

Acid News

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



At the Aberthaw power station in Wales.

Photo: Richard Baker

Children's health endangered

We have previously reported at some length on the state of emergency that had to be proclaimed in the Ruhrgebiet last January on account of smog brought about by an inversion. As politicians are apt to be forgetful in summer, when the danger appears to be over, we remind them with the following personal account from Essen of what it felt like to be there.

"For days on end we have been living under a lid of smog. Everything appears in shades of

grey, and sight is limited to 50 metres at the most. Persons with poor circulation and those suffering from bronchial trouble have been warned over the radio from going out. Children were preferably to be kept at home, and in most of the Ruhr cities the schools have been closed.

"At such a time we are especially anxious for our children. Every little cough is worrying, nursery doors are kept open, windows shut tight. The cause of our worry is pseudo-croup."

Pseudo-croup

Pseudo-croup manifests itself as inflammation and swelling of the larynx, with consequent acute difficulty in breathing accompanied by a spasmodic ringing cough. In extreme cases affecting infants and young children, the relatively rapid swelling of the larynx may result in death through suffocation. Pseudo-croup, which occurs mostly at night, may be caused by virus but is especially noticeable at times of above-average pollution of the atmosphere.

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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 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

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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)

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!



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Connection shown

In an article in *Originalien Fortschritte der Medizin* No. 14, 1984, Professor Dr med H. Haupt, of the Städtische Kinderklinik Duisburg, reveals a connection between air pollution and diseases such as croup. The following summary appeared under the heading "Effects of air pollution on respiratory tract diseases in young children. Morbidity rate in residential areas with varying degrees of pollution."

In a retrospective study of hospitalized patients (children aged between 0 and 4 years) covering four years the dependence of the incidence of croup (infectious laryngitis) and obstructive bronchitis on air pollution was investigated. For this reason the incidence of morbidity in residential areas with various levels of SO₂ and sedimenting dust were compared.

The results show a definite connection between high levels both of SO₂ and dust and a high rate of morbidity. This connection was particularly marked in areas with simultaneously high levels of SO₂ and dust.

West German parents alarmed

As early as 1982 a so-called Eltern-Initiative Pseudo-Krupp was formed in Essen, after a pediatrician had noted a three to four-fold increase in pseudo-croup in his district at Essen-Borbeck. Between 1980 and 1982 he had come across 146 cases. As a result of his observations a heated debate started in West Germany, and subsequently more than fifty "parents-initiatives" have been formed all over the country.

Those wishing for further information should write Familie Dickel, Levinstrasse 27, 4300 Essen 11, Federal Republic of Germany.

Tourist boycott of Great Britain

Britain is the largest emitter of sulphur dioxide in Western Europe. Overall it exports 23 times as much sulphur as it imports, contributing significantly to the acidification of forests and lakes in Scandinavia and other countries.

Most people in Britain would like to see measures taken against Acid Rain and are prepared to pay more for electricity if power stations are cleaned up; yet the British government has taken no actions.

On the contrary it is blocking

all action by the European community. It will not join the so-called 30 per cent club in Helsinki and it is the country making the strongest efforts to resist the reduction of vehicle emissions.

Friends of the Earth are therefore coordinating international action (with the support of British groups) to boycott holidaymaking in Britain until significant pollution controls are introduced.

For information contact: Friends of the Earth International, P.O.Box 17170, 1001 JD Amsterdam, Holland.



Great Britain - Still the dirty old man of Europe

Drawing: Nils Forshed

Weakness but some promise

The ECE Convention on long range transboundary air pollution was signed in 1979 and came into force on March 16, 1983. Most of the countries of eastern and western Europe are Member States of the Convention, together with Canada and the United States. The Convention gives rise to high expectations, and politicians regard it with pride. However, one can only be disappointed when assessing its effects from an environmentalist point of view. With regard to the principal question of air quality management, the Convention only imposes very general obligations: Article 2, for instance, reads:

"The Contracting Parties, taking due account of the facts and problems involved, are determined to protect man and his environment against air pollution and shall endeavour to limit and, as far as possible, gradually reduce and prevent air pollution including long-range transboundary air pollution."

Note. The ECE - Economic Commission for Europe - is a United Nations body, not to be confused with EEC, the European Economic Community.

Then Article 6:

"Taking into account articles 2 to 5 (the 'fundamental principles'), the ongoing research, exchange of information and monitoring and the results thereof, the cost and effectiveness of local and other remedies and, in order to control air pollution, in particular that originating from new or rebuilt installations, each Contracting Party undertakes to develop the best policies and strategies including air quality management systems and, as part of them, control measures compatible with balanced development, in particular by using the best available technology which is economically feasible and low-and non-waste technology."

This last article is scandalous. Apart from the extremely tentative language, I have never found another treaty provision which contains every possible escape clause in such compact form.

Other parts of the Convention are more fully elaborated, such as those dealing with information and consultation, and cooperation in research and monitoring.

The rules on information,

consultation and cooperation are poor consolation. Important as they are, they can be no substitute for rules on air quality management, that is, standards for the prevention and reduction of air pollution.

One must admit, however, that the Convention is not a single event, it is part of a process. It provides for permanent negotiations between Member States within a so-called Executive Body, and these negotiations may lead - it is to be hoped in the near future - to the adoption of standards and of more concrete obligations. The EB, consisting of representatives of all Member States, meets annually and has as its function (Article 10):

- ☐ to review the implementation of the Convention
- ☐ establish working groups to consider matters related to the implementation and development of the Convention (and to this end to prepare appropriate studies and other documentation and to submit recommendations to be considered by the EB)
- ☐ fulfil said functions as may be appropriate under the provisions of the Convention.

This means there is a chance that the Convention will be further developed. Some first attempts were made at the 1983 and 1984 meetings of the EB. In 1983, two proposals were submitted, one by the Scandinavian countries providing for a program for reducing national emissions of sulphur dioxide by 30 per cent by 1993 using the figures for 1980 as a base. The other proposal was submitted by Austria, the Federal Republic of Germany, and Switzerland. It was to be additional to the first one and envisaged a reduction of the sulphur content of light fuel oil and diesel oil to 0.3 per cent. Neither of these proposals was adopted, and the 1984 meeting

Meeting to stiffen Convention

The Economic Commission for Europe, a United Nations body, is holding in July 85 a meeting in Helsinki in pursuance of the Geneva Convention on Long-range Transboundary Air Pollution.

The meeting is to sign a protocol that is to be attached to the Convention, giving agreement to a reduction of emissions of sulphur and so of transboundary air pollution by 30 per cent by 1993, as counted from the levels in 1980.

The Convention, signed at Geneva in 1979 by 34 nations and the European Economic Community, has been ratified by 30 states and the EEC. Its adoption was regarded as a definitive ad-

vance for international efforts to lessen depositions of acid and souring of the environment. Of the 35 original signatories only **eighteen** are expected to sign the protocol after it has been approved by the ECE's Executive Body.

Three of the main polluting countries, Great Britain, the USA and Poland are still refusing to take serious measures against air pollution.

In addition to discussing the means of limiting emissions of sulphur in accordance with above mentioned protocol, the delegates will be debating an approach to the reduction of nitrogen oxide emissions.

Reduce emissions by 75%

It is evident from the effects of acidification on the environment that emissions must be reduced. The two essential questions then are:

How great will the reductions have to be in order to prevent further damage to the environment and give ecosystems a chance to recover?

How much time do we have? In other words, what is the rate of acidification? What is the present geographic distribution of the damage, and what will it be in the near future?

Although rapidly expanding, our knowledge of the acidifying processes is still relatively limited. Chemical models are now being constructed for soil processes, and within a few years we shall, for specific soils, have a more precise answer to both of the above questions.

At the moment we can only make rough estimates based on the following three criteria: the

pH of rain, the buffering capacity of sensitive soils, and the negative effects on plant growth.

The pH of rain

At present the acidity of rain varies between 4 and 5 pH. As the normal pH is 5.6 (CO₂ in water), the acid load is thus 4 to 40 times too high. Although the figure may be affected by natural emissions of SO₂ and NO_x, we can still conclude that the emissions should be reduced to 10 to 25 per cent of the present levels. This is necessary not only to halt the acidification of soil and water, but also to stop the direct effects of acid rain on foliage and on the structure of snow (increasing the probability of avalanches, as well as, in my opinion, influencing the rate at which snow melts).

Sensitive soils

In sensitive soils in Sweden (thin layers on rock) acidification is

now occurring at a deposition level of 200 acid equivalents per hectare a year (approx. 3 kg S/ha). Poor but deep sandy soils there have an acid buffering capacity that is four to five times higher, but is still less than 1000 eq. per ha. The present deposition in the Netherlands averages 6000 eq., going up in some parts to 8500 eq. In West Germany, acidification in areas far from industrialized regions amounts to 5400 eq. In order to stop the acidification of sandy soils at least 50 km from industrial areas in these two countries, depositions and therefore also emissions should be reduced to 12-17 per cent of the present levels. In northwest Europe generally the deposition of pollutants in rural areas should be reduced by 75 per cent or more.

The rate of acidification can be estimated from the leaching of minerals from the soil at present deposition levels. In the case of

of the EB also failed in this respect. The EB has still not arrived at a decision as to the reduction of sulphur dioxide emissions. The only progress made in 1984 was that the number of States that announced their intention of *voluntarily* reducing sulphur dioxide emissions increased to eighteen. This modest progress can be credited to the conference at Ottawa and Munich, held respectively in March and June 1984. While these conferences could not produce legally binding declarations - they were useful in that they gave an additional impulse to the negotiations within the EB and had some influence on the decisions of some states to make unilateral declarations.

Lothar Gündling
Max-Planck-Inst. Völkerrecht
Berlinerstrasse 48
D 6900 Heidelberg 1

Top Ten

Promised reductions in SO₂ emissions, using 1980 as base year.

Sweden	60%	to 1995
France	50%	1990
F.R.G.	50%	1993
Canada	50%	1994
Norway	50%	1994
Denmark	50%	1995
Netherlands	40%	1995
Austria	30%	1993
Belgium	30%	1993
Finland	30%	1993
Italy	30%	1993
Liechtenstein	30%	1993
Luxembourg	30%	1993
Switzerland	30%	1993
Bulgaria	30% *	1993
Czechoslovakia	30% *	1993
G.D.R.	30% *	1993
U.S.S.R.	30% *	1993

* = of exported SO₂



Photo: Christer Agren

The text is part of a paper presented at Acid Rain Strategy Seminar, Wye College, Ashford, Kent, March 1985. Seminar report can be ordered from Stichting Natuur en Milieu, Donkerstraat 17, 3511 KB Utrecht, Netherlands.

sensitive sandy soils the 1-metre-thick top layer will, in consequence of such leaching, become completely acidified in twenty to two hundred years. In many sandy soils acidification has already penetrated through the root zone.

Plant growth

Negative effects on plant growth are already found at low concentrations of air pollution. The effects can vary from damage to foliage and reduction in growth to physiological disfunctioning. Combinations of several substances are in many cases more harmful than any of the individual substances alone. Data only exists however concerning a dozen plant species, and the combined effects are rarely researched. Combinations of ozone (O_3) and SO_2 are especially harmful, and standards will have to take into account such combined effects.

It can be concluded from the scanty research that the concentration of SO_2 , NO_2 , and O_3 in rural areas should never exceed an annual mean value of 20 $\mu\text{g}/\text{m}^3$ and a daily mean value of 50 $\mu\text{g}/\text{m}^3$. The maximum hourly mean value for O_3 should be no more than 120 $\mu\text{g}/\text{m}^3$. In urban and industrial areas an annual mean of 30 $\mu\text{g}/\text{m}^3$ for SO_2 and NO_2 , and a daily mean of 100 $\mu\text{g}/\text{m}^3$, can be tolerated because there it is unnecessary to have complete protection of vegetation and agricultural crops.

In northwest Europe the annual mean concentrations of SO_2 may be as high as 100 $\mu\text{g}/\text{m}^3$ outside the industrial regions, while the daily mean values often reach 300 $\mu\text{g}/\text{m}^3$ or more. So the SO_2 concentrations, and thus the emissions, will have to be reduced to 20 per cent of the present levels.

Necessary reductions

As measured in rural areas in Holland, the concentrations of

NO_2 often rise above an annual mean of 30 $\mu\text{g}/\text{m}^3$ and a daily mean of 80 $\mu\text{g}/\text{m}^3$, necessitating a reduction to 65 per cent. Ozone (O_3) is the greatest problem. Values are regularly recorded for concentrations above an annual mean of 60 $\mu\text{g}/\text{m}^3$, a daily mean of 150 $\mu\text{g}/\text{m}^3$, and an hourly one of 300 $\mu\text{g}/\text{m}^3$, with peaks of 500 $\mu\text{g}/\text{m}^3$. It can be concluded that the concentrations of O_3 will have to be reduced to 30 per cent or less of present levels.

From the above it may be concluded that emissions should be reduced, on an average, at least to 25 per cent of their present levels. For SO_2 the reduction will have to be greater (to 20 per cent or even less), for NO_x and hydrocarbons to at least 25 per cent, and for ammonia to 50 per cent (except in regions with vulnerable soils or intensive agriculture, where there must be reductions to 10 or 20 per cent. These goals must be set for the near future, although it would be unrealistic to think in terms of less than ten or fifteen years. In the long term still further reductions may well be necessary.

The fast rate of damage necessitates quick action, and thus the setting of short-term goals. Emission reduction policies must be made to take effect without delay. The goal must be an average reduction to 50 per cent of the present emissions. For SO_2 the reduction should be more (to 20-30 per cent). A reduction of 50 per cent for NO_x will hardly be obtainable within five years, owing to the relatively slow replacement of old cars and the large number of small sources of pollution that will have to be renewed. The short-term goal should thus be to reduce NO_x emissions by 25 per cent, and hydrocarbons by 50-80 per cent. For NH_3 the aim can be set at an average reduction to 75 per cent of present emissions, and a specific reduction to 25-35 per cent for ammonia-rich regions.

Emissions of SO_2 and NO_x , thousands of tons per annum

	SO_2	NO_x
Austria	430	
Belgium	810	181
Bulgaria	770	
Czechoslovakia	3,370	
Denmark	450	
Germany East	4,000	
Germany West	3,510	3,000
Finland	570	
France	2,890	1,455
Greece	340	
Hungary	1,720	
Ireland	260	
Italy	3,070	
Luxembourg	30	
Netherlands	490	500
Norway	140	
Rumania	2,000	
Spain	2,090	
Sweden	510	317
Switzerland	120	
Turkey	650	
UK	4,250	
USSR	25,500	
Yugoslavia	830	

Source: Steve Elsworth: Acid Rain (Pluto Press, London)

Achievement of the short-term goals will result in a considerable slowing down of the rate of acidification and forest decline. It is important to realize that trees that are now only just visibly damaged will be dead within seven or eight years if there is no decrease in environmental stress. Moreover in sandy soils the acidification process occurs roughly at a rate of one centimetre a year and is practically irreversible.

No unnecessary waiting

Although acid rain constitutes an international problem, its international aspects should not be allowed to overweigh practical measures. In Scandinavia, for instance, the dry and wet depositions of acid, formed from SO_2 and NO_x , come chiefly from afar. In more heavily industrialized countries, on the other hand, the

depositions are mainly from domestic sources and neighbouring countries. Eighty-five per cent of the depositions in the Netherlands originate in West Germany, Belgium, the United Kingdom, and the Netherlands itself, and 80 per cent of those in the UK are from its own industries. Reducing the emissions in north-western Europe alone would make for a marked decrease in the depositions over this part of the continent. There is no need to wait until the whole of Europe takes action. Drastic reduction of the depositions in any one country can only be brought about if the countries that contribute the most to its pollution also act drastically. In practice it would only be necessary to reduce emissions in three other countries at the most, besides making reductions at home, in order to achieve the desired result.

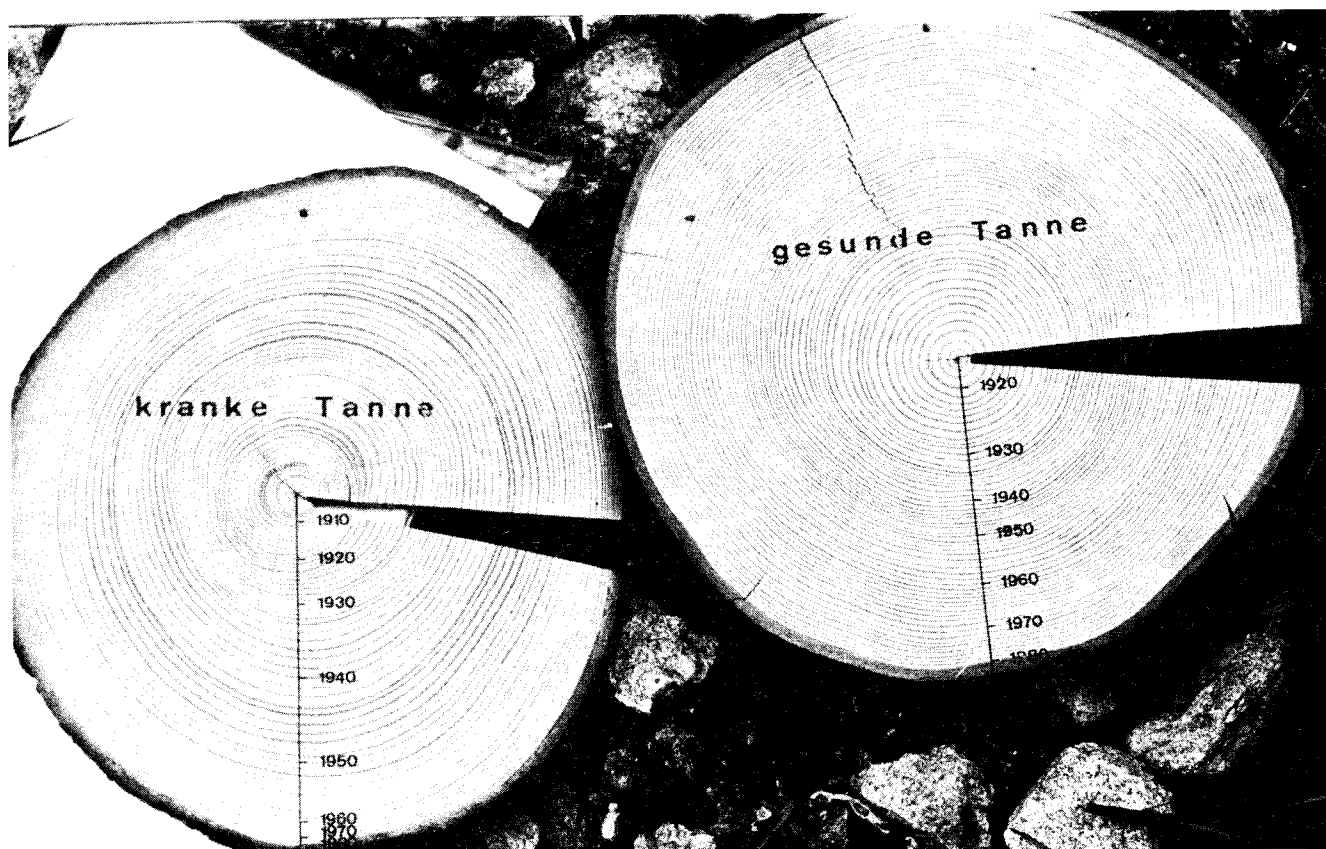
Jan Fransen
Stichting Natuur en Milieu

The text is part of a paper presented at Acid Rain Strategy Seminar, Wye College, Ashford, Kent, March 1985: "Quantification of the Acid Rain Policy". Seminar report can be ordered from Stichting Natuur en Milieu, Donkerstraat 17, 3511 KB Utrecht, Netherlands.

Depositions; tons of SO₂ per annum

	Domestic sources	Foreign sources	Total
Austria	151,000	539,000	690,000
Belgium	198,000	182,000	380,000
FRG	1,160,000	1,314,000	2,474,000
Bulgaria	270,000	397,000	667,000
Czechoslovakia	1,266,000	1,733,000	2,999,000
Denmark	109,000	113,000	232,000
France	1,232,000	1,336,000	2,568,000
Italy	1,357,000	612,000	1,969,000
Finland	260,000	648,000	908,000
GDR	1,117,000	603,000	1,720,000
Greece	137,000	382,000	519,000
Hungary	448,000	475,000	923,000
Ireland	96,000	94,000	190,000
Luxembourg	4,000	10,000	14,000
Netherlands	99,000	275,000	374,000
Norway	61,000	545,000	606,000
Poland	1,012,000	1,813,000	2,825,000
Portugal	72,000	122,000	194,000
Rumania	822,000	1,080,000	1,902,000
Spain	1,121,000	486,000	1,597,000
Sweden	218,000	961,000	1,179,000
Switzerland	32,000	225,000	257,000
Turkey	360,000	520,000	880,000
USSR	22,674,000	4,879,000	27,553,000
UK	1,545,000	391,000	1,936,000
Yugoslavia	308,000	1,153,000	1,461,000
Other areas	261,000	8,048,000	8,309,000
(+ unident.)			

Source: Steve Elsworth, *Acid Rain* (Pluto Press, London)



Sections through trunks show differences in growth of a damaged silver spruce (left) and a healthy tree. Examples from the Black Forest.
Photo: Christer Ågren

Agriculture and acidification

Acidification causes damage to Dutch agriculture estimated in terms of money to half a million guilders a year. On the other hand, agriculture itself contributes in high degree to acidification by the emission of ammonia. This phenomenon became known only a few years ago. It is not yet clear what happens to ammonia in the air, soil and water, although a lot of research has been done. But the seriousness of the problem is clear enough, and almost everyone, including the agricultural organizations, agrees that something must be done to diminish emissions of ammonia.

In the Netherlands ammonia (NH_3) is the third main source of acidification of the environment, coming closely behind sulphur and nitrogen oxides. According

to the latest figures, more than 140,000 tons of ammonia are emitted each year, making a contribution of 30-35 per cent to the acidification of the environment. Almost 90 per cent of the total emission consists of ammonia volatilized from animal manure.

Areas affected

The density of the emissions is much higher in the southern and eastern regions (see map 1) than in the rest of the country. Due to the policy of the European Community and the Dutch government, agriculture has specialized in intensive livestock breeding, and during the sixties and seventies this branch of agriculture expanded tremendously. The breeding of pigs and poultry is concentrated mainly on the sandy, lime-deficient soils of the provinces of Overijssel, Gelder-

land, Utrecht, Noord Brabant and Limburg (see map 2). So the highest emissions are found where the soils are in any case most sensitive to acidification. It can be no mere coincidence that the forests in these areas are among those in the worst condition.

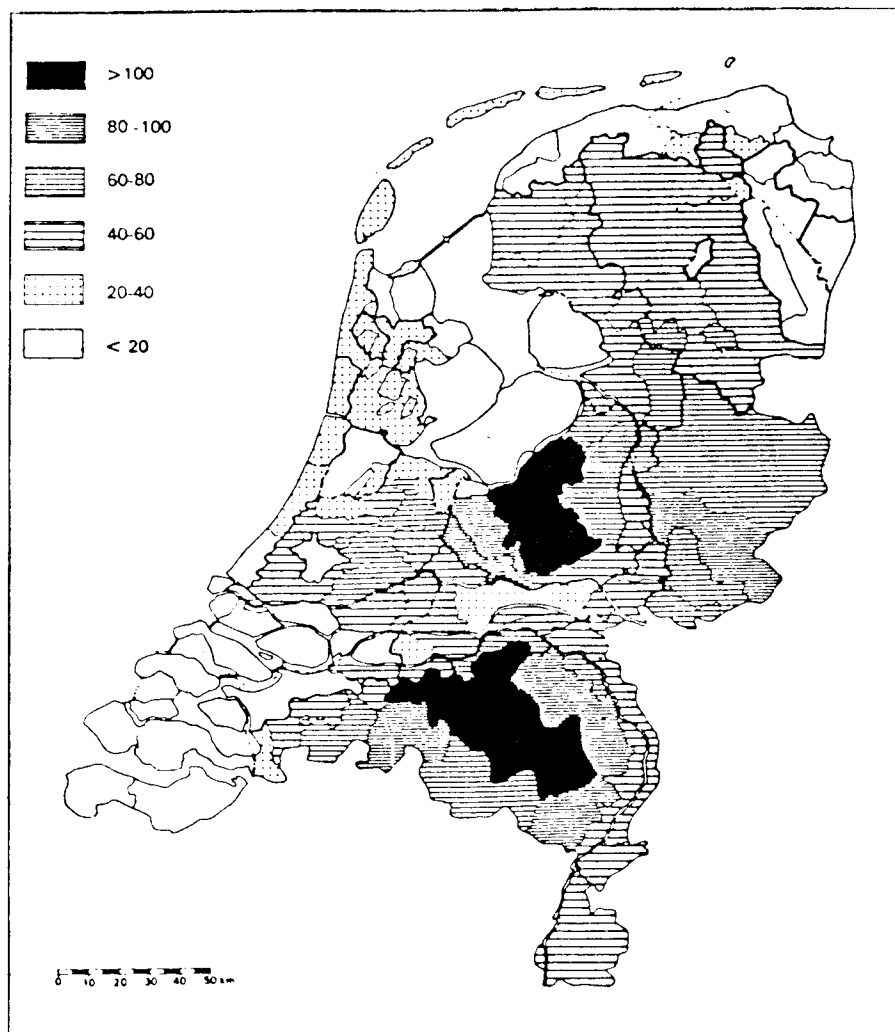
It is generally known that ammonia neutralizes acids, and to some extent it does so in the air. Like all nitrogen compounds it also has a fertilizing effect. The net effects of ammonia emissions are however detrimental to the environment.

In contrast to the acidifying effects of SO_2 and NO_x , which usually take place across great distances, those of ammonia act in the immediate vicinity, damaging plants and trees. The Rouwkuilen nature reserve, for instance, in Venray (province of Limburg), which is completely surrounded by intensive livestock breeding, has been totally destroyed by ammonia pollution.

Water as well as soil

It is possible for farmers to lessen the acidity of the soil by liming, which is however very expensive. But nothing can be done to stop acidification of the deeper soil: ammonia is washed into the soil with rainwater and is converted into nitrate. This conversion frees hydrogen ions which cause acidification. Ammonium (NH_4^+ formed from ammonia) and hydrogen ions wash out other chemicals from the soil, such as calcium and potassium, which are important for the soil's fertility. They also free toxic chemicals like aluminium.

Nitrate is formed during the conversion of ammonia. This chemical washes out of the soil and enters the ground water which is used in many places for drinking water. Too much nitrite (formed from nitrate) in the water causes health problems. A quarter of the wells in sandy soils are now threatened by excessive concentrations of nitrate in the ground water. In areas



Map 1: Ammonia emissions from animal manure in kg/ha/year for each agriculture region.

with surpluses of animal manure the ground water is polluted to a depth of 15 meters with nitrate concentrations that are 3 to 6 times higher than permissible.

Too much manure

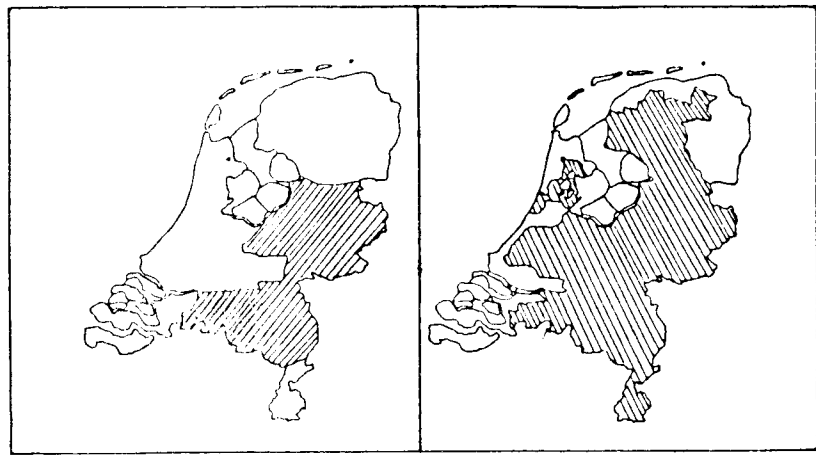
Ammonia volatilization is just one problem caused by animal manure in the Netherlands. Others are:

More than 100 million animals produce 86 million tons of manure yearly. In certain areas it is impossible to spread all the manure in a responsible manner. This gigantic production leads to surpluses which cause overmanuring of the soil in many regions.

Sometimes it can even be considered plain dumping. Taking both the current agricultural standard for manuring (based on nitrogen) and the environmental one (based on phosphate) into consideration, far too much animal manure is produced in the Netherlands, with surpluses of 18 and 36 millions tons as shown in maps 3 and 4.

Via additives to fodder a lot of pollutants disappear into the soil with all this manure: copper which is added to pig fodder to improve growth, zinc, cadmium and residues of medicines. All these chemicals damage the soil, plants and animals.

Improving manure management can contribute much to diminishing the emissions of ammonia. Animal manure should be



Map 3: Areas with a manure surplus according to agricultural standards

Map 4: Areas with a manure surplus according to environmental standards

spread only during cool and moist weather and at the beginning of the growing season; the storage capacity for animal manure at farms must be enlarged so that it will no longer be necessary to spread the manure in the winter just because the pits are overflowing; the manure must be ploughed under directly and manure-injection equipment can be used.

There will have to be better facilities for the transportation of manure surpluses to areas where farmers can use it. Filters should also be fitted to cattle sheds to prevent the escape of volatilized ammonia.

New approach needed

Technical means for stopping the emission of ammonia exist in industry and they should be used. Most of these measures can be taken within the short term, and can contribute to a diminishing of ammonia emissions. The costs are however very high. To solve the other problems with animal manure, it will be necessary to gradually lessen the size of the livestock herds and to use manure more responsibly. This includes stopping the addition of pollutants to the fodder.

All this calls for a different approach to agriculture, an approach which integrates the interests of farmers, consumers, the Third World, and animals.

In the next few years, Dutch government policy aims at a more responsible distribution of manure throughout the country. By means of a temporary law the government wants to put a

stop to the expansion of intensive livestock breeding in the south and east and thus to the growth of ammonia emissions in these areas. The aim is to limit the total emission this year to 130,000 tons, and bring the amount down to 100,000 by 1990 and to 65,000 tons by the year 2000.

Polluter must pay

FoE-Netherlands are demanding a comprehensive solution to the problems caused by ammonia emissions from animal manure. Immediate measures (as indicated above) should be taken to diminish such emissions, with priority for the areas where intensive livestock breeding is concentrated and the greatest damage by acidification occurs. Structural measures must become an integrated part of agricultural policy: livestock breeding must become less intensive and more emphasis given to the environment and the well-being of the animals, as well as to incomes of the farmers and to employment in this branch of agriculture.

According to the principle "the polluter pays," agriculture will have to pay for the technical measures that will have to be taken, but the consumer must also contribute.

The Dutch government will have to discuss this problem with the other EEC governments and try to reach agreement in regard to an alternative structuring of intensive livestock breeding in Europe.

Leo Taekema
FoE Link 5/1985



Map 2: Soils (deficient in lime) sensitive to acidification.

Greens enter politics

On account of widespread concern on the part of those institutional bodies that are charged with the protection of the environment, there is little actual progress to report from Italy.

This is illustrated by a statement in a report made to the prime minister by the Minister for the Environment, which says: We risk seeing a general overstepping of the limits that must be adhered to if the laws against pollution are to be observed. In such cases the effects on the environment will be immeasurable.

As regards acid rain, there has only been one official investigation: that carried out in 1984 on behalf of the Department of Agriculture and Forests. This showed 5 per cent of the forests to be damaged. Although experts say that this is probably less than the actual damage, it makes clear that there is no time to lose.

During the last decade chemical analyses of rain have been made periodically at only five of the control stations run by the Meteorological Institute of the Air Force. Recently this information gap was however partly filled in by publication of the results of research carried out by an independent group consisting of academicians and experts from various part of the country as well as from the Nuclear Institute in North Italy.

Rain acid

For the purposes of the investigation the chemical characteristics of rain during one year, from October 1982 to September 1983, were analyzed at nineteen control stations spread over an area of 60,000 sq kilometres. The results showed a high degree of acidity, and contrary to the views of the Electrical Institute, only some areas of the Po Valley, such as around Milan, are likely to escape damage on account of having well-buffered soil.

In economic terms, the damage caused by acid rain, as assessed by the Nuclear Institute in 1984, amounts to 15 billion lire.

Government vacillating

Lately the government has started to back down on its program for lessening pollution from power plants. A national Energy Program passed by Parliament in 1981 emphasized the need to adopt every possible technological means for reducing the emission of pollutants. Here it was stated that the cost would be no obstacle to the increasing use of coal for power production. Now however Parliament is discussing a revision of this program on the basis of a government proposal which stresses the cost to the economy much more than the need to protect health and the environment. In the new text, concern is evinced over the effects of the EEC draft directive concerning emissions from large combustors, it being claimed that the installation of desulphurizing devices would considerably reduce the advantage of using coal instead of oil for the production of electricity.

In contrast, the Nuclear Institute has now come out in favour of introducing emission ceilings even for existing plants, and not only for new ones. It also proposes more stringent regulations than those in the EEC directive.

Success in local elections

At the conclusion of the Acid Rain Week on April 20 the Lega Ambiente organized a meeting of all the ecological groups "In the name of polluted people." Bringing together some 20,000 persons, this meeting became the focal point of all local opposition to new nuclear and coal-fired power plants.

Even more significant was the success of the "Green Lists" in the municipal, provincial, and regional elections on May 12.

Thanks to the proportional system, an average of 2.5 per cent of the votes permitted the election of 150 Green List representatives to various local authorities. In some municipalities in the Piedmont region, where people were worried about a proposal for a nuclear plant, the Greens obtained more than 20 per cent of the votes.

In the district of Rome, which is the biggest in Italy, with more than three million inhabitants, two Green representatives were elected, one being the president of the Friends of the Earth, Rosa Filippini.

This election success is the result of moves started by the Amici della Terra in 1982. It means the Italian ecologists have now overcome their reluctance to enter politics, and shown their willingness to stand for election - in the first place to the local authorities, which are responsible for 80 per cent of environmental policy.

Main sources of pollution

Sulphur dioxide (SO ₂)	%
Power plants	52
Industry	30
Road vehicles	6
Small emitters	12
Nitrogen oxides (NO _x)	%
Road vehicles	46
Power plants	24
Small emitters	16
Industry	14

B. Bonardi

*Amici della Terra,
Piazza Storza Cesarini 28,
00186 Rome.*



Nuclear power and automobiles

In September 1983, under incitement from the Germans, the French foresters set going a survey. In the Vosges, the DEFORPA program (dépérissement des forêts attribué à la pollution atmosphérique) was intended to permit

- Assessment of the damage through extension of the ground sensor grid and a study of the distribution of spoilage by remote infrared detection.

- Identification of the agents and causes of forest death by measuring the gaseous pollutants and acid depositions, and studying their effect in combination with hydrological stress.

- Research into the action of photo-oxidants and SO₂ on the chlorophyllous structures of fir and spruce.

Results obtained after one year confirmed that the malady was continuing. By 1984 it was found that 29 per cent of the fir trees, 16.5 per cent of the spruce, and 10.5 per cent of the Scots pine came under classifications 3, 4 or 5 (badly damaged, dying, dead). As for the relatively few deciduous trees in the area, 4 per cent were dying.

The seriousness of these findings has led the ONF (Office National des Forêts) to extend the area of observation from the Vosges to the Jura, the northern Alps, the Ardennes, and Morvan. All these regions are either exposed to winds from the south-east or southwest that carry large amounts of pollutants, or are noted as being frequently misty.

According to official estimates, 5,000 hectares of forest are badly affected, while another 30,000 are more or less damaged. The Minister for the Environment, Monsieur Bouchardeau, admits that more than one tenth of the Vosge forest area is affected.

Monsieur Bouvarel, head of the

forestry commission of INRA (Institut National de Recherches Agronomiques) concluded in 1983 that "forest dieback is connected with the increase in atmospheric pollution", adding however that it was not only due to acidification. "One must also keep in mind", he said, "the deadly effects of ozone and fluorocarbons."

Just as these conclusions were being drawn, a major parliamentary debate was getting under way on the subject of acid rain - showing that the French government is now beginning to take a serious view of forest death. Friends of the Earth fear however that it may all peter out in interminable arguments between experts.

Pollution from the roads

France's 25 million road vehicles are, together with stationary combustion plants, one of the main causes of atmospheric pollution. These sources are responsible for 50 per cent of the country's emissions of nitrogen oxides (precursors of acidity and photo-oxidants) and for 40 per cent of those of uncombusted hydrocarbons (also formers of photo-oxidants). Such pollution not only causes damage to vegetation, but also endangers human health - accounting for 70 per cent of the carbon monoxide emitted in France, as well as aldehydes, smoke, and metallic particles, including lead.

It is thus imperative to reduce it. Friends of the Earth (France) are opposed to different standards for different cylinder volumes (although they would accept different dates for the standards to come into force for vehicles with different engine sizes). In any case, there is no justification for denying motor vehicles' share of the responsibility for forest death.



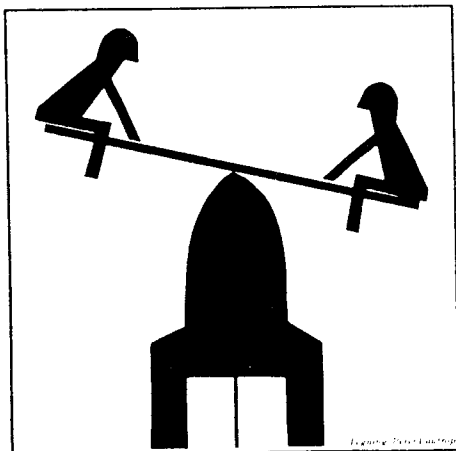
It has been established that ozone and other photo-oxidants (such as PAN) are violently phytotoxic (poisonous to plants), that heavy metals act as catalyzers, that the considerable increase in emissions of nitrogen oxides (as against a diminution of SO₂ emissions) is ascribable to road traffic. The synergetic effect of pollutants call for synergetic remedies. As it happens the anti-pollution regulations for automobiles can hardly be called severe. As concerns carbon monoxide and uncombusted hydrocarbons, the emission limits have not even been lowered by half since the issue of the first EEC directive in 1970 (a new directive was issued on April 13, 1981). The emissions of nitrogen oxides have in the meantime increased.

Prior to the directive of June 12, 1983, embodying new limits for all types of vehicle, the only emission limit for diesels concerned smoke. The new regulations came into force in October 1984 for new models, but will not be applicable until 1986 for existing vehicles.

In the United States, the limits on carbon monoxide and uncombusted hydrocarbons were reduced by 90 per cent between 1971 and 1983, and those on nitrogen oxides by 75 per cent. The Japanese have followed the US example, as the Swiss are also about to do. Sweden has got half way. So there remains the EEC, where the internal tensions are well known.

What will then happen?

In principle there is the standard, with each country deciding how to adhere to it. But if the European standard is to correspond to those of the Americans and Japanese, there is only one way to meet it, namely, by adopting the catalytic converter. The lean-burn engine has several disadvantages: it gives increased emissions of uncombusted hydrocarbons, it requires an electronic ignition system and possibly electronic injection. The extra cost would amount to about the same as that for a catalytic converter. In any case no engine of this type is yet available in Europe, and we are not prepared to risk further emissions of nitrogen oxides that the simple catalyzer envisaged for use with lean-burn engines is unable to deal with.



Nuclear alternative

The phasing out of twenty-five old thermal power plants will make it easy for France to make the promised reduction of emissions of SO_2 by 50 per cent between 1980 and 1990. But this is no example to follow. Chemical pollution can in general be neutralized (by filters, scrubbers, fluid-bed techniques, catalytic converters). Centuries and millennia are needed on the other hand to reduce radioactivity. Moreover,

- Nuclearization will not eliminate nitrogen oxides and ozone, which are more and more due to emissions from road vehicles.

- Under normal market conditions, except perhaps for the production of basic continuous power, coal-fired power stations, even if fitted with the most effective desulphurizing equipment, are less expensive than nuclear plants.

- It is less expensive to electrify a factory that would otherwise be emitting SO_2 than to equip it with desulphurizing devices.

For homes and small workshops insulation and heating control, as well as switching over to gas, heat pumps, or solar heating, should be more profitable than using electricity.

Such arguments have general validity, even in a supernuclearized country like France. For those countries that have kept the use of electricity within reasonable bounds, there is an additional warning: greatly increased electrification will require very large capital investments.

Stop press

The French government, including the Minister for the Environment, is now playing down road traffic as a major cause of forest

death. This probably affected the outcome of the recent meeting of the Environment Ministers of the EEC countries.

On the other hand an old demand by *les Amis de la Terre* has now been met. The system of "the polluter pays", which has already been applied in France with good results as regards water pollution, is to be extended to pollution of the air.

Every business will have to pay to a proposed *Agence de l'Air* a sum corresponding to the amount of its emissions. This agency, with a budget of 150 million francs, is intended to assemble a large expertise on anti-pollution techniques - and thus be able, in addition, to act as consultant to business firms. It will also, through grants and low-interest loans, support approved projects for controlling emissions and developing new techniques.

Dominique Martin
Les Amis de la Terre
72, Rue du Chateau d'eau
75010 Paris



Branch of spruce showing extensive needle loss. Whereas a healthy tree would retain the growths from the last 7-10 years, here only one year's needles are left.
Photo: Christer Agren

Views differ on Waldsterben

In the forests of Central Europe a number of new diseases have appeared and taken epidemic proportions. This has been especially the case in the last two or three years, and many trees have been affected. The phenomenon of Waldsterben can be perceived in natural forests and forests with exotic trees as well as in mixed stands. In Germany, for example, Waldsterben has occurred in forests of spruce and fir, in Czechoslovakia in fir forests, and in Hungary in the holm oaks.

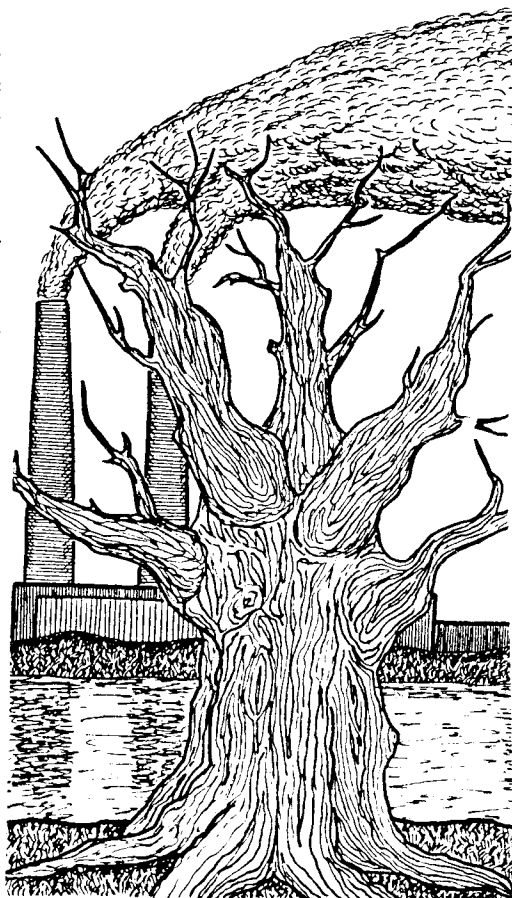
Our generation responsible

At the moment, there is no useful way of preventing Waldsterben. The only possibility is a drastic reduction in the emission of pollutants. Unfortunately, neither countries with a free economy nor countries with regulated economies give much reason for optimism as regards environmental protection. Not only are the trees threatened, but also, on account of erosion, over-fertilisation, etc., the very condition of the soil.

Our generation is responsible for the future generations, for our children and grandchildren. It is our moral duty to protect and conserve natural species, especially in the nature reserves. There is also a practical aspect - the existence of ecological systems is the only guarantee for the development of the natural sciences.

Debate in Hungary

In Hungary it is the holm oaks that are especially under threat. Lichtenthaler and Buschman have recently published some misleading information about Waldsterben in this country. They said that Waldsterben could be observed between the Austrian border and Budapest. This is not true; the phenomenon is very



Drawing: Anders Agren

rarely perceived in that particular region, and then only in the Keszthely and Bakony mountains. Waldsterben is found in the northern tablelands between Budapest and the Russian border, and also all along the Czechoslovakian border.

Up until the autumn of 1983 an average of 22 per cent of the holm oak population had died. The situation is critical in the Zempleni mountains in northeast Hungary, where 23 per cent of the higher tree crowns and 46 per cent of the lower ones are dead! Most of them have dried up. The sick and dead trees also show blockages of the trachea in the trunks.

In some parts of Hungary Waldsterben amounts to as much as 80 per cent - the 40-60 year old holm oaks being especially susceptible to infections and poisoning.

There are different opinions as to the causes. In the first place it seems certain that affected and sick trees aggravate the problem. It has been proved that sick trees absorb more aluminium and iron, as well as accumulating potassium in their roots. There is also little contact between the roots and micorrhiza moulds which is essential for nitrogen-fixation.

The explanation of Waldsterben has divided the Hungarian scientific world into two camps.

The first camp believes that forestry practices are the main reason. Trees of the same species and age-group, in combination with a nutrient depreciation in the soil, represent the main cause of deterioration of the ground and the trees loss of resistance to toxic elements, infections and pollution. Air pollution is just a secondary, minor problem.

The second camp believes that air pollution and acid rain is just as much a problem as forestry techniques, and perhaps the major one.

Solution international

As in other countries in Central Europe, the environmental movement in Hungary is highly concerned about Waldsterben. In the past few years the population of holm oaks has been significantly reduced in the Hungarian tablelands. It is possible for individual countries to introduce "tailor made" measures to save forestry and agriculture, but the fight against air pollution can only be successful if conducted on an international scale.

It is on economic, ethical, scientific, and social grounds that one hopes the solution for Waldsterben will be found - and found quickly.

R.L. Baross
TEJO
Balzac u. 11
1136 Budapest

Active ecological movement

The history of the Polish Ecological Club is connected with a national ecological crisis, which itself was part of a general economic and political one. To many of us, 1980 marks the birth of the ecological crisis. In that year people's eyes were opened to the destruction of the natural environment, although the crisis actually began in the seventies.

Economic growth had become such an obsession that environmental considerations were either waived aside or simply ignored. Take for example, the development regarding the country's second aluminium smelter near Konin, in central Poland. In 1973 official approval was given for creation of a three-kilometre protective belt around the plant. Nothing came of it.

In the summer of 1980 information and reports about the ecological situation, which had previously been suppressed or censored, became not only publicly available but were also widely discussed. It was possible to read in official governmental reports about regions in Poland which were subject to ecological catastrophe. These were notably Silesia, Cracow, the Copper Basin and the Gdansk coast.

Effects of pollution

In Poland, the main source of pollution is industry. It is responsible for 65 per cent of the air pollution, while transportation is the cause of 35 per cent. Consequently the worst pollution effects are associated with centres of industry, which are also the main centres of population. The Voivode of Katowice is Poland's largest industrial region, producing the 30 per cent of the nation's wealth. It covers only 3 per cent of the land area, but includes over 11 per cent of the country's population. It produces 31 per cent of Poland's coke, 32 per cent of the electricity, 52 per cent of the steel and 98 per cent

of the country's coal. According to official statistics this region is responsible for 32 per cent of all gas and dust emissions. It is estimated that 70 per cent of its inhabitants live in conditions that are injurious to health. From studies in the Szopienice district of Katowice it appeared that 35 per cent of the children and adolescents that were examined had symptoms of lead poisoning, which until recently had been classified only as an "occupational disease." There was 30 per cent more cancer there and 47 per cent more respiratory disease than in the rest of the country.

High sickness rate

In the old historic city of Cracow the situation is in many ways even more serious. The city has the highest infant mortality rate in Poland (258 per 100,000 inhabitants, national average 184). Occupational illness in Cracow amounts to 92 cases per 100,000 workers as compared with national average of 63 per 100,000. The two main sources of pollution are (or were) the aluminium smelter at Skawina and the Lenin steelworks in the Nowa Huta part of Cracow.



Photo: Hans Östborn

Reaction started

The 1980 official report showed that losses to the national economy could amount to 280-480 billion zlotys annually, as a direct consequence of environmental degradation. The escalating costs of treating drinking water, recultivating devastated agricultural and forest land, and of the already stretched health services, led to the conclusion that environmental safeguards and protection must form a part of any social and economic reform. Local interest groups, together with academicians and journalists, began seriously to discuss the question of man's true relationship with nature. Independent groups began to formulate a new environmental strategy based on respect for human and natural resources, as opposed to a policy of domination and exploitation founded on a blind faith in science and technology.

As a result the Polish Ecological Club (Polski Klub Ekologiczny) was established on September 23, 1980, in Cracow. It was started by a group of trade unionists, journalists, doctors, and academicians, who were concerned about the destruction and mismanagement of the environment in and around Cracow, and were determined to do something about it. The Polish Ecological Club is the country's first truly independent environmental pressure group and it recognizes the social nature of environmental problems. It quickly grew in popularity and was finally officially recognized and registered on May 25, 1981, in Cracow, having then set up seventeen branches in all the old provincial capitals.

The club began the work of opening people's eyes to the destruction of the natural environment and informing them of the danger to health and life that this brought about. We initiated inquiries by experts and the documentation of evidence, so as to be able to intervene effectively in the most serious cases.

Major successes

One of the club's biggest successes, and certainly the most widely publicized, was in bring-

ing about the shutting down of the Skawina aluminium smelter, one of the country's biggest polluters. The closure was ordered by the Minister for the Iron and Steel Industry in January 1981, following a massive local campaign which included a court action by local residents against the plant management and the local authorities, claiming compensation for damage to health from the toxic wastes produced by the smelter. This closure and its aftermath proved to the Polish people, as perhaps nothing else could, the emptiness of the slogan of the sixties: "Technology will repair what it has destroyed."

Nor was the closure of the Skawina works the Club's only success. It has also forced that of other polluting industries, which had been built without any facilities for treating their wastes and effluents. It has forced a reassessment of many industrial planning decisions, as well as, the rehousing of people endangered by environmental hazards, as for instance in Legnica where houses had been built next to the huge copper works.

Other activities

The Polish Ecological Club not only demands the closing of factories, but helps to solve ecological problems in other ways too. After the closure of the Skawina smelter local farmers are still fighting to get the polluted land officially recognized as unfit for recultivation and to receive compensation. Our experts help and give advice as how to regenerate land.

As an alternative movement we also make proposals for changing technology and factory production methods. One example of this strategy is a proposal for change at the Lenin steel plant, the biggest polluter in Cracow. In 1981 we held a big discussion meeting on the acid rain problem and air contamination by sulphur compounds from the steelworks. As a result of this discussion we demanded changes in production methods and a general modernization of the plant. Our proposals have now been included in official plans.

Another example of successful club action is the preparations by the government for declaring the city of Cracow a strictly protected area (in the meaning of our law), in order to save historic monuments from further destruction. New norms will form the basis for the compulsory reduction by industry of emissions of pollutants - not only SO₂, NO_x and dust, but also other polluting substances.



We have been fighting for these norms in Cracow since 1981. After the shutting down of the Skawina smelter, this is our greatest success and on basis of the government's decision we are now demanding a revision of the development plans for Cracow.

New kind of ethic

Ecological education plays a big role in our activity. Every week we have a meeting in Cracow - called Thursday with Ecologists - where we speak about ecological problems. These meetings are open for everybody. Among the means for ecological education we use films and the theatre. Recently we have had big support from artists and painters, which is very important, since these groups are formers of opinion. We also have special proposals for ecological education in schools of all levels.

The Polish Ecological Club is an independent, apolitical, social movement for those who are aware of the dangers connected with the disturbance of the biological balance in an era of technical and industrial development and a consumer society.

Our program represents a new kind of ethic - an ecological ethic, an ethic of life and survival. This

shift towards a more "ecocentric" view of man and nature, is essentially a reaction to the failures of the economy in the last decade, with mismanagement of human and natural resources and investments in large-scale prestige projects. It is a reaction to the fast deteriorating living standards of millions of working people, as a direct result of health hazards. We stand for a shift in ideology away from the values hitherto existing in planners' thinking. Underlying those values was a sense of optimism and faith in the ability of man to understand and control physical, biological, and social processes through science and technology. Poland's current economic and ecological crisis has however shown such optimism to have been disastrously misguided. Limits to growth as well as self-reliance and decentralization are key elements in the fight against the dehumanising effects of industrialization. Man is subject to natural laws, and if the ecological crisis is to be overcome, nature must be held in greater respect.

Preferring progress, but not always growth, we accept development in accordance with rules of Nature. We agree with plans of investment, if they include rules for ecodevelopment. In this sense we organize public discussions of government intentions and give our opinion.

A Polish NGO

The statements of the Constitution of Polish People's Republic, the Stockholm Declaration, the Common Declaration of Human Rights, and the Geneva Convention are the basis for the club's activities. Article 12, paragraph 2 of the Constitution states that: "The Polish People's Republic will ensure the protection and rational development of the natural environment, which constitutes both a national resource and part of the common heritage."

The Polish Government participates in international environmental politics and initiatives and signs many conventions. Information about environmental laws and conventions which have been signed by the Polish Gov-

ernment are handled as a part of our public ecological education. In this sense our movement is a movement for human rights, developing on a basis of democracy.

The club works on the principle of cooperation between enthusiasts, scientists, and publicists. These work in committees composed of specialists in chosen topics, as well as in local groups. The Polish Ecological Club counts 3000 members in the whole of Poland - the Malopolska Branch in the south alone having a membership of 700. The board's headquarters is in Cracow. As an independent movement the club gets no money from the government. We may be poor financially, but we are rich in new values: we aim to be the ecological conscience of Poland's citizens.

Dr. Zygmunt Fura
President Polish Ecological Club
Malopolska Branch - Krakow
Rynek Gl. 27
Palac Pod Baranami
31 010 Kraków
Poland

ACID RAIN CONFERENCE

Unifying Network created

The "International Citizens Working Conference on Acid Rain" held May 20-24 in The Netherlands, and convened by Friends of the Earth International, was attended by more than 70 delegates from altogether 28 countries, including most of the West European countries, as well as Poland, Hungary, Canada, USA, Hong Kong, Philippines, Malaysia, Indonesia, Brazil, Argentina and Mexico. One of the successes of the conference was the meeting of activists from very different cultural and socio-economic situations. Regional meetings, as for instance of North American and Northwest European delegates, and North/South discussions were also very productive.

An important result of the Conference was the creation of the "Air Pollution Action Network",

to be coordinated by the Secretariat of Friends of the Earth International (FoEI) and WISE-Amsterdam. The Network's tasks will be twofold, dealing with both information and action.

On the information side, the Network will strongly emphasize North-South relations concerning air pollution. Issues of concern will be the double standards in decisions about the location of polluting industries, where transnational corporations export these activities to areas with much lower emission standards and lower wages, and where there is strong repression of trade unions, consumer organizations and environmental groups. Activity to improve standards in order to reduce air pollution in the North is likely to accelerate the tendency to export of hazardous industries to less developed

countries. This problem needs to be taken into account and therefore, campaigns against transnational polluters need to be coordinated internationally.

The Network will also stimulate the exchange of information concerning more technical aspects, such as information on emission limits, deposition limits, control and abatement technologies, soft energy paths in relation to air pollution, etc.

On the action side, the tasks of the network will be to stimulate coordinated actions on air pollution issues, such as the International Acid Rain Week.

The Air Pollution Action Network will consist of a loose structure of groups agreeing to undertake actions, "twinning" and joint lobbying. WISE/FoEI and the Swedish NGO Secretariat on Acid Rain will be the

Another result of the Conference was the decision to launch campaigns in the UK and the USA, the two largest contributors to acid rain among western industrialized countries. The campaign in the UK will focus on the tourist industry, the UK's second major industry, with a call to boycott the UK as a holiday destination until its contribution to air pollution has been drastically reduced. As a part of the Campaign, citizens of continental Europe will be asked to send pre-printed postcards to UK hotels and tourist information offices.

The US campaign was formulated by conference representatives from Mexico, the USA and Canada who identified major

Interested groups can be informed of these and other acid rain activities through the Air Pollution Action Network.

The conclusions of the Conference were manifold. With reference to the proposed theme for next year's International Action Week, it was concluded that the solution to air pollution on the present large scale was to change energy usage patterns and that groups concerned about acid rain do not have sufficient information on soft energy alternatives. Acid rain was considered another reason to implement soft energy strategies as soon as possible.

Further it was concluded that saving European and American forests would require reductions of air pollutants by at least 75 per cent and 50 per cent respectively within the next ten years. Pressure will be put on the Economic Commission for Europe (ECE), the European Economic Community (EEC), and the Organization for Economic Cooperation and Development (OECD) to help bring about these reductions. All steps in this direction should be supported by the environmental movement.

WISE-Amsterdam News Communiqué, June 1985



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