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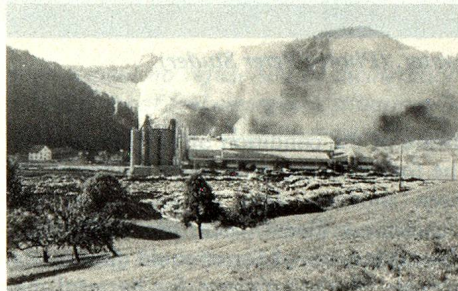


to be found in the air as nitrogen dioxide, are today three times that of 1960. Approximately three quarters of the NO<sub>x</sub> discharges in Switzerland come from the road transport sector, i.e. from fuel combustion. Although the exhaust norms for petrol driven cars, stipulating that all cars produced since 1987 must have a catalyser, have gradually reduced the emission of NO<sub>x</sub>, there will still be twice as much nitrogen oxides being discharged in 1995 into the Swiss air as was the case in 1960. By then at least half of these discharges will be coming from transport (chiefly from lorries), should no further action be taken. Nitrogen dioxide is a poisonous gas, above all harmful to the human respiratory ducts. Sunlight changes the nitrogen oxides into ozone, causing the well-known summer smog and which, based on the knowledge we have to date, is a chief contributor to the forest death.

● The emission of hydrogen carbons (HC) has doubled since 1960. 60% of these emissions come from industrial and business source groups. 80% of this groups discharges derive from the evaporation of solvents used to thin paints and varnishes, to scour metals, in dry cleaning or as an adhesive or cement in road construction. Roughly 27% of HC emissions are a result of traffic due mainly to incomplete fuel combustion. Therefore a rationing of fuel

and solvents would quickly and effectively reduce the amount of HC discharged. HCs also contribute to the production of ozone. Within the broad classification of HCs there are also highly toxic compounds such as benzene, benzopyrene, chloride compounds such as perchloroethylene, fluoride hydrocarbons (fuelgas in aerosols) or polychloride biphenyl (Seveso poison).

Those who associate air pollution with smoking chimneys and sooty shirt collars



*Chipboard factory in rural Lucerne: Arduous enforcement of the air purification regulations. (Photo: Martin Urech)*

will be of the opinion that the Swiss air is clean in comparison to other industrial states. All the more toxic though are those harmful elements which remain invisible.

*Hanspeter Guggenbühl*

#### Water and Soil Protection

## Fertilizers and pesticides under attack

*Water was the leading environmental problem around 20 years ago. The nationwide construction of water purification plants has eased the situation today. The level of fertilizers present in our central lakes shows however that the condition of our water is far from ideal. A lot also remains to be done in the area of soil conservation.*

Concern at the pollution in our lakes caused by the waste created by modern civilisation saw the awakening of our ecological consciousness. This led to the inclusion of an article in the Constitution as early as 1953 which led to the Water Protection Law four years later, to be strengthened in 1971. The effect of this law and the regulations deriving from it are notable. A direct consequence is that 4 in 5 inhabitants are today connected to one of the approximately 800 water purification plants (ARA) in our land. These have all been built over the past 25 years. It is only thanks to this incredible effort, that cost the Federation, Cantons and Local Authorities over 20 billion Swiss

Francs, that we are able to swim in the lakes again, which were once so polluted that they were a health hazard. It is also thanks to this effort that we are able to catch noble fish in our rivers again.

#### Over-Fertilization of the Lakes

There is still a long way to go before we have solved all the problems connected with water protection. The ARA are not always able to provide an immediate solution to water pollution. Certain lakes in particular require additional assistance. Air and pure oxygen for example are pumped into the lake of Hallwyl.

Most plateau lakes suffer from an excess of

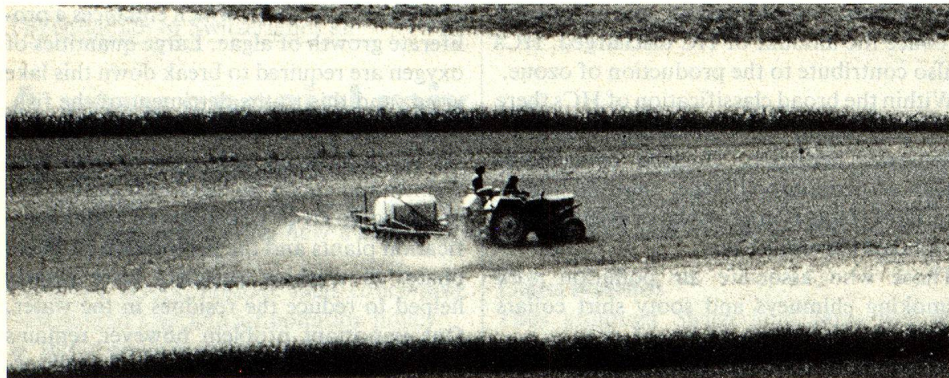
phosphor, a fertilizer which enhances a proliferate growth of algae. Large quantities of oxygen are required to break down this lake weed, and this to the detriment of the fish. Thus there is 2.5 times excess phosphor in the north basin of lake Lugano, and even 5 times too much in the south basin. The breaking down of phosphor by water purification plants and the prohibition of phosphates in washing powders have greatly helped to reduce the residues in the water. One important problem however remains unsolved: Excessive quantities of fertilizers are still being used by agriculture – the chief culprit as far as water pollution is concerned, as these fertilizers contain large amounts of phosphor which infiltrate the groundwater and consequently the rivers and lakes.

Agriculture is also responsible for groundwater contamination through nitrates (also used as a fertilizer) and pesticides. Thus the discovery of Atrazin – a weedkiller – in groundwater made headlines. Another example: a considerable number of Local Authorities discourage their inhabitants, and in particular children, from drinking tap water as a result of the high nitrate level in the drinking water.

#### Fighting pollution at its origin

Fertilizers and pesticides are only a part of the substances whose production, storage and transport present a danger to the groundwater. The «Ordinance for materials endangering the environment», which came into force two years ago, is one of the predominant Federal Ordinances in this field. This demands that each new substance should firstly clearly state the consequence it will have on the environment. It also stipulates how the consumer is to be informed (labelling, directions for use) and limits the usage of many products; this includes the use of heavy metals, of «Pyrale» and other phenols which are used in wood protection, and the use of certain ingredients to be found in washing powders etc.

The Ordinances chief target is to fight pollution at its source. Far too many of these substances infiltrate the groundwater, rivers and lakes or can be shown to be present in the soil. Dust, rain or sewage sludge are responsible for this – the latter of which is used in agriculture. Sewage sludge contains large amounts of harmful elements, which when present in a high enough concentration can have a negative influence on plant growth. Lead, for example, damages root growth; cadmium and fluoride disturb micro-organic development which plants need, whilst acids attack the chalk and clay



*Pesticides used for agriculture burden soil and water. (Photo: Peter Studer)*

particles in the soil. Absorbed by the plants, these harmful substances find their way back onto our plates through the food chain.

**Our soil – the big unknown**

Whilst the health of our water has been concerning us for over a quarter of a century, the necessity to protect our soil from pollution has only been preoccupying us in recent years: We have become particularly

aware of the condition of our soil through the forest deaths. Ever since the forest has been showing signs of an overall and treacherous illness, there have been fears that wide areas of forest could die and disappear. The «Ordinance for harmful materials in the earth» which has been in force for two years, is an important step towards putting the 1983 Law for the Protection of the Environment in the area of soil fertility into effect.

This Ordinance lays down set limits for certain harmful materials and in addition establishes the legal basis for a surveillance system. This is in the development stage at the moment and consists of a national net of ground observation stations known as NABO. Not to be forgotten are also the efforts being made by scientists in this area within the framework of national research projects. We actually know very little about this vital part of our environment, which, contrary to all appearances, is really teeming with life: every square metre of ground contains 2½ kilos of living organisms – of which 1 kilo of toadstools, 1 kilo of bacteria and 200 grams of earthworms. The protection of this part of the environment, which may not appear all that spectacular, is absolutely vital. The problems may be only too difficult to solve, but they must be solved at all cost. The Swiss Society for the Protection of the Environment has tried to put this fact into words in the form of a warning in which the main message is: Water can be purified, air filtered but how are we to «clean» our poisoned soils?

*Jean-Jacques Daetwyler*

International Environmental Protection

**Forerunner Switzerland**

*Switzerland has always been reproached for going out on its own whenever it has introduced regulations in the interest of the environment, stricter than those being enforced in the rest of Europe. At the same time Switzerland has engaged itself avidly in an intensification and harmonisation of international environmental protection measures over the past few years.*

Switzerland was one of the leading forces in the drafting of the Geneva Convention on long-range transboundary air pollution and for the three protocols which put the convention into concrete terms. The latter concerned themselves with the financing of a European measuring and evaluation system for air pollution (EMEP) as well as with the reduction of sulphur and nitrogen emissions. Switzerland was equally involved in last years conclusion of the Montreal Protocol on ozone-depleting substances. The aim of this protocol is to reduce the production and usage of fluoride hydrocarbons which according to scientific findings are responsible for the ever increasing hole in the ozone layer over the Antarctic. Switzerland, together with the Netherlands, was the joint instigator of last years meeting of the Ministers of the Environment of the European Economic Community (EEC),

the European Free Trade Association (EFTA) and the EEC-Commission. It was decided at this meeting that a formula should be drawn up to organise the cooperation between the EEC and EFTA States as well as the EEC-Commission in matters concerning the environment. The long term goal is a common European environmental policy.

**Risky Waste Tourism**

The endeavours to draw up an international regulation for the export of dangerous wastes date back to an initiative taken by Federal Councillor Egli at a Geneva Conference in 1983. This initiative followed the criss-cross journey the Dioxine barrels from Seveso made through the whole of Europe. A Conference of the Organisation for Economic Co-operation and Development (OECD) at minister level held in Basle at the

invitation of Switzerland in 1985 concluded that an effective observation and control system for international transport of hazardous wastes should be prepared, together with a legally binding treaty. This should be ready for signature by the end of this year. In the meantime the governing council of the PNUE (United Nations Environment Programme) has decided, on the initiative of Switzerland and Hungary, to negotiate a global control system. This is being prepared by a group of experts with a Swiss as chairman. The treaty bases itself closely on the OECD system and has the following principles:

- The production of dangerous wastes should not only be kept to a limit wherever possible – their import and export should also be kept to a minimum, providing this has no detrimental effect on an efficient, rational and environmentally justifiable waste management.
- Those exports which are nonetheless imperative are to be subjected to a strict control system from start to finish. All exports must be registered with the exporting and importing countries before they are undertaken. Transportation may only then begin when all the States involved have given their consent. The authorities of an exporting country is to refuse consent should there be any doubt as to the safety of