No.5, December 1984

# Acid News

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

*Lysa hora, Ostravice, Czechoslovakia* *Photo: Hans Östbom*

# *International Acid Rain Week*

# *April 15-21 1985*

The Stop Acid Rain Campaign/Norway
c/o The Norwegian Society for Conservation of Nature
Box 8268, Hammersborg N- OSLO 1 NORWAY
Phone: + 47 - 2 - 42 95 00

The Swedish NGO Secretariat on Acid Rain
c/o The Swedish Society for the Conservation of Nature
Box 6400 S- 113 82 STOCKHOLM SWEDEN
Phone : +46- 8- 15 15 50

# Acid News

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

ACID NEWS is a newsletter produced jointlv 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 at 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 write or send us a copy of it.

**Address:**
The Swedish NGO Secretariat on Acid Rain
c/o The Swedish Society for the Conservation of Nature (SNF)
Box 6400
S-113 82 STOCKHOLM SWEDEN

**Telephone:** 08-15 15 50

**Editor:** Christer Ågren
**Published by:** The Swedish Society for the Conservation of Nature
Printed by: Williamssons Offset, Solna

## 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)

**Address:**
The Stop Acid Rain Campaign/Norway
P.O. Box 8268, Hammersborg
N-OSLO 1 NORWAY

**Telephone:** 02-42 95 00

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

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

STOP ACID RAIN

ISSN 0281-5087


# Action increasingly

Research in Scandinavia has shown that lakes that are sensitive to acidification can manage a maximum sulphur deposition of approximately three to five kilograms per hectare a year.

Today the deposition over southwestern Sweden, where more than eighty per cent of the lakes are acidified, amount to twentyfive to thirty kilos per hectare a year. If the lakes in this region are to recover, a reduction of the sulphur depositions by 80-90 per cent will be required. This assumes however that there will be no increase in the deposition of nitrogen pollutants — which on the contrary should preferably decrease.

We cannot as yet give any corresponding figures showing requirements for the survival of the forests. The damage here is in all probability due to a combination of a number of pollutants — sulphur dioxide, nitrogen oxides, hydrocarbons, heavy metals, and photo-oxidants. I am however convinced that a marked reduction of these would pay off in the form of healthier forests.

## Reductions can be made

Let me also give examples showing that emissions really can be reduced — quickly and radically.

Between 1970 and 1978 Japan reduced its sulphur emissions by a good 70 per cent. That country now has the world's strictest emission standards for sulphur dioxide as well as several of the other pollutants mentioned.

I can cite, too, the example of my own country, Sweden, where between 1970 and 1983 we too managed to reduce sulphur emissions by about 70 per cent, and are in progress of reducing them still further.

## Slow moves

In the sphere of the ECE Convention (which comprises 34 nations) it has still not been possible, despite attempts over several years, to gain agreement even on a relatively modest proposal to reduce emissions of sulphur by 30 per cent between 1980, the base year, and 1993. Of the other pollutants, nitrogen oxides have only just begun to be discussed, and hydrocarbons and heavy metals are not even in the picture.

## Aim higher - act faster

We must both aim higher, and act more quickly.

No matter what country we are talking about, the local environment is affected both by what the inhabitants do, and by what others do. Some of us are however more affected by outside actions — or lack of them — than others are. About 90 per cent of the sulphur depositions →


*Photo: Christer Ågren*

# urgent

→ in Norway, for instance, come from external sources, and one country, England, is alone responsible for a greater part of these depositions than the Norwegians themselves.

### Act together

We have collectively given rise to these problems that are now causing such dismay, and we must therefore combine to solve them.

Provided we *act* together, we can do it. And certainly in the environment protection organizations we are going to be active.

### Repeating it

Last year we had very good results from the International Acid Rain Week, with a fine showing of activities by many organizations in many different countries. We also got good coverage in the media — TV, radio and the press. So we shall be following up with another such week in 1985 (April 15-21), in which a number of international and national organizations, including IYF and FoE International, have already declared their intention of participating actively.

As in 1984 there will be no detailed central planning. It will thus be up to the various organizations and their local groups to determine how much effort they feel they can put in.

### Incitement

In order to incite to action, the Swedish NGO Secretariat on Acid Rain will be gathering ideas as to what might be done, and presenting them in Acid News in good time before the event.

Send in your proposals to Acid News, so that we can spread them around.

In the hope that 1985 will be a less acid year.

Christer Ågren

# Conference sets plans for widespread actions

INT. AKTIONSKONFERENZ gegen
**Waldsterben und Luftverschmutzung**

September 28-30 some 400 delegates from environmental organizations in eleven West European countries assembled in the villages of Egg and Andelsbruch, near Bregenz in the Austrian Alps, for a weekend conference on forest death.

The outcome was an agreement to carry out several simultaneous actions throughout Europe. Much of the time was devoted to discussions within various working groups, which proved constructive, and it was as a result of these discussions as well as those at the plenum meeting that this idea of internationally coordinated action emerged.

The actions agreed upon were the following:

— On energy conservation, early in the New Year. To show the great waste of energy taking place today, as a result for instance of poorly insulated buildings and energy-demanding packaging, and also to point to the possibilities of achieving lower and more efficient energy consumption.

— In International Acid Rain Week, April 15-21, 1985. Coordinated protests against the pollution of the air. As a corollary: peace between peoples and between man and nature. Actions to be carried out simultaneously at as many places as possible all over Europe — for instance in the form of exposés of forest damage in the vicinity of urban areas, primarily for the benefit of the local inhabitants, and of information regarding the extent of forest damage throughout Europe and its causes. The worst polluters in each locality can also be pointed out, and demands put forward for remedial measures in the form of better emissions control, fuel saving and improved transportation systems both for passengers and freight.

— World Environment Day, June 5, 1985. It is proposed to stage actions at the frontiers in order to emphasize the international spread of pollution, with invitations to politicians to come and state exactly *what* they are doing for the improvement of the environment.

— An international conference for action on Forest Death is to be held near Strasbourg on June 7-8, 1985. Individuals and organizations are requested to send in suggestions as to how a long-term international strategy should be organized in order to combat pollution and forest death.

For the time being the two following organizations that arranged the conference at Egg and Andelsbuch are acting as coordinators:

Aktionseinheit gegen Waldsterben, Postfach 570, D-7290 Freudenstadt, F.R.G.

Aktionsgemeinschaft Stop dem Waldsterben, Klosterfeldstrasse 16, A-6921 Kennelbach, Austria.

In order to help spread promising proposals rapidly, a list will be published in a coming number of Acid News. We therefore ask readers to send in as many ideas as possible for all types of action to the Swedish NGO Secretariat on Acid Rain without delay. From the replies we get we intend to make up a list for presentation in good time before Acid Rain Week. Our proposal is that the organizations in each country should translate the suggestions (=or as many as they wish) into their own language for distribution to local groups.

Let your imagination rip — let the united environment organizations give the polluters something to think about!

Marie Arehag

# Acid Rain Inquiry Votes for Action

September 27 to 29 saw an unprecedented event in the U.K. — an independent and balanced inquiry into acid rain, organized over three days by a reputable environmental body, calling on evidence from scientists of several different countries.

The Acid Rain Inquiry was held in Edinburgh by the Scottish Wildlife Trust at the George Square Lecture Theatre. The format was arranged to give an overall view of acidic air pollution, and then to consider presentations from different locations, relating to lake death, forestry damage, the spread of acidification, and technologies for combatting it. Advocates for and against desulphurization were invited to speak, and the proceedings were monitored by a chairman and panel of assessors to ensure a balanced presentation. The public were invited to all the sessions, and encouraged to ask questions wherever there were areas of uncertainty. At the end of the conference, individual organizations were asked to make a contribution, and then a motion, agreed by the panel of assessors, was put to the conference for approval.

Below is a summary of some of the points made by certain of the scientific witnesses:

## History of acid rain

Dr Peter Brimblecombe, of the University of East Anglia, demonstrated that acidic air pollution has been recorded in local amounts since Roman times. The problem began in the U.K. in the thirteenth century, when, for economic reasons, coal was introduced into London to replace wood as an industrial fuel. Londoners' reaction was vehement, as the fumes produced by coal-burning were powerful and unpleasant — so the first reaction to fossil-based pollution occurred at least six hundred years ago.

Dr Rick Battarbee, of University College London, has been looking at the sediment of various lakes in Scotland in order to find out when they began to acidify, and has found that in at least one case, the damage began in the middle of the nineteenth century. Analysis of the diatoms in Loch Enoch, Galloway, shows that there has been a progressive increase in the acidity of the water since around 1850, with a measurable increase in the last thirty years. This would seem to suggest that certain lakes have been acidifying since the onset of the Industrial Revolution.

## U.K. trees affected too

The U.K. Forestry Commission was at the conference, and stated that tree damage was occurring in South and West Scotland, and in northwest England. The damage was described by Dr Bill Binns of the Forestry Commission as *"new and quite widespread on a number of species"*. Dr Binns and a colleague disclosed for the first time that the damage was detected in March 1984, and was dated back to last winter. Norway and Sitka spruce have shown shoot and needle death, and 'foliage browning' has been recorded on Grand Fir, Lodgepole Pine, Scots Pine and Douglas Fir. Height increments have been reduced in Cumbrian trees for the last 15 years or so.

This was a major change of direction for the Forestry Commission, who as recently as summer 1984 were saying that no 'new' damage to U.K. trees had been noticed. The Commission claims that the damage is probably *"primarily climatic"* — a statement vigorously contested by Friends of the Earth — *"but it is exceedingly difficult to prove one way or the other"*.

## CEGB muddies the water

It was a tribute to the conference organizers' skill that the Central Electicity Generating Board was represented at the conference, and made a presentation. The normally ebullient CEGB has been exceedingly shy of late, ever since the House of Commons Environment Committee lambasted them over their 'trite and evasive' attitude towards acid rain, and has refused four times to appear on TV to argue their point of view, preferring to conduct their public relations through written press statements, brochures, and a video about acid rain (to be released shortly).

On this occasion, however, the CEGB was prepared to testify in the person of Mr Ron Scriven. He rested his case on the unproven nature of the acidification process, and the familiar CEGB line that the important thing about acid deposition is not the total amount of emissions pumped into the atmosphere, but the rate of oxidation of $SO_2$ and $NO_x$. The quantity of oxidants being limited, he argued, there would be no measurable advantage on the ground of cutting emissions to the air, as the same amount of pollutants would be oxidized anyway. The solution he recommended is to cut the supply of oxidants. This is an unproven but popular theory among advocates of non-desulphurization: *"There is no point"*, said Mr Scriven, *"in cutting our emissions of $SO_2$ in the U.K. unless this ensures a corresponding cut in acid deposition."*

The next speaker, however, provided evidence that a cut in →

$SO_2$ emissions **did** result in a reduction in acid deposition. Dr David Fowler of the Institute of Terrestrial Ecology stated that emissions of $SO_2$ in the U.K. had fallen by 25 per cent since 1978, and that this was parallelled by a 50 per cent reduction in the amount of acid deposited in northern Britain: testimony which was very damaging to the CEGB's case, and which they unsuccessfully tried to refute. One of the cornerstones of the CEGB's argument is beginning to crumble...

## Evidence from abroad

Experts from Canada, Germany, and Norway stated the case for the environment in their countries. Dr Tom Brydges of the Ontario Ministry of the Environment talked about the acid rain problem in Canada. Surveys of a number of lakes had established that surface water acidification effects had been observed only in the study areas which received more than 20 kg of sulphate per hectare per year. Some sensitive waters may be affected at deposition below 20 kg/ha per year, but these are a fairly small percentage of the total resources.

The figures were interesting to the European environmentalists present, as they indicated a target value to be aimed at: deposition through much of Britain, for example, is much higher than this. Dr Brydges also confronted the issue of whether the case against acid rain was well enough established. *"The issue"*, he said, *"is now resolved beyond any question."*

This sentiment was echoed by Professor Schütt of Munich University, who talked about the *Waldsterben* (= forest decline) in West Germany. Visible symtoms of *Waldsterben* started at the same time over large parts of Europe (1979-80). Within four years it had affected almost every species of native tree in central Europe; it occurs with similar intensity on poor and rich, alkali and acid, thick and thin soils at all altitudes; it was still increasing in its effects through 1984; and some of the typical symtoms of the syndrome have never been described before, especially in beech, larch, and spruce.

Professor Schütt described all the possible causes of *Waldsterben* that have been isolated so far, and concluded that the most likely primary causes were a combination of air pollutants, such as ozone and wet and dry acid deposition: *"Acid rain* **is** *responsible for Waldsterben. If we do not succeed in stopping acid rain in a very short period of time.. we are convinced that our forest ecosystems will break down within the next ten or twenty years. We have to stop acid rain, and as fast as we can."* Was ozone alone responsible? *"To stop the destruction of our forest ecosystems, we will have to reduce emissions of nitrogen oxides... but I can see no scenario for saving our forests that does not include a reduction of emissions of sulphur dioxide."*

## The conference resolution

Several other scientists spoke at the conference, but reasons of space do not allow a summary of all their evidence. At the end of the three days, the panel of assessors drew up a resolution which was presented for discussion and vote. The panel consisted of Professor Aubrey Manning, of the University of Edinburgh; Professor Fred Last, Institute of Terrestrial Ecology; Mr Gerald Jolly, retired General Works Manager, Unilever Ltd; and Mr Paul Ekins, of the Ecology Party Council. The resolution was:

Recognizing that atmospheric pollution are matters of international concern and that some are widely dispersed through the atmosphere from one country to another, *and* having noted 1) the changes already recorded in freshwaters in parts of Britain, and 2) the deleterious events in a) Scandinavia, where acid rain — in the strict sense — is implicated in the acidification of freshwaters and the loss of fish, and b) continental Europe where the rapidly increasing area of forest decline is associated with gaseous pollutants — probably oxides of nitrogen and ozone —,

The Conference *recommends* that the government implements without delay, the emission abatement requirements of the European Community and the proposals of the House of Commons Select Committee, taking note of the many ways in which these requirements can be met.

*In doing so* attention must be given to 1) the inevitable secondary impacts of such a policy, and 2) the provision of adequate resources a) to prosecute further research and b) to ensure the rural environment is correctly monitored.

The resolution was passed almost unanimously by the 500 people present, with a handful of votes against. Perhaps the most dramatic incident of the conference occurred shortly before this, however, when one of the panel members put aside his impartiality and delivered a blistering attack on the CEGB. Mr Paul Ekins noted the comments about the CEGB delivered by the House of Commons Environment Committee, and concluded that their behaviour at the conference remained unchanged: *"Alas, the CEGB is still intent on acting against the public interest — the same shirking of responsibility, the same partial presentation of evidence and obfuscation of the issues, the same complacent lack of concern noted by the Select Committee are still in obvious evidence."* Mr Ekins concluded by saying that he would write to the Energy Minister to request the resignation of the chairman of the CEGB, Sir Walter Marshall, and to ask for far-reaching changes at high levels in the organization.

Steve Elsworth

# Twelve power stations must be cleaned up

Friends of the Earth calls upon the government to meet the terms of the EEC Draft Directive on acid rain and names the twelve coal/oil-fired power stations which the CEGB (Central Electricity Generating Board) must fit with pollution control equipment in order to comply.

These stations are: Drax A, Drax B, Ferrybridge C (2), Cottam, Eggborough, West Burton, Didcot, Ratcliffe, Grain, Ironbridge and Thorpe Marsh (see map).

## Must act now

Friends of the Earth Countryside Campaigner Chris Rose says: *"The government must commit itself to nothing less than full implementation of the EEC Directive — that's a 60-per-cent cut in sulphur dioxide and a 40-per-cent cut in nitrogen oxides — which can't be done with a few pilot schemes or by waiting for new technologies: we must act now."* Recent evidence shows severe acid rain problems are now afflicting Britain and worsening in Europe.

## Cleaning costs

FoE's list is based upn CEGB data used in calculations by Earth Resources Research Ltd., to be published by ERR in a report later this year. Assuming the relatively crude and costly Wellman Lord system of flue gas desulphurization, coupled with 5-per-cent electricity conservation in the CEGB's Scenario 'C' for growth in electricity consumption, the EEC targets could be met (by 1995) at a cost of GBP 1.432 billion — adding 3-4 per cent to electricity costs over ten years (i.e. 0.3-0.4 per cent increase per year of an average annual increase of over 4 per cent in recent years).

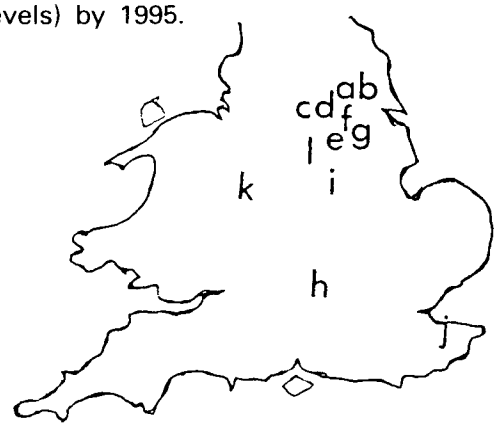
## Nuclear power no alternative

Stewart Boyle, FoE's Energy Campaigner, rejects the so-called "nuclear option", pointing out that: *"To meet the EEC Directive by building nuclear power stations to reduce sulphur emissions would cost GBP 17 billion — more than 12 times as much as pollution control on existing coal stations — even with a crash program of one Sizewell every year for twenty years, and even then we'd only reach the EEC target by 2005. So the nuclear route would be too expensive, too late — and too risky."*

FoE backs the House of Commons Environment Committee's call for Britain to join the "30-per-cent club" and cut emissions by a third immediately, and to meet the EEC targets by cleaning up CEGB's stacks.

Map showing CEGB power stations that will need to be retrofitted with flue-gas desulphurization equipment to meet the EEC Directive (emissions from large plants - over 50 MW) for a 60-per-cent sulphur dioxide cut (from 1980 levels) by 1995.

A. Drax A
B. Drax B
C. Ferrybridge C
D. Ferrybridge C
E. Cottam
F. Eggborough
G. West Burton
H. Didcot
I. Ratcliffe (new boiler, 2 units)
J. Grain
K. Ironbridge
L. Thorpe Marsh




**Costs & Nuclear Power:**

1. Nuclear power stations can only be used to provide base-load electricity supplies. The base-load varies from 11 GW (20% of total capacity) in summer to 23 GW (40% of total capacity) in winter. At best therefore, nuclear power could contribute a maximum of 23 GW to the grid, which still leaves 32 GW of capacity to be found. The majority of this would have to come from coal-fired power stations.
2. Nuclear power cannot hope to substitute for coal-fired power stations either in sufficient time or to a sufficient capacity in order to achieve the EEC Directive on $SO_2$ and $NO_x$ emissions by 1995.
   a) Assuming a program of one large PWR (1200 MW) every two years from 1986, there would still only be 6.36 GW of nuclear capacity of 1995, due to the major part of the current nuclear capacity closing down by that time.
   b) Even if we were to assume a massive PWR construction program of one large PWR every year from 1986 until the end of the century, there would still only be 14.4 GW of nuclear capacity by 2005. This would still leave a coal-fired power station capacity of 27-30 GW.
   N.B. Such a program would cost approximately GBP 17 billion and would be the largest civil construction program ever in the U.K. This compares with a cost of GBP 1.432 billion for a program of FGD as proposed by FoE, which could achieve the target of the EEC Directive. The total current CEGB capacity is 55.2 GW, and the current nuclear contribution is 4.5 GW.
3. Nuclear power causes its own pollution problem, particularly in the area of nuclear waste. By 2040, the industry will create 650,000 cubic metres of radioactive waste (containing nearly 13.5 million curies of alpha radiation alone), on the basis of the CEGB's current proposed nuclear program.
4. A large nuclear power program will reinforce our dependence upon overseas suppliers for uranium.
5. A recent report by FoE and ERR ("Accidents will happen"), indicated that a major accident at a proposed Sizewell B nuclear power station could have the following possible effects:
   — 1,500,000 people would have to abandon their homes.
   — Ipswich would have to be evacuated for a period of 20 years.
   — The cost to the nation would be GBP 1 to 15 billion.
   — Agricultural produce would have to be banned for human consumption over an area as far as Ireland.

FoE Ltd, 377 City Road
GB-London EC1, U.K.

# Ireland: Hoping for strong winds

When one thinks of Ireland, images of soft green fields and endless waves of warm rain spring to mind (forget the leprechauns and the Guiness in this fantasy); and because it is still relatively unindustrialized and "blessed" with prevailing westerly winds, Ireland, except for its cities, has remained largely unpolluted. Paradoxically, this very innocence can have its own dangers, for it creates a sort of complacency both about the transboundary effects of the emissions we do produce and about changes here that may turn this country's environment into yet another European garbage heap.

## Tall stacks at Moneypoint

The question of acidification in Ireland has become critical with the imminent appearance of Moneypoint (a strangely appropriate name), the Irish Electricity Board's (ESB) new coal-fired 900 MW power station, the first part of which (300 MW) is scheduled to come into operation early in 1985. Conceived as a consequence of wildly inaccurate projections for industrial growth, Moneypoint has been an embarrassment to the ESB since the late seventies when work began. Burning relatively high-sulphur coal (1.6 percent), Moneypoint's emission control system consists of two tall stacks and the hope of a strong wind. The 65,000 tons of $SO_2$ emitted by the new plant will more than double the present ESB output and add more than one third to Ireland's total $SO_2$ emissions.

## A poor country

The ESB has issued all the standard reasons for failing to take any adequate emission-control measures (insufficiency of data, questionable efficacy of controls, etc.), but it hinges its real argument on economics, threatening a 20 percent increase in rates if forced to adopt emission controls. And because the Government is in a fair amount of trouble already and doesn't want to be seen as the bearer of further bad tidings, it tends to support the ESB.

Ireland is a poor country, and the prospect of paying more for someone else's streams and forests is difficult to swallow. Sadly but inevitably the evidence of recent studies is now beginning to focus attention on the growing problem of acidification within Ireland. Let us hope actions taken to protect ourselves will be reflected in a new appreciation of the international nature of pollution.

## Rain acidity increases

In July this year An Foras Forbortha, the Government's environmental agency, issued a report entitled "Air Quality in Ireland". It noted that the acidity in Irish rain has been steadily on the increase. The average pH readings for four successive five-year periods were 5.9, 5.8, 5.7 and 5.5. The percentages of samples with pH values below 5.6 were respectively 27, 32, 40 and 48.

## Leaching of nutrients

The same month the Irish Farmers Monthly in an article called "Acid Rain hits Irish Farming" reported that Dr Paul Dowding, Head of Graduate Studies at the Botany Department, Trinity College, estimates that since they started taking samples at Glencree (Co. Wicklow) ten months ago, at least three acid rain occurrences have taken place which would cause considerable leaching of nutrients from soils in the Wicklow area. The electricity plant at Moneypoint will have a serious effect on plant life downwind of it!

Since then a number of articles have appeared in Irish newspapers referring to the dangers of air pollution and acidification, and in October the Irish Times ran an editorial urging readers to recognize the "menace" of acid rain.

## Awareness needed

Clearly, it is now urgent to create an awareness of the situation, both at a public level and in a more detailed way with decision makers. The funding to do this is virtually nonexistent, the feedback much better. But the seed is sown and it only remains to nourish it until it blossoms into popular consciousness.

William Chase, HOPE
Harbour View
Bantry, Co. Cork, Ireland

# ECE Convention: Some slight progress

A meeting of the Executive Body of the Convention — the second since its signing on March 16, 1983 — took place September 25-28. Among the agenda was a proposal put forward at Munich for the "Elaboration of a draft specific agreement on sulphur emission reductions".

The aim was to get all the signatories to the Convention to agree to at least a 30-per-cent reduction of sulphur emissions by 1993. After the Munich conference altogether 18 nations had declared their intention of doing so.

The required unanimity was however still not forthcoming at the meeting of the Executive Body, due largely to the reluctance of one country, Great Britain, to cooperate internationally in the reduction of emissions.

One encouraging outcome of this meeting: two more countries, Italy and Czechoslovakia, agreed to join the 30-per-cent club, thus bringing the membership up to twenty.

# Eastern Europe: Dying trees —

Ostravice, Czechoslovakia

Photo: Hans Ostbom

*"No one who has been this can be in any doubt about the connection between air pollution and forest death."* Thus William Dickson, one of the scientists at the Swedish Environment Protection Board who are researching acidification, as he lets his gaze rest on a whole stand of dead trees in the Beskedy mountains of Czechoslovakia. Today, as on so many days, the wind is coming from the north — and there on the horizon lies the great industrial area at Ostrava. Altogether tens of thousands of tons of sulphur dioxide and other pollutants get spread over Moravia — for not far off across the Polish border lie Cracow and Katowice, also with big industries.

## No new phenomenon

Forest death is not new to Czechoslovakia. It has been occurring on a large scale for at least thirty years, and Czechoslovakian scientists have been studying it for almost as long.

The damage in the Beskedy mountains is however of more recent date, having occurred for the most part during the last ten years. The worst happened as late as 1979, after a sudden temperature drop on New Year's eve from 15 degrees above to 25 below zero. The climate shock was too much for the already stressed trees, which quickly died over an area of several thousand hectares. Those that survived were weakened and are now suffering badly from insect attacks. This year alone it has been necessary to clear more than a thousand hectares of dead forest.

## Air pollution the main cause

Although climate shocks and insect attacks may give the final deathblow, it is generally agreed in Czechoslovakia that the main cause of forest death is to be found in airborne pollution. This is held to be the case despite the fact that the air of the Beskedy mountains has the lowest content of pollutants in Czechoslovakia. Here the average annual value for sulphur dioxide is 15-25 ug/m$^3$ (micrograms per cubic metre). And to the Czechs that is clean air. In the Erzgebirge close to the East German frontier the annual average is about 120 ug/m$^3$, with occasional peaks of 600-700 ug/m$^3$. And yet an average annual figure of only 20-30 ug/m$^3$ is sufficient to cause chronic damage to conifers. There are also the synergetic effects of combinations of sulphur dioxide and other pollutants, such as nitrogen oxides and photochemical oxidants.

## Deciduous trees do better

The forests in this area contain mostly spruce, but it is nearly all planted — where in the natural way of things there should be

# — and yet optimism

→ mixed stands. Today there are many in Czechoslovakia who would like to see the natural forest regain ground. Research in East Germany and the Soviet Union, as well as in this country, has shown that deciduous trees not only withstand air pollution better, but also have the effect of improving the soil. Decomposition and biological turnover is also greater in forests with mixed stands.

## Acidification of the soil

Evident as it is that air pollution causes forest damage, it seems equally evident that acid soils have less to do with it. The soils of the Beskedy mountains, as well as those of the badly hit mountain regions in the northern part of the country, are largely brown soils that are rich in nutrients and offer a good resistance to the ever-recurrent acid rain. Podzolic soils of the type found in Scandinavia, which are sensitive to acidification, only occur in about 9 per cent of the Beskedy forests. With access to records from the 1950s, Professor Emil Klimo of the forestry faculty at Brno university has been able to make useful comparisons with more recent data, which show declining pH values — in other words, increased acidification of the soil in the intervening period.

*"Despite the fact that the pH value has dropped by a whole point, we can affirm that the areas of severe forest damage by no means correspond with those with the most acid soils,"* declares Professor Klimo.

In the Erzgebirge pH values as low as 2.2 have been recorded in the top soil layer. In this almost unbelievable acidity only a few grasses can grow, and where there should be a forest, there is now a grass steppe. Here and there attempts have been made to reach unaffected mineral soil in which to plant seedlings by removing the top half-metre of earth, but even at that depth the soil was far too acid, having a pH of about 3.

## Planting in vain

*"There's no fun in being a forester in these parts"*, says Ludvig Riha, head of the forestry administration in Ostravice.

We are standing on the slopes Malý Smrk, some 1000 metres above sea level. All around are dead spruce trees, and below us is a large clear-cut area where two workers are planting seedlings amid tree litter and high grass. The mountain side is steep, and the work is tiring — especially as the men are aware that their work is probably in vain. Even if the plants take root and grow for a few years, they are likely to die when they come up over the protective grass. →

*Lysa hora, Ostravice, Czechoslovakia* *Photo: Hans Östbom*

## →Trying to restrict damage

After a whole life as a forester, Ludvig Riha is now about to retire. His face shows that he suffers with the forest.

*"It would be wrong to say that we are now practising forestry. We are entirely occupied in trying to restrict the damage,"* he says while emphasizing that foresters and gamekeepers can do nothing about airborne pollution.

*"Note that in this area some 75 per cent of the trees are affected. During the last few years alone we have had to resort to premature felling on several thousand hectares. We have 45,000 hectares of damaged forest in my district alone,"* he related, and continued:

*"Today the forests in Czechoslovakia are in general heavily exploited. The aim is to get as much timber out of them as possible. Here however we can't do that, all our effort has to go into reforestation."*

On the slope below us small groups of spruce and rowan are being planted — the rowan to provide protection for the spruce in the early stages. In mixed stands the rowans act to some extent as filters for the pollutants, and also provide a good micro-climate around the seedlings.

## Taking a long view

It may seem odd to find spruce still being planted in these parts, when all experience speaks against it. But, says Ludvig Riha:

*"Spruce is nevertheless the species that normally produces the most timber on this soil, and we have to be optimistic. All our effort is now being directed to creating as good a forest environment as possible by 2050, because we reckon by then that the deposits of sulphurous brown coal will have become exhausted, and there will consequently be much less air pollution."*

## Increased erosion

Those are the words of a forester whose concern is for the future. But just where we are there is not much to suggest that an improvement might be in sight. Almost half of the seedlings have already died, and premature felling is becoming necessary in ever larger areas. We can hear the trees falling around us. An aerial cableway has to be used to haul the timber down the steep slope, since tractors are out of the question on the soil here. The mere fact of cutting down the trees leads to increased erosion.

*"We simply have to leave dead trees standing in some places,"* says Ludvig Riha, *"in order to retain the soil. We are obliged to* →

*Ostrava, Czechoslovakia* *Photo: Hans Östbom*

→ *plant new trees among the dead ones and delay felling until the new growth has become established."*

## Drinking water affected

There are special regulations governing forestry practices in the Beskedy mountains, on account of its being designated a water-conservation area. In the valley below are the big reservoirs providing drinking water for the industrial district around Ostrava. Erosion is making the water turbid and difficult to use. The sour soils also release haevy metals which pollute it too. It is a general complaint that air pollution and the dying forests cause trouble for the water supply.

*"Only by stopping air pollution can we hope to retain life in our forests,"* is Ludvig Riha's final comment.

## Emissions must be checked

According to Professor Wladyslaw Grodzinski of Cracow, many European foresters have adopted an extremely dangerous attitude in preferring to wait and see if the trees show any evident damage. When the needles begin to turn brown, and the tops to thin out, it is already too late, he says.

A colleague from Brno university has similar thoughts:

*"There is no possibility of stopping forest death in areas that are already affected by a high degree of air pollution. As researchers we must however be optimistic and produce the best possible evidence on which to base political decisions. If our society is to survive, polluting of the atmosphere must be checked,"* says Professor Ferdinand Vasicek.

The soil scientist Professor Oleg Chertov of the Leningrad Botanical Institute feels forest death digging deep holes in his soul. Searching for the words, he continued:

*"It's awful to see, a disgrace to us all that our civilization should behave so unintelligently. We should reflect that our environment is to be that of our children and grandchildren."*

## Outspoken scientists

The emotional and uncompromising attitude of these East European scientists rather surprised me. In Sweden we are more cautious, but it seems that in Eastern Europe the scientists are more sure of themselves. They can often point to research projects that have been going on for five or ten years, or even 20-30 years, when we have only just started.

In the Niepolomice forest near Cracow, some 75 scientists have been engaged in one project for the last eight years. This forest is an old crown domain dating from the time when Cracow was the capital. The stands are mostly of pine, with some oak, but there are also parts with deciduous trees, beeches and lindens. Although there are as yet no signs of forest death here, Professor Grodzinski raises a warning finger:

*"From the knowledge we now have of the way forest death comes about, we can say already that in ten or fifteen years the situation will have become serious."*

What worries Polish scientists is the accumulation of heavy metals throughout the ecosystem. Says Professor Grodzinski, *"Every year three tons of metal fall over each square kilometre of this forest, and up to 400 kilograms are dangerous heavy metals such as cadmium, nickel, lead, and chromium.*

*"Ever increasing accumulations of heavy metals in the top soil layers constitute an ecological time-bomb.*

*"When the soil becomes more acid the metals will be released and in a very short time every living thing in the ecological system will be exposed to a poison shock."*

It is already known that those metals delay the decomposition of dead matter — needles, leaves, and twigs — on the ground. The trees' supply of nutrients is reduced, and their roots are poisoned.

*"In combination with high contents of sulphur dioxide in the air, this has led to a reduction of tree growth by 8 to 20 per cent. Remember that 90 per cent of the lead is retained in the ecosystem, as well as 85-90 per cent of the cadmium. These metals have a half-life of about one hundred years, so that most of that deposited in our forests today will still be there — if it hasn't been transported to do damage elsewhere — at the end of the 21st century,"* notes Professor Grodzinski.

Pessimists can easily outline a fearful future for Europe. When listening to scientists, however, I sense a growing optimism. They have in any case pointed out the way: stop the pollution of the atmosphere. It is now up to the politicians to do their part.

Bo Landin

# Swiss lower speed limits

As from New Year Swiss drivers will have to restrain themselves. The speed limit on motorways will then be 120 instead of 130 kph. On ordinary open highways it will be reduced from 100 to 80 kph, and in built-up areas from 60 to 50 kph.

The changes are being made as the result of a recent appraisal of forest damage. Politicians were made aware of the gravity of the situation last February, when a report was published showing that one tree in 15 was dying, and that 14 per cent of all trees were damaged.

Environmentalists have been urging much stricter measures, with unleaded petrol topping the list. They have also protested against what they consider to be too slight a lowering of the speed limits.

The government's reply is that the inhabitants of the French and Italian-speaking cantons are opposed to any kind of speed limit, so no stronger measures were possible.

# F.R.G.
# Forest damage accelerating

The results of last summer's cataloguing of forest damage in the Federal Republic were published in October. This shows that damage has increased both in extent and degree during the past year. Whereas 34 per cent of the forest was affected in 1983, this year it was 50 per cent. Damage is now seen in forests covering some 3.7 million hectares.

The first nationwide survey to uncover damage in the West German forests was made in the summer of 1982. Then it appeared that about 8 per cent was damaged. This first survey was however by no means so thorough as the subsequent ones.

The next year's survey was much better organized. The field personnel was more carefully briefed, for example, and supplied with pictorial means for classifying damage. Moreover in four of the principal states with forests careful sampling was carried out as a means of ensuring a more objective assessment of the damage.

In the summer of 1984 the sampling method was used in all the states of the republic. This involved examining the condition of the forest at the intersections of a network of lines at the most 4 kilometres apart.

## Classification of damage

The condition of the trees was assessed in accordance with the following scale:

0 No visible damage
1 Slight damage
2 Medium damage
3 Severe damage
4 Dead

The criteria were primarily the loss of needles and leaves, and the extent to which needles and leaves showed discolourations (yellow, brown). In this last survey, too, estimates were made of the extent of damage from attack by insects and fungi.

## Training of personnel

In order to reduce the effect of subjective judgments, careful instruction was given to forestry personnell all over the country, and illustrations in colour were distributed in order to provide sounder guidance.

This last survey was consequently of a higher quality than the preceding ones, which should be borne in mind when comparing the various results.

## Half the forest affected

As mentioned, it has now been revealed that 50 per cent of the West German forests show visible signs of damage. Even if the improved methods of survey are taken into account, the deterioration since 1982 is fully evident (see Table).

About 33 per cent of the damage is in category 1 (slight damage), while 16 per cent of the forest has suffered medium damage, and 1.5 per cent is either severely damaged or dead. This means some 110,000 hectares of forest have suffered severe damage or worse (Table 2). The dead trees are usually found isolated in healthier stands. Groups of dead trees, or dead forest lots, are very seldom found in West Germany.

## An important species

The most important kind of tree from various points of view, including the economic, is spruce (Picea abies), and 50 per cent of just this kind are damaged. The situation is especially serious as regards the older stock (trees over 60 years old), where 82 per cent of the spruce is damaged, half being in categories 2, 3, or 4. The most threatened trees are silver fir (Abies alba) of which 87 per cent is damaged. The figur →

FOREST DAMAGE — BY TREE SPECIES

| Species | Percentage of the forest area* | Percentage of trees damaged (all categories of damage) | | |
|---|---|---|---|---|
| | | 1982 | 1983 | 1984 |
| Spruce | 40 | 9 | 41 | 51 |
| Pine | 20 | 5 | 44 | 59 |
| Silver fir | 2 | 60 | 75 | 87 |
| Beech | 17 | 4 | 26 | 50 |
| Oak | 8 | 4 | 15 | 43 |
| Other Species | 13 | 4 | 17 | 31 |
| Total | 100 | 8 | 34 | 50 |

*Total forest area in the F.R.G. is about 7.4 million hectares

FOREST DAMAGE — BY CATEGORY OF DAMAGE

| Category of damage | Percentage of the forest area | | | Percentage of damaged area | | |
|---|---|---|---|---|---|---|
| | 1982 | 1983 | 1984 | 1982 | 1983 | 1984 |
| 1 (slightly damaged) | 6 | 25 | 33 | 75 | 72 | 66 |
| 2 (damaged) | 1.5 | 9 | 16 | 19 | 25 | 31 |
| 3 and 4 (severely damaged/dead) | 0.5 | 1 | 1.5 | 6 | 3 | 3 |
| Total | 8 | 34 | 50 | 100 | 100 | 100 |

Source: Bundeslandwirtschaftsministerium, Bonn, 1984

*Dying forests in Schwarzwald, southern West Germany.* *Photo: Christer Ågren*

for pine (Pinus sylvestris) is 59 per cent. Increased damage is however also evident in the case of deciduous trees, especially beech (Fagus sylvatica) and oak (Quercus robur).

The worst damage appears in stands that are more than 60 years old, although younger trees may also be affected, and especially silver fir and pine.

## Regional differences

Worst hit are the southern states, and it is precisely those that are most forested. In Baden-Württemberg 66 per cent of the forest is damaged, in Bavaria 57 per cent. In both these states sampling was carried out in 1983 as well, and the amount of damage then was 49 and 46 per cent. There was thus a distinct increase from one year to the next.

## Insects and fungi

It appears that attacks from bark beetles have so far been negligible. Only 0.1 per cent of the undamaged trees (in category 0) were found to be affected, and of the trees with some form of damage (categories 1-4) only 0.7 per cent had been attacked by bark beetles.

This is due on the one hand to the very favourable weather during the last year, and on the other to the counteracting measures applied by foresters. Deciduous trees are in any case far more liable to attack, both from insects and fungi, than conifers. There are extremely good grounds for the belief that the "new" damage that has been observed of late in the European forests is *not* due to attack from insects or fungi. On the contrary it seems proved that if the trees become stressed, and so weakened, by air pollution, their resistance to injurious attacks will be lessened. Fungi and insects are thus only a secondary factor.

Since the autumn of 1983 the weather conditions in Europe have been exceptionally favourable for trees, with plenty of rain in the early summer and suitable temperatures later on. All the same, the damage has gone on, and has actually much increased.

## Mixed stands

Since deciduous trees are now showing damage to a markedly greater extent, worry is growing over the possibilities of severe ecological consequences. Beech and oak are especially important in German forestry. They act as stabilizers in the forest ecosystem, and there are no other kinds of tree that might substitute for them in this respect.

## Forestry practice

Although conservation measures can have relatively little effect on the situation, they are nevertheless being applied in West Germany. Greatly increased amounts of federal and state funds have been made available and earmarked in part for such purposes as fertilizing (primarily in forests on poor soil) and reforestration as well as developing new forests.

## Air pollution

It is however taken as an axiom that the problem of dying forests can only be solved by dealing with the basic cause. In other words, priority must be given to reducing the emission of pollutants.

Christer Ågren

*This article is based on the report published by the Bundesminister für Ernährung, Landwirtschaft und Forsten, Postfach 140270, D-5300 Bonn 1, F.R.G. under the title of "Waldschadenserhebung 1984".*

# Acid Rain Conference to be held in spring 1985

Friends of the Earth International's Acid Rain campaign is gaining momentum. Initial funding for a worldwide NGO-conference (NGO: Non-Governmental Organization) on acid rain was obtained from the Dutch Government. Preparations have started and it looks as though the conference can be held in April or May 1985.

As has been the case with other environmental issues, pressure from non-governmental organizations is necessary for making progress in reducing air pollution. Both western Europe and North America have a very active NGO-community on the acid rain issue. Although some scientific and informal contacts exist between the two continents, there is surprisingly little interaction between organizations actively addressing the problem of acid rain with governments and the public. The problem has moreover reached alarming proportions in eastern Europe.

## Coordination needed

While several of the groups working regionally on acid rain have expressed interest in more contact and coordination with others, there has not been an organized opportunity expressly for this exchange. FoEI, with its global membership, is an excellent vehicle for organizing such a conference. This does not imply, of course, that only Friends of the Earth affiliates will participate. As far as possible the participants of the conference should be true representatives from national networks or organizations most active on the issue in their country.

Representation of the Third World will be by invitation of a number of Third World groups from areas that are beginning to be affected by acid rain. Outreach to at least one Japanese and one Australian organization will produce participants from these countries. Special efforts will be made to ensure participation from East European NGO's.

## Main issues

Depending on the needs and preferences of participants, all issues concerning acid rain can be discussed at the conference. The following issues, however, should be discussed in depth at the conference:

— **Soft energy strategies** as a basic solution to acid rain and air pollution in general. Reduction of fossil fuel consumption is a requisite for solving the problem. The conference will look for energy strategies that will both reduce the dependence on fossil fuels and ensure a non-nuclear future.

— **Public education**: sharing media approaches, grass-roots public education, etc.

— **International conventions and intergovernmental bodies.** Discussion on strategies towards international bodies where acid rain is discussed and policies are decided on.

— **Building the network.** Which follow-up do we want after the conference? More specifically, how should a NGO-network on acid rain be organized so as to: further development of an overall common strategic approach; monitor government programs; improve the means of communication; and finally to raise funds in order to maintain the network.

The conference will be held in the Netherlands, because of its central location, both for NGOs and acid rain.

Suggestions and ideas are most welcome. Also, if you want to be put on the pre-conference mailing list, contact:

Pieter Lammers
FoE International Secretariat
Box 17170
NL-1001 JD Amsterdam
Netherlands
Phone: 20-838 955

From FoE LINK, No. 3, 1984

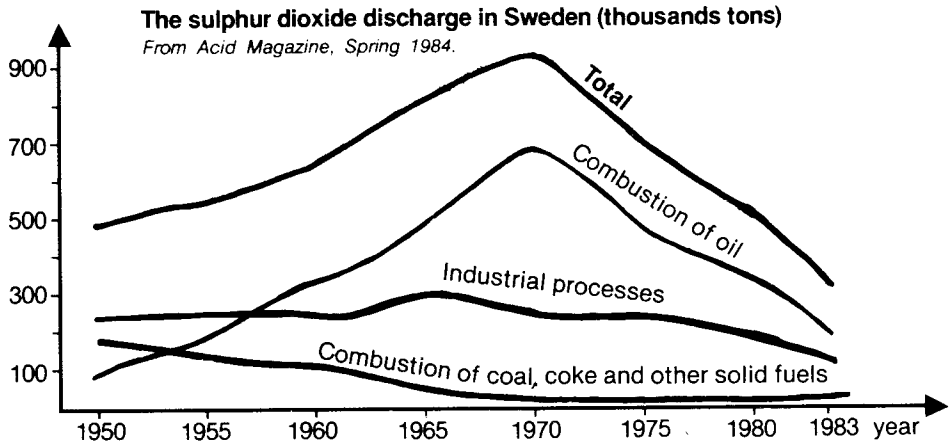
## Correction

In the graph on page 3 of the last number of Acid News, one of the curves failed to reproduce. This should have shown the total emissions of sulphur in Sweden. We are therefore printing a corrected version.

## Correction

We regret omitting acknowledgement of the photo on the first page of No. 4. It was taken by Tore Hagman/Naturfotograferna.

**The sulphur dioxide discharge in Sweden (thousands tons)**
*From Acid Magazine, Spring 1984.*



# Belgium sits on the fence

As evidence of acidification damage within Belgium grows, so does public attention to the acid rain issue. Recent studies have shown declining pH values and high aluminium concentrations in heathland pools, and acidification of ground water in the northern part of the country. (See Acid News 1984/2.) While research into effects on forests is being intensified, symptoms of forest damage have already been found in the east. In the region along the border with Germany, where 70 percent of the forest cover is reported to be affected, the environmentalist party Ecolo scored 16 percent of the vote in the recent European Parliament elections, well above its national average.

## Inadequate laws

The existing air pollution control laws are completely inadequate. The principal aim of these regulations, based on a law dating from 1964, is to improve ambient air quality, especially in urban areas, in order to protect public health. This is essentially achieved by measures for diluting air pollution from industrial sources, and to control emissions from traffic and domestic heating (which are only responsible for 3 per cent and 13 per cent of the total discharge of sulphur dioxide).

The regulation on the sulphur content of fuel oil provides for a gradual sulphur reduction, but this phase-out of high-sulphur fuel has been strictly applied only to light fuel oil used for domestic heating, while the reduction has already been postponed twice for heavy fuel oil used in industry and power stations, which accounts for 27 percent of total $SO_2$ emissions.

The regulations on air pollution from industrial plants enacted in 1975 do not set emission limits for $SO_2$ from coal-fired power stations and industries (15 per cent of total emissions). The emission limits for oil-fired plants (which cause 53 percent of overall emissions) are very high compared with those in force in other countries and there is no requirement for desulphurization measures. The main provisions of these regulations prescribe minimum chimney heights, which clearly shows that their main purpose is to dilute pollution, not to reduce overall emissions.

## Reduction program

Belgium ratified the ECE Convention on July 15, 1982. In a television speech on World Environment Day 1983, the Secretary of State for the Environment, Firmin Aerts, admitted that the existing legislation was completely outdated and that only a drastic cut in $SO_2$ and $NO_x$ emissions could solve the acid rain problem. He announced a program to reduce Belgian emissions by 30 percent between 1980 and 1993. A task force composed of representatives of the national and regional governments, industry and the utilities has been set up to elaborate this program. So far, however, this task force has not come up with any concrete policy proposals.

## Dilution of pollution

Despite the government's stated commitment to emission reductions, the only new measure taken since Belgium joined the ECE Convention does not indicate a real departure from the old policy of pollution dilution and immission control. On March 16, 1983, the day the ECE Convention entered into force, the Secretary of State for the Environment issued air-quality standards for sulphur dioxide and suspended particles. However, as the air-quality limit values laid down in this decree had already long been achieved throughout most of the country, this measure was little more than a confirmation and legitimation of the status quo. In fact, the decree was but the long-overdue implementation of an EEC Directive of 1980, which the European Commission itself now admits is totally insufficient to curb acid rain.

## Strong nuclear lobby

The utilities, for their part, argue that the cost of retrofitting their power stations with FGD systems would be very high, would drive up the price of electricity and would force them to close down a number of older plants. To back up their claims they have produced cost estimates of desulphurization which are well above the international average. In fact, they view the acidification problem as an argument to justify their nuclear policy and support their case for more nuclear power plants. The electricity companies contend that by shifting from oil to coal-fired and from fossil fuel to nuclear power plants they have already cut $SO_2$ emissions from electricity generation by 25 per cent between 1980 and 1982, and will achieve an overall reduction of 60 per cent by 1986.

Thus, so the argument goes, the government's objective of a 30-per-cent reduction of total $SO_2$ by 1993 will be achieved without any need for costly desulphurization measures. Indeed it appears that the further development of nuclear energy also figures prominently in the government's air pollution control strategy. Outlining Belgium's policy in his address to the 1982 Stockholm Conference on Acidification of the Environment, Secretary of State Aerts confirmed that Belgium would favour *"energy sources that do not produce sulphur"* in the production of electricity.

Due to the reluctance of the utility companies, the strength of the nuclear lobby, and the slow pace of government action, Belgium is sitting on the fence, awaiting EEC action. While the Belgian government will probably support and comply with whatever directives the EEC Council manages to agree on, it is unlikely to take any anticipative or more stringent measures.

Marc Pallemaerts

# Youth campaign:
## Save the forests of Europe!

Fourteen youth organizations in Sweden, comprising over 150,000 members, have started a coordinated campaign aimed at saving Europe's forests. The initiators were two organizations supporting the Swedish NGO Secretariat on Acid Rain — the Swedish Youth Association for Environmental Studies and Conservation, and the Environmental Federation — and the campaign is backed by all the political youth organization except one, the Conservative Youth.

### Double aim

The aim is on the one hand to conduce to a reduction of atmospheric pollution, now a most serious threat to the European forests, and on the other to protect one of Europe's last unbroken stretches of natural forest — that extending just below the treeline along the Norwegian border. The latter is now also threatened, but this time by exploitation.

The campaign statement opens as follows: "We who will still be alive well into the 21st are disturbed. The very basis of our life is threatened by today's economic and political decision-makers. The forests are being damaged and devastated, the lakes and air poisoned."

The campaign organizations are therefore putting forth these demands: Greater protection of the areas of natural forest, the value of which has been scientifically demonstrated, and rapid and effective measures for reducing emissions of airborne pollutants, and those emanating from road traffic in particular.

The campaign started off on a nationwide scale, setting up posters in more than a hundred different towns. Further action was planned for the New Year, as well as in connection with the International Acid Rain Week in April and World Environment Day in June, 1985.

Christer Ågren

# Nine countries' experts agree on vehicle emissions

Experts from nine nations assembled in Stockholm last October at the invitation of the Swedish government in order to discuss the introduction of unleaded petrol and the enforcement of stricter emission controls for road vehicles. There were delegates from Austria, Canada, Denmark, West Germany, Finland, the Netherlands, Norway, and Switzerland as well as Sweden.

It was agreed that unleaded petrol should be made generally available in good time before 1989, and at least to some extent in 1986. The experts further considered that the emission requirements for vehicles should be made as strict as those now prevailinng in the United States.

Discussions within the group are continuing.


*Great Britain — The dirty old man of Europe.*

*Drawing: Nils Forshed*