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The condition of Switzerland's air

## A very special mix

*Some say that Switzerland is «Europe's prime example» in the fight against pollution. Others counter with the fact that the toxic content of the Swiss air exceeds the stipulated health limits. Both parties have a case. However that won't improve the air around us.*

There are several positive facts concerning Switzerland's air and air pollution policy.

- Based on its population, Switzerland has the smallest sulphur dioxide discharge in the whole of Europe. Reason: The average sulphur content of petroleum products used in Switzerland is lower than elsewhere in Europe thanks to strict regulations. Added to this: The majority of sulphur dioxide discharge comes from industry. Since Switzerland imports a large proportion of finished or partly finished articles for the heavy and chemical industries, there are many chimneys emitting our pollution on the other side of our borders.

- Besides Austria, Switzerland has the strictest car exhaust regulations in Europe. She lies however 10 years behind the USA and Japan. All the same the real benefits of the strict exhaust regulations will not come into full effect until the 1990's, since they are valid for new vehicles only.

- In its air pollution ordinance (LRV) Switzerland has set the same strong limits on toxic discharges from industry and trade centres as West Germany. However positive results of the LRV regulation will not be felt until the 1990's due to the time limit set for the necessary improvement measures to be made.

### Limits exceeded

Thus although Switzerland fares well in comparison to the rest of Europe, our air is not clean enough. Various poisons in the air (especially nitrogen dioxide and ozone) exceed the discharge limit as set down for health protection in the LRV. Zurich and Basle, to take two examples, show annual nitrogen dioxide air readings which exceed by two the permitted limits. It is argued that «the imissions limits have been set too low». It is true to say that these limits are lower than in most other countries, but they are not too low: They correspond largely with the imissions limits recommended by the World Health Organisation.

It doesn't take figures alone to show that there is too much poison in the air. The effects are already to be found in nature and man. The forests are dying. Most scientists doing serious research into this, agree that the prime reason for the forest deaths is air pollution. Doctors have noted with concern that the number of cases of throat and lung illnesses, as for example chronic bronchitis, have increased dramatically over the past few years especially in children.

### Far off the target

The environmentalists, economists and po-



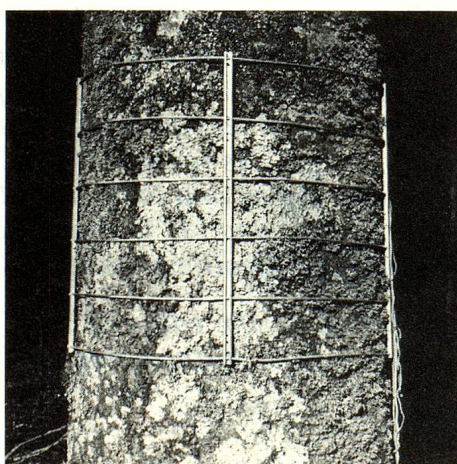
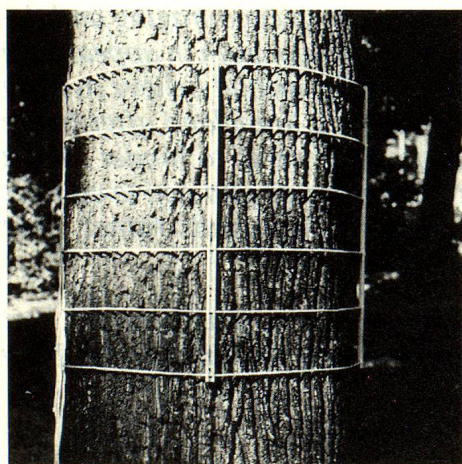
Official poster of the air purification campaign of the Federal Office for Environmental Protection.

liticians agree in theory: Air pollution in Switzerland must be reduced. The goal laid down by the Federal Council in its Air Pollution Concept to save the forests is for the amount of air pollution to be limited to the levels of 1960. Parliament pledged its support to this goal in 1987. Experiments made on annual rings in trees have shown that the forests had already started to die at the end of the '50's. However if this goal is really to be reached then the measures already taken by the Federal Council (exhaust norms/air pollution ordinance) or those to be taken will not suffice. This is not a mere claim coming from the environmentalist organisations. It is supported by calculations made by the Federal Office for Environmental Protection and a study undertaken by Electrowatt AG. Environmentalist organisations demand that this goal be reached by reducing fuel and solvent consumption by one third by means of immediate rationing. The automobile and industrial associations are opposing this demand vehemently. The general majority in Parliament is also against the introduction of such severe emergency measures.

### Discharge reduction

Not to be disputed is the fact that the amount of discharges coming from the nitrogen and hydrocarbon groups, which have increased enormously since 1960, must be reduced drastically:

- The readings of nitrogen oxides (NO<sub>x</sub>),



Since lichen are approximately ten times as vulnerable to the air quality than other plants or man, they are the ideal early warning system for air pollution. The amount of air pollution is critical when no lichen can grow (left, city centre Zurich). Healthy lichen growth (right, in a rural area) indicates a low pollution level. This measuring method was developed within the framework of the national research programme 14. (Photos: Rolf Herzig)



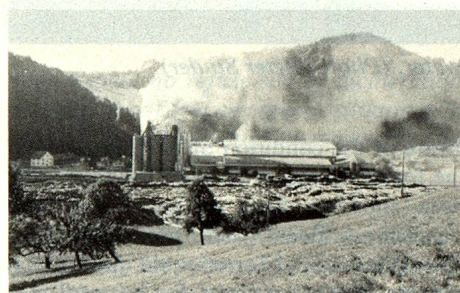


to be found in the air as nitrogen dioxide, are today three times that of 1960. Approximately three quarters of the NO<sub>x</sub> discharges in Switzerland come from the road transport sector, ie. from fuel combustion. Although the exhaust norms for petrol driven cars, stipulating that all cars produced 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, benzpyre, 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*

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 «Pyrrole» 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

## 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