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**Working Paper**

## Restructuring and Internationalization of the Forest, Mining and Related Engineering Industries in Finland

ETLA Discussion Papers, No. 267

**Provided in Cooperation with:**

The Research Institute of the Finnish Economy (ETLA), Helsinki

*Suggested Citation:* Raumolin, Jussi (1988) : Restructuring and Internationalization of the Forest, Mining and Related Engineering Industries in Finland, ETLA Discussion Papers, No. 267, The Research Institute of the Finnish Economy (ETLA), Helsinki

This Version is available at:

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# Keskusteluaiheita Discussion papers

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RESTRUCTURING AND INTERNATIONALIZATION  
OF THE FOREST, MINING AND RELATED  
ENGINEERING INDUSTRIES IN FINLAND

No 267

19.08.1988

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ISSN 0781-6847

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RAUMOLIN, Jussi, RESTRUCTURING AND INTERNATIONALIZATION OF THE FOREST, MINING AND RELATED ENGINEERING INDUSTRIES IN FINLAND. Helsinki : ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 1988. 86 p. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847 ; 267).

ABSTRACT: Prevailing trends in the international economy during the 1980s such as slackening demand for raw materials, high interest rates, the introduction of new production technologies, the rise of NIC-countries, and advances in European integration have provoked severe adjustment problems in the peripheral economies in Europe.

The internal development problems associated with the maturing resource-based sectors have contributed to these adjustment problems in Finland. Most of the metal mines are at the point of exhaustion and few new discoveries have been made. The rapid rise of stumpage prices and the problems of availability of wood have posed new challenges to the forest products industry.

As a reaction, Finnish industry has undergone extensive rationalization, changes in production structure, restructuring of companies and rapid internationalization of production. Especially the mechanical wood industry has experienced a severe setback with many closures of sawmills. Considerable mergers have taken place in the pulp and paper industry. In addition, the Finnish companies have acquired companies and built new mills inside the European Community.

The engineering industries supplying the pulp and paper industries have experienced restructuring and internationalization as well, which has led to the formation of the largest paper machine manufacturer in the world. The leading mining and metal company Outokumpu Oy has acquired foreign mines and metal works and diversified into engineering and electronics industries.

The closures of mines and mechanical wood plants have provoked distress in the peripheral regions and the former accomplishments of the regional policy have been put into question. The trend that activities are becoming more concentrated in southern Finland is intensifying.

Although Finnish companies have acquired companies and built new mills inside the EC, direct integration with the EC seems to be out of question for political reasons.

KEY WORDS: Restructuring, internationalization, forest, mining and engineering industries, regional development, Finland.



# RESTRUCTURING AND INTERNATIONALIZATION OF THE FOREST, MINING AND RELATED ENGINEERING INDUSTRIES IN FINLAND

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A slightly revised version of the paper presented at the workshop "Nation State, the Region and the Spatial Organization of Power: the Dynamics of Centre-Periphery Relations" organized by European Science Foundation in Bergen, Norway May 26-29, 1988



## 1. Introduction

The industries in Finland, like in other industrialized countries in the West, have experienced a considerable restructuring during the 1980s. The most striking phenomenon has been the rapid internationalization of the Finnish industries, especially during the last few years. The curtailment of export possibilities to the Soviet market due to the low level of oil prices in the international market and a certain disorganization in the Soviet economic administration due to perestroika have contributed to this internationalization drive towards the West.

This restructuring process has become a major political issue as the new coalition government formed by the Conservatives and the Social Democrats, "the Unholy Alliance", after the parliamentary elections in 1987 has made "the policy of managed structural change" a major slogan of the Government.

A major item in the policy of structural change by the Government has been an increase in the public funding for research and development. Traditionally, the relative size of industrial R&D effort in Finland has been low compared with the leading industrial nations of the West but now the official target is to attain the Swedish level. Most of the increase in public funding for R&D is dispensed by the Ministry of Trade and Industry through diverse agencies.

Paradoxically enough, no studies have been undertaken about this industrial restructuring and the spurtlike internationalization as yet. In fact, there are serious gaps in the Finnish research in view of the tasks ahead. No scholar is specialized in industrial geography in Finland. Only a few scholars practise industrial sociology, industrial economics, or regional economics. Studies regarding the world economy do not belong to the Finnish research traditions. On the other hand, the aggregate statistical analysis prevailing



among professional economists is hardly appropriate to the analysis of new dynamic phenomena<sup>1)</sup>.

The FIBO-Project in the Helsinki School of Business Administration has dealt with the internationalization of Finnish companies since the middle of the 1970s, but its aims are to serve primarily the strategies of the companies. Larger issues related to the internationalization process of the Finnish economy are not taken into consideration. The adjustment problems of the Finnish economy vis-a-vis the exports from the developing countries are dealt with in some studies as well. These studies do not, however, cover the new dynamics since the middle of the decade (cf. Luostarinen 1979, 1982, Kiljunen 1985).

The study of the restructuring and internationalization of the Finnish economy in the 1980s is therefore a great challenge. In this paper, the focus is on the two resource-based industries, the forest products industry and the mining and metal industry. It is possible to characterize the structural change in Finland by means of these two industries as they are also closely related to the engineering industry.

This study is a continuation of my former studies on the development of the forest sector and the mining sector and on regional development in Finland. A good indicator of the speed of the change is that although my most recent studies

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1) The Research Institute of the Finnish Economy (ETLA) has carried out an analysis of the major structural changes in the Finnish economy in one of its reports last year, see ETLA 1987. The sociologist Matti Kortteinen has written a critical evaluation of the "managed structural change", cf. Kortteinen 1987. It is an interesting order of things: critical books have been written before undertaking serious research on the core of recent transformations.

stem from the year 1986, a major effort has been necessary to update and upgrade the analysis (cf. Raumolin 1985b, 1986a, 1986c, 1986e).

In this paper, I shall first deal with some theoretical issues related to the problem-field, and then I shall turn to the forest products industry and the mining and metal industry. After this, I shall focus on the engineering industry and regional development problems. Finally, I shall, among other things, deal with the role of Finland in the changing industrial centre-periphery relations in Western Europe.

## 2. Some Theoretical Issues

The problem complex related to the theme of the study is quite complicated. Involved are such theoretical issues as the new international division of labour and the adjustment problem of a peripheral economy, multinationals from small countries, small state and European integration, location of the pulp and paper industry, location of the mining and metal industry, restructuring and concentration in resource-based industries, development of the engineering industry, and regional development problems and policies.

Taking into consideration the limited aims of this study, only a few theoretical notes will be presented in the following. As regards the adjustment problem of the peripheral industrialized economy, typical of them is the economic structure dominated by manufacturing branches producing low skill and standardized products whereas branches producing high skill and innovative products are poorly the presented. This kind of economic structure is vulnerable to the competition from, for instance, the newly-industrialized countries (see table 1.).

Table 1.

## PATTERNS OF INDUSTRIAL SPECIALIZATION

		Human capital intensity	
		low skill/ standardised	high skill/ innovative
Value-added content	intermediates	leather, wood, textiles, non-metal min. pulp, paper, iron and steel	rubber, chemical
	final products	furniture, clothing footwear, miscellaneous basic metal, transport equip.	pharmaceuticals instruments, industrial mach. electrical mach.

Source: K. Kiljunen: Industrialisation in Developing Countries and Consequent Trade-Related Restructuring Constraints in Finland. Helsinki 1985 p. 51.

The reasons for the internationalization of the companies from small peripheral industrial countries embody both push and pull factors. The push factors comprise the restricted home market and the open character of the economy whereas the pull factors include the openness of and possibilities offered by the international markets (cf. Luostarinen 1982).

The analysis of industrial dynamics based on the product cycle view does not consider the maturity situation hopeless. A strategy of de-maturing involves, for example, competitive product profiling and technological upgrading of production. Access to new technology includes many options, such as internal research and development, acquisitions, licensing,

joint ventures, and strategic alliances (cf. Downy & Nikolchev 1986).

Turning to the discussion on European integration, the classic article of the German economist Herbert Giersch stressed the key role of transportation costs:

"The locational consequences of the formation of, for example, a Western European Union can now be described by the following general statement: the abolition of barriers to inter-European trade and to inter-European movement of factors will weaken the deglomeration effect of national agglomeration and will thus enforce international, or more precisely, inter-European, agglomeration. It will strengthen the attractiveness of the highly industrialised centre both for labour and capital. Towns and regions with artificial advantages due to national agglomeration will become disadvantageous. On the other hand, particular regions near to industrial centre, which have suffered under the depressing influence of national border, will gain instead (Giersch 1949/1950 p. 91)".

The Austrian economist Kurt W. Rothschild has, on the other hand, stressed the economic importance of a country's size, which has been traditionally neglected in integration theory. According to him, superior financial resources are as important as technological and organizational efficiency in the struggle for markets between the oligopolies. Since the largest enterprises are generally found in the large countries, the integration will create a tendency of the most dynamic enterprises to move their centre of activities from the small to the large countries. The agglomeration effects of large industrial and population centres will reinforce this tendency (Rothschild 1944, 1963).

This tendency could be modified by a deliberate regional policy. The integration of the small countries into a large economic space will, however, eliminate the opportunities for such a policy. That is why a policy of low tariffs, or regional preference agreements, would better meet a small country's aims for economic development.

The French economist Sylvain Wickham relativized the former theoretical views on economic integration in his book about European industrial space in 1969. He contended that some small countries seem to have experienced a more rapid growth than the large ones. Expansion took place in many coastal areas whereas several traditional industrial regions experienced decline. In fact, the formation of the EEC and the opening of the era of cheap oil and the fall of maritime transportation costs had taken place almost simultaneously (Wickham 1969).

Typical of industrial development was the increase in plant size, the rationalization of production and the concentration of enterprise. Automation and engineering knowhow transformed the process industries. The industries could be divided into three groups: new and innovative, maturing, and old and stagnant. Structural change in the industry led to the closure of old, small and inefficient plants all over, which made regional development problems more critical.

The trend toward concentration of population and the polarization of urban structures led to the formation of huge national consumption centres in Western Europe. The future of small towns did not seem to be promising. Wickham foresaw, however, possibilities of equalizing regional development opportunities in the long run. New transportation techniques, energy sources and production technologies would change location factors in favour of small towns. The growing geographic separation between corporate headquarters, production units and research laboratories had a parallel impact.

Wickham made an effort to synthesize the analysis of abstract economic space and concrete geographic space, macroeconomic analysis and dynamic industrial economics: this approach was not theoretically elegant, but it produced interesting and important results.

When the second enlargement of the European Community took place at the beginning of the 1980s, it is interesting to note that the spell of abstract economic theories of integration had somewhat disappeared. A kind of political economy approach was common to the representatives of Institut für Weltwirtschaft an der Universität Kiel, British development economists and Hungarian experts on the world economy (cf. J.B. Donges et al. 1982, D. Seers & C. Vaitzos (eds.) 1982, F. Kozma 1982).

A scholar from the European periphery interested in the European integration would nowadays like to have at his or her disposal a recent book about the European industrial space both on an abstract economic level and in a concrete geographic setting. Would this task be too demanding for big research institutes or large university departments inside the EC?<sup>2)</sup>

In turning to theories on location of the pulp and paper industry, one has to move over to the North American Continent where a large integrated economic space has formed an excellent laboratory for studies in locations of industrial activities. The German economist Andreas Predöhl dealt with the location of the pulp and paper industry in his fundamental studies of the location of industries in the USA in the 1920s (Predöhl 1929).

After the abolition of the tariff on newsprint in 1913 the American newsprint industry moved to the periphery of the continent, to Canada where ample hydropower and pulpwood resources were available. New large integrated mills were built in the backwoods. The woodpulp and newsprint industries were typical centrifugal industries oriented toward raw materials.

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<sup>2)</sup> The British geographer Peter Dicken has carried on an effort in this direction during the last few years, cf. Dicken 1986.

On the other hand, other branches of paper fabrication, such as book paper, fine paper, printing and writing paper industries preserved their traditional locations in the Northeast and Middle West. These non-integrated mills were protected by the tariff and less dependent on the location of raw materials sources. The development of new forest industries in the Pacific Northwest and in the South did not seem to change the established interregional division of labour. The production of kraft paper from southern pinewood started to create a new rapidly growing centre of the pulp and paper industry in the South.

The American economist Helen Hunter has narrowed down the reasons for the locational inertia of the seemingly inefficient mills in the Northeast and Middle West. These were: 1) the relatively high proportion of fixed to total costs and the durability of machines and buildings, 2) the adaptability of paper machinery to the production of different grades of paper, 3) the slow growth of consumption of high-grade paper compared to other grades of paper, 4) the availability of imported pulp, and 5) the tariff on high-grade paper (Hunter 1955).

The forest economist David S. Dealey who dealt with mergers in the forest products industries in the USA in the 1950s, established that a movement of mergers which surpassed anything similar in history was taking place after the World War. One of the major reasons was a shortage in the timber supply. The companies aimed at a control of wood resources and stumpage prices by acquisitions and vertical integration of production. On the other hand the new possibilities for integrated use of wood resources led to a growing integration of manufacturing facilities. These development trends stressed the necessity of a sustained management of forests (Dealey 1958).

The mergers made possible a more efficient use of capital in the building of new capital-intensive production units as well. The opportunities of small firms were hampered by evident technological and financial disadvantages. The present trend in the forest products industries was toward large-scale and integrated operations backed by large timber holdings.

In view of the developments in North America, the discussion in Western Europe dealt with more traditional issues. The plans for the creation of a large common market provoked discussion between the interests of the Nordic pulp and paper industries and that of the Continental industries. The Managing Director of the Federal Ministry of Economics in FRG, Robert Aengeneyndt, expressed the Continental point of view (Aengeneyndt 1959).

According to him, the step-by-step abolition of customs and trade restrictions on the part of the Common Market should be followed by the establishment of free access to raw material through suppression of existing export restrictions of timber, free investment rights within the area, free acquisition of woodlands, and free movement of labour. If free trade of forest products were to be established in Western Europe, these considerations should be applied to the case of major exporting nations as well.

In view of the competitive advantages of Europe's heavily wooded countries, a policy of self-restriction of the capacity increases should be created to preserve a competitive balance between the Continental industries and the industries in the major exporting nations. A transitional period would allow the Continental industries to undertake any necessary adjustments.

The Managing Director of the Swedish Paper Mills Association Ewert Landberg presented the Scandinavian point of view. He



remarked that Scandinavia lacked fossil fuels and was partly dependent on costly imports for energy production. The advantages of the large-scale integrated production of pulp and paper were most evident in such grades as were suitable for long production series, particularly newsprint, and kraft paper (Landberg 1958).

On the other hand, Scandinavia did not possess special advantages as regards such grades as writing and printing paper, cheap wrapping paper, high quality special papers and most grades of board. As the Continental mills were located close to large consumption centres, they enjoyed evident advantages in the possibilities of integration into the end-use stage. The Scandinavian pulp industry was continuously interested in maintaining its pulp exports to the Continent. It was obvious that the establishment of a large free trade area would lead to a growing specialization of production favourable to the consumers of paper and board and related products.

During the 1960s when the new competition of the American pulp and paper industry was experienced in the European market, some Nordic experts turned their eyes towards the American model. The Swedish economic geographer Gunnar Alexandersson presented a comparative study on the pulp and paper industry in North America and in the Nordic countries. In view of the building of huge new integrated mills in the southern USA, he proposed the building of new integrated sulfate pulp mills in the northern periphery of Europe. There were also theoretical possibilities of building a new capacity in the southern periphery of Europe based on rapidly-growing plantations of eucalyptus (Alexandersson & Geijer 1966).

From the American point of view, the organization of the European pulp and paper industry was irrational. There were small non-integrated and geographically separated mills dispersed all over. The American pulp and paper companies were

much larger than the European ones. Unlike the Nordic companies which often had interests in many branches, they concentrated on the forest products industry. A crucial question for the future of the European pulp and paper industry was whether the integration of operations should take place through the initiative of Nordic or Continental companies.

According to the Finnish consulting engineer Risto Eklund, the core of the integration problem in the forest products industries was the vertical integration on the level of an industrial establishment: the technical integration of two or more consecutive stages of the production process. Other important forms of integration were joint sales agencies and the pooling of overseas shipments which could also provide considerable economies of scale (Eklund 1967).

Western Europe was lagging behind North America in integration. The average size of mills had, however, grown rapidly in some sectors in Sweden and in Finland during the Mid-1960s following the American example. The Finnish industry in particular was becoming the most "Americanized" in Europe.

From an international point view, new trends in the integration process included such things as European participation in joint ventures in North America to ensure supplies of bulk type products, North American expansion to Europe to ensure market outlets, and international investments within Europe aimed at the promotion of vertical integration.

As regards changes in factors of location, the expansion in the use of cheap oil had made the industry less dependent on traditional local energy sources in Europe. For its part, the development of free trade areas had changed the influence of customs tariffs. New factors of growing importance included water and effluent problems and low-cost shipping of

final products. For instance, specially designed vessels and the use of large unit loads were reducing the influence of sea distances.

Growing use of wastepaper made it possible to locate large sectors of the paper industry close to the consumption centers in Western Europe. The production of special grades which did not provide economies of scale or which did not gain much from integration would increase in the Continent. The integration of paper production and paper conversion was proceeding in view of expanding markets.

A striking phenomenon is the absence of the analysis of the development of the European pulp and paper industry by economists and industrial geographers during the last few decades. Is it so that this sector is not interesting enough as compared with other industrial sectors? Reviews in professional journals or reports by consulting bureaus, ministries of trade and industry and international organizations are no substitute for scientific research (some exceptions to the rule are Windhorst 1981 and Lewis 1981).

The founders of modern location theory, Alfred Weber and Andreas Predöhl, classified the mining industry as being among those industries oriented toward raw materials like the sawmill, pulp and newsprint industry. Traditionally metal mines, smelters and works were located close to each other in Central Europe. The exhaustion of mines and the opening of new mines in other continents, however, changed this situation radically during the last century. When Wilhelm Avieny, Director of Metallgesellschaft A.G., dealt with structural changes in the world economy of mining and non-ferrous metal production during the period of industrialization, he touched upon many locational issues (Avieny 1941).

Smelters of non-ferrous metals shifted to harbour locations where concentrates were imported from all over the world.

Avieny presented many arguments why this situation was justified by paying special attention to the case of zinc. The smelting of zinc needed a special knowhow and qualified labour force which had accumulated in Western Europe during the centuries. As large amounts of coal were necessary in the reduction process, the smelters should be located close to large coalfields such as the Ruhr region. The rational utilization of the high content of sulphur in zinc ore presupposed the building of sulphuric acid plants close to zinc smelters. This chemical industry together with the linked fertilizer industry could only be profitable when located close to major consuming centres. The same kind of arguments could be applied to the cases of other non-ferrous metals, especially concerning the stage of refining.

The foundation of many new independent states which adopted economic nationalism started to change former structures after the Great European War 1914-1918. These agrarian states aimed at industrialization by using the natural resources at their disposal for the building of a national economy. Smelters and even refiners of non-ferrous metals had been erected, for instance, in Yugoslavia, Romania, Hungary and Finland. This created an overcapacity in smelting, especially in Central Europe.

Since Anglo-Saxon mining companies controlled the world trade, and as the supplies of non-ferrous metal products became more and more dependent on foreign sources, the adoption of alternative strategies was necessary. The use of scrap metal had to be increased wherever possible. The utilization of substitutes, such as aluminium, ceramics, glass, steel and wood had to be promoted.

The Canadian resource economist Anthony Scott presented a view of the development of the extractive industries at the beginning of the 1960s which was very different from the Central European shortage point of view. Scott had adopted

the North American vision of abundance. The development of the extractive industries, such as the mining industry, passed through three stages: the first or primitive stage, the second or capital-intensive stage and the third or controlled stage (Scott 1962).

Typical of the first stage was a shortage of metals. The mines were under common ownership and hand tools were used in extraction. Industrial organization was small-scale and local. In the second stage, great amounts of capital and energy were used in extraction, which made it possible to increase considerably the supply of metals. The exploration activities became systematic and scientific. Large metal companies integrated backwards to the mining industry so as to gain control of raw material supplies. Their expansion to the underdeveloped countries created externally-oriented enclaves. Private ownership or permanent tenure of mines were a mark of this stage.

The existence of substitutes and raw material abundance characterized the third stage. The role of scientific research became more and more pronounced in the production. Many backward and forward linkages developed around the metal industry in the industrialized West. The industry integrated forward towards the consumer and the adoption of a market-oriented strategy was necessary for the survival of the companies. As the mining industry in the underdeveloped countries still remained in the second stage, it was facing the danger of losing markets for its bulky standardized products.

The location of the mining and metal industry is a complicated issue; no simple answers are possible. The issue becomes even more complicated as concerns the industries supplying the forest products industry and the mining and metal industry. In fact, there are no studies of the development of these industries on an international level. And if

such sector profiles are missing, it is difficult to undertake relevant research on national development paths, especially in the periphery.

The specialists in geography of manufacturing and industrial economics have traditionally had a certain bias vis-a-vis big and beautiful, i.e. steel, oil, motor vehicles, chemicals, aircraft, textiles etc. It is of course much more difficult to gain information on smaller and seemingly insignificant industries. The scholars should maybe become better detectives ...

The source material used in this study leans heavily on my personal collection of information about Finnish companies since 1982. This mainly consists of news and feature articles from different periodicals and newspapers, principally from the leading newspaper in Finland, Helsingin Sanomat, and the economic weekly Talouselämä. It is perhaps one of the advantages of a small country that it is possible to collect considerable information about all the significant companies whereas this is impossible in a large country.

### 3. A Note on the Finnish Economic Structure<sup>3)</sup>

Finland is the most forested land per capita in Europe. She has enjoyed evident comparative advantages in the building of a dynamic forest products industry. Among the industrialized countries Finland is still the most dependent on the exports of forest products.

During the industrialization phase, Finnish industries have been able to create diverse backward and forward industries around the forest product industries. These include, among other things, paper machinery production and consulting engineering services.

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3) cf. Raumolin 1985b, 1986c.

Although, domestic mining resources in Finland have not been notable in the European scenery, a dynamic copper industry was created on the basis of a large deposit. Later on, this industry has expanded to a diversified multimetal industry. Many linkages have also been built around the mining and metal industry in Finland.

Domestic energy resources have been quite limited in Finland. Wood and comparatively small hydropower resources have been traditional domestic energy sources. Instead, all the fossil fuels have been imported. It is a certain paradox that the main export industry, the pulp and paper industry is quite energy-intensive.

The diversification of the exports from the absolute dominance of forest products took place quite late, starting in the late 1960s. Finland became associated with EFTA in 1961 and made a free trade agreement with the EC in 1974. Bilateral trade with the Soviet Union has been important since 1945.

Large domestic concerns have dominated the enterprise structure since the beginning of this century. These concerns have had interests in many branches, mainly in the forest products industry and the engineering industry. The stock market has not been important traditionally in Finland. Instead, big commercial banks and insurance companies have exerted control of the industries.

After Finland gained independence in 1917, public enterprise has played an important role in energy production, the mining industry, metal industry, forest products industry, chemical industry and engineering industry. Due to strong domestic enterprise, the restricted home market and public regulation, there has been traditionally little foreign direct investment in Finland.

During the last few years, the line between private and public companies has become more and more obscure. The state-owned companies and private companies have established joint ventures, an increasing shift of managers between the public and private sector is taking place, and the state is funding joint research and development projects. The Ministry of Trade and Industry has initiated a policy of diversification of shareholding of the state-owned companies including their entry into the stock market, but it will keep a majority of the shares in its hands. In general, the government has liberalized the money market in Finland.

#### 4. The Forest Products Industries

##### 4.1. The Background<sup>4)</sup>

A prevailing trend in the world economy of forest products during the last few decades has been the rise of production in the South. Many developing countries, especially NIC-countries have promoted an import substitution policy in forest products. In addition, exports of sawngoods and plywood have increased thanks to cheap wood and labour costs. Finally, exports of chemical pulp have expanded on the basis of rapidly-growing plantation forests particularly from Portugal and Brazil.

In the industrialized West, the paper production using waste paper as a raw material has extended to new grades, such as newsprint. On the other hand, advances in quality control of pulp and paper, and new accomplishments in process control have made it possible to manufacture traditional high-grade papers with fast and large paper machines. High-grade papers are becoming new bulk products!

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4) cf. Eklund 1978, Raumolin 1984b, Rolo 1985, Kiljunen 1986, Lewis 1987.



The continuous introduction of new production technologies, the increase in mill size, and the adoption of new pollution control measures as well as inflation and high interest rates have considerably raised the costs of new mills. The upgrading of old mills has become very expensive as well. As the dynamic pulp and paper companies are investing continuously, they have become heavily indebted.

In general, the international trade of the forest products has grown more slowly than during the 1960s and the early 1970s. A heavy recession took place at the beginning of the 1980s whereas the trade of paper and paper products has experienced an upward cycle since 1984. The particular demand for such grades as printing and writing papers, copy paper and speciality papers has been strong. Instead, the trade of sawngoods has experienced a recession due to the loss of the booming market in the Middle East and to a certain saturation of demand in the industrialized West.

Concentration and mergers have characterized the development of the enterprise structure. Striking changes have been taking place in the USA while new dynamic enterprises have progressed in the Pacific Rim Area. On the other hand, several old and small paper mills have been closed in the European Community.

When the custom tariffs for paper and board came down in England during the EFTA period, the British pulp and paper industry experienced a heavy restructuring and decline. The British industry was not able to meet the Nordic competition in bulk products except for some large companies as Bowater and Reed, which had internationalized their production already earlier.

After the establishment of free trade in forest products between the EC and EFTA in 1984 and the enlargement of the EC towards the Mediterranean region, the traditional pulp and

paper industry is meeting with heavy competition from the side of the Nordic industries. In addition, new dynamic enterprises are developing in the Iberian peninsula on the basis of rapidly-growing eucalyptus plantations. The forest products industry on the Continent will be facing large-scale restructuring toward the end of this millenium.

#### 4.2. The Pulp and Paper Industry<sup>5)</sup>

Like the international conditions, the internal conditions of the Finnish pulp and paper industry have changed considerably during the 1980s. The wood market has become unpredictable and more complicated than before. The structural change of ownership in private small-scale forests, the dominating form of forest ownership in Finland, has shifted the control increasingly from the hands of farmers to absentee town-dwellers. The supply of high quality pine logs and birch logs is insufficient. Relative shortage situations have become the rule during the upward cycle and the stumpage price has attained a high level, internationally speaking.

Since the forest products have lost their traditional dominant position in the Finnish exports, the forest products industries and the related interest groups are no longer capable of imposing their view with regard to foreign exchange policy. The Government and the Bank of Finland are not willing to moderate inflationary pressures and special sectoral problems by drastic devaluations as was the case during the 1950s and 1960s. Instead, the Bank of Finland has raised interest rates, which has provoked difficulties for the heavily indebted pulp and paper industry.

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5) cf. Raumolin 1986a, Ryti, Seppälä & Sormanto 1986, Ehrnrooth & Kirjasniemi 1987.

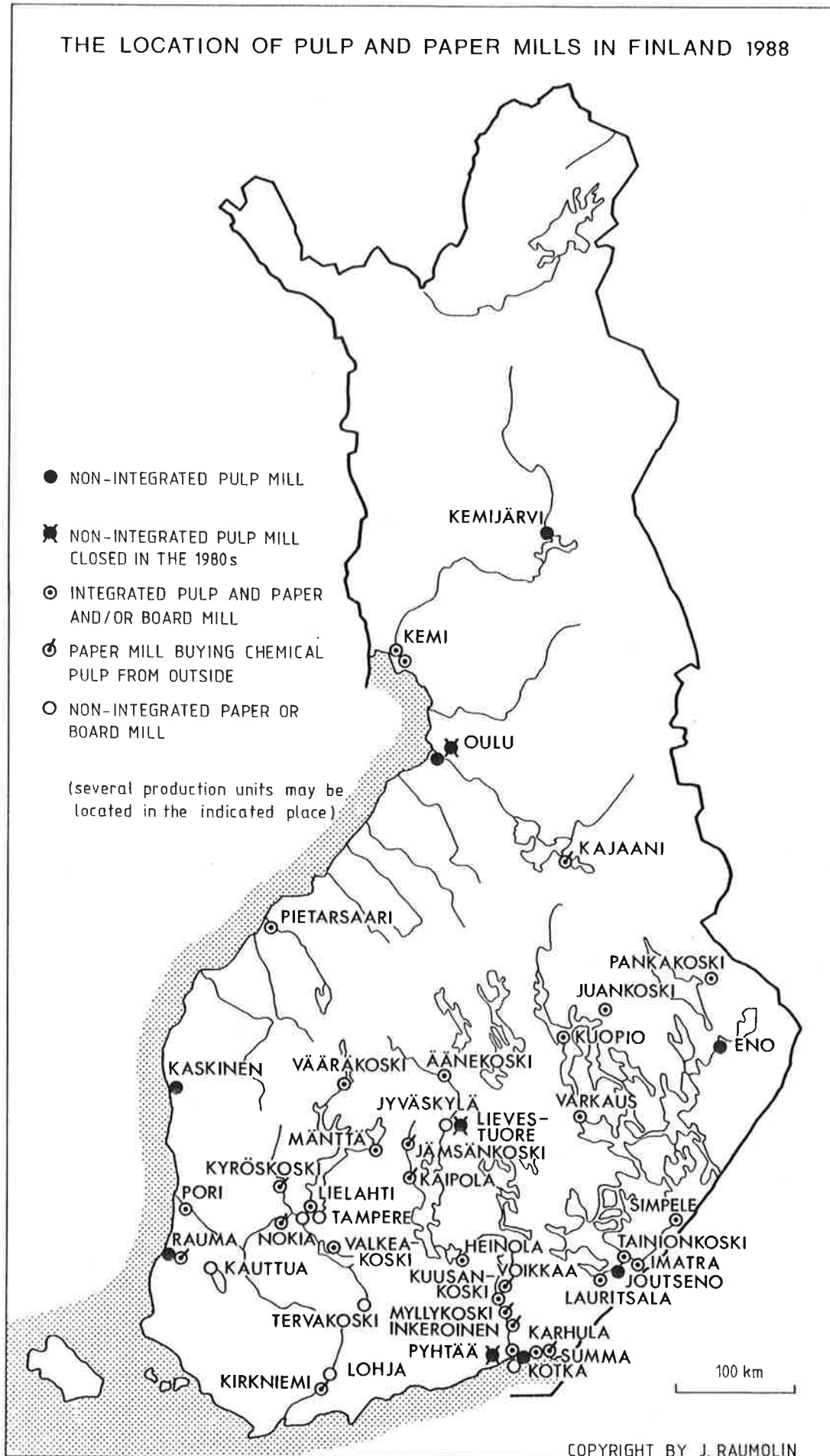
The shift to the new thermomechanical pulping method, with its very energy-intensive character, has caused conflicts in the energy policy. The pulp and paper industry has asked for the building of new nuclear power capacity whereas most of the people and the government have not been enthusiastic about such a solution, particularly after the Chernobyl accident. The industry is claiming that it has to curb the building of new pulp and paper production capacity in Finland due to the negative attitude vis-a-vis nuclear energy.

In general, environmental issues have become more sensitive than before in Finland during the 1980s. For instance, the impact of airborne pollution has gained greater prominence in public discussion. The companies have to adopt stricter measures to cut down on the pollution of water and air.

The official techno-intensive forestry idea making obligatory the use of clear cuttings, heavy site preparation, plantation of monocultures, forest drainage and fertilization, and the use of herbicides is called into question in critical evaluations. Some private small-scale forest owners are revolting against official forest management practices. The conservation movement has asked for the expansion of the network of natural parks and gained some victories, especially in northern Finland, where the landscapes produced by industrialized forestry are considered unattractive by the tourist interest groups as well.

Because the pulp and paper industry tend to be on the wrong side of many issues sensitive to many Finns its public image has somewhat deteriorated. This has resulted, among other things, in difficulties in hiring qualified personnel among the youth entering the labour market. The industry has reacted by organizing large-scale public relations campaigns.

Map 1.



As concerns the reponse of the industry to the new competitive challenges, investment in new production technology has continued since the middle of the 1970s. Traditional groundwood and sulfite pulp installations integrated to paper mills have been replaced by new thermomechanical (TMP) or chemithermomechanical (CTMP) pulp or pressure mechanical groundwood (PMG) installations.

The production of sulfate pulp has become concentrated in large units with production capacities of 300,000 - 500,000 tns per year. Consequently, several paper mills resort now to chemical pulp from external sources. The older generations of paper machines have been replaced by new large and fast ones with a production capacity of 100,000 - 200,000 tns per year. The aim of the actual expansion of process control is to create millwide automation systems. Multi-sided forest products manufacturing integrates have been built in Lauritsala, Varkaus and Kemi (cf. Map 1).

A shift to new products has taken place rapidly since the middle of the 1970s. Professor Niilo Rytö and Risto Eklund, the leading strategists of the industry associated with the consulting engineering company Jaakko Pöyry Oy, foresaw the erosion of the competitiveness of many traditional bulk products exported from Finland, such as sawngoods, chemical pulp, kraftliner board, kraft paper and newsprint. They proposed a shift to higher value-added products, such as special boards, paper products, speciality papers, and particularly to groundwood printing and writing papers. The competitive advantages in Finland, the development of the demand and the coming abolition of custom tariffs in the European Community favoured investment in such grades.

This shift started already during the investment wave in the middle of the 1970s. It was consolidated during the investment wave at the beginning of 1980s and continued during the recent investment wave in the Finnish pulp and paper in-

dustry. Consequently, Finland has become by far the leading exporter of printing and writing paper in the world (cf. Table 2).

Table 2

THE SHARE OF FINLAND IN THE WORLD EXPORTS OF PAPER IN 1985

Paper and Paperboard Total		Printing and Writing Paper	
	%		%
1. Canada	24.4	1. Finland	28.2
2. Finland	15.5	2. FRG	12.5
3. Sweden	13.2	3. Austria	9.1
4. USA	8.0	4. Canada	7.5
5. FRG	7.4	5. Sweden	6.9
6. France	3.4	6. France	6.4
7. Austria	3.2	7. Italy	4.9
8. Norway	3.2	8. Netherlands	3.9
9. Netherlands	3.0	9. Japan	3.3
10. USSR	2.6	10. Brazil	2.4
Others	16.2	Others	14.9
World total	100.0	World total	100.0

Source: The Finnish Forest Industries' Information Centre:  
Basic Statistics of World Forest Industries in 1985.  
August 20, 1987.

The internationalization of the Finnish pulp and paper industry has speeded up simultaneously. The acquisitions and investments are mainly directed toward the European Community whereas the expansion to North America has been quite limited. As Western Europe is the main market area of the industry, a logical consequence of the shift to higher value-added products is a drive closer to the market.

Previously, the acquisitions of the Finnish pulp and paper industry aimed at gaining a stronger position in the market of fine paper, packaging, and tissue and paper conversion products. The large fine paper mill jointly erected by Oy Kaukas Ab and Kymi Oy in northern Germany in the late 1960s inaugurated a new trend in investment. The erection of this mill was subsidized by the Government of the FRG in the interest of regional policy (cf. Table 3.).

Finnish companies have acquired Continental mills for the support of their strategies of increased market penetration in selected grades and market segments. In addition, Yhtyneet Paperitehtaat Oy (United Paper Mills) has recently built a large newsprint mill in Wales and Kymmene Oy is building a large LWC (light weight coated) printing paper mill in Scotland.

The reasons given for the building of these new mills just in Great Britain include the existence of secure wood and energy supplies and the subsidies given by the British Government in order to promote regional development in the peripheral areas. In addition, there are gaps in the British production after the decline of the British enterprise.

The Finnish expansion to the Continent is still continuing. Yhtyneet Paperitehtaat and the Norwegian company Norske Skog A/S have struggled for the control of Cellulose de Strasbourg S.A. (Stracel), which is a small producer of sulfite pulp. Yhtyneet Paperitehtaat has presented a plan to erect a large newsprint mill close to Strasbourg. The former French Government took the side of Norske Skog whereas the new Government after the elections made a decision in favour of Yhtyneet Paperitehtaat. The Norwegian Government has negotiated with the French Government about possible cooperation in the oil industry, whereas the Finnish Government has decided to buy Crotale missiles and radar systems from the French company Thomson-CSF.

Table 3

## SUBSIDIARIES OF FINNISH PULP AND PAPER COMPANIES IN THE EC IN 1988

company	subsidiary or associated with	country	products	year of acquisition or foundation
Kymmene Oy	Star Paper Ltd	UK	fine paper mill	1930
Rauma-Repola Oy	Paproback Ltd (50 %)	UK	bag factory	1960
Yhtyneet Paperitehtaat Oy	Downings Ltd	UK	paper conversion	1962
A. Ahlström Oy	Cartier Bosso S.p.A.	Italy	fine paper mill	1963
Kymmene Oy	Schauman Emballages S.A.	France	bag factory	1966
Kymmene Oy	Nordland Papier GmbH (new company)	FRG	fine paper mill (built a new mill)	
Oy Nokia Ab	Sodipan-Nokia S.A.	France	disposable soft tissue products	1969
Oy Tampella Ab	Tampella Espanola S.A.	Spain	board mill	1971
Oy Nokia Ab	British Tissues Ltd (50 %)	UK	paper and sanitary products	1973
Metsä-Serla Oy	Fin-Crepe A/S	Denmark	sanitary products	1976
Kymmene Oy	Papeteries Boucher Docelles S.A.	France	fine paper mill	1977
A. Ahlström Oy	Euro Lanzo S.p.A	Italy	laminated packaging	1977
Yhtyneet Paperitehtaat Oy*	Hunt & Boardhurst Ltd (80 %)	UK	paper conversion	1977
Yhtyneet Paperitehtaat Oy	Walki GmbH	FRG	paper conversion	1978
Oy Nokia Ab	Nokia Ltd	Ireland	disposable soft tissue products	1979

\* Yhtyneet Paperitehtaat sold its assets in the company to Pergamon Holdings Ltd in June 1988.



company	subsidiary or associated	country	products	year of acquisition or foundation
Enso-Gutzeit Oy	Enso Rose Ltd	UK	rerolling & wholesale	1979
A. Ahlström Oy	Kämmerer GmbH (98 %)	FRG	fine paper mill	1979
Metsä-Serla Oy	Stuart Edgar Ltd (67 %)	UK	sanitary products	1980
Yhtyneet Pape-ritehtaat Oy	Walki Converters Ltd	UK	paper conversion	1980
Yhtyneet Pape-ritehtaat Oy	Shotton Paper Co Ltd (new company)	UK	newsprint (built a new mill)	1982
Enso-Gutzeit Oy	Berghuizer-Enso Formaafabriek B.V. (50 %)	Netherlands	sheeter	1982
Metsä-Serla Oy	Tissu Canarias S.A. (63 %)	Spain	sanitary products	1983
A. Ahlström Oy	Ahlström Tubes Ltd	UK	cartboard cartridges	1984
Yhtyneet Pape-ritehtaat Oy	Raflatec Ltd	UK	laminated papers	1984
Rauma-Repola Oy	Sterling Coated Materials Ltd	UK	silicon papers	1985
Metsä-Serla Oy	Neopac A/S	Denmark	linerboard	1985
Metsä-Serla Oy	Cartonpack S.A.	Greece	linerboard	1985
Oy Myllykoski Ab	Gebrüder Lang GmbH	FRG	newsprint	1986
A. Ahlström Oy	Croydon Tubes Ltd	UK	cartboard cartridges	1986
Kymmene Oy	Caledonia Paper Ltd (new company)	UK	LWC-paper mill (under construction)	1987
Yhtyneet Pape-ritehtaat Oy	Walkisoft GmbH (new company)	FRG	tissue paper	1988
Yhtyneet Pape-ritehtaat Oy	Cellulose de Strasbourg S.A. (Stracel) (50,04 %)	France	will build a newsprint mill	1988

Sources: Data provided by the Central Association of Finnish Forest Industries; surveys of foreign investment in the economic weekly Talouselämä; company news in the newspaper Helsingin Sanomat.

An internal rationalization of the operations took place in the major pulp and paper companies during the 1980s. They have sold their interests in other branches, such as the shipping industry, chemical industry and engineering industry inherited from the earlier decades. The leading companies Kymmene Oy, Enso-Gutzeit Oy and Yhtyneet Paperitehtaat Oy have concentrated their forces in the forest products industry (cf. Tables 4., 7. and 8.).

A restructuring of the companies has also been a part of the structural change of the pulp and paper industry in the 1980s. Experts had proposed a formation of larger companies since the late 1970s, but a combination of heavy indebtedness, high interest rates and difficulties in raising funding for new investments was needed to spark the process in the middle of the 1980s. The example of the concentration and merger process that occurred in Sweden a little earlier also had an impact of its own on the process in Finland.

Many reasons have been given to justify the formation of larger forest products companies in Finland. Larger companies are more able to collect wood and use the raw material at their disposal more efficiently. They have a better capacity to raise funding for new investments. There are evident economies of scale in the building of internal research and development facilities. Large companies can enjoy the advantages of large product assortment. Only large companies have sufficient resources to establish an international marketing organization of their own. In addition, only large companies can meet the challenge of the giant American companies.

After the restructuring and merger process started in 1985, it expanded rapidly throughout Finland. Historically seen, the pulp and paper industry had experienced a large restructuring and merger movement only once before at the beginning of this century when the major companies were formed. The

current restructuring and merger process has not been rational from the point of view of the industrial economy in all its aspects. It has been most difficult to get around the demarcation lines dividing the influence spheres of the leading commercial banks, the Union Bank of Finland (SYP) and the KOP-Bank. And when party political interests and the Government became involved in the restructuring of the northern industries the whole process became a great dramatic event (cf. Table 4.).

The most striking merger was the formation of Kymmene Oy on the basis of the former companies Kymi-Strömberg Oy, Oy Kaukas Ab and Oy Wilh. Schauman Ab. All these companies belonged to the sphere of the Union Bank of Finland (SYP). The strategist of the merger was Casimir Ehrnrooth, Managing Director of Kaukas, who became the Director General of the new company. Kaukas was a much smaller company than Kymi-Strömberg but it had consistently been able to shift its production toward printing and writing paper, built an efficient manufacturing integrate in Lauritsala and showed good profits. Kymi-Strömberg, on the other hand, lacked a clear strategy and had run into difficulties.<sup>4</sup>

Oy Wilh Schauman was a honourable family-based company which was strong in the plywood industry and the chemical pulp production but incapable of raising funds for the building of a paper mill. It was acquired mainly because of the combined interests of Kymi-Kaukas in controlling wood resources and flows in central and eastern Finland. This acquisition took

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4) The Ehrnrooth family is actually perhaps the most powerful family in the Finnish business life: it has a close contact with the Union Bank of Finland (SYP); two brothers of Casimir Ehrnrooth are managing directors of large companies and his son Henrik acquired a major interest in the leading consulting engineering company Jaakko Pöyry Oy with the money he gained from the sale of shares of Oy Kaukas Ab. Henrik Ehrnrooth is now Managing Director of Jaakko Pöyry Oy.

place following a heated contest with some companies from the KOP-Bank group.

After the merger, Kymmene Oy is the largest forest products industry company in Finland and is one of the largest companies in Western Europe. It has pulp and paper mills in Finland, FRG, Great Britain and France. The company has set its sights aim at becoming the leading manufacturer of fine paper and printing and writing paper in Europe. It seems to have the potential to realize such an aim.

The state-owned Enso-Gutzeit oy is contesting the leading position of Kymmene in Finland. Like Kymmene this company stems from eastern Finland. Enso-Gutzeit passed through a difficult rationalization programme at the beginning of the 1980s but was able to start expansion in 1985. It is now the largest sawngoods producer in Western Europe, and strong in the mechanical wood industry in general. It manufactures special boards, newsprint, fine paper, printing and writing paper and speciality papers. Its operations are vertically integrated from woodlands to marketing (cf. Table 5.).

Enso-Gutzeit has presented many plans to upgrade its outmoded sulfate pulp mill at Uimaharju, in northern Karelia, during the last few years. This mill was established by the Government on the grounds of regional policy in the 1960s. After initial domestic initiatives to restructure did not give any result the company started to negotiate with the Soviets about a joint venture. The woodlands department of the company has already extended its logging operations across to the Soviet side of the border. In general, the new policy of the Soviet Government is favourable for joint ventures and many Finnish companies have initiated negotiations in this respect.

Table 4

## RESTRUCTURING OF THE FINNISH PULP AND PAPER INDUSTRY IN THE 1980s

1. In 1982 Enso-Gutzeit Oy sold Finnish Chemicals Oy to Oy Nokia Ab and its shares (33 1/3 %) in the chemical industry company Priha Oy to Neste Oy and Kemira Oy.

In 1982 Enso-Gutzeit Oy sold its subsidiary shipping company Finnlines Oy to EFFOA, Neste Oy and other Finnish companies and its other shipping company Vaasanlaivat Oy to Rederi Ab Sally.

In 1983 Enso-Gutzeit Oy sold in 1983 the Tainiokoski hydro-power plant to IVO Oy.

In 1985 Enso-Gutzeit Oy acquired Oy Stockfors Ab from family interests. This company had a groundwood mill in Pyhtää, hydropower plant, forests and engineering shops. Enso-Gutzeit sold the engineering shops and will close the groundwood mill in 1988.

In 1986 Enso-Gutzeit Oy acquired the fine paper mill of Tervakoski Oy from the Bank of Finland.

In 1986 Enso-Gutzeit Oy acquired the Varkaus forest industries integrate from A. Ahlström Oy. For its part, Enso-Gutzeit sold its Engineering Division to Ahlström.

In 1986 Enso-Gutzeit Oy left the common marketing organization of the Finnish paper industries, Finnpap and established an international marketing organization of its own.

In 1986 Enso-Gutzeit Oy acquired one of the largest sawmills in Finland, Plan Sell Oy at Kitee, from the Union Bank of Finland (SYP).

In 1988, Enso-Gutzeit Oy sold its pine-oil division to Veit-siluoto Oy.

2. In 1982 Kymi Oy acquired the paper products company Oy Tilgmann Ab from Konstsamfundet Ab.

In 1982 Kymi Oy acquired all the assets of the leading Finnish electrical engineering company Strömberg Oy of which it had owned a majority of shares formerly.

In 1983 Kymi Oy merged with Strömberg into a new company Kymi-Strömberg Oy.

In 1984 Kymi-Strömberg Oy sold its subsidiary air condition equipment company Oy Aerator Ab to Oy Huber Ab.

In 1984 Kymi-Strömberg Oy sold its subsidiary adhesive paper company Kymtac Oy to Yhtyneet Paperitehtaat Oy.

In 1985 Kymi-Strömberg Oy sold Oy Tilgmann Ab to Yhtyneet Paperitehtaat Oy.

In 1985 Kymi-Strömberg Oy sold its shares (50 %) in Advanced Forest Automation Oy (Afora) to the other partner Oy Nokia Ab. This automation company was founded in 1982. Nokia sold it to the American multinational Combustion Engineering Inc. in 1987.

In 1985 Kymi-Strömberg Oy sold its subsidiary Högfors foundry to Suomi Valimo Oy.

Kymi-Strömberg Oy acquired 45 % of shares of Oy Kaukas Ab in 1985. Kaukas and the Union Bank of Finland (SYP) acquired 45 % of the assets of Oy Wilh. Schauman Ab in 1985.

In 1986 Kymi-Strömberg Oy sold Strömberg to the Swedish electrical engineering company Asea AB.

In 1987 Kymi-Strömberg Oy and Oy Kaukas Ab merged into a new company Kymmene Oy. Oy Wilh. Schauman Ab was merged into Kymmene in 1988.

In 1987 Kymmene Oy sold the Juankoski board mill to its managers.

3. Rauma-Repola Oy, among other things, the largest sawmill industry company in Western Europe, initiated a radical rationalization programme of its mechanical wood industry operations in 1984. Only two of its former ten sawmills belong still to the company. The others were either sold or shut down.

In 1985 Rauma-Repola Oy sold its door factories to the Swedish company Swedish Match AB.

In 1986 Rauma-Repola Oy sold its mechanical wood industries in eastern Finland to Oy Wilh. Schauman Ab, Kymi-Strömberg Oy and Enso-Gutzeit Oy.

In 1987 Rauma-Repola Oy acquired Oy W. Rosenlew Ab from the Rosenlew and von Frenckell families.

Oy W. Rosenlew Ab was merged into Rauma-Repola Oy in 1988.

4. The KOP-Bank proposed in 1983 that the three companies Kajaani Oy, Kemi Oy and Oulu Oy in northern Finland should be merged into a larger company. The fourth pulp and paper company operating in northern Finland, state-owned Veitsiluoto Oy strongly opposed this plan. A debate on the reorganization of the northern pulp and paper industry started at the end of 1985. A political struggle between the Centre Party, supporting the plan of the KOP-Bank, and the Social Democratic Party, supporting Veitsiluoto Oy, disturbed the work of the Coalition Government for a while.

The issue was finally settled through the negotiations between party leaders in 1986. Veitsiluoto Oy acquired the state-owned pulp company Oulu Oy. On the other hand, the majority of the shares of Kemi Oy were acquired by Metsäliitto Oy while Kajaani Oy became a minority shareholder. The Bank of Finland and other state organizations sold their interests in Kemi Oy.

5. G.A. Serlachius Oy and the forest industries company of the forest owners' cooperative Metsäliitto Oy Metsäliiton Teollisuus Oy, started to collaborate in timber procurement and sawmill operations in the middle of the 1980s. Their cooperation in chemical pulp production had already started earlier. These two companies merged into a larger company Metsä-Serla Oy in 1986.

6. The investment company Interpolator Oy, founded by the SKOP-Bank, acquired the majority of the shares of Oy Tampella Ab in 1987. Tampella had formerly loosely belonged to the influence sphere of the Union Bank of Finland (SYP).

Sources: Company news in the economic weekly Talouselämä and in the newspaper Helsingin Sanomat.

Table 5.

COMPANIES PRODUCING OVER A MILLION TONS OF PAPER AND BOARD IN 1986

	output (1000 tns)
International Paper (USA)	5,320
Stone Container (USA)	3,154
Weyerhaeuser (USA)	3,004
James River (USA)	3,000e
Georgia-Pacific (USA)	2,721
Mead (USA)	2,590
Boise Cascade (USA)	2,580
Container Corp. of America (USA)	2,364
Scott Paper (USA)	2,300e
Abitibi-Price (Canada)	2,280
Great Northern Nekoosa (USA)	2,233
Kimberly-Clark (USA)	2,134
Westvaco (USA)	2,059

	output (1000 tns)
Jujo Paper (Japan)	2,040
Oji Paper (Japan)	2,021
Daishowa Paper (Japan)	2,000
MacMillan Bloedel (Canada)	1,879
<u>Enso-Gutzeit (Finland)</u>	1,708
Consolidated-Bathurst (Canada)	1,657
<u>Stora (Sweden)</u>	1,569
Honshu Paper (Japan)	1,533
Union Camp (USA)	1,520
<u>Kymmene (Finland)</u>	1,494
Owens-Illinois (USA)	1,350e
<u>Bowater Inc (England)</u>	1,296
<u>PWA (FRG)</u>	1,275
Jefferson Smurfit (USA)	1,273
<u>Holmens Bruk (Sweden)</u>	1,230
Taio Paper (Japan)	1,184
<u>Feldmühle (FRG)</u>	1,178
Domtar, (Canada)	1,146
<u>SCA (Sweden)</u>	1,078
Federal Paper Board (USA)	1,050
<u>Reed International (England)</u>	1,040

e signifies estimated output

European companies underlined

Data based on L. Galasso & J. Pearson: Top 100 Listing 1986.  
Pulp and Paper International Sept. 1987 p. 55.

Rauma Repola Oy has traditionally strong interests in the forest products industry and the engineering industry. This company ran into great difficulties in the 1970s and is passing through rationalization waves. It acquired Oy Wilh.



Rosenlew Ab mainly because Rosenlew's forests are located close to its pulp and paper mills in Rauma. Rosenlew was a traditional family-based company which was not able to develop its pulp and paper industry. Rosenlew's outdated pulp and paper mill in Pori is facing closure in the near future.

G.A. Serlachius Oy was also an old family-based company. Its resources were not sufficient to undertake a major upgrading and expansion of the production. The new company Metsä-Serla Oy is facing a difficult rationalization of its mechanical wood industries and board industries. Neither does the strategy of the Metsäliitto group of continuously building new market sulfate pulp mills give a promise for a better future for the new company.

The acquisition of Tampella Oy by Interpolator Oy is a sign of the penetration of the SKOP-Bank into the traditional activity spheres of the large commercial banks. The SKOP-Bank is the "central bank" of the local saving banks. It has utilized the opportunity given by the liberalization of the money market and the rapid development of the stock market in Finland during the last few years.

In spite of the considerable restructuring and mergers realized recently in the Finnish pulp and paper industry, the process is not yet complete. It is probable that the next move will take place inside the group of the companies controlled by the KOP-Bank (Yhtyneet Paperitehtaat, Rauma Repola and Kajaani) or by the state (Enso-Gutzeit and Veitsiluoto). It is perhaps pertinent to speculate about the formation of four giant companies, each of them belonging to the sphere of major financial or resource controlling core groups in Finland.

It may be appropriate to classify the Finnish pulp and paper companies in four groups according to the experience from the 1980s. The first group consists of Stars which have been

dynamic and profitable companies, such as Oy Kaukas Ab, Yhtyneet Paperitehtaat Oy and Oy Myllykoski Ab. These companies have also been active in the internationalization of production. It is interesting to note that both Yhtyneet Paperitehtaat and Myllykoski are both large buyers of chemical pulp and have not hesitated to use waste paper as raw material for newsprint production. Kaukas conquered larger fields by merging with Kymi-Strömberg Oy.<sup>6)</sup>

The second group consists of Rising Giants, i.e. Enso-Gutzeit Oy and Kymmene Oy. Both Enso-Gutzeit and Kymi-Strömberg Oy experienced difficulties at the beginning of the decade but a new dynamic phase has started during the second half of the decade.

The third group consists of Middle Rangers, such as Metsäliiton Teollisuus Oy, G.A. Serlachius Oy, Veitsiluoto Oy, Oy Tampella Ab, Kajaani Oy, Rauma-Repola Oy and A. Ahlström Oy, which have been able to upgrade their production but lack the dynamic characteristics of the Stars. These companies have experienced ups and downs in profitability. Metsäliiton Teollisuus and Serlachius merged into a larger company, whereas Ahlström decided to shift altogether from bulk products to special boards and speciality papers.

The fourth group consists of Losers which have suffered heavy losses and been incapable of shifting away from traditional bulk products. Oy Wilh. Schauman, Oy Rosenlew Ab, Kemi Oy, Oulu Oy and Sunila Oy belong to this group. Schauman, Rosenlew and Oulu have merged with larger companies. Kemi and Sunila are subsidiaries of other companies without possibilities to develop strategies of their own.

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6) All the Finnish companies are not included in this classification. For instance, small board companies or speciality paper companies are excluded.

The shift to higher value-added grades and the growing internationalization of production has led to changes in the organization of marketing. Enso-Gutzeit took the initiative of creating a marketing organization of its own. Finnpap, the old joint-marketing organization for bulk papers, is doing its best to adapt to the new circumstances by decentralizing its operations and by introducing new information technology, but it is quite probable that other companies will follow Enso-Gutzeit's example in the near future.

Going back to the discussion about the location of the pulp and paper industry and the European integration presented in the introduction, recent development trends have eliminated most of the reasons given for the exceptional survival capability of the old mills.

Firstly, demand for paper grades formerly produced in small and old mills has strongly increased, which has attracted new investment. Secondly, advances in production technology have increased the possibilities of economies of scale in the production of these grades. Thirdly, the protection by custom tariffs vis-a-vis the Nordic industry has disappeared in Western Europe.

Among the continental pulp and paper industry, only the leading German companies have been able to adapt to the new situation by investing in new large and fast machines in a timely manner. The shift of the Finnish industry to new products and its connected strong expansion have raised concerns among the traditional Continental paper industry.

Unlike the Finnish industry, the other great Nordic exporter of forest products the Swedish industry has not invested as much in new grades. The strong devaluation of the Swedish crown in 1982, the considerable domestic hydropower resources and the larger forest areas owned by the companies in Sweden

have made the manufacturing of traditional bulk products more profitable there than in Finland.

Up to now, the long upward trend in the paper market in Western Europe experienced since 1984 has contributed to postpone the coming adjustments. When the next downturn arrives, the conflict between traditional and new producers will become more open.

#### 4.3 The Mechanical Wood Industry

Finland has belonged historically to the leading exporters of sawngoods in the world but such traditional competitive advantages as ample resources of good-quality logs and cheap wood and labour costs have been lost long ago. Sawngoods based on good northern pine is still an asset in the international market. The techno-intensive forestry seems incapable, however, of producing such a pinewood. The industry has made an effort to introduce a clear quality classification in the wood market during the last few years, but private small-scale forest owners have been opposed to such a measure. An evident reason for this opposition is that stumpage price of sawlog is higher than that of pulpwood.

The enterprise structure in the Finnish sawmill industry is dualistic. On the one hand, most of the pulp and paper companies have sawmill operations. On the other hand, there are independent sawmill companies. Most of the independent companies are, however, in a way dependent on the pulp and paper industry because of the importance of the sale of chips for their viability. The pulp and paper industry is controlling the chip market in Finland.

Some medium-sized independent sawmills have been the most profitable during the 1980s because of their flexibility and good marketing effort. The entry into the sawmill industry has been continuously easy because of the small initial

capital outlay needed. The surest way to run into economic disaster for an independent sawmill entrepreneur is to erect a huge and technologically most advanced sawmill. This kind of sawmill may have a justification only as part of the manufacturing integrates of the pulp and paper companies.

The traditional and firmly-established sawmill owner's mentality has retarded the adaptation of the Finnish sawmill industry to the new circumstances. According to this mentality, the market of sawngood is cyclical: periods of ups and downs follow each other and one has to be well prepared for the next upswing. In spite of strong warnings by experts, the production capacity of the sawmill industry was still greatly expanding during the upward cycle of 1979-1981.

No new upward cycle has been experienced since the beginning of the 1980s. Instead the Finnish sawmill industry has showed considerable losses year after year and finally, a heavy rationalization and curbing of the production capacity of the industry started in the middle of the 1980s. Rauma-Repola Oy, which was the largest sawmill industry company in Europe, sold or closed all its sawmills except a few ones located close to its pulp and paper mills on the West coast. This was an extreme type of reaction, but many other companies have also cut down their sawmill industry production.

Many very famous large export sawmills, such as the Lahti sawmill in Lahti, the Røyttä sawmill in Tornio, the Halla sawmill in Kotka, the Pihlava sawmill in Pori, the Penttilä sawmill in Joensuu and the Martinniemi sawmill in Haukipudas have been shut down during the last few years or are facing closure in the near future. Smaller sawmills have also been closed all over the country.

Another traditional export branch, the plywood industry, has fared better than the sawmill industry. Oy Wilh. Schauman Ab combined with Kymmene Oy has been the dominant plywood manu-

facturer in Finland. Plywood made of northern birch continues to enjoy a good reputation in the international market. In fact, a shortage of good birch logs is a limiting factor for the development of this industry.<sup>7)</sup>

Instead, the domestically-oriented fibreboard and particle-board industries do not enjoy any special advantages. Because of heavy losses and strong foreign competition, the capacity of the fibreboard industry in particular has been radically cut down.

Other branches of the mechanical wood industry, such as the manufacturing of prefabricated houses are in better shape. After Rauma-Repola Oy decided to pull out of the mechanical wood industry, the Swedish company Swedish Match AB gained a dominant position in the door industry in Finland.

Although some large companies such as Rauma-Repola Oy and A. Ahlström Oy have withdrawn from the mechanical wood industry, others like Enso-Gutzeit Oy and Kymmene Oy have increased their capacity in these branches through acquisitions and mergers. The Metsäliitto Group has continued to maintain a strong interest in the mechanical wood industry.

In spite of severe cuts in capacity and a rationalization process, there is still a considerable mechanical wood industry in Finland. Parts of it operate as more or less integrated units of large pulp and paper companies whereas other parts belong to companies specialized in the mechanical wood industry. Those interested in upgrading the sawmill industry recently created a special society for the promotion of research and development in this branch. New emphasis is being put into product development and marketing in general.

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<sup>7)</sup> The dogmatic attitude of the forestry profession, which considered birch a weed during the 1950s and 1960s, is partly responsible for this shortage.

## 5. The Mining and Metal Industry

### 5.1. The Background<sup>8)</sup>

Typical of the world market of metals has been low prices during the 1980s. This has been partly related to the slower growth of output than formerly in the industrialized West but deeper structural changes have also to be taken into consideration.

Firstly, an expansion within the tertiary sector has taken place in the West, which implies a relative fall in demand for metals. Secondly, the industries with lower material intensity are growing faster than those with higher intensity. Thirdly, the use of raw materials required in the fabrication of a product has diminished. Fourthly, a substitution process of man-made materials for metals is taking place. For example, fibre optics is challenging the use of copper in telecommunications.

In addition, development problems of metal exporting countries in the South have aggravated these tendencies. Many mining projects funded by generous loans during the 1970s have started production. The heavy indebtedness of metal exporters and their inevitable need for considerable foreign exchange receipts have led the governments to increase output and exports, which has contributed to further reductions in metal prices.

On the other hand, the building of national metal industries belongs to the actual development trends in the South. Many exporters of metals have erected smelters and refineries, and most of the newly industrialized countries have built national metal industries. The availability of concentrates of non-ferrous metals has been reduced in the international

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8) cf. UNIDO 1985, Raumolin 1986b, Fortin 1987, Kolko 1988.

market and overcapacity problems have become serious in the industrialized West.

The mining industry has showed losses in the West and many mines have been shut down. Low profitability has characterized the metal industry as well. Particularly the steel industry has become a major crisis industry due to new competition from the South, outmoded production technology and the slacking demand for steel products. The adjustment policies include a rationalization of production, reduction of production capacity and restructuring of the industry.

#### 5.2. The Case of Outokumpu Oy

Although the quantitative importance of the mining sector has been restricted in the Finnish economy as compared with the forest sector, its strategic importance cannot be underestimated. A modern copper, nickel, zinc and steel industry has been built on the basis of domestic metal mines. This industry has provided the domestic engineering industry with valuable inputs and been one of the export industries.

The enterprise structure has been very concentrated in this sector in Finland. The state-owned company Outokumpu Oy has been involved in the non-ferrous mining and metal industry whereas a couple of private companies and a state-owned company have operated in the steel industry. The state-owned companies have integrated the production vertically from metal mining to metal manufacturing.

The favourable circumstances during the 1960s made the traditional copper industry company Outokumpu Oy a multi-metal company. Prices of non-ferrous metals were high and the postwar prospecting activities resulted in several discoveries of metal deposits in Finland. Nickel production started at the beginning of the 1960s, Outokumpu erected a large zinc



plant in the late 1960s and the production of stainless steel started in the middle of the 1970s.

The availability of two principal raw materials for the making of stainless steel, nickel and ferro-chrome, contributed to the decision to enter into steel making. Outokumpu opened a valuable chromium mine in northern Finland, the only one in Western Europe. Internationally speaking, South Africa keeps a quasi-monopoly on supplies of chromium. The Government decided to locate the new plant close to the mine in northern Finland on the grounds of regional policy (cf. Map 2.).

After having developed a new flash-smelting method in copper metallurgy in the late 1940s, the company invested in research and development activities and started to export metallurgical process technology, concentration equipment and process control instruments during the 1960s. Technical expertise became one of the major assets of Outokumpu Oy.

During the 1970s, only a few promising metal deposits were found in Finland whereas most of the mines in operation were beginning to reach the point of exhaustion. Outokumpu Oy was facing the problem of dwindling domestic raw material supplies. As the company had the intention to keep in the business, it began to look for raw material sources abroad. During the 1980s, it has acquired small copper mines in Norway and Sweden, a large zinc mine in Ireland and become involved in metal trading. Outside Europe it actually has shares in mining projects in Canada and Australia (cf. Table 6.).

In view of maturing markets and dwindling supplies, Outokumpu Oy has adopted a policy of diversification during the 1980s. Among other things, it has acquired the leading granite industry company in Finland. Because granite can withstand airborne pollution, its appreciation as construction material

has increased during the last few years. The company expanded its engineering industry by establishing new plants and acquiring companies. For instance, it has become a prominent producer of hydraulic hammers. It has also developed efficient and pollution-preventing boiler and energy technology.

By using the knowhow accumulated in metal detection, Outokumpu Oy has gained a dominant position in metal detection security systems in airports. The development of the production of detectors and analysers has led to acquisitions of companies in Sweden and the USA. The company has also contributed to the development of a basic component industry in Finland.

This expansion of the engineering industry and the electronics industry not only serves the diversification aims but it also helps to keep the production process technologically advanced and efficient. It is linked to the company's continuous research and development effort in process technology and process control. The engineering exports actually comprise entire production processes and complete plants.

Outokumpu Oy has looked for closer contacts with markets in the metal industry. It acquired first a couple of small American copper products companies and then made its major move in this field by acquiring the Swedish companies Metallverken AB and Wirsbo Bruks AB. Metallverken had a larger copper products capacity than Outokumpu, a subsidiary in the Netherlands and a good marketing organization in the European Community. By these acquisitions, Outokumpu Oy became one of the leading copper products manufacturers in Western Europe. The combined copper products industry of Outokumpu aims at developing special products for important market segments.

Map 2.

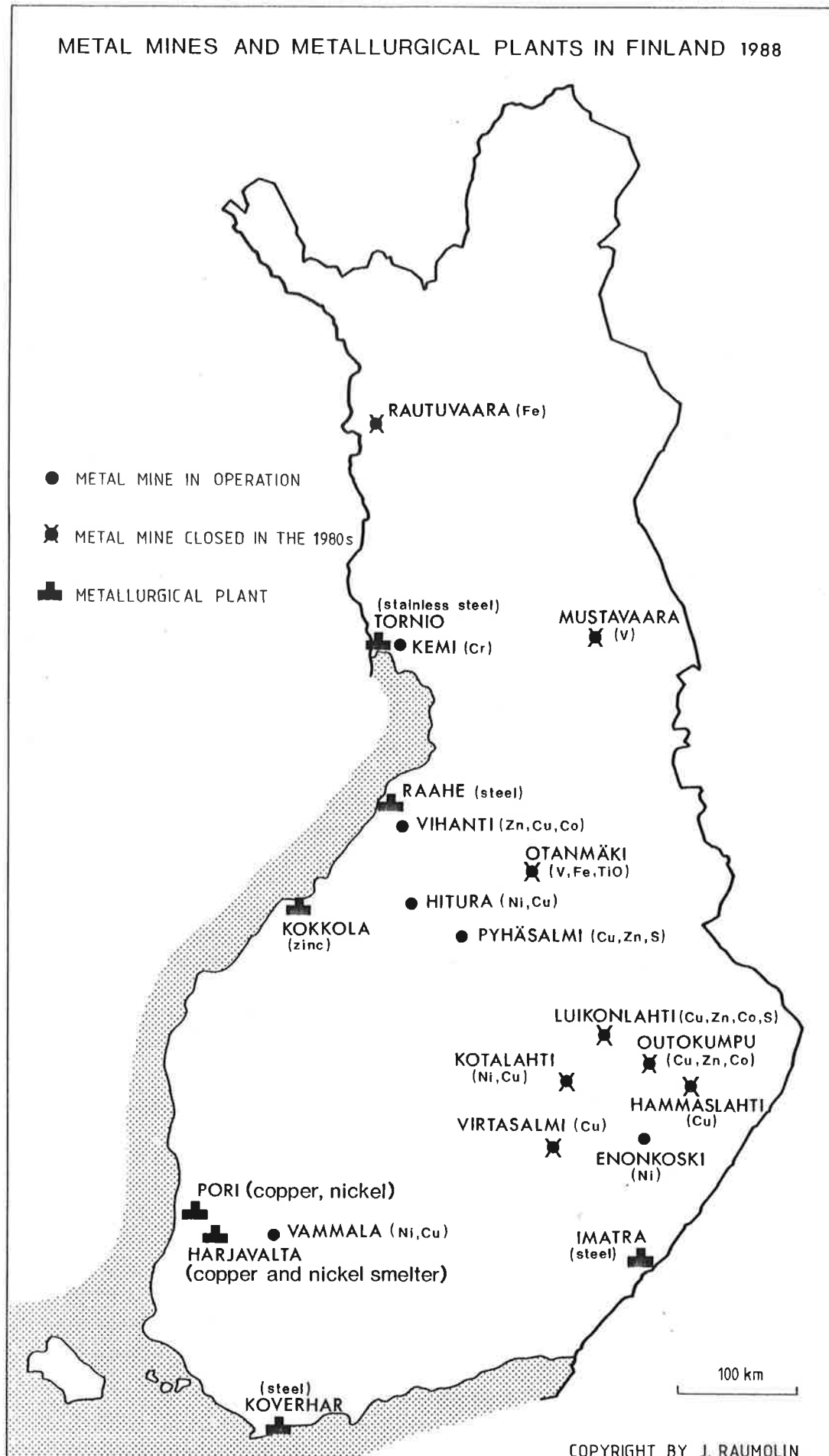


Table 6

## RESTRUCTURING AND EXPANSION OF OUTOKUMPU OY IN EUROPE IN THE 1980s

1. Finland

In 1980 Outokumpu Oy established Turula Engineering Works in Outokumpu to manufacture machinery and equipment for the mining and metallurgical industry.

In 1980 Outokumpu Oy acquired Oy JA-RO Ab in Pietarsaari, which specialised in production of stainless steel tubes, pipes and fittings, from Oy Wilh. Schauman Ab.

In 1984 Outokumpu Oy sold the production of copper intra-uterine devices to Leiras Oy.

In 1984 Outokumpu Oy sold a hydropower plant at Pamilo to IVO Oy.

In 1984 Outokumpu Oy sold the talc concentration equipment of the closed Vuonos mine to Oy Lohja Ab.

In 1984 Outokumpu Oy restructured its former Engineering Division into three separate divisions: Electronics Division, Engineering Division, Industrial Equipment Division.

In 1984 Outokumpu Oy acquired Rammer Oy, specialized in manufacturing hydraulic hammers, from Teuvo Grönfors.

In 1984 Outokumpu Oy, in collaboration with Oy Nokia Ab, founded Micronas Oy to establish a semi-conductor factory in Finland. It owns 25 % of the new company.

In 1984 Outokumpu Oy established Granite Products Oy to quarry granite at in Taivassalo.

In 1985 Outokumpu Oy acquired the leading producer of granite in Finland, Suomen Kiviteollisuus Oy (FINSKA) from the Kainu family.

In 1985 Outokumpu Oy in collaboration with Oy Nokia Ab, established Okmetic Oy in order to manufacture silicon wafers in Finland. It owns 88 % of the company.

In 1986 Outokumpu Oy acquired the sulphuric acid and sulphur dioxide plant associated with its Harjavalta copper smelter from Kemira Oy.

In 1986 Outokumpu Oy acquired the Engineering and Hydraulic Hammer Divisions of the Kone Oy Salpakangas works. The activities of this Engineering Division was continued by Roxon Oy with minority participation (30 %) by Kone Oy. Outokumpu acquired all the shares of Roxon in 1988.

In 1987 Outokumpu Oy acquired the Virolahti and Ylämaa granite quarries from Baltic Granit Oy.

In 1987 Outokumpu Oy and L & G Steinmüller GmbH FRG signed a cooperation agreement concerning the marketing of pollution control equipment in the Nordic countries. In addition, Outokumpu became a majority shareholder of Steinmüller's former subsidiary in Finland, Steka Oy specialized in boiler technology. Both of the companies signed in 1988 an agreement with Soviet counter parts aiming at establishing a joint venture on pollution control equipment and systems in energy production.

## 2. Nordic Countries

In 1981 Outokumpu Oy acquired 50 % of the shares of Løkken Gruben A/S & Co, the old copper mine in Norway from Orkla Industrier A/S. Because of poor profitability, the mine was shut down in 1987.

In 1984 Outokumpu Oy acquired A/S Bjeldovagge Gruber copper mine in Norway from A/S Sydvaranger.

In 1986 Outokumpu Oy acquired the Viscaria copper mine in Sweden from LKAB.

In 1986 Outokumpu Oy acquired Gränges Metallverken AB and Wirsbo Bruks AB from Electrolux AB. These two Swedish companies were manufacturers of copper products. Metallverken had production units in the Netherlands and USA as well.

Outokumpu Oy's traditional Copper Products Division, Metallverken, and Wirsbo Bruks' copper tube production were reorganized in 1987 to form the Copper Products Industry of Outokumpu Oy. The new Wirsbo Bruks AB continued plastic and steel tube production of the former Wirsbo Bruks.

In 1987 Metallverken AB and Perstorp AB formed a new company Metallverken Foils AB on a 50/50 basis. The new company manufactures thin metal foils for the electronics industry.

In 1987 Outokumpu Oy acquired Wenmec Systems AB in Sweden, specialized in electrolysis systems for the non-ferrous refining industry.

In 1987 Outokumpu Oy and the Norwegian Orkla-Borregaard A/S established a new joint company, Norsulfid A/S which owns and operates the Folldal Verk A/S and Grong Gruber A/S mines in Norway. Both produce copper and zinc concentrates.

In 1988 Outokumpu Oy acquired Surhammars Magnetfabrik in Sweden specialized in fabrication of magnets from Schunk Sinter Teknik AB. Outokumpu formed a new subsidiary Sura Magnets AB.

In 1988 Outokumpu Oy sold Wirsbo Bruks AB to the Finnish company Uponor Oy controlled by Asko Oy.

### 3. European Community

In 1985 Outokumpu Oy acquired PGT Europe GmbH in FRG, a subsidiary of Princeton Gamma Tech Inc. New York State, USA, acquired formerly by Outokumpu from American investment companies. PGT manufactures instruments and analyzers.

In 1986 Outokumpu Oy acquired 75 % of the shares of Tara Mines Ltd, the Tara zinc-lead mine in Ireland from Noranda Inc. and other shareholders. The Irish state owns 25 % of the mine.

In 1986 Outokumpu Oy acquired Transmine Group with main offices in London, New York and Paris from Shamrock Holding Investment Inc. Transmine Group was transferred under Outokumpu Trading B.V., a new subsidiary in the Netherlands of which Outokumpu owns 70 %.

In 1987 Outokumpu Oy acquired 21 % of the shares in the Spanish copper semis manufacturer Ibérica del Cobre S.A. Outokumpu and Ibérica del Cobre also established a joint marketing company which concentrates on the marketing of Outokumpu's copper products in Spain and neighbouring countries.

Sources: Multimetall Company Outokumpu Oy 1982; Corporate Brochure Outokumpu Oy 1987; Outokumpu News 1-3, 1987; data provided by Outokumpu Oy, company news in Helsingin Sanomat and Talouselämä.

In contrast to the impressive expansion, there have been sales of assets, closures of mines and the closure of a cobalt plant in Kokkola. Outokumpu Oy has showed poor profitability in the 1980s. Among other things, the exports of engineering knowhow, machinery and equipment have suffered from the poor conditions of the international mining and metal industry. Stainless steel has been most profitable among bulk products.

In the long run, raw material procurement will continue to be a problem, especially with regards to copper. Outokumpu Oy started its search for new sources very late: large international mining companies control most of the flows of copper concentrate with long-term agreements. In addition, the

copper smelter in Harjavalta is not optimally located in view of raw material imports because it is not on the coast.

The company's efforts to participate in new mining ventures in Chile have met with political resistance in Finland. Recently, the company participated in the funding of the opening of the La Escondida mine by an international mining consortium. In return, it will receive copper concentrate in the future.

In spite of the diversification effort, the principal branches of the company's production are maturing bulk products, such as copper products, zinc, and stainless steel. Its success is dependent on the profitability of these products. The company enjoys evident advantages, such as modern production technology, new plants, and relatively large volume but those alone cannot guarantee a good future.

During the last few years, there have been talks about a restructuring of the zinc industry in Western Europe or about a restructuring of the Nordic stainless steel industry. Outokumpu Oy has been accused by the Continental industries of underpricing its copper products. The authorities of the European Community have accused the manufacturers of stainless steel of aiming to form a cartel. It seems to be evident that restructurings will take place on the Nordic level and on the level of Western Europe. It is just as evident that Outokumpu Oy will be involved in these restructurings: the company does not necessarily start the negotiations from a weak position.<sup>9)</sup>

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9) The author of this study proposed in a newspaper article in 1986 that the OECD should establish a common body to deal with the rationalization of the copper industry as has taken place in the case of the steel industry, cf. Raumolin 1986d.

### 5.3. The Steel Industry

The Finnish steel industry is relatively young compared with that of Western Europe. Lack of domestic iron and coal and the limited size of the home market retarded its development.

The first large-scale private steel mill stems from the late 1930s and the second was built in the 1960s. The state-owned company Rautaruukki Oy erected its steel mill also in the 1960s. And as mentioned in the previous section Outokumpu Oy built its stainless steel mill in the 1970s. Both private mills were located in southern Finland, whereas the state-owned mills are in northern Finland due to political decisions (cf. Map 2.).

Consequently, modern and advanced production technology has characterized the Finnish steel industry. For instance, oxygen converter and continuous casting were adopted in the 1960s, among the first in Western Europe. The private steel industry pioneered the use of continuous casting methods in the manufacturing of special steels.

After the impact of the crisis in steel making in Western Europe was experienced in Finland in the middle of the 1970s, the private steel industry companies were merged into a new company, Ovako Oy, in 1979. Oy Wärtsilä Ab acquired 38.3 % of the shares of the new company, Oy Fiskars Ab 33,5 % and the Union Bank of Finland (SYP) 17,2 %. The private steel industry has belonged to the influence sphere of this bank.

Ovako Oy showed losses at the beginning of the 1980s, but it soon started a strong rationalization programme, invested in process control and automation, promoted research and development, developed new special steel grades and put special emphasis on marketing. By the middle of the decade it was already turning a profit. It was also able to sell new process control technology both to the East and the West.



Ovako Oy and the Swedish company SKF-Steel AB were merged into a new company Ovako Steel Ab in 1986. The Swedish company manufactured special steels and was owned by the Swedish multinational SKF AB, which is specialized in manufacturing ball-bearings. The Swedish steel company was larger than Ovako Oy, but it was not profitable. That is why the new company retained the former name of the Finnish company and its Managing Director is a Finn. SKF AB owns 50 % of the new company whereas Oy Wärtsilä Ab has 25 % of the shares, Oy Fiskars Ab 20 % and Union Bank of Finland (SYP) 5 %.

This merger has been presented as a good example of a Nordic rationalization of the industries. Two other Swedish steel companies which still exist after the mergers, the private special steel maker Avesta AB and the state-owned Svenskt Stål AB however did not like it. Ovako Steel Ab has concentrated on the manufacturing of special steels: it is the leading producer of certain grades in Western Europe.

Because the EC is the main market for Ovako Steel, the company has recently started to integrate forwards into the Continental market. The first acquisition was Ste Nouvelle des Forges et Ateliers de la Foulrière in France. In addition, the company just acquired the two largest foundries in Sweden and is negotiating about the acquisition of the Luleå rolling mill from Svenskt Stål. In Finland, it ceased its production of rails, which was a standard product of the Imatra steel works for fifty years.

The state-owned Rautaruukki Oy is manufacturing basic steels. It has developed strong steels to the needs of the Finnish shipbuilding industry, especially for ice-breakers. Rautaruukki has integrated its production forward into the manufacturing of steel tubes: it has become the leading producer of tubes in some market segments in the Nordic countries with subsidiaries in Sweden and Denmark.

Rautaruukki Oy has promoted research and development related to the production process and exported in collaboration of the Soviet export house Tyazhpromexport steel production technology to many developing countries. In addition, it has exported rolling mill technology in collaboration with the British company Davy McKee Ltd . Both Tyazhpromexport and Davy McKee have delivered machinery and equipment for the Raahe steel mill of Rautaruukki.

Rautaruukki acquired the commercial steel production facilities of Ovako Steel Ab in 1987. A new company Dalsbruk Oy with minority participation (20 %) by Ovako Steel Ab was founded to continue the operations in these branches. A clear division of labour was thus established between the two steel makers in Finland.

After the closing of its iron mines in Finland, Rautaruukki Oy has retreated from the mining industry and closed its prospecting and exploration activities as well. It has built a new railroad car factory at Otanmäki to provide work for the miners of the closed mine. The production is destined for the Soviet market, but the company has had difficulties in getting a sufficient amount of orders to maintain an efficient operating rate.

Before closing down its mining activities, Rautaruukki was a large producer of vanadium and developed a special expertise in the field. It sold knowhow regarding the process chain of vanadium in collaboration with Jaakko Pöyry Engenharia to the Brazilian company Odebrecht last year.

As a steel company Rautaruukki Oy has fared quite well up to now compared with Western Europe. The coming reductions in the Finnish shipbuilding capacity will, however, set a new challen-

ge for the company. It is not easy to conquer new markets.<sup>10)</sup>

There are still five steel companies in Sweden and Finland. It is quite probable that this number will be smaller in the future. Avesta AB and Outokumpu Oy have, for instance, negotiated about cooperation in the production of stainless steel. It may be so that modern and efficient process technology, advanced process control and automation and dynamic product development and marketing need to be complemented by a certain volume of production to guarantee the survival in the maturing markets.

## 6. The Engineering Industry

The engineering industry delivering machinery and equipment to the forest sector and the mining sector will be dealt with together here because many companies are suppliers for both sectors. I shall first present a short review of international trends in the related engineering industries. Then I shall turn to the case of the Finnish engineering industry.

As regards the prevailing trends in the international market, there are certain differences regarding the demand for machinery and equipment between the forest sector and the mining sector. The conditions of the forest products industries are more dynamic than in the mining industry. For

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<sup>10)</sup> Finland had one of the largest shipbuilding capacities in Western Europe in the early 1980s, partly due to the access to the Soviet market and partly due to the technological sophistication of the industry. Direct public subsidies have been minimal as compared with other countries. During the last few years, the curtailment of the Soviet demand and the heavy subsidized competition in the West have provoked a considerable rationalization. About a half of the jobs have been lost since 1985. Wärtsilä Marine has closed two shipyards and Rauma-Repola has to reduce its capacity drastically in the a near future.

instance, a strong rebuilding of the pulp and paper mill machinery has taken place during the last few years although few new mills have been erected in the industrialized West. In addition, dynamic developments have taken place in the developing countries, especially in Latin America and South-East Asia.

Instead, the mining and metal industry has continuously been in quite a depressed condition except for the case of newly industrialized countries. Some recovery in machinery and equipment manufacturing is of course taking place but this is not as easy as in the case of paper mills because of the different character of machines and plants. This means that the competition between the producers of machinery and equipment for the mining sector is very tough.

As far as the enterprise structure is concerned, recent transformations of production technology in the engineering industry, the need to undertake research and development and aggressive marketing have presented great difficulties for many of the traditional small and medium-sized producers. There is a clear trend towards concentration of the suppliers. It has been said, for instance, that there is room only for a few manufacturers of large paper machines in the world market.

Among the traditional centres of production, Germany is still strong whereas the American industry is passing through a considerable restructuring. Some large concerns such as Combustion Engineering Inc. are collecting suppliers into larger units (Georgia Kaolin, Bauer-Sprout Waldron, Taylor Systems, Accuray etc.). The Swedish industry has somewhat lost its former momentum. This state of affairs is offering new opportunities for dynamic new forces.

Turning to the Finnish engineering industry producing machinery and equipment for the forest sector, many companies,

such as Oy Tampella Ab, A. Ahlström Oy, Enso-Gutzeit Oy, Rauma-Repola Oy and Yhtyneet Paperitehtaat Oy have traditionally had interests both in the forest products industries and in the manufacturing of machinery and equipment for this industry. It is only during the recent restructuring that Enso-Gutzeit and Yhtyneet Paperitehtaat have withdrawn from the engineering industry.

Because of the extensive home market Finland has enjoyed certain comparative advantages in the production of machinery and equipment for the forest products industries. The traditions of this industry stem from the past century although the production of integral paper machines started quite late after the World War 1939-1945. The start was then exceptionally strong because four companies entered the business. As a comparison, there has been only one paper machine producer in Sweden. I shall pay special attention to paper machinery production in this section.

Of these companies, Tampella had specialized in manufacturing water turbines, boilers and groundwood machines for the pulp and paper mills before entering the paper machinery business. Wärtsilä is a large multibranch concern with heavy emphasis in the engineering industry. Kone ja Silta Oy, which merged with Wärtsilä, was the leading engineering industry company in Finland in the 1930s, specializing in chemical pulp mill machinery and equipment. It obtained a paper machine license from Walmsley Ltd, the leading British paper machine maker, in 1937 and built the first paper machines made in Finland.

Valmet is a large state-owned company formed in 1946 from remnants of the armaments industries. Since the company had good design capabilities and other branches with possibilities for synergy with paper machine making, its rise to being a strong paper machine builder was rapid. A. Ahlström had specialized in manufacturing sawmill and chemical pulp mill machinery and equipment before entering into paper ma-

chine making. It has belonged as the Finnish partner to the inter-Nordic Kamyr group developing chemical pulp preparation methods and machinery.

During the late 1960s, a division of labour developed between Tampella, Valmet and Wärtsilä so that Tampella specialized in board machinery, Valmet in large paper machines and Wärtsilä in paper finishing machinery and equipment. This informal division of labour became officially established when the three companies founded a common marketing unit, the TVW group in the 1970s. The fourth paper machine maker A. Ahlström did not join this group but specialized in board machines and narrow paper machines.

Manufacturing of paper machines experienced considerable changes in the 1970s. New paper making methods, such as twin wire systems, were introduced, machines grew faster and larger, and a better integration with process control systems was needed. New automated technology was introduced in the manufacturing of machines. On the other hand, the market for machines ran into a recession. It was difficult to adapt to the new situation.

The Finnish companies decided, however, to stay in the business. Valmet, for instance, had made paper machine manufacturing one of the leading branches of the company and it was also involved in the manufacturing of machine tools and automation systems. Wärtsilä had to carry on a hard struggle because it was entering a new field, manufacturing of paper finishing machines, dominated by a few German, Swiss and American producers. Both Valmet and Wärtsilä had however, resources, to invest in research and development.

At the beginning of the 1980s, Wärtsilä started to internationalize its production by acquiring an American and a German manufacturer of paper finishing machinery. These acquisitions offered better access to important markets.

Valmet passed through a stage of production rationalization at the beginning of the decade, but it was soon ready for new expansion. Except for Valmet only a few dynamic manufacturers of large paper machines were still left in the world market, such as the German J.M. Voith and the American Beloit (cf. Table 7.).

Table 7

THE FORMATION AND EXPANSION OF VALMET PAPER MACHINERY INC.  
IN THE 1980's\*

1. Oy Wärtsilä Ab

In 1983 Oy Wärtsilä Ab acquired Appleton Machine Company Inc. Appleton, Wisconsin, USA specialized in production of paper finishing machinery from Wisconsin interests. A new subsidiary company Wärtsilä-Appleton Inc. was formed.

In 1984 Oy Wärtsilä Ab acquired the roll handling and finishing production of Sunds Defibrator AB in Sundsvall, Sweden controlled by SCA AB.

In 1985 Oy Wärtsilä Ab acquired Otto C. Strecker GmbH, Pflungstadt, FRG specialized in the production of paper finishing machinery from family interests. A new subsidiary company Wärtsilä-Strecker GmbH was formed.

2. Valmet Oy

In 1983 Valmet Oy acquired Kajaani Oy Electronics, Kajaani, Finland specialized in process control instruments for paper fabrication from Kajaani Oy. A new subsidiary Kajaani Electronics Oy was formed.

In 1984 Valmet Oy acquired 65 % of the assets of the paper machine division of Dominion Engineering Works Ltd., Montreal, Canada from Canadian General Electric Co. A new subsidiary company Valmet-Dominion Inc. was formed.

In 1985 Valmet Oy acquired 40 % of the shares of Sensodec Oy, Kajaani, Finland established in 1984 to prepare process control systems for paper machines.

In 1985 Valmet Oy became associated with to the development of Roiboc Oy, Kuopio, Finland formed in 1984 to manufacture instruments for controlling paper quality.

In 1986 Valmet Oy acquired 75 % of the assets of the paper machine division of KMW AB, Karlstadt, Sweden together with its production unit in Charlotte, N.C., USA from Nordstjerna

AB. Two new subsidiary companies Valmet-KMW AB and Valmet-KMW Inc. were formed.

In 1986 Valmet Oy acquired the process control company Sentrol Systems Ltd., Downsview, Ont., Canada, from Canada Development Corporation.

In 1986 Valmet Oy acquired 60 % of the shares of Enerdry Inc., Knoxville, TN, USA specialized in manufacturing of air systems for paper machines together with its production unit in Thunder Bay, Ont., Canada from Gordon Chalmers and the associates. A new subsidiary company Valmet Enerdry Inc. was formed.

### 3. Valmet Paper Machinery Inc.

In 1986 Valmet Oy and Oy Wärtsilä Ab restructured in collaboration their shipyards and paper machinery production. The paper machinery production was pooled together: Valmet is controlling 65 % and Wärtsilä 35 % of the shares of the new company, Valmet Paper Machinery Inc. Helsinki, Finland which officially started its activities on January 1, 1987. Wärtsilä-Appleton Inc. and Wärtsilä-Strecker GmbH were renamed Valmet-Appleton Inc. and Valmet-Strecker GmbH in this context.

The common international marketing organization for paper machinery, TVW Group formed in 1976 by Oy Tampella Ab (board machinery), Valmet Oy (paper machines) and Oy Wärtsilä Ab (paper finishing machinery) shut down its activities at the beginning of 1987. Valmet Paper Machinery Inc. retained the former interests of Valmet and Wärtsilä through the TVW group (together 20 %) in the engineering shop Ateliers de Construction Allimand S.A., Rives, France.

In 1987 Valmet Paper Machinery Inc. acquired 51 % of the shares of Rotomec S.p.A., Casale, Italy specialized in manufacturing of paper finishing machinery from Finanziaria Polletti & Osta S.p.A.

In 1987 Valmet Paper Machinery Inc. acquired 70 % of the shares of the paper machine division of A. Ahlström Oy, Karhula, Finland. A new subsidiary company Valmet-Ahlström Inc. was formed.

In 1988 Valmet Paper Machinery Inc. acquired the majority ownership of Jylhävaara Oy, Valkeakoski, Finland, specialized in manufacturing of paper finishing machinery together with its subsidiary Jylhäraisio Oy, Raisio, Finland, specialized in manufacturing coating color kitchens as well as other chemical handling equipment, from Yhtyneet Paperitehtaat Oy.

In 1988 Valmet Paper Machinery Inc. acquired Infrarödteknik AB, Vänesborg, Sweden specialized in fabrication of infrared drying and heating systems for paper machines from Skåne Gripen AB.



In 1988 Valmet Paper Machinery Inc. established a subsidiary Valmet Builders Inc in Charlotte N.C., U.S.A. to deliver turnkey installations to the paper industry in North America.

\* Acquisitions of process control companies are included here although Valmet Oy has a separate automation division founded in 1979.

Sources: Company news and articles in the economic weekly Talouselämä and the newspaper Helsingin Sanomat: Valmet Paper Machinery Inc. Annual Report 1987; data provided by Valmet Paper Machinery Inc..

Valmet gained direct access to the North American market by acquiring majority ownership of the paper machine division of Dominion Engineering Works Ltd in Canada. Dominion Engineering was among the leading paper machine producers in the 1930s together with Walmsley, which was acquired by Beloit in the 1960s. The acquisition of the majority ownership of the paper machine division of KMW AB eliminated the only competitor of the Finnish paper machine makers in the Nordic countries. KMW (Karlstads Mekaniska Werkstad) was strong in the international market before the rise of the Finnish paper machine industry.

Valmet has been a dominant partner in the restructuring of the Finnish paper machine industry in the 1980s. The paper machine production of Valmet and Wärtsilä was merged into a new company Valmet Paper Machinery Inc. in 1986 when these companies restructured their shipyards and paper machine industries. Valmet has also acquired the majority ownership of Ahlström's paper machine operations and Jylhävaara Oy's paper finishing machinery and equipment production.

Through its acquisitions Valmet Paper Machinery has become the leading paper machine manufacturer in the world. It is able to supply all the machinery and systems needed for paper and board making and finishing process. It has production

facilities in Finland, Sweden, FRG, Italy, the USA and Canada. The company invests about four percent of its annual turnover in research and development and it has six research centres in Finland and abroad. Valmet Paper Machinery Inc. firmly intends to keep its leading position and the company has showed good profits during the last few years. Recently, it has started to diversify towards consulting engineering.

After the formation of Valmet Paper Machinery, the activities of the TVW Group ceased and Tampella gained new independence. Tampella has been active in product development. It has developed, among other things, an original pressure groundwood method, new boiler technology, new methods to control water pollution and been competitive in board machine manufacturing. The company has, however, suffered from low profitability. After the change of control of the company, the former director of Wärtsilä paper machine manufacturing was appointed as the new Managing Director. The company is coming back to paper machine manufacturing and it recently acquired the majority ownership of the Italian paper machine manufacturer Carcano S.p.A.. It has built a new large integrated research centre in connection with its pulp and paper mills at Inkeroinen. Doubts have been raised, however, about its possibilities to compete with Valmet Paper Machinery.

The strong paper machine manufacturing industry in Finland has contributed to the technological renewal of the production in the Finnish pulp and paper industry. The Finnish industry has had a rapid access to new large and fast paper machines and new paper finishing systems and it has become associated with research and development work. The importance of these finishing systems has greatly increased due to the shift of the production to higher value-added grades. The large international consulting engineering companies, particularly Jaakko Pöyry Oy, have contributed to this re-orientation as well.

Among the Finnish companies, the subsidiary of Yhtyneet Pape-ritehtaat, Jylhävaara Oy participated in the development of the new thermomechanical pulp technology. The engineering shop of Enso-Gutzeit also acquired an American license from Bauer for the manufacturing of TMP technology. As the resources of Jylhävaara Oy were limited, however, the Swedish company Sunds Defibrator AB, the leading producer of the TMP and CTMP machinery in the world, acquired control of this division of Jylhävaara Oy (cf. Table 8).<sup>11)</sup>

After the American authorities refused to allow a cooperative agreement between Sunds Defibrator and the American maker of TMP machinery Ingersoll-Rand Inc. the Finnish company Rauma-Repola, which manufactures pulp mill machinery and equipment, acquired one third of the shares of Sunds Defibrator. The majority of the shares of this company is now in Finnish hands (cf. Table 8).

Ahlström has retained its traditional role as the leading Finnish supplier of chemical pulp mill machinery and equipment. It has extended its production facilities in Finland during the 1980s by acquiring a pump factory at Mänttä from G.A. Serlachius Oy and the Savonlinna engineering shop from Enso-Gutzeit. It also acquired Rosenblad Corporation in the USA. As the company is a main shareholder of Kamyr, it has a good international marketing channel at its disposal.

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<sup>11)</sup> The American companies Bauer-Sprout Waldron and Ingersoll-Rand together with the Swedish-Finnish Sunds Defibrator dominate the world market of TMP machinery.

Table 8

## FINNISH ACQUISITIONS OF SWEDISH ENGINEERING INDUSTRY COMPANIES SUPPLYING THE FOREST PRODUCTS INDUSTRIES SINCE 1979

Valmet Oy and Volvo AB signed a co-operation agreement in 1979 according to which Valmet took charge of the tractor production of Volvo located in Eskilstuna. The companies established a joint production of logging machinery. In 1982 Valmet acquired all the shares of Umeå Mekaniska AB in Umeå, Sweden specialized in the production of logging machinery.

In 1979 Rauma-Repola Oy acquired 50 % of the shares of ÖSA AB, the prominent producer of logging machinery, from Östberg family. Rauma-Repola acquired all the assets of the company in 1982.

In 1984 Rauma-Repola Oy acquired Stensele Mekaniska Verkstad from Kockums Industri AB controlled by AB Statsföretag. Rauma-Repola closed the production of logging machinery by this engineering shop in 1986.

In 1984 Oy Wärtsilä Ab acquired the roll handling and finishing production from Sunds Defibrator AB controlled by SCA AB.

In 1985 Terästuote Oy controlled by Oy Hackman Ab acquired AB Stridsberg & Björk, a manufacturer of blades and knives, from Nils Dahlqvist.

In 1985 Oy Partek Ab acquired Hiab-Foco AB, a manufacturer of cranes from AB Bahco.

In 1986 Valmet Oy acquired 75 % of the assets of the paper machine division of KMW AB from Nordstjerna AB. A new subsidiary company Valmet-KMW AB was established.

In 1986 Kone Oy acquired the materials handling division of KMW AB from Nordstjerna AB.

Sunds Defibrator AB, the leading producer of TMP and CTMP-machines in the world, acquired in 1986 the TMP and CTMP production of Jylhävaara Oy controlled by Yhtyneet Paperitehtaat Oy. On the other hand, Yhtyneet Paperitehtaat acquired one third of the shares of Sunds Defibrator from SCA AB. A new subsidiary company Jylhä-Sunds Oy was established in Valkeakoski Finland.

In 1988 Valmet Paper Machinery Inc. acquired Infrarödteknik AB specialized in fabrication of infrared drying and heating systems for paper machines from Skåne Gripen AB.

In 1988 Rauma-Repola Oy acquired one third of the shares of Sunds Defibrator AB from SCA AB. The Finnish companies Yhtyneet Paperitehtaat and Rauma-Repola, which belong to the KOP

Bank-group of industries together control two thirds of the shares of Sunds Defibrator. A new subsidiary company Sunds - Rauma Oy was established in Pori, Finland.

In 1988 Valmet Oy acquired Granab AB, the manufacturer of cranes from Skrinet AB, AB Meditron, Hans Eliasson and the Byström family.

Sources: Surveys of foreign investment in the economic weekly Talouselämä; company news in Talouselämä and the newspaper Helsingin Sanomat.

Ahlström has developed new types of boilers, such as the Pyroflow system, which eliminates sulphur waste. As boiler production is one of principal branches of the company, it has acquired a couple of smaller boiler makers in Finland during the last few years. In addition, the company recently acquired licences of pollution control equipment from General Electric Company and from Mitsubishi in view of the expanding markets for such a technology.

Ahlström has also been the leading producer of sawmill machinery and equipment in Finland and in order to keep its position it has acquired some dynamic small machine makers. It has been active in the development of process control systems for the forest products industries as well.

There are also several other suppliers of sawmill machinery in Finland, among them Valmet, for instance. Some small engineering shops have specialized in manufacturing simple small-sized sawmill machinery, particularly for the markets of the developing countries.

Many companies are producing machinery and equipment for the mechanical wood industry in general. The most dynamic among those is Raute Oy which has a subsidiary Durand-Raute Inc. in

North America. This medium-sized company has established a research centre, automation division and engineering division. It was the first Finnish company to establish a joint venture in China and it is just preparing new joint ventures in the Soviet Union. The blade maker Terästuote Oy has acquired subsidiaries in Sweden and in the USA in the 1980s.

There are two prominent makers of wood-handling systems in Finland, Kone Oy and Rauma-Repola Oy. Kone Oy has acquired the wood handling division of KMW in Sweden with its subsidiary in the USA. Rauma-Repola has established a collaboration with Fibre Making Process Inc. in North America. The large cement industry and building materials company Oy Partek Ab has acquired the leading manufacturers of log cranes in Sweden and Finland.

The Finnish logging machinery industry has also internationalized the production. The leading manufacturers Valmet and Rauma-Repola have acquired the Swedish companies specialized in manufacturing of logging machinery and, in addition, Rauma-Repola acquired the majority ownership of the French logging machinery maker Cemet-Agrip S.A.. It has become the leading producer of logging machinery in the world. Rauma-Repola and Valmet have also made cooperative agreements with the Canadian companies Timberjack and Bombardier. In addition, Valmet recently acquired Gafner Machine Inc. in the USA. For its part, Interpolator Oy had started to regroup smaller logging machinery companies in Finland.

The direction of the international expansion of the supplier industry has deviated from that of the pulp and paper industry. Whereas the main direction of the former has been Sweden and North America, the latter has expanded towards the European community. This difference partly stems from different markets of the products in question, partly from the transportation point of view and partly from custom tariffs. The

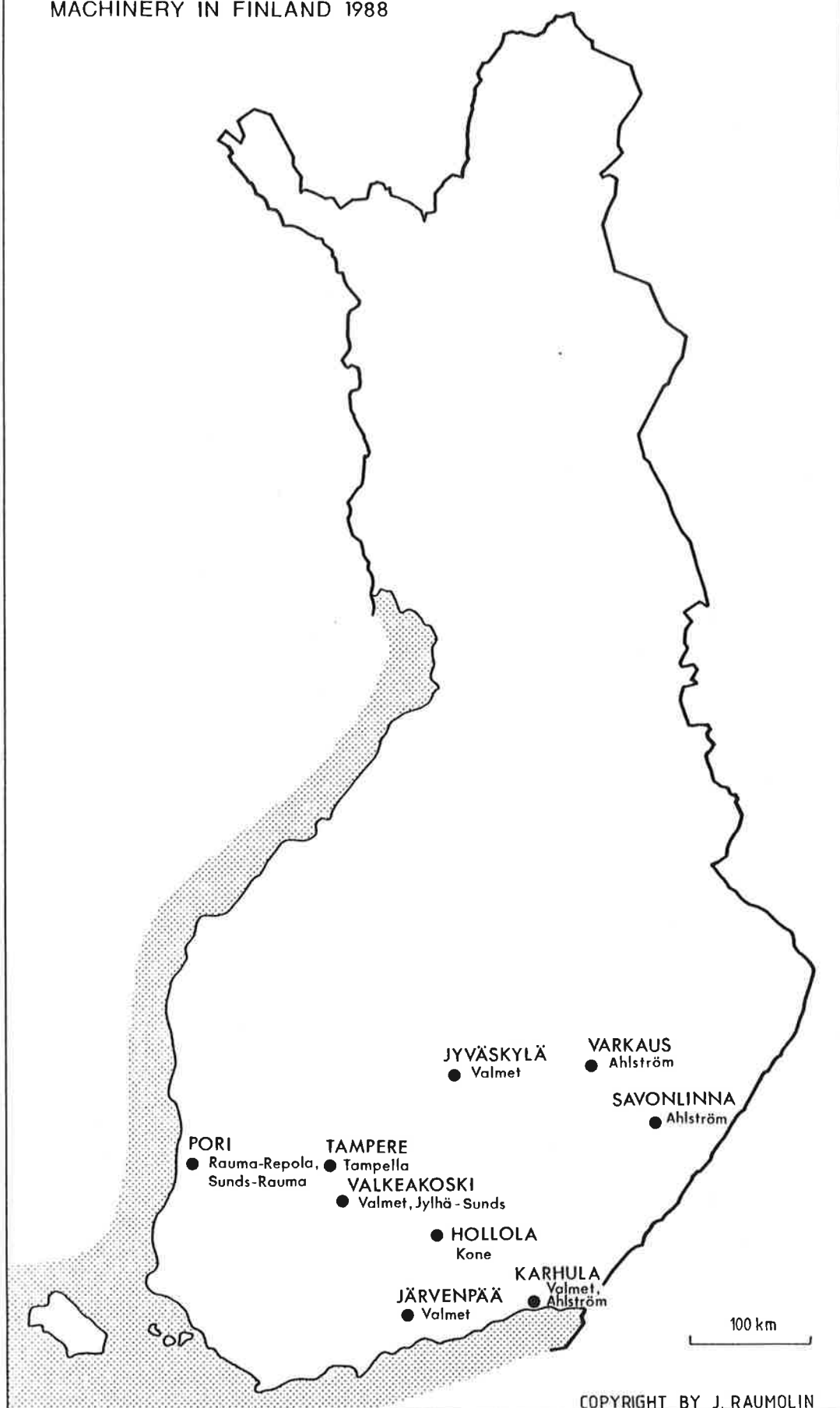
large North American forest products industry has attracted Finnish supplier industries. On the other hand, the European market can be well served from the production units located in northern part of the Continent.

The Finnish expansion to Sweden has been particularly strong. Finnish companies have acquired the operations of the Swedish logging machinery and paper machine industry and are strongly involved in the pulp machinery industry as well. The only section where the Swedish industry is still dominant is the manufacture of chain saws. It was evidently thought in Sweden during the difficult years of the 1970s that this industry forms a maturing branch which is not worth developing. Since the attitude has been different in Finland, the Finnish companies have taken over the Swedish companies. The well established marketing channels of Swedish companies have helped to further the expansion of Finnish companies.

As far as the expansion of the Swedish industry is concerned, it has been directed towards more future-oriented sectors. A major acquisition of the Finnish industry by the Swedish industry was the case of Strömberg. The acquisition of this company by the Swedish electrical engineering multinational Asea AB raised some discussion even on the government level in Finland. Strömberg was the only large electrical industry company in Finland and an important supplier for the forest products companies among other things.

After some discussion, this acquisition was accepted as a part of the Nordic rationalization of industries. A little later on Asea AB and the Swiss electrical engineering multinational Brown Boveri merged into a new European multinational Asea Brown Boveri (ABB). As concerns the division of labour inside this new multinational, Strömberg received a mandate for global production of electrical drives, which is one of the strongest sections of this former Finnish company.

MAIN LOCATIONS OF PLANTS PRODUCING PULP AND PAPER MILL  
MACHINERY IN FINLAND 1988





This was an important decision in view of keeping Finland as a centre for paper mill technology.

Turning to the location of the engineering industry supplying the forest products industry in Finland, the main locations are indicated on Map 3. As compared with Map 1. and Map 2. indicating the locations of the pulp and paper mills and the metallurgical plants in Finland, the engineering industry is located more in the South. This location pattern is typical of the Finnish industries as a whole.

The plants producing pulp and paper mill machinery in Jyväskylä, Varkaus and Savonlinna are located further north than is normally the case in the engineering industry. The location in Jyväskylä stems from the location of the armaments industry operations far from the borders, whereas the origins of the plants in Savonlinna and Varkaus is related to the traditional existence of large steamer and floating fleets in the inland lake systems.

The starting point for the Finnish engineering industry that manufactures mining and metallurgical machinery and equipment has been very different from the industry manufacturing machinery for the forest sector. Practically no such industry existed before the national independence, the home market has been limited, and the competition from the well-established Swedish and German industry has been strong. The diversification of the companies which have gained strength by making machinery and equipment for the forest industries has, however, contributed to the development of an autonomous technological capability in the mining sector.<sup>12)</sup>

The Finnish core companies in this branch have been Outokumpu, Tampella and Lokomo Oy/Rauma-Repola. Lokomo Oy started to manufacture crushing and concentrating machinery and

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<sup>12)</sup> Cf. Raumolin 1986c.

equipment during the interwar period. This company was acquired by Rauma-Repola in 1971. Tampella started to manufacture drilling machinery during the World War 1939-1945 and founded a special division Tamrock to expand this production in 1969. As mentioned above, Outokumpu has been active in metallurgical technology since the 1940s.

During the period of great expansion of the Finnish mining and metallurgical industry in the 1960s, new companies such as Murskauskone/Roxon Oy, which manufactured crushing and screening equipment, were founded. Some established companies as Kone Oy started to manufacture materials handling equipment and Ahlström special boilers for the mining sector. During the 1970s, Outokumpu was able to export turnkey plants together with other Finnish suppliers.

This supplier industry has typically tried to take advantage of synergistic opportunities including both collaboration and sub-contractor networks. For instance, Ahlström, Outokumpu and Rauma-Repola have collaborated in project export; Outokumpu and Tamrock have used a joint marketing organization abroad, and Outokumpu and Ovako have jointly developed blast furnace automation.

The slump in the international market in the middle of the 1970s provoked a certain restructuring in Finland; for instance, Kone Oy acquired Roxon, which had expanded its production to hydraulic breakers and bulk handling systems. The situation became still worse in the 1980s as the unfavourable trends in the international market were aggravated by the shrinkage of mining operations in the home market. The only possibility to be successful was to promote active research and development and to look for expansion in the international market through acquisitions and aggressive marketing.

Outokumpu has expanded its engineering industry capacity by acquisitions and creation of new production units. The company is strong in the international market as concerns mineral analysis units, hydraulic hammers, flotation cells, metallurgical knowhow and process control instruments and systems.

Tamrock has been very active in research and development and marketing. It has acquired two drilling equipment manufacturers abroad, Nya Strömnes AB in Sweden and Driltech Inc. in the USA. In Finland, it acquired the production of LHD dumpers from Perusyhtymä Oy. Tamrock initiated the production of this machinery in Finland in the 1970s, but the company sold it away in 1977. Tamrock is operating in worldwide markets and its market share is about one third in its principal products, such as hardrock drilling jumbos.

When the American crushing equipment manufacturer Nordberg Manufacturing Co. decided to sell its European subsidiaries, Rauma-Repola acquired these companies, Nordberg UK Ltd in England and Ateliers Bergeaud S.A. in France. Through these acquisitions, Rauma-Repola became the leading producer of crushing equipment in Europe and gained better access to the French, Spanish and African markets.

Rauma-Repola decided to enter the field of oceanography by acquiring the Italian company Drass S.p.A and the British company Osel Group Ltd together with the Finnish engineering bureau Malmari & Winberg Oy in the middle of the 1980s. The company has built two deep sea research submarines for the Soviet Union. It developed an especially strong steel for this purpose. These submarines are destined to study the seabed mineral deposits and are unique in the world.

Some small Finnish companies have succeeded in specializing in certain market segments and by showing flexibility. Larox Oy manufactures classifiers and pressure filters for the world-

wide market. It has extended the its client sphere to the process industry in general, including the pulp and paper industry, by and by. This company has been among the first in Finland to adapt laser technology in its production process (cf. Jagren et al. 1987).

The location of this supplier industry in Finland does not deviate much from the location of the suppliers for the forest sector. In fact, most of the companies in question manufacture machinery and equipment both for the forest sector and the mining sector. Outokumpu Oy is an exemption; it has established its Turula engineering shop in the town of Outokumpu in northern Karelia in order to alleviate unemployment problems due to the closure of the local copper mine.

The competitive pressure by the Swedish supplier industry has been continuously strong in Finland, especially concerning the making of machinery and equipment for the mining industry. The Swedish company Atlas Copco AB has about an equal share of the world market of hardrock drilling machinery and equipment as Tamrock. When the American company Allis Chalmers Inc. sold its mineral processing division in 1987, the Swedish mining and multibranch company Bolindén AB acquired it and thus became a much stronger competitor for the Finnish industry.

Very few acquisitions have taken place between the Finnish and Swedish supplier industries. When Oy Nokia Ab sold its subsidiary Airam Oy to its directors in 1985, they also sold the drill steel, tunnelling and drifting equipment and drilling accessories manufacturer Kometa Oy to the Swedish company Secoroc AB, which like the other Swedish company Sandvik AB is one of the world largest manufactures of drilling tools. On the other hand, Tamrock has acquired Nya Strömnes AB in Sweden. For its part, Atlas Copco will close its subsidiary production units in Finland this year.

Since both Finnish and Swedish companies are struggling for leadership in European and world markets, the possibilities for Nordic cooperation and division of labour, in fact, seems weak in this branch.

## 7. Regional Development and Policy<sup>13)</sup>

Disparities in development between the South and the North have been typical characteristics throughout the history of Finland. During the period of industrialization, the forest products industries have had a decentralizing influence on regional development in Finland. Sawmills and pulp and paper mills have been erected in the interior of the country and revenues from timber sales and logging and floating work have contributed to make marginal agriculture viable. Most of the metal mines have also been located in the national peripheries.

After the World War 1939-1945, the regional policy mainly consisted of building new large-scale capital-intensive plants, such as chemical, metallurgical and pulp plants in the North, subsidies of small-scale agriculture, public works to alleviate unemployment and establishing new universities in the national peripheries. This policy was successful only in one case: the chemical plants, the metallurgical plants and the new dynamic university in Oulu and the surrounding region created a regional growth pole on the northwest shore of the Gulf of Bothnia.

The coincidence of many factors, such as the industrialization and urbanization of southern Finland, mechanization of agriculture and logging operations, restrictions of agricultural production due to a overproduction of dairy products, introduction of an active labour market policy, and reforms

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<sup>13)</sup> For general characteristics cf. Raumolin 1982, 1985a, 1986e, Eskelinen 1984, 1987, Okko 1987.

of business legislation, provoked a rapid rural depopulation in Finland in the late 1960s and at the beginning of the 1970s. As a reaction, regional policy was changed to support the establishment of small enterprise in the peripheral areas. This policy succeeded in creating some industrial activities in the national peripheries. For example, some small enterprises making logging machinery and manufacturing instruments for the pulp and paper industry have been established there.

One of the major aims of the new regional policy was to guarantee equal access to basic services to all the citizens all over the country. As most of the services were located in central places in the communes, this policy meant a growing marginalization of the communal peripheries. As a reaction, a grassroot village movement grew up in several parts of the country during the late 1970s. Its aim was to revitalize the life in peripheral villages. This movement has been able to raise the self-confidence, cultural life and some services in many villages.

The situation took a turn for the worse again in the 1980s. The closing of metal mines, sawmills and mechanical wood industry plants has had a negative impact on the development of peripheral regions. The state-owned companies Outokumpu and Rautaruukki have alleviated the problems of the decline in the largest mining communities by establishing new engineering industry operations in Outokumpu and Otanmäki and by retraining miners to do other jobs.<sup>14)</sup>

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14) Researchers associated with the Karelian Institute at the University of Joensuu have been active in the study of the impact of the rationalization and restructuring of resource-based industries on local communities and the regional economy in northern Karelia, cf. Koistinen, Salin & Tikka 1987, Eskelinen & Vatanen 1988. The economic sociologist Tarmo Koskinen has dealt with the fate of mill communities in general, cf. Koskinen 1987.

The rationalization and the automation of the forest products industry and the metal industry have resulted in heavy losses of jobs. For instance the southeasternmost province in the country, the Kymi province, where around two fifths of the Finnish forest products industries are located and where one third of the paper production takes place, lost 18 % of its industrial jobs during 1980-86. The greatest loser was the town of Kotka, which has grown up along with the forest products industries and the exports of forest products. Because of the dominance of large-scale capital-intensive pulp and paper industry, few small and medium-sized industries existed there.

The government has tried to alleviate the new development of problems of industrialized regions by supporting the promotion of small and medium-sized enterprise and the creation of industrial and technology parks close to the universities. As far as the province of Kymi is concerned, the recent investment boom in the pulp paper industry and the new progress of the steel works in Imatra have somewhat relieved the situation.

In spite of the aims of regional policy, the growth of the population and occupations in the Helsinki region has been considerable. It has been estimated that 60 % of all new jobs created in 1970-1986 has been located there. Particularly, the growth of the jobs in the electronics industry and the new service industries has been concentrated in the Helsinki region. People with a yuppie-like life-style prefer to live there. A shortage of labour in qualified occupations, and rising costs for housing and amenities are new characteristics of the Finnish metropolitan region.

As concerns international aspects of the development of the Finnish metropolitan region, the realization of the growing importance of airborne traffic has been quite late. The state-owned company Finnair has, however, actively built

North-North connections. It has direct flights to New York, Montreal and Seattle and, on the other hand, to Moscow and Tokyo.

Helsinki has become an important contact place for East-West security and disarmament issues. Good connections and facilities, and an efficient organization have contributed to Helsinki's emergence as an international conference city in spite of rising costs. In the context of the opening of East-West trade connections, Helsinki could develop specific consulting services on the basis of Finnish long-run experience.

The idea of the creation of specific North-North and East-West gateway functions around the Helsinki Airport and the metropolitan region has not raised the attention of Finnish planners who have concentrated on domestic issues. Very recently, the town of Vantaa where the airport is located has started to look upon the example of the development that is taking place around the Arlanda Airport close to Stockholm.<sup>15)</sup>

As a corollary to the growth in the metropolitan region, many current trends seem to lead to the new wave of rural depopulation. The problems of overproduction have not been solved in agriculture and new limitation measures are necessary. The ownership of the forest land is shifting more and more toward the towns due to the prevailing inheritance rules. The introduction of a more advanced stage of mechanization is promoted in logging operations. A curtailment of traditional public services, such as post offices and public transportation networks is taking place, by and by.

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<sup>15)</sup> As to the new gateway functions, cf. de Smidt 1988.



During the presidential elections last winter, the political opposition, especially the Centre Party raised the spectre of rural depopulation and was able to attract new voters in rural areas and in the peripheral regions. Instead, the votes for the Social Democratic and Conservative candidates concentrated quite clearly in urban areas and in southern Finland. After these elections, the Government has paid new attention to regional policy.

The recent proposal by the Government for a new law on regional policy as well as the recent report on the pros and cons of regional development by an association close to the industry include many points in common, such as better utilization of the existing infrastructures, the creation of new communication networks, the diffusion of new technologies, administrative decentralization and the need to balance the development of the Helsinki region (cf. Hallituksen esitys... 1988, EVA 1988).

By a liberal interpretation of these documents, it is possible to sketch the contours of a future regional policy in Finland. An effort will be made to promote counterbalancing centres to the growth of the Helsinki region inside the traditional industrial core area in southwestern Finland. Such counterbalancing centres will be established around the towns of Turku, Tampere and Lahti.

Following the example of the Oulu region, new growth centres will be promoted around university towns where the existing and future technology parks are located. These kinds of centres are situated in the Vaasa-Seinäjoki region, Jyväskylä region, Kuopio-Varkaus-Joensuu region and Lappeenranta-Imatra region (see Map 4.)

Touristic development will be active in the Åland Islands located between Finland and Sweden in the middle of the Baltic Sea, in the Kuusamo region in northeastern Finland

and several parts of the province of Lapland. The plans to extend the pulp industry capacity in northern Finland are, however, hardly welcome from the point of view of touristic interests.

The problem areas will consist of provinces and regions without university facilities, tourist attractions and industrial traditions, such as the province of St Michels in southeastern Finland and the interior parts of the province of Oulu in northern Finland. The traditional rural communities everywhere in Finland will face considerable problems of adaptation.

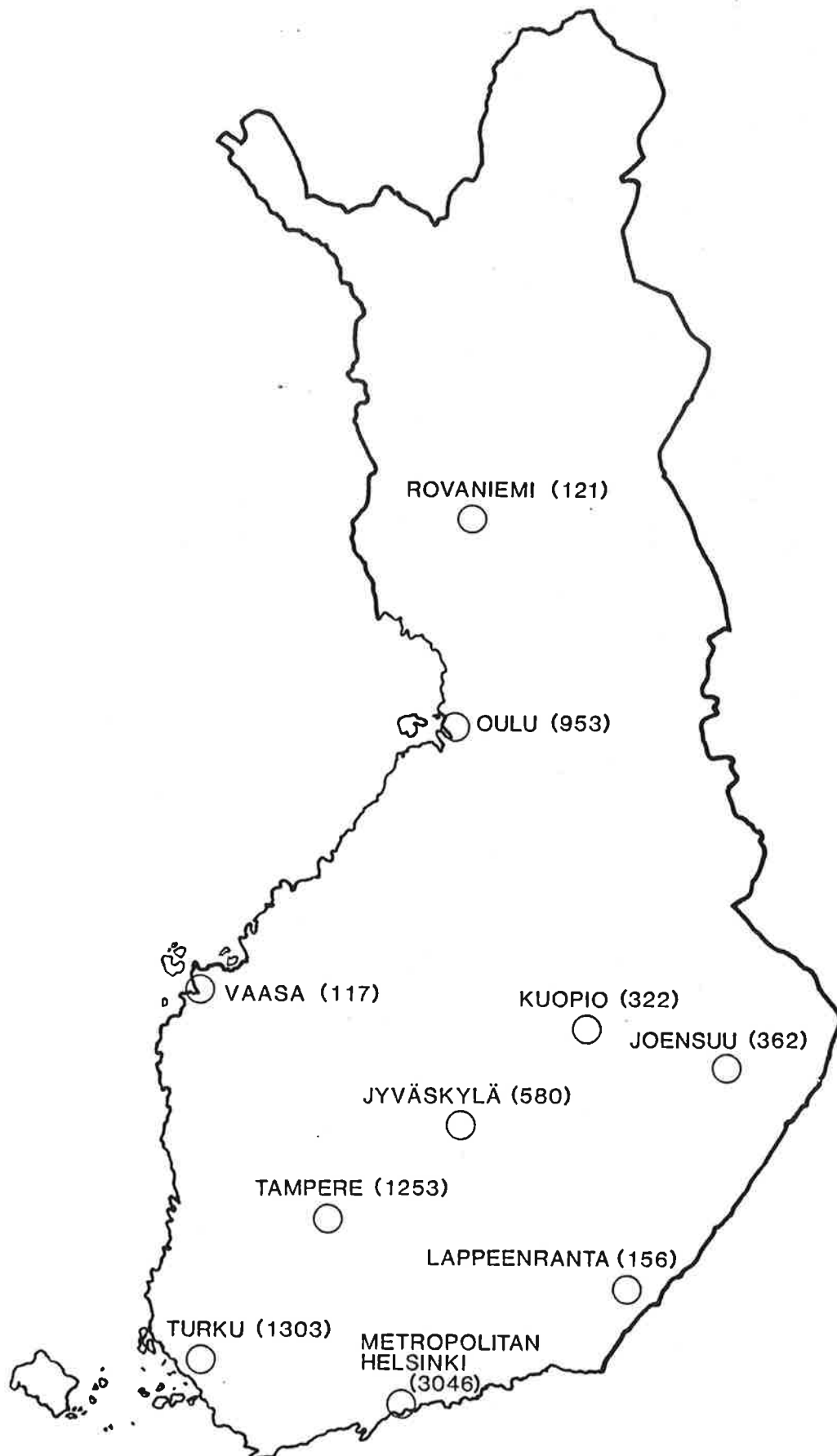
The international discussion about the future liberalization of the trade of agricultural products and the cutting down of subsidies does not promise anything good for the Finnish agriculture. Since it is practised in the harsh northern conditions, it has few chances of surviving if any kind of free trade is established. The question of agriculture will also be a serious issue in any discussion about the prospects of a growing economic integration of Finland towards the European Community.

## 8. Final Reflections

In this section, I shall deal with the position of Finland in the changing centre-periphery relations in Western Europe, and, as a specific case, the changing economic relations between Finland and Sweden. Then I shall deal with some problems connected with the spurtlike internationalization of the Finnish economy and, finally, I shall touch upon the relations between Finland and the European Community.

German centre-periphery theorists classified Finland as a typical agricultural country in the periphery of Europe which was exporting raw material based products during the interwar period. Some theorists found out certain characteristics of

Map 4. FINNISH UNIVERSITY TOWNS



Note: The number of teachers is indicated by (xx).

Source: Data based on EVA: kurssi muuttuu. Raportti alueellisista uhkista ja mahdollisuuksista. Helsinki 1988.

a new industrialized country in the case of Finland (cf. Predöhl 1937, Avieny 1941, Raumolin 1984a.).

Finland has gradually lost certain comparative advantages exporters of raw material based products typically enjoy, such as cheap raw material and labour costs, and a relative shortage situation has developed vis-a-vis the domestic natural resource base during the 1980s. That is why the pulp and paper industry has acquired certain characteristics of the centre by shifting to the production of highly value-added paper grades. In addition, it has extended its operations to the industrial core area of Western Europe.

One of the paradoxes of the actual situation is that the Finnish pulp and paper industry is investing in the peripheral areas of England partly because of the relative abundance of resource factors there as compared with Finland. This would have been inconceivable during the interwar period when England was a wood-hungry metropolitan country vis-a-vis the wood-rich periphery country Finland (cf. Raumolin 1985b).

Finland has become a world centre in the production of machinery and equipment for the forest industries, especially as concerns paper machinery. She has acquired characteristics which have been traditionally typical of Germany, the USA and Sweden.

After the exhaustion of domestic mines the Finnish metal industry has become more and more dependent on imports of raw material. This development follows the path experienced in Central Europe long ago. Outokumpu Oy is therefore acquiring mines in the European periphery, in northern Scandinavia and Ireland and looking for raw materials supplies all over the world.

The Finnish mining and metal industry is also acquiring characteristics of the centre. The metal industry is well-

known for its technological sophistication and is shifting its production to higher value-added special products. The supplier engineering industry has acquired characteristics of the centre as well.

In fact, Finland seems to be the only peripheral exporter of raw material based products which has been able to rise into the centre of the production of the machinery and equipment for the forest sector and the mining sector during this century. The Finnish case can be compared with, for example, Norway, Canada, Australia and Latin America in this respect (cf. Raumolin 1984b, 1986b).

Turning to Sweden, this country has traditionally been, except for being a heavy competitor in the export market of forest products, a centre of technology vis-a-vis Finland. A drastic transformation is taking place in the economic relations between Finland and Sweden. Finnish companies have acquired a large part of the industries operating in the so-called mature sectors in Sweden during the last few years. Finland has surpassed the USA as the largest source of foreign investment in Sweden.

An interesting exception to the rule is the forest products industry. There is very little Swedish investment in the Finnish forest products industry and vice versa. A reason for this state of affairs may stem from the fact that the largest dynamic companies are about the same size and competitive in the international market. Up to now, the restructuring and concentration of the industry has taken place inside the national borders. This does not exclude, of course, the possibility of the formation of giant Nordic forest product companies in the future.

Such concepts used in the current discussion as "the Nordic rationalization of the industries" or "the Nordic division of labour" are not quite clear. Do they mean, for instance,

that Sweden concentrates in the most dynamic and advanced sectors whereas the others keep operating in more mature sectors? Who is responsible for the promotion of these restructurings: governments, large commercial banks or large companies? Who is deciding which strategies to adopt? (cf. Perroux 1966).

As far as the internationalization of the Finnish economy is concerned, there were only a couple of Finnish multinationals in the year 1970, such as Kone Oy and Vaisala Oy, and their number was still limited in the year 1980. Nevertheless, almost all the largest Finnish companies are internationalizing their production. Most prominent among them, in addition to Kone and Vaisala, are Oy Nokia Ab, Valmet Oy, Oy Wärtsilä Ab, Outokumpu Oy, Huhtamäki Oy, Kemira Oy, Neste Oy, Oy Partek Ab, A. Ahlström Oy, Oy Tampella Ab, Kymmene Oy, Yhtyneet Paperitehtaat Oy and Rauma-Repola Oy.

This process has been so spurtlike that it is difficult to get a grip on it. It may be so that even the companies experience difficulties in digesting their rapid expansion. Traditionally, international orientation has not been the forte of Finnish society and culture. The posing of important questions concerning its impact on domestic investment and employment, foreign trade, the possibilities of an autonomous monetary policy or regional development is only beginning.

There are gaps in the education for international tasks, knowledge of foreign languages is insufficient, the politicians, the mass media and the people are unprepared to consider economic issues from an open international point of view, and the rise of Finland close to the position of the industrial centre and its practical implications are not clearly understood.

Turning to the relations between Finland and the European Community, Finnish companies are actively investing in the Continent. In addition, economic and technological relations are expanding by the participation of Finnish companies in several Eureka projects, which are listed in table 9. The Finnish Government has also decided to apply for membership in the Council of Europe.

The growing integration of the Finnish economy toward the European Community and the project of the deepening of the European economic integration at the early 1990s will sooner or later bring attention to the issue of the deepening of the relations between Finland and the EC. Actually, Finland is enjoying many of the advantages of the integration without having to take on the responsibilities of the Community, such as contributing to regional development funds.

Finnish politicians keep saying that joining the Community is unacceptable for political reasons. On the other hand, the representatives of the Community have clearly stated that there are no such opportunities as associated membership within the Community. It will be a perplexing question in Finland how to fit together the divergent political and economic interests and to harmonize the conflicts between the political space and the economic space (cf. Predöhl 1984).

Table 9

#### FINNISH PARTICIPATION IN EUREKA (June 1988)

EU 7:	Eurotrac
EU 8:	Cosine, European Research Network
EU 20:	East, Eureka Advanced Software Technology
EU 37:	Euromar
EU 37/3:	Euromar - Seamos
EU 45:	Prometheus

- EU 48: UMDC Universal Modular Colour Display System for Process Control
- EU 68: Fieldbus
- EU 72: Famos
- EU 94: Polyvalent Measuring System for Hazardous Gases
- EU 95: Compatible High Definition Television System (HDTV)
- EU 117: Wollastonite for Polyurethanes
- EU 130: CIM for Constructional Steelwork Including Expert Systems
- EU 133: Intelligent Quattro (IQ)
- EU 162: Process Industry Applications of Electron Beam (EB) Treatment
- EU 164: Microencapsulation
- EU 183: New Polymer Fibres
- EU 185: HAA (Development of Hybrid Antibiotics)
- EU 199: Chedyn
- EU 210: Enzymatic Treatment of High Yield Pulps
- EU 244: Wollastonite Reinforced Phenolic Engineering Moulding Compounds
- EU 263: Safety Engineers' Workbench
- EU 265: Famos - Planet

Source: Data provided by the Technology Development Centre, Helsinki.

The various interest groups in Finland seem to be quite unprepared to face these difficult questions openly. The Federation of Finnish Industries has pointed out the advantages of the integration whereas the Federation of Labour Unions has criticized the industry for its negative attitude concerning the creation of transnational labour unions inside the Nordic companies which have internationalized their activities.

Some companies seem to have adopted a strategy of integration on their own, but most of the Finnish interest groups and individuals concerned have adopted an evasive attitude. As an example of this attitude in society, it is problematic



that the youth keep learning English and the knowledge of such important European languages as German, French, Spanish and Italian is marginal.

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