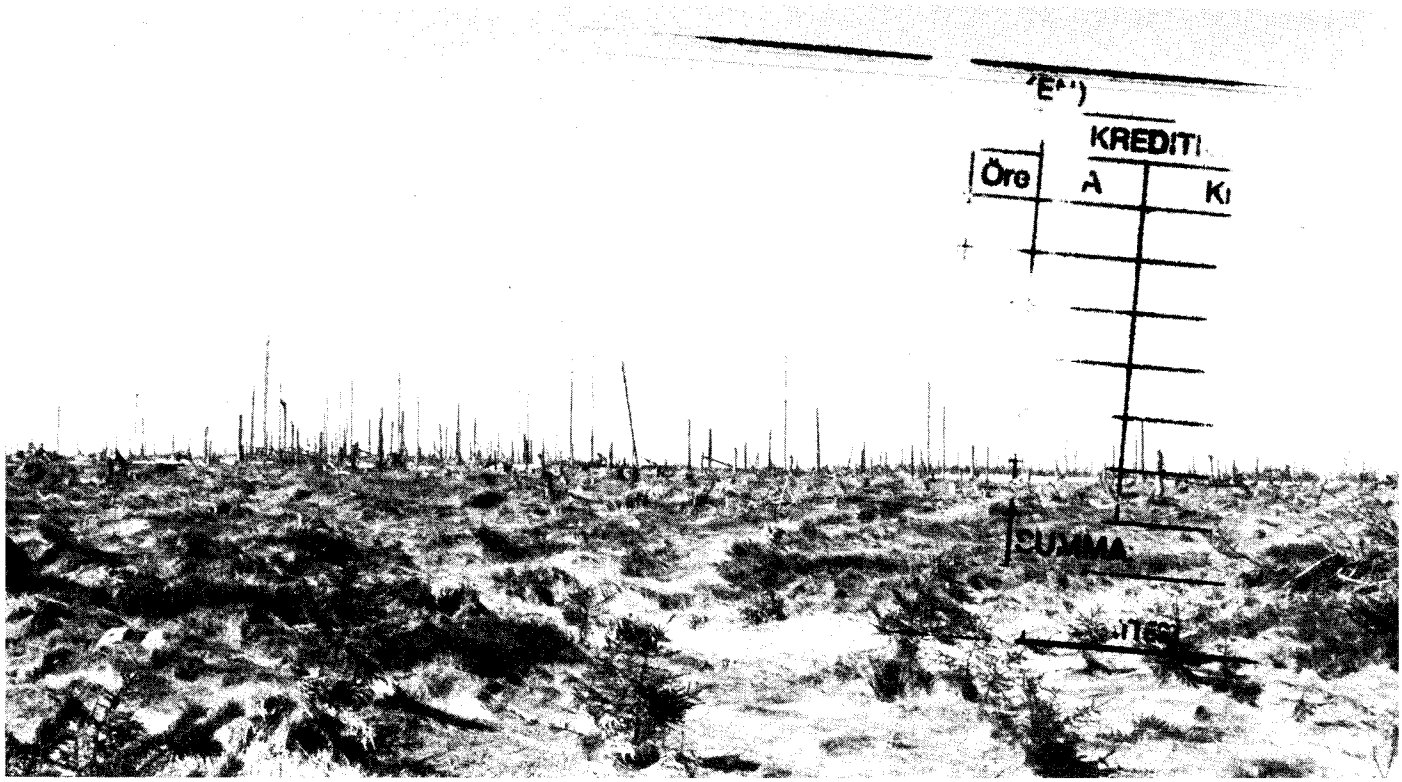
No. 1, Feb. 1989

Acid News

A Newsletter from the Swedish and Norwegian NGO Secretariats on Acid Rain



ECE FORESTS

Accelerating damage seen

A considerable increase in damage to broadleaved trees in Europe has been revealed in a study issued by the UN Economic Commission for Europe. While the damage to conifers was found to have decreased slightly in 1987 as compared with 1986, the rate of increase over the previous year for broadleaved trees had risen from +2 to +20 per cent. Moderate to severe defoliation of broadleaved trees was higher than that of conifers in seven out of 16 countries. In six countries more than 15 per cent of the broadleaved trees were markedly defoliated.

The study was based on surveys carried out in 22 European countries in accordance with the guidelines of an ECE manual. As may be seen from the table, fifteen of the surveys were nationwide, the remaining seven being confined to selected regional areas.

Forest land in the countries that made surveys totals some 103 million hectares, 57 million of which constitute coniferous forest, with pine and spruce predominating. In the 46 million ha of broadleaved forest the main species are beech and oak. The 1987 surveys covered more than 50 per cent of the coniferous forests and about 40 per cent of the broadleaved.

In the surveys, sample trees were assessed for damage in accordance with the five-class system shown in the table below.

Continued on page 3

Class 0	Needle/leaf loss up to	10 %	No defoliation
Class 1	Needle/leaf loss	11-25 %	Slight defoliation
Class 2	Needle/leaf loss	26-60 %	Moderate defoliation
Class 3	Needle/leaf loss over	60 %	Severe defoliation
Class 4			Dead tree

Picture above was taken in the Erzgebirge, East Germany, near the Czechoslovakian border. This is an area that used to be covered in coniferous forest. Photo Christer Ågren.

The Swedish NGO Secretariat on Acid Rain
Miljövård
Box 33031
S-400 33 Göteborg, Sweden
Phone: +46-31-82 24 33

The Stop Acid Rain Campaign/Norway
Det Norske Skogselskap
Wergelandsv. 23B, N-0167 Oslo 1, Norway
Phone: +47-2-46 98 57

Acid News

A newsletter from the Swedish and Norwegian NGO secretariats on acid rain.

ACID NEWS is a joint publication of the two secretariats, whose aim is to provide information on the subjects of acid rain and the acidification of the environment.

Anyone interested in these problems is invited to contact the secretariats at either of the addresses below. All requests for information or material will be dealt with to the best of our ability.

In order to fulfill the purpose of Acid News, we need information from everywhere — so if you have read or heard about something that might be of general interest, please write or send a copy to:

The Swedish NGO Secretariat on Acid Rain
Miljövård
Box 33031
S-400 33 Göteborg, Sweden
Telephone: 031-82 24 33

Editor: Christer Ågren
Published by: The Swedish Society for the Conservation of Nature
Printed by: Williamssons Offset, Solna
ISSN 0281-5087

THE SECRETARIATS

The Swedish NGO Secretariat on Acid Rain is supported by the following environmental organizations:

- The Environmental Federation (Miljöförbundet)
- The Swedish Anglers' National Association (Sportfiskarna)
- The Swedish Society for the Conservation of Nature (Svenska Naturskyddsföreningen)
- The Swedish Youth Association for Environmental Studies and Conservation (Fältbiologerna)

Address and telephone: see above.

The Norwegian secretariat, **"The Stop Acid Rain Campaign/Norway,"** is organized by six non-governmental organizations concerned with the environment:

- Nature and Youth (Natur og Ungdom)
- The Norwegian Forestry Society (Det Norske Skogselskap)
- World Wildlife Fund/Norway (Verdens Villmarksfond)
- The Norwegian Association of Anglers and Hunters (Norges Jeger- og Fiskeforbund)
- The Norwegian Society for Conservation of Nature (Norges Naturvernforbund)
- The Norwegian Mountain Touring Association (Den Norske Turistforening)

The Stop Acid Rain Campaign/Norway
Det Norske Skogselskap
Wergelandsv. 23 B,
N-0167 OSLO 1, Norway
Telephone: 02-46 98 57

EDITORIAL

Stop dilly-dallying

Another international agreement for limiting emissions of air pollutants has recently seen the light. This is the so-called NO_x protocol (see p. 8). It does not require any real reductions in its first stage, but merely calls for a freezing in 1994 of emissions of nitrogen oxides at their 1987 level. It is however also laid down in the protocol that, as a second stage, measures must be taken to actually reduce emissions, and that these measures must take into account critical loads.

In the view of many, and not least of the environmental groups, the provisions of the first stage are hopelessly inadequate. It was evident that this feeling was widespread, too, from the fact that twelve nations took matters into their own hands by signing a declaration, independently of the protocol, in which they bound themselves to reduce their emissions by about 30 per cent by 1998.

Because the protocol is so weak in its first stage, all the more importance will attach to the second stage. As a matter of principle, too, this second stage will be especially important, since it will require aims and strategies to be based on critical loads. This is something that the environmental organizations have been steadily urging — maintaining that enough is already known about critical loads for sulphur and nitrogen to enable decisions to be made now.

There is a latent risk in the wording of the protocol, about "cooperating to establish measures and a time-table (for achieving reductions of nitrogen oxides) no later than 1 January 1996," that more years of delay will follow.

In regard to energy use and air pollution, the ECE area — which includes the United States and Canada as well as the whole of Europe — occupies an outstanding position in the world. It answers for a good 70 per cent of the total world use of energy, about 70 per cent of the non-natural emissions of sulphur, and at least 60 per cent of the nitrogen oxides emitted.

Thus the ECE Convention provides the possibility of bringing about a marked direct reduction of polluting emissions and indirectly of energy consumption and causing changes in the energy system itself. It is therefore regrettable that concrete measures to reduce emissions should be developing so slowly and have to date been so inadequate.

Short-sighted national self-interest, unrealistic demands for absolute equality of sacrifice, as well as for full scientific proof of the necessity and effectiveness of proposed measures, are currently hindering and delaying progress within the framework of the Convention. If we are to get anywhere, all nations will have to

☐ Give higher priority to measures designed to limit emissions, for example by developing technologies that will be favourable to the environment, and by revising their energy, transport, and agricultural policies.

☐ Facilitate the introduction of modern techniques for a better use of energy and cleaning of emissions.

☐ Provide the economic means for the transfer of such techniques to other countries, for example by giving advantageous loans and supporting an international clean-air fund.

☐ Promote bilateral cooperation for the improvement of air quality, especially between countries of eastern and western Europe.

☐ Unilaterally adopt measures that go beyond those already prescribed by international agreements for limiting emissions.

The final goal must of course be to bring emissions down to a level that is well below that which is necessary for the well-being of humanity and of the environment.

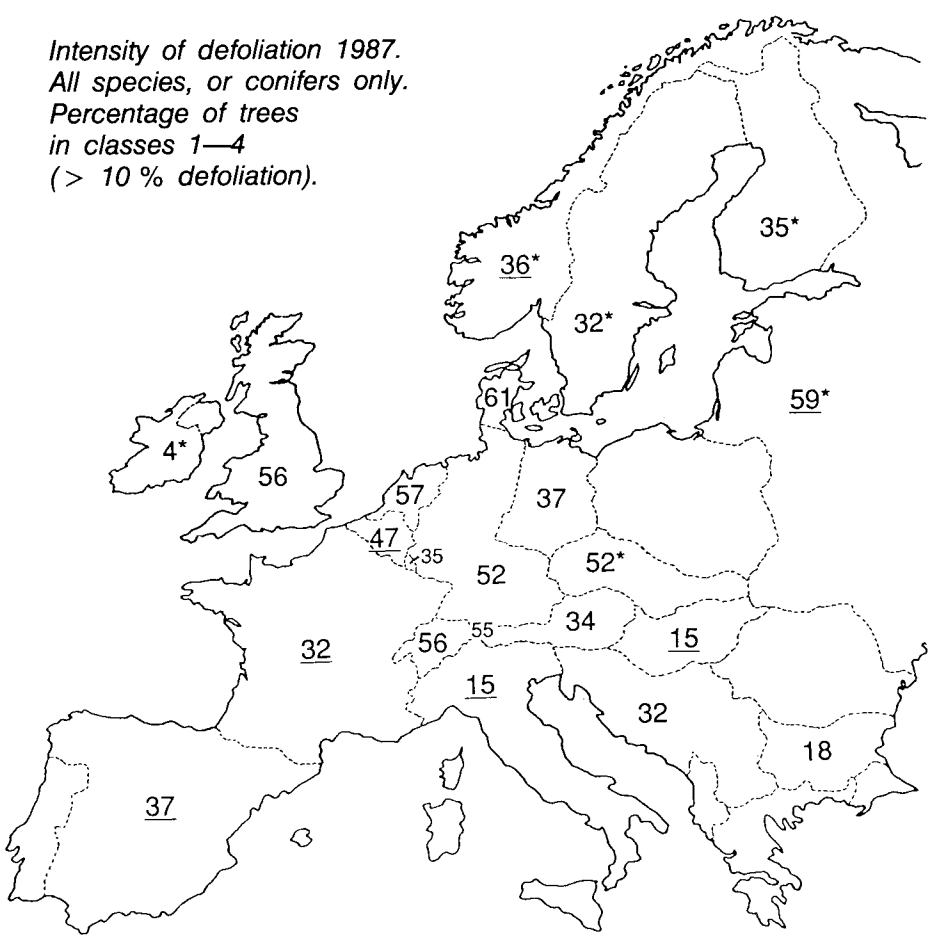
Christer Ågren

Intensity of defoliation in European countries 1987, either for all species, or conifers only. Based on nationwide or regional surveys.

Intensity of defoliation		No defoliation (Class 0)	Slight to severe (Classes 1-4)	Moderate to severe (Classes 2-4)
None	Ireland* (N)	95.9	4.1	0.0
	Hungary (R)	85.0	15.0	6.0
Low	Italy (R)	84.7	15.3	3.0
	Bulgaria (N)	81.7	18.3	3.6
	Sweden* (N)	68.3	31.7	5.6
	Yugoslavia (N)	67.8	32.2	10.4
	France (R)	68.3	31.7	9.7
	Austria (N)	66.5	33.5	3.5
	Finland* (N)	65.3	34.7	12.1
Moderate	Luxembourg (N)	65.4	34.6	7.9
	Norway* (R)	64.1	35.9	17.8
	Spain (R)	63.0	37.0	12.6
	German Democratic Republic (N)	63.0	37.0	?
	Belgium (R)	53.5	46.5	12.5
	Czechoslovakia* (N)	47.7	52.3	15.6
	German Federal Republic (N)	47.7	52.3	17.3
	Liechtenstein (N)	45.0	55.0	19.0
Severe	Switzerland (N)	44.0	56.0	15.0
	United Kingdom (N)	44.0	56.0	22.0
	Netherlands (N)	42.6	57.4	21.4
	USSR (Lith. SSR)* (R)	41.5	58.5	14.8
	Denmark (N)	39.0	61.0	23.0

* Conifers only. (R) = Regional selected areas (N) = National level

Intensity of defoliation 1987. All species, or conifers only. Percentage of trees in classes 1—4 (> 10 % defoliation).



Except when underlined (regional) the figures represent nationwide surveys.

* Conifers only.

Source: UN ECE/ICP Forests (1988)

Continued from page 1

The degree of defoliation gives a general impression of the state of health of the sample trees. There are other, scientifically more advanced methods involving for instance surveys and analyses of root systems, needles, content and transport of nutrients and water, rate of photosynthesis, and growth rings. By such means damage can be registered at an earlier stage than is possible merely by ocular observation of crown density. Moreover the ECE figures do not take into account trees that may have died and then been removed. Although the figure may not be very high, this does mean that the worst damaged trees are missing from the statistics.

According to the ECE surveys, a rating of the intensity of forest damage based on the percentage of trees with more than 10 per cent loss of foliage shows only one country (Ireland) to be practically without damage.

Blatant urgency

In three countries, Hungary, Italy, Bulgaria, the damage was rated low (less than 30 per cent of the trees defoliated). In ten it was accounted moderate (30-50 per cent defoliated). These were Finland, Sweden, Norway, France, Yugoslavia, Austria, Luxembourg, Spain, the German Democratic Republic, and Belgium.

In eight countries the damage was rated as severe — more than 50 per cent of all the trees having been found to be defoliated in Czechoslovakia, the Federal Republic of Germany, Liechtenstein, Switzerland, the United Kingdom, Netherlands, USSR (Lithuanian SSR), and Denmark.

Alarming figures such as these can only underscore the urgency of the need for a drastic and rapid reduction of emissions of pollutants in Europe. It is now generally agreed that air pollution is a major factor causing widespread forest damage.

Christer Ågren
Reinhold Pape

Surveys find few in a state of good health

At the end of last year there appeared two new reports on the state of Britain's trees. First came one from Greenpeace, published in November, followed on December 1 by the Forestry Commission's for 1988. While showing varying results, both agree that a distinct deterioration in the health of the tree population is in progress. In fact the Forestry Commission reports an overall decline of 8 per cent since 1987.

Whereas the Forestry Commission's survey covered the whole of the UK and all species of tree, Greenpeace's confined itself to ten counties of southern-southeastern England and three species only — beech, oak, and yew — chosen because of their "national importance in the English countryside and heritage." Of these three species in that part of the country covered by the Greenpeace survey, only 10 per cent of the oak, 5 per cent of the beech, and 4 per cent of the yew were found to be healthy.

In its previous survey (1987), the Forestry Commission had reported that only 8 per cent of Britain's oak and beech trees could be regarded as being entirely healthy. Last year it found that the crown density (the standard by which tree health is generally assessed) of beech had improved, while that of Norway spruce and oak had remained about the same, and in Sitka spruce and Scots pine it had continued to decline. The number of Scots pines showing signs of ill-health had risen from 10 per cent in 1985 to 60 per cent in 1987, and nearly 80 per cent in 1988.

Dr John Innes, the Forestry Commission scientist in charge of the surveys, was reported in the Daily Telegraph to have blamed a combination of climate, air pollution, insect attack, and fungi for the fact that Britain's trees appeared to have some of the thinnest crowns in Europe.

He said that the importance of air pollution, or acid rain, in determining the health of trees was still not understood. Oak and beech, for instance, appear to have a denser foliage in the south and east parts of the country, where pollution is highest. It is surmised that this is either because there are areas that are most favourable to tree growth, or because certain pollutants stimulate growth.

Symptoms of damage, comparable to those in parts of Europe, are now widespread in beech and oak in southern England, confirming the evidence previously presented for the whole country by the Forestry Commission. Difficult to explain except by the influence of air pollution.

According to the Greenpeace survey, in Buckinghamshire, a notably "beechy" county, the percentage of moderately to severely damaged beeches was in fact only 18, or less than half the average for the survey. The oaks and yews in that county, on the other hand, were just as much damaged as anywhere.

Dr Innes is also reported to have said that crown density did not necessarily show tree health, and that trees in some parts of western Britain might be expected to have thinner crowns, since winds were higher there than on the Continent. In the Commission's previous survey, the worst damage was found in the north and west.

The Commission's playing down of the importance of air pollution does naturally not go unopposed. Fiona Weir of Friends of the Earth was quoted, also by the Daily Telegraph, as saying that while it was agreed that drought, storms, and insects affected tree health, the most easily controllable factor was air pollution. The author of the Greenpeace report, Andrew Tickle, had already noted the statement by a House of Commons environmental committee that the Forestry Commission stood alone in its refusal to accept a nexus between air pollution and forest damage.

In the conclusion to his report, Mr Tickle writes: "This survey has established that damage symptoms, comparable to those seen in forest declines already occurring in areas of continental Europe, are now widespread in beech, oak, and yew over southern England. This only confirms the damage already reported on a national scale by the Forestry Commission for beech and oak. The severity of damage to these broad-leaved species at least equals that reported for Germany and Switzerland, where research results so far indicate that air pollution is an essential, causal factor in the destabilization of forest ecosystems... Although clear, causal proof that air pollution is damaging our native trees is lacking, the balance of evidence seems to suggest that the widespread and severe damage reported in this survey cannot be explained by the influence of other stresses alone."

According to the Greenpeace survey, almost 40 per cent of the beeches, over 50 per cent of the oaks, and nearly 75 per cent of the yews were moderately or severely damaged, having lost over 25 per cent of their crown density. In the Commission's view, of all British trees a quarter showed more than 26 per cent loss of foliage, compared with a notional "perfect" tree.

G. Howard Smith

Sven Angermark ©

CLEAN CARS

Will Community catch up?

With or without the common market in 1992, European controls on toxic exhaust fumes from motor vehicles will continue to be screwed tighter. So say participants on all sides of the negotiations for new emissions controls on cars in the Community. As such 1992 will neither foster nor hinder the progress of controls, according to insiders in the debate, because the existing structure of voluntary harmonization of motor vehicle certification is already well established.

But it will take at least until 1992, and probably longer, before EC controls equal those already in force in the USA, Japan, Switzerland, Austria, Sweden, Norway, and those about to be adopted in Finland. The question that consumers, environmentalists, and European parliamentarians are asking European car manufacturers is: If you can build to meet US standards and specifications for export, why do you resist the same standards in the Community?

The process of harmonizing European controls on car pollutants began in 1976 and suddenly accelerated ten years later after people became aware of the link between road-traffic pollution and forest damage from acid deposition.

December 3, 1987, the EC Environment Council, under Danish presidency, agreed on two-stage standards, with first and second stage reductions in emissions of carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxides (NO_X) from medium-sized and large cars (1.4–2 litres, and more than 2 litres cylinder volume), and first stage reductions for small cars; but it reserved the much touchier issue of a second stage for small cars (under 1.4 litres) for the German presidency.

Poetic justice, some thought, since the Germans had forced the problem to the top of the EC political agenda a few years previously by adopting national tax incentives for "environmentally friendly" diesel-powered cars and cars meeting US emissions standards. The classification of diesel vehicles as "environmentally friendly" is coming to haunt German policymakers, who had overlooked their contribution of carcinogenic particulate emissions.

The second-stage standards for small cars is vital to controlling air pollution in the EC, since they make up 60 per cent of the EC car fleet and account for over one-half of the total distance driven. Small cars produce more than 45 per cent of automotive NO_X, much being produced in non-urban driving

which is not taken into account in current emissions testing procedures.

In the early morning hours of June 29, in Luxembourg, German Environment Minister Klaus Töpfer, acting as President of the Council of Ministers, secured a common political position on the Commission's proposal of a limit of 30 grams/test (gr/test) for CO and 8 gr/test for combined NO_X + HC.

The Federal Republic of Germany, the Netherlands, Greece, and Denmark wanted to go all the way to meeting US standards by reducing HC and NO_X emissions to 5 gr/test, but agreed on condition that:

☐ The Community would reconsider and possibly impose further reductions on pollutant emissions in 1991;

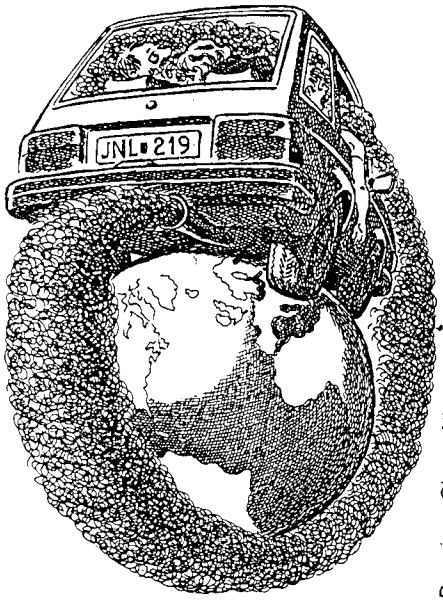
☐ The Commission would propose before June 30, 1990, a test cycle that represents driving patterns outside urban areas;

☐ The Commission would submit a report by December 31, 1990, on the effect of the overall car emissions package, and make proposals for tightening the limit values for the three categories of cars, taking into account the desire of some member states for a NO_X + HC limit of 5 gr/test.

The French government backed away from the agreement in July, under open pressure from Jacques Calvet, head of the Peugeot-Citroen group. Negotiations this autumn are focusing on preventing the FRG and the Netherlands from expanding or introducing new systems of tax breaks for buyers of cleaner cars.

"The /French/ are making the necessary investments now for 1992, but they can't accept the pressure from the countries providing financial incentives for cleaner cars," commented a European Commission official.

It seems that France intends to stick to the agreement but is insisting that the other member states are "brought to respect the common market," according to sources in the France government.



Drawing: Claus Albrechtsen ©

Compromise rejected

Then, on September 15, the European Parliament refused to go along with the other EC institutions, rejecting by a vote of 243 to 67 the proposed EC controls on pollutants from small-engine cars as too weak, and calling for adoption of the US standards.

"If we look at all motor vehicle emissions in Europe and the growth rates of motor vehicle use between now and the year 2000, the proposed EC standards are not going to decrease pollutant emissions at all," argues Michael Walsh, an international consultant on motor vehicle emissions controls in Washington, DC.

"A major political price being paid by the European Community as a whole is the souring perception of Europe in Germany, the Netherlands and Denmark," says Dr Wolfgang Hager, partner at European Research Associates, a Brussels-based economic affairs consultancy.

The countries most threatened by Japanese imports are those that are most backward in environmental protection.

Because cars and trucks — or "mobile sources" of air pollutants as the US Environmental Protection Agency likes to term them — move about and produce different levels of pollution depending on their design, age, maintenance, and use, politicians are at a loss when trying to quantify the health and environmental gains from tighter exhaust controls. Instead countries have chosen a type of regulation based on the "state of the art" of the control technology.

Environmentalists, in chorus with the governments of West Germany, the Netherlands, Denmark, and Greece, say that EC standards should be the same as in the United States. The "state of the art," they say, should be what is technically feasible, not what is technically easy and financially painless to the motor vehicle manufacturers. By allowing European manufacturers to do less, the European Community has "condemned Europe to more air pollution caused by cars than is necessary," said the European Environmental Bureau (EEB) in a press release, in Brussels.

EC harmonization of automobile pollution controls will continue at its own pace after 1992, in the view of many observers. Although Japanese imports will pose a mighty threat to EC manufacturers after internal trade barriers fall in 1992, some industry representatives in France, Italy, and the United Kingdom do not think that the availability of cleaner Japanese cars will make much of a difference to the market.

Other producers, consumer groups, and observers think differently. "European producers are profiting from the politicians' weakness," argues Francois Lamy, responsible for energy, health, and consumer product safety at the Office of the European Consumers Unions (BEUC), in Brussels. "Particularly the French and Italian producers are resting tranquilly behind the barriers that keep out Japanese cars (less than 3 per cent of the market in France and Italy), while in West Germany the economy and the environment serve each other dynamically — forcing production of cleaner, more

competitive cars that consumers prefer."

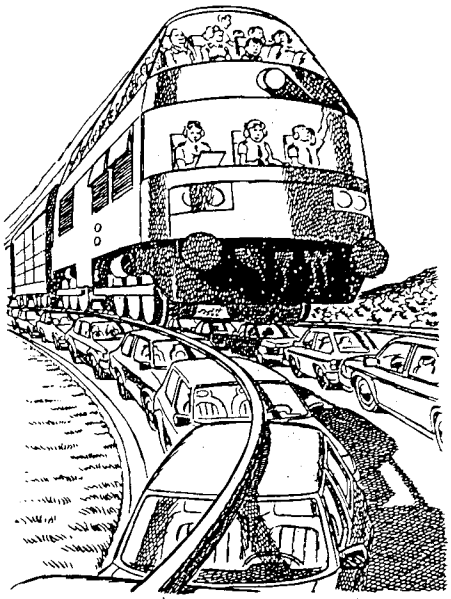
"The countries that are most threatened by Japanese imports are exactly those that are most backward on environmental protection. The attractiveness of Japanese cars, which will be delivered at low cost and equipped with catalytic converters, makes the threat much more dangerous," Dr Hager believes. His view is supported by the EC governments pushing for stronger controls.

In 1992 there may be a replacement of the voluntary EC type certification scheme by a mandatory one, possibly including pollution controls. A Commission "white paper" on motor vehicle regulation has been circulating for well over a year, but the Commission services are still divided on the question of mandatory environmental standards, according to Commission sources. Mandatory standards are inevitable, representatives of the automobile industry believe.

A floor, not a ceiling

As of last July, any new, harmonized environmental standard affecting the common market must "take as a base a high level of protection" according to the new article 100A of the Treaty of Rome, the European Community's constitution. But it also explicitly allows the member states to go further than the Community standard to protect public health or the environment.

The West Germans and the Dutch are giving manufacturers in other European countries a headache by doing just that: they are offering substantial tax advantages to the purchasers of cars with catalytic converters, and almost all of the eleven German Länder (states) have adopted smog-control regulations that limit use of the more polluting type of vehicle under dangerous conditions of atmospheric pollution. The European Commission, believing that tax breaks violate the common market, has introduced infringement proceedings against the German government and will do so shortly against



Drawing: Claus Albrechtsen ©

the Dutch. European car manufacturers see the anti-smog regulations as a barrier against trade in their cars, which do not meet the US standards.

But the Commission's complaints may run smack into article 100A and the mid-September decision of the European Court of Justice, allowing Denmark to impose national deposit and recycling requirements on beverage containers for reasons of environmental protection.

These developments give the environmentally progressive states reason to hope that their higher standards will be allowed to prevail for them alone, if not together with others, and in the process may be turning EC product-related environmental standards into a regional valley, penetrated and surrounded by the higher standards of other member states and neighbours.

Ultimately, then, it will be up to European consumers to decide, as their governments and associations believe they are ready to do, whether they are willing to pay a little extra for a technology that will serve to protect their health, agricultural crops and forests, as well as reduce wear and tear on their cars. The common market in 1992 won't speed up the manufacture of cleaner cars in Europe, but it will add clean Japanese cars to an already highly competitive marketplace.

European Environment Review
(By permission)

Editorial postscript

A decision on emission standards for cars of less than 1.4 litres was made by the EC environmental ministers in November. The limits are now to be 30 grams of carbon dioxide and 8 grams each of hydrocarbons and nitrogen oxides per test, to be applicable to new models as from 1992 and to all cars from 1993.

The ministers thus overruled the decision made by the European Parliament in September, calling for stricter controls (see above). The Parliament was proposing limits of 20 grams for carbon monoxide and 5 grams for hydrocarbons and nitrogen oxides. (The USA-83 requirements correspond approximately to 12 and 4.5 grams per test.)

Previously, in July, the Danish minister of the environment had announced that his country would be introducing compulsory USA standards from 1990, and that to promote sales of cars meeting these stricter requirements, there would be tax incentives in 1989.

For the same reason, the Netherlands are now raising the tax incentives, making them twice as high for cars meeting the US standards as for those only coming up to the EC requirements (1700 as against 850 guilders). These arrangements, which came into force on January 1 this year, will be financed by a general tax increase on all new cars. As a possible means of slowing the increase in traffic, and also hastening the advent of more environmentally compatible vehicles, the Dutch are moreover considering the introduction of some kind of emissions charge.

ECE CONVENTION

Now a protocol for nitrogen

On November 1, 1988, twenty-five nations meeting in the Bulgarian capital, Sofia, signed an agreement to limit emissions of nitrogen oxides. This agreement constitutes the second of two protocols supplementing the UN Convention on Long Range Transboundary Air Pollution. Previously, in 1985, twenty-one countries had bound themselves in a similar manner to reduce emissions of sulphur dioxide by 30 per cent as between 1980 and 1993. See table.

Specifically, the nitrogen-oxide protocol means that after 1994 emissions shall not exceed the 1987 level. In other words, it does not prescribe any actual reductions. It does lay down, however, that as a second step measures shall be taken to bring about reductions, and that these measures must be such as take into account internationally accepted critical loads (see Acid News 3/88). Negotiations to this end are to start no later than six months after the protocol comes into force — which should probably be around 1990-91. Actual measures for limiting emissions must start to be taken no later than 1996.

This NO_X protocol was the outcome of a meeting of the Executive Body of the ECE where representatives of all the thirty-two states that have ratified the Convention were also present. The Executive Body decided as well to set up two new working groups. The one that will deal with hydrocarbons (volatile organic compounds, VOCs) is to "prepare the necessary substantiation for appropriate internationally agreed measures and proposals for a draft protocol to the Convention aimed at the limitation/reduction of VOCs or their transboundary fluxes as well as of photochemical oxidants."

The other, Working Group on Abatement Strategies, will "aim to develop a common understanding of critical loads and proposals for abatement strategies."

Christer Ågren

Editorial comment on page 2.

* ECE = Economic Commission for Europe, a United Natons organ.

Article 2 of the Protocol to the 1979 Convention on Long Range Tansboundary Air Pollution, concerning the Control of Emissions of Nitrogen Oxides or their Transboundary fluxes.

Basic obligations

1. The Parties shall, as soon as possible and as a first step, take effective measures to control and/or reduce their national annual emissions of nitrogen oxides or their transboundary fluxes so that these, at the latest by 31 December 1994, do not exceed their national annual emissions of nitrogen oxides or transboundary fluxes of such emissions for the calendar year 1987 or any previous year to be specified upon signature of, or accession to, the Protocol, provided that in addition, with respect to any Party specifying such a previous year, its national average annual transboundary fluxes or national average annual emissions of nitrogen oxides for the period from 1 January 1987 to 1 January 1996 do not exceed its transboundary fluxes or national emissions for the calendar year 1987.

2. Furthermore, the Parties shall in particular, and no later than two years after the date of entry into force of the present Protocol:

(a) Apply national emission standards to major new stationary sources and/or source categories, and to substantially modified stationary sources in major source categories, based on the best available technologies which are economically feasible, taking into consideration the Technical Annex;

(b) Apply national emission standards to new mobile sources in all major source categories based on the best available technologies which are economically feasible, taking into consideration the Technical Annex and the relevant decisions taken within the framework of the Inland Transport Committee of the Commission; and

(c) Introduce pollution control measures for major existing stationary sources, taking into consideration the Technical Annex and the characteristics of the plant, its age and its rate of utilization and the need to avoid undue operational disruption.

3. (a) The Parties shall, as a second step, commence negotiations, no later than six months after the date of entry into force of the present Protocol, on further steps to reduce national annual emissions of nitrogen oxides or transboundary fluxes of such emissions, taking into account the best available scientific and technological developments, internationally accepted critical loads and other elements resulting from the work programme undertaken under article 6.

(b) To this end, the Parties shall co-operate in order to establish:

I. Critical loads;

II. Reductions in national annual emissions of nitrogen oxides or transboundary fluxes of such emissions as required to achieve agreed objectives based on critical loads; and

III. Measures and a time-table commencing no later than 1 January 1996 for achieving such reductions.

4. Parties may take more stringent measures than those required by the present article.

Andrew Kerr ©

Despite years of protests — here one on the eve of the 1984 Munich Multilateral Conference on the Environment — emissions are increasing.

ECE Convention on Long Range Transboundary Air Pollution. Acceptance as of November 1988.

	Convention	SO_2 Protocol	NO_X Protocol	NO_X Declaration
Austria	x*	x*	x	x
Belgium	x*	x	x	x
Bulgaria	x*	x*	x	
Byeloruss. SSR	x*	x*	x	
Canada	x*	x*	x	
Czechoslovakia	x*	x*	x	
Denmark	x*	x*	x	x
Finland	x*	x*	x	x
France	x*	x*	x	x
GDR	x*	x	x	
FRG	x*	x*	x	x
Greece	x*		x	
Holy See	x			
Hungary	x*	x*		
Iceland	x*			
Ireland	x*			
Italy	x*	x	x	x
Liechtenstein	x*	x*	x	x
Luxembourg	x*	x*	x	
Netherlands	x*	x*	x	x
Norway	x*	x*	x	x
Poland	x*		x	
Portugal	x*			
Romania	x			
San Marino	x			
Spain	x*		x	
Sweden	x*	x*	x	x
Switzerland	x*	x*	x	x
Turkey	x*			
Ukrainian SSR	x*	x*	x	
USSR	x*	x*	x	
UK	x*		x	
USA	x*		x	
Yugoslavia	x*			
EEC	x*			
Total	35 (32)	21 (18)	25	12

x = signed
* = ratified

Twelve nations have formed a Thirty Per Cent NO_X Club

At Sofia, twelve of the countries attending the ECE meeting showed their displeasure at the weakness of the resulting protocol for control of nitrogen-oxide emissions by wishing to go a step further, and bind themselves in a joint declaration to reduce their emissions by 30 per cent by 1998.

Five nations — Switzerland, West Germany, the Netherlands, Sweden, and Austria — had already made it plain at an early stage of the negotiations that they wanted to go further than most of the others were willing to do. These five countries had tried to get it said in the protocol that emissions must be reduced by at least 30 per cent between 1985 and 1995. It soon became evident, however, that this was more than the majority would be prepared to go along with. Led by the Swiss, several countries therefore decided to undertake, through a declaration, to reduce their emissions more than was required in the protocol.

In order to get more countries to join in, the proposed text of the declaration had to be somewhat watered down. Instead of requiring a reduction of 30 per cent between 1985 and 1995, it came to read: "...a reduction of national annual nitrogen oxide emissions in the order of 30 per cent as soon as possible and at the latest by 1998, using the level of any year between 1980 and 1986 as a basis for the calculation of the reduction."

This made it possible for seven more countries — Belgium, Denmark, Norway, France, Italy, Finland, and Liechtenstein — to associate themselves with original five. Their joint declaration also emphasizes the importance of reducing emissions of hydrocarbons as well.

Christer Ågren

EAST GERMANY

May need money from West

When the statistics for Waldsterben in 1988 cause our politicians and lobbyists for industry to turn their gaze eastwards to the GDR, whence comes most of our airborne and waterborne pollution, they must surely ask themselves: Have we done enough for Europe, our common home?

I maintain we have *not*, and that a closer look will confirm this assertion. In contrast to the FRG, East Germany had to undertake postwar reconstruction on its own, without any blood transfusions in the way of foreign capital. The built-in restraints of a planned economy, the arms race, and the oil crisis did not make matters any easier.

Christer Ågren ©

New plant at Jänschwalde near Cottbus in the southeast, with a capacity for 3,000 MW of electricity and 510 MW of heat, will burn 100,000 tons of brown coal per day.

In the GDR, electricity is generated almost exclusively in obsolescent plants burning brown coal. Also generated is three to four million tons a year of sulphur dioxide and nearly half a million tons of nitrogen oxides. Five nuclear plants produce only 11 per cent of the GDR's power, but at the same time they emit three times as much radioactive substance as the Federal Republic's twenty plants taken together. While the industrial apparatus is also in urgent need of modernization, per capita energy consumption in East Germany is twice as high as in western countries.

And who has ever heard of the GDR as an oil exporter? According to the former East German economist, Professor Harry Maier, writing in the periodical Energiewirtschaftliche Tagesfragen, the fuel oil obtained from imported petroleum, for instance, is not used for the country's own industry, but sold abroad for hard currency. Electricity substituted for oil — a crazy solution from the economic as well as the ecological point of view, pressing up energy consumption as well as emissions of pollutants.

A study of energy consumption in the two Germanies shows the GDR to be the more intensive user. The East German energy and fuel industries take 17 per cent of the power used, as against 11 per cent in the west. Manufacturing and power plants take 58 per cent in the east, 51 per cent in the west — all according to the consumption statistics for 1985.

The reverse is true for domestic consumption, with the all-electric West German households taking 24 per cent, and the East German only eleven. The potential for savings in power generation and manufacturing is appreciably higher in the east. And after Chernobyl, alternatives to nuclear power are being considered there too. The incitements to saving should be very great, since

☐ The energy industry in the GDR swallows a good quarter of the industrial investment total, with a return on capital of seventeen years as against two for investment to save energy — a cost advantage of 50 to 80 per cent.

☐ A modernization of power plants would make it possible to save 6 billion marks on fuel, and dropping the subsidies on household electricity a further billion.

Experts of the West Berlin Institut für ökologische Wirtschaftsforschung have spelt out for the leaders of the GDR what will have to be done. By proceeding by stages at various levels, they say, nuclear power can be phased out by the year 2000 without incurring any need to burn more brown coal.

Among the possibilities for making savings, the IÖW experts point to the following.

☐ As regards household consumption of electricity, savings of 10-70 per cent can be made without any sacrifice of comfort. The gradual introduction of more efficient domestic appliances alone could save about 1,000 megawatts of generating capacity — corresponding to one whole block of the Stendal nuclear power station.

☐ Better electric drives in manufacturing would save 2,200 megawatts, or more than the current nuclear capacity.

☐ Conversion of all the district heating plants in the GDR for the production of power as well would make 1,600 megawatts of the present generating capacity superfluous.

☐ Improved lighting systems could, at a conservative estimate, save 250 megawatts.

☐ An equal amount could be saved by using improved methods for the production of caustic soda, cement, and electric steel.

☐ Modernizing the coal-fired power stations to double their efficiency would reduce the amount of brown coal needed by 60 million tons a year.

☐ This in turn would result in an annual saving of more than 800 gigawatt hours in the opencast mining of brown coal, and thus an additional saving of 1.5 million tons of brown coal for generating power. (1 gigawatt = 1 million kWh.)

☐ Equipping one half of all the power stations that need modernizing for the production of heat as well as power would provide "environmentally friendly" heat for 10 per cent of the East German households and save 6 million tons of brown coal.

☐ As in the West, renewable energy sources are orphans in the East German electricity supply system. The small contribution from hydro power could be doubled, and wind power could well be used, after the Danish model, in northern GDR and off the coast of the Baltic. Solar energy could also make quite a considerable contribution. District heating plants using biogas, perhaps also with heat pumps, might find a wide use, particularly in farming areas.

The IÖW report presents two scenarios for environmentally acceptable power generation in the GDR without having resort to nuclear plants. Both scenarios assume a lowering of the growth rate for electricity consumption by 1 per cent each year up to 1990. Scenario A is based on a lengthy stabilization of consumption at the 1985 level. All the additional advantages obtainable from the use of electricity would be gained from the technical savings.

Scenario B on the other hand assumes a growth in consumption of 0.5 per cent per annum between 1990 and 2000. There are gains to be made here too, though. After modernization the coal-fired plants could produce more power from the use of only slightly more brown coal, despite a somewhat reduced overall generating capacity.

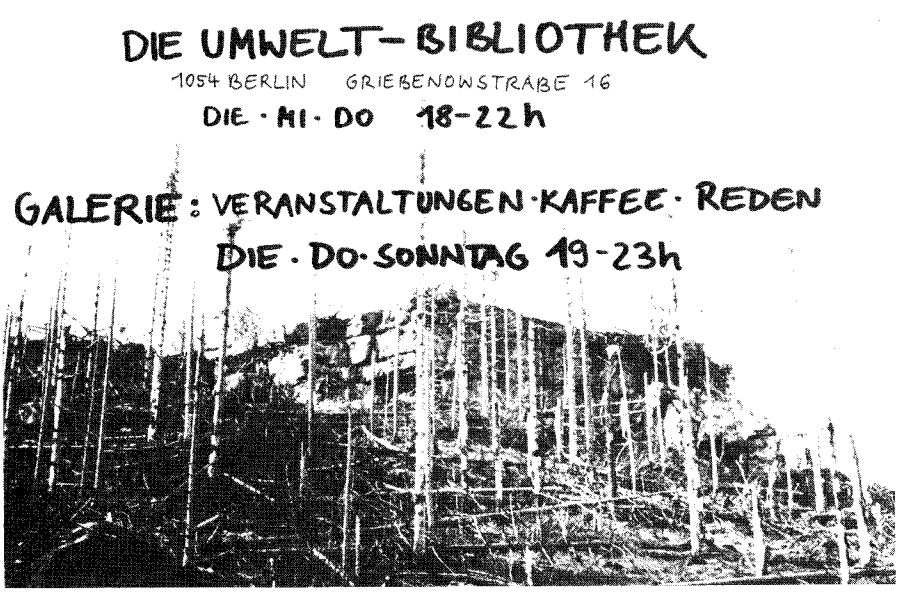
If the modernized heating/generating plants were equipped for flue-gas cleaning, the present emissions of 3-4 million tons of sulphur dioxide could be brought down to something like 130,000 tons, and emissions of nitrogen oxides from 430,000 to about 64,000 tons a year. The benefits to the environment of a drastic reduction of opencast mining hardly need enlarging upon.

But there can be no saving of the East German air without Western money. The total costs can only be expressed in Western terms. If it was in the Federal Republic, the removal of sulphur from 15,000 megawatts of East German generating capacity using brown coal by the wet slurry method would cost 6 billion DM, and nitrogen oxide removal between 2.3 and 3 billion. It would take three to five years, and yet only capture fifty per cent of these emissions. For real relief to the environment a more rational use of energy will be unavoidable. Reduction of the power plants' consumption of brown coal by 60 million tons a year would, in Western terms, cost altogether 18 billion DM.

Cooperation in the energy technical field between West Berlin and the GDR would have to involve engineering, development, consultation, and planning work. Flue-gas cleaning of the East German coal-fired plants would create more than 1,200 jobs in West Berlin and at least 2,000 in the Federal Republic generally. The GDR could provide around 70 per cent of the management force required for the task as its contribution. Through compensation deals in the transport and energy sectors — the rail connection between West Berlin and the FRG could for instance be rehabilitated with West German funds — East Germany could be spared an investment cost and use the money instead to pay for West German deliveries of flue-gas cleaning equipment.

During the nineties it will also be possible to dispense with nuclear power without having to build any new coal-fired plants. On account of existing contracts, nothing can be done before 1990. Nuclear generating capacity would be replaced primarily by modernized coal-fired plants, and only in the second place by alternative energy sources.

Klaus Scheerer



Environmentalists in East Berlin are oblidged to distribute photographs with hand-written texts to advertise their meeting place.

In Robin Wood Magazin 4/88, published by the West German environmental organization Robin Wood e.V. Nernstweg 32, D-2000 Hamburg 50, FRG.

** IÖW Schriftenreihe 3/87. Alternative Energiepolitik in der DDR und in West Berlin. By M. Jänicke, L. Merz, J. Pöschke, S. Schön, and T. Schwilling. Institut für ökologische Wirtschaftsforschung, Giesebrechtstr. 13, D-1000 Berlin 12.*

SWEDEN

The environment to the fore

Tighter controls for emissions of sulphur and nitrogen from combustion plants were just one outcome of the great debate on the environment in the Swedish parliament last June.

In Sweden attention has of late been focusing more and more on the environment, and in the run-up to the parliamentary election on September 18, environmental matters were a major subject to debate. The extent of popular engagement was also verified by polls taken just before the election. When asked to rank the issues in order of importance, interviewees put the environment first, even before those normally considered of most importance in Sweden, employment and the economy.

This upheaval of opinion was noticeably reflected in the election results, which brought a new political party onto the parliamentary scene for the first time in a great many years. This was the Environmental Party, the Greens, which with 5 per cent of the national vote, gained 20 seats in the Riksdag.

The great parliamentary debate had however taken place earlier, on June 6-7, when the government presented its environmental package, set forth in a volume of 350 pages. In addition to the government bill, the Riksdag is having to consider some 600 motions from the opposition parties and individual members.

After a long and occasionally heated debate, a number of measures were passed. Here follows an outline of the main ones concerning air pollution and acidification.

Sulphur dioxide

☐ The aim is to bring about a national reduction of emissions of 65 per cent by 1995, and 80 per cent by the year 2000, with 1980 as the base year for calculation.

☐ New coal-fired combustion plants may, irrespective of size, emit no more than 50 milligrams of sulphur per megajoule of energy input (mg S/MJ), corresponding approximately to 250 mg SO_2 per cubic metre of flue gas. This requirement came into force on July 1, 1988.

☐ Combustion plants that are fired with any other fuel than coal, and are calculated to emit more than 400 tons of sulphur per annum, may not emit more than 50 mg S/MJ. The limit for smaller installations of this type is 100 mg S/MJ. These requirements, which apply both to new and existing plants, will be enforced in stages, beginning with plants in the largest cities and those in the southernmost part of the country in 1993. Pending their introduction, the highest permissible sulphur content of heavy fuel oil is being reduced from 1 to 0.8 per cent. (For light fuel oil it is 0.2 per cent.)

Nitrogen oxides

☐ The aim is for a reduction of 30 per cent between 1980 and 1995, and the possibility is to be considered of increasing this to 50 per cent by the year 2000.

☐ New coal-fired plants may, irrespective of size, emit no more than 50 mg NO_X/MJ, corresponding to about 150 mg NO_X/m^3. Also applicable as from July 1, 1988.

☐ For other new combustion plants emitting more than 300 tons of nitrogen oxides a year, the maximum is 50-100 mg NO_X/MJ, and for new plants smaller than this, 100-200 mg NO_X/MJ.

☐ In the southern part of the country, as from 1995 the tighter regulations will apply to existing plants as well.

☐ There will be stricter emission standards for diesel-driven light trucks and buses, starting with the 1992 year models, and for heavy vehicles of this kind with the 1994 models. The requirements will correspond to those applicable in the United States to 1990 year models. During the two years prior to their coming into force, grants will be available for vehicles already conforming to the new standards, at an assumed cost to the state of 450 million kronor.

☐ Grants of 1,000 kronor will also be available to the owners of petrol-driven passenger cars if they fit equipment (such as three-way catalyzers without mixture control) that reduce emissions by at least 40 per cent. (A

ANDRE MASLENNIKOV ©

The equivalent of more than 20 million dollars a year is being spent on liming Sweden's lakes and streams.

law was passed in 1986 making the USA-83 requirements for passenger cars compulsory for 1989 year models, with tax reductions for voluntary compliance in the case of 1987 and 1988 models.)

Hydrocarbons

☐ Emissions are expected to drop by about 30 per cent between 1985 and 1995, largely as a result of the tightened standards for passenger cars. By 2010 emissions are expected to have been halved.

☐ A strategy is to be developed for still further reductions of emissions of hydrocarbons.

Liming

☐ Parliament has allocated 110 million kronor for liming lakes and streams during the next year. Government subsidies usually amount to 85 per cent of the cost of liming. No appropriations were made on the other hand for liming forest land or treating acid drinking water.

Carbon dioxide

☐ In consideration of the greenhouse effect, parliament decided that emissions should be frozen, in other words, not allowed to exceed 1987 levels. A program is also to be prepared for a gradual reduction of these emissions.

CFCs

☐ As result of a national scheme for phasing out completely halogenated chlorofluorocarbons (freons) their use in Sweden is calculated to be at least halved by the end of 1990, and to have largely ceased by the end of 1994.

International institute for environmental technology

☐ For setting up such an institute, 25 million kronor has been allocated for each of the next five years. The new institute is to promote research and the development of environmentally compatible technology, and to spread abroad knowledge of such technology as will contribute to sustainable economic development while at the same time saving the environment. It is to be located in Stockholm, and will start work this year.

International clean-air fund

☐ Parliament enjoined the government to support the setting up of such a fund, to be used for investments in emission-cleaning technology, transition to more suitable energy sources, and making energy production more efficient.

Christer Ågren

Extensive measures proposed by the government and passed by the Riksdag during the summer sessions promise to go far towards cleaning up the environment.

NORWAY-USSR

Arctic nature under threat

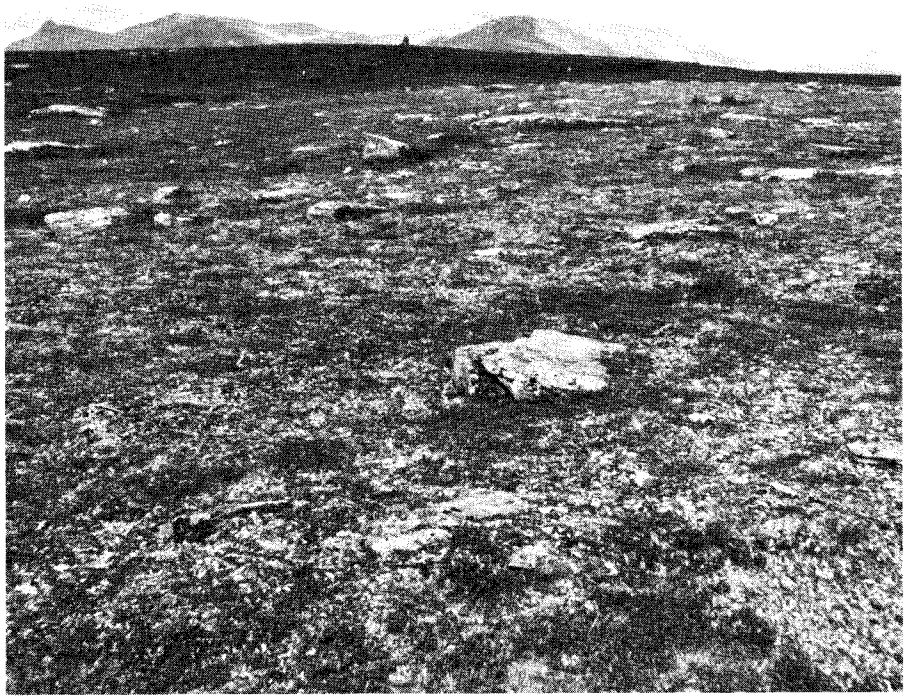
Besides being the largest and most northerly county in Norway, Finnmark is also the most easterly. Its farthest eastern part, squeezed between Russia and Finland, is Sør-Varanger, with natural features ranging from endless stretches of bare mountain to the pine forests of the Pasvik valley. Here, too, is the country's most northerly national park.

Although far from the region of southern Norway that has suffered most from acid rain — from Sør-Varanger to Oslo is actually as far as from Oslo to Rome — this area now threatens to be affected too. Its people's health, its forests and reindeer pastures, and waters teeming with fish, are endangered by poisonous clouds sweeping in from eastern Europe and the Soviet Union in particular.

Only five kilometres from the frontier, on the Russian side, is the greatest emitter of sulphur in northern Europe: the enormous smelter at Nikel, which lets out well over 200,000 tons of sulphur dioxide a year. Another smelter at Montesegorsk, 200 km south of Murmansk, in 1988 emitted 337,000 tons (see map). Measures made over a series of years under the Norwegian state program for monitoring pollution show Sør-Varanger to have had the highest yearly average concentrations of sulphur dioxide and sulphate in the whole country. During the winter of 1983-84 the recommended limits for concentrations of SO_2 in the atmosphere (100 μg SO_2/m^3) were exceeded by 3-8 per cent.

Waters in danger

Although the geology of eastern Finnmark makes it more resistant to acidification than southern Norway, it now seems that this resistance is in process of failing. Tests made by the Norwegian Water Research Institute (NIVA) at 32 places in Sør-Varanger in 1986 showed waters to have become markedly acidified in the course of the last two decades. This was especially so in the Jarfjord area, where four lakes were found to have lost about 80 per cent of their buffering capacity.



Andreas Bohlin ©

The amounts of mobilized aluminium in the water (aluminium in inorganic ion form) had also increased. Local environmental officials are now expecting acid flushes, especially at the time of the snow melt. Then the streams carry relatively more water than they do in the south, because the snow melts while the ground is still frozen, making for proportionally more meltwater and less "clean" water to neutralize it.

Calculations have also been made in order to see what will happen if the pollutant load should continue to increase. It is estimated that if the sulphur compounds in the air should increase by 30 per cent, one-third of the lakes in eastern Finnmark would lose all resistance to acidification. A doubling of the pollution would send 62 per cent over the danger line, and result in at least 47 per cent of the lakes becoming devoid of fish.

Vegetation damaged

Not only waters are affected by airborne pollution, as has been shown by studies made as part of the Monitoring Program for Forest Damage. Nutrient analyses of the needles from normal trees in the valley of the Pasvik river reveal high values for sulphur, nickel, iron, and copper. In terms of the needles' content of dry substance, sulphur amounted to 0.13 per cent, iron to 0.0092, copper 0.0008, and nickel 0.0014 per cent. These figures are two or three times as high as those from samplings in other parts of Norway. Similar values have also been found in mosses from this area.

Growths of lichen on trees have gone into sharp decline, most probably on account of depositions of SO_2. Still more serious is the fact that lichens on the eastern side of the Finnmark plateau are dying out, which will mean catastrophe for reindeer which feed on them.

Between 1986 and 1987 there was a slight decline in the trees' crown density in east Finnmark — which scientists also attribute to the heavy load of pollutants. Typical SO_2 damage has been found for instance on pines in the Pasvik valley.

Heavy metals

Among the emissions from the smelter are a number of heavy metals. Because of the prevailing winds, most of them fall over Soviet territory, but not all. Scientists from Tromsø university have found the deposition of heavy metals, such as arsenic and nickel, to be higher in the Pasvik valley than anywhere else in Norway. While depositions have declined in Norway as a whole, they have increased in Sør-Varanger. In 1977 the mean average concentrations of chromium, copper, and nickel at Pasvik were respectively 5, 40, and 80 ppm. By 1985 they had risen to 20, 160, and 160 ppm.

Heavy metals may bring an added risk to health even in small doses. Although little is known of their combined effects, in combination they are probably a greater danger than they would be singly. At any event the cases of cancer and metal allergies are unusually high among the local population in these parts. Because the area is so sparsely populated, however, it is difficult to produce statistical "proof" of linkages.

The question is whether it will be possible to save the vulnerable Sør-Varanger environment. The Pasvik forest is unique in growing so far north, lichens would take an immensely long time to reestablish themselves, fishing and other outdoor pursuits are things that the people have very much at heart.

Since only 10 per cent of the sulphur deposited over Norway emanates from local sources, whatever Norway can do will be of little avail unless other countries act as well. Emissions from western Europe have already lessened, but those from the East seem set to increase. And it is just the latter that will have to be reduced if an environmental catastrophe is to be avoided in eastern Finnmark. Action will be especially needed in the northern parts of the Soviet Union.

As adherents to the ECE protocol for sulphur, the Soviets have agreed to reduce their emissions by 30 per cent by 1993 (from 1980 levels). But there are signs, too, that they are now taking a more serious attitude to environmental problems in the north. On January 15 last year they signed an agreement with Norway for cooperation in this area, with especial application to the vulnerability of the arctic region. Under this agreement the two countries are to act jointly to protect the air space from pollution, preserve the marine environment, save the lakes and streams along their common frontier, and engage in monitoring and the exchange of research findings. This means they should cooperate in taking the requisite measures for the attainment of these ends.

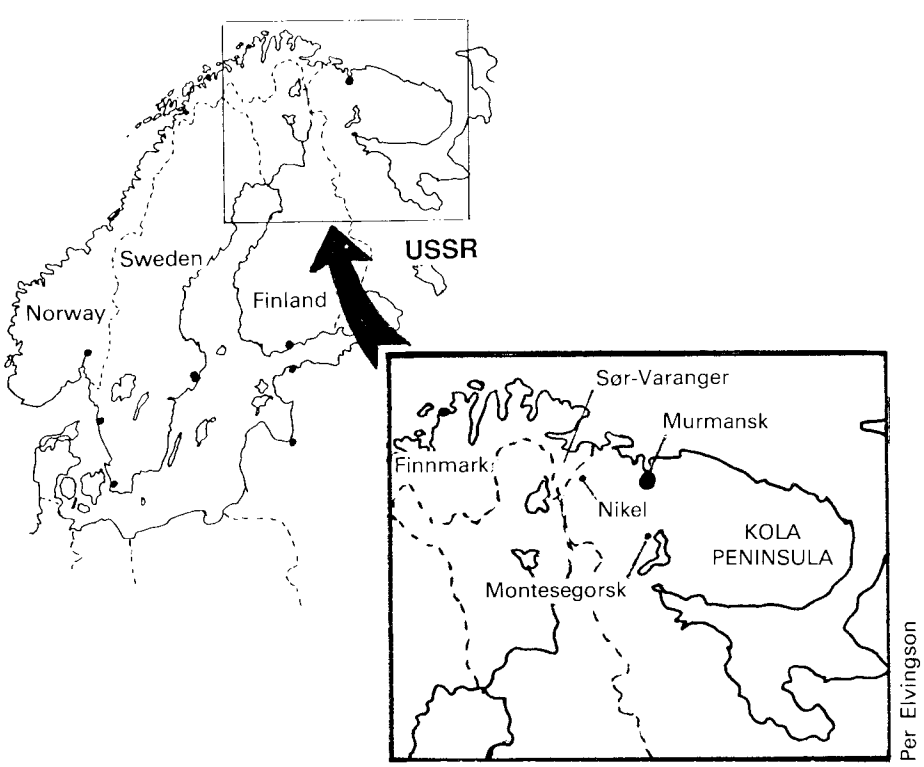
Glasnost

The Russians are now showing much more openness, one example of which is the invitation they extended to a group of Norwegian politicians and journalists to visit Nikel last June. That members of the press were included and allowed to film and take photographs is something unique. Previously photographing Russia even from the Norwegian side of the frontier had been strictly prohibited.

The damage on the Russian side turned out to be far worse than in Sør-Varanger. Up to several kilometres from the smelter the countryside was a complete desert. During the visit the Russians revealed that this was one of the plants that would be equipped for flue-gas cleaning in fulfillment of the terms of the protocol. They would moreover be going further, and reducing their emissions by 47 per cent.

While the Soviets deserve all praise for their new attitude, it may be questioned whether this step will suffice to save the Finnmark environment. What is happening in these parts only emphasizes the fact that the present international agreements for reducing emissions are not good enough. The limits to nature's tolerance must be the only real guide.

Helen K Søbye
The Stop Acid Rain
Campaign/Norway



Per Elvingson

UNITED KINGDOM

Curbing emissions and the division of costs

Study to relate depositions of sulphur at sensitive sites to emission sources — and bring down the annual depositions to 5 kilos per hectare — showed greater environmental benefits from reducting emissions at small plants close to sites than at large ones farther away.

An acid deposition control strategy designed to achieve maximum environmental benefit in Britain and Scandinavia could involve retrofitting flue gas desulphurization (FGD) equipment to many of Britain's smaller power stations, according to a study by Harwell Laboratory.* The work has considerable implications for the Government's electricity privatization plans, because a strategy of this kind could impose unequal cost burdens on the two new generating companies.

Harwell's study was carried out for the Department of the Environment. It forms part of a long-term program to develop economically and environmentally more efficient approaches to reducing acid deposition in sensitive areas to tolerable levels.

Until now, the focus of UK and EEC policy on acid emissions from stationary sources has been to pursue overall national emission reduction targets. The most important of these is the EEC Directive on large combustion plants, agreed in June, which requires SO_2 emissions from these sources to be cut by 60 per cent in three stages ending in 2003, with 1980 emission levels providing the baseline.

At present, the Central Electricity Generating Board (CEGB) has plans to retrofit FGD units to its 4000 MW coal-fired station at Drax, North Yorkshire, and to a 2000 MW station — probably Fiddler's Ferry, on Merseyside. Official and CEGB estimates are that retrofits will be needed on another 6000 to 8000 MW by 2003 for the UK to comply with the Directive.

Until now, the expectation has been that these controls would be concentrated on large baseload facilities with long remaining lives. However, modelling work pioneered by Dr Dick Derwent of Harwell's Modelling and Assessments Group suggests that this may by no means be the environmentally optimum strategy.

In the study, a simple trajectory model was used to relate the deposition of sulphur at selected sensitive sites to emission sources plotted on a 150 sq km grid. A computer optimization technique, "simulated annealing," was then employed to determine the optimum spatial pattern for an FGD retrofit program which would bring sulphur deposition at these sites down to 5 kilos per hectare per year — suggested internationally as a "critical load" which sensitive ecosystems may be able to tolerate in the long term.

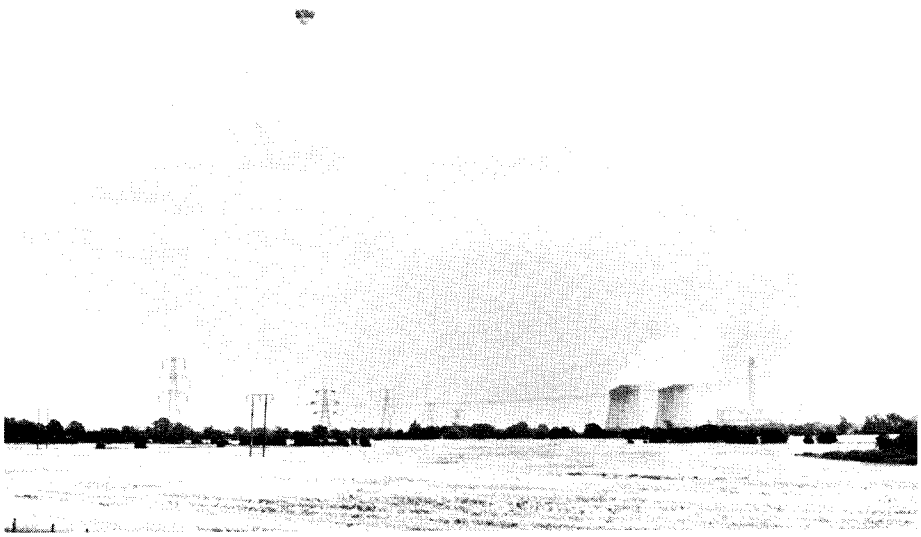
The technique involves setting up a random configuration of FGD units across the emission inventory. One of these devices is then moved randomly over the grid. The effect on sulphur fall-out at the receptor sites with each rearrangement is computed, using the trajectory model. If the rearrangement reduces the deposition, the FGD configuration is kept. The process continues until no further improvements in deposition can be obtained.

Optimum FGD retrofit strategies were developed in this way for two British sites in central Wales and southwest Scotland, and for southern Scandinavia. The results show clearly that reductions in SO_2 emissions from power stations that are often small, non-baseload, close to these areas, would be of greater environmental benefit than installing FGD devices at more remote baseload stations which emit much larger quantities of sulphur dioxide.

Hence the largest reductions in sulphur deposition in central Wales could be achieved by installing FGD units on four stations in south Wales and Shropshire with a total capacity of 3200 MW, with 2000 MW stations such as Fiddler's Ferry and Cottam coming much lower on the list. And curbing SO_2 emissions from the two Scottish stations at Cockenzie and Longannet would have a larger impact on sulphur deposition rates in southwest Scotland and Scandinavia than installing FGD units on 2000 MW stations in England.

Lessening of the depositions of sulphur in Scandinavia could cause unequal burdens for generating companies.

A strategy of this kind could have other benefits. The units would be easier to install than at baseload stations, where the cost of suspending generation while ductwork connections are made would be substantial. The environmental side-effects of FGD, including raw material



GREENPEACE/KERR ©

Greenpeace's hot-air balloon Trinity in flight over Drax power station in 1987 while filming acid rain damage and protesting emissions.

transport and disposal of solid and liquid by-products, would be on a smaller, more dispersed scale.

The study also holds potentially major implications for privatization of electricity. In July, the CEGB and the Government agreed on the division of Britain's power stations between Big G and Little G, the generating companies to be formed after privatization. Big G will dominate in the southwest, Wales, the West Midlands, Yorkshire and the northeast, while much of Little G's capacity will be in the East Midlands.

One of the criteria employed in the share-out was to give the two companies a roughly equitable share of liabilities for future investments in pollution control equipment. Harwell's study, however, suggests that Big G could bear the brunt of an FGD program which optimizes environmental benefits.

Thus, of the 12 stations in England at which FGD units would do most to curb sulphur deposition in Scandinavia, Little G would have only three with a total capacity of 2500 MW, while Big G would have nine with a capacity of 10000 MW. These include Blyth A and B and Stella North and South in the northeast, and Thorpe Marsh and Eggborough on Humberside, as well as Drax. Similarly, sulphur abatement on 3200 MW of Big G's capacity would have priority over any of Little G's units if the goal was to curb deposition in central Wales.

Harwell is now working up a more detailed strategy to curb both sulphur and nitrogen deposition at some 20 acid-sensitive sites in Britain. The results are likely to influence decisions as to where additional FGD units, as well as any extra NO_X emission controls, may be needed to comply with the EEC Directive.

Overall, Harwell's work suggests strongly that the Government should not include potential emission control liabilities in the privatization prospectuses, since controls based on the principle that Big G and Little G should bear costs proportional to their assets may be some way from the environmental optimum. Instead, market mechanisms such as emissions trading could be used to ensure that the utilities and other major emitters share the costs of a pollution reduction program developed over the next few years along the lines suggested by Harwell's work.

Ends Report 165/October 1988

Published with permission. Ends Environmental Data Services, Finsbury Business Centre, 40 Bowling Green Lane, London EC1R ONE.

* AERE-R13110, Optimization by simulated annealing and an optimal strategy for retrofit flue gas desulphurization in the UK. HMSO, 4.00 pounds.

Among recent publications

Air pollution, acid rain and the environment (1988)
The second report of the Watt Committee's Working Group on acid rain, edited by K. Mellanby. Describes causes, effects, and control strategies, with special emphasis on the situation in the UK. Its main conclusions are that more research is necessary in regard to some aspects of acid rain and air pollution, and that some of the alarming reports of widespread damage caused by air pollution cannot be confirmed. In English. 129 pp. Published by Elsevier Applied Science Publishers Ltd, Crown House, Linton Road, Barking, Essex, England IG11 8JU.

Acid rain — science projects (1987)
Describes a number of activities and experiments related to the acid rain. Mainly intended for use in schools. By H. Stubbs and E. Hessler. In English. 22 pp. Can be ordered from the Acid Rain Foundation, Inc., 1630 Blackhawk Hills, Saint Paul, Minnesota 55122, USA.

Air pollution from cars (1988)
Brochure by Greenpeace UK, giving a summary of the air pollution problems caused by car emissions, and especially criticizing Ford in the UK for not introducing models equipped with catalytic converters. 8 pp. Obtainable from Greenpeace UK, 30-31 Islington Green, London, England N1 8XE.

Tree survey of southern England (1988)
Survey, carried out by A. Tickle, shows that nearly 40 per cent of the beeches, over 50 per cent of the oaks, and nearly 75 per cent of the yew trees are moderately or severely damaged. It points out that a large number of the trees surveyed were on sites of conservationally valuable woodland. The report can be ordered from Greenpeace UK, 30-31 Islington Green, London, England N1 8XE.

Action urgently needed

Air pollution effects on tropical ecosystems are emerging as a major, unaddressed threat in many regions throughout the tropics. Long a problem associated with industrialized countries in more temperate regions, air pollution from fast-growing urban centres and from biomass burning is identified as the cause of a wide range of adverse environmental impacts across many areas in the tropics. If land-clearing practices continue unabated and urban development follows current projections, the situation will worsen dramatically in coming decades.

Although the causes and effects of tropical air pollution in many respects are distinct from pollution in temperate latitudes, and the need for research and monitoring is great, prudence dictates action. The European and North American experiences have shown that the uncertainties of atmospheric and ecosystem impacts should not forestall preventative measures that will be required in any event. Organizations which can effect change in the development and environmental protection policies of countries in the tropics should make every effort to do so.

Tropical air pollution arises principally from these human activities: biomass burning from forest clearing and agriculture, and emissions from fossil fuel combustion and industrial processes. The relative contributions of these two sources are roughly equivalent, but vary widely according to the pollutant and from region to region. Fossil fuel emissions are characteristic of urban centres, and biomass burning of less-settled areas, but in both cases the impacts are felt over wide regions. Biomass burning, which reaches its height in thousands of fires burning throughout the Amazon every year, is a phenomenon of global impact, visible in satellite data.

The impacts of tropical air pollution now being documented include: direct effects of oxidants on vegetation; acidification of tropical soils, especially those with low buffering capacity; and significant contributions to the build-up of greenhouse gases, including CO_2, nitrogen oxide, and ozone. In certain areas, such as Brazil's Serra do Mar near Sao Paulo, the loading of atmospheric pollutants has led to widespread deforestation.

Regions thought to be at greatest risk include much of southeastern Latin America, southwestern India, equatorial Africa, southeast Asia. In addition to the heavily-impacted areas in southeast Brazil, significant effects have been observed near urban centres in southeastern China and Nigeria.

Climate and biogeochemical features unique to the tropics serve to intensify the formation and effects of certain air pollutants. High daytime temperatures and intense sunlight escalate production of photochemical oxidants such as ozone — a pollutant injurious to human health and vegetation, and an increasingly important contributor to global warming. Background emissions from natural sources of sulphur, nitrogen, and hydrocarbons are high in the tropics. Their sources include vegetation and soils, volcanic activity, and lightning. Deforestation elevates such emissions through rapid decomposition of vegetation and accompanying soil exposure. Biomass burning further exacerbates the problem, increasing vertical mixing into the upper troposphere.

Air pollution now emerging as a chronic threat to ecosystems in the tropics

The effects of the pollutants themselves may also be heightened in the tropics. Many regions have acutely acid-sensitive soils and thus are extremely vulnerable to acidification through sulphur and nitrogen deposition. Soils with exceptionally high metal content give rise to metal ion mobilization following acidification. In addition, the effect of acidification on leaching rates for metal ions may be multiplied by heavy erosion in areas of high rainfall.

Finally, although the most severe pollution effects are often observed immediately downwind of urban centres, air pollution in the tropics is a long-range transport phenomenon. Greater vertical mixing of air masses occurs in the tropics than in temperate zones. Pollutants entering the upper troposphere have a long residency time, which in turn allows them greater travel than pollutants emitted in higher latitudes. Impacts of tropical air pollution are, therefore, expected to be felt in temperate-zone countries.

In many of its causes and effects, air pollution in the tropics is a phenomenon distinct from temperate zone pollution. Fundamental questions regarding biogeochemical processes remain to be answered, and there is an urgent need for baseline data and monitoring. The existence of such uncertainties should not, however, delay immediate and long-term preventive measures.

The experience of Europe, North America and Japan in controlling fossil fuel emissions is widely applicable in the tropics. Rapid diffusion of emissions control technologies into developing countries is one obvious place to begin. The anticipated explosive growth in the use of motor vehicles makes it essential that cars be fuel-efficient, equipped with state-of-the-art emissions control devices. Sta-

tionary sources must be designed to accommodate the latest technologies such as flue gas desulphurization, fluidized bed combustion, and selective catalytic reduction. It is imperative, too, that short-term government subsidies for land-clearing be stopped, and that biomass burning, which in some countries accounts for more than half of the anthropogenic emissions, be curtailed.

For the long term, however, the answer lies in developing low-emission industrial processes and energy-efficient technologies and transportation systems. Indeed, if per capita energy consumption in developing countries, based on the combustion of fossil fuel, begins to approach the extravagance of industrialized countries, the environmental consequences will be catastrophic.

Any program for economic development should aim to minimize atmospheric pollution through the use of alternative energy sources and energy-efficient technologies. Systems to utilize solar energy directly could be particularly appropriate in the tropics, and are already available. The expansion of urban areas in the tropics provides a crucial opportunity to begin moving in this direction, and an important role awaits the multilateral lending agencies and banks. To date, the banks have undertaken little long-range planning for air quality, particularly with respect to transportation systems. This is a conspicuous omission, given the adverse economic impacts of increasing reliance on foreign fuel that accompanies increasing vehicle use.

Consequences are regional and global as well as national

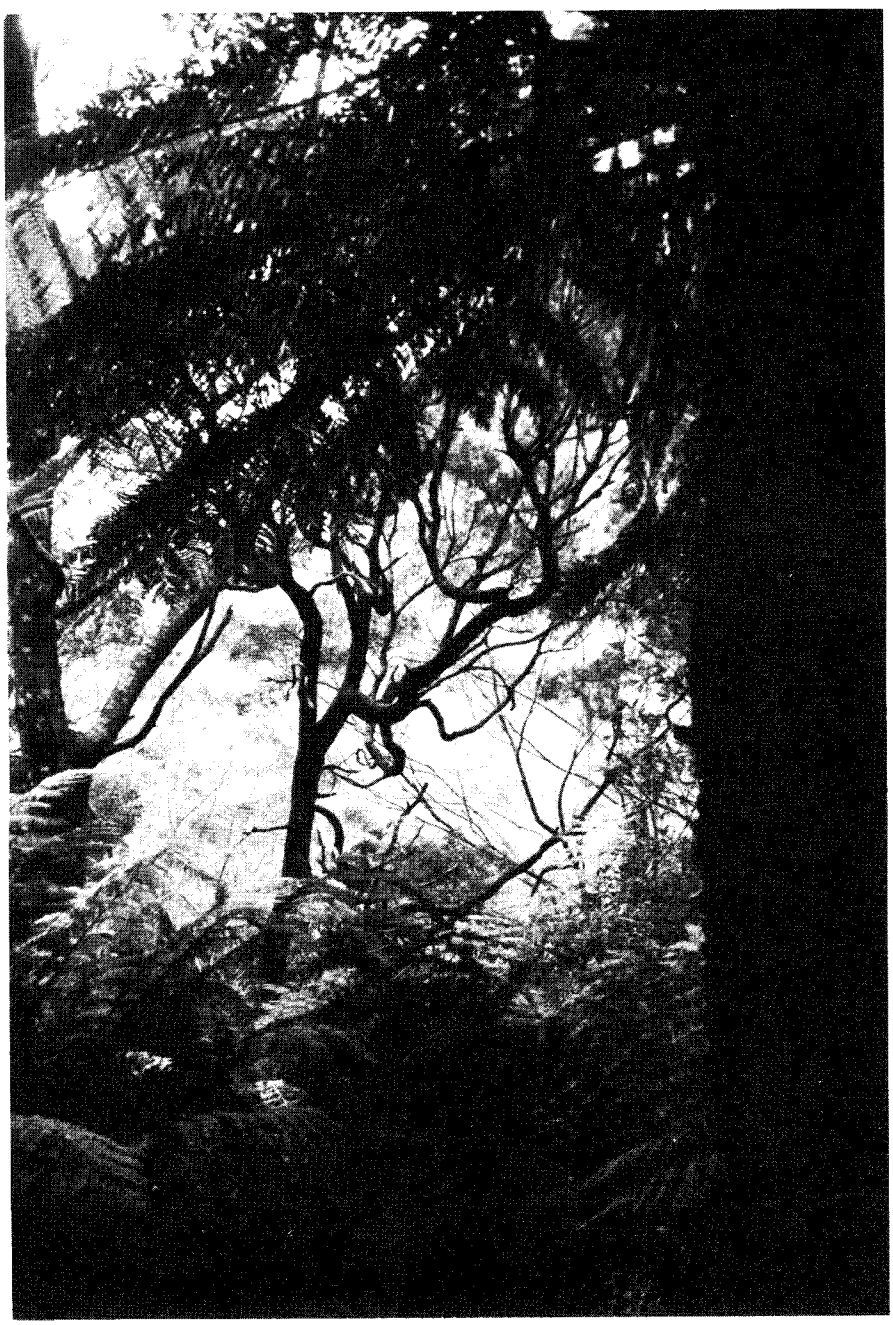
Much has been written about the need for sustainable agriculture in the tropics — essentially, no more must be extracted from the natural environment than it can replenish. A corollary is true for pollution control in these regions: emissions must be maintained at levels that the environment can assimilate. Although the more immediate threat of deforestation has rightfully dominated the debate on protection of tropical ecosystems, air pollution, the impacts of which are expected only to increase, is now emerging as a chronic threat. Particularly in the case of biomass burning, air pollution in the tropics is seen as both a cause and effect of perturbation of the natural environment.

The consequences of air pollution in the tropics are regional and global as well as national. The means to begin averting deterioration of tropical ecosystems is at hand. Technologies for alternative energy supply, efficient energy use, and emissions control and policies for energy-efficient urban development and transportation, must be made available to developing nations in the tropics through the combined efforts of multilateral lending institutions, United Nations initiatives, bilateral aid, and the production and marketing program of multinational corporations.

Richard Mott

In WWF Special Report number 2. 1988

Contacts: Richard Mott, Environmental Law Institute, 1616 P St, NW Washington, DC 20036, USA or Adam Markham, WWF International, CH-1196 Gland, Switzerland.



PER ELVINGSON

Rainforest in Austalia

Recently reviewed and noted

Acidification of Tropical Countries (1988)

As the world faces up to the new challenges of the ozone hole and the greenhouse effect, acid rain suddenly sounds like yesterday's problem. A new book, *Acidification of Tropical Countries*, edited by Henning Rodhe and Rafael Herrera, (Wiley, pp 405, 65 pounds, 155 dollars), reminds us that, for much of the developing world, it could be tomorrow's issue.

Until recently, it was fashionable to believe that tropical countries would be a long time approaching the levels of industrialization that have turned soils and rivers acid in Europe and North America and parts of southern China. But as our 1970s notions of "limits to growth" and predictions of demographic catastrophe recede, the possible environmental perils awaiting the tropical world from industrialization loom larger.

Acidification of Tropical Countries, the 36th in a worthy series on global environmental issues by the Scientific Committee on Problems of the Environment (SCOPE), is the first attempt to consider the perils of acid rain at the equator.

The first conclusion is that the rampant destructions of forests by burning is the major air pollution problem in many areas, including much of Brazil. Nitrogen oxides, of the kind unleashed in the developed world from car exhausts, waft out of the forests, creating ozone smogs.

The second conclusion is that many tropical soils and rivers are as vulnerable to acid fallout as any in Canada and Scandinavia. Up the Orinoco, in Venezuela, there could be big problems as oil prospectors arrive to exploit the Orinoco Heavy Oil Belt. The rivers and soils of the entire Orinoco basin are already naturally acid, with a resulting low biological activity.

A case study by Rafael Herrera and others — much the best section of the book — concludes that "although these systems evolved under acidic conditions, they might not tolerate increased acidity, as they already survive near the threshold at which aluminium could become more soluble." Once mobilized in this way, aluminium is immensely toxic to both plant and fish life.

"The potential for acidification of Venezuelan ecosystems is large," concludes Herrera. Other vulnerable places identified in the report include southeast Brazil, where emissions of sulphur compounds are already as great as across much of Europe; tropical West Africa, notably Nigeria; much of southern India; and southeast Asia, including Vietnam, Malaysia and Indonesia.

Fred Pearce

New Scientist, November 5, 1988.

Guterverkehr und Umwelt (1988)
Proceedings of an international conference, held in March 1988 in the Federal Republic of Germany. The environmental consequences of modern traffic schemes in the European Community and Scandinavia, such as Scandinavian Link, are discussed. The report is mainly in German, with a summary in Danish. Price 27 DM. Can be ordered from Stadt & Land, Dreiecksplatz 6, D-2300 Kiel 1, FRG.

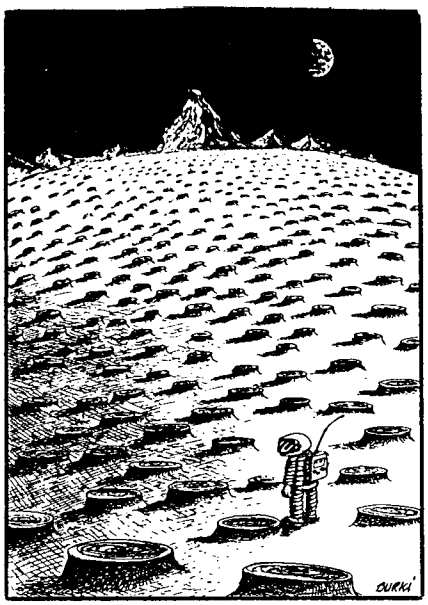
Effects of liming on the soil fauna in forests (1988)
A literature review by Tryggve Persson, summarizing the present state of knowledge concerning the effects on soil fauna of liming forests. In English and Swedish. 97 pp. Report No. 3418. Obtainable from the National Swedish Environmental Protection Board, Box 1302, S-171 25 Solna, Sweden.

Liming as a measure to improve soil and tree condition in areas affected by air pollution (1988)
The report, edited by F. Andersson and T. Persson, gives the results and experiences from a Swedish research program started in 1983, as well as experiences from other investigations. Its conclusion is that "considering the long-term effects of the deposition of acidifying sulphur and nitrogen compounds, combined liming and tree vitality fertilization is to be recommended." A research and development program is proposed for such countermeasures. In English. 131 pp. Report No. 3518. Obtainable from the National Swedish Environmental Protection Board, Box 1302, S-171 25 Solna, Sweden.

Effects of air pollutants and acidification (1988)
A 28-page brochure in English describing the Swedish program for research in this field, to be carried out between 1988 and 1993. Report No. 3516. Obtainable from the National Swedish Environmental Protection Board, Box 1302, S-171 25 Solna, Sweden.

Pollution control in Sweden (1988)
Report by Göran Persson giving a brief overview of Swedish organization and policy for pollution control. In English. 27 pp. Report No. 3517. Obtainable from the National Swedish Environmental Protection Board, Box 1302, S-171 25 Solna, Sweden.

Ecophysiology of acid stress in aquatic ecosystems (1987)
Proceedings of an international symposium held in January 1987 in Belgium, including 40 scientific presentations. Edited by H. Witters and O. Vanderborght. In English. 472 pp. Price 3,000 Belgian Francs. Can be ordered from Dr Frank Fiers, K.B.I.N., Vautierstraat 29, B-1040 Brussels, Belgium.



Drawing: Burki, © 24 Heures
Mort des forêts

Critical loads for sulphur and nitrogen (1988)
Report from an international expert workshop held in March 1988 in Sweden and arranged by the Nordic Council of Ministers in collaboration with the UN ECE. Edited by J. Nilsson and P. Grennfelt. Contains the workshop report, a summary, and fourteen scientific background documents. In English. 418 pp. Report No. 1988:15. Obtainable from the Nordic Council of Ministers, Store Strandstræde 18, DK-1255 København, Denmark.

Report from UN ECE critical levels workshop (1988)
The final draft report from an international expert workshop held in March 1988 in the Federal Republic of Germany. Contains the recommendations and conclusions of the meeting as well as six scientific working papers. In English. 146 pp. Can be ordered from Umweltbundesamt, Bismarckplatz 1, D-1000 Berlin 33, FRG.

UNITED STATES

Now coming to terms

Two states prominent in the debate on how to deal with acid rain, New York and Ohio, have agreed on a proposal to reduce acid rain-causing pollution. The agreement between Governor Mario Cuomo of New York and Governor Richard Celeste of Ohio is a compromise that will require reductions in national sulfur-dioxide and nitrogen-oxide emissions levels over an extended period of time. Ohio emits more SO_2 than any other state. New York is considered a major victim of Ohio's pollution.

Governor Cuomo, an advocate of legislation that would reduce the acidification damage to his state, agreed to a compromise as being more likely to be approved in Congress. The agreement is also more likely to find support among the economically beleaguered Midwestern industrial states. Legislation now under consideration in Congress would impose heavy costs on utilities and industries, making long-term investments by these industries prohibitive until this issue is resolved.

The agreement proposes to raise 900 million dollars a year, one half the estimated cost of compliance. Two-thirds of this would be paid by the oil industry through a change in the management of the US Strategic Oil Reserve. The proposal calls for an accelerated filling of the reserve by oil companies, which would be required to set aside 2 per cent of their imports for the reserve. The oil companies would retain title to the oil and pay storage fees that would generate 650 million dollars. The remaining 250 million would be paid by the Federal Government. The other half of the cost of compliance would be paid by polluters.

Although this agreement is more likely to find legislative approval, it is unclear whether it will find support among the oil and coal industries. Also unclear is whether the agreed reductions will satisfy international programs for abatement of SO_2 and NO_X. Canada's agenda calls for a 50-per-cent reduction of SO_2 emissions, whereas the Cuomo/Celeste proposal would yield roughly a 43-per-cent reduction of SO_2 and 25 for NO_X.

In a surprising reversal of previous policy, the Reagan Administration agreed August 6 to freeze NO_X emissions at 1987 levels. The US had previously refused to sign the international protocol curbing NO_X emissions, saying it should receive credit for previous reductions. Although this freeze provides international unity in combatting acid rain, the NO_X protocol is merely a small step on the road to acid rain abatement. NGOs, such as Friends of the Earth, Greenpeace, and the International Union for Conservation of Nature and Natural Resources, contend that 75-per-cent reductions in NO_X emissions are needed to prevent further damage to the environment.

Recent studies in the southeastern United States and the Chesapeake Bay region reveal that the effects of NO_X are much greater than once thought, and are not confined to the industrial states or the Northeast. Policy experts now believe that both the Reagan Administration's NO_X freeze and the Cuomo/Celeste agreement will bring little in environmental improvement. Both actions are significant, however, in indicating that the US is coming to terms with its international responsibilities for acid rain reduction and that regional agreements such as the Cuomo/Celeste agreement can beneficially influence national legislators.

Jay Lee

Pacific Energy and Resources Center, 1055 Fort Cronkhite, Sausalito, CA 94965, USA.

EAST-WEST

In new atmosphere exchanges can proliferate

Newfound freedom enables environmental groups in eastern countries to get together on international projects, backed by western colleagues.

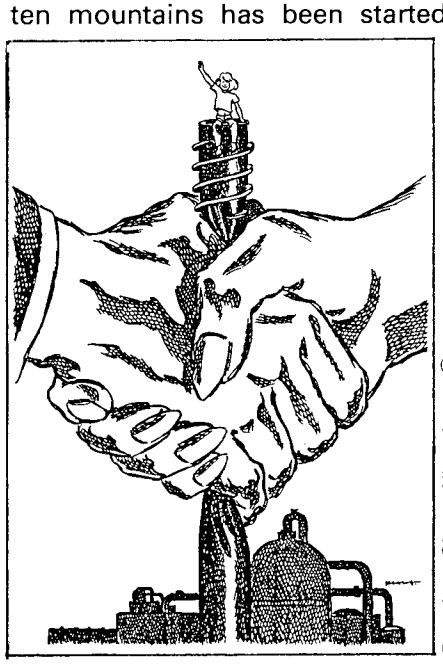
In these times of *glasnost*, cooperation between environmental groups from Eastern and Western Europe has become highly popular. Early in December, for example, some fifty environmentalists from West Germany, the Netherlands, Switzerland, Austria, Yugoslavia, Czechoslovakia, Poland, the USSR, and East Germany convened at the Bükk National Park in Hungary to discuss cooperation. The meeting was organized by the Air Pollution Action Network (AIRPLAN), which is based in the Netherlands.

With the aid of a grant from the Dutch government, AIRPLAN is also organizing a three-year East-West Project, which will include three East-West meetings for consultation between non-governmental environmental groups and a special project for cooperation between Dutch and Polish NGOs. The grant also enables two officers to be employed for the project in Amsterdam.

The meeting in Hungary was to discuss environmental actions and strategies. It was fascinating to hear environmentalists from Latvia, Estonia, Ukraine, and Moscow reporting on the possibilities of working relatively openly in the USSR nowadays. In Kiev, for example, more than 60,000 people demonstrated last November against nuclear power, and in September 200,000 had formed a chain along Latvia's Baltic Sea coast in protest against environmental ravages.

Environmental groups in Poland, Czechoslovakia, and Hungary are also finding better opportunities for public engagement. In East Germany, on the other hand, the situation is still difficult. Environmentalists there are often questioned and threatened by the security police, and refused travel permits even for visits to neighbouring socialist countries. Little contact has been possible with environmentalists in Rumania and Bulgaria. A 22-page report was however recently published by some informal groups in Rumania, concerning the environmental crisis and the lack of any nature conservation measures in that country.

Three years ago several groups in Eastern Europe formed their own environmental network, named Greenway. A Greenway newsletter is now published quarterly in Hungary, and regular seminars are arranged. A special project on air pollution problems in the Sudeten mountains has been started by environmental groups in Poland, Czechoslovakia, and East Germany, and there is a plan for similar collaboration in regard to the Carpathian mountains.



Drawing: Claus Albrechtsen ©

Various youth camps, with participants both from East and West, have been organized during the past year by Youth and Environment Europe (YEE) and European Youth Forest Action (EYFA). Last summer EYFA also arranged a bus tour through East Germany and Czechoslovakia to Kiev in the Ukraine, when even Westerners were allowed to visit coal-fired power stations and the Chernobyl area.

During the meeting in Hungary the East-West programs of the World Wide Fund for Nature (WWF), the International Union for the Conservation of Nature (IUCN), and Friends of the Earth International were also presented and discussed. The WWF is aiming at a "Debt for Nature" swap between the Polish government and West European and American banks, by which the WWF would purchase at a discount a small part of Poland's debts to the banks — now amounting to more than 40 billion dollars — on condition that an equivalent amount is invested in Polish environmental programs.

In February last year the IUCN started an East European program involving reports on the state of the environment in Eastern Europe, educational schemes and the identification and management of sites of outstanding value that appear threatened by pollution and industrial or other development.

Then in October Friends of the Earth International made Poland the venue of its annual meeting. With funds from the Italian government it is also planning an East-West meeting in 1989, as well as a Baltic Sea Environmental Conference, to be held in Estonia.

Other meetings of the environmental movement during 1989 will include one on the Bohemian forests, in Prague at the beginning of June, and a big environmental and peace camp in

EYFA

Big European polluters are to be named and visited

The European Youth Forest Action (EYFA) was started in 1985 in Sweden as a joint demonstration by nearly all the Swedish youth organizations. Its principal aim was to gather youth organizations with differing backgrounds and interests around a general platform of demands. In spring 1986 this platform was sent to youth organizations all around Europe and nearly 250 signed it.

So as not to stop at being a giant petition, but to give the last word of the name substance too, in 1986 we started to organize an action and information tour around Europe, visiting fifteen countries, and continued in 1987 and 1988.

Some 125 persons from fifteen European countries attended the European Youth Forest Action camp in Freiburg in August 1988. There were newcomers from Scotland, Ireland, Finland, Spain (Catalonian, Basque), and Portugal. The most important outcome of this get-together was a decision to campaign against the 100 biggest polluters of Europe. In every country youth organizations were to agree on what they consider the ten biggest polluters in their country (emitters of sulphur and nitrogen oxides, nuclear polluters, car makers, and so on). From this a list of the 100 biggest polluters of Europe will be put together and presented at national press conferences during the International Air Pollution Week in 1989.

In the summer of 1989 EYFA will arrange action tours to some of the major polluters on the 100 list. There are working groups for four action tours starting from north, south, eastern, and western Europe. The plan is to take international groups on bus tours during two weeks at the end of July. There are ideas for actions, for example at Sellafield nuclear reprocessing plant, coal-fired power plants in Spain, chemical and steel industries in Poland, Czechoslovakia, and Hungary, and in northern Scandinavia. The four tours will end up in an international Ecotopia camp somewhere in central Europe during the three first weeks of August.

Lars Igeland

➤ Murmansk at the end of the month. Some 1,500 young people from the Scandinavian countries alone are expected to attend, and EYFA is arranging a bus tour to this camp meeting, where a major theme will be the problem of air pollution in the Kola peninsula area.

Considerable bilateral cooperation has been initiated between environmental groups in West Germany, Sweden, and the Netherlands, and Polish counterparts such as the Polish Ecological Club. The Foundation for Environmental Contact Poland/Netherlands also has projects for the exchange of information on energy, waste, drinking water, and nuclear power generation.

Last year the Swedish-Polish Environmental Federation (SPM) arranged a seminar in Sweden on Poland's problems of air pollution, as well as a youth training course in environmental matters, and an environmental exhibition at an agricultural fair in Poznan.

The Federation has also started a project for monitoring pollution in the River Vistula, and as a result of a collection has obtained the equivalent of 10,000 dollars to enable gas to be used instead of coal for heating historical dwellings in Krakow. It is, too, trying to twin Swedish with Polish towns, and so far six towns in Sweden have signified readiness to take up the idea. The City of Gothenburg has already made 100,000 dollars available to its environmental partner Krakow, for the purchase of equipment for measuring air pollution.

During the meeting in Hungary the proposals put forward for East-West cooperation were many, and included ideas both for practical aid and joint actions such as the International Air Pollution Week. A report of the meeting will shortly be available from AIRPLAN.

Reinhold Pape

Last september 200,000 peoples formed a chain along Latvia's Baltic shore in protest against destruction of the environment.

Air Pollution Action Week 1989 — May 27 to June 5

Environmental groups represented at the first East-West consultation meeting in Hungary last December have decided to hold the 7th international action week against air pollution between May 27 and June 5, 1989.

Instead of being an International Acid Rain Week only, this year it will be an International Air Pollution Week, focusing on soil acidification and the environmental effects of ozone, as well as on the alarming depletion of ozone in the upper atmosphere and global warming.

World Environmental Day, June 5, has also been declared by environmental groups such as Friends of the Earth as a special action day for the last two topics.

The Polish Ecological Club will be promoting a car-free day. A special campaign newspaper will be published by the Swedish NGO Secretariat on Acid Rain at the beginning of April in cooperation with the Air Pollution Action Network, European Youth Forest Action and the European Environmental Bureau. Nevertheless we suggest that *You* start with the preparations for the action week already now!

Reinhold Pape

Ellen Auensen ©

USEFUL CONTACTS

Some addresses of organizations/international networks active on air pollution problems and east-west cooperation:

Friends of the Earth International (FoE-I)
26-28 Underwood Street
GB-London
England N1 7JQ

Air Pollution Action Network (AIRPLAN)
Box 5627
NL-1007 AP Amsterdam
Netherlands

European Youth Forest Action (EYFA)
Postbox 566
NL-6130 AN Sittard
Netherlands

European Environmental Bureau
Rue du Luxembourg, 20
B-1040 Bruxelles
Belgium

Greenway
ELTE Nature Conservation Club
Egyetem tér 1-3
H-1053 Budapest
Hungary

World Wide Fund for Nature (WWF)
Avenue du Mont Blanc
CH-1196 Gland
Switzerland

Youth and Environment Europe (YEE)
Klostermollevej 48
DK-8660 Skanderborg
Denmark

International Union for the Conservation of Nature (IUCN)
The World Conservation Union
Avenue du Mont Blanc
CH-1196 Gland
Switzerland

Foundation for Environmental
Contact Poland/Netherlands
P.O. Box 5627
NL-1007 AP Amsterdam
Netherlands

Swedish-Polish Association for Environment Protection
c/o M. Andersson
Hällbygatan 32 D, 4 tr
S-752 28 Uppsala
Sweden

Swedish NGO Secretariat on Acid Rain
Miljövård
Box 33031
S-400 33 Göteborg
Sweden

Canadian Coalition on Acid Rain
112 St. Clair Avenue West, Suite 401
Toronto, Ontario M4W 2Y3
Canada

National Clean Air Coalition
801 Pennsylvania Avenue, S.E.
Washington, D.C. 20003
USA

Greenpeace UK/Andrew Kerr
30-31 Islington Green
London
England N1 8XE

Institute for European Environmental Policy/Helmut Schreiber
Aloys-Schulte-Strasse 6
5300 Bonn 1
West Germany