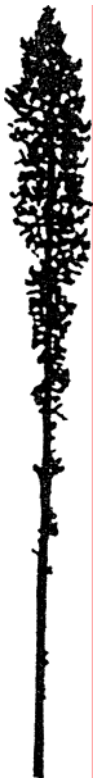

FROM NSR TO INTENSIVE FOREST MANAGEMENT'

Hugo von Sydow[2]

Forest Industry Lecturer

Forestry Program
Faculty of Agriculture and Forestry
The University of Alberta
March 12, 1987

FOREST INDUSTRY LECTURE SERIES NO. 18

'Forest Industry Lecture presented at the University of Alberta, March 12, 1987
'Attache, Swedish Embassy, Washington, D.C.

THE FOREST INDUSTRY LECTURES

Forest industry in western Canada is cooperating with Alberta Forestry, Lands and Wildlife to provide funds to enrich the Forestry Program of the Faculty of Agriculture and Forestry at the University of Alberta through sponsorship of noteworthy speakers.

The Forest Industry Lecture Series was started during the 1976-77 term as a seminar course. The late Desmond I. Crossley and Maxwell T. MacLaggan presented the first series of lectures. The contribution of these two noted Canadian foresters is greatly appreciated.

Subsequent speakers in the series have visited for periods of up to a week, with all visits highlighted by a major public address. It has indeed been a pleasure to host such individuals as C. Ross Silversides, W. Gerald Burch, Gustaf Siren, Kenneth F.S. King, F.L.C. Reed, Gene Namkoong, Kenneth A. Armson, John J. Munro, Peder Braathe, Vidar J. Nordin, Juhani Paivanen, Connor Boyd, Peter Rennie, John A. Marlow, and Gordon Gullion. The subjects of their talks are listed at the end of this paper.

This paper contains Hugo von Sydow's major public address given on 12 March 1987.

We would like to take this opportunity to express our thanks again to the sponsors of this 1986-87 program — we appreciate very much their willing and sustained support:

Alberta Forest Products Association - Edmonton

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Forestry, Lands and Wildlife - Edmonton

HUGO VON SYDOW

Mr. Hugo von Sydow was from 1985 to 1987 Attache for Forest Industry Affairs at the Swedish Embassies of both Washington, D.C. and Ottawa where he advised on all matters of forestry. That position is the most recent of interesting tasks which he has undertaken.

After high school Mr. von Sydow worked in forestry in both Sweden and Canada (in Quebec) before serving two years in military service in his home country. He then entered the Royal College of Forestry in 1950 and graduated from there in 1954.

Upon his graduation in 1954 he worked for the Swedish Forest Service until 1960 with a study and work tour of Australia and New Zealand in 1955 sandwiched in. From 1960 until 1966 he was district forester in northern Sweden for Holmens Bruk, one of Sweden's leading forest products companies.

From 1966 to 1984 von Sydow was secretary general for the Joint Committee of Swedish Forest Industries and from 1984 to quite recently he has held his post as Attache. During his work as secretary general between 1966 and 1984 he has served on numerous boards and committees as representative for the Swedish forest industries and private companies concerning forest policies, legislation, taxation, transportation, environment, and research and development both within and outside of universities.

Mr. von Sydow is an avid cross-country skier, and enjoyed skiing to the Tonquin Valley while in Alberta.

INTRODUCTION

"Parts of the country will be so impoverished of forest that peat as well as dried cow dung must be used instead of wood for cooking and warming huts and this depressing fate must the inhabitants suffer because they heedlessly chopped down their forests, which they previously had."

This quotation is not a contribution to a debate on the environment in Alberta or anywhere else in Canada. I found it in the minutes of a session of the Swedish Parliament in 1855 when members were discussing the management of Crown Forests.

At that time Sweden was a poor, rural country with 80% of the working population employed in farming. Our forests were in an extremely NSR-shape (NSR: non-sufficiently restocked). In southern Sweden, overpopulation, extensive agriculture and cattle raising had ravaged large areas of the natural old forests. In the North, an expanding sawmill industry demanded the best of the mature timber. In Central Sweden, mines and iron works needed incredible amounts of energy in the form of wood and coal. With few exceptions forest management was nonexistent.

Less than 100 years ago our forest resources were severely endangered.

On the social side, the situation was no better. In bad years - and there were many - the rural population was starving. This, in combination with economic inequality, limited labour demand, and growing social awareness among the rapidly increasing population, were some of the factors behind the social unrest of the 19th century. These conditions led to the first mass emigration from Sweden. Between 1853 and 1873 more than 100,000 Swedes - just over 3% of the population - settled in North America. More were to follow. Altogether, nearly 1.4 million people emigrated between 1865 and 1930. More than 80% were bound for North America. How many were lucky enough to settle in Alberta, I do not know.

Concerning the forests, it did not turn out as disastrously as the Member of Parliament in 1855 predicted. On the contrary, today forestry and the forest industry are the cornerstones of the Swedish economy and form the backbone of our social welfare system. This sector is our most important export business. Sweden has never had as much wood as it has today.

The course of action which took Sweden from a threatening catastrophe with a major part of the forest land as NSR (long before that expression was created) to intensive forest management with a promising future - that is the issue I have been invited to discuss with you today.

Peter Murphy had no difficulty in enticing me into coming here for that purpose. The assignment has stimulated me to reflect on the development of Swedish forestry in the light of what I have experienced during my stay in Canada. It has been, in many ways, instructive. But, above all, I am honoured to be invited to lecture in the well-known Forest Industry Lecture Series. In doing this, I would be happy if I also can express my gratitude for all the hospitality and openness I have met all over your country.

These have been very educational years for me. Now, more than ever, I understand the value of professional and collegial exchange between our countries on all levels of forestry. I am glad to extend very special greetings from the Swedish University of Agricultural Sciences and its Forestry Faculty. Peter Murphy and many of you know how much we appreciate the student exchange between our universities.

IMPORTANCE OF FORESTRY IN SWEDEN

Some of you have had the opportunity to personally know our northern location on the globe. Placed on the North American map Sweden would, for instance, stretch from north of Edmonton to the southern part of Victoria Island. By your standards Sweden is a small country, just two-thirds the size of Alberta. However,

there are about four times as many Swedes surviving there - without being crowded. Most of us prefer to live in the urban areas.

As late as the turn of the century, Sweden was a rural country. Today it is highly industrialized. Farming employs no more than 5% of the population. As far as that goes, the agriculture is also highly mechanized, with higher production and lower employment - as it is in Canada.

The forest sector, however, holds a great importance for regional development and for employment in the country on the whole. The forests are the basic source of employment for one of every sixteen gainfully employed Swedes (Figure I).

Another of the many similarities between Canada and Sweden is our dependency on export. Of our respective total forest products output we both export 75-80%.

The forest products sector is the number-one export business in terms of net export value. Last year, the net export income was CAD 7.6 billion (SEK 38 billion), which represents one fifth of our total net export balance (Figure 2).

Compared to Canada, in terms of tonnes and cubic metres, Sweden is not a very prominent producer. Of lumber, we can manufacture half as much as you; of pulp and paper, less than half. However, as a supplier to the world market we deserve some respect.

In pulp we rank No. 3 after Canada and the U.S. (Figure 3)

In paper and paperboard, we are competing with Canada and Finland. The U.S. is No. 4 (Figure 4).

In sawn wood, we hold a silver medal after outstanding Canada, but ahead of the Soviet Union.

The European Community is to Sweden what the U.S. is to Canada. More than three quarters of our total forest products exports go to the EEC and Western Europe (Figure 5). Therefore, there are several reasons why we are watching your lumber issue with the U.S.

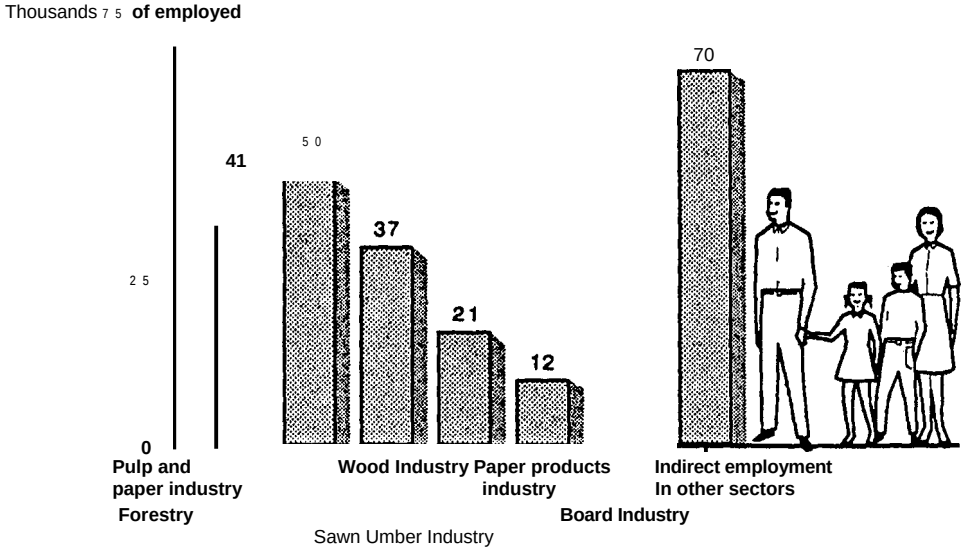
But today I am here to discuss forestry.

In our harsh location up in the north we have been given the Gulf Stream to help us survive. But Mother Nature does not guarantee any remarkable wood production. The preconditions vary greatly depending on local climate and geology. Whereas the soil production capability in the far south averages 6-7 cubic metres per hectare and year, it is below 3 cubic metres in the north. For the country on the whole the average is a little more than 4 cubic metres per hectare per year (Figure 6).

The ambitious aim of forest management - we are going to talk more about that later - makes it quite expensive. On average for the country - it varies considerably - the cost for annual investment and maintenance in forestry is recorded at $13 (CAD) for every productive hectare. This means that for every cubic metre felled, we pay $5-6 for reforestation and maintenance. We consider the costs worthwhile. In our situation nothing is as expensive as a timber shortage.

Concerning tree species we have been more lucky: only two softwood species (until the lodgepole pine) - Scots pine (Pinus sylvestris) and Norway spruce (Picea abies), both of the best sort for lumber and pulping - and of the hardwoods, primarily birch (Betula spp.), which is also an excellent raw material for pulp and paper making.

The forests provide work for one in every sixteen gainfully employed
(Forestry and the forest industry provide employment for 235 000 persons)



1/ 86 Source: Official statistics

Figure 1.The forests provide work for one in every sixteen gainfully employed (forestry and the forest industry provide employment for 235,000 persons).

Figure 2. Exports by the forest industry pay for imports of oil, gasoline and foodstuffs (the products of the forest industry gave by far and away the biggest net income from foreign trade in 1985. SEK billion).

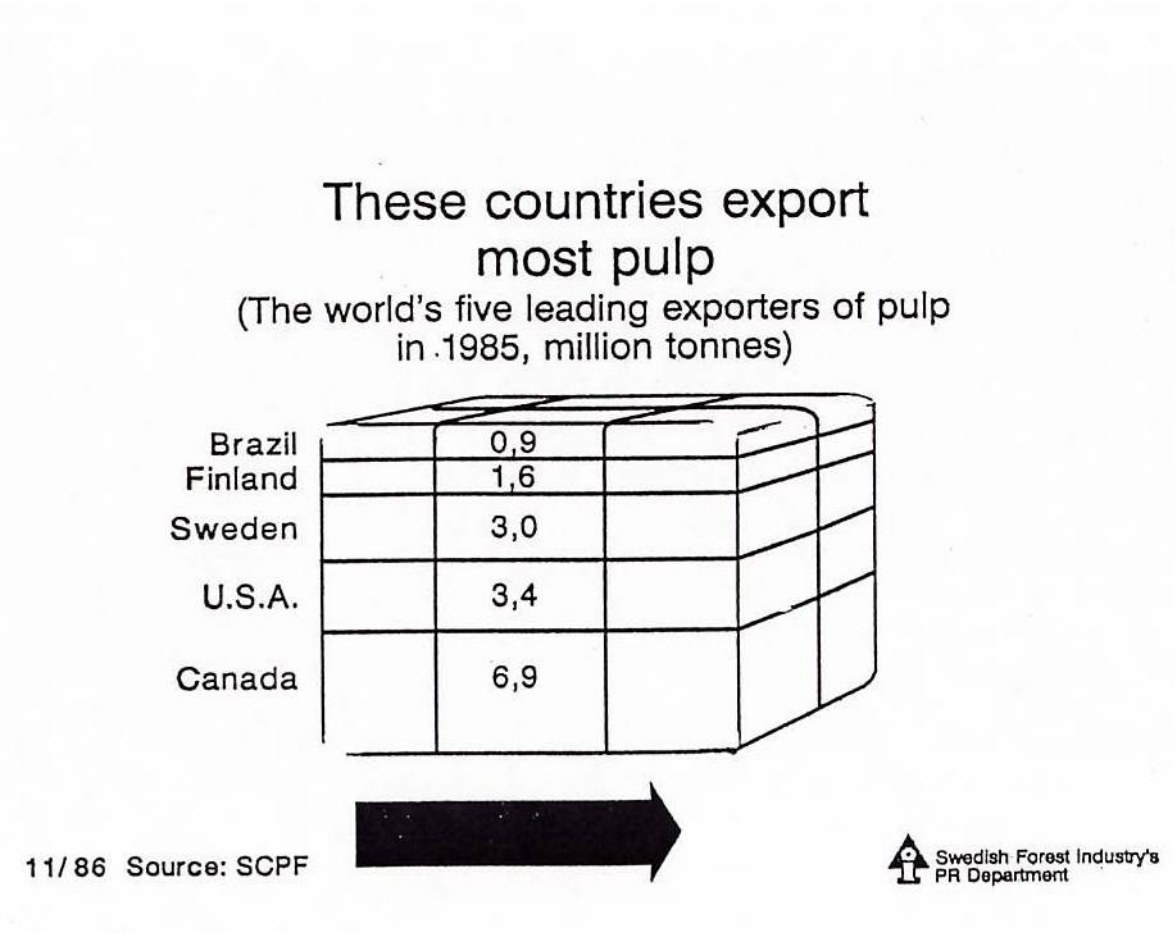


Figure 3 These countries export the most pulp (the world's five leading exporters of pulp in 1985, million tones).

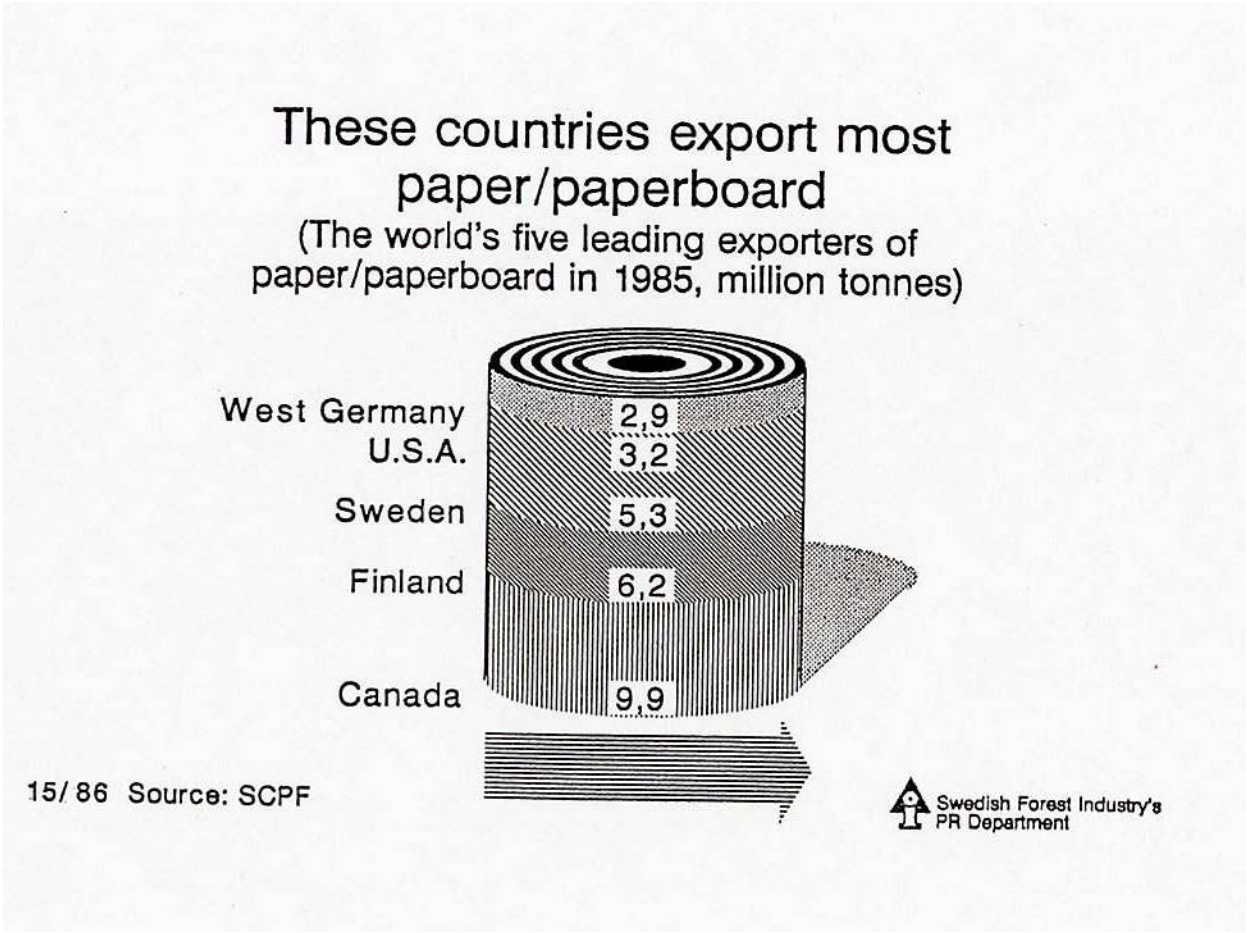


Figure 4. These countries export the most paper/paperboard (the world's five leading exporters of paper/paperboard in 1985, million tonnes)

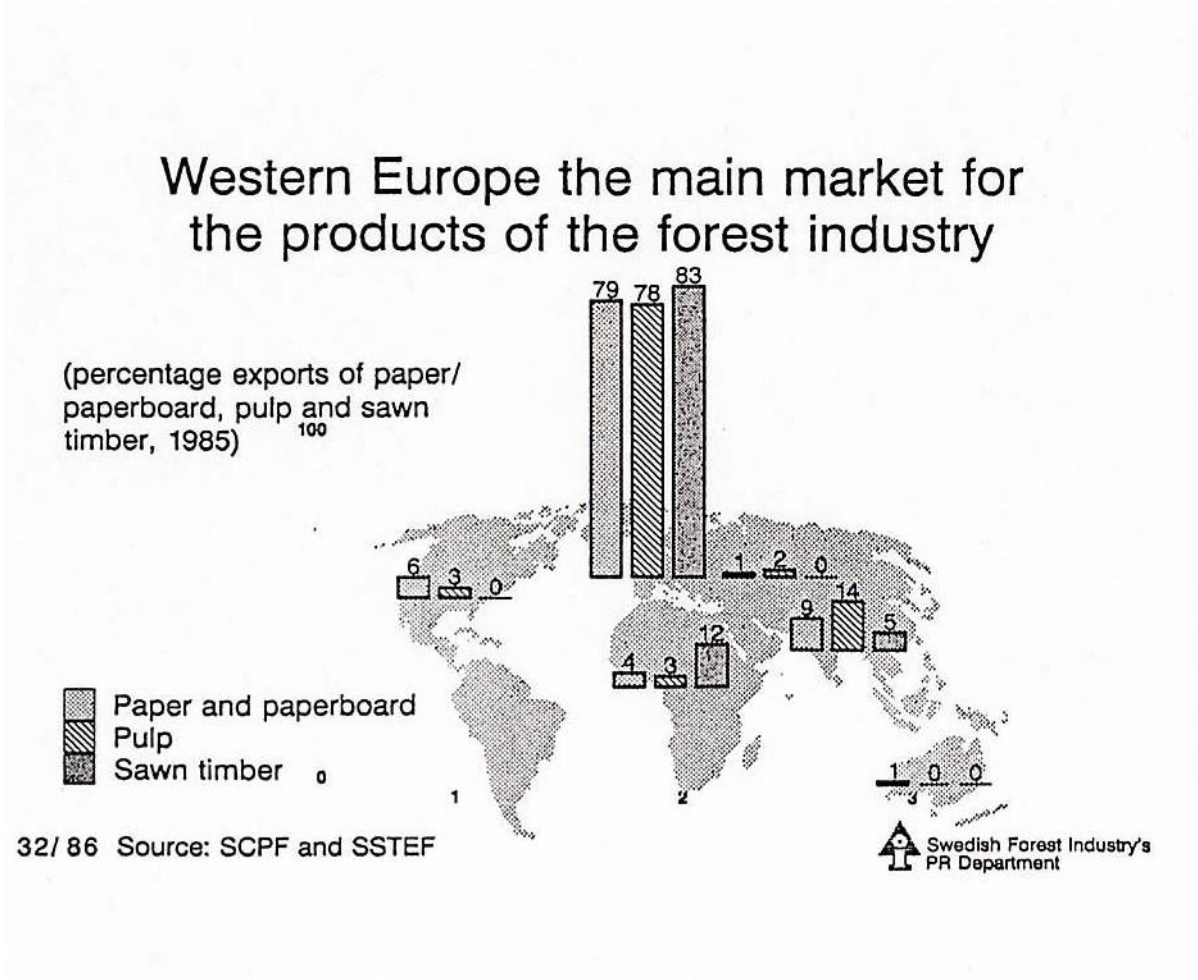


Figure 5. Western Europe is the main market for the products of the forest industry.

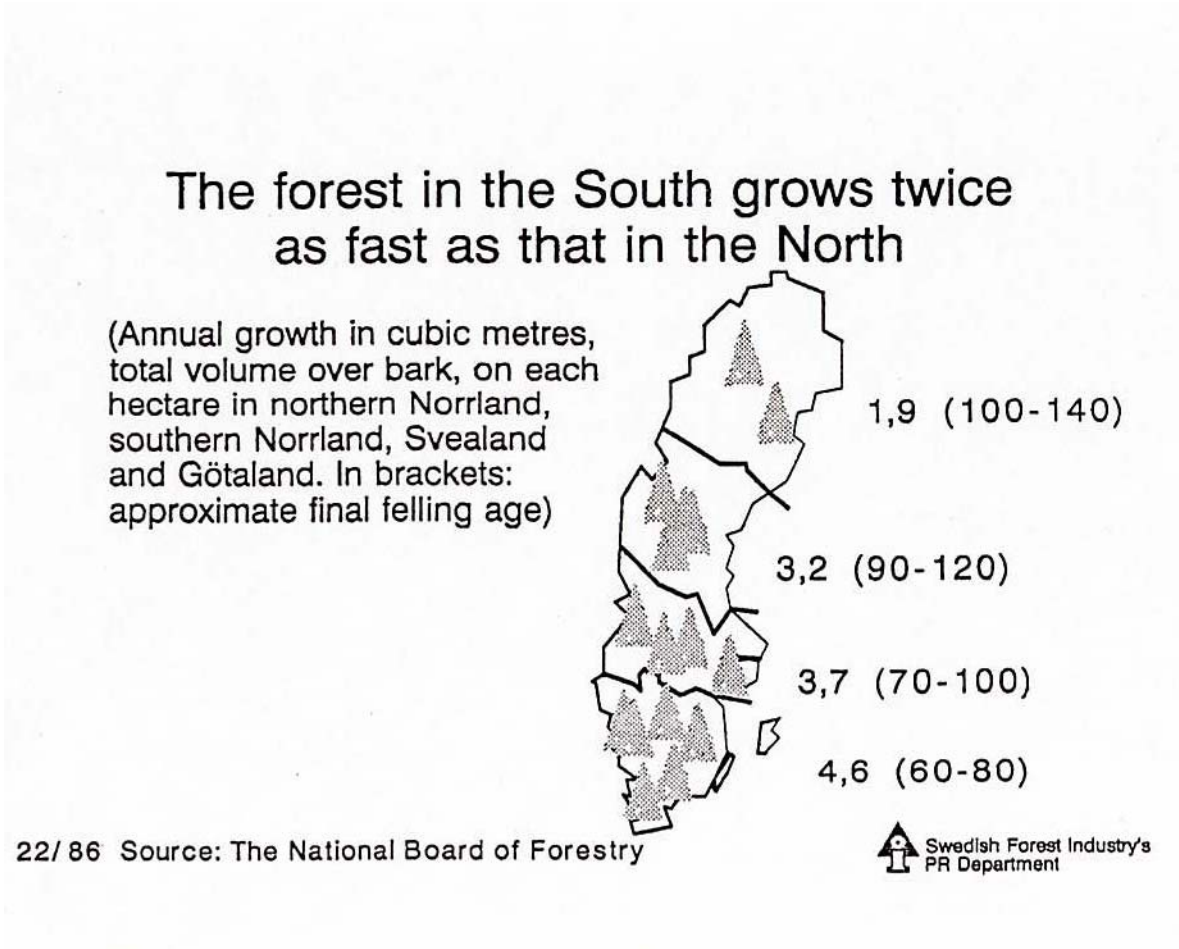


Figure 6. The forest in the South grows twice as fast as that in the North.

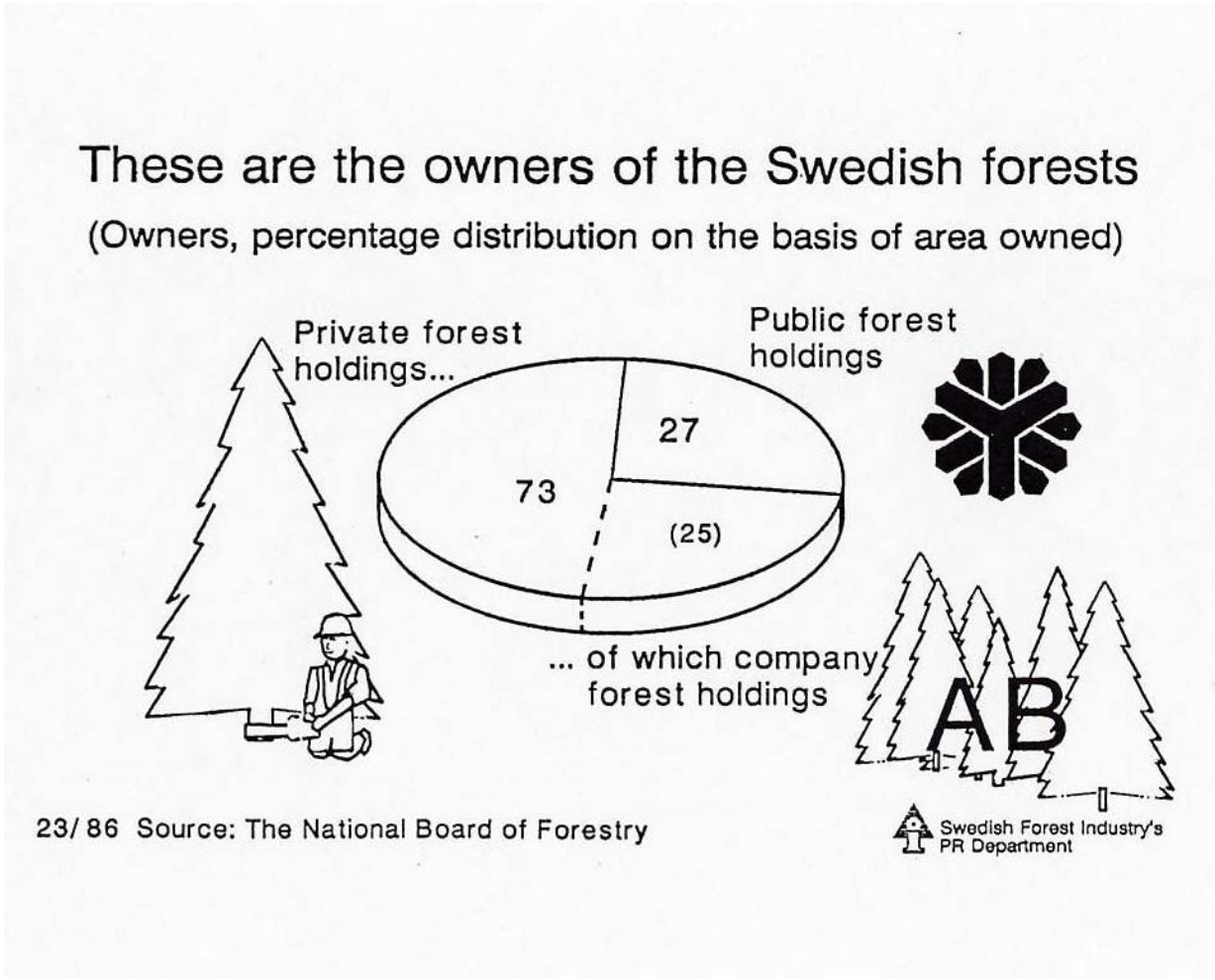


Figure 7. These are the owners of the Swedish forests (owners, percentage distribution on the basis of area owned).

Owner distribution is the basis in forming a forest policy. As is the case in the Maritimes, the Swedish forests are predominantly privately owned (Figure 7). Of the total woodland area, 27% is owned by public bodies, of which the main part is administered by the Swedish Forest Service (a government-owned enterprise, Domanverket), 25% by the private forest products industries, and 48% by private individuals. Of the 25% in company possession the seven largest companies own 90%. Private ownership is predominant in southern Sweden, but it is also distributed among 240,000 holdings throughout the country.

Also, the industry in question is mainly in private hands. Of the total production of pulp, paper and lumber the State enterprises manufacture 3%, 15% and 8%, respectively.

Sweden is an open market economy; this applies to a high degree to the timber market. As you understand from what has already been told, the forest industry is far from self-sufficient in timber supplied from its own woodland holdings. To varying degrees the companies are dependent on wood purchased in free competition for standing or delivered timber.

Important participants in the price negotiations are the Forest Owners' Associations, which represent the owners of about 45% of the private forest land areas.
Obviously, the raw material to the forest industry is comparatively expensive. The companies have to pay a price high enough to make it profitable for the private owners and to keep them in good spirits for further investments in this long-term business.

Determining timber prices is a complicated business in Sweden. The prices of pulpwood, saw logs and standing timber in the open market vary considerably according to tree species, size, quality, location, time of delivery, etc. Just to indicate the magnitude of costs of pulpwood in the current year I may mention that according to official statistics the price of pulpwood, first rate softwood delivered at truck road, is in the region of $50 (CAD), varying from $40 for birch in northern Sweden, to $54 for spruce in southern Sweden. In addition you have to pay certain bonus, truck transport to the mill and overheads.1

With the high standard of living that we have allowed ourselves, the industry will always remain in a squeeze between the price the world market is prepared to pay for manufactured products and the price the forest owners will accept for their timber.

How does it work? How do we get people interested in growing wood under these unfavourable conditions?

It is time for us to return to where we started, some one hundred years ago.

FOREST MANAGEMENT POLICIES AND RESULTS

As you remember, by then the Swedish forests were in miserable shape - except for virgin forests in remote areas up in the north. But in time, with social, economic and technical development during the latter decades of the 19th century a new concept of silviculture gradually emerged. The transition started in southern Sweden where extensive tree plantations on abandoned farmland were initiated by foresighted pioneers. Reforestation experienced a revival. It also resulted in the enactment of our first nationwide Forestry Act in 1903.

[1] $1 (CAD) = 5 Swedisk kroner (SEK)

The basic regulations of the Act were:

all fellings were to be immediately replaced by new forest

fellings of mature forests were to be rationed to guarantee sustained yield.

This Act has been amended several times since 1903 but the core of it is still in place.

The spirit of 1903 has been the main theme throughout the years. The responsibility for our woodlands has been embedded in our very heart and soul.

Therefore, all parties involved could agree with the introductory section of the current Forestry Act, passed by the Parliament in 1979. That paragraph also constitutes the basic of the revised forest policy:

"By means of proper utilization of their wood-producing capacity, woodlands and the forests on them should be managed in such a way as to provide a permanently high and valuable timber yield. This management should pay heed to nature conservation and other public interests." (Article 1, Forestry Act)

For the first time in our forest legislation we find in the new Act an aim for wood production - at least an annual yield of 75 million cubic metres. It also contains fairly detailed prescriptions for establishing new stands, tending young stands, cutting mature stands, forest protection, etc.

In this context it should also be mentioned that the requirements of the Act include all owner categories, even the State. The supervision of the Act as well as forestry extension rests on the Swedish Forestry Administration, i.e. the National Board of Forestry and the County Forestry Boards.

We think the 1979 policy is on the right track. The resources are continuously increasing.

From the 1920's, when the annual inventories started, the growing stock has risen from 1,700 million cubic metres to 2,600 million according to the latest survey - or by more than 50%. It is not unrealistic to forecast up to three billion cubic metres within a few decades - virtually doubling the stock during this century (Figure 8).

The annual growth is following the same trend. From less than 60 million cubic metres in 1920 it is today recorded at some 95 million, or more than 50% greater (Figure 9).

The most dominant part of the annual cut goes to the industry as raw material. Therefore, increasing growth and actual felling allow a corresponding expansion of the industry production, as also illustrated in Figure 9.

Our predecessors have led the way; now the responsibility to go further is ours. We shall, of course.

The current allowable cut on a sustained yield basis is about 75 million cubic metres. According to recent assessments by the Swedish University of Agricultural Sciences (SLU), we have the knowledge and the means to reach the level of 100 million cubic metres in the middle of the next century, but it will be expensive.

APPLIED FOREST MANAGEMENT

And now, a few words about forest management as applied in Sweden today and the methods which will be further improved.

The main factor behind these positive trends mentioned, is intensive and improved forest management in general with the direction to utilize the local conditions given in the best possible way: replacing overmature and inferior stands, planting high quality seedlings, employment of safe and effective planting methods, optimizing rotations and thinnings, proper tree species, etc. The Forestry Act gives guidelines to the best of existing knowledge and the Forestry Administration is active in information and extension services. The large scale forestry operators (the companies and the Forest Service) with their own highly qualified staff run forest management programs on a higher level than demanded by the Forestry Act.

Fertilization is a well established measure, primarily with large scale forestry, and decisions are based on biological considerations and a cost/benefit analysis. On the average 0.6% of the total forest area is fertilized every year, adding 2.5 million cubic metres to Mother Nature's own capacity.

Drainage of suitable wetlands means another contribution to the forest area and wood production. Environmental protection is carefully taken into consideration.

Lecturing in Alberta on recent improvements in Swedish forestry, of course, I should have started by reporting on the most sensational achievement - the introduction of the Lodgepole pine *(Pinus contorta),* from northern British Columbia and Yukon. Because we have been discouraged many times in efforts to test exotic, potentially faster growing species, the introduction *of contorta* was first tested for many years in careful provenance trials. The results are very promising. This species has become our third softwood tree. It is sturdy and it produces 60-80% more than the indigenous pine. Still, we are playing with caution: the forestry legislation places a limit of 35,000 hectares of annual new *contorta* planting area.

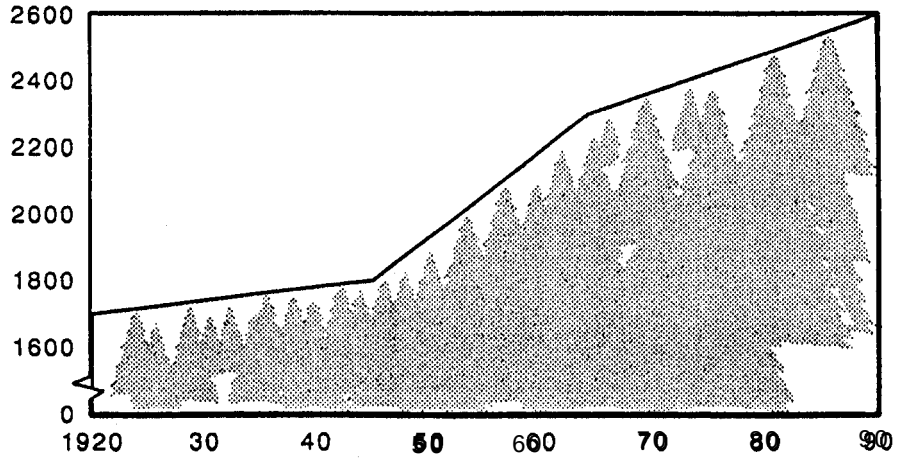
In Sweden some 70 million *contorta* seedlings are planted every year - probably more than in entire Canada. Thank you for that contribution!

The knowledge acquired by research and development work offers even greater opportunities than ever before of actively influencing forest management. Also up-to-date education and advanced knowledge transfer are of utmost importance. Most of our forest research is carried out by the University of Agricultural Sciences (SLU) and its Forestry Faculty, but several other universities and institutes are also involved. As in this country, the Swedish R&D activities within the forest sector are joint ventures between the State, industry, forest owners' organizations and other interests. Well-known in Canada are our State-industry institutions the Logging Research Foundation "Skogsarbeten," and the Institute for Forest Improvement.

A good example of joint scientific-forestry contribution to policy deliberations is shown in the results of the felling calculations recently performed at the SLU Forestry Faculty (Figure 10). Three options were presented based on different assumptions concerning the direction of silviculture. The middle alternative (Alternative 1) shows the allowable cut if the forestry policy pursued today is permitted to prevail. A higher alternative (Alternative 2), with significantly increasing AAC over the long term, presupposes more intensive management with, among other measures, more fertilization and planting of lodgepole pine. The assumptions for a lower curve (Alternative 3) include limitations on active forestry over considerably large areas and also no fertilization or planting of exotic species. Thus, the present generation has a great responsibility in deciding whether or not our successors will have access to the opportunities provided by an expanding timber production.

...and this is how much forest there is in Sweden

(Timber stocks in million cubic metres, total volume over bark, 1920-1980 and forecast for 1990)



20/ 86 Source: National Forest Survey

Swedish Forest Industry's PR Department

Figure 8. …and this is how much forest there is in Sweden (timber stocks in million cubic metres, total volume over bark, 1920-1980 and forecast for 1990).

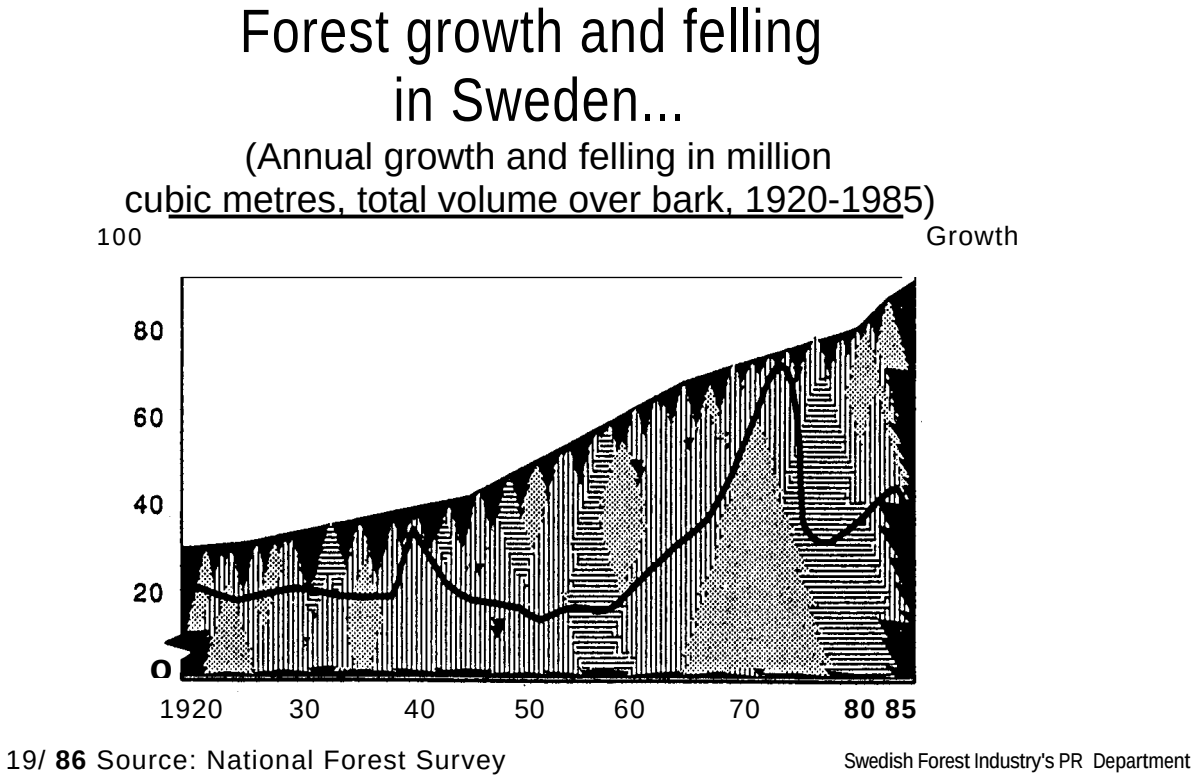


Figure 9. Forest growth and felling in Sweden (annual growth and felling in million cubic metres, total volume over bark, 1920-1985).

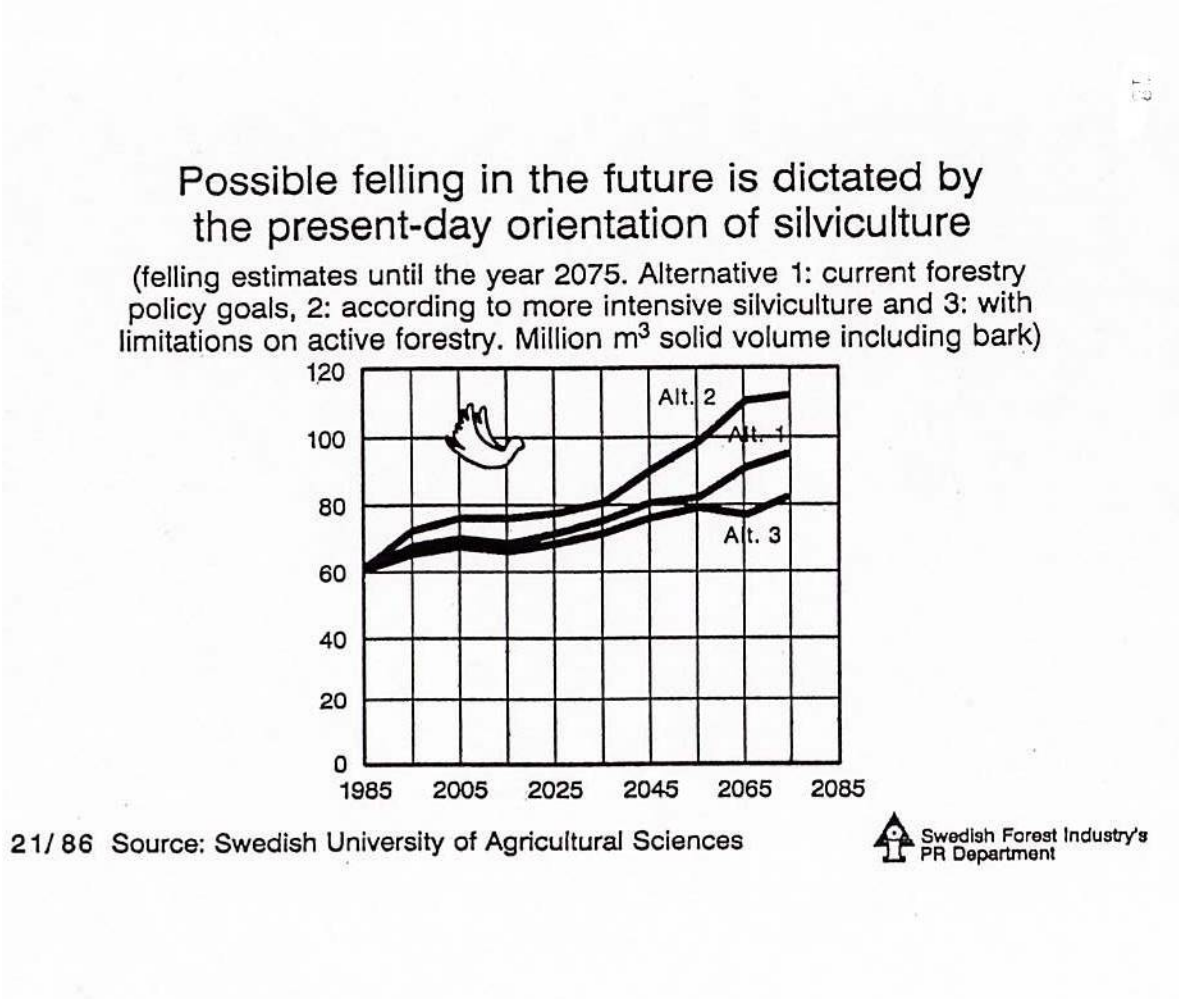


Figure 10. Possible felling in the future is indicated by the present-day orientation of silviculture (felling estimates until the year 2075. Alternative 1: current forestry policy goals, 2: according to more intensive silviculture and 3: with limitations on active forestry. Millions m^3 solid volume including bark).

CONCERNS

You may wonder if there are no clouds at all in the sky above the Swedish woodlands.

Yes, certainly, there are. And literally speaking, as well.

First, let us establish that an absolute prerequisite for realizing an intensive forest management according to the policy guide-lines, is competitive industry - an industry that can remain in the market with profit enough to pay a price, and which may stimulate the forest owner to grow and cut his timber. Even in Sweden "competitiveness" is a buzz-word - the Canadians will always be chasing us on the forest products markets.

There is also another cloud in the sky that is considered to be a real threat. You are familiar with it, especially in eastern Canada. I am referring to air pollution - what you call the "acid rain."

By no means do we speak of a "Waldsterben" - or forest death - in the same sense as some European countries. But there are early warnings and bad signs. During the past few decades, biological life in thousands of lakes in Sweden has been devastated. Still more lakes are endangered. The pH level in the soil covering large areas of Sweden is falling. Damage to the forest is being reported, mainly to the Norway spruce, with a pattern similar to that of central Europe. Something is going wrong.

We have well-founded beliefs that the common denominator of all these disturbances is man-made pollution resulting from the combustion of fossil fuels. Other factors may contribute to the stress, but air pollution is the villain most suspect. Many measures have been taken to reduce emissions and restrict their effects, but there is still much to be done. The obvious need for intensified research will be met, but there is no excuse to delay action in tackling the most threatening environmental peace-time problem facing the industrialized world today.

The Canadian National Forest Awareness Campaign was launched at the beginning of this year. At first I was astonished. Would a public awareness campaign concerning the importance of forestry be necessary in Canada - the world leader in forest products?! Then it struck me that this is exactly what we in the Swedish forest sector have been doing for a number of years. There is a well established, close co-operation between all parties involved in a continuous public relations program to improve the image of the sector, to remind people of the importance of healthy forests and a competitive industry and to explain our goals and means. We have learned that a "campaign" - in our sense of the word - is not sufficient. This is a long-term struggle.

But it does pay. According to a recent survey of people's attitudes towards different sectors of industry, 77% of the population considered the forest industry as the most important. More than 60% of these interviewed had a positive impression of the sector, while 20% had a negative attitude - primarily for environmental reasons. But to a great extent the problems were seen as being in forestry; the clear-felling was mentioned among other measures.

A real concern, however - confirmed by this latest survey - is the consequences of pollution. No fewer than 84% answered `yes" to the question whether they were worried about damage to the forest due to air pollution. This is a level of concern greater than in any other similar survey taken.

Our own interpretation of these recurrent surveys of public attitudes is that there is a growing understanding of goals and means in modern forestry. No doubt, the foresters have also adjusted their methods to environmental considerations. We firmly believe that in most cases, even intensive forest

management can successfully be combined with environmental and recreational interests.

Finally a few words about a problem in our sector, that can seem somewhat contradictory after all the boasting in the preceding text. Some of you might remember an incident in St. John, New Brunswick, some months ago, when a ship loaded with wood chips for Sweden was stopped for safety reasons. Sweden importing raw material for its pulp industry?!

Yes, really. It is true that the annual allowable cut could at least meet the demand of raw material from our entire industry, even in times of full utilization of capacity. But the nut to crack is to get the private owners to make the most of their AAC (allowable annual cut). For a number of years there has been a considerable gap within the private forest lands between the allowable cut on a sustained yield basis and the volume actually felled. The output has not covered the demand - the balance has been imported from Europe and even from North America. There are many reasons for this reluctance among the private owners - many of us are blaming our taxation system in the first place.

Last year we saw another successful example of pragmatic teamwork among all parties involved in tackling this intricate issue; the Government, the Forestry Administration, the industry and, even the private owners' own associations. A package was worked out to stimulate the output of timber, including some amendments to the tax legislation. Positive results were not long in coming, but there is still a gap before we fully utilize our resources.

CONCLUSION

Ladies and gentlemen, let me put an end to this report and relay greetings from your old competitors, colleagues and friends "over there" with another quotation. This one is attributed to Bishop A.C. Agardh in the beginning of the 19th century:

"The freedom of Sweden is entirely dependent upon the health of her forests."

From today's point of view on balance of payments, the Right Reverend, the Lord Bishop was damned right - if the expression is permitted.

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18. From NSR to Intensive Forest Management. Hugo Von Sydow. 12 March 1987**.**

Copies are available free on request to the Department of Forest Science, The University of Alberta, Edmonton, Alberta T6G 2H1.