu'ils de devaient transmettre aux ingénieurs norvégiens.'⁶ A new effort was made starting in 1915.

Career Immigrants and Skilled Workers

The term 'career migrant' has been minted by the American historical sociologist, Charles Tilly, to cover the kind of migrant who is recruited by their employer, on the basis of a particular skill in demand. They had to be enticed to move to a peripheral country like Norway through fairly generous remunerations. Socially they entered society on the upper rungs of the ladder.

Why were these specialists recruited? Norway was a peripheral country, with a small domestic economy. Thus it was given that the bulk of technological innovations had to come from the outside, most of them from the larger and most advanced economies. If one had a general basis of knowledge, magazines and textbooks might do. However, this mode of acquisition had limitations. A large proportion of knowledge could not be distilled or translated into general, theoretically stated principles. This was a tacit – or perhaps better – a murmuring – knowledge of experience,

⁵ René Bonfils: 'Pechiney au pays de Vikings, 1912–1958', *Cathiers d'histoire de l'aluminium*, 27, Hiver 2000/2001

⁶ Bonfils, 2000/2001, p. 24

class index' they scored low, only 5,5 per million were factory owners, wholesalers or other businessmen. In relative terms, the Germans had the highest score, 4,4 percent.²

Most of those who started their own businesses came in the wake of the first industrial revolution, from the 1840s onwards. Examples are known from branches like textiles, clothing, shoe manufacturing, food and tobacco. Some came by accident, like the young brothers Rieber, who stayed on after a German emigrant ship bound for USA shipwrecked outside Bergen on the West coast of Norway in 1836. They went on to found a firm that grew into one of Norway's important industrial groups.³ Several were self-made men, sometimes beginning as managers, before starting on their own. Liv Brox Haugen has suggested that in the early days, before industrial structures settled, Norway might be seen as a 'country of possibilities' for young men intent on making a career.⁴ Relatively few were fully-fledged industrial capitalists when they came, moving to or expanding their business on a new scene. One such example was the Swiss family firm Cloetta brothers, who first started as chocolate producers in Sweden and later established a factory in Oslo (Kristiania), which at the turn of the nineteenth century was the largest and most modern in Norway.

These entrepreneurs illustrate the importance of another type of resource, which Pierre Bourdieu has conceptualised as social capital, in this case family networks. The mechanism was chain migration, one migrant pulled the next one after him or her. Brothers were brought in as managers, and sons went on to expand the business. One prime example is an immigrant from Slesvig (the borderland between Denmark and Germany), Peter Jebsen, who founded a cotton weaving plant outside Bergen in 1846. Jebsen, his brothers, their sons and employees, and at least 15 men from Slesvig, came to Norway to start or take over in all 13 textile firms. Other family members were subsequently active in mining and pigment production on a large scale.

During the second industrial revolution, before WW I, foreign investment played an important role – foreign capital held 39 per cent of the shares in Norwegian industry in 1909; French capital was heavy in Norsk Hydro, and in the case of the aluminium producer Pechiney in Det Norske Nitrid Aktieselskab, with plants in Eydehavn in the south and Tyssedal in the west of Norway, and added to that a mine in

² Knut Kjeldstadli: Del III. 1900–1940, in K. Kjeldstadli (ed): *Norsk innvandringshistorie. Bind 2: I nasjonalstatens tid 1814–1940*, Oslo, 2003.

³ Fritz Hodne: 'Industriborgerkapet i Norge 1850–1920. Dets karakter og funksjon', in Knut Kjeldstadli, Sissel Myklebust and Lars Thue (eds): *Formingen av industrisamfunnet i norden fram til 1920*, TMV series, No. 5, 1994

⁴ Liv Brox Haugen: *Innvandrede arbeidedes bidrag til industrialiseringen av Norge i perioden 1840–1900*, MA thesis, 2001, University of Oslo.

located in practices, procedures and grips, learnt by working with the body. Learning took place by doing, through observation and imitation and own experience. As Kristine Bruland has argued, this kind of embodied knowledge could only be transferred through the migration of knowledgeable, competent people. Norwegians went abroad, to work, to receive education, to study on the basis of state stipends, they learnt and returned. But to build such a stock of knowledge was slow, and import of foreign specialists was often swifter.

This channel of knowledge was particularly important in the first phases of industrialisation. However, it also functioned in the 20th century, not only in connection with the establishment of new plants, but also in renewals in established firms. Bruland states that in the 18th and early 19th centuries technology transfer took place mostly through individuals.⁷ From the mid-nineteenth century, more precisely from 1843 when the ban on machinery export was lifted, British producers of capital goods, machinery, in particular took over as the main agent in the transfer of technology.

While the term career migrant usually is reserved for the upper layers of society, they did in fact share several characteristics with *skilled workers*. These differed from ordinary migrants in several ways: they possessed a scarce good – their knowledge, they were sought and sometimes imported, by the employers, they had to be lured away and to move by getting privileges, high payment, a decent lodging, etc. Within this category the English played an important role particularly during the phase of the first industrial revolution in Norway, from the 1850s and onward. Branches like textile or the railway offer prime examples. The Germans seem to have grown in importance during the second industrial revolution. Examples span from porcelain production (Porsgrund) to textiles and clothing (Herkules), machine knitting (Salhus) and steel works (Jørpeland).⁸ Swedes were important in both phases, if nothing else because of their sheer numbers, in glass works, textiles, construction work, steel production. Bruland has suggested ‘whereas earlier immigrants were highly-trained artisans, by the second half of the nineteenth century they were primarily supervisors and overseers; the relevant skills may have shifted from technical knowledge to organisational or managerial skills’.⁹ This overstates the case. In glass works in this period there are relatively large groups of skilled Swedes, Germans, Czechs and Scots, in production of matches and wood processing industries many were, if not

⁷ K. Bruland, ‘Skills, Learning and the International Diffusion of Technology: a Perspective on Scandinavian Industrialisation’, in M. Berg and K. Bruland (eds.), *Technological Revolutions in Europe. Historical Perspectives*, Cheltenham, UK and Northampton, MA, USA, 1998, p. 169.

⁸ Brox Haugen, 2001, and Knut Kjeldstadli 2003.

⁹ Bruland 1998, p. 180.

skilled, so industrially trained, most of them Swedes, men and women.¹⁰ Import of skilled labour *after* 1900 has been documented within construction, production of shoes, clothes and bags and other traveling equipment, canning, paper, felt for paper machines, packing, glass works, technical porcelain, carbide, steel, enamel, leaded glass, knives, introducing pneumatic hammers in ship works, drawing of metal threads and electrical cables. In some cases, like itinerant navvies building railways or laying the foundations of new plants the workers were not formally skilled, but *de facto* they possessed specialised and scarce work knowledge.¹¹

What role did the immigrants play, whether they were career migrants or skilled workers? I base my answer on the work of Bruland, some business histories and two masters theses in history, one by Liv Brox Haugen covering the second half of the nineteenth century and one by Magnus Otto Rønningen, covering 1914 to 1927.¹² Stated most generally, firms sought to recruit and keep foreigners because Norwegian professionals were scarce or unavailable. More precisely, foreigners were fetched or received in order to install new machinery, often from the firm producing the equipment. Furthermore, skilled personnel were needed to get the machines running. More complex machinery, systems that consisted of parts that were integrated technically, always needed adjustments between parts and adaptations in a new location. A paper mill in Drammen (Holmen-Hellefos) bought a paper machine from New York in 1904 and commented: 'As it is difficult to find machine operators (maskinførere) in Scandinavia who are familiar with the American, somewhat rapid machines, it has been arranged for machine operators to come from America to get the machine running.'

A further reason for the import of specialists was the need to train Norwegian workers during transitional periods. And finally, as Marx told us, forces of production do not exist outside the relations of production. In industrial capitalism technology and social organisation intertwine, both with respect to coordination and power. An additional motive, thus, went along with new machinery or technical devices. This represented only a space of possibility, whether this potential was realised or not rested on social relations. Foremen and managers were sometimes also expected to introduce new work habits, intensifications etc. I shall return this point in my final remarks.

¹⁰ Brox Haugen, 2001.

¹¹ Kjeldstadli, 2003.

¹² Magnus Otto Rønningen: 'slige specielt uddannede folk kan ikke faaes her hjemme.' *Utenlandske arbeidstakere og norske arbeidsgivere 1914-1927*. hovedfagsoppgave (M.A.) in history, University of Oslo 2000.

Let us turn from my 'why' to 'how' people were recruited. Magnus Otto Rønningen has, as mentioned, looked into the role of the employers in labour immigration to Norway between 1914 and 1927. On the basis of his work a list of mechanisms can be made according to the degree of formalisation: through family or acquaintances, or employees sent out to recruit among former colleagues, through new work managers who brought key personnel along, through sending a foreman or master or the owner himself as an agent, through Norwegian unions, through a business contact, advertisements in foreign papers or the trade union publications, or through a private or official labour recruitment agency. In the crisis-stricken Germany after WWI the *Reichswanderungsamt* informed labour emigrants about the conditions in other countries, including Norway. Finally, personnel were sent to local factories owned by international or foreign corporations like German Siemens, AEG, Osram or Badische Anilin- und Sodafabrik.¹³

The peculiarities of the Norwegian system of labour migration are best seen in comparison with other countries: 1) It was built on a proper labour market, where free labour was sold, not on slavery or indentured labour. 2) The system was liberal. Passports were abolished in 1860 and only reintroduced in 1917. In the years of crises from 1920 arose a will to privilege Norwegians. 3) The system was both public and private, unlike the German case where a semi-official *Deutsche Arbeiterzentrale* played the main part in recruitment of, amongst others, Polish rural workers. During and after WWI the French state was active even in the traditionally liberal British state. 4) The Norwegian labour market was not a dual market, split along ethnic or national lines between a privileged sector for national workers and a sector for underpaid, unsecured foreign workers. This is not to deny that workers might be both unsecured and underpaid. This was frequently the case of our third migrant type – along with the entrepreneur and the career migrant – namely migrants and seasonal workers.

Labour Migrants and Seasonal Workers

Conceptually, as prototypes, these two may be kept apart. *Labour migrants* were workers who came with the intention of a longer stay, or did not participate in any fixed seasonal pattern. They, mostly young men, came with their bodies, so to speak, with their general ability and willingness – and I may add sometimes their lack of willingness – to work. They did not possess any property in particular. In principle

¹³ Rønningen 2000, pp. 181-201.

any one of them could be replaced by any other. The commodity they sold, their labour power, was not a restricted good like that of the skilled workers. They were unskilled. Usually, representatives of employers did not bother actively to recruit these workers, on the contrary, the workers actively sought the jobs. As they represented general labour, they entered the receiving society at the lowest steps of the social ladder. Swedish young men and women constituted the bulk of these migrants.

Now, *seasonal labourers*, are socially close to the former group, and individuals might easily switch among these two patterns. Seasonal labourers often entered what has been called a migration system. Migration in these cases is not random, but has the following characteristics: migration serves as a function both in the sending and the receiving area or locality, and due to this mutual utility, the system obtains a degree of permanence, understood not in any blind functionalist way, but through conscious efforts. Now – in the economically marginal border regions of Sweden the seasonal migration into southern Norway filled the need for cash, and could be combined with a craft at home. In Norway, they filled a need for extra manpower, in agriculture they specialised in draining marches. There were not that many in industry proper, but seasonal workers were of some importance in some localities and branches. One such local system comprised Swedish workers in the brick and tile production in the city of Fredrikstad, in the south-easternmost part of Norway.

En passant, I will mention that in a project on Norwegian immigration history, we had to abandon a nice hypothesis about a complex migration system with several relays – Norwegians going to US, Swedes filling their place in Norwegian industry and agriculture and Swedes in their turn being replaced by Polish workers in the market oriented and mono-cultural agriculture in the south of Sweden. However, although these migration movements took place, on closer inspection they were unrelated. The typical emigration areas of Norway received very few newcomers, foreign workers went to the same areas that received Norwegian internal migrant workers.

The Importance of Immigration

How *important* were the contributions of immigrants to the industrialisation of Norway between 1840 and 1940? Put very bluntly: necessary in the initial phase, from the first industrial revolution in the 1840s. Useful in the second industrial revolution, the phase of the expansion of large-scale before and during WW I. Less important in the phase of economic transformation and trends towards autarchy after the war.

Let us consider these phases in turn, the factors of production and the type of immigrant. In the nineteenth century individual entrepreneurs or capitalists were few, as already stated. What about skill? Kristine Bruland has made a very strong case

for the importance of British producers of machines in furthering industrialisation in second-round countries like Norway. These firms took a keen interest in selling their machinery, as their internal market could not absorb their production capacity. The suppliers provided 'overall packages of technology: information, equipment and machines, skilled labour, management expertise, and so on.'¹⁴ In her doctoral thesis on the Norwegian textile industry she sees British firms as *the* prime mover behind the complex transfer of technology, a necessary cause. I quote, 'the process was driven by international market-seeking, and an international outlook, on the part of British mechanical engineering firms.'¹⁵ In one subsequent work she has expanded her theory, in the sense that it is applied to a wide range of industries and to the interchanges between branches, in her words industrialisation 'involved multi-sectoral learning and growth.'¹⁶ In the effort to demonstrate the viability of a theory there is of course the danger described in the words of the holy script: search and ye shall find.' – while we do not look systematically for and thus do not find counter examples. On the other hand she has – and rightly so, I think, given more attention also to the internal prerequisites in the receiving countries, to the 'national innovation system.'¹⁷ On the whole I think her general theory – the importance of the diffusion of technology – is well founded, including its stress on the importance of immigrant specialists.

Unskilled immigrant labourers – did they matter in the Norwegian industrialisation processes? Despite technological progress, one shall not forget that extensive use of manual labour was the condition for the construction of a modern infrastructure, roads, quays, and also railroads in the first industrial revolution. The main strategy of employers to get work done was still to increase the number of employees. We tend to forget the low levels of mechanisation or automatisisation, the absence of rails and cranes in internal transportation in the factories. What was colloquially called 'brad power,' manpower, was for a long period more important than let us say electrical power. And this labour was cheap. The specific impact of immigrants have to be weighted against the much larger number of overseas emigrants, which in Norway was very high in a comparative European perspective, in relative terms second only to Ireland. As already mentioned there was no direct link between emigration and immigration in areas in Norway, no direct replacement. Nevertheless, one may ask whether immigrants compensated for emigrants in the broader labour market

¹⁴ Bruland 1998, p. 172.

¹⁵ Bruland 1989, p. 154.

¹⁶ Bruland 1998, p. 161.

¹⁷ Bruland 1998, p. 16.

of eastern Norway? Ca. 130 000 immigrants came from 1856 to 1900, according to estimates made by Jan Eivind Myhre. During about the same period, from 1850 to 1900, ca. 500 000 went overseas; to them a number of emigrants to Europe should be added, probably numbering somewhere between 50 000 and 100 000.¹⁸ To return to the question, did immigrants matter? Yes, they did, in the sense that quite a lot did work in Norway. But they mattered also in a more precise sense – if we think counterfactually, might the situation have been radically different without them? I am on thin ice here, but the answer is probably no. The huge number of emigrants is the more important fact. Emigration – more than immigration – determined the available pool of general labour power. There was a surplus of labour, a chronic underemployment until the last decennia of the century. But the pool was exhausted, the pool was running dry, labour became relatively scarcer, and wages started to rise. The levels rose beyond that of Swedish wages, one obvious motive for the migration into Norway.¹⁹ Whether wages might have risen even further without the supply of Swedes, is a possibility, but hard to estimate.

In the absence of such calculations it is also difficult to answer another question: did the influx of Swedes along with the internal surplus of labour slow down the pace of mechanisation? Based on a simple or perhaps simplistic neoclassical production function theory, one might expect that the inducement to replace labour with machinery was less strong, given a plentitude of workers. Once more, the number on emigrants probably overdetermined the immigration.

Then, let us consider the next phase of the industrialisation process. That immigrants did matter in the expansion from around 1905 to 1920 is clear. But at this stage of research it is not possible to be exact about their share in different connections. To come up with more or less random examples is methodically not satisfactory. A real evaluation would have to include Norwegian efforts. Or one might compare the Norwegian case with the role of immigrants in other economies. But we simply lack reliable data, for instance, about foreign engineers as career migrants, even after vacuum cleaning available company histories. However, they did play an important role in branches like electro-technical industry, where foreign capital was prominent. They mattered more in some industrial milieus than others – the cities in Østfold, bordering on Sweden in the south of Norway, profited from Swedish initiative and

¹⁸ Jan Eivind Myre: Del II. 1860–1901, in K. Kjeldstadli (ed.) 2003: 'Andreas Svaestuen. Nordisk emigrasjon – en komparativ oversikt', i *emigrationen fra Norden indtil 1. Verdenskrig. Rapporter til Det nordiske historikemøde i Kobehavn 1971* København.

¹⁹ Knut Kjeldstadli: 'Industriarbejderklasse i Norden før 1920? En kommentar', in Kjeldstadli et al. (ed) 1994.

ingenuity. And in some firms they were not only useful, but a necessary precondition. In the case of Pechiney the firm ran into considerable, but not insurmountable difficulties when the French were conscripted.

How then to argue for lessened importance *after* 1920? First, ordinary labour immigration dwindled after 1920. There was a trend towards closure of the national labour market. This is partly due to a more restrictive policy towards labour immigrants, partly in cooperation with national unions and professional associations. The main reason, though, is the simple fact that there was not much point in economic immigration. There was serious unemployment, few jobs to go to. This had to do with the business crises, in addition to an emphasis on a new and different strategy by the employers. Workers were not used extensively, in huge quantities and with a slack tempo, as before. The use of labour became intensive, through increased rationalisation and mechanisation, implemented in order to increase both productivity and the intensity of work.²⁰ So, foreign wage earners stayed at home, a situation parallel to that of the youth in the rural areas of Norway.

A second reason for the shrinking importance of immigrants is the following. From a technological point of view the Norwegian economy became more mature. Import substitution through two, three generations offered a potential for learning, a new Technical University or *Haute École* in Trondheim in 1910 produced able candidates: in parenthesis – the establishment of the university was intimately connected with immigration, three of the first professors were Germans. This fact created some natural resentment linked to scepticism against the German tradition in technical education which was accused of privileging and isolating 'science' and 'theory' as opposed to American practical solutions.²¹

This double situation – economic crises and a tendency towards technical maturation – may be gleaned from the composition of Norwegian civil engineers. Ca. 10 000 graduated from 1901 to 1955. This figure includes both those who were educated at some national technical institution or enrolled as members of their association. Those who were born outside Norway, were few. I should add that many who were foreign born and trained and sent to Norway in the service of a mother company, probably did not bother to register with the Norwegian association. This holds in particular if they were what migration research refers to as sojourners, not intending their stay to be permanent. The figures underestimate their importance.

²⁰ Knut Kjeldstadli: *Jerntid. Fabrikksystem og arbeidere ved Christiania Spigerverk og Kværner Brug fra om lag 1890 til 1940*, Oslo 1989, p. 271.

²¹ Tore Jørgen Hanisch and Even Lange: *Vitenskap for industrien. NTH – en høyskole i utvikling gjennom 75 år*, Oslo 1985, pp. 43.

On the other hand, Norway exported its engineers. An uneducated guess is that at least one third, at most half at any one point in time or another was educated or worked abroad. Some were more or less permanent globetrotters. Take the prototypical case of Anton Sophus Bachke, born in the mining community of Sulitjelma in 1903, his father a mining engineer, himself graduating from Trondheim in 1927. Then followed a career as consultant and land surveyor in Brazil, power plant construction in Canada, copper mining in Chile, consultant work in Shanghai and Ningp in China and steel work in Australia, before he returned to work at a cement factory in Trondheim in 1937, where he remained, with the exception of a couple of years in Australia in the early 1950s. Return migrants like Bachke were numerous, most of his colleagues came back from USA, Germany or Sweden. They were probably more important in the transfer of technology after 1920 than immigrants born outside of Norway.

Many stayed on. By 1955 c. 17 per cent either lived abroad or had died abroad, the number rose to 29 per cent if we limit the selection to those who were educated abroad. Out of a total number of more than 1500, 45 per cent resided in the US, a pattern that went way back and aligned with general Norwegian emigration. Among the 18 per cent in Sweden and 8 per cent in Canada, the majority left after WWII. The very low numbers for Germany probably hide a substantial remigration to Norway.²²

The picture I have drawn of the situation after 1920 should be given a *retouche*. In his previously mentioned masters thesis, Magnus Otto Rønningen has looked into applications for work permits from Norwegian companies to The Central Passport Office. Also in the years of crises were foreigners needed and allowed to enter, for reasons already mentioned. The typical application would be a German erector, i.e. a highly skilled mechanic sent from a machine firm to install and assemble new machinery. Most of these labour migrants did not seek or obtain permanent residence, however.²³

A Closing Remark

My argument has been made within an economic-technological framework. There is also a social and cultural story about industrialisation and immigration, about encounters, clashes and learning processes. Issues of social class intertwined with different national styles. In 1914 a Swiss engineer, Konrad von Heuser, was almost thrown into the river by female textile mill workers at Nydalens Compagnie near Oslo. He had been brought in to modernise the factory, particularly to realise the

²² Bjarne Bassoe (ed): *Ingeniormatrikkelen. Norske sivilingeniører 1901–1955*, Oslo 1961, p. X-XV.

²³ Rønningen 2000, pp. 111–141.

production potential of the machinery both through rationalisation in the literary sense of doing things more rationally, and through intensification. Reflecting upon the events later on, one of the workers interpreted the clashes – I try to render his colloquial style – Heuser was ‘to introduce such as it was in Germany, you see, and there, I understood, there was much more compulsion in all things. People were not allowed to do neither this or that, and within this they lived, down there, whereas here they wanted the old, did not want anything like that.’ In the words of a female worker, who in fact both liked von Heuser personally and thought him right on many points: ‘...he thought he should beat us to become just like these Germans, but he took it in a totally wrong way, he should have thought that he might not beat us into anything.’ As I said, there is another story, but this I shall not tell today.