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Number 20

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EDITORIAL

Lujo TONCIC-SORINJ
Secretary General of the Council of Europe
September 1969 - September 1974

This issue of "Naturopa" is devoted chiefly to water and the current problems of safeguarding and improving its chemical and physical characteristics. The Council of Europe is endeavouring here to contribute something of its own to the universal effort made to make the protection of the environment everybody's business.
Man's depradations have now reached such a stage that the harm he has caused to the environment can no longer escape attention. Ecology has shown us not only the close interdependence of water and the other elements of which our environment is composed but also the deadly consequences of man's illconsidered actions, which are always in danger of upsetting the delicate balance of existing situations. Water has at last been recognised as something more than an inexhaustible, all-purpose consumer product.
Now that water has thus been reinstated in its proper place in the world order, we may pause to think back to what is has always meant to poets and dreamers. Water has indeed always been a source of inspiration to the peoples of antiquity and to our own poets.
Primitive man had of course no idea of the water cycle. That came with the progress of science, which has shown us how water is constantly. turning into vapour and clouds which, in turn, precipitate themselves as rain. And yet a number of philosophers of antiquity imagined structured systems to account for the phenomena of springs, lakes and rivers. Plato describes a world-wide network of underground canals in which vast quantities of water flow at different temperatures. The canals meet in the centre of the network without it being possible to stop the flow of the water. The pressure thus built up causes the water to escape, either towards the centre of the earth or upwards, to form springs, rivers, lakes and seas.
Others see water as the tears of our Mother Earth, or her blood, or the milk from her breast. To explain the origin of water the male principle is also invoked. This it is that forces Mother Earth to release her streams.
The sun, another image of the male principle, gives life to the springs, just as it is also the instigator of plant life. In the imagination of poets, water is essentially a means of seeing oneself and being seen. Clear water, springs, pools and running streams naturalise the human image as they reflect it. For Claudel water is "the eyes of the earth — earth's means of looking at time". Pure water is also seen as a "sort of substance of substances, for which all other substances are attributes" (Bachelard). Let us remember too the sexual signification of the river, a transposition of feminine nakedness.
Deep, sluggish or stagnant waters, on the other hand, are often evoked by poets to suggest sadness. In the poetry of Edgar Allan Poe water is often an invitation to death : "Water is no longer something one drinks ; it is something that drinks ; it swallows shadow like a black syrup".
For Claudel, underground waters carry a suggestion of purification. If one digs down into the earth one comes to water. This groundwater, this underground lake, from which an altar emerges, will be a "settiing tank for polluted water". Here the water symbolises Heaven. A similar image occurs in Edgar Allan Poe's description in the little lake of "Landor's Cottage" : "The trout and some other varieties of fish, with which this pond seemed almost inconveniently crowded, had all the appearance of veritable flying fish. It was almost impossible to believe that they were not absolutely suspended in the air". Thus water, by peopling the sky with fish, becomes a sort of universal haven.
The quality of life seems in process of becoming a parameter which will henceforth have to be taken into consideration in the difficult choices that have to be made between socio-economic progress and the protection of the environment — choices that will determine the vital role of water in the economy of the biosphere. It will depend on them too whether the law of the "four elements", which classifies the various manifestations of our imagination according to whether they partake of the nature of fire, air, water or earth, will still stand. The voice of water must continue to be heard.

THE EUROPEAN CONVENTION ON THE PROTECTION OF INTERNATIONAL WATERCOURSES AGAINST POLLUTION

Ambassador Emanuel DIEZ
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The starting point for the Council of Europe's work on this convention was a draft European convention on the protection of freshwater against pollution, adopted by the Consultative Assembly in May 1969. This latter text was appended to the Assembly's Recommendation 555, which proposed that the Committee of Ministers set up a committee of governmental experts to prepare a European agreement. Its key feature was a set of clauses defining a state's liability towards the nationals of other states who had suffered damage due to water pollution originating in its territory.

When examining the Consultative Assembly's draft, the Committee of Ministers noted that the virtually unlimited causal liability it provided for in respect of states not only went much further than current public international law but also prejudiced to an unacceptable degree the interests of upstream countries, which would have difficulty in subscribing to such an arrangement. Furthermore, the Committee of Ministers regretted the absence of pratical measures for combating existing pollution and preventing any further pollution. The proposed system for settling disagreements between states was also found to be inadequate. The Council of Europe Secretariat was accordingly instructed to draft a completely new set of provisions with the help of scientific experts possessing the relevant specialist qualifications.

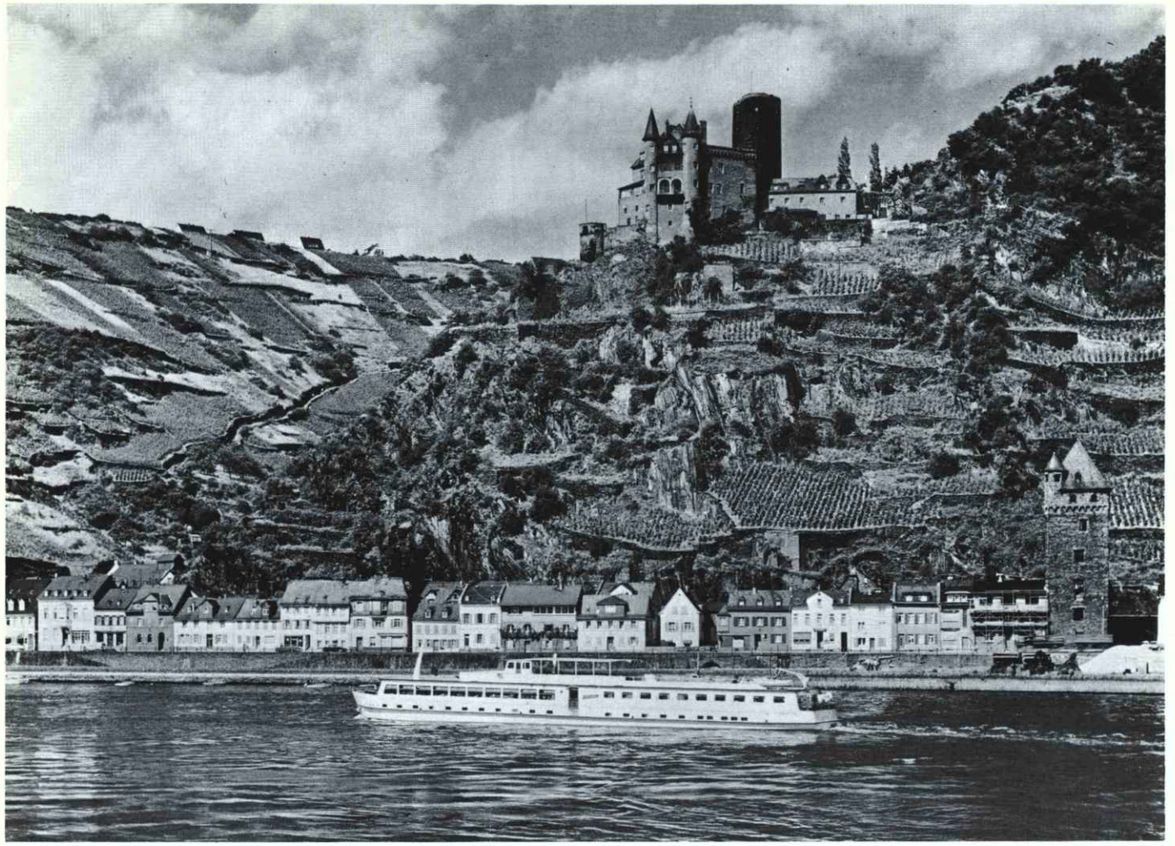
These provisions were used as a basis for discussion by an ad hoc committee of legal and technical experts which began work in early 1971. The draft convention thus drawn up by this committee was recently submitted to the Committee of Ministers for finalisation. The Committee of Ministers will now not only have to settle the various political questions still unresolved but will above all have to decide whether and in what form the convention should be opened to signature by the Council of Europe member states and possibly by other states. As it now stands, the draft is a European outline agreement which seeks to combat water pollution by prescribing practical measures based on minimum standards and providing for the setting up of regional commissions ; wherever such a body does not already exist Contracting States are expected to create one, on a bilateral or multilateral basis, either for an international watercourse as a whole or for important sections thereof.

During the drafting of the text, the conflict of interests between upstream and downstream countries became a major issue at the outset. Here again, it was obvious that highly strict requirements for upstream countries had no chance of being accepted unless downstream countries were at the same time prepared to take on equivalent or at least comparable obligations. In the discussions the view was expressed that downstream countries should for their part be made responsible for purifying their effluent in the neighbourhood of river mouths and that their acceptance of an obligation to keep their coastal waters clean could be regarded as counterbalancing what was required of upstream countries. However, on the initiative of the French Government, a separate convention was subsequently drawn up in Paris on the prevention of marine pollution from landbased sources. The conclusion of this instrument, which applies to the North Sea, the English Channel and the North-East Atlantic (but not to the Mediterranean), enabled provisions on coastal waters to be excluded from the Strasbourg convention.

The scope of the convention initially gave rise to much discussion. The experts were unanimous in thinking that the convention should apply to international watercourses, that is to say, to watercourses which separate or cross the territories of two or more states. A proposal that all tributaries of international watercourses should also be covered by the convention met with opposition from countries with no coastline.

They pointed out that, in that case, all their watercourses would without exception come within the scope of the convention and hence be subject to international control, whereas numerous rivers in states that did possess a coastline would be excluded from its scope because they were purely national. In the view of upstream countries, such an unequal distribution of the obligations arising out of the convention would be politically intolerable.

In its present form, the convention applies as a rule to international watercourses only. The minimum water quality standards to be laid down by the special commissions are intended to be applicable first and foremost to such watercourses. Where no such commission exists, the standards set out in the appendix to the agreement will apply. The same regulations are normally valid for the vicinity of river mouths too, i.e. as far as the point where a river's water becomes saline because of the sea. In exceptional cases, for which special rules should be laid down, certain rivers or sections of rivers may be exempted from the regulations for a limited period. An absolute ban on the discharge of certain dangerous or harmful substances listed in another appendix to the agreement applies to all international watercourses and their tributaries. Further, Contracting Parties must do everything in their power not only to prevent any increase in the pollution of international waters but also to bring about a gradual improvement in their quality. With regard to inland waters — which also includes national waters — Contracting States must endeavour to take all appropriate measures to reduce existing pollution and prevent any new forms of pollution. Should any cases of serious pollution suddenly occur, states must warn one another and immediately take the requisite steps, either unilaterally or in collaboration with the other countries affected. To enable the application of these provisions to be supervised, periodic reports have to be sent to the



The River Rhine - a symbol in many respects

Council of Europe Secretariat. The convention also provides for special machinery to adapt the various technical specifications and if possible make them more strict, especially the abovementioned minimum standards and list of totally prohibited substances.

As already pointed out, the convention contains no new obligation for states regarding their liability for damage caused by water pollution. Consideration of these problems took place against the background of the sharp conflict of interests over the River Rhine. The Consultative Assembly's proposal, which essentially envisaged unlimited causal liability for states, was well-intentioned but went much too far. It naturally alarmed governments and finally led them to reject even a much milder liability clause. In order that the lack of provisions on liability should not be interpreted as meaning that state liability as embodied in the rules of general international law is precluded, the convention explicitly stipulates that the prevailing legal situation remains unaffected. It was regrettable that a Secretariat proposal in favour of limited state liability was not adopted, for it would undoubtedly have led to an improvement in the present situation and would also have been perfectly accepable to countries situated upstream. According to this proposal, a country would not be liable unless, in violation of the convention, it had either itself caused pollution having repercussions beyond its frontiers or permitted or tolerated such an act by a private individual.

Disputes between Contracting States concerning the interpretation or application of the convention or of agreements on the special commissions must be submitted to an arbitral tribunal, unless the parties concerned agree on some other procedure for peacefully settling their differences. In the case of major international waterways, such as the Rhone, several riparian states may be involved in an international dispute, either as plaintiffs or as respondents ; and in exceptional cases, a state may play both roles simultaneously. An attempt to work out a special equitable procedure for such cases was abandoned on account of the almost insurmountable institutional difficulties encountered. As the main object is to prevent two parallel sets of proceedings being instituted on the basis of different facts, the presidents of the arbitral tribunals involved will have to agree on an arrangement for at least co-ordinating procedures for the establishment of the facts. As a European agreement, the convention is open to all Council of Europe member states. It has not yet been decided whether it will be open to other countries too. In practice, this would mainly mean the East European countries and the Asiatic neighbours of Turkey. The ad hoc committee understandably felt that this delicate matter was mainly a political one and should therefore be settled by the Committee of Ministers.

To sum up, it may be said that the draft convention, although leaving many questions open, is nevertheless the first serious attempt in Europe to find

a multilateral solution to the problem of protecting freshwater against pollution. By reason of the complexity of the problems involved and the diverging interests of the states concerned, it was impossible to solve every problem straightaway to the satisfaction of all. The draft represents the maximum that could be accepted by the majority of Council of Europe member states at the present juncture. It is therefore to be hoped that their governments will not only sign the convention as quickly as possible but will also ratify it in due course.

THE FUTURE EUROPEAN CONVENTION ON THE PROTECTION OF INTERNATIONAL WATERCOURSES AGAINST POLLUTION

IMPLEMENTATION

Professor H. GOLSONG
Director of Legal Affairs,
Council of Europe

1. The campaign to control water pollution can draw, both in theory and practice, on a wide range of measures and instruments, distinguishable both by the effects which they are calculated to produce and the circumstances in which they can be used. As far as legislation and legal regulations are concerned, the following types of action can be differentiated.

a) defining quality standards for the natural environment which it is intended to protect, namely water purity standards (immission standards) ;
b) regulating the discharge into watercourses of certain substances which are known for their polluting effects (emission standards) ;
c) regulating the use, or even production, of such substances.

2. The draft European Convention for the Protection of International Watercourses makes a significant choice among these approaches. For one thing, it is not designed to regulate the use or production of polluting substances — certainly because any such instrument is likely to raise in use grave problems of economic and industrial policy which are difficult to solve at present in a context extending beyond the European Communities. However, we may recall that in 1968 a small number of Council of Europe member states prepared, within this organisation, the European Agreement on the restriction of the use of certain detergents in washing and cleaning products, which is now binding on six member states and is designed to stop washing or cleaning products with a detergent content of less than 80 % biodegradability from being offered for sale.

3. The draft European convention does, however, lay considerable emphasis on the regulation of emissions. Thus Article 5 obliges the Contracting States to prohibit or restrict the discharge into international hydrographic basins — and thus purely national tributaries of international watercourses — of the dangerous or harmful substances listed in an appendix to the convention. The lists contained in this appendix use a formula which has occurred frequently in international discussions and schemes relating to water pollution control (United Nations Conference on the Human Environment, Stockholm 1972, Oslo Convention of 1972 on the Prevention of Marine Pollution by dumping from ships and aircraft, London Convention of 1972 on the Prevention of Marine Pollution by dumping of waste and other matters, the 1974 Paris Convention on the Prevention of Marine Pollution from land-based sources). The first is the so-called "black" list of substances which are highly toxic and persistent in water, such as mercury, cadmium and organohalogenic compounds — silicic, phosphoric and stannic. Discharge of these substances must be prohibited, unless modern technology makes it possible to restrict them to a safe level. For this reason, any discharge likely to contain such substances must first be officially authorised. The second or "grey" list contains substances which are harmful but not so dangerous as those in the first. It includes a whole series of metalloids, metals and their compounds, discharge of which must be subject to highly restrictive regulations. To this is appended a general clause calling for constant supervision of the discharge of biocides not included in the "black" list and all other substances likely to have a harmful effect on the quality of surface waters.
4. The main interest of the draft European convention, however, lies in the priority which it gives to the definition of immission standards, namely quality criteria to be respected or attained

in the watercourses scheduled for protection. This is the main aim of the "standstill" clauses in Article 2, in the case of all surface waters on the territory of the Contracting States, and Article 3, concerning more specifically international watercourses : here the Contracting States undertake to prevent the deterioration, either quantitative (increase in the level of pollution) or qualitative (new forms of pollution) in water quality as it now stands. At a higher level, the convention will itself contain an appendix laying down minimum water-quality standards which must be applied in international watercourses at the points where they are crossed by international frontiers and at their outlets. These standards are expressed in terms of the maximum permitted concentration of certain chemical substances (parameters). Although regarded as representing a minimum, these standards are not respected in all international watercourses, and particularly not in the case of certain slow flowing rivers in highly industrial areas. The draft thus allows for derogation from these standards ; but such derogation must first be agreed among all the states concerned ("negotiated" derogation), must always apply for a strictly limited time and be accompanied by a programme for purification of the water in question.

Apart from these minimum standards, immediately and generally applicable under the convention itself, the latter establishes procedures and terms of reference for the preparation and adoption of special waterquality standards. The setting for these procedures will be river commissions, which Contracting States riparian to the same watercourse undertake to establish and operate as specified in the convention (pactum de contrahendo). The standards must match certain water use requirements which are laid down in the convention (production of drinking water, the conservation of wildlife and securing conditions in which it thrives, fishing, recreational amenities, irrigation, etc.). Depending on the use in question, they must correspond to the quality limits (maximum concentration per parameter) appended to the convention.

The future European convention thus attempts to answer both the need for undertakings which are directly applicable and uniform (minimum standards), and the need to take regional or local requirements and possibilities into account in any scheme for the improvement of water quality (outline convention for the preparation of special standards).

5. As the United Kingdom MP, Mr Grieve, said in his recent report to the Consultative Assembly of the Council of Europe on the draft convention (Doc. 3443), the formulation of water quality objectives accords with a modern and up-to-date approach to the water pollution problem. This approach sees a need for quality levels of this kind which, even when they cannot be ideal, are at least economically viable ; merely laying down standards of man's standard of conduct in relation to his environment may well have no effect, since pollution results from a variety of causes, of which the conduct of man so regulated might not be the most significant. Given this approach, it is logical that the convention should not itself detail ways of achieving nationally the water quality standards which it prescribes. The text of the draft is extremely general here : "measures appropriate", "measures required", etc. Every Contracting State must therefore select appropriate methods from those available and combine them as effectively as possible : regulating discharge, installing purifying plant, provisions for industrial processes, prohibiting the establishment of polluting industries, regulating the use and production of certain substances, etc. As the anti-pollution campaign develops, the absence from the future convention of any fixed and binding rule on this question will have the advantage of leaving room for the modifications which will certainly be needed to realise the basic aim : achieving a proper level of water quality.

Reflecting the co-operative spirit pervading the draft European convention, the Contracting states also undertake at all levels (enforcement of minimum standards, the derogation system, the introduction and application of special standards) to negotiate and agree, particularly within river commissions, on the content of their water conservation programmes, assessment of the results obtained and any revision and adaptation of those programmes.

6. Furthermore the convention itself reflects the dynamism which it seeks to impress on national and international water conservation policies : it embodies simple and speedy procedures for its own revision, establishing a committee of government experts to prepare for the technical appendices (quality standards and prohibited discharge) any modifications necessitated by scientific and technical development and the improvement of water pollution control.

The instrument prepared by the Council of Europe will thus introduce a whole range of machinery establishing, within a coherent and interdependent whole, a number of national and international mechanisms, the harmonised and effective functioning of which will help to foster protection of the environment in an area where it seems particularly endangered.

TRANSFRONTIER PROBLEMS OF FRESHWATER CONSERVATION ESPECIALLY IN THE RHINE AND LAKE GENEVA

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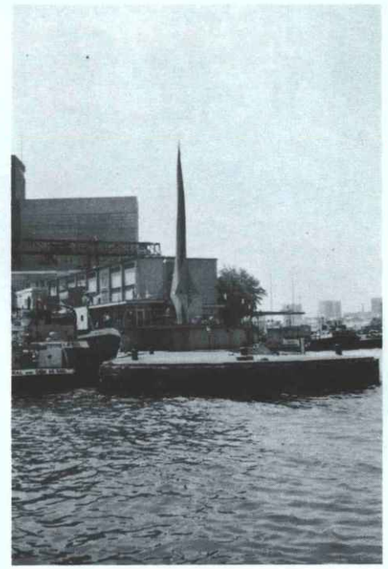
I. International co-operation

It is mainly since the second world war that international co-operation in the protection of fresh waters against pollution has been placed on a firm footing. Since then, research on a number of lakes and watercourses has shown pollution to have reached such a level, as a result of population growth and industrial development, as to be a threat not only to aquatic flora and fauna, but also to public health, the drinking water supply, agriculture, bathing facilities and the landscape.
Although lakes and watercourses are not always exposed to the same forms of pollution, research has identified a number of common features : a fall in oxygen content, the formation of putrescent matter, a substantial increase in nitrates, phosphates and chloride, an increase in algae and toxic industrial waste and the presence of certain pathogenic bacteria. In recent decades, several countries have separately spent substantial sums on cleansing their waters in order to check this dangerous trend. Moreover, countries bordering on international watercourses have endeavoured to conclude water protection agreements with their neighbours. Between 1960 and 1963, for instance, 6 international agreements setting up commissions to investigate these problems were concluded amongst countries which are members of the Council of Europe.



Meeting point of three countries on the Rhine, indicated by a metallic pointer — Switzerland, Germany and France.

II. Terms of reference and operation of the commissions

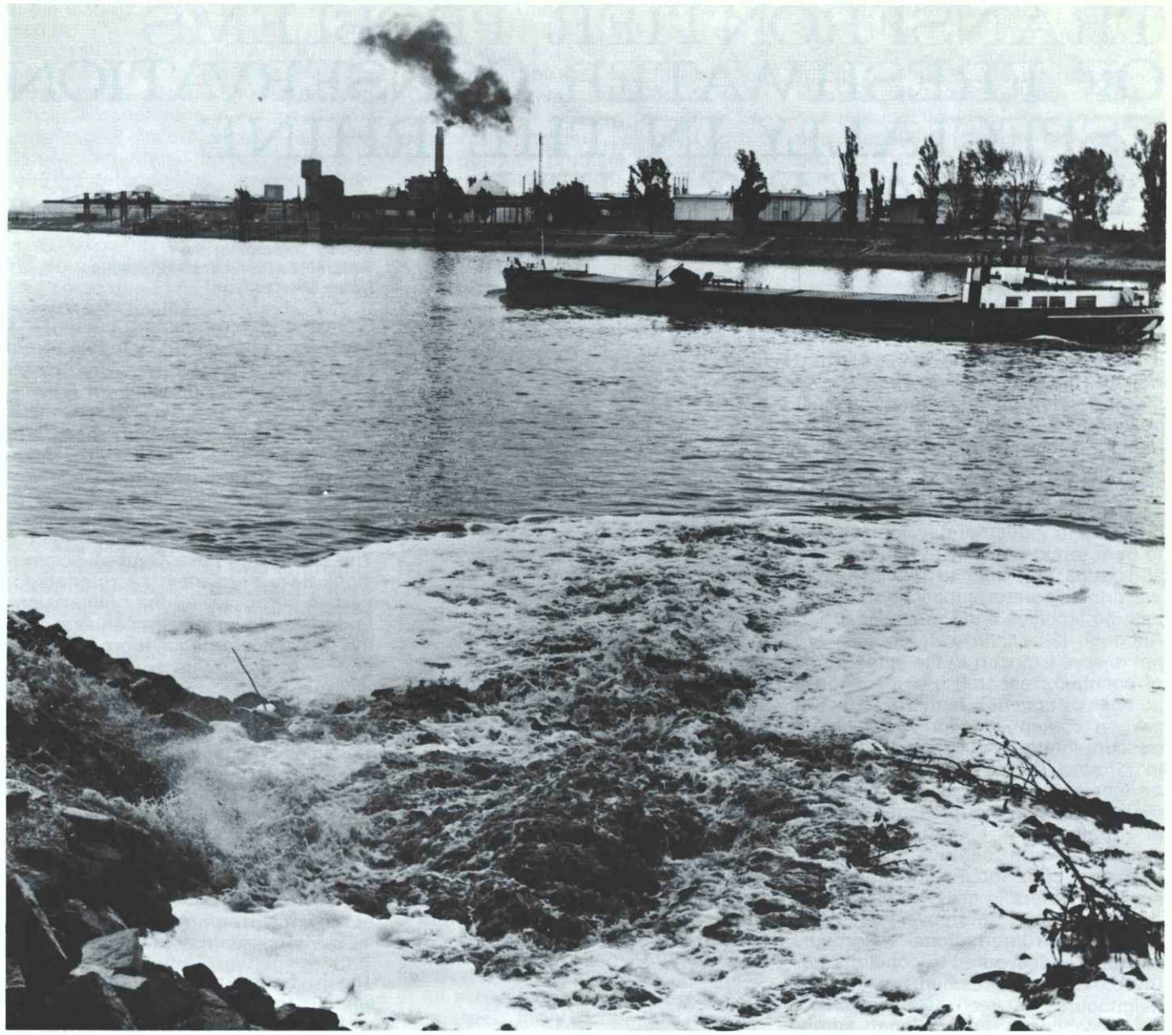
The work of the transfrontier water conservation commissions is to determine the state of health of the relevant waters by means of physical, chemical, biological and bacteriological research, to find out the main causes of pollution and to make proposals for appropriate action in the form of recommendations to the contracting governments.
The commissions differ little in their composition. Those for the Rhine, the Saar and the Moselle and the tripartite commission representing Belgium, France and Luxembourg comprise 4 government-appointed delegates from each Contracting Party. The Swiss-Italian agreement provides for 6 members each, whilst the Lake Geneva agreement does not specify the size of delegations. The commissions generally enjoy a large measure of independence in their work and are able to consult experts.

The Rhine and Lake Geneva commissions have permanent secretariats for certain purposes. All the commissions undertake to establish contacts with the relevant international organisations and also co-operate with other international commissions. Their decisions are usually reached unanimously but in the case of the Rhine and Lake Constance commissions one delegation's abstension does not prevent decisions being taken.

There are few differences in the rules governing the financing of research. As a rule, each government covers the cost of its own representation and of research programmes conducted on its territory.

The primary function of the commissions is to carry out the technical work which has to be done before any measures are taken at international level. For this purpose, their terms of reference, which are to organise or carry out any research necessary in order to determine the nature, extent and cause of pollution, seem sufficiently broad. On the other hand, it may have been over-cautious not to make some of their recommendations mandatory. To make up for this, the member countries of the Rhine Commission have been holding meetings at ministerial level since 1972 in the hope of reaching agreement where the Commission failed.

The following is a brief account of the activities and achievements of 2 international commissions of different types, one dealing with a watercourse (the Rhine) and the other with a lake (Lake Geneva).



The cost of abusing our water systems may well exceed all estimates.

III. The Rhine Commission

This commission was set up under the agreement of 29 April 1963 between the Federal Republic of Germany, France, Luxembourg, the Netherlands and Switzerland, to take the place of a temporary commission established in 1950. To begin with, it confined itself to carrying out physico-chemical analyses on the Rhine's rate of flow, its chloride, phenol and dissolved oxygen content and then its hardness, sulphate concentration and radioactivity. It is at present concerned with a number of specific problems such as chloride pollution, chemical pollution, thermal contamination, radioactive contamination and pollution from biocides, detergents and hydrocarbons.

a) Chloride pollution

The surveys show that the salinity of the. Rhine has been increasing constantly for the last 15 years. At a conference on 25-26 October 1972 in The Hague, the Ministers of the 5 signatory states agreed on the following measures to control salt pollution of the Rhine :

1. Storage facilities with a capacity of 60 kg/s of chloride ions will be established in Alsace by 1 January 1975, subject to parliamentary approval. The French Government will choose the site and ensure that groundwater and the environment are protected.
2. All effluents exceeding an amount to be determed by the international commission will be checked for chloride ions. The commission will also specify the control procedure.
3. The riparian states undertake to introduce appropriate measures on their territory to avoid an increase in salt discharge into the Rhine basin. The international commission will continue its measures concerning salt contamination of the Rhine and its tributaries, so as to ensure compliance with this undertaking.
4. Delegations urged that the limit value of 20 mg/l of chloride ions at the German-Dutch border should be observed in all circumstances. The commission will investigate means of achieving this.
5. Delegations agreed that the total cost of the storage facilities should be shared among the member states of the international commission.

The Ministerial conference held in Bonn on 4-5 December 1973 decided that the findings of the salt storage study should be the subject of an international agreement.

b) Chemical pollution

This type of pollution has also grown worse in recent years and the Rhine Commission has accordingly compiled 3 lists of chemicals whose discharge into the river must be either banned completely (black list), restricted (grey list) or made subject to certain conditions (beige list). The *black list* contains the following chemicals :

— organo-halogenated compounds, organic silicon compounds and compounds capable of producing such substances in the water ; organophosphoretted pesticides, organostanic pesticides not quickly converted in the water into biologically inoffensive substances ;
— substances with scientifically recognised carcinogenic qualities ;
— mercury, cadmium and their compounds.

The *grey list* comprises substances whose discharge into the waters of the Rhine basin must be severely restricted, viz :

— substances giving rise to unpleasant smells and tastes and compounds capable of producing such substances in the water ;
— mineral oils ;
— metals, metalloids and their compounds, such as :

zinc	arsenic	barium
copper	antimony	beryllium
nickel	molybdenum	boron
chrome	titanium	uranium
lead	tin	vanadium
selenium		

— cyanides and fluorides ;
— biocides and their derivates not covered by the black list.

The *beige list* covers substances which cause adverse changes in the water, which need to be watched closely and whose concentration needs to be gradually reduced, such as :

— substances adversely affecting the oxygen balance, ammoniac, nitrites ;
— nitrates ;
— substances which, through their intensive use, can seriously jeopardise the quality and utilisation of waters to which they are added : calcium and magnesium sulphate and chloride, phosphates.

At the conference in Bonn on 4-5 December 1973, the Ministers agreed to draw up national lists of the main sources of mercury and/or cadmium pollution, paying particular attention to industries using those substances, which were hence likely to discharge them into the Rhine and its tributaries. The Rhine Commission was asked to specify quantities of mercury and cadmium for the purposes of these lists. Subsequently, national programmes would be devised for reducing pollution by the relevant industries, such as :

— electrolysis plants ;
— paper and cellulose factories ;
— chemical industries using substances containing mercury or cadmium ;
— cadmium metal surface processing works.

c) Thermal pollution

The temperature of the Rhine cannot be said to be subjected to exaggerated rises at present, but the erection of future power stations along its banks is a matter of concern to the riparian states, as the temperature can substantially affect the chemical and biological quality of the water. It is known that power stations release into the surrounding air and water about twice as much energy in the form of heat as they produce as power. The raising of the temperature of watercourses is particularly harmfu! as the water is often slow to cool down again in the atmosphere. The erection of power stations too close together may, therefore, have a cumulative effect. The effect of raising the temperature is to lower the oxygen content. The fall in oxygen content has an adverse effect on communities of organisms (biocenoses) and especially on fish. A rise in temperature also increases the harmfulness of certain substances and their combined effects.

It is comforting to note that, as early as the first conference in The Hague, the member states' Ministers agreed that all future power stations along the Rhine must be equipped with a closed cooling system or the equivalent. They also took some important decisions concerning temperature elevation due to nuclear power stations under construction at Fessenheim in France and at Philippsburg and Biblis in Germany. The Rhine Commission was asked to prepare regulations for the operation of Rhine power stations and to draw up proposals for the effective control of heat discharge.

d) Other pollution

According to measurements made so far, *radioactivity* does not seem to be a major problem for the moment. Testing for *detergents* show this type of pollution to be declining, though this question is being kept under review as detergents are known to affect watercourses' self-purifying capacity.

In view of the danger of accidental spillage of *hydrocarbons*, the commission has created an alarm system along the Rhine.

IV. The Lake Geneva Commission

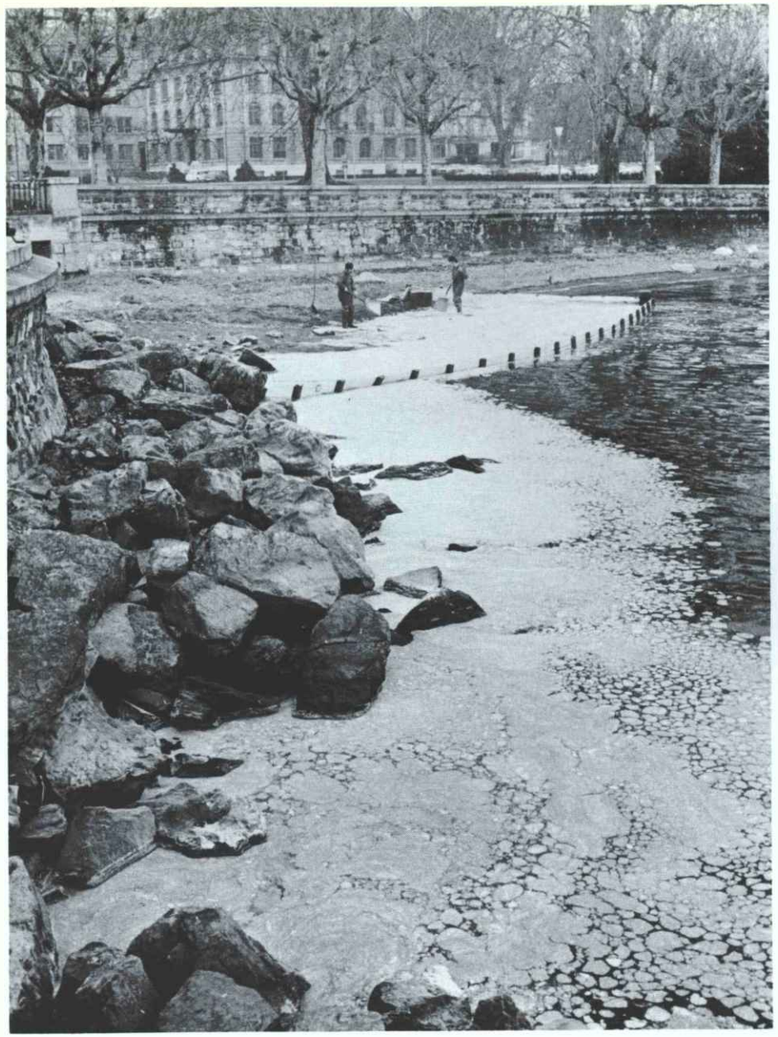
There as been close co-operation between France and Switzerland on the protection of the waters of the Rhone basin since 1950. In the beginning, a number of specialists including doctors, engineers, biologists and chemists, most of them employed by state departments, were brought together under the auspices of the Union des Rhodaniens. Their aim was to study the problem of water pollution in the Rhone basin, to find appropriate remedies and co-ordinate their two countries' efforts. Systematic observation was undertaken and intensified. However, for the purpose of implementing the necessary remedial measures, it proved necessary to give the association official status, and so talks were held between the two countries, resulting in the conclusion on 16 November 1962 of the Franco-Swiss agreement on the conservation of the waters of Lake Geneva. The two countries agreed to co-operate closely in protecting the waters of Lake Geneva and the Rhone between the lake and the point where it left Swiss territory, including the surface and underground waters of their tributaries insofar as they contributed to pollution of the lake and river.

In 1971 it was decided, because of the volume of work to be done, to set up a permanent technical and scientific secretariat. The current research forms part of a 5-year programme, covering the years 1971-75, the cost of which is borne, having regard to the interests involved, 25 % by France and 75 % by Switzerland. The whole lake's state of health is being studied by several scientific institutes and laboratories in both countries by means of systematic investigations carried out regularly from fixed control stations, using standardised procedures and methods.

Despite considerable efforts to cleanse waste waters in recent years, the lake's condition is tending to deteriorate further, or at least is not yet showing any sign of improvement. The lake's slowness to respond is due partly to the fact that the protective measures are by no means complete and partly to the tremendous volume of water (90 thousand million m³) to be exchanged.

Two aspects typical not only of Lake Geneva (above and opposite) but also of almost all the European lakes : at a distance of only 2 km. apart, healthy, living fresh water and polluted, dead and useless water.

One of the factors attracting the specialists' particular attention is the increase in phosphorous. Systematic research is being carried out to establish whether this increase is of human, agricultural, industrial or natural origin, mainly on the stretch of the Rhone situated upstream from the lake and on its main tributaries. So far, it is not possible to draw precise conclusions. Fertilisers appear to be accumulated in the lake, i.e. more enter the lake than leave it. Various fertility tests, based on phytoplankton development capacity, show possibilities for further growth.
Lake Geneva at present serves as a water supply reservoir for a population of 500,000 ; as its banks are also used for bathing, is has been considered necessary to study the dispersal of effluent from sewage treatment plants (physical and bacteriological marking of effluent, heat and conductivity measurements, colouring of sediment, etc.) Lastly, effluent from treatment plants should comply with certain standards and the commission has drawn up common standards for the two countries governing the discharge of residual water.
Where the provision of sewage treatment facilities is concerned, most of the work planned is in progress, so that the cleansing programme should be complete by the end of this decade (mechanical and biological treatment, dephosphatisation).
However, the conservation of the waters of Lake Geneva also raises other problems. It may suffice to mention those caused by the over-use of herbicides and algicides (in harbours), motor boats, power stations, hydroelectric plant, solid waste disposal, hydrocarbons and the recent laying of a gas pipeline in the lake. These matters are often the subject of "recommendations" submitted by the commission to the governments of the two countries.



V. Conclusions

The problems of transfrontier water pollution are often complex and take a long time to solve. Often it is an open question whether international co-operation works well enough and whether the commissions set up are sufficiently effective, especially as water conservation legislation still differs considerably from one country to the next. Moreover, a watercourse may perform quite different functions upstream and downstream.
It is encouraging, however, to note a growing sense of solidarity in the field of transfrontier pollution : direct and courteous dialogue has begun.
The exchanges between countries of information about work done, the findings arrived at and the measures planned are undoubtedly a sign of this spirit, which has already made it possible to dispel certain misunderstandings and favour the adoption of common policies. The examples mentioned illustrate this co-operation. Let us hope that one day in the not too distant future the member countries of the Council of Europe will be able to rely on international freshwater conservation conventions based on the same basic principles. Once that is the case, a great many of the present difficulties can be overcome.

DRINKING WATER SUPPLY IN THE NETHERLANDS

G. W. PUTTO
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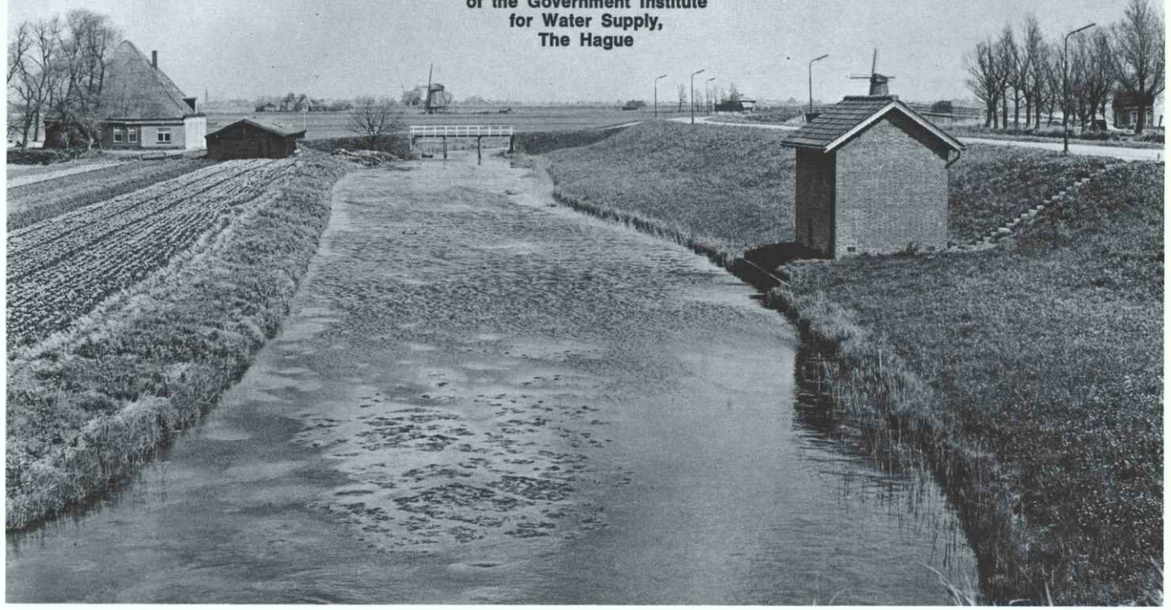

At present more than 99 % of the population of the Netherlands are connected to a piped supply of drinking water. This percentage was mainly achieved without government subventions, which were granted only after World War II for connections which required an exceptionally high investment.

The Minister of Public Health and Environmental Hygiene is responsible for the national policy with regard to water supply. His advisory institution is the Government Institute for Water Supply whose director is also head of the Ministry unit dealing with drinking water supply. The Institute which was established in 1913 and has a current personnel of 200 deals with all aspects of water supply such as geohydrology, hydrology, chemistry, biology technology, law, economy and general planning. Whereas the primary task of the Institute is to advise the government, its services are also available for provincial and municipal authorities, as well as for private corporations and persons.

Moreover, in 1968, the Institute was designated as International Reference Centre for Community Water Supply by the World Health Organisation.

There are about 115 water supply board in the Netherlands of which over 80 are municipal while 30 form part of the district water boards which are the joint concern of municipal and local governments.

In 1948, the Union of Water Suppliers and the Union of Water Engineers jointly established the Testing and Research Institute of the Netherlands Water Supplies KIWA Ltd. The present problems of water supply are mainly caused by the need to meet an ever increasing water demand while the available water resources are diminishing or have been affected bodily by the pollution of ground and surface waters.

The increase of water demand is in the first place caused by the growth of the population from 3,000,000 in 1850 to the actual figure of 13,500,000 while the estimate for the year 2000 is 16,000,000.

Furthermore domestic water consumption has increased by a higher per capita demand as a consequence of the improvement of living conditions. It is expected that the daily per capita consumption will amount to 200 litres in the year 2000 while at present the corresponding figure is about 100 litres.

Finally, an increasing water demand was caused by the development of industry especially after World War II. However, it seems that this increase in demand will gradually level off with the effect of the polluter-pays principle which was introduced by the new legislation on surface water pollution. At present population and industry consume together about 1.800 million cu m per year of which 1000 millions are delivered by water supply boards while 800 millions cu m are abstracted directly by industry itself.

It ist expected that in the year 2000 the corresponding total demand will be 4000 millions cu m of which 3000 millions cu m will be supplied by water

supply boards and 1000 millions will be abstracted by industry.

The total amount of abstracted ground water is at present about 1.300 millions cu m ; water supplies and industry each use about half this quantity.

The quantity of groundwater which can be abstracted without causing damage by lowering of the groundwater table — e.g. to agriculture and the existing ecological problem is estimated at 1.900 millions cu m per year. Against the background of a total water demand of 4000 millions cu m in the year 2000 this means an need of 2100 millions cu m surface water in that year. This is about three times the present consumption of surface water.

The main sources of surface water are the rivers Rhine and Meuse. The Rhine is heavily polluted, to such a degree that during periods of low flow its water cannot be used for drinking water supply. The Meuse is less polluted but is characterised by periods of low flow which do not allow for any abstraction.

As the water supply boards have to ensure an uninterrupted supply of drinking water it will be necessary to provide for the storage of water which is to be abstracted when river conditions are favourable.

For storage water two methods are being used, namely the artificial replenishment of ground water and the construction of storage reservoirs.

Both kinds of works imply claims on water resources and the use of land and may have a considerable impact on existing conditions. The problems of future water supply are many sided and in view of this situation in 1964 the Ministry ordered the Government Institute for Water Supply to prepare a master plan for the country's future water supply.

After extensive studies and numerous consultations with authorities, government services and water suppliers a first draft was completed in 1971. This draft was submitted to the National Committee for Physical Planning. Consultations between this committee and the Government Institute for Water Supply resulted in a agreement between the Minister of Public Health and Environmental Hygiene and the Minister for Housing and Physical Planning with regard to the procedures to be applied to this matter.

It was decided that the measures indicated in the master plan should take the form of a so-called "structural scheme". This means a scheme in the field of physical planning which describes in general terms the regions and waters which will have to play a part in water supply. The utilisation of the areas and waters will be subjected to certain restrictions. The scheme has to be adopted by the Council of Ministers and then has an official status, so that it has to be taken into account when central, regional or local governmental policy is at issue.

Meanwhile a draft for a structural scheme for future water supply has been published as well as being made available for public inspection. It is expected that a decision of the Council of Ministers will be taken at the end of this year.

The scheme which envisages ground and surface water abstractions has a general character. It covers a period of 30 years and will have to be revised every five years. A following step is a more detailed planning, especially in view of waterworks to be constructed in the near future.

To this end plans will be prepared with the joint co-operation of the Union of Water Suppliers and the Government Institute for Water Supply for the construction of water works within a period of ten years.

It is intended that the finalised plans for the works have a legal basis in view of which new legislation is now being prepared. It is envisaged to guarantee the realisation of the plans and to attribute power of control to the Minister of Public Health and Environmental Hygiene.

It has been taken into account that future water supply will need extensive and complicated technical works which can only be dealt with by water suppliers of sufficient technological competence and financial capacity. As a number of water supply boards do not have very extensive areas of supply and thus will not be able to cope with all these requirements, it has been considered necessary to regroup existing water supplies into larger units. A bill dealing with this matter has been submitted to parliament, where discussions regarding this matter will probably take place within a few months.

During the preparation of the master plan it became clear that there was a necessity for scientific research with regard to several chemical, biological and technical subjects.

Both the Testing and Research Institute KIWA Ltd. and the Government Institute are together active in this field. Joint projects include : research on desalination, artificial replenishment of groundwater and limnological problems of storage reservoirs. The situation in the Netherlands has a special character by the dependence of this country on polluted international rivers. In other respects the state of affairs is comparable with other industrialised countries eg England, France and the Federal Republic of Germany where recently legislation in the field of water resources management was enacted in order to deal with similar problems. This article intends to give an impression of the Netherlands approach to the subject matter.

WATER POLLUTION CONTROL IN THE SCANDINAVIAN COUNTRIES

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Considerable work has been done in water pollution control in recent years in Finland and in the other Scandinavian countries. In particular, water pollution control measures have become more effective due to improvement in the administration. In Sweden, for example, an organ called the Naturvårdsverket was founded in 1969 to handle matters of environmental conservation and in Finland all matters relating to water including water pollution control became the responsibility of the National Board of Waters in 1970. In Norway, the highest body handling questions of water pollution control is the recently founded Ministry of the Environment (established in 1972).

The implementation of water pollution control measures is also being intensified and the necessary funds for this have been increased considerably, despite the application of the principle "polluter pays", whereby the polluter does indeed pay the cost of water pollution control measures, and which is generally in operation throughout Scandinavia. In Finland the government contributes financially to these implementation measures by granting loans and giving direct aid where necessary for action taken by both communities and industry.

In the following exposé of the present situation and future goals of water pollution control in Scandinavia, emphasis will for the most part be given to Finland. However, for issues of major importance reference will be made to other Scandinavian countries. Questions concerning water pollution control will be discussed with respect to both communities and the wood processing industry. Finally the environmental protection agreement made between the Scandinavian countries will be considered.

The state of pollution of the watercourses

According to reports on the quality of the water in the watercourses, pollution has made about 3 % of the lake area of Finland practically totally unsuitable for use as community water supply, or for recreation and fishing. A further 20 % of this area is polluted but not to the same extent so that various uses can still be made of it. The suitability of this latter area has not only been reduced in recent years by the load from agriculture and dispersed settlement but also includes a large number of watercourses whose water quality is poor due to the natural properties of the drainage area. Most of the lake area is, however, in its natural state (or in a comparable state) and can be utilised accordingly. With respect to the rivers, with the exception of northern Finland, all of the largest ones (with a total combined length of over 8800 km) are for the most part exploitable.

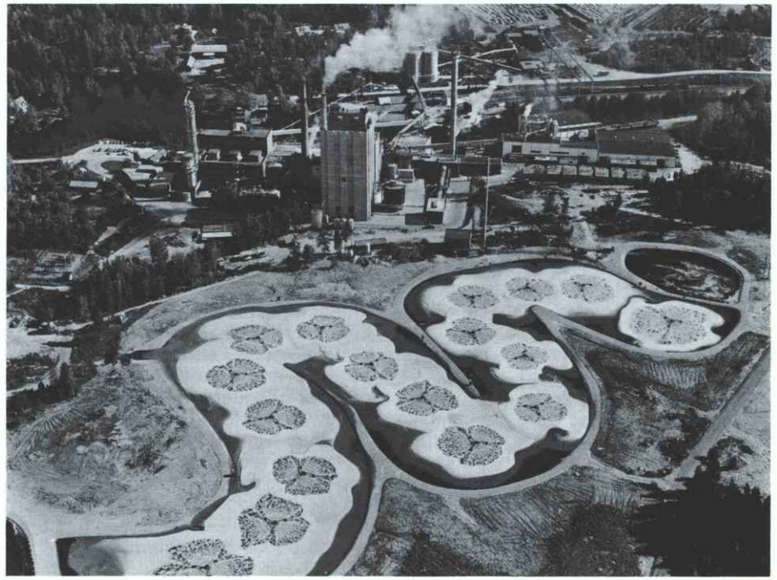
Off the coast of Finland, about 100 sq km of the waters are badly polluted whereas the less highly polluted areas, totalling about 240 sq km, are still fit for multifunctional use. In addition a sea area about 1400 sq km in size has been found to diverge in some respect from the natural state. About 3 % of the lake shores and coastal areas are severely polluted, and about 16 % are slightly polluted.

Even though the polluted water areas are not very extensive relatively speaking, it is noteworthy that about a quarter of the population of Finland live by really badly polluted water areas, and about half live near slightly or badly polluted watercourses. For this sector of the population the pleasantness and healthiness of their living conditions have degenerated and the use of nearby watercourses for recreational purposes has decreased.

It is difficult to estimate accurately how much the state of the watercourses and coastal areas has changed in recent years in Finland. In places improvements have been noted, but in other places the situation has become worse. It is significant that in spite of the rapid growth of industry during the past decade, the load on the watercourses has not increased. This cannot, however, be considered a sufficient improvement from the point of view of water pollution control.

There are not exact data on how much the situation in the other Scandinavian countries differs from that in Finland. Generally speaking the situation e.g. in Sweden is probably much the same.

The airing of waste water from a pulp mill in Sweden. Such biological treatment and other methods within the plant itself reduce the discharge of oxygen-consuming substances to a level that does not seriously harm the water quality of smaller rivers and streams.



According to some estimates, 10-20 % of Sweden's lakes are eutrophic. In particular, many lakes which are valuable for the well-being of society (those in densely populated areas) are highly eutrophic. No study has yet been made on the total number of highly polluted lakes. According to a study on the state of pollution of 1250 Swedish lakes, it was estimated that in northern Sweden a negligible percentage of the lakes was eutrophic, whereas 10-20 % of the lakes in southern Sweden were eutrophic. However, only a small percentage of these lakes could be considered highly eutrophic. Since a great many people come into contact with the most highly polluted lakes, public opinion easily holds that lakes are usually very polluted. In the most densely populated areas of the country, as we can well imagine, there are indeed more polluted lakes. This is illustrated by a study on the lakes in Stockholm Province made in 1972 which showed that 50 % of the lakes were usable in their suitability, 10 % were moderately eutrophic, 20% higher eutrophic and 20% almost overgrown.

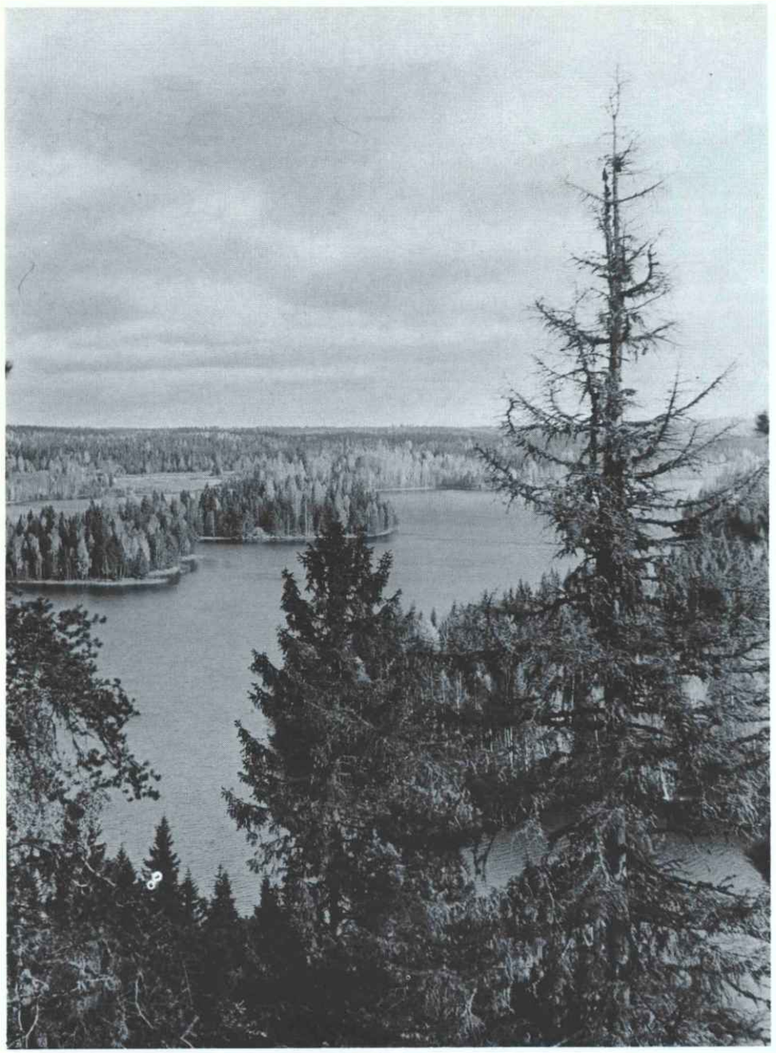
Water pollution control in communities

In 1970 the Committee for Financing of Water Pollution Control, Water Supply and Sewage Treatment defined Finland's water pollution control goals and determined the distribution of costs among the state, municipalities and industry as well as underlining the need to develop legislation. The goal of water pollution control was not only to prevent further pollution of the watercourses but also to improve the situation in places where there is the greatest need to make waterways suitable for recreational use. Communities have been requested to decrease the sewage load of the watercourses over a period of a decade to half of what it was in 1970. This goal must be reached in spite of the fact that during this same period an extra one and a half million people will be served by the same public water supply which implies that at the beginning of the 1980s over 90 % of municipal sewage will have to be treated by simultaneous precipitation. Naturally this will entail considerable expenses and even now the costs have proved very much higher than the committee estimated. In Finland communities must themselves pay most of the costs of construction and all of the running costs of sewage treatment plants. So that municipalities can meet the expenses involved in water pollution control, an act has been promulgated on the municipal sewage fee. The funds from sewage fees are used especially for constructing sewage treatment plants. The state supports municipal construction of these plants by granting them interest subsidy loans and water pollution control grants and by constructing main sewers and pump stations at the government's expense.

It is hoped that in Finland most of the community sewage treatment plants will be built by the end of 1978 — construction of these plants is indeed now being carried out on an extremely wide scale.

It is noteworthy that until recently people have unanimously demanded fast action to save Finland's watercourses from rampant pollution. Of late, however, municipalities, especially, have claimed that water pollution control measures are being taken too quickly or at least more quickly than planned in the committee report mentioned above.

As a result of construction of water treatment plants, the sewage treatment situation has also improved considerably. For instance, at the end of 1971 about two-thirds of the sewage conducted by communities to the sea was treated biologically or by simultaneous precipitation, and about one-third was discharged into the watercourses after only mechanical treatment or without any treatment at all. During the past two years the situation has improved



"According to reports on water quality of the watercourses, pollution has made about 30 % of the lake area of Finland almost totally unsuitable for use as community water supply, or for recreation and fishing. About a quarter of the Finnish population live by really badly polluted water areas, and about half live near strongly or slightly polluted watercourses."

considerably. The authors have no readily available data summaries on the treatment of sewage conducted to inland waters for this period, but the situation is probably the same as on the coast or perhaps a bit better.

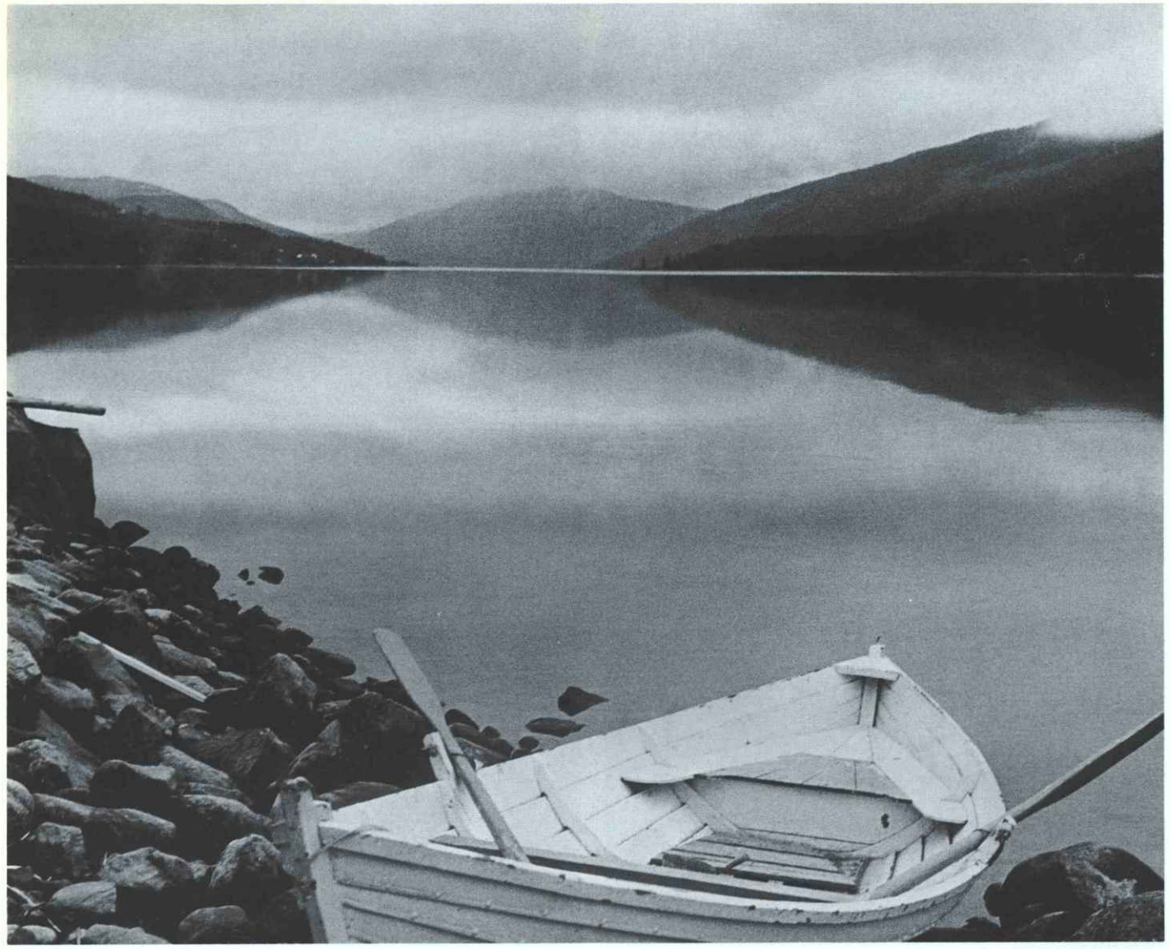
During the past five years a great deal has been done in Sweden in treatment of municipal sewage. About two million Swedish crowns have been invested in treatment plants since 1960. Nearly half of the costs have been covered by the state. The use of chemical treatment to remove phosphorus has spread quickly. At the end of the 60s there were only a few isolated chemical treatment plants which served about 5 % of the population of densely populated areas. In the middle of 1973 nearly 40 % of the sewage of densely populated areas was treated chemically or by simultaneous precipitation. About 45 % was treated biologically and over 15 % of the sewage was conducted untreated or only mechanically treated. The treatment situation has improved a great deal even over what it was then. A few municipalities whose sewage is discharged into inland watercourses with a small reception capacity have decided to add filtration to biological and chemical treatment of their sewage. The remaining load after this kind of treatment is estimated to be less than 5 mg/l for BOD_7 (Biological Oxygen Demand) and under 0.2 mg/l for phosphorus.

Water pollution control in the wood processing industry

The Scandinavian countries have developed an important wood processing industry, thanks to their extensive forests and water resources. The long-fibred conifer found in Scandinavia is admirably suited as a raw material for high quality paper. The surface water resources are also sufficient to supply the needs of this industry. The inland watercourses in Sweden and Finland also make good floating routes to transport wood economically to the processing site.

As an important user of water, the pulp and paper industry has also caused considerable water pollution control problems in Scandinavia. The most detrimental effect of waste water is caused by the waste liquor from pulp, which, particularly in old sulphite mills, was by no means always recovered. In such cases the BOD value in waste water is high and oxygen deficiency may occur in quite extensive water areas.

The situation has been eased by the fact that industry's move to modernise



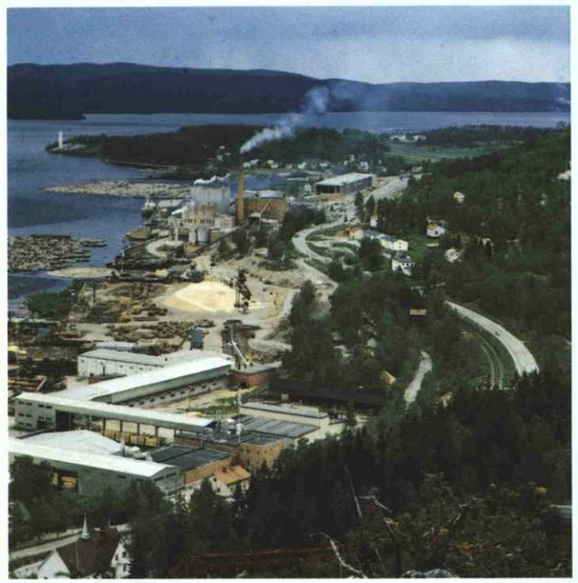
mills and recover fibres and waste liquor have coincided with the demands of environmental protection. Thus about 20 of the smallest of Sweden's sulphite mills, out of a total of 80 pulp mills, have closed down in recent years and modern plants have been built in which the stringent requirements of environmental protection have been taken into consideration from the very start. Finland at present has 33 pulp mills, all but two of which recover their waste liquor. One of these two mills will be shut down in the next two years and the other is at present building a burning plant for the waste liquor. Finland is indeed the world's leading country in recovering waste liquor from pulp mills.

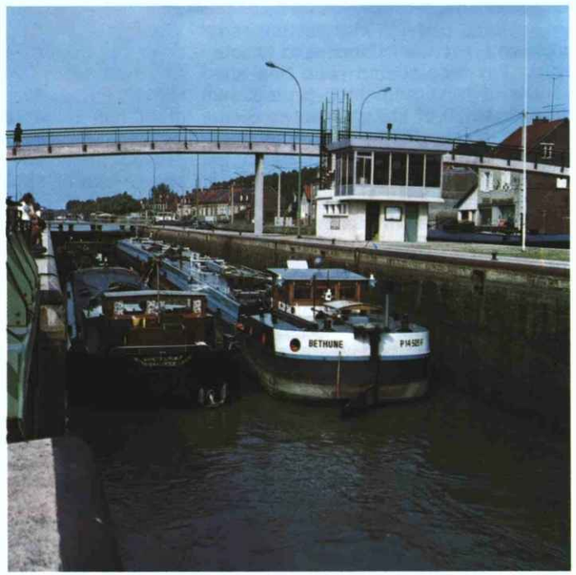
The emphasis in Scandinavia has been on the recovery and re-use of waste water. Generally, only mechanical treatment has been used for treating waste water and this has commonly been accomplished in round, concrete sedimentation tanks. Often the fibre recovered during mechanical treatment has been returned to the process, and thus this phase has also proved financially feasible. Recovery and re-use of effluents have achieved lasting results in environmental protection, since measures have not proven financial burdens on industry. Thus during the recent energy crisis the Scandinavian wood processing industry could note with satisfaction that as a result of its waste liquor recovery it was 50-60 % self-sufficient with regard to energy and correspondingly independent of the rise in the price of oil, which nonetheless presented quite a considerable additional bill to the industry.

The goal in Sweden is to decrease the waste water load produced by the wood processing industry by 1980 to one-third of what it was in 1965 in spite of the considerable growth in production. In order to reach this goal, high-level treatment of waste water will also often have to be used. At present 5-6 of the mills located in inland Sweden have begun simultaneous precipitation, and this method will become more general in the next few years, though only batches of the strongest effluents will be treated, and not all the mill wastes.

The goal of Finland's wood processing industry is to decrease the waste water load by 1980 to half of the level in 1970 as regards BOD while the suspended amount of solids conducted to the watercourses is reduced by 80 %. The aim will be to make chemical treatment sufficient, but in some cases biological treatment will also have to be used.

Since a large proportion of the funds used for environmental protection are aimed at modernising the industrial process, it is difficult to give any figures on the sums spent on environmen-





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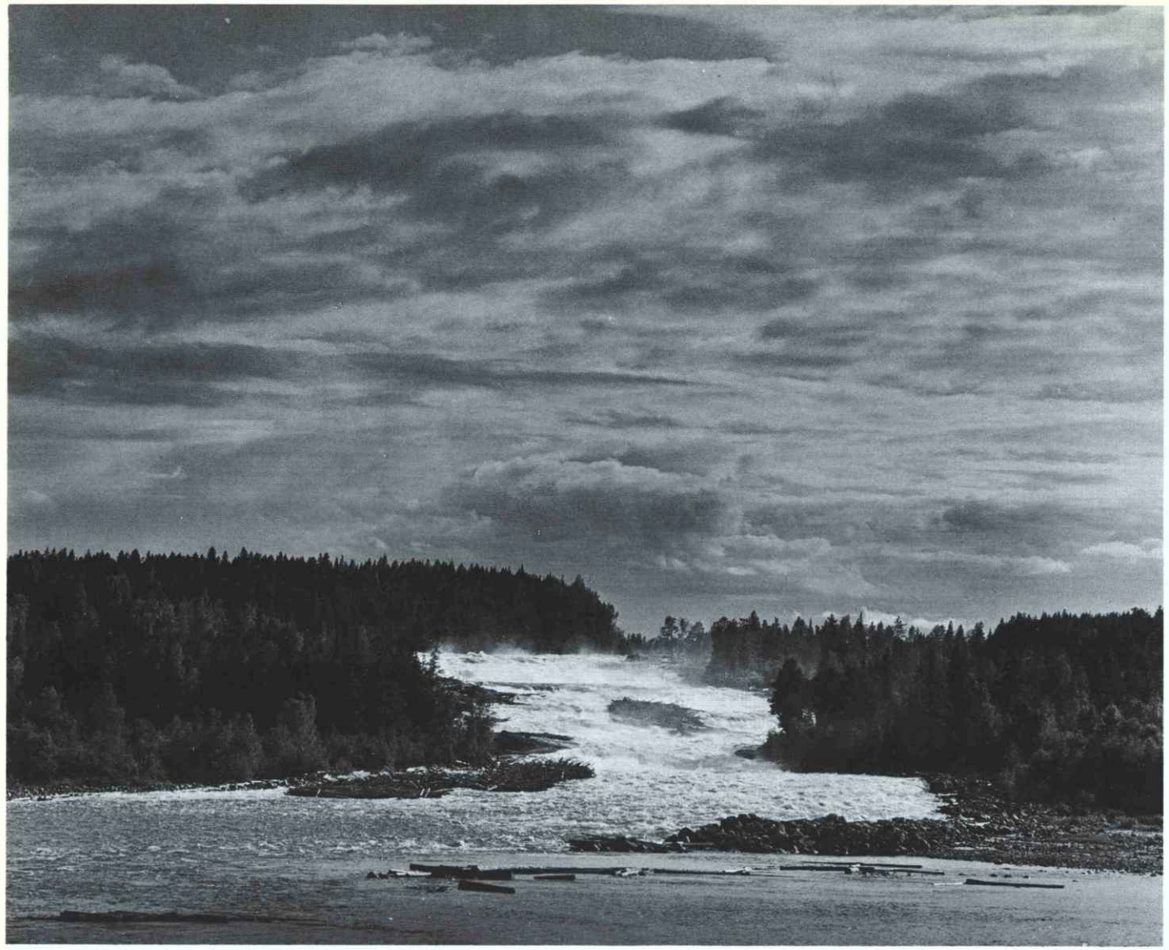

tal protection in Scandinavia. The estimate for Finland is, however, that investments by the wood processing industry in 1974-1983 will total 850 million marks, while in 1969-1973 they were about 260 million marks. Sweden's wood processing industry, in turn, invested 480 million marks in 1969-1973 while the estimate for 1974-1978 is 650 million marks.

Aspects of the Scandinavian environmental protection agreement

There are naturally no experiences as yet of what the Scandinavian environmental protection agreement will mean for water pollution control in Scandinavia, since the agreement was only signed recently.

Rough estimates have, however, already been made on these effects. In any case, the agreement charges the parties to pay special heed to the environmental effects of various activities and measures regardless of national borders. The agreement will thus promote the determination of the environmental effects of measures and the choice of these measures so that the overall effect on the environment is as small as possible. The agreement also makes it possible, under certain conditions, to interfere with measures implemented in the territory of another country if these change the environment and affect conditions beyond that country's national borders. This factor is especially important in the protection of such border watercourses as the Torniojoki and Tenojoki Rivers, even though these rivers are not particularly subjected to sewage load. Naturally, the agreement also makes it possible to interfere with industry's environmental effects on coasts, should they extend to the area of another Contracting Party through the water or air.

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DANGERS DUE TO THE HEATING OF RIVER-WATERS BY ATOMIC POWER STATIONS

Prof. Dr. Karl HÖLL, Dr. Ing. E. h., Hamein, Weser

No technological innovation has led to such heated controversy as that of atomic power stations. On the one hand, the energy industry seeks to persuade the public that atomic energy is harmless to the environment and, on the other, the public instinctively feel that some terrible disaster is about to befall mankind, whilst doctors conscious of their responsabilities issue warnings.

"Nothing is safer than atomic power stations" maintain the energy producers, and "nuclear energy is much cheaper than the energy produced hitherto by conventional power stations". Both assertions have been proved false. There have been serious breakdowns in practically all the atomic power stations and experimental plants operating in the Federal Republic of Germany, from the Ems to the Danube.

The worst was probably the one which occured — on two occasions — at the atomic power station at Würgassen on the Oberweser. In the case of Würgassen, the West German Federal Minister of the Interior officially informed the Internal Affairs Committee of the Federal Parliament that this accident "was indeed the greatest conceivable atomic accident", that is to say GAU (der grösste anzunehmende Atomunfall) which means maximum danger necessitating the immediate evacuation and isolation of the population within a radius of 50 km.

Contrary to earlier claims, the cost of nuclear energy is much higher than that of the conventional forms of energy ; if the absolutely essential requirements were complied with by the atomic power stations, it would be higher still. This fact has more or less been confirmed by the Federal Government. It was stated also at the recent International Reactor Conference in Berlin.

As regards the danger to health through radiation from atomic power stations, the public is told that only a few "millirems" are discharged. But the smallest atomic power station in the Federal Republic of Germany, that at Grundremmingen on the Danube, discharges from its chimney into the atmosphere daily as much as 5,400 curies of radioactive gases produced by "unspecified" radioisotopes and containing tritium, krypton 85, caesium 137 and also "a little" iodine 131 : but a single curie of iodine 131 is enough to contaminate 10 thousand million litres of milk.

The American Atomic Energy Commission (AEC) established damage to health. The doctors investigating the effects of radiation were subsequently prevented from continuing their work. Russian researchers (including Moskalev) have made similar findings in the case of small Russian power stations.

At the conference on energy held by the VDI (Association of German Engineers) in Düsseldorf in October 1973 it was stated that :

"waste heat will remain a problem even after all other environmental questions have been technically solved."

As a hydrologist, I should like to make a few comments on this subject.

Atomic power stations discharge inordinate quantities of waste heat, incomparably more than conventional power stations, with the result that atomic power stations with a wasteheat utilisation rate of 30 % do not represent any real progress from the point of view of heat technology. Atomic power stations therefore need large quantities of cooling-water, which is drawn from rivers and discharged back into them after being heated. Cooling-water in atomic power stations with a boiling-water reactor is heated to temperatures of up to 38° C as I myself have found.

This is extremely alarming, for 38° C is the optimum temperature for the development of the pathogenic bacteria contained in river-water.

Pathogenic bacteria, such as thyphus bacteria and enterococci, are always present in the waters of our rivers: they will be proliferated in future through the discharge of heated cooling-water. *This heating of water by atomic power stations is therefore something fundamentally new in water hygiene.*

Moreover, the self-purification of river-water is hindered because the "bacteria eaters", the bacteriophages, are killed when water is heated up to 38° C. Thus, pathogenic bacteria spread over vast stretches of rivers ; they survive much longer and are far more virulent in the heated river-water than in cold water (thermal pollution). The heated river-water thus becomes a centre or contagion and, at all events, is quite unsuitable for bathing in. The atomic industry maintains that the temperature of the river-water does not exceed 28° C ; this is a condition it is required to observe.

But the heat units (quantities of heat) discharged into the river are calculated by computer for the whole year's flow of the river concerned (i.e. for the total annual flow in summer and winter, including days when the power station is not operating). This is misleading and inadmissible.

The fact is that the heated cooling-water which re-enters the river from the atomic power station mixes only very slowly and far from thoroughly with the cold river-water. There is therefore a warm-water current of 33° C or more flowing through a long stretch of the river. (As already stated germs live longer in such water and the other bacteria multiply at a fantastic rate *(thermal pollution)*. Hydrologists know from experience that discharged waste-water does not mix readily with river-water, particularly if it is warm. But neither does the cold water of two rivers mix easily, as can be seen, for instance, from the different colours of the water at the confluence of the Danube and the Inn near Passau of from measurements of salt-content at the confluence of the Werra and Fulda near Münden.

Thermal pollution gives the river-water a musty, putrid smell preventing it from being turned into satisfactory drinking water by the water-purification works downstream, in addition to which the water temperature is too high, since it should not be more than 12 to 15° C (German DIN standard 2000).

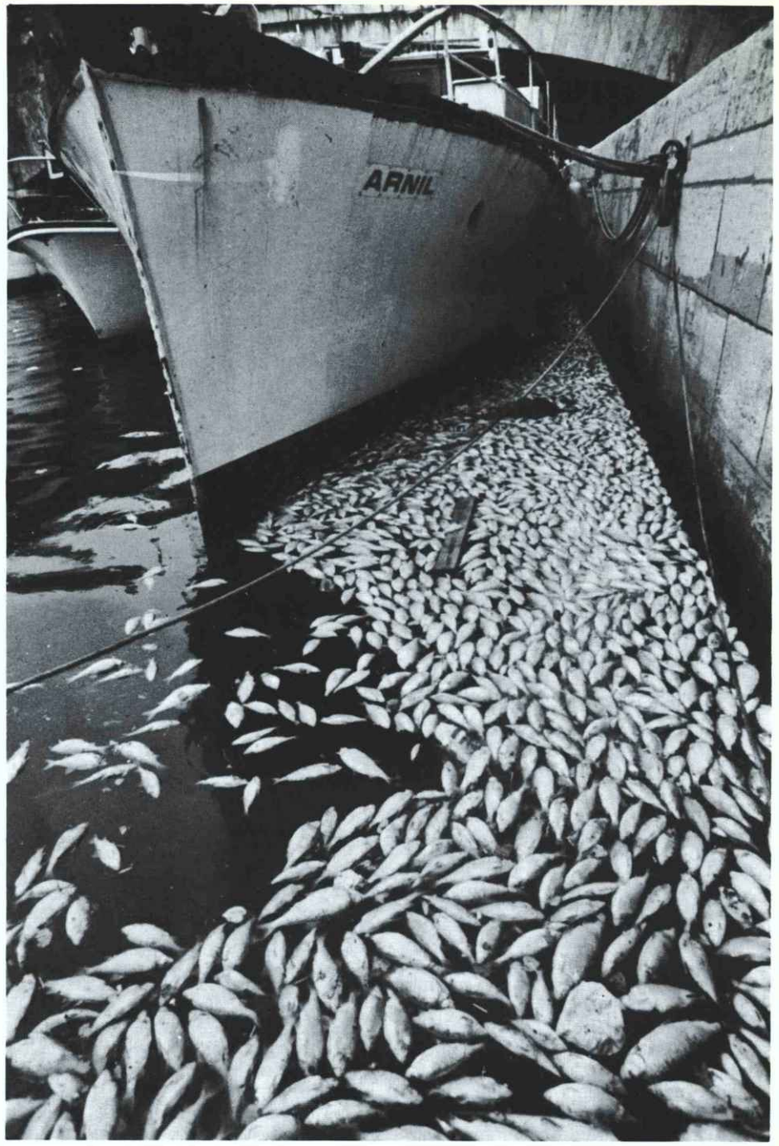
Blue algae will inevitably begin to appear in the warm river-water. These algae (cyanophyceae) are thermophilic and eutrophic ; they proliferate in warm eutrophic water and form blue-green patches in the water and unsightly patches on the banks. Water and landscape protection measures should be taken to prevent their proliferation. Blue algae are difficult to eliminate and seriously inhibit the circulation of matter in the lower reaches of rivers by deposits of sludge. They would create considerable difficulties in the filter chambers of water-purification works because they easily "slip through". Excessive proliferation of the algae intensifies the fetidity of the water.

But the blue algae present another grave danger : like the bacteria to which they are closely related, they exude highly toxic substances. In warm countries blue algae in river-water have already frequently caused considerable harm to health, even after the treatment of drinking water by water-purification works, e.g. in the region of Ohio and the Potomac and in Minnesota in the USA ,as well as in South Africa. Repeated epidemics broke out whose origin could never be properly explained until the Americans identified the FDF factor (fast death factor) which very quickly causes the death of animals which have been given contaminated water to drink, and the SDF factor (slow death factor) which proves fatal in 4 to 48 hours.

Today we know exactly the chemical properties of the poisons secreted by cyanophyceae ; they are cyclic biliproteides (poisonous proteins and cyclic peptides which, isolated from the blue algae, have been shown by experiments on animals to be highly toxic). Even 1/100 mg of these substances per 1 kg body-weight is lethal. G. Vogler reports in detail on examples of poisoning in human beings and animals in *Archiv für Hygiene* (Vol 131 (1969), pp. 1-19). (As already stated, instances of poisoning occur frequently in warm countries and the heating of river-water by atomic power stations would inevitably create the same serious problem in our part of the world.)

Hitherto, thanks to our normal river-water temperatures, we have been spared epidemics of this kind caused by phytoplankton-toxins, principally because the winter water temperatures prevent the blue algae from spreading to any great extent. If, however, the temperature of the river-water is raised by 10 to 12° C in winter and reaches 28° C in summer, then the same misfortune will inevitably befall us.

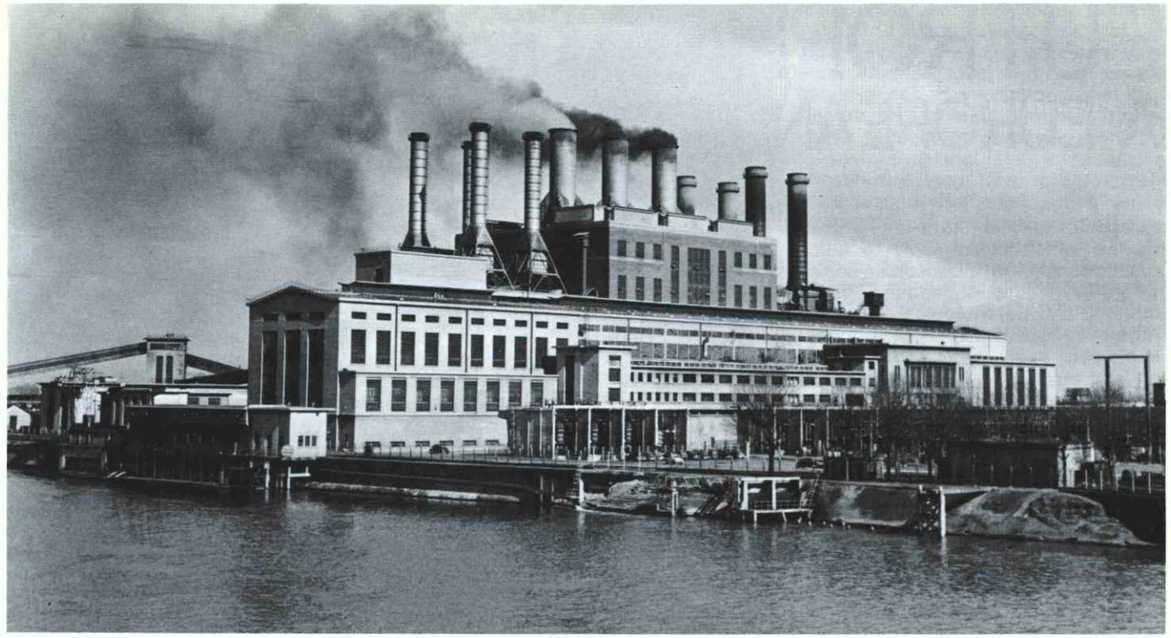
The thermic contamination of Dutch waters by cooling-water from thermal



The heating of river water in winter, proclaimed as an "advantage", can seriously affect fisheries. Instead of hatching in the spring, the young fish may hatch out in the winter months during which they find no food in the river and consequently die.

power stations led, last year, to the catastrophic destruction of tens of thousands of water birds. I. Haagsma, of the Rotterdam Veterinary Institute, established the case of death as botulism poisoning from clostridium botulinum. Where water temperatures exceed 28° C, these dangerous bacteria multiply if the oxygen content is low, and they naturally abound in warm cooling-water currents with temperatures of between 28° C and 38° C. In addition to encouraging the proliferation of bacteria and blue algae and the formation of vapours in the river-valley the heating of river-water in the winter, proclaimed as an "advantage" also seriously affects fisheries. Every increase of 10° C in temperature speeds up all chemical and biochemical processes to 3 fold. The development of aquatic animals also obeys this basic law.

A Breslau fisheries biologist, Professor Stangenberg, has shown, by experiments in the Oder basin, that whereas



Radioactive contamination is still a subject of much controversy. But it should be remembered that radioactive fission products accumulate fast in aquatic organisms — plankton, the food fish eat — and the fish themselves and, through this food chain, ultimately cause genetic harm to human beings.

the normal incubation period for fish spawn is 225 days, in a water temperature of 2° C it is only 56 days in a water temperature of 8° C. Instead of hatching in the spring, the young fish hatch out in the winter months, at a time, that is to say, when they find no food in the river and consequently die. Professor Stangenberg reports on his findings in the Russian review : Health and Technical Hydrobiology, 1967.

The atomic industry believes that it can obtain optimum aeration by means of cascades and submerged conduits under pressure. But it is mistaken : water can absorb and hold only the quantity of oxygen corresponding to its temperature. When pressure is relieved, it discharges any oxygen in excess of the amount normally present at a given temperature ; anyone can see this for himself by drawing water from a pipe whose temperature has been increased by only 2° C through proximity to a room wall or to central heating pipes : the water in the glass promptly becomes cloudy because the oxygen immediately escapes in large quantities. Thus it is illusory to imagine that oxygenation is possible by this method. Reference must also be made to the radioactive contamination of water, which is still the subject of much controversy. Doctors conscious of their responsibilities repeatedly stress that the tiniest dose of radioactive isotopes has, in the long run, harmful genetic and somatic effects on human beings. This is certainly true of the long-lived artificial radioisotopes contained in the waste waters and gases discharged by atomic power stations. The noble gas krypton 85 is particularly dangerous, for it is heavy and sinks to the bottom of a water-course or enters it through the various forms of precipitation.

It is also not generally realised that, from time to time, large quantities of salt are discharged from the regenerators of ion exchangers, in which the primary circuit water is softened and desalted. This sporadic occurrence of a high salt-content in river-water creates serious problems for water-purification works situated downstream.

It must also be remembered that radioactive fission products accumulate fast in aquatic organisms — plankton, fish and the animal food fish eat — and, through this food chain, ultimately cause genetic harm to human beings. In the second accident at the Würgassen atomic power station 1,050 tons of radioactive water from the primary coohant circuit entered the waters of the Weser (K. Bechert, "Das Leben" 11th Year, January 1974).

Consequently the operation of atomic power stations, as designed and built at present, has a variety of harmful effects on water. The thermal pollution resulting from the heating of river-water is incompatible with the principles embodied in the "European Water Charter", and particularly with Principle No. IV, which states that "the quality of water must be maintained at levels suitable for the use to be made of it and in particular must meet appropriate public health standards", and Principle No. V, which states that "when used water is returned to a common source, it must not impair the further uses, both public and private, to which the common source will be put".

EUTROPHICATION
A EUROPEAN PROBLEM

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Eutrophic, well-fed, over-fed, a qualificative which could apply to numerous situations in a consumer society where every effort is made in all fields, material and psychological, to encourage over-consumption. Contemporary ecologists apply it, however, to the aquatic environment and, more precisely, to the closed ecosystems of lakes.

Lakes and not ponds. The difference does not depend on area : we speak of the Cazaux Pond, despite its 5,650 hectares (14,125 acres), but of the Lake of Mourillon (in front of the hospital at Thonon les Bains) though it measures only a few thousand square metres. It is a question of depth or, more precisely, of the existence of thermic stratification during the warm season, when two layers are superimposed in the lakes, with practically no interpenetration between them. The upper layer, 15 metres deep, consists of a warm epilimnion whose temperature decreases slowly with depth, eg from 18° C at the surface to 14° C at 12 metres. Thereafter the temperature drops suddenly, within the space of 2 or 3 metres, to 6 or 7° C, and then slowly again down to the bottom where, at 4° C, the water reaches its maximum density.

In a pond which is rarely more than 4 to 5 metres deep, the water temperature varies with the season but is always more or less constant from the surface to the bottom.

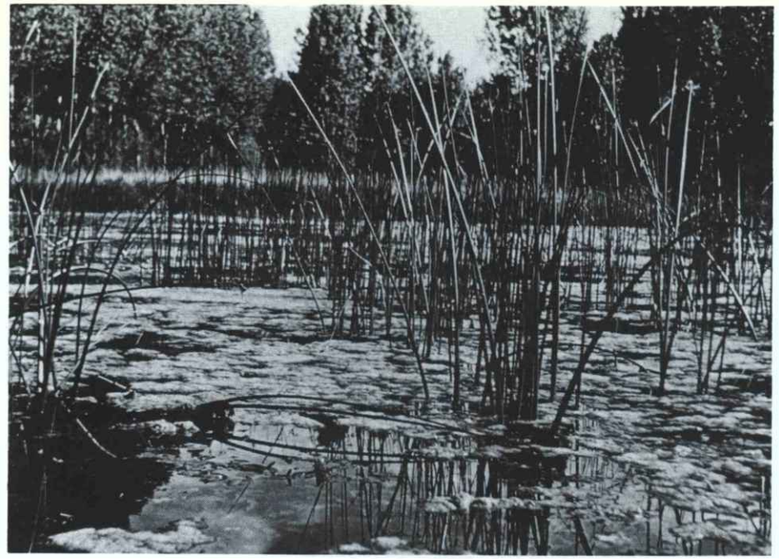
Ponds, like lakes, evolve naturally in the absence of man and human activities. Run-off fills them gradually with elements carried from the catchment area. Water plants, whether attached to the ground or not, further this filling-in process — in ponds, these can accumulate, in spite of their decomposition, into enormous masses. When the final stage is reached in the development of these environments, the climate can contribute to produce strange phenomena. For example, in the tundra of the American far north and northern Eurasia turgescences will rise up in the heart of the ice, sometimes within a few weeks, and reach heights of several tens of metres (the "pingos" phenomenon).

Eutrophication is closely bound up with the presence of man or, more precisely, with what is normally called "the progress" of his civilisation. The banks of the Lake of Geneva, Lake Constance, the Lake of Annecy and the large Swedish lakes have been inhabited by sizeable populations for hundreds or even thousands of years. Natural phenomena have continued there (40 metres of elluvium in the Lake of Nantua) without the waters of the lakes being significantly affected by them.

The lakes' transparency remained unimpaired and, until recently, the deeper waters still harboured trout and chars as in former times. The development of sanitary installations together with the introduction of detergents have radically altered the situation in less than 20 years, since the end of the first half of the century. The problem is not really one of pollution : the situation is hardly any better when sewage from the riparian communities passes through conventional purification plants than in the case of direct discharge. A lake is itself an excellent natural decanting basin which generally suffices to ensure that the quality of the water of the outflowing river is perfectly acceptable. But domestic effluent, even after treatment in a purification plant, contains soluble nutritive elements which induce biological processes in a lake liable to seriously impair the quality of the water : nitrates and phosphates, the normal end-products of domestic sewage after it has passed through a purification plant, are excellent nutrients, and in recent times domestic detergents have doubled the dose of phosphates naturally produced by human habitation. The development of intensive agriculture in the catchment basin of a lake, together with the fertiliser-charged run-off ofter rain — fertilisers being almost always applied to excess — are also factors contributing to increase the quantity of nutrients in the water.

Industrial stock-breeding methods (cattle, pigs, poultry) also lead to the production of enormous quantities of animal waste in a small area, and if the manure is not spread properly it becomes a major source of phosphorus and nitrogen. Thus fertilised, the aquatic environment fosters the proliferation of macroscopic and, particularly, microscopic algae, which, during the summer stratification flourish mainly in the epilimnion. Penetrated by sunlight, the epilimnion becomes rich in oxygen owing to the photosynthetic action of the algae, the saturation rate being exceeded in the case of advanced eutrophication.

A first consequence of the proliferation of algae is impairment of the water's transparency. In addition, the dead algae sink to the bottom where they slowly putrefy. A heavy consumption of oxygen results and if the content falls to zero anaerobic fermentation takes place, releasing methane and hydrogen sulphide. This produces considerable changes in the lake fauna. Oxygen being a vital necessity for the trout and chars which inhabit the deeper waters, these disappear more or less rapidly. More numerous but commoner species develop in the upper layers, with occasional explosive increases in their numbers owing to the overabundance of food present in the environment : in the Lake of Geneva it has been observed that young perch grow unusually rapidly with the result that they are caught in nets, with the normal regulation mesh, during the first year of their life, even before they have had time to reproduce. In the most serious cases, eutrophication becomes more visibly apparent to the riparian population by the explosive growth, during certain periods of the summer stratification, of microscopic algae. These often give the water a particularly disagreeable appearence (eg the "Bourguignons' blood" that appeared for the first time at Morat, then at Nantua, and subsequently in the Lake of Geneva), which is, in itself, enough to discourage tourists. Bathers dislike the viscous deposits that cover their skin, although, in fact, their health is not endangered in any way. Water supplies for riparian towns obtained from the lake during these periods of algal proliferation would present no hazard for public health, but would nevertheless have an unpleasant taste on account of the algae. Thus eutrophication has multiple facets, but it cannot be regarded purely and simply as pollution. It is primarily a consequence of improved sanitation but doubtessly attributable also to a slightly lesser extent in most cases, to the



extents of agricultural activities round the closed environment constituted by a lake.

All the large European lakes, from Lough Neagh (Ireland) to Lake Mälaren (Sweden), the Lake of Geneva, Lake Constance and Lake Maggiore, as well as the French lakes of Annecy, Bourget and Nantua, to mention but a few, have been more or less seriously affected.

Their situation differs considerably, however, from that of the Great Lakes in North America, where eutrophication appears dominated by actual poisonous processes due to the discharge by industry of chemical substances and hydrocarbon residues. For example, all life is now threatened in Lake Erie and any remedial action seems much more difficult than in the case of the European lakes.

A debt of gratitude is owed to OECD for echoing in time the first cries of alarm uttered by the limnologists at the first meeting on problems of eutrophication, held in May 1968 at Skokloster Castle near Upsaala in Sweden. It was there that the representatives of member states were able to form an idea of the magnitude of the problem, of the type of research required and the kind of remedial measures that needed to be taken. Their concerted efforts led to the establishment of a doctrine. The "Report on Eutrophication", finalised in 1973 and due to be submitted at the next meeting of the OECD Committee on the Environment, constitutes a clear, precise and comprehensive compendium of knowledge in this field and a guide to the steps to take in the existing situation to combat the spread of the evil and, as far as possible, restore quality of the water.

If the lake is not too large, a particularly effective solution can be envisaged, namely the construction of a peripheral collector to intercept the wastewaters discharged throughout the catchment area, carry them downstream away from the lake and channel them, after purification, into the outflowing branch of the lake. This has been done at Annecy (the peripheral installations are almost completed) and Nantua and is now being done at the Lake of Bourget.

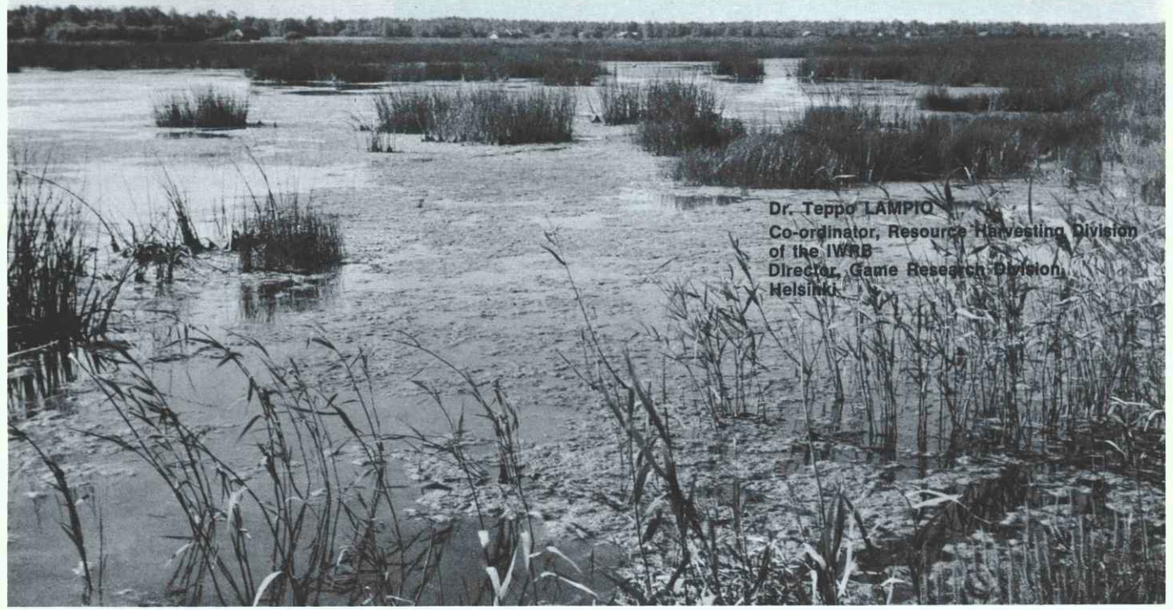
In the case of the larger lakes, such as the Lake of Geneva or the Lake of Neuchâtel, installations will have to be built at the riparian purification plants to remove fertilising elements ; in the case of the lakes mentioned it was decided to extract phosphorus. This element is, fortunately, both the easiest to remove and the one whose character as regards eutrophication is most pronounced. Already dephosphatation is being carried out in all the purification plants around the Lake of Neuchâtel and the practice is being extended to the catchment basin of the Lake of Geneva (the purification plant at Thonon Evian is being equipped for the purpose).

The construction of peripheral collectors, or the use of the reagents necessary for the precipitation of phosphorus, inevitably entails considerable expenditure (operation costs in the latter case have increased by 50 %), but experience shows that this expenditure is justified : at Annecy and Neuchâtel encouraging signs are already discernible : an increase in transparency and a gradual regression of the algae which are a characteristic of eutrophication bear witness to the effectiveness of the action taken.

Admittedly, vigilance is necessary because sedimentary deposits are likely to restore to the lake some of the phosphorus they have progressively accumulated. Remedial action (such as aeration) in the lake itself will probably be need to supplement the effects of the initial measures taken.

This will be a task for the future, but if we persevere with the work begun, there seems every chance of saving our European lakes.

WATERFOWL HUNTING IN EUROPE
TODAY AND TOMORROW



Dr. Teppo LAMPIO
Co-ordinator, Resource Harvesting Division
of the IWRB
Director, Game Research Division,
Helsinki

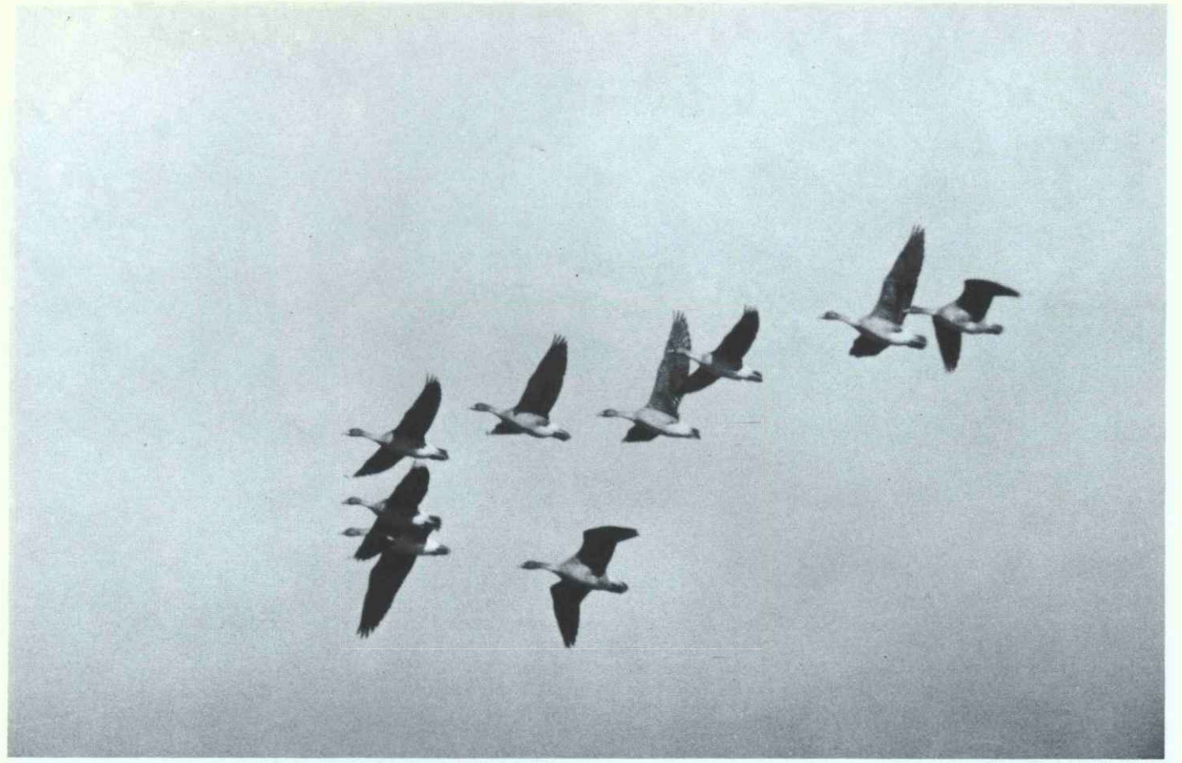
Hunting is one of man's oldest livelihoods. Thus laws which regulate shooting usually have their origins way back in the past. Hunting legislation has characteristically preserved certain traditions so that a so-called new game law is nearly always just an improved version of a previous one. Until recently, provisions in force in neighbouring countries have had only a slight influence upon developments added to which the persistence of old customs has prevented the materialisation of even moderate requirements for waterfowl protection.

For waterfowl the preservation of traditions primarily means two things. If ducks could think, the contradictory regulations in different countries would bewilder them. What is strictly forbidden in one country may be quite legal in another. Thus the birds are shot at from July/August to February/March, wherever they fly, except in a few sanctuaries.

According to studies by the Resource Harvesting Division of the International Waterfowl Research Bureau, the pressure upon the waterfowl populations has recently become much more intensified. The number of waterfowl hunters in European countries and other areas which have their own game laws has increased lately in twenty-one of these countries or areas, remained unchanged in six and decreased only in two of them. There are more than four million waterfowl hunters in Europe alone. In certain countries they are even allowed to practise shooting for more than eight months without any bag limits or sales restrictions. Moreover, in order to make as much profit as possible many hunters, particularly in Western Europe, shoot as many birds as they can. But it is not only the expanding army of sportsmen with their ever more effective arms and ammunition that threatens the future of waterfowl. Accessibility has improved and private means of communication increased so much that even the most remote areas now lie within the reach of sportsmen. Thus many regions which were previously undisturbed have now lost their significance as natural waterfowl reserves at the same time as new protected areas are established. The range of waterfowl has diminished considerably due to the loss of large natural areas to civilisation.

Deterioration of the waterfowl environment has been even more extensive since this is not limited to the industrial zones of Southern and Central Europe but stretches all the way to the northern breeding sites. We must ask ourselves whether waterfowl populations will be able to withstand an even greater pressure in the future. Furthermore, although we may agree that hunting did not cause significant reductions in waterfowl populations in the past, under the present and very different circumstances shooting may become harmful or even downright disastrous unless the harvesting of waterfowl is rapidly brought into balance with the reduced endurance of the populations.

Regulations concerning the protection of waterfowl in Europe are extremely discrepant. They must be made uniform if we are to provide effective protection for waterfowl. The four countries where swans are still unprotected, and the fifith where there is an open season on them, should follow the example of the other countries and protect swans all the year around. If the mute swan increases excessively in a given area, as some have complained, the phenomenon must be handled locally without endangering the existence of the wild arctic swans. All geese are currently protected throughout the year in five countries, and in many other countries one or



Game, especially migratory species, are in dire need of careful management in all countries where they occur during their life cycle.

several individual species are fully protected. Ducks, on the other hand, are not fully protected anywhere, although in a large number of countries there are closed seasons on a varying number of species. The species which are fully protected differ greatly from country to country and even those species which receive the greatest protection in certain areas are still hunted over half of Europe. By contrast, with the exception of the woodcock and snipe, all waders are fully protected in eleven countries or other areas, and there are also several other countries with open seasons for only one or two species. In many other areas wader hunting is legal but rather unpopular. Thus waders are not in as much danger as geese and ducks. Another question is whether waders should be considered as game birds at all.

Despite these enormous irregularities, certain common factors do exist : in the north and east open seasons are reasonable (mostly 2-3 months), but in the west and south they stretch over half a year, or even eight months. As there are a great many sportsmen in these latter countries and market hunting is commonly practised, the deficiencies in hunting regulations in many areas of western and southern Europe are obvious. Even though we have no clear proof that shooting in these countries has reduced waterfowl populations it should be fully evident that a great danger would arise should all European countries permit the extensive hunting now going on in western and southern Europe. We may ask with good reason on what grounds some countries are entitled to take a much larger share of the common waterfowl production than all the others. Shooting should be made to conform with the endurance of waterfowl populations and a solution ought to be found to harmonise the different countries. So far many European countries have voluntarily shortened their open seasons hoping that their example would be followed by the others. But the others seem to think it quite enough for the first group to worry about the future of waterfowl. It seems that changing the old traditions and customs in order to improve protection is a most difficult task. As collaboration between the different countries should be started as soon as possible we should find something on which all countries must agree. We could for example begin with an agreement which prohibits the sale of waterfowl bags everywhere in Europe. It is absurd that sportsmen in many countries unselfishly protect birds and spend time and money on management whereas their colleagues elsewhere kill as many as they can for personal profit. Secondly, we should agree that all the open seasons be cut down to half a year or less. Even this is too much ; to my mind open seasons should be no longer than 3-4 months.

Furthermore, rare species which can be recognised easily enough in the autumn and winter should be fully protected, as has already been done in many areas. But if these efforts are to be sufficiently effective they must be carried out on a co-ordinated basis. It is often typical of today that protective measures are directed to species which are common everywhere except for particular areas where their rarity is due only to the marginal location from the point of view of the distribution of the respective species. Shooting itself should also be rationalised by abandoning techniques and practices which are totally destructive or wasteful.

Sufficient harmonisation of waterfowl hunting will evidently not succeed without an international convention

which would oblige all the European countries to accept certain common principles. Numerous studies and extensive preparatory work are needed for such a convention in order to avoid making the decisions on the basis of mere presumptions. No doubt it would not be reasonable to apply the same principles and regulations throughout Europe although the decisions ought to be made on a flyway basis. What we need most are reliable and comparable hunting, kill and shooting statistics in all the European countries. It may be mentioned that the Resource Harvesting Division of the International Waterfowl Research Bureau has already begun preparations to obtain such statistics from all over Europe by 1975. Banding of waterfowl and collecting wing samples should also be intensified, waterfowl counts extended and the analyses of findings speeded up, investigations initiated to reveal the nature of waterfowl hunting in detail, etc.

The large number of independent countries makes the regulatory system adopted in North America extremely difficult in European circumstances. It is obvious that progress should be made step by step, as was emphasised above. Many waterfowl experts are of the opinion that the American system should not even be attempted in Europe. Perhaps we should make it our goal in the old world to find out the harvestable surplus of waterfowl in good, average and poor years, and to establish national quotas. Each country should regulate shooting within its limits according to the rules of the convention, taking into account the level of waterfowl populations. Particular attention ought to be paid to avoiding overshooting in each individual country and throughout Europe. But before this several autumn and spring migrations will pass. Sportsmen in Europe seem to be neither very anxious for co-operation nor worried about the future of their favourite sport.

Traditional knowledge together with modern methods will hopefully guarantee the survival and healthy development of Europe's game birds and animals and the conservation of their habitats.

INTERNATIONAL CONVENTIONS AND STUDIES ON FRESHWATER FISHERY BETWEEN FINLAND AND ITS NEIGHBOURING COUNTRIES

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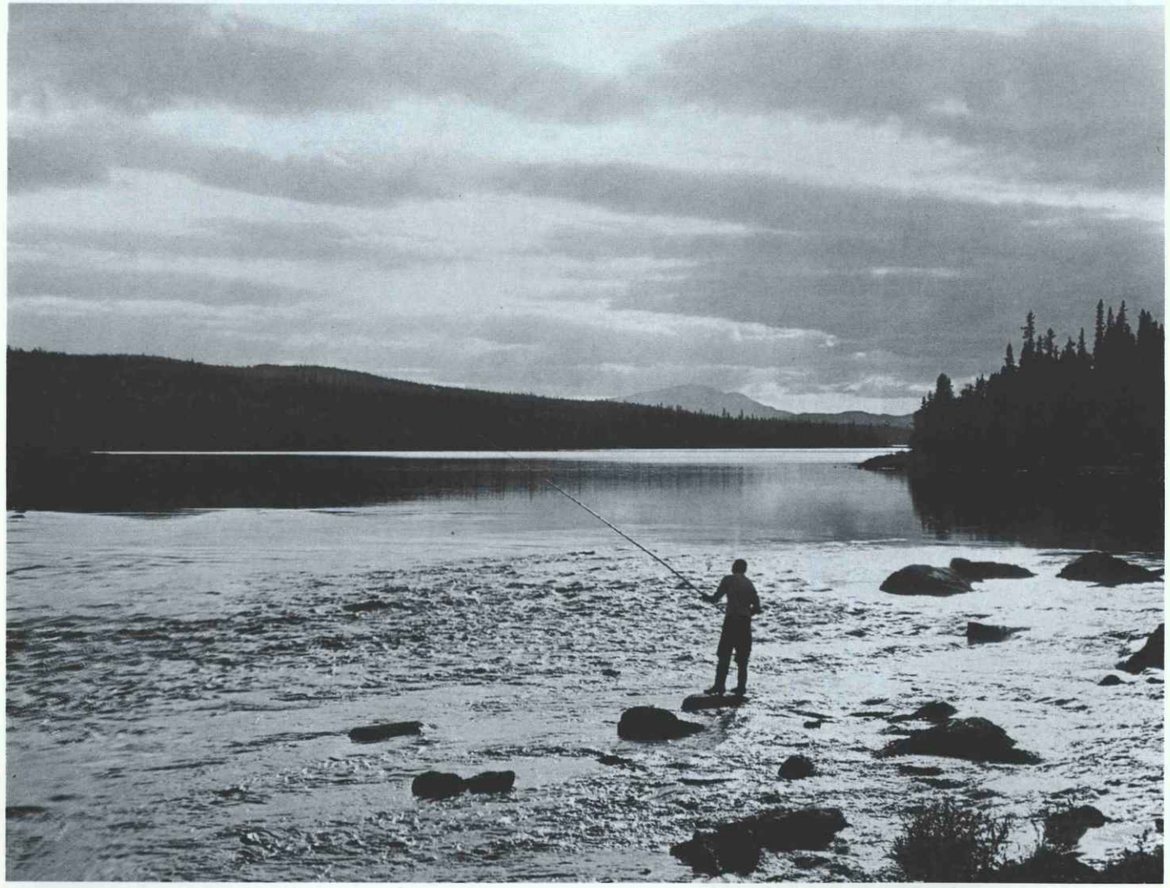
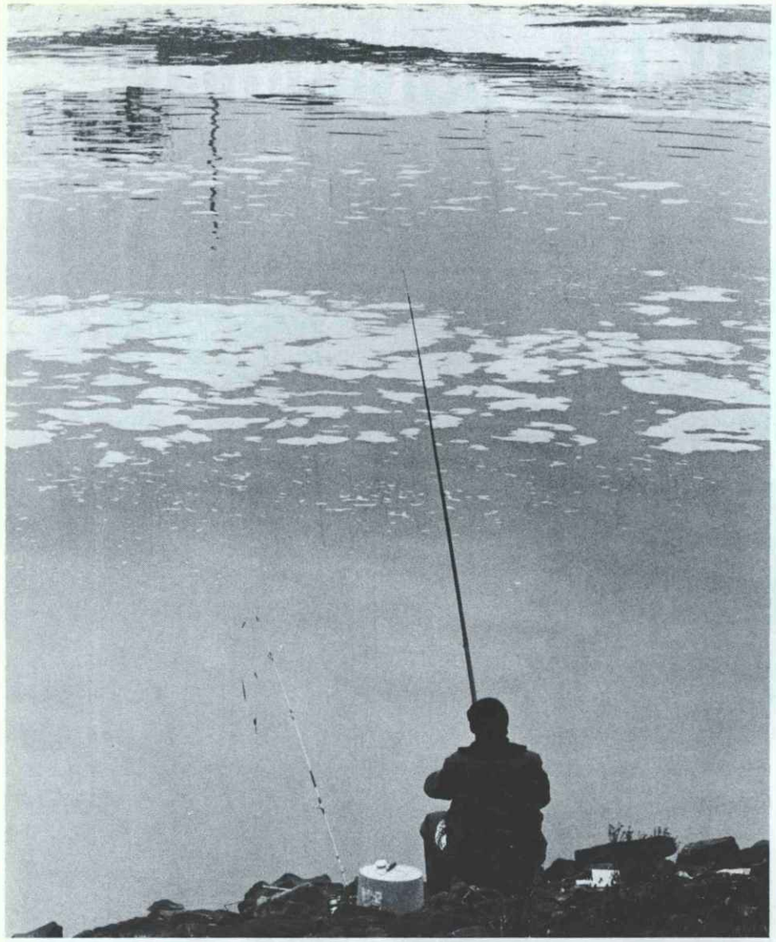
The main cause for freshwater fishery conventions between Finland and its neighbouring countries has obviously been the common interest in migratory fish species, especially salmon and trout. The conventions have been drawn up thus far on a bilateral basis. Recently, Finland has signed conventions which contain fishery regulations with Sweden, Norway and the USSR. These cover, with a few exceptions, all the border watercourses.

In 1971 a Finnish-Swedish Border River Convention was ratified. This convention fixes the regulations, concerning fishing gear, fishing areas and protected areas, open and closed seasons, size limits for fish, fishing rights, selling of licences and also control of the Tornionjoki River. In addition to fishery, the convention covers floating pollution, regulation of water level and flow and different kinds of building operations. Both execution of the convention and control are carried out by a permanent commission.

Some common studies with Sweden of the Tornionjoki River have been carried out. These dealt with the growth areas of salmon and the sea trout young as well as smolt production. In 1972 measures were started to cultivate salmon young up to smolts at Muonio fish farm with the financial assistance of the Border River Commission.





Co-operation on fishery in border watercourses between Finland and Norway is not yet as highly developed as it is in Sweden. There are some separate fishery conventions, but no permanent commission. Such a commission has, however, been planned.

For the Tenojoki River, which is the largest salmon river in Scandinavia, a fishery convention between Finland and Norway was ratified in 1972. It has regulations on the same matters as the convention with Sweden, but only deals with fisheries. The fishery convention for the Näätämönjoki River is also under consideration. In addition to normal fishery regulations, it also defines some measures to improve the spawning run of salmon by constructing fish ways in the worst rapids.

There has been some collaboration on investigations concerning salmon smolt production and fishery statistics in the Tenojoki River and new projects are being developed.

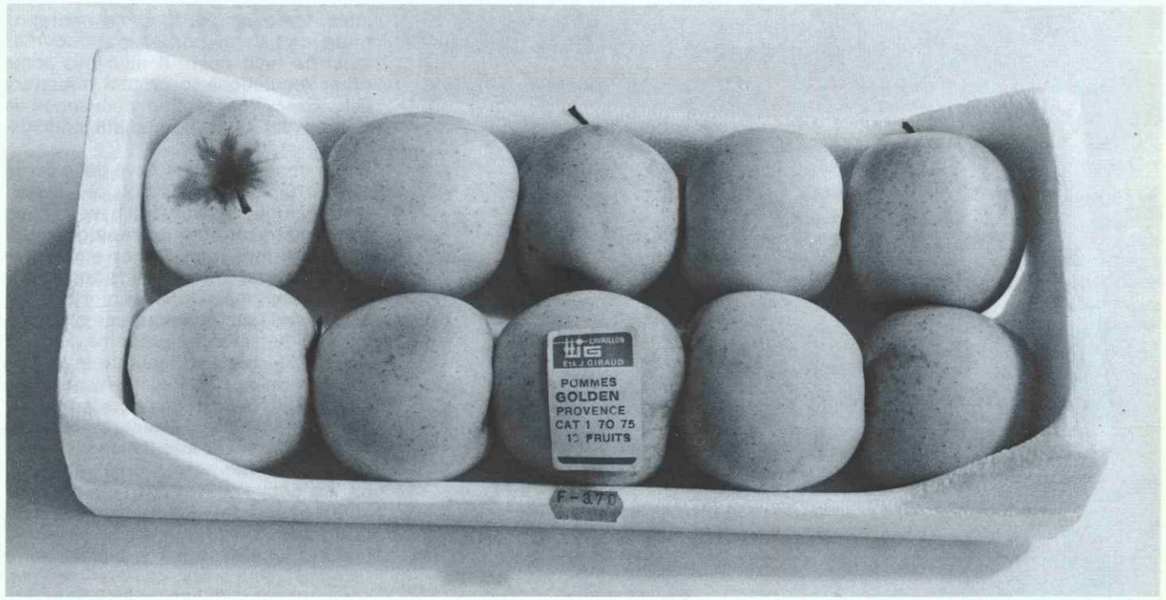
It is still perhaps too early today to judge the working of the above-mentioned conventions. This is also difficult, because the main cause for the decrease in salmon and sea trout stocks has recently been found generally in sea fisheries. The Baltic fishery convention, signed in Gdansk, Poland in 1973, however, works toward the same goals as the Finnish-Swedish Border River Convention and some results can thus be expected. On the contrary, in the sea areas where the salmon of the Tenojoki and Näätämönjoki Rivers have their feeding areas, there are as yet no corresponding regulations.

Since 1965 Finland has had a ratified convention with the USSR concerning the border watercourses. This convention was developed on the basis of a convention from 1960, which defined some common measures concerning occurrences on the border. The nature of the convention of 1965 is much the same as that of the convention between Finland and Sweden, but the fishery regulations are more limited and of a more general nature. It stipulates, for example, that the migration route of fish in border watercourses must be held open. It also has some other regulations to protect migratory fish. Execution of this convention is carried out by a permanent commission.

Some general studies have been made since 1973 on the Koutajoki watercourse. Finnish scientists have carried out studies on the spawning conditions of brown trout and on smolt production capacities of rapids and scientists from the USSR are studying migrations and feeding areas of brown trout in the same watercourse.

In 1973 the Lappish Institute in Kautokeino, Norway, started its work. This institute is financially supported by the Governments of Sweden, Norway, Finland, Denmark and Iceland. Its activity covers the whole area inhabited by the Lapps and its goal is to make studies necessary for the development of the Lapps' natural means of earning a living, one of which is fishery. As a result of the work of this institute, some general fishery regulations for the Lapp areas of Sweden, Norway and Finland can be expected.

FOOD AND THE CONSUMER



Dominique PONS
Deputy Editor-in-Chief
of « 50 millions de consommateurs »
(50 Million Consumers) a monthly review
published by the Institut National
de la Consommation
(National Consumer Institute)
Paris

French consumers are not satisfied. Yet they can find all the food they want in great abundance in the markets, shops and supermarkets. Domestic production, together with imported fruit, vegetables and meat, has now brought about an economy of plenty, not to say of waste.

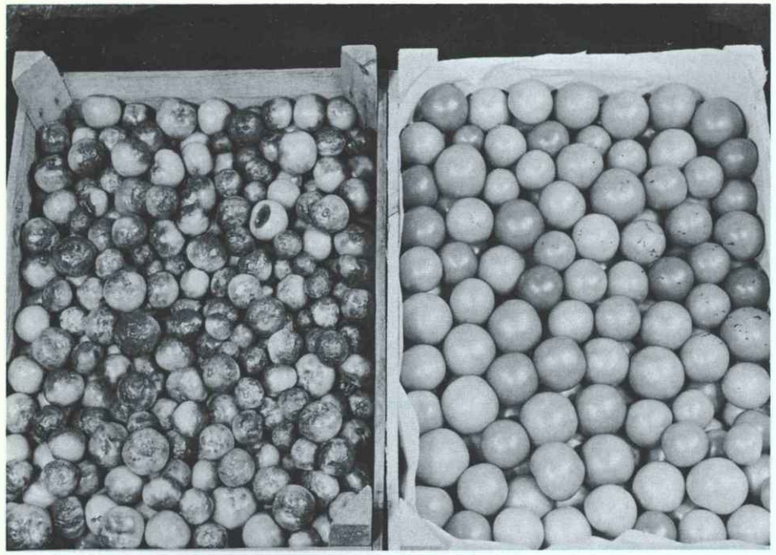
It cannot be denied that food prices are relatively much lower than they were at the turn of the century. Anyone nowadays can eat at a reasonable price and according to his needs. Statistics show that the proportion of the French household budget spent on food has come down to only 33,66 % and in the higher income brackets the figure is about 16 %. French people are nevertheless dissatisfied, since although the quantities supplied by agriculture are quite adequate, the same cannot be said for the quality. The standardisation of French food has inevitably resulted in a certain levelling of quality.

Although the experts might well admit it, this does not help matters. Only standardisation can provide enough food for 52 million Frenchmen (just think that 12 million collective meals are served practically every day).

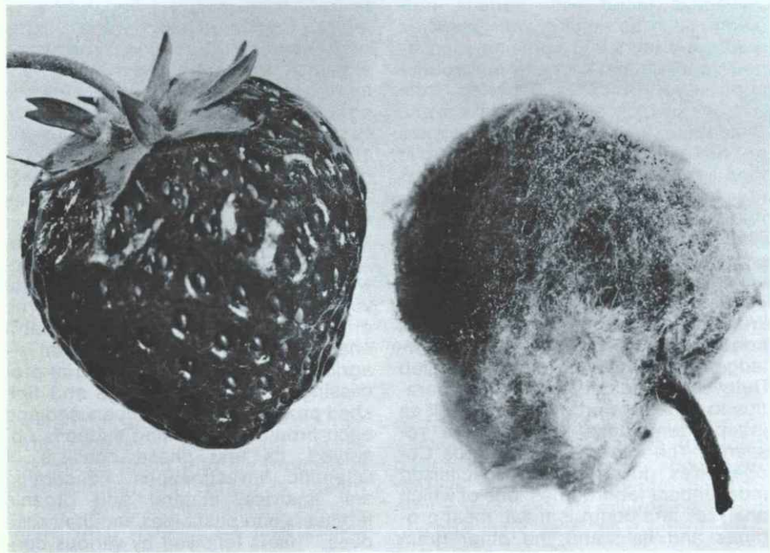
To dissatisfaction with quality is added a mistrust of the excessive use of pesticides, fungicides, herbicides, etc., in which farmers have a tendency to indulge. To take the example of fruit, it can be looked at from two points of view : for the consumer a fruit must be attractive, tasty and inexpensive, while for the producer it must primarily be "resistant", i.e. able to withstand transport and storage without difficulty and at the same time preserve its good appearance.

Golden Delicious apples are a case in point. They are picked before they are ripe and put in cold storage. This allows retailers to "spread" sales over the whole year and enables consumers to be supplied every day with Golden Delicious apples. The drawback of the system is that the apples treated in this way have less and less flavour. This fruit, which was practically created in response to consumer demand, is now so unsatisfactory in quality that even the consumers are growing tired of it — one of the disadvantages of standardisation.

On the other hand, consumers are no more likely to find good quality products under the "readymade" label, that is, pre-packed. A decree was indeed issued on 14 October 1973 containing regulations for labelling prepacked goods : the label must show the quantity and composition of the product, in the case of some perishable foods the latest date of sale and a name and address which can be referred to in the event of a complaint. Unfortunately these regulations are not being complied with very well and various enquiries carried out both by the Institut National de la Consommation and by consumer organisations have shown conclusively that much remains to be done in this field.



Twentieth century consumers demand products that are attractive, tasty and inexpensive, for the producer are the problems of storage and transport. But who takes care of the nutritional value ?



Consumers might at any rate be allowed to hope that everything is being done at present to provide them with a means of escaping some day from this standardisation and that a policy of quality is in process of emerging. Unfortunately this is not at all the case. The Institut National de la Recherche Agronomique (National Agronomy Research Institute), which is responsible amongst others for dealing with this question, works on an absurdly small budget. It is only given polite acknowledgement by the Ministry of Agriculture and the large French food firms only devote to 0.04 % of their turnover to research.

It is sad to see that quality plays little part in the economy as a whole and that consumers are left no choice in the matter. They can, of course, fall back on biological foods, but alas, although the latter may be attractive in some respects, they still have a long way to go before they are taken seriously. At the same time French consumers are very sensitive to the increases in food prices which they are always noticing when they do their shopping. In 1973 there was an increase of 10.9 % (eggs went up 30 %, pork 19.4 %, poultry and game 17.3 % and only meat alone went up only moderatley, by 4.2 %, though here the temporary removal of VAT (now reinstated) has to be taken into account) and there are no indications that the rate of increase will slow down or level off in 1974.

Where, then, does the blame lie ? It is extremely difficult to say. In spite of the efforts made by the authorities to impose a system of accurate labelling, which enables customers to identify easily what they are buying and how much they are paying for it, consumers remain helpless ; they do not really understand the complexities of producer prices, middlemen and profit margins. They can only take note and complain.

Information is doled out in driblets. Consumer representatives are rarely on the price-fixing bodies. It could be that their inquisitiveness and interference in a jealously guarded domain are not welcome. The day consumer organisations and their technical organ, the INC, play their full part socially and economically, the consumer will be respected and his case will be given a fair hearing.

FOOD A CAUSE OF POLLUTION

Rudolf SUTER
Chairman, delegation of the administration of the Federation of Migros Co-operatives, Switzerland

Food, although a mainstay of life, has, with the increase in demand and the development of technology, also proved to be a burden on our environment. This relationship between pollution and food is a complex problem, with which various other factors are linked, such as a country's nature, its laws, its standard of living and its needs.

The smallness of our own country, its high population density and its inevitable dependence on other countries for supplies both of raw materials and of finished products and foodstuffs give increasing significance to this problem, which has been latent for several decades now.

Swiss legislation on food, which derives from the Federal Constitution and has several times been revised and amended, was passed by popular vote on 8 December 1905. Through orders and regulations, it essentially seeks to protect the health of consumers and save them from being misled when buying food. As a result of heavy industrialisation and environmental disequilibrium, the authorities concerned are nowadays faced with serious problems, such as dealing with pesticide residues, combating contamination by heavy metals and carrying out frontier controls of products imported from countries which do not have the same regulations as Switzerland. Because the widespread use of chemicals in food is a recent practice, science is not always able to supply accurate information on the long-term effects. This is one of the many reasons why official controls, necessarily based on scientific data, sometimes prove inadequate or out-of-date.

With a view to introducing stringent controls, adapted to current knowledge, the founder of Migros, Gottlieb Duttweiler, decided to set up laboraties to supervise production as well as independent ones to supervise research. The Federation of Migros Co-operatives now has two specialised independent laboratories, one of which analyses and controls meat, meat products and fish, and the other grain products and legumes. In addition, there is a central laboratory which is responsible for controlling all products before they are put on sale as well as bacteriological analyses, pesticides, traces of heavy metals and research in general. It is also responsible for establishing quality standards for all food products sold by the Migros network. For some sectors, the standards are considerably stricter than official ones ; this is so, for instance, in regard to the use of certain pesticides. In 1958 an independent body, the Nutrition Research Institute, was set up to carry out basic and applied research in the field of nutrition. The control of food products is, however, only one of many aspects of the environment problem. Food in its widest sense plays a key part in the life of our planet. Its main purpose is to feed man without having any adverse effects on his health or equilibrium. Undeniably, however, all food products, whether natural or manufactured, are affected by the deterioration of the environment (deposits of lead in vegetables and of mercury in tinned tunny) and are themselves an indirect cause of pollution (destruction of packing material, pollution due to widespread use of chemical fertilisers or to manufacturing processes).

An organisation such as Migros, which covers about 25 % of the Swiss retail market in the food sector and occupies an important place in the country's productive system (some 25 % of the goods marketed by Migros are produced in its own factories), is confronted with all aspects of the production to the consumption stage. In view of the magnitude and complexity of the problem, the Federation of Migros Co-operatives initiated a study of a special production programme aimed at marketing foods which are as natural as possible, from both the agricultural and the industrial (processing of raw materials) point of view. The object of this programme, known as Migros-Sano-Control, is to respect certain balances in our environment as far as possible and to find a solution half-way between the abuse of chemicals and the praiseworthy but somewhat impracticable movement in favour of biological production. The originality of this programme is that it enables all stages of production — agricultural production, industrial processing, packaging, storage and finished products — to be supervised and each producer's working methods observed. Its first phase consists of scientific investigations concerning soil analysis, mineral and organic fertilisers and pesticides and their residues. This is followed by various controls carried out during growth or manufacture. The first products to comply fully with the criteria laid down by a committee of experts and be given the label M-Sano (various eggs and chickens) are to be marketed next spring. The successful implementation of this programme will undoubtedly be an important turning-point in the consumption field in general. After making various isolated efforts (such as replacing the use of preservatives by pasteurisation in the case of certain table drinks, reintroducing multi-purpose bottles and eliminating PVC from certain forms of packaging), producers will be faced with the problem of manufacturing food which is healthy for man, while consumers will have to realise what significance their choice of food has for the future pattern of consumption. Only through the joint efforts of producers, who should undertake to market products suited to man's needs and his environment, and of consumers, who must learn to recognise and safeguard natural values in the food sector as well as in other areas of consumption, will our economy manage to survive, for it will then have the backing of a better informed and more responsible society.

Will the beauty of the sea continue to run parallel with the health of its inhabitants ? Ever increasing pollution either directly through effluents or indirectly through fallout, is already inflicting serious damage to marine life.

...NEWS...NEWS...NEWS...NEWS...NEWS...

FROM STRASBOURG

Water. Pure, fresh water to drink our fill. A gift of nature that literally falls from the heavens ! Who is not familiar with pictures at least of brooks teeming with trout, of waterfalls and cascades where dragonflies dance their eternal dance of spring ?

In organising a new European freshwater conservation campaign a few years after launching its Water Charter, the Council of Europe's aim is to show that the problems of safeguarding our continent's freshwater resources are far from solved.

With the launching of the Water Charter in 1967 the Council of Europe issued a first appeal to the European public to realise that their water, a natural resource whose value is all too often unrecognised and underestimated, is not in limitless supply.

In the course of this year, 1974, the Council of Europe is once again appealing to all Europeans to contribute to a joint effort to protect our freshwaters and manage them scientifically. This information campaign is being run by the Council's European Information Centre for Nature Conservation. It is being conducted this autumn at the same time as a symposium, organised jointly by the European Federation for the Protection of Waters and the Council of Europe's parliamentary Assembly, is held in Strasbourg. In order to reach as many people as possible, the Centre has contacted the major European newspapers, the relevant organisations and the specialist press and sent them a variety of information material intended for publication so that it may be brought to the attention of the public. At the same time, the Centre's National Agencies will also be drawing attention to these issues nationally and regionally.

At the heart and core of all these activities and of this compaign lies the Council of Europe's Convention on the Protection of International Watercourses against Pollution, which is at present being considered by the Organisation's Committee of Ministers. Its adoption and ratification should constitute an important step towards effective protection of a most precious asset.

May everyone realise what is at stake and decide what they can do to help !

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