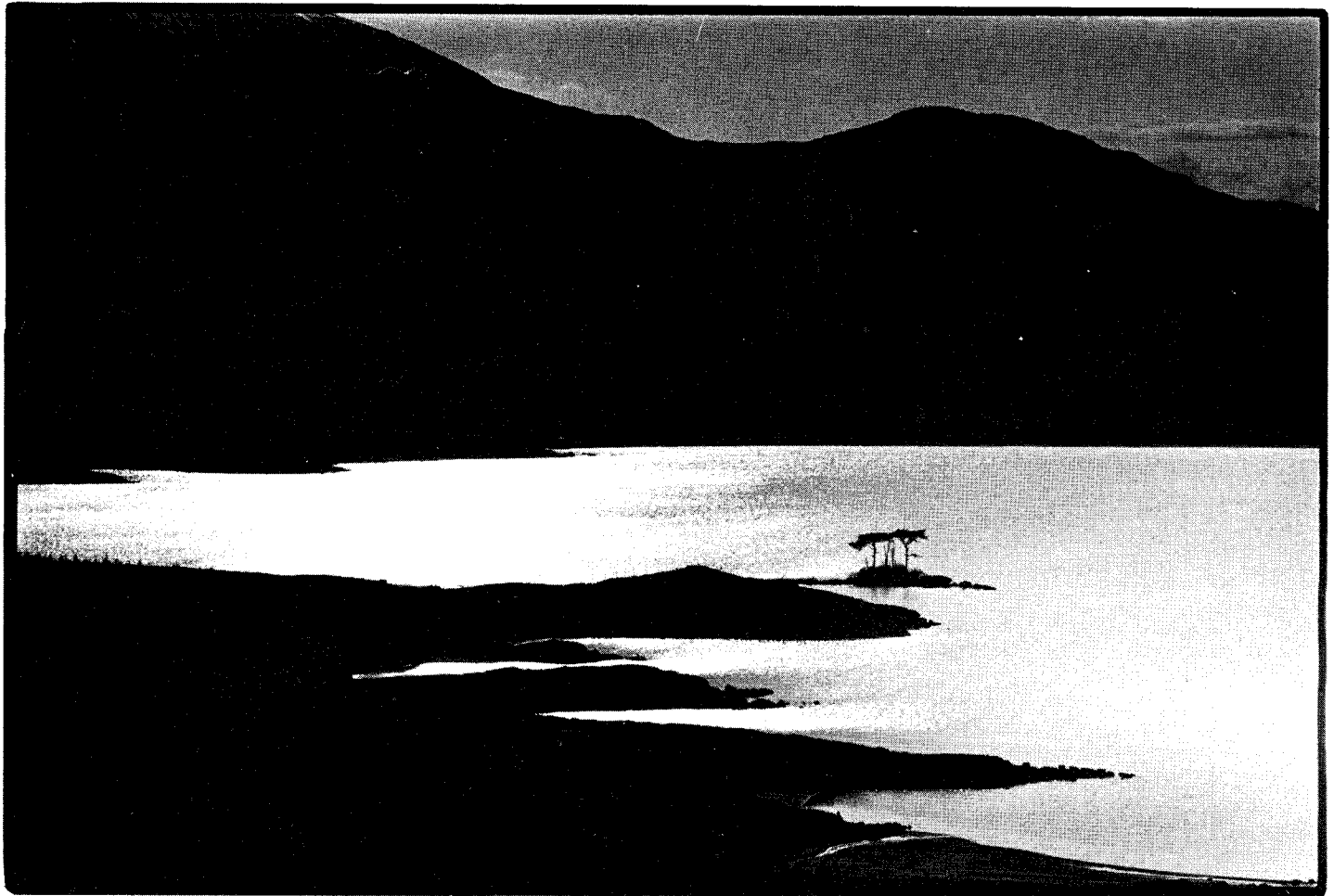


Acid News

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



Loch Dee

Photo: Hans Östbom

Britain is bying time

"The Royal Society meeting was a disgrace. This sort of thing could give science a bad name".

The remark was made to me by a British scientist just after a three-day discussion meeting on acid rain held at the **Royal Society in London**. One of the conference organisers was Dr Chester of the Central Electricity Board (CEGB); and the first day of the symposium witnessed the launch of a joint CEGB/National Coal Board research project into acid rain. The CEGB has more than a vested interest in the acid rain controversy, as it pumps 2.6 million

tonnes of Sulphur Dioxide into the air every year, and is the biggest single polluter of the air in western Europe. To ask them to organise a conference on acid rain is rather like asking the tobacco industry to launch an investigation into lung cancer: they will find all sorts of reasons for the complaint, but somehow they will forget to mention that smoking cigarettes is the most important factor in the process.

Independent research?

Of more importance to environmentalists, however, is the remarks that

were made by the Chairman of the CEGB at the press conference to launch the research project on acid rain. *The CEGB and NCB*, said Sir Walter Marshall *are concerned to ensure that the research is carried out independently*. So they are giving the Royal Society 5 million, and allowing them to conduct their investigations independently. The results will be completed and published in five years' time.

"Unwise to take action"

Was the CEGB, a reporter asked, going to install any desulphurisation



Acid News

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

ACID NEWS is a newsletter produced jointly by the Swedish and Norwegian secretariats on acid rain. The secretariats' and the newsletter's main task is to provide environmental and nature conservation organisations and others with information on the subject of acid rain and acidification of the environment.

Anyone who is interested in these problems is invited to contact the secretariats on the address below. Any questions or requests for material will be dealt with to the best of our ability.

In order to make Acid News interesting, we are dependent on information on what is happening elsewhere in the world. So if you read or find out about something which might be of general interest, please send a letter or a copy to us.

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THE SECRETARIATS

The Norwegian secretariat, "The Stop Acid Rain Campaign/Norway", is organized by six non-governmental organisations 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)

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"The Swedish NGO Secretariat and Acid Rain" is organized by four nongovernmental organisations concerned with the environment:

- The Environmental Federation (Miljöförbundet)
- The Swedish Angler's National Association (Fritidsfiskarna)
- 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!



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→ Britain is ...

equipment in Britain's power stations before the research project was finished? *No*, replied Sir Walter, *it would be unwise to take any action on retrofitting desulphurisation equipment before the results of the scientific investigation have been studied.*

If you ignore the scientific purposes of the research – these will be discussed later – and look at the politics involved, you cannot avoid being impressed by the elegance of the CEBG's initiative. Acid rain is not the subject of major public controversy in Britain, although it looks as if it might be in 1984. On the diplomatic front, the West German announcement of a major desulphurisation programme is embarrassing for the CEBG – if the West Germans think acidification is a major threat, why don't we? – and presumably the FRG has been twisting arms in the EEC. British MPs, especially the Scottish ones, are beginning to get worried about the environmental effects of acidification in Scotland and

Wales. The Welsh Farmers' Union have reported "progressive damage" to their crops, and have started making noises. From the CEBG's point of view, the pressure is building up – but with a total income of 8379 million (figure for England, Scotland and Wales, 1980 - 81) – the estimated costs of desulphurisation, now running at £ 1500 million to £ 4000 million, look terrifying.

The solution? Launch a research project, which means you don't have to take any action for five years. Make the objectives of the project reasonably limited, and define its terms of reference so that the scientists are not looking at the broad picture of acidification (they might recommend desulphurisation if they do). Then if the research indicates that the UK might play some part in the acidification of Scandinavia, you can say that the programme was too limited, and that more investigation is necessary. Thus buying yourself another five years' grace. →

What is going on in Great Britain

Ever since the mid-50s, Great Britain has emitted between 5 and 6 million tons of sulphur dioxide annually, making the country the largest source of sulphur emissions in Western Europe.

Furthermore, ever since acid rain was taken up as a major international problem at the end of the 60s, Great Britain has consistently exhibited an extreme unwillingness to adopt any measures whatsoever to seriously reduce its sulphur emission.

In the early 70s, Great Britain denied any connection whatsoever between its sulphur emissions and the increasing ravages of acid rain that were plaguing Scandinavia. Then, when the OECD showed in the mid-70s that sulphur emissions from Great Britain were actually being transported long distances – up to several thousand kilometres in a few days – the British began instead asking whether acidification was really being caused by the acid precipitation.

Finally, after hundreds of scientists and acidification experts had declared that releases of acidifying substances actually lead to deposition of the same substances, and that this in turn acidifies ground, surface water and ground water, the result was that the British could almost begin to believe in these so

remarkable, as they viewed it, connections.

But there are so many uncertainties, they then pointed out. For example, why exactly do the fish die in acidified water? What specific chemical element, in what form and concentration, kills the fish? These (and countless other) important questions must be examined and researched thoroughly. Until such time, one are not going to adopt any expensive measures to reduce emissions!

The quantity of (trivial) details that *have to* be explored somehow appears to increase exponentially with the quantity of knowledge gained by the CEBG's research scientists.

Despite this seemingly endless procrastinating, things have finally started happening in Great Britain. Do you wonder what things? Read on and you will find out: What is really going on in Great Britain?

Christer Ågren.

This is number five!

By mistake, the last issue of Acid News was announced as number five. It should have been number four. This issue is number five. We apologize...

→ More than 3000 studies!

The Canadians, who have some experience of this process in the USA, have pointed out that more than 3000 studies have been carried out to date on the acidification issue. As a Canadian official complained to the Herald Tribune: "More research is like counting the species of mosquitoes before spraying the lakes to stop malaria".

The first "real" study?

Disregarding this, the British electricity and coal industries are getting very good publicity out of their project. "Look, we are extremely concerned about acid rain", they can say, "Haven't we just launched a £ 5 million investigation into it?" The impression is being given to the British press that this is the first **real** study of acidification. The NCB has called the survey "the most comprehensive to be undertaken in any country" and adds "There is a great deal of public interest in acid rain, considerable conjecture and speculation about its effects, but few scientific facts to rely on ... This new joint project will add greatly to the knowledge of ac-

idification of surface waters and the implications for fish life so that, on completion of thorough and detailed research, effective remedial measures can be realistically assessed".

The research, which will apparently be carried out in conjunction with the Norwegian Academy of Science and Letters and the Royal Swedish Academy of Sciences, will have four objectives:

1. In the affected areas of Norway and Sweden, what are the factors, in addition to pH, that in practice determine the fishery status of lakes?
2. What are the biological, chemical and hydrogeological characteristics of catchments which determine whether the composition of surface waters falls within a range acceptable to fish?
3. In Norway and Sweden, to what extent are these characteristics being adversely affected by the acid deposition itself?
4. What changes would be brought about in water chemistry and fishery status in Norway and Sweden by given levels of reduction of man-made sulphur deposition?

Red herrings

Those people who were at the Royal Society symposium will recognize the influence of Dr Chester of the CEBG in objectives 1 and 2. He is developing a theory that the balance of Calcium and Hydrogen ions in a lake is as important to fish survival as pH levels (the idea has its attractions). However, when he expanded this theory to imply that Sulphur deposition is an exaggerated factor in causing fish deaths, there was the scientific equivalent of uproar. The Norwegian scientists claimed that the Norwegian data that Dr Chester was using for his hypothesis was being misappropriated, and had not been collected for the purposes to which he had adapted them. The person from the Department of Environment who summed-up the conference at the end of the three days described Dr Chester's presentation as "a red herring", but Dr Chester was unabashed. "It has all been carefully stage-managed", I was told by a Norwegian who was at the meeting, "it was a sham."

Steve Elsworth

Acidification in the U.K.

Acidified rain

— Our measurements show clearly that the most acidic rain falls when the wind blows from south or south east, says Stuart Coy, chemist with the Solway River Purification Board in southern Scotland, when we visit the station at Loch Dee.

— The rain in this part of the world has a pH of about 4.6. But it can fall quite dramatically, in a matter of hours, when the wind is coming from the south, where the major population centres are located: that is Lancashire, the Midlands area and London. And we have recorded rainfall with pH as low as 3.5. That is getting to be something like a hundred times more acidic than you would anticipate of rain, which had fallen through an uncontaminated atmosphere.

The acidification has now also "attacked" the British countryside, including the English and Scottish lakes and rivers. But it is just recently that scientist and authorities have started to see the typical signs of acidification: falling pH, high levels of aluminium, lowered buffering capacity of the water and biological changes like loss of salmonid fishes (salmon and trout). Many believe this

is the first step towards the kind of destruction which has already been seen in Scandinavia for many years.

Afforestation

Loch Dee is surrounded by smoothly rounded hills. Blanket bogs cover the



"We have recorded rainfall with pH as low as 3.5", says Stuart Coy. Photo: Hans Östbom

whole landscape and there are very few trees.

– *The problem for this area in Galiloway is that the hills around here are made up of hard bedrock like granite which doesn't naturally possess properties to neutralize the acidic rain water, says Stuart Coy, who also goes on to say that the extensive afforestation of the Scottish highlands add to the acidification problem.*

– *The Forestry Commission and the forest industry are plowing every hillside to create a better environment for the seedlings of spruce they plant. Unfortunately this tree cover concentrates the wind-borne dry air pollution, which is then washed off the needles when the rain falls. This makes the rainfall under a tree much more acidic than the rain falling on an open hill side. Moreover, the coniferous trees themselves acidify the soil as they mature.*

Loch Dee Project

Stuart Coy and the biologists working with the so-called 'Loch Dee project' have also shown that the very dense tree plantations hinder the sunlight in such a way that the essential primary production in the small rivers is completely stopped.

– *This in itself is a threat to the fish populations needing the food supply, and the situation is not made better when the stream goes acidic because of the rainfall.*

Local water authorities and the Forestry Commission are now working hard in the Loch Dee area to find answers to the many questions they ask about acid rain. Ian Murray is a forest ranger and when we meet

him he is just taking water samples from the loch itself.

– *I take samples every week from all the burns leading into the loch and also throughout the course of the loch. The fishing in here is very good at the moment, but the acid rain has stopped a lot of the fishing in other lochs roundabout here. In the hills there are lochs with no fish in at all, due to the acidity in the water. If something isn't done to stop the emissions now you can come up here in the future and you are never going to see a fish rising or any living thing at all in this water, predicts Ian Murray looking out over the beautiful Scottish landscape.*

C.E.G.B. dispute

All the research at Loch Dee is carefully reviewed by the Central Electricity Generating Board. The CEGB rejects all reports and statements that puts a clear connection between what is happening in the lakes in Scotland and acid rainfall. The CEGB makes it look like acidification is a semantic problem rather than a scientific.

– *They even dispute the fact that fish has disappeared from many lakes and rivers, says Gary Fry, regional officer for the Nature Conservancy Council in Dalbeattie.*

– *When we say that the fish has disappeared they just ask for evidence that the fish once existed, and sometimes it is very difficult to find old estimates of fish populations to prove the case on a firm scientific basis.*

Gary Fry is especially worried about acid rain, because it is the kind of pollution the authorities can't con-

trol, not even on a nature reserve.

– *We have many nature reserves up here, established to protect the wild fauna and flora from, among other things, the pollution from cities and industries. The acid rain and all the problems the acidity create we can do nothing about on the nature reserve itself. It seems, if we really want to stop this nature destruction, that the only way to go about is to stop the emissions at the sources, Gary Fry concludes.*

Scotland

In the same way that acidification has put a chilly tone upon the relations between Scandinavia and the UK, it is now also putting a strain on the relations between England and Scotland. Most of the pollution comes from England, but the problems are caused in Scotland, where a lot of people enjoy the outdoor life, the fishing and the hunting.

Gary Fry shows us some recent clippings from Scottish newspapers; – *As you can see we have a good debate about this, and I am sure that the Scottish people will fight hard for their fishing, says Gary Fry who also tries to make his own organisation, the Nature Conservancy Council more active on the acid rain issue.*

– *The acidification damage inflicted on the British countryside is still of such a recent date that we haven't yet found the best means of coping with it.*

Lake District

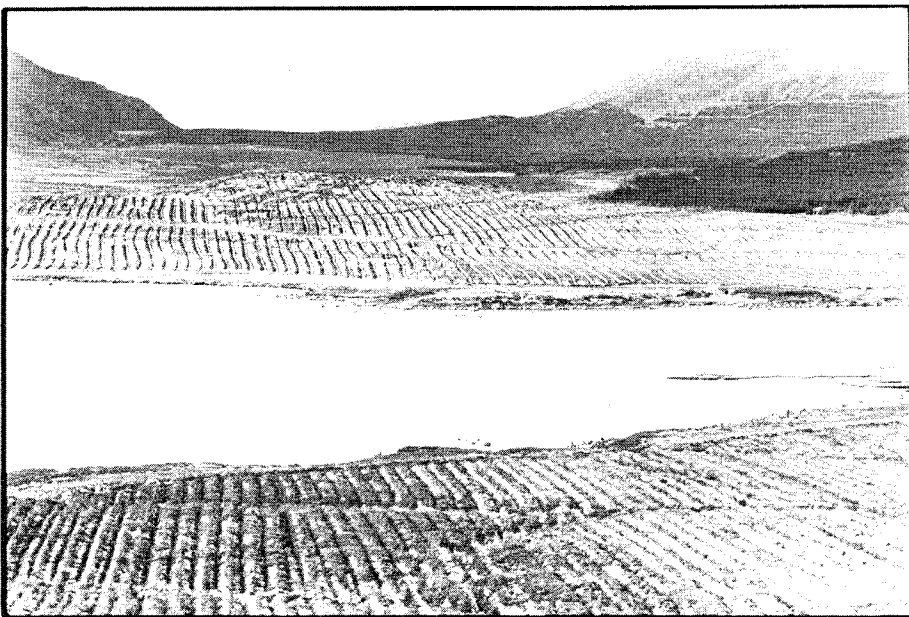
Also the well known Lake District in northern England has been hit by acidification. Many of the rivers, like the Esk and the Duddon, have lost large parts of their fish populations. The well known salmon and trout of the Lake District are slowly disappearing.

– *We have surveyed the rivers and their tributary streams with a special electrical fishing gear, says biologist Ray Prigg with the water authorities in Carlisle, and we can conclude that the fishless areas are getting larger.*

Fish kills

– *We have noted that the pH of the rivers is falling, that the aluminium content is high and we can most certainly say that fish kills in the spring are caused by sudden acid chocks due to acidic melt water.*

One of the first to warn about the dangers of acid rain and the fish kills in the Lake District rivers was Hugh Falkus. He is a well known TV personality and a great expert on salmonid fish and fishing. For him the



The modern forestry and the afforestation add to the acidification problems in the Scottish highlands. Photo: Hans Östbom

cause of the fish kill is obvious:

– *It is the industrial pollution that is to blame. The fate of the Esk fish is just like the canary which the miner used to test for gas in the pit. Their death is a warning that something is happening to our environment, says Hugh Falkus.*

Wales

Recently the water authorities in Wales have reported that the fish has disappeared from several rivers and lakes and they have now suggested that a special scholarship should be established at the university in Swansea to study the acid rain.

But the effects of the acid rain do

not effort only fish and insects. Acidic drinking water represents a great danger to human health. Several cities in the UK have piping systems of lead. Acidic water corrodes the pipes and the lead is dissolved in the drinking water.

Drinking water

At the Loch Braddan water works in Ayrshire water officials have to combat the acidic water in the reservoir by continuously adding lime to the drinking water. The water is distributed to the city of Ayr and its surroundings.

– *If we don't add the limestone powder to the water the people will suffer*

from lead poisoning, Douglas Herring says, as he explains how the automatic liming equipment works.

Lead poisoning causes severe damage to the brain and the central nervous system. It is generally thought that the Roman empire fell as a result of lead poisoning, then caused by acidic meals prepared in leadcontaminated pottery.

Could this be the warning that starts the necessary debate in the United Kingdom? No doubt, acidification has slowly begun to put a stranglehold on the British countryside.

Bo Landin.

* * * * *

You must accuse us!

WE NO LONGER FACE ACUTE AIR POLLUTION IN THE UNITED KINGDOM BUT WE STILL HAVE SIGNIFICANT PROBLEMS:

UK Secretary of State

The worst polluter

"I place emphasis on the words "in the United Kingdom" because it does seem that there is now increasing concern in Europe, if not in this country, and certainly among many of those concerned with the environment, about the problem of acid rain. It seems to me that were the "best practicable environmental option" approach to be adopted ... this should include looking at problems created in other countries ... As I understand it, no one is obliged at the moment to consider the effects in other countries outside the United Kingdom ... On this issue, this country, I believe, is now seen as one of the worst polluters in Europe – certainly the least caring."

These are the words of Lord Peter Melchett, when he addressed the House of Lords on the issue of acid rain and general air pollution on the 23rd of March 1983. Lord Melchett is a well known speaker on environmental matters, chairman of Wildlife Link and Council member of the Royal Society for the Protection of Birds. More over he was also junior minister in the Department of the Environment as well as the Department of Energy during the last Labour government.

No big issue

– *Acid rain is not a big political issue in the UK, it's not even a major environmental issue. It is very low down the list of questions people ask on wildlife and pollution in general,*

and Peter Melchet gives two reasons for this;

– *The first reason is that acid rain isn't producing any visible effects, or even significant invisible effects in this country. It is not polluting rivers and lakes like the great masses of*



Peter Melchet/Photo:Bo Landin

dark brown sludge and evil smelling things that people can see and smell easily. Anybody can do that, and anybody can do something about it.

– *The second point is the fact that*

this country is not under attack from the countries that are affected by the acid rain. We don't get the message here that we are bad. That might be the fault of our own media, but it might also be the fault of for example the Scandinavian governments and pressure groups. I suspect the latter as much as anything I think if we were under serious attack some of the news would be filtering through. Today it is not even coming through to organisations particularly concerned with the environment, not even enough to make it begin to be a priority problem.

– *So others must come to this country and say: "Look, you are really causing problems for us!!"*

But why doesn't the politicians bring the issue up, why don't they place it higher on the political agenda?

Increased awareness needed

– *I think, on the whole, that the politicians awareness will reflect the awareness of the general population. Particularly in the House of Commons, because they will know and act on the issues that the people of their constituency write to them about. The MP's get hundreds of letters every week, and if only one in five years is about acid rain – and this estimate is on the high side I think - you can understand that the issue gets low priority. No, the MP's are concerned with unemployment* and when environmental problems are brought up it is about the destruction of wildlife and the use of chemicals in agriculture, because they get a letter a month about that. *Because they get thousands of letter every month about that.* →

At first it seems as if Peter Melchett has a very pessimistic view of the possibility of making acid rain into a major environmental issue. However, he does think that things could happen soon, if only some hard work is done.

– It is not true to say that the environmental awareness is low in the UK. The awareness is low on some issue, but concern about chemical pollution is the highest of all. People seem to be very concerned about the hidden, sinister dangers. I think there is a potential that the acid rain and the metals problem will become one of the chemical issues that interest people, certainly.

– But it is simply that acid rain hasn't been raised in the public mind, and on top of that you have the facts that this terrible problem seem to be happening in other countries, to some one else, to some one elses' forests, to some one elses' children and not to your own.

Damage in the U.K.?

Looking at the present news-papers debate on this issue it is easy to get the impression that the acidification problems only concerns Scandinavia and West Germany. But no doubt, the problems will arise in the UK as well, if they haven't already. Doesn't this offer some hope to the other nations, that the UK will act when it suffers damage as well?

– Yes, but I wouldn't advise other people in Europe to wait for it to happen here. That seems to me to be a too negative approach. And also a dangerous one. Because, after all, we may be bumping along without it happening badly enough here, and certainly not quickly enough to do much about the problems you suffer from.

Scandinavia too quiet!

– It seems to me vital that Scandinavia raises the issue of what Britain is doing to other countries. And I think that the pressure which is likely to be effective is to start saying loudly and frequently, that Britain has the reputation as the worst polluter of other peoples soil and other peoples forests, in Europe. It is national pride rather than fear of it happening here which is going to be the best weapon.

But to combat air pollution like sulphur dioxide will cost money, a lot of money?

Prepared to pay

– Again, looking at opinion pools they show that people are prepared to pay an extra penny out of the pound on a new tax to combat pollution. Yes, people are prepared to pay, or at least a large proportion are. But in practice I don't think these political decisions are taken on that sort of basis. The governments don't ask, or say "are people prepared to pay". They say "can we afford in terms of our international reputation and consequences on other policies, like with the common market, **not** to clean the emissions.

More pressure needed

– The answer to that question would depend on the political pressure. But, to come back to the Common market, the other states there should be able to put a very considerable pressure on Britain on the grounds of equity and fairness in trading, which was what the Common market was meant to be about. The others should say: "We are paying theses costs of pollution control, we are now producing electricity at a greater cost because of it, and you must do so too!!"

More research?

But one problem is that the British government and the CEGB (Central Electricity Generating Board) refuses to act, giving the excuse that more research is needed?

– That is always the answer on any pressure put on any environmental issue. It is true even when the evidence is quite clear, unless there is significant public and political pressure. There is of course always more for human beings to discover, but we have to look beyond this fact when enough facts are produced to support action. Today scientists in Scandinavia and in West Germany and many other countries have produced enough evidence on acid rain. It is time that other countries stood up and said loudly:

"We are suffering now. No research you can do in your country can make any difference to the extent we are suffering. We have done something to clean up our emissions, you must now do the same!!!"

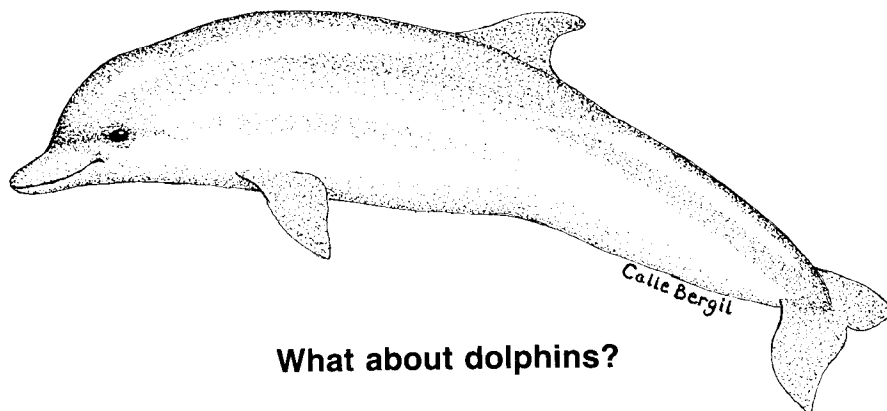
What about dolphins?

Acid rain is most certainly too serious to make jokes about, but Lord Melchett, knowing the deep feelings the British have for all forms of animal life, still suggests this course of action:

– I think if anyone in Sweden or Germany can come up with a lovable animal which is being killed by acid rain, it will help a great deal. We know from opinion surveys that dolphins are the one species with the most supporters. So if you could come up with some dolphins that get poisoned by acid rain and comit suicide for the cause of the environment, you will probably be successful in creating the needed public pre-assure...

Dolpins or not, let's hope Lord Melchett and others in the United kingdom, will succed in the huge task they have ahead.

Bo Landin



What about dolphins?

Successful meeting in London

A first step towards an intensive campaign on acid rain was taken by **SERA** (Socialist Environment and Resources Association - Public Health Group) on the 13th of July. At a well attended meeting in the House of Commons' Grand Committé Room they launched a broad political campaign on the issue. The meeting was chaired by Dr David Clark, MP (Labour) and saw speakers from the United Kingdom and Scandinavia.

It was noted by several speakers that the discussion took place the same night as the House of Commons discussed and voted on the "hanging issue", that is the death penalty for criminals. That proposition was overwhelmingly voted down. Let's hope the British government and its elected members of parliament have the same understanding and courage to say no to the continuous killing of wildlife in Britain and abroad, as a result of acid rain.

Invisible export

Gerald Kaufmann, MP and the opposition spokesman on the environment, pledged the backing of the Labour Party for the call for action on the issue of acidification. It is not easy to talk to the government about this he said, but by using the only language this government understand, he said that Britain today has a trade deficit, the country has an invisible export. In this case the large export is very negative for the country, perhaps not only economically but especially for the country's reputation abroad.

Of course, Gerald Kaufman said, it is easier to sit in the government and take the decisions, but as an opposition we can start campaigns and educate the people. In the end we will win the fight against acid rain as well, he said.

- Removal of pollution is more important than energy costs or energy efficiency, Gerald Kaufman said with address to the government and the Central Electricity Generating Board.

European fight

A very important work on the acidification issue is done in the European Parliament. Ken Collins from the Labour Party is a member of the European Parliament, and is also the chairman of its Environmental Committee. He addressed the meeting assuring that environmental matters will be a major plank in labour politics in the future.

Telegram sent from the Swedish Prime Minister, Olof Palme, to the SERA meeting in London, July 13.

ACIDIFICATION CAN ASSUREDLY APPEAR FRIGHTENING, ELUSIVE AND UNSTOPPABLE. ITS EFFECTS ARE BECOMING EVER MORE APPARENT AND WIDESPREAD. THE DIRE EFFECTS OF OUR THOUGHTLESSNESS ARE BEGINNING TO CATCH UP WITH US - ALL OF US, WHEREVER WE MAY BE. IT WAS MAN THAT STARTED THE COURSE OF EVENTS THAT ARE NOW DAMAGING HIS ENVIRONMENT AND IT IS IN MAN'S POWER TO TOLL THEM BACK AGAIN.

YOUR CONFERENCE IS AN IMPORTANT LINK IN THIS WORK.

OLOF PALME

- I have hopes that the acid rain issue will become the number one topic on the labour ballot for the Europarlament at the elections next year, he said. He also noted the need for better efficiency on these issues within the government. Today a dozen of directorates handle the questions. There is no overall view on these matters, something which has been noted by several speakers in the Houses during the last year as well.

The worst emitter

The United Kingdom is by far the worst emitter of sulphur dioxide in West Europe, professor Fred Last from the Institute of Terrestrial Ecology told the meeting. Westerly wind mostly carry this pollution to remote places, in for example Scandinavia, but every so often the pollution falls to earth in the United Kingdom, as a devastating acid rain. The heavy rains on the westerly highlands in England and Scotland bring enormous amounts of acidifying chemicals to the ground. Even if the acidity of the rain is not as low as in other parts of Europe, the total acid load due to high precipitation is as high as in the severely damaged areas of Scandinavia and Europe. Current measurements indicate that the annual mean pH of rain is lowest in south east Scotland at about pH 4.0-4.3. This is up to 50 times as acidic as "pure rain" which has fallen through an uncontaminated atmosphere.

Crop damage

Dr Peter Freer-Smith from the Lancaster University showed that sulphur dioxide and oxides of nitrogen in combination cause several damage to crops under laboratory

conditions. It is believed that the same damage is caused in the field, resulting in crop losses.

International support

Representatives from both the Swedish and the Norwegian embassies in London told about the present situation with acidified lakes and impoverished landscapes in Scandinavia. In Sweden almost 20.000 lakes are affected and in Norway many of the major salmon rivers in the south are depleted of fish stocks. The speakers reminded the audience that 75-85 per cent of all the acidifying pollution in Scandinavia comes from sources abroad, a large proportion from the British Isles. A telegram of support for the planned activities was also received from the Swedish Prime Minister, Olof Palme.

Damage in the U.K.

Bo Landin, a Swedish biologist and scientific writer explained some of the basic problems of acidification of lakes and soils, and he pointed especially at the secondary effects like aluminium pollution and the leaching of dangerous metals from the soil, once the acidification process has started. He also noted, after having travelled in the UK that the effects of acidification now clearly can be seen also in England and Scotland (see article in this issue of Acid News).

Campaign starting

Ann Weigall from SERA concluded the conference by reminding the audience that this was the beginning of a UK campaign on acidification.

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British action on acidification

Royal Society Symposium

Despite all the hyperbole, the recent three-day Royal Society symposium did little to convince the environmental lobby that the British government intend to do anything very serious about acid rain in the near future. Although the meeting had an impressive scattering of international researchers, most of the papers were simply repetitions of others given at previous conferences and there was a scarcity of the kind of balanced overview needed to give scientists and decision-makers a picture of either the international situation or the state of knowledge about the effects in the UK. Individual projects were described in detail with little attempt to pull them together into a cohesive whole. The Central Electricity Generating Board's attitude in attacking every paper piecemeal angered several of the foreign guests and gave the impression of a body trying to convince the world that there were no real problems rather than adopting a responsible scientific approach to the situation.

Recent acidification

Nonetheless, a few interesting facts did emerge about what is happening in Britain. Dr Richard Batterby of the University College of London pinpointed the use of diatoms buried in lake sediment as a way of indicating changes in acidity with time; different species being found in different acidities. Significantly, he found evidence of acidification in Scottish lochs, dating back to the

start of heavy industrialisation, well before the afforestation which is often blamed for falling pH. There had also been an apparent steep rise in rate of acidification over the last couple of decades, tying in well with evidence of fish loss from parts of Scotland and Wales. Some of the poster papers showed changing fish population and acidity in Welsh and Scottish rivers and the evidence of acidification in Britain is slowly building up into a more complete picture.

Dirty money

Even less likely to impress the cynics is the proposal for the CEB and National Coal Board to put £ 5 million into research on acid rain through the auspices of the Royal Society. The money is to be spent in Scandinavia, and much of the proposed work is regarded as repetitive of earlier research in Scandinavia by many of the experts. Spoken of openly as "dirty money" by at least one Swedish scientist, the cash is seen by many as a cheap way of buying five year's respite from having to take pollution prevention action. The project is certainly a further blow to those Scandinavians already smarting over what they regard as a condescending and negative attitude to their own work by some British researchers. Rumours that the research will not involve people who already have experience of acidification work are fanning flames of resentment and further reducing the respect for it on the mainland of Europe.

The development of the Royal Society project is certainly going to be

watched very keenly indeed. Royal Society members could do well to take care that the long-standing respect for the society does not suffer as a result of ill-timed involvement in a highly political issue.

British campaigning

On a slightly more optimistic note, the *Socialist Environment Resources Association* (SERA) hosted a meeting of several environmental groups on the last day of the symposium, to try and work out some overall strategy for British campaigning. A gratifying number of organisations are intending to become involved in some way, from sponsoring a national acidification survey by SERA to well-coordinated actions by *Greenpeace* throughout Europe drawing attention to acidification problems. *Friends of the Earth (Scotland)* took on the role of producing an inter-group newsletter, and of organising the next meeting of interested groups in late November. The *Acid Rain Information Group* have completed a pamphlet, which will shortly be distributed to many MP's, health authorities, local governments and interested organisations, to help raise public awareness in the UK.

British environmental problems have a long history of being brought into the open by a relatively few active people, prepared to dig away at the facts and bring them to the public attention. Hopefully acid rain will become an issue that can't be brushed under the table very much longer.

Nigel Dudley

Dirty money ?



Friends of the Earth (Scotland):

A determined campaign is running

Audrey Boyle of Friends of the Earth (Scotland) discusses the extent of the acidification threat facing Britain and outlines some of the campaigning measures being instituted in response.

The UK as a net exporter of Sulphur Dioxide discharges between five and six million tonnes of this particularly noxious pollutant every year. Over half of this is attributable to fossil-fuel power stations. But whilst contributing heavily to the severity of Scandinavian acidification we are fouling our own nest, so to speak, with 79% of this huge annual tonnage landing on the UK. So despite being the largest emitter of SO₂ this side of the German Democratic Republic we cannot ourselves hope to escape the harmful ecological effects. As Shakespeare pointed out in 'Macbeth'; *the even hand of Justice brings the cup to the poisoner's lips!*

Increased acidification

The results in the UK of this intense environmental assault are manifesting themselves in most of the upland areas where the rocks are of the hard non-weathering types and the topsoils thin. Amongst these areas can be counted the Lake District in north western England, parts of Wales and in south west and central west highland Scotland. In fact, wherever the spotlight is shone on susceptible regions, evidence of increased acidification is discovered.

So far in the UK perhaps the most common observation is the decrease in the number of salmonid species now inhabiting the increasingly acidic upland streams and lochs.

In addition, various water Authorities are investing in expensive programmes for the liming of drinking water. The problem may be especially acute in the Glasgow area where most of the older housing still

relies on lead piping to convey its water and the 'softness' of the water can increase the level of drinking water contamination.

Campaigning

What measures are environmental campaigning organisations taking to turn around the policies leading to still further acidification?

Friends of the Earth (Scotland) are running a determined campaign on both national and international levels.

Monitoring and lobbying

Nationally we are monitoring political developments with a view to introducing a Private Members Bill to Parliament and lobbying MPs to support the Early Day Motion introduced by Donald Stewart MP.

Education

Public awareness of the problem is considered to be one of our most important weapons and close contacts are being established with the media. A variety of educational and campaigning exhibits are being made available for schools and community groups.

Co-operation

The strength of the campaign lies in co-operation with other groups for interchange of information. The Acid Rain Information Group (ARIG) are keeping us informed on domestic research developments. Already we have established our credibility with several research bodies on whom we can rely for up to date information. FoE (Scotland) will continue to act as a mouthpiece for these often reticent Government-funded organisations.

International contacts

On the international level, we maintain close contacts with NGOs throughout Europe; attending meet-

ings and exchanging information. An important direct contact with decisions made in the European Parliament has been established via Ken Collins MEP, Chairman of the Committee on the Environment, Public Health and Consumer Protection. When the Parliament reconvenes and the rapporteur has collated the results of public hearings on acid rain held earlier in the year we can expect European political moves to achieve a renewed significance.

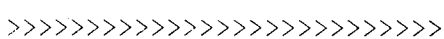
Conservation and cleaning

For Friends of the Earth, a major aspect of the campaign which should not be disregarded is to keep up the pressure for a solution to the acidification problem to be based on the introduction of policies involving increased fuel conservation. These would be in addition to the mandatory retro-fitting of fossil-fuelled plant. This last measure may well cost less than the £ 4 billion suggested by the CEEB; much of the newer but now uneconomic oil-fired plants are due for conversion to coal combustion and the opportunity should be taken to install flue gas desulphurisation equipment. Further, the modern 2000MW coal-fired plants had at the design stage land, and presumably finance, set aside to allow retro-fitting to be achieved.

No nukes

What FoE are anxious to avoid is strengthening the arguments for further expansion of the nuclear power programme. Travelling down this road would inevitably open a Pandora's box of environmental problems.

Audrey Boyle
Friends of the Earth (Scotland)
53 George IV Bridge
Edinburgh EH1 1EJ
Scotland



"Another silent spring"



This is the title of a Swedish film that recently won a prize at the big international film festival in Rotterdam, the Netherlands. Earlier this year it also won a film festival in Czechoslovakia.

The film deals with the acid rain problems from an international point

of view. It shows the causes to, and the effects of acid rain. Possible measures to stop acid rain, and the international policies in this matter is also shown.

As the film won in Rotterdam, it will be translated to all EC languages, that is it will be available in English, German, French, Danish,

Dutch, Italian, Greek and in Swedish. In a few months the film will be made possible to buy and/or borrow from the Swedish NGO Secretariat on Acid Rain. If you or your organisation would like to do so, please write soon to the Secretariat, so to make it possible for us to estimate the demand.

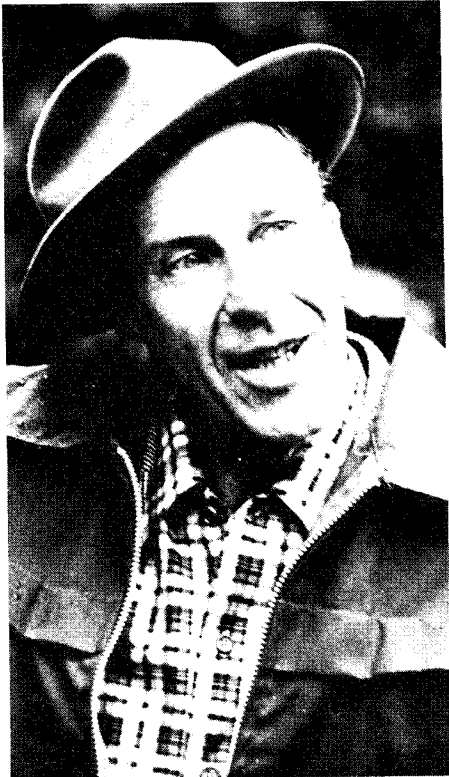
The Stop Acid Rain Campaign/Norway recently arranged an Acid Tour for British journalists

"If Great Britain doesn't clean up its releases of acid discharges, and if acid rain continues - our forests will eventually die. If that happens, Tovdal will have to be abandoned..." This was the lament that 20 British journalists listened to from Tormod Eskedal, a farmer from the Tovdal Valley in Southern Norway. In the past decades, he has seen the fish disappear from rivers and lakes due to acid rain originating from Great Britain.

Mr Eskedal was one of many Norwegians to testify on the curse of acid rain on a trip arranged for British journalists in the southernmost part of Norway, September 12-14.

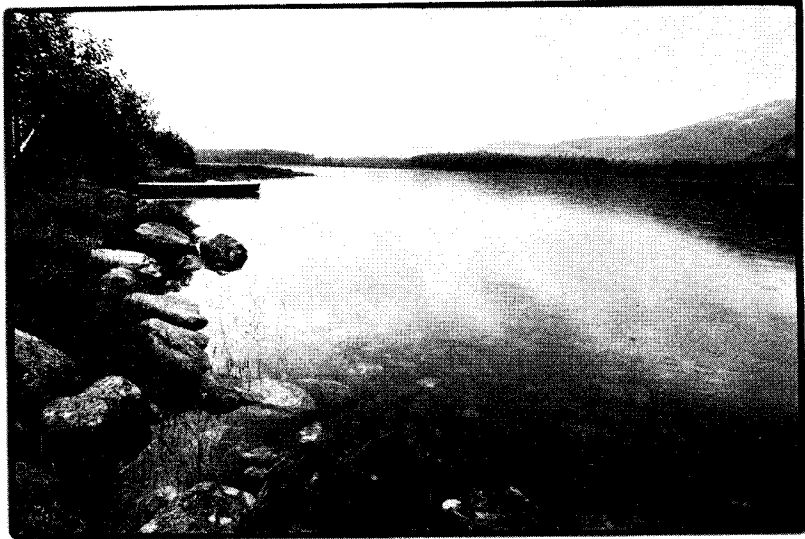
Forest threatened

"We are very worried about our forests. And of course, the soil is also



Mr Tormod Eskedal Photo: Christer Ågren

being damaged by the acid rain. One sign of this is that we have been forced to double our use of lime in agriculture during the last few years. And harvests are steadily decreasing in spite of this," said Eskedal. This worry was also shared by Michael Hauhs from the Institute for Soil Science and Forest Nutrition in Göttingen, West Germany. Mr. Hauhs has been working for a long time with the problems of tree death in West Ger-



The river Tovdal in Tovdal Valley, in Southern Norway.

Photo: Christer Ågren

many. After having briefly studied the situation in Norway, there was no doubt in his mind that the forests of Scandinavia are threatened by acidification.

Fish die

The British journalists, who represented large and influential newspapers and magazines, were also briefed on the entire history of acid rain in Tovdal. Are Tveit, who runs a fish farm in the valley, told them how the fish started dying back in the 1960's. Tveit now uses groundwater from a depth of 70 metres, to which he also adds lime, to enable his fish to survive. He was forced to give up raising Norwegian trout years ago - only Canadian brook trout survive in the acidified water. Measurements of the pH in the creek from which Tveit used to take his water now show a pH of 4.3.

Once upon a time, avid British anglers used to come to Norway to fish the Tovdal River. In the old days, especially in the 20s and 30s, Boen Manor often had guests from England who came to fish for salmon. Now there isn't a salmon left in the river. And British anglers are no longer seen at Boen Manor.

Expensive liming

Treating rivers and lakes with lime is not common in Norway. The reasons for this may include the special geography of southern Norway. Very few lakes are accessible by car or other vehicles. In addition, most lakes and rivers have a very high rate of water flow through them. In other words, lime would have to be added con-

tinuously, which means that a more widespread use of this "medicine" in Norway would not be economically and practically feasible. Moreover, there is a widespread agreement in Norway that using lime against acidification is about as effective as using aspirin against cancer. The members of the group visited the Våråna River, where a trial liming project has been in progress for several years.

Industry

To the great surprise of the journalists, representatives of Norwegian industry were strongly opposed to their British colleagues in the question of acid rain. "A step-by-step approach to reduce emissions is the only politically and economically feasible solution, and it is encouraging that the ECE Convention on Long-Range Transboundary Air Pollution not only has been ratified by many important countries, but that within this framework, decisions are being agreed on."

This statement comes from Øyestein Dahle, Director of Corporate Affairs, Esso Norway Inc. Esso Norway is itself in the process of sharply reducing its emissions at Norway's largest oil refinery, from 1100 kg of SO₂ per hour in 1976 to 170 kg of SO₂/hour, which is the goal for 1985.

Mr Dahle also referred to cost-benefit studies from the OECD and Norwegian scientists. These studies come to the conclusion that the benefits of reducing sulphur emissions will exceed the costs of achieving this reduction with good margin.



Mr Are Tveit, a fish farmer in Tovdal Valley, who in the late 70's lost all his annual production of brown trout, because of acidification of the water. He is now instead rearing canadian brook trout.

Photo: Christer Ågren



Michael Hauhs showing the journalists damages on spruce.

Photo: Christer Ågren

Press conference

A press conference was also held for the journalists and the question that occupied most of the time was naturally what people in Norway thought about the fact that that the CEEB and the NCB in Great Britain are going to conduct a research project in Scandinavia costing £ 5 million over the coming five-year period

"We have not reached any official position yet on this question. What is clear is that we already know enough to take concrete actions to reduce sulphur emission. These actions do not mean that no further research should be conducted. On the contrary, new research may give arguments for further actions," said Mr John Dale, State Secretary at the Norwegian Ministry of Environment.

Mr Erik Lykke, Director General of the Norwegian Ministry of Environment, answered in this way: *"The reason why this research project has been launched is not too difficult to understand; by focusing attention on major uncertainties one can avoid focusing on certainties."*

And Dr Lars Overrein, Director of the Norwegian Institute for Water Research, said that he was worried about rumours saying that the British would not collaborate with established and experienced Norwegian scientists: *"No serious research could be carried out in Norway without involving the scientists that have been working with these issues for more than a decade,"* Dr Overrein said.

Still, both the Norwegian researchers and the representatives of government authorities wanted to "wait and see" for some more time. A Swedish scientist was, however, somewhat less diplomatic in expressing his feelings: *"The CEEB and the NCB are just buying time. This is dirty money..."*

Increasing interest

The conclusions of the trip, in which representatives of several British conservation organisations also participated, is that both the mass media and the general public in Great Britain are showing an increasing interest in the acid rain issue. The Stop Acid Rain Campaign/Norway is quite pleased with the great interest displayed in the trip, and they will continue to concentrate their main efforts on Great Britain.

Trygve Aas Olsen.

ECE "Acid Rain" Convention

Forty-three months after the signing of the ECE Convention of 1979 on Long Range Transboundary Air Pollution, the *Convention's Executive Body* had its first meeting, June 7-10, 1983, in Geneva.

Slow move

Although the Convention's signatories resolved in 1979 to implement the Convention **prior** to its ratification by at least 24 of the 35 signatories (which brought the Convention into force March 16, 1983) the Convention's implementation seems to have been slowed considerably by the ratification process. For one thing, the ECE Senior Advisors on Environmental Problems, which was responsible for the Convention's interim implementation, contained representatives of states which had not ratified the Convention. Also, several of the Senior Advisors were inclined to move slowly even into "safe" areas as research into effects, exchange of information on technology, and solicitation of energy data and SO₂ emissions data from member states.

The June -83 meeting began with a consensus that the new Executive Body should report directly to the Executive Secretary of the ECE rather than to the Senior Advisors, and that the Executive Secretary, K.A. Sahlgren of Finland, should be expected to provide staff for the Executive Body.

Scandinavian proposal on SO₂

Sweden, Norway and Finland, aware that the Convention is critical weak in lacking specific abatement targets, proposed that each memberstate reduce its SO₂ emissions by 30% (see *Acid News*, June 1983). The three Nordic countries were supported by five other states - Canada, Denmark, Austria, Switzerland and the Federal Republic of Germany. Some other states, including the U.S.A., expressed general approval of the proposal, but did not support a specific numerical target. No action was taken on the Nordic proposal.

Nitrogen oxides

Switzerland, Austria and the FRG jointly proposed that member states reduce emissions of nitrogen oxides, the precursors of the nitric acid in acid rain. This proposal was supported by the Nordic countries and Canada, and several other delegations expressed general approval of its goal.

No action was then on this proposal either.

No reduction goals

In sum, the Executive Body was willing to make general statements and to support research, monitoring, and inventories, including the collection of data from member states on national strategies and policies for reducing sulfur pollution, especially transboundary sulfur pollution. The ECE member-states seem no more willing now than they were in 1979 to set specific reduction goals, even though the attitudes of several states - most notably the F.R.G. - has shifted to a strong pro-reduction stand.

Eastern Europe

Not much is likely to happen in the term to give teeth to the Convention. The Executive Body will not meet again until September, 1984. Meanwhile, the Eastern European Countries are beginning to recognize that acid rain is destroying their forests, buildings and monuments. Poland recently established a new office for environmental protection. But the economics of Eastern Europe are weak, their energy needs are great, their most abundant fuel - soft brown coal - has a high sulfur content, and their industrial production has always had a much higher priority than pollution control.

The U.K. awakening?

The Federal Republic of Germany is already leading its fellow states in the European Economic Community toward stronger SO_x and NO_x control measures. There are even indications that the United Kingdom - never in the vanguard on this issue - may be awakening to the damages to its own lakes and rivers in Wales and Scotland from acid rain.

More victims needed?

Nations take concerted international action only if and when it is in their national interest to do so. Fortunately for the proponents of acid rain abatement, more and more countries are becoming victims of acid rain. At some point, even the Eastern European States and the U.K. will become aware that the cost of acid rain damage far exceed the costs of control. If the Executive Body of the ECE Convention hastens that awareness through data exchange, cost-benefit studies or whatever, it may begin to fulfill at least the more modest hopes of its sponsors.

Armin Rosencranz

Acid Rain

Resources

Directory

This is a booklet produced by the **Acid Rain Foundation, Inc.** (USA). It contains a great number of different information material on acid rain, such as sections on Legislation, Conferences, Basic set of references, Current books, Curriculum, Audio-visual materials, Bibliographies, Ideas for action and Miscellaneous. Of course it is mainly directed for use in USA and Canada, but there is also very much of international interest. The cost is \$6, which should be payed in US dollars in advance, and it can be ordered from:

The Acid Rain Foundation, Inc.
1630 Blackhawk Hills
St. Paul, MN 55122, USA



Map over forest-damages in the FRG

The map is in the size 60 x 90 cm, and it shows the areas in the FRG where damages on forests have been shown, and it also points out where the power plants are located. It costs 2.50 DM, and can be ordered from:

BBU-Geschäftstelle
Friedrich-Ebert-Allee 120
D-5300 Bonn, FRG

Update on the USA

California

News media in California have given much attention in recent months to the "acid fog" phenomenon. Pristine areas of California bordering to the Pacific Ocean have been thought to be invulnerable to acid precipitation, because most winds blow from west to east, and these areas are bordered on the west by thousands of miles of open sea. Researchers from the California Institute of Technology have found, however, that fog in coastal areas more than 50 miles away from the Los Angeles and San Francisco air basins have pH levels of 3.5. They speculate that the fog rolls in over Los Angeles and San Francisco from the ocean in the morning, cleanses the air of acid-forming pollutants during the day, and rolls back out to the sea in the evening. During the night, winds carry the acidic fog up or down the coast. The next morning, the fog rolls in again, this time enveloping pristine coastal areas which often contain conifer forests and freshwater lakes situated on slow weathering granite bedrock.

California legislators, already alarmed by acid rain, decided recently to spend \$ 18 million over the next five years for acid precipitation re-

search and monitoring.

E. P.A. turn

Meanwhile the new E.P.A. chief, William Ruckelshaus, has completed his overhaul of the Environmental Protection Agency. He has replaced his predecessor's people, who were mostly pro-business Washington "outsiders", with progressive and pragmatic senior officials with broad government experience. These appointments have earned the approval of environmentalists and have bolstered Agency morale.

Immediate action

President Reagan, who had earlier espoused the position of the power industry that more research is needed to justify costly acid rain abatement action, seems finally to have shifted his position. His own hand-picked White House task force on acid rain endorsed most of the findings of the June, 1983 report of the National Academy of Sciences (see Acid News June, 1983) and called for immediate action to halt the increase in acid deposition.

Forest damages

President Reagan comes up for reelection next year, and is well aware

of the numerous showing that Americans are overwhelmingly in favour of clean air and are willing to pay for pollution control. Moreover, the new worry over possible acid rain damages to forests has driven a wedge in the business community's resistance to acid rain abatement. Abatement may hurt the power industry but help the timber industry. Interestingly, E.P.A. administrator Ruckelshaus' last job was as vicepresident of the Weyerhaeuser Company, one of America's largest timber and forest product companies. Reagan and Ruckelshaus have both made public statements stressing the importance of the acid rain problem and the need for abatement action.

Action = research?

In the wake of these developments and changing attitudes, there has even been some movement in the long-stalled bilateral negotiations between the U.S. and Canada. On August 23, 1983, the U.S. and Canada agreed to conduct a joint project to trace the pollutants that causes acid rain. The project is efforted to show whether and how pollutants are carried over distance by wind currents.

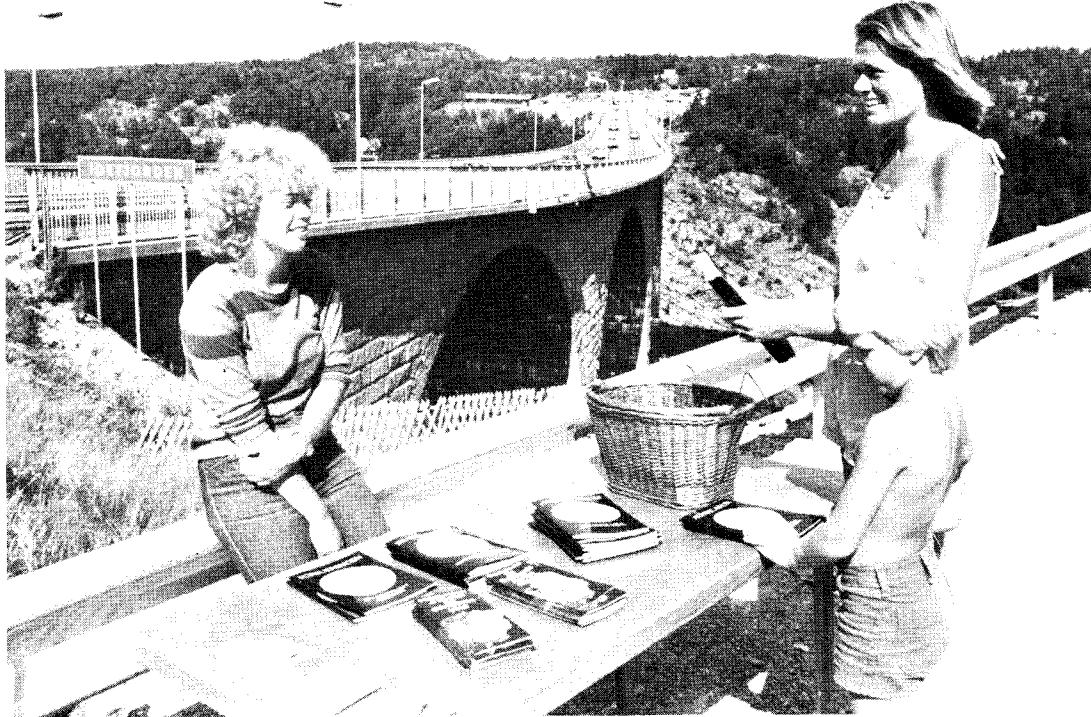
Armin Rosencrantz

The Statue of Liberty is crumbling away

The Statue of Liberty, which stands at the entrance to New York harbour, is now so heavily corroded with rust, both inside and outside, that an emergency rescue operation has had to be undertaken. During the next two years, restoration work for approximately \$30 million will be carried out. This is approximately six times as much as the entire statue cost to erect in 1886. The statue is made of an iron frame covered with copper. The main reason for the sudden corrosion is the corrosive acids that are formed from the air pollutants, sulphur and nitrogen oxides.



Tourist information campaign



The information stand at Svinesund. In the background the border bridge. Photo: Lennart Gustavsson/Strömstads Tidning

If you want to meet as many european tourists as possible, no place could be better than Svinesund, the border bridge between Sweden and Norway on the Swedish west coast. People coming from the continent to Malmö or Gothenburg, having done the obligatory tour of the Swedish west coast, stop at Svinesund to have an ice cream or a cup of coffee while admiring the view over the first norwegian fjord before they proceed to visit the wilderness of the clean and beautiful mountains of Norway...

Nature lovers

So here we have a mass of uninformed, motivated, nature-loving europeans just waiting to learn about the damage that their industries are doing to this same cleanlooking countryside!

Caravan, material- and people

That's what we hoped, anyway, the environmental group in Strömstad, when we decided to carry out an acid-rain campaign during a few weeks of the most intense tourist season. One of us owned a caravan, which we placed outside the

customs house - with permission - another ordered a car-load of information material to be stuffed in the caravan (The National Swedish Environment Protection Board provided us with posters, post cards, leaflets, books, buttons in swedish, english and german), and a third person tried to mobilize the group.

This proved to be the most difficult part: to get hold of enough people who, in the middle of our short summer were willing to sacrifice a few days of their vacation for the noise and traffic of Svinesund. Even more: they had to be qualified for their task as well, being equipped with both knowledge of the acid rain problem and the ability to explain it in three or four languages... Luckily we had been granted a sum of money for our expenses, and this we spent on paying a modest salary to two reliable and language-talented 17-year-old boys, who took care of the campaign during the last two weeks when the personal resources of the environmental group itself were emptied.

And the result?

Very reassuring. We were met with a

very positive interest, both by those who knew nothing at all (i.e. the majority) and those who had heard of acid rain. People listened, asked questions, read the leaflets and asked for more information. Especially the tourists in the bus-loads that were emptied at the customs - they seemed to believe that this was another part of the travelling programme.

Politicians contra people

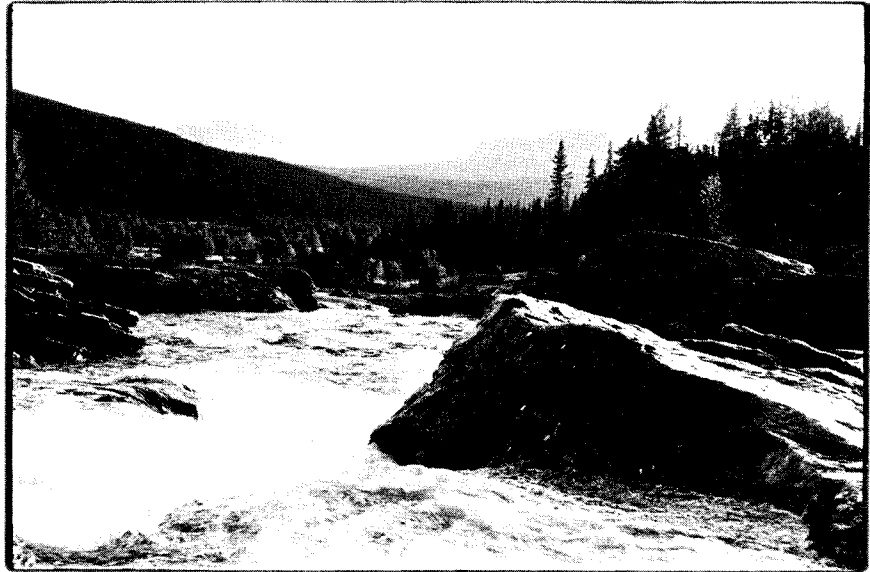
We met with germans who had heard of dead forests, with british people who had seen an apparently quite provocative program on television about British export of acid rain, we met with swedes and norwegians who were very well informed, but most of all we met with people who knew nothing at all about acid rain, who were just those uninformed, nature-loving europeans that we had pictured when we started the campaign! And NOBODY said "no, I don't want to hear about it, this is not our problem". That was the most surprising thing of it all! Apparently that is the attitude of the politicians, not the people...

Cecilia Simonsson

The fish kills have now reached the Swedish mountains!

Fish kills as a result of acidification have now reached the Swedish mountains. In Lofsdalen Valley in Härjedalen, the fish population of the crystal-clear mountain streams has declined by 90%. During the heavy spring and autumn flows, the streams exhibit very low pH values. Iron and manganese are then dissolved in the highly acidic water, and when the pH later rises, the metals are precipitated in the water and onto the gills of the fish. Over a period of four years, from 1977 to 1981, the fish populations in the streams feeding Lofssjön Lake decreased by 90%. Last year, cages with fish were placed out in the water courses as an experiment. In one of the streams, the fish died the same day it was put out.

"The reason for the acidification is the long-range transport of air pollution, both from Sweden and from overseas. Virgin areas in the mountain wilderness have now also begun to be affected," says William Dickson at the National Swedish Environment Protection Board.



Acidification of streams and rivers in the Swedish mountain region, has during the latest years become a growing problem, causing severe fish kills. Photo: Christer Ågren

"This no isolated case," he continues. "There are similar signs in Värmland and northern Jämtland counties."

The National Swedish Environment Protection Board, together with

the National Swedish Board of Fisheries, has now initiated a large study of Sweden's waterways. The state of 3000-4000 water courses will be documented over the next few years.

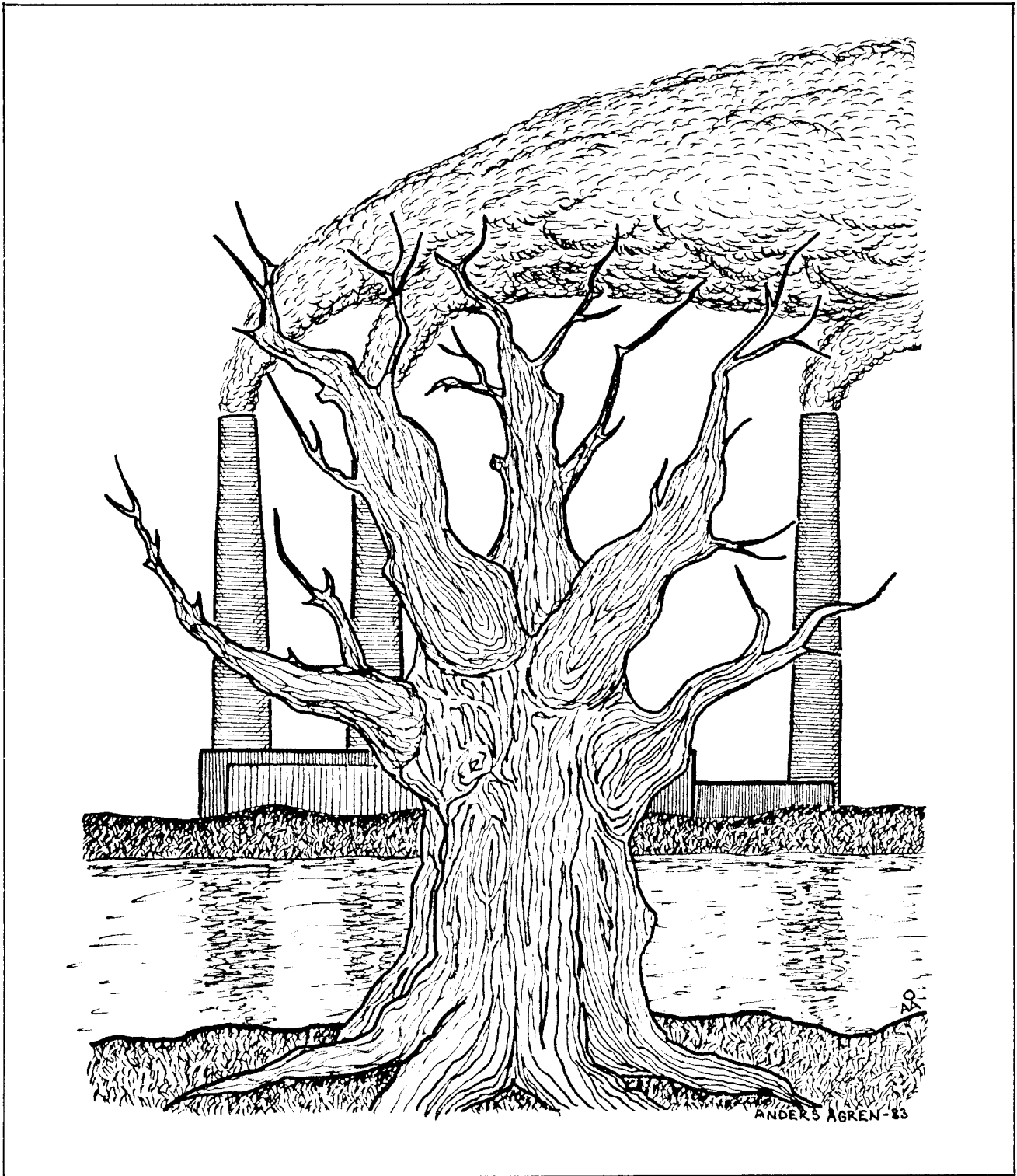
Christer Ågren.

Noah's Ark poster

The poster is produced by The Swedish NGO Secretariat on Acid Rain, and it is available with text in English, German or Dutch (and also in Swedish and Norwegian). It is printed in four-colour, and the size is approximately 43 x 60 cm.

The poster can be ordered from the Secretariat, free of charge for non governmental environmental organisations.





How to recognize trees damaged by air pollution

Allgemeine Forst Zeitschrift have produced a new magazine with colour photos and a text describing how you can recognize trees damaged by air pollutants. It deals with

spruce, silver fir, scots pine, beech and red beech. The magazine is called: **"ZUM ERKENNEN VON IMMISIONSSCHÄDEN AN WALD-BÄUMEN 1983"**

16 pages, size A4, cost: 6.50 DM
It can be ordered from:
BLV-Verlagsgesellschaft mbH
Lothstrasse 29
D-8000 München 40, FRG