

The UNESCO Associated Schools Project

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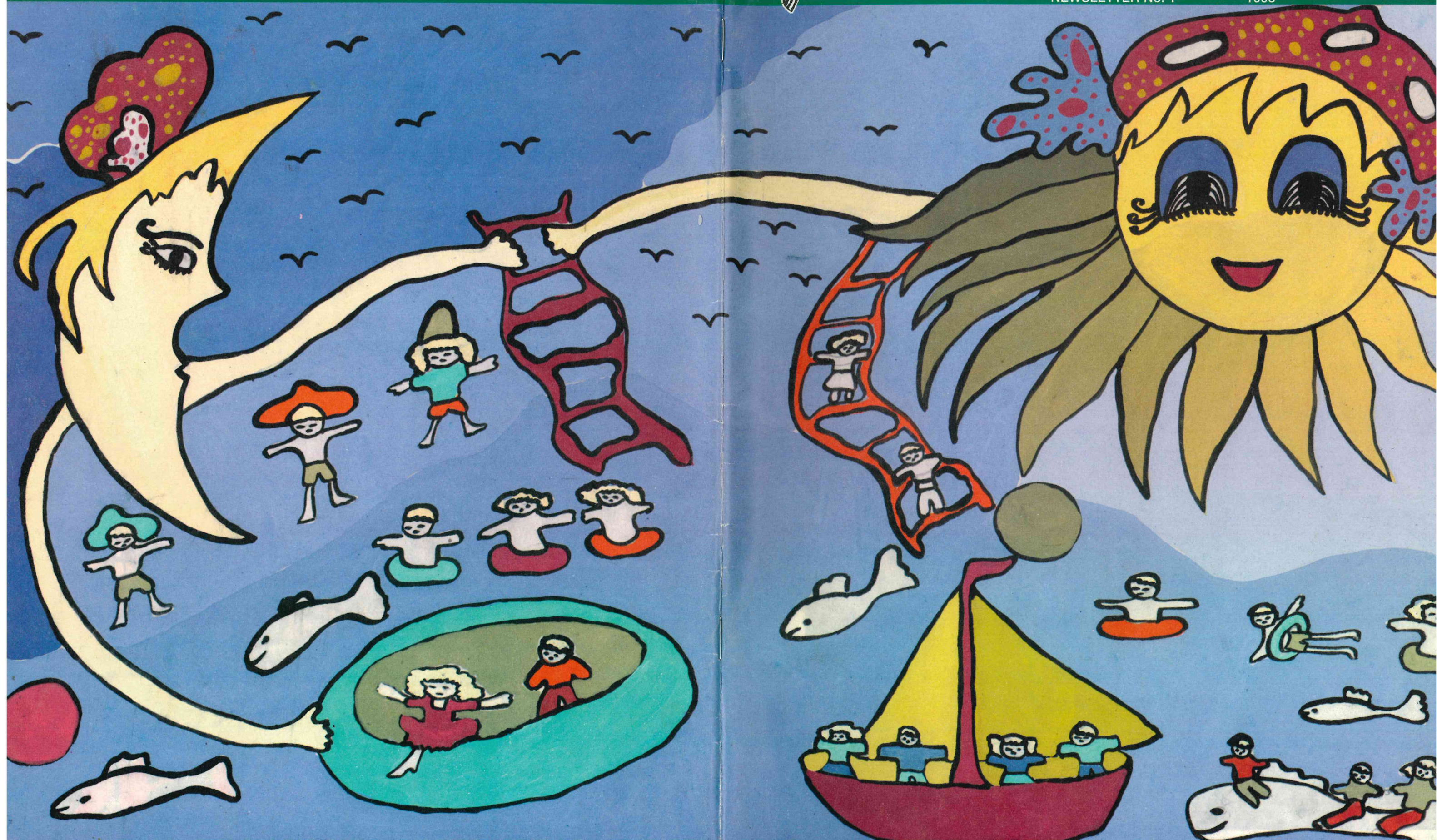
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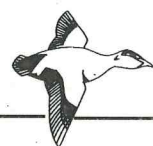
# The Baltic Sea Project

NEWSLETTER No. 1

1995







## The Baltic Sea Project

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**Editors:** Kerstin Lantz Persson and Siv Sellin.

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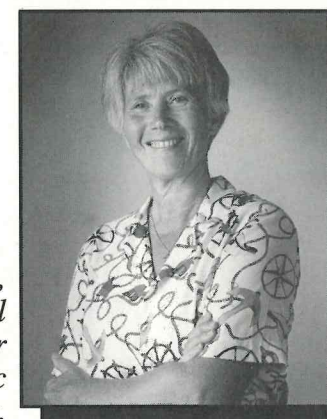
•Catalina-Maria Nedelcu

### LOGOTYPE:

Karin Petersson and Kjell-Åke Holmberg/Hompe

## EDITORIAL

# Environmental crisis a moral dilemma



Siv Sellin,  
general  
coordinator  
of the Baltic  
Sea Project.

To my satisfaction, I find that schools have been and are successful at developing methods for studying changes in the environment. Six different BSP programs have been developed, for different ways of studying the environment. This makes it possible for teachers and students to choose the area that suits their vicinity best. Most of the teachers who have developed these programs are natural science teachers.

When awareness of environmental problems began to rise, we believed that the damage could be repaired. Environmental problems were mainly regarded as problems relating to pollution, problems that could be rectified. In many parts of the world, this perspective has also led to solutions of point source environmental problems. However, it gradually became clear that diffuse emissions were at least as much of a problem as point source emissions, and that it was necessary to take account of the exploitation of natural resources.

In recent years, awareness has arisen about the fact that the environmental crisis came into being in the interplay between man and nature, and that it is largely a consequence of human activity. For this reason, we need a holistic view in order to solve the environmental problems.

The BSP project utilises this view, which took expression, for example, in our theme, "Save the Baltic Sea" for the conference in Karlskrona. The participants were not only expected to study the problem, but also to elucidate the causes of, and make proposals regarding solutions to the environmental problems in the Baltic Sea.

The "Rivers" program contains proposed tasks not only in chemistry and biology, but also in history, social studies, and geography. In conjunction with the program "Estimation of Air Quality by Bio-indicators", presented in this issue of the Newsletter, there are proposals for theme studies on "Air Quality" for the 1995/96 school year.

### An active role

In order to create awareness and the ability to act in our students, we are working in the BSP project with a view to giving the students a more active role, thus

also changing the role of the teachers. This issue of the Newsletter contains a letter from a teacher at the University in Linköping, Sweden, where she describes her view of the role of the teacher, and about how she uses problem-based learning (PBL), and how it changes the classroom situation for the students. A more detailed description of PBL may be found in the book *Working for Better Water Quality in the Baltic Sea*.

One example of active students is presented in this issue describing how students from Frederika Bremer Upper Secondary School in Haninge, Sweden have begun to take personal responsibility for their school environment. Another example comes from Rujiena Secondary School, Latvia, where the students used the Eco-Baltic Survey, to study how they could increase the number of environmentally-sound products sold in their town's shops. The BSP Newsletter would be happy to receive more such examples from schools, regarding how practice in being active can be attained in reality.

### Ethical reflection

Since the environmental crisis has been caused by a lack of interplay between mankind and nature, environmental problems have become a moral issue. Ethical reflection must, therefore, be regarded as a significant aspect of environmental education. What is environmental ethics? An introduction to this subject area is provided in a summary of a lecture held at a study day for BSP schools in Sweden on "Links between society and environment". I hope that the next issue will contain comments on environmental ethics from some other country in the Baltic region.

I am pleased to see that many sister projects have got started, and look forward to continued good cooperation.

The BSP is a sub-regional project within the UNESCO Associated Schools Project with the aim to promote both environmental education and intercultural learning.

The United Nations and UNESCO were founded 50 years ago, an occasion well worth observing by the BSP schools. Please, send ideas on how to celebrate their 50<sup>th</sup> anniversaries.





## Public awareness one important tool

The Helsinki Commission (HELCOM), the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea, held its 16th meeting in Helsinki, Finland, March 14-17, 1995. The meeting approved 11 new recommendations dealing with industry, agriculture and forestry, municipalities, nature protection and sea transport.

The Commission noted that loads of organic substances and nitrogen in almost all river basins have decreased since 1991.

The Convention to protect the Baltic Sea was signed in 1974 and came into force in 1980. This convention was the first international agreement to cover all sources of pollution both from land and from ships.

### New elements in the Convention

In 1992, the new, more effective Convention was signed by all the countries bordering on the Baltic Sea (Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden) and the European Economic Community. This new convention covers the coastal waters and calls for actions in the whole catchment area, which is more than four times as large as the sea itself.

The precautionary principle and of the "polluter pays" principle and the obligation to use the best available technology (BAT) and the best environmental practice (BEP) are some other new elements in the Convention as well as nature conservation.

The Joint Comprehensive Environmental Action Programme (JCP) to realize the goals of the Convention was approved of in 1992.

The Programme consists of six complementary elements. Its target is to reduce pollution from both point and non-point sources. One of the most basic and important means of reaching the target is the element of Public Awareness and Environmental Education.

### Valuable and sensitive Baltic Sea

The Baltic Sea is a very special and sensitive marine environment. It is young, and the ecosystem is fairly poor as compared with that of the oceans. The scarcity of species makes the ecosystem sensitive to any disturbances. The basin is semi-enclosed and shallow, with brackish water. One of the main problems is the low oxygen content in the deep and bottom waters. Inflows of saline and oxygen-rich water from the North Sea are rare, resulting in low oxygen concentrations in the water, over long periods of time. This characteristic makes the Sea a harsh environment for living organisms.

Eutrophication, toxic substances and oil spills

pose continuous threats to this valuable ecosystem. The main reasons for the unsatisfactory state include both past and present industrial, municipal and agricultural emissions, and the production and use of energy.

### Moral and ethical obligations

The Baltic Sea is, in many respects, very important to the people making a living close to it. Its value as a source of recreation and of living is widely recognized. According to the principles of sustainable development, our generation has a moral and ethical obligation to upgrade and maintain the ecology and biodiversity of the Baltic Sea for present and future generations.

In spite of the harmful development in many respects, some positive trends have been noted. This proves that efforts to protect the sea are not only justified but also successful. The positive trends in the reproductive ability of the white-tailed eagle and both harbour and grey seals are clear signs of improvements in environmental quality.

In general, the processes to improve the quality of the environment are very slow. It is very important to begin education as early as possible in each individual's life. Schools are a good forum for environmental education. Through networks and cooperation among schools in one country and among countries, upgrading of environmental thinking should be easy. It is highly important to collect, combine and share data on the state of the Baltic Sea, on the impact of pollution, and on the available technology and the economic and ecological solutions to improving the situation.

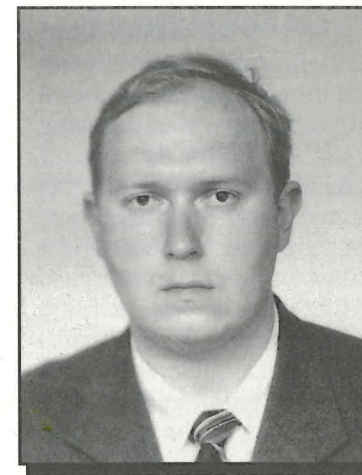
The Baltic Sea is our sea. Without joint efforts there is hardly anything to be done to save the sea. International cooperation between countries is a crucial factor in promoting the ideas of the Helsinki Convention. We can put our knowledge together, exchange information, produce new ideas, create networks and finally reach our joint target – a clean, biologically diversified, beautiful Baltic Sea of which we and the future generations can be proud.

*Leena-Marja Kokko  
is project  
coordinator  
in the Ministry of  
the Environment,  
Finland*



## Most changes have small beginnings

*Vootele  
Hansen  
Minister of  
the  
Environment  
in Estonia.*



I am delighted to write to the Baltic Sea Project Newsletter. The BSP and the newsletter connect schoolchildren of the countries around the Baltic Sea, this means the new generation, who is going to continue our work in the future.

The Baltic Sea connects the people living along its coasts. Already in ancient times it rendered other regions accessible. Proof of this can be seen in archaeological finds. The era of Hanseatic merchants, which has developed many common traits in older historical centres, is also well-known. Without the ports around the Baltic Sea, even the era of the industrial revolution and railway construction would have been different.

And now after half a century in which the Baltic Sea was divided by an iron curtain and the coastal life on its eastern shore was lulled, the sea once again connects different countries and peoples. The Baltic Sea Project Newsletter is also a proof of this.

### The sea supports many people

The sea supports thousands of people. In addition to seamen, there are dockers and industrial workers in harbours, there are engineers, shipbuilders and projectors as well as people working for them. Nowadays, the number of people involved in collecting and processing information about the sea and activities connected with it, is increasing rapidly. Still, fishermen are those with the closest ties with the sea, for the sea is their profession as well as their tool.

During the last generation, fishery has been supplemented with fish breeding to a considerable extent. Over the course of centuries, the lifestyles of fishermen and their working methods have created unique ethnographic coastal cultures. Shouldn't we,

in addition to protecting biological diversity, preserve the diversity of human culture as well?

The sea is a habitat for numerous plant and animal species we live side by side with in this world. Mankind has brought to the sea richness as well as dangers, threatening generic abundance. At present, eutrophication is the greatest threat to the Baltic Sea. One might say that inland seas like The Baltic, have their natural life cycles, and eutrophication is just the natural result of ageing. But we can not agree with it. First of all, the period following the Ice Age, has not been long enough for a sea to live and die. Secondly, human activity has speeded up the process of eutrophication by tens, or even hundreds of thousands of times.

What can a person do in the face of changes as monumental as these? Does my activity have any influence on this? In reality, most big changes have small beginnings. For instance, the first personal computers in the 1970s were toys for computer freaks.

### Friendly lifestyle

Likewise, we all have to adopt an environmentally friendly lifestyle, and not in big issues and with propaganda, but through our everyday small pursuits. And there is nothing new in it. Only a few generations ago, there was no water supply in our houses, and thus water was consumed economically.

In the course of industrial development, and that of energy becoming more readily available, more water was used, thus increasing the amounts of effluent water. Still, it is possible to have both comfort and sustainability.

Good luck to all of You in making the small changes, which will help Our Sea to live and to last.



## FLOODS CAUSES POLLUTION IN DANISH SEAS

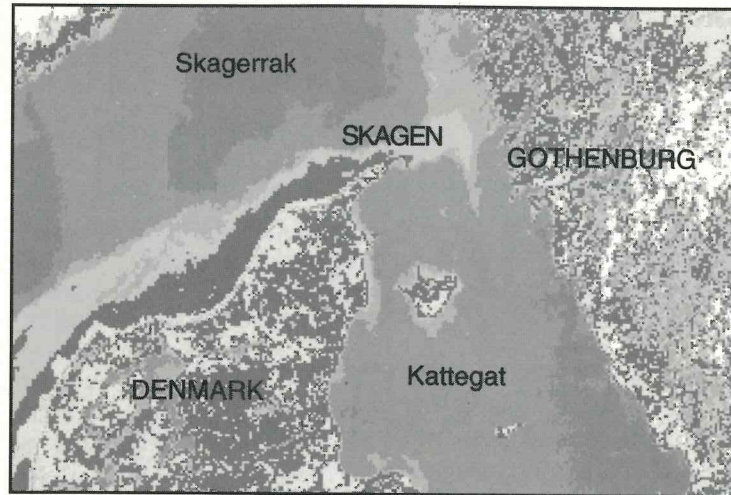
••Satellite photos of the North Sea show a 15 km broad fan of grumpy-brown water flowing north along the west coast of Jutland. In February the fan has reached the northern tip of the peninsula (Skagen), and it is now running south at a speed of 22,000 m<sup>3</sup> per second into the inner parts of the Danish Seas. The polluted water contains 70 micromolar nitrate, which is seven times the normal values, and 1.5 micromolar phosphate—about twice the normal values. The dirty water will continue to run into the Kattegat as long as the wind is westerly, and only a storm from the east can prevent it. The large amounts of nutrients will increase eutrophication of the Danish Seas, and it is expected to create further depletion of oxygen this summer due to the increased phytoplankton production during the spring, which will be a catastrophe for fish and benthic animals in the sea.

**1æ Rungsted Upper Secondary school Denmark**

## WORRIED INSURANCE COMPANIES

••The major international insurance companies are getting more and more worried about the extensive damage caused by environmental hazards. Above all, financial values are destroyed by flooding and storms.

There is no longer any doubt that warming of the atmosphere and oceans increases the probability for storms, tides, flooding and other extreme events, according to Mr. Gerhard Berz from the worlds largest reinsurance



The polluted water from the German and Netherland spring flood covered a 10-20 km<sup>2</sup> long area along the coast of Denmark.

company, München Re, as quoted in the magazine Newsweek. According to Newsweek, large natural disasters have become four times as common since early the 1980s.

**Dagens Nyheter, Sweden**

## OFFICIALS GET FREE BICYCLES

••The bicycle has become an important symbol for the municipality of Örebro, one of the ecological municipalities in Sweden. There are 650 bicycles for rent in the municipality and everybody working for the city has been given their own bicycle. The politicians in the city have also decided to decrease the use of electricity by 30 %.

**Dagens Nyheter, Sweden**

## ENVIRONMENTAL EDUCATION FOR POLITICIANS

••The leading politicians and civil servants in Stockholm are being trained in environmental and ecocyclic thinking. This is the first step in an educational programme which, in a

few years' time, will have included 55 000 employees and politicians in the city of Stockholm.

It has been decided that the local Agenda 21 shall be the guide for the activities of the city. In the future district administrations, there will be one person responsible for environmental questions.

Stockholm will be a candidate for the title "the environmental capital of Europe".

**Dagens Nyheter, Sweden**

## THE COVER

□ Thank you for your drawings to the cover of BSP Newsletter. Out of 26 contributors the following prize winners have been chosen.

1. Catalina-Maria Nedelcu, Design club, Cariova, Romania
2. Matilda Zemaitaite, K. Donelaitis school, Lithuania
3. Helena Samuelsson, Danderyd Upper Secondary school, Sweden
4. Andreea Saceleanu, Cercul de desen, Onesti, Romania
5. Christian Fredrixon and Cecilia Lenander, Söderslätsskolan, Trelleborg, Sweden
6. Maris Pärnat, Tartu 16 Keskkool, Estonia

## NO TO RADIOACTIVE WASTE IMPORT

••The Sosnovy Bor's Green Peace Association of Social Ecological Union of Russia is protesting against the authorized rad waste import, processing and its disposal in Russia. Russia does not need more plutonium than it already has.

The public is kept from discussing and solving the problems relevant to its vital interests and national security. Russia does not have laws regulating the management of radioactive substances, there is no Law on atomic energy,

no law on waste handling, and no law on radioactive safety protection and protection of the population's interests.

**Ecological Bulletin Russia**

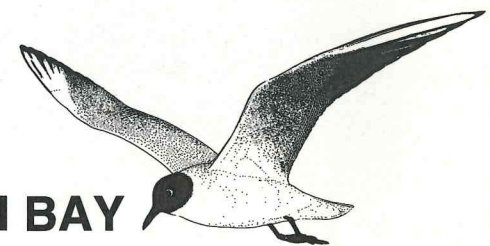
## DROP IN ECONOMIC ACTIVITIES MEANS LESS POLLUTION

••After many years of investigation and analysis we can assert that the concentration of toxic substances has gone down. This is not due to the introduction of new waste water cleaning installations but because of a drop in economic

activities. Many enterprises have been closed down.

Alongside the decline of the old economic system there is another tendency in small business development. The output and environmental influence of these new enterprises are still very small, but, as a rule, they invest in environmental protection even less than state industrial enterprises. So the decrease of pollution in the sea water may change to an increase.

**Ecological Bulletin Russia**



## DEATH OF GULLS IN THE BOTHNIAN BAY

During the last three summers there has been a strange death of birds in the coastal area of Örnköldsvik, Sweden. The species that are dying are mostly gulls, for example the Common Gull (*Larus canus*), Black-headed Gull (*Larus ridibundus*), Great Black-backed Gull (*Larus marinus*) and Herring Gull (*Larus argentatus*). Even some seabirds and waders have been affected.

In a coastal stretch of about 50 km from Nordmaling to Ulvöarna birds have been sick, with symptoms such as paralysis and spastic movements of head and body. After a few hours of illness the birds die. In the summer of 1993, the illness started at the end of May and continued until the beginning of July and about 90 birds were found sick or dead. In 1994, the illness started in the middle of July and stopped a month later. During this time about 200 birds were found.

25 birds have been analysed at the State Veterinary-Medical Institute. The biologists have not yet found any clues as to why the birds die. It seems like neither bacteria or virus is involved. Autopsies of dead birds show bleeding in heart and liver and the death of the birds comes very fast. All dead birds has been in good condition before they got sick.

So far it seems as if the birds are poisoned in some way and investigations made by the local board of environmental protection has not found any sources that can explain the death of the birds. In the area of Husum, where the most birds have died, two river mouths are situated and also one of the biggest paper and pulpmills in Europe. No pollution that can explain the death of the birds is registered, but chemical analysis from the marine centre at Umeå University shows high level of phosphorus in the seawater at the time.

During the warm period of July and August 1994, with extremely warm sea water, the same coastal area experienced an algae bloom of a heterotrophic dinophlagellat (*Oxyrrhis marina*). This mass bloom of oxyrrhis caused a red tide of seawater and, at the same time, death of zooplankton was noticed. This is the first time a red tide was discovered in the Baltic Sea north of the Åland Sea.

It has not been proven that this species of dinophlagellat can be dangerous, but there is one case of death in an eel farm in Denmark in 1974. Lots of eels died when the water turned red due to the mass bloom of *Oxyrrhis marina*. Two theories about the eel death were discussed. One was that the algae produced a toxic substance that killed the eels, and the other was that the extremely high cell concentration of the dinophlagellat caused low oxygen levels in the water, and the eels died because of that.

Marine biologists say that the dinophlagellats is the group of marine organisms that spreads fastest out in all marine areas. It is also known that dinophlagellants is a group of organisms that can be toxic. At this moment nothing is known as to whether there is a connection between algae blooms and bird deaths. It is still a mystery.

**If you discover similar death of gulls and sea birds in any other places around the Baltic Sea and if there has been recognition of red coloured seawater in other places, please contact me at this address:**

**Thomas Birkö, biologist, Environmental office, Municipality of Örnköldsvik, 891 88 Örnköldsvik, Sweden**

NOTES



## NAKSKOV UPPER SECONDARY SCHOOL – GEOGRAPHY MEDIUM LEVEL

## Teaching the Baltic



Nakskov Fiord. A drowned moraine landscape connected with the Great Belt.

**In Denmark all grammar school pupils are taught geography. After one year they can choose a second year of the subject at a higher level. They have four lessons a week. This year in Nakskov Upper Secondary School there are 14 pupils who attend this class, Henning Johansen writes.**

The topics for the year are planned along the way by the teacher and the class in collaboration. However, the first topic is planned by the teacher alone as an introductory course. This year the topic for this introduction was The Baltic Sea. 16 lessons with the following topics were held:

Map exercise, sea water, waves, thermo-haline circulation, sea contamination, the formation of the Baltic Sea, pollution by industry, dumping into the Baltic Sea, nutrients, fisheries, M74 – infection of the salmon fry, coastal types, the bridge across the Sound, and evaluations

#### Comments on the education

Since it was an introductory course I tried to cover as many aspects of The Baltic Sea as possible. This meant that the tuition was some-

times a little superficial e.g. it may be said that topics like Coastal Types and Fisheries contain enough material for a whole course in themselves.

There were also some problems concerning the qualifications of the pupils since they came from five different classes. It became quite clear that if they were to benefit from the teaching about coastal types, the teacher would have to spend a relatively long time on the theories of for example, coastal classification.

All in all, the material used worked well, with the reservation that Leithe-Eriksen's book on the Baltic Sea, published by Greenpeace, often seems a little biased.

Furthermore, one might spend more lessons on the bridge across the Sound and some newer material is certainly to be found, but since only the environmental problem was of interest, I considered this sufficient.

Both films showed dealt satisfactorily with the subjects – Dumping and M74 – but one could wish for a film on fishing in the Baltic in general instead of on such a specialized topic as the mortality of salmon fry.

**Henning Johansen, teacher  
Nakskov Upper Secondary school**

#### Material in Danish language

Diercke Weltatlas  
Jensen m.fl (ed.), Natur-Kultur-Menneske. 1992. (NKM)  
Leithe-Eriksen, Østersøen, 1992. (Ø)  
Miljøministeriet, Miljøindikatorer 1992.  
COWI/VKI, Undersøgelser af konsekvensen for havmiljøet af en fast forbindelse over Øresund.  
KM 4.2. Del 1. Østersøens vandmiljø. Dec. 1990.  
(COWI), Læreren's arbejdsbog. (L)  
NKM p. 131-133, 133-135, 138, 140-141, 157-159  
Ø p. 62-68, 69-75, 82-88, 100-107, Film, L p. 25-27  
COWI p. 18-21, 36-38

## Map exercise

1. Write on the outline map the names of all countries with coastline on the Baltic Sea.
2. Write on the map the names of the major parts of the Baltic Sea e.g. the Sound etc.
3. Add the names of the largest islands in the Baltic.
4. Mark the major mouths of rivers flowing into the Baltic. Write the river names, too.
5. Mark and name towns with over 500 000 inhabitants in the Baltic region. Give a definition of this designation.

## Environmental problems

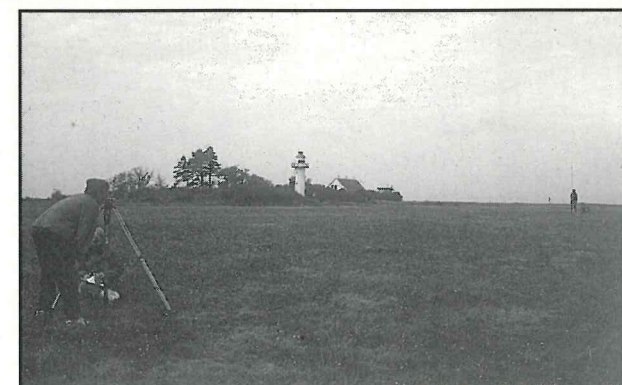
1. What is eutrofication and what are its expressions in the Baltic?
2. What is the difference between phytoplankton and zooplankton? What is the impact of these types of plankton upon the conditions of life for animals in the Baltic?
3. In which areas has the bottom fauna disappeared in the Baltic? Where is the largest risk of oxygen deficiency?
4. Discuss the possibilities of restoring the environment of the Baltic.
5. What is the content of PCB and DDT in the Baltic in 1989? Compare with 1970. (Use Ministry of Environment, Indicators of Environment Health 1992)
6. Draw a diagram of the sources of nitrogen in the Baltic.
7. What can be done to limit the discharges of nitrogen into the Baltic?
8. Comment briefly on the problems connected with the improvement of the environment of the Baltic.



Podon Polyphemoides

## Questions to answer

1. Which type of Thermo-Haline circulation is found in the Baltic Sea?
2. What is a recipient?
3. Find Sellafield and mark the route of the radioactive isotope on the adjoining map. Fix the time of arrival where it is possible.
4. Find in the Ministry of Environment, Indicators of Environmental Health the amount of nitrogen and phosphorus in the Baltic Sea.
5. Which problems may arise when using the principle of the middle line? Find in the atlas examples of these problems in the Baltic Sea.
6. In figure 27 p. 159 in Natur-Kultur-Menneske is seen that the northern part of Jutland has existed since the time of the Yoldia Sea? How high is the uplift in the Stockholm area? (Atlas p. 115)
7. Natur-Kultur-Menneske p. 158. What does "boreal" and "Atlantic" mean?



Pupils surveying the coast of Albuen, a recurved spit between Nakskov Fiord and the Great Belt.



## EUROPEAN PROJECT FOR 13-14 YEAR OLD STUDENTS

# Many subjects involved

Toila Secondary school is situated on the Baltic Sea in northeast Estonia. The school-house is in the beautiful Oru Park on a bank of limestone. Every morning our students walk through the park to the schoolhouse and admire the beautiful sights of the glacial valley of the River Puhajogi (Holy River). In the spring we listen to singing nightingales and in the autumn we see leaving swans in the sky. We love nature and the sea and we want to preserve it Lilian Niitsoo, history and civics teacher, writes.

Side by side with wonderful nature there are oil shale mines, thermal powerplants, industrial towns, radioactive waste near Sillamae and pollution in our home county Ida-Virumaa (East Viruland). That is why we worry about the ecological situation in our county and we are interested in environmental problems in the world.

This school-year we started the link project "Three Seas: The Baltic Sea, The North Sea and The Mediterranean Sea" with our partner schools in Raase, Finland, in Amsterdam, the Netherlands and in Montpellier, France. This is a European project for 13-14 year old students. The following subjects are involved: chemistry, physics, geography, biology, English, French or German, vernacular language, art, music and history.

## Biology

In October 1994 the biology teacher Helgi Ebok and students studied the River Puhajogi which flows into the Gulf near our school. They studied the fauna of the river. Students found a lot of *Pollasea quadrispinosa*, also *Lepidostoma hirtum* and *Radix peregra*. They could not find species which like clean water such as *Ecdyurus volitans*, *Ephemeroptera*, *Siphylurus aestivalis*, etc. This means that the River Puhajogi is slightly polluted. The situation has improved since 1982 when waste water treatment was established in Toila. The polluted water comes from the town Johvi (12 km from Toila) and from the Fish Cannery of Toila. We hope

that in the near future there will be waste water treatment in the town of Johvi, and that the situation in the River Puhajogi will better.

## Domestic waste water

Our partners from Holland sent us the project "The water in your home". It is a part of the project "Three Seas". We are working for better water quality in the Baltic Sea and for sustainable economies, so we have to study the domestic waste water, too. We have no results yet because we are just carrying out this project, but I hope the readers of the BSP Newsletter are interested in it. Everybody can do it at home, especially those students who have no access to the sea.

## Bird counts

Our school took part in midwinter waterbird counts in the period from January 10 until January 20 1995. Class 8A and the biology teacher Helgi Ebok carried out the counts

on the coast of the Gulf of Finland and at the mouth of the River Puhajogi. The narrow coastal region was covered with ice, there were a lot of pieces of ice in the sea. The air temperature varied from -3C to -10C. Four bird species were observed in Toila: 170 *Larus canus*, 20 *Larus argentatus*, 3 *Larus ridibundus*, 5 *Anas platyrhynchos* and in the River Puhajogi 8 *Anas platyrhynchos*.

## Feelings of the sea

We wrote down the music and the words of a sailors' song and translated it into English and then sent it to our partner schools. It is fascinating how feelings and perceptions of the sea are expressed in the sailors' songs.

In history we learned about old fishing equipment, old boats and fishermen's traditions.

Lilian -Niitsoo

Toila Secondary School

Students studying algae with their biology teacher Helgi Ebok in Toila, on the Gulf of Finland.



PHOTO: T. RUUTOPOLD

# Investigation of air conditions

The BSP meeting in Karlskrona was a starting point for the cooperation between the scientists from Northern Vidzeme Regional Nature Protection Complex (Latvia) and Estonian pupils from Saaremaa Uhisgymnasium and Nature House (Tallinn).

The students are observing the lichens in the town of Kuressaare.



PHOTO: ANNE KIVINUKK

Estimating air pollution with lichens is quite popular in our schools now.

The Estonian pupils made the observations in 1991-1993. Latvian pupils started last year under the guidance of Sandra Berzina from Vidzeme. The methods of the studies were different, but the aim was the same: to assess the air conditions of the home place. The aim of the current observations was to compare the different methods, exchange information and cooperate with the students from different countries who are interested in the same topic.

## Lichens as bio-indicators

We meet on Saaremaa (an island in western part of Estonia) on the 7<sup>th</sup> of October. The Latvian scientists told us how lichens could be used as bio-indicators. The map of

Kuressaare (a little town at Saaremaa with a population of 17,000) was divided into squares and we had to go to each square and study ten deciduous trees. We used five sensitive species as bio indicators, starting with the most sensitive one: *Usnea hirta*, *Pertusaria amara*, *Evernia prunastri*, *Parmelia sulcata* and *Hypogymnia physodes*.

## Summing up

After the observations, we sat down in a classroom to sum up our work and draw a map. We found that the centre of the city had a medium degree of pollution, but in the outskirts of the city the degree of pollution was high, because of two harbours – for oil and passengers – a big boiler-house and factories. They are all situated in the outskirts of Kuressaare.

Besides, the trees had very few other lichens. This fact should also be taken into consideration.

The observations will go on at the other settlements of Saaremaa. The students from Saaremaa Uhisgymnasium will make the final report of the studies.

In the late afternoon Mr. Andris Urtans from Vidzeme taught us how to do a proper river watch and gave us many useful hints.

It was interesting to exchange experiences between different countries and at the same time we learned a lot.

Anne Kivinukk,  
teacher at Nature House

Pille Nurste,  
student at Nature House

## 14 questions about the water in your home

1. Where does the water that you use in the house come from? (Well, spring, river, canal, etc.).
2. How does it come into your home? (Directly from the well, via water pipes, etc.).
3. Is the water purified before it comes into your home?
4. Is your home connected to a sewer system?
5. Is the used water purified before it is returned to the nature?
6. How many taps do you have in your home?
7. How many of those taps can give hot water?
8. Calculate the flow of the tap.
9. Do you have a bath? If so, calculate the total capacity.
10. Do you have a shower? If so, calculate the average quantity of water used for a shower by one person.
11. Calculate the average quantity of water used by one person for a bath.
12. Compare the results of 10 and 11.
13. Which machines in your home use water? How much water do they use per day?
14. Each student should try to calculate the quantity of water used per day in his or her home. If you divide this quantity of water used per day in each home by the number of people living there, you get the average quantity of water used by one person per day. Now calculate the average for the class.



## INTERNATIONAL PINE NEEDLE RESEARCH

# Three countries comparing results

**Environmental problems are international. Pollutants don't respect country boundaries. This is especially true of sulphur compounds, the main reason for the acidification. Since our school, Meri-Pori, got special permission for environmental subjects in 1990, Simo Korpela writes, we have been interested in doing some international research and in seeking partners for international research and sample exchanges.**

**W**e have studied the condition of the pine needles in our neighbourhood near Pori for six years. In the spring of 1992 we had the opportunity to make a research trip to the Kola Peninsula in Russia. We took several pine needle samples from the Montshegorsk industrial area and got the information that if the total sulphur content of the pine needles rises twice as high as it is in Finland today, the trees will die.

Of course we are also very interested in doing the same measurements using the same X-ray fluorescent method in other countries.

We had an excellent opportunity for this at the Baltic Sea Conference in Karlskrona last autumn. Birgitta Berggren from Sweden was there establishing an internationally linked school system in order to do research on air pollution using the epiphyte lichens of trees as bio-indicators. We had also done the same kind of lichen research, and we were very eager to join the link-net.

At the same time, we agreed that in the link school-net Meri-Pori Upper Secondary School might do small scale pine needle research so that some schools from Sweden and Estonia would send us pine needle samples, and we would send back all our results.

## Visiting participating school

In February this year we visited the participating schools in Esto-

nia in order to discuss and decide on the sampling of pine needles.

We use two-year old needles, taken near the top of the tree from branches on which the rain falls directly. The needles are dried using a herbal drier at 40°C, and cut into little pieces. The rest is done in cooperation with the nearby Kemira industrial plant laboratories. The pieces of needle are ground to powder and pressed to briquettes.

Kemira laboratories have very good X-ray fluorescent equipment that can also be used in determining the total sulphur content of the pine needles. We also see (using a scanning electronic microscope) the wax level of the pine needle, because the acid rain dissolves the wax on the needles.

## Comparable results

We can have international research with comparable results, because we use the same equipment for all the samples. This is a good point in this kind of organisation.

All the participating schools will get all the results and can draw their own conclusions regarding the state of their environment by comparing them with those of the other countries.

Accurate environmental measurements often need such expensive equipment that no school can afford it. That is why it is a good idea to seek partners in universities or industrial laboratories, and when some school has an opportunity to do some special measure-

ments the others can also take advantage of it with this kind of arrangements.

## Limited numbers of schools

There are bad points as well. The number of participating schools is always limited. No university or industrial laboratory will take unlimited amounts of samples for laborious research work demanding accuracy and expensive equipment.

The pupils from the nearby school can be in the laboratory when the final determining is done, while others can't. There is very little to be done about the first bad point. A change of participants from time to time could be some kind of solution.

The other bad point has been solved, so that we have one half of our link school partners visiting our annual international camp school this spring (28<sup>th</sup> of May to 2<sup>nd</sup> of June) and we hope that we will have the others next year. At the camp school we will do research on air pollution with bio-indicators, and visit the Kemira laboratories, where we may see all that is included in our pine needle research. We hope that the efforts like this will become more common. At least for us this has been a great pleasure.

**Simo Korpela**

**Meri-Pori Upper Secondary School**

## Instructions for collecting needles

□ □ This is a suggestion of an easy way to take pine needle samples from high branches. We use a fully loaded shot gun ourselves, but we cannot recommend this method for everybody.

Use a rope and throw it (by using a weight) over the chosen branch – fix the saw chain to a part of the rope – pull the chain over the branch – and cut the branch off.

It is easy if the saw chain is turned the right way, the cutting edges towards the branch. If not, turn it.

For the sample, choose a pine tree about 8-10 m high that has a few metres of free room around it. The branch to be taken should be selected so that the rain has fallen relatively freely upon it. A suitable sample height is usually 1/3 down from the top of the tree.

Take three separate 2-year-old needles gently cut them off with scissors and put them alone in a film-covered jar. (These needles are for scanning electronic microscopic photography, in order to determine the condition of the wax level near the air holes of the needles).

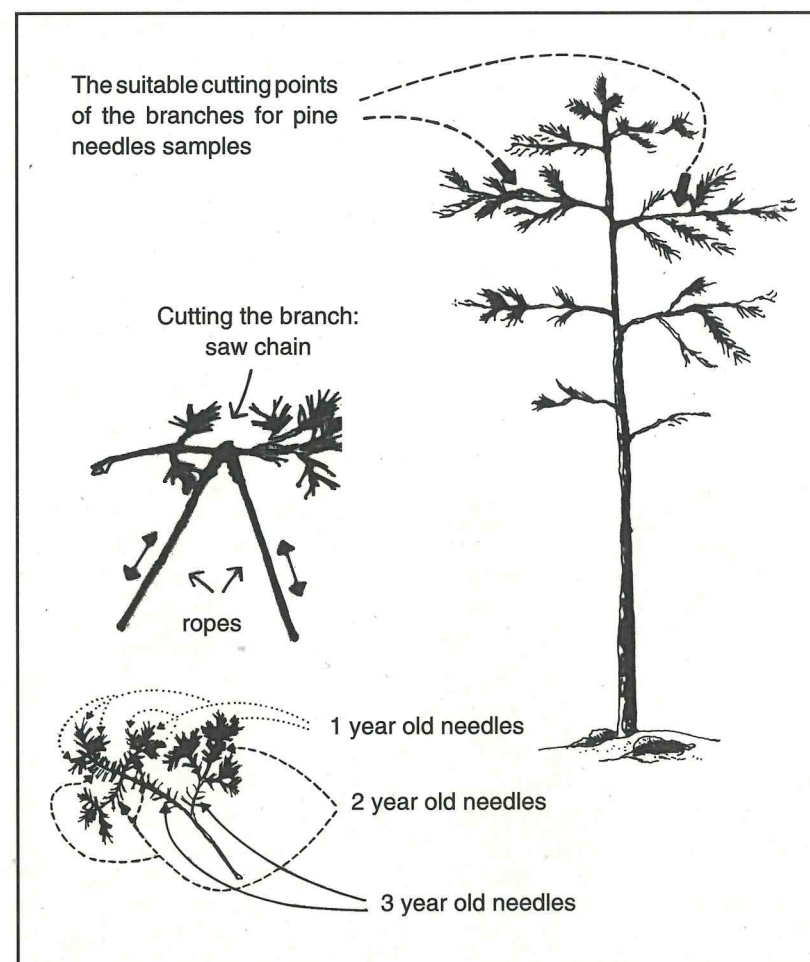
Pull off (by hand) one dm<sup>3</sup> of needles and put them into a plastic jar. (We determine the total sulphur content of these needles using X-ray fluorescence method).

Take two samples, one from a "clean" area and the other from a polluted area. Mark the sampling location on the samples. Mark each sampling area on a map and describe it in writing. Send the samples to us, and, in due hours, we will send you all the research results on the needles collected by our link schools in Estonia, Finland, Lithuania and Sweden.

For the coming years we hope that you will take the samples at the beginning of January and send them to us immediately. We will send you more information about the research methods being used and will compare the results with the results from this year samples. Thank you very much for your interest!



PHOTO: BIRGITTA BERGGREN



DRAWING: STINA MARSH

## More information from

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# Baltic-eco-survey

A group of pupils from grade 6-8 under the guidance of the chemistry teacher tried to expand on the Baltic-Eco-Survey questions.

– We do not give answers to all the questions because not all of them are relevant to our little country town, Anda Dekšne, teacher of chemistry writes.

☐ What are you doing to increase the amount of environmentally sound products in the shops?

Our town Rujiena is one of the provincial towns of Latvia and therefore a lot of problems which would be very urgent in a large city are not as acute here.

We made an inquiry in 30 stores in our town with the purpose to find an answer to this question. They were mainly food stores and also some shops of industrial wares.

The traders of these stores had to answer one question: what they are doing to supply their assortment with ecologically sound and healthy products

In the answers, we did not feel great responsiveness on the traders' side to look for ecologically sound products. The majority of traders look for the products which sells well and gives immediate profits without thinking of possible hazardous effects of these products.

## Certain regulations to follow

Of course, the shop managers must follow certain regulations: they are allowed to sell only such products as have a special quality certificate. However, it is up to the conscience of the traders to decide if they will follow these regulations or not.

In the shops in our town we can find a lot of different products which are full of various preservatives and emulsifiers, but the real chemical components of these products are not mentioned on the label. Especially chewing gum which is produced in the Eastern

countries and imported ice-creams and chocolates, which contain a lot of lecithin.

All these above mentioned products are mostly consumed by small children and teenagers who are unaware of the unhealthy influences of these products on their digestive tracts. But a lot of shopkeepers don't care to reduce the supply of poor quality products if they insure fast profits.

## Latvian-made products

However, there are some shops in our town, for example, Simts, Vodze, E. Salmi Im Darzemi Veolaos (greengrocers), which mostly offer Latvian-made products.

For example, the shop Vidzeme sells fresh dairy products and meat which come from the enterprises of Bujiena and Valmiera. The shop Simts sells sweets from confectionary factories in Riga. These chocolates and sweets have a short shelf life because they are not so saturated with preservatives and artificial ingredients. Saknu Un Darzenu Veikals sells mainly products raised in the local region – potatoes, carrots, beets, cabbages, swedes and other vegetables. Fruit is purchased in small amounts from the local farmers. The exception of course is some kinds of exotic fruit. They are imported from the Southern countries.

## An inquiry

In order to investigate the opinion of the inhabitants of Rujiena and their knowledge of these matters we carried out an inquiry.

☐ Are you concerned about what kind of foodstuffs you use daily?

☐ Are you sure to use ecologically sound products or



*Do you have ecologically healthy products in your shops?*

does it not matter if they are full of synthetics?

☐ Do you pay any attention to the label on the product?

We asked 370 persons of different ages and occupations.

- 87.7 per cent of them use mainly food from their gardens. These are mostly fruit and vegetables. They are raised using natural fertilizers, so we can say that this is ecologically sound production.
- 10.6 per cent of them assured us that they buy all their necessary food in shops. However, they try to find and buy such food which is fresh and raised in the local region.
- Only 1.7 per cent answered that they don't pay special attention to what quality of food stuffs they consume. The reason is the high price for a really food quality production. These people buy and use what is the cheapest.

The second question was generally answered in the affirmative.

However the people remarked that it is difficult to understand the label because of not knowing foreign languages. In addition, they said that there is a shortage of information about a possible hazardous biological effect of emulsifiers and preservatives upon the human organism.

**Anda Dekšne, teacher**

**Rujiena Secondary school**

## ENVIRONMENTAL NGOS IN THE EASTERN AND WESTERN BALTIC

# Similar goals, different roles

**Non-governmental nature conservation societies in the Eastern Baltic countries date back as early as the 1920s, i.e. they are not much younger than their Nordic sister organizations, Ramūnas Povilanskas writes.**

Unfortunately, their fate has been absolutely different. While in the Nordic Countries they succeeded in recruiting hundreds of thousands of members and supporters, Eastern Baltic nature conservation societies were either abolished or incorporated into the semi-governmental structure closely linked with Communist system. Every citizen and almost every institution was supposed to be a member of the "all-Soviet-Union" nature conservation society with obligatory payment of membership fees to the state.

It was no surprise that people had little credibility in such societies and public concern over destruction of the environment had no legal expression. With the start of "perestroika" various semi-legal circles and groups were formed.

This opposition was expressed in folklore festivals, promoting non-governmental education, etc.

## Growing concern

More and more people were concerned about the quality of their environment: water, air, and the protection of the endangered species.

However, it must be stressed that a rather small part of Soviet society was really environmentally or culturally concerned and the ignorance of most people on environmental issues is still the sad heritage of those times, which is really very difficult to cope with.

In 1988, the "singing revolution" started in all three Baltic

states with environmental slogans since the opposition to the communist rule and claims for independence could be most legally (so to say, most softly) expressed in showing the disastrous consequences of the communist rule on the environment.

The real non-governmental organizations were established in all the Eastern Baltic countries and they enjoyed very wide public support. Several controversial industrial mega-projects were stopped (e.g., construction of Zarnowiec or upgrading of Ignalina nuclear power plants, to mention a few), people got some access to the information on the quality of their environment.

Special public concern and irritation were related to the presence of the Soviet troops in the Baltic and their damage to the environment. Especially irritating was the secretness, covering not only purely military, but also almost all other spheres of Soviet life.

Unfortunately, this evil tradition has survived, often causing just opposite reaction in the society – lack of trust and credibility for any activity of industrial managers and decision-makers on the part of the public side.

## Slogans forgotten

But this period of wide spread public support for the environmental movement was rather short. Actually, the decline of interest and public support for the environmental movement was proportional to the decline in economy. The new leaders, especially at the national level, who used environmental slogans to gain power, have forgotten them as soon as they have had to choose between the economy and ecology.

It is considered that the genuine environmental concern might be only in the countries with a high



*The drawing is made by Gediminas Viesunas.*

average income so it is not surprising that the more the Baltic citizens were aware of their poverty, the more they tried to forget their environmental concerns.

To make a long story short, Eastern Baltic environmental movements now appeared almost in the same position as before the singing revolution: "locked" in local circles on the margins of society.

But their role in the present situation should neither be underestimated or overestimated. To day environmental activists are different from those of '88. They are fewer in number, but they represent the most active and best organized sector of society.

Time has shown the importance of several principles of their activity: non party-political engagement, problem-oriented specialization, constructive opposition towards governmental structures.

**Ramūnas Povilanskas**

**European Union for Coastal Conservation**





## PHOTOGRAPHY COMPETITION

# "Stop the garbage"

**This year's activities undertaken by our GREEN SCHOOL No 8 concerning ecology are mainly connected with the Baltic Sea, Jadwiga Walczak, Sopot, writes. We have taken part in "The Baltic Sea Project" for schools associated with UNESCO.**

For the second time, our school joined "Coast-watch Europe" operation. 77 pupils with two teachers counted refuse and cleared the Sopot's beach.

Also for the second time we took part in "Air pollution project Europe". For four weeks we measured the amount of rainfall, studied and analysed its character (acidity, and how polluted it is).

We decided to make other schools interested in "The Baltic Sea Project". On the "Earth day" we invited a group of pupils from the primary school in Dziemiany – this school has recently been admitted to the UNESCO programme.

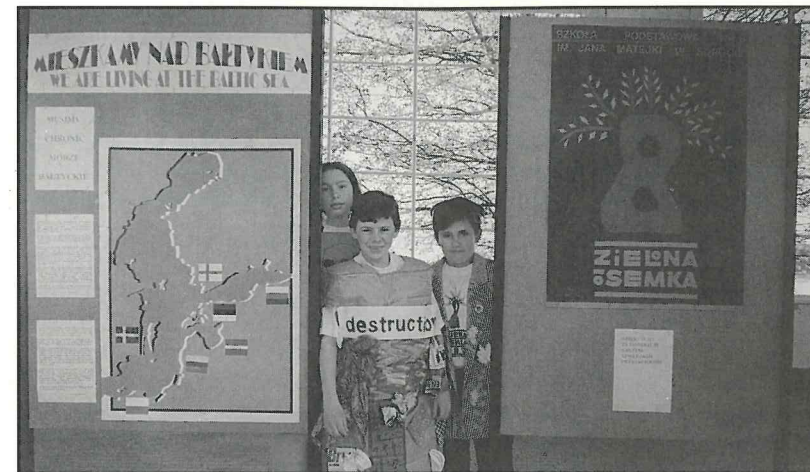
Together we counted refuse and cleared the part of the Sopot beach which is supposed to be "ours" – we will clean it in future actions undertaken by school as well. We gathered nine bags of rubbish!

### Own computer version

Pupils from Dziemiany have prepared their own computer version of the results from the operation which, with ours, were presented at the exhibition held in May on the Sopot pier under the banner "Living at the Baltic Sea".

These are the titles of the large-scale illustrations presented:

- We live along the Baltic Sea
- Protecting the Baltic – you save yourself
- Tomorrow it may be too late
- In theory everybody takes care of the environment but who puts this into practice?
- Acid rain
- Forests (Will the forest continue to exist)
- Let us save water
- Help ozone
- Everyone has the right to live in silence
- Each of us produces garbage
- Solutions to the ecology crisis – pupil's suggestions
- The best work of our pupils connected with the environmental protection



The pictures show the exhibition in the centre of Sopot after an idea by the representatives of the Swedish Trade Union. They were interested in making environmental education more popular amongst children.



There are many photos, maps, graphs, works of the pupils/their propositions and mottos in our large-scale illustrations.

The idea of organizing this exhibition in the centre of Sopot was developed by the representatives of the Swedish Trade Union interested in making ecological education more popular amongst children. We came into contact with these representatives thanks to the civic authorities of Sopot. We presented the results of our ecological activities to the Swedish guests.

Another example of our ac-

tivities is organizing a photography competition "Stop the garbage" and a competition entitled: "Health for everybody – Everybody for health". These competitions are a part of the school tradition.

A meeting was also organized. Pupils from our school had an opportunity to get to know how much Sopot's streams and water in the Gdansk Bay are polluted, and what is done to reduce the pollution. They talked with the lady president of the special committee dealing with the environmental

protection at the civic authorities of Sopot.

We took part in an all-Polish competition "Let's save our Mother Earth" and in many others competitions during the last twelve months.

We hope that all the actions undertaken by our school during the last year to protect our environment helped to change the attitude of our pupils towards nature for better.

**Jadwiga Walczak, Szkoła Podstawowa Nr 8**

## BSP seminar in a Nordic conference

□□ The 16th Nordic Conference for Teachers in Mathematics, Natural Science and Technology will be held in Linköping, Sweden July 30 - August 3, 1996. Teachers in the BSP from the Nordic countries and Estonia, Latvia and Lithuania will be invited to attend.

The theme of the conference is Education for the Future – Energy, Environment and Communication. The UNESCO network INISTE will be responsible for part of the program.

The Baltic Sea Project, originally created as a merger between the UNESCO Associated Schools Project (ASP) and the International Network in Science and Technology Education (INISTE) has been invited to arrange one half - day seminar on the BSP.

The lectures arranged within INISTE and the BSP seminar will be in English.



# Plant and animal ecology studied

Traditionally, plant ecology is one of the most common fields of the pupils' scientific work. Such work is carried out at the Dept. of Phytocoecology and Plant Ecology (St. Petersburg State University) and is supervised by Dr. Irina Antonova. This year, of 29 projects, eighteen are devoted to some aspects of plant ecology.

Ecological projects take three main directions. The first – the influence of city pollution on anatomy and morphology of arboreal plants – is studied using the examples of *Acer ginnala* (R. Glebova, 11 D) and *Picea pungens* (A. Sachenko, 10 D).

It is revealed that in *P. pungens* all recorded injuries may be divided into four groups: moreover, the influence on the tree as a whole organism results in decreases of the total number of buds in the most polluted districts of St. Petersburg. *A. ginnala* remains very beautiful even under heavy pollution.

The second direction of these studies is outdoor ecology of wild flowers in the coastal zone of the Gulf of Finland. These studies are very popular among our pupils. Ten projects belong to this sphere. Climate influence on the *Frangula alnus* crown structure is studied by N. Usenko (11 D). Profound investigations of changes in the both leaf and sprout structure of some plants according to the degree of their parasitism are being carried out by J. Kolenov and A. Amdii (11 D).

## Comparative morphologies

The third direction is the study of species variability within distribution area under different ecological and geographic conditions. The study made by P. Butylin (10 D) is devoted to the *Polypodium vulgare* morphology changes; the ferns were sampled in the Carpathian and Caucasian mountains and in the Gulf of Finland. A. Dolnik (11 D) carried out similar investigations of the pine trees on the southern coast of the Gulf of

Finland and in Northern Russia. I. Kokhovskaya (11 D) compared morphology variability in the genus *Campanula*, inhabiting mainly Western Russia.

20 years ago periwinkles (*Vinca minor* L.) were introduced in the Leningrad region (By the Gulf of Finland), are survived and even replaced some domestic species. A. Kryukov (10 D) studied anatomical and morphology changes resulting from this introduction.

This year we are developing animal ecology, as well. I would

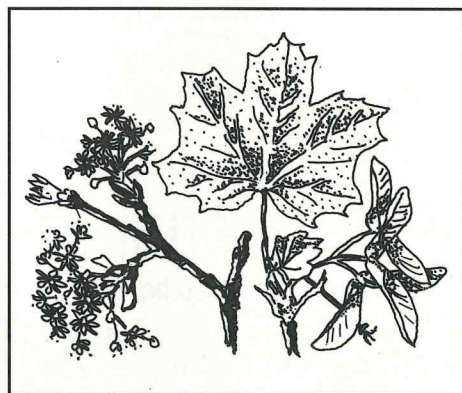
like to mention two projects in this context. The first one is being supervised by E. Kozminskii (Dept. of Invertebrate Zoology, St. Petersburg State University) and concerns gastropod population ecology and city influence on the mollusc population dynamics.

Referees from several institutes of the Russian Academy of Sciences gave an excellent evaluation of ten projects and recommended them for publication in scientific journals.

## Influence of urban pollution on the anatomo-morphologic structure of the acer ginnala annual sprout

Urban pollution causes a suppression phenomenon in plants. *Acer ginnala* inhabiting the Russian Far East is resistant to pollution. So, in this work changes of the anatomo-morphologic structure of annual sprout was considered in terms of its example. Some plants were sampled in the countryside (New Petergof). In each habitat,

ten plants were studied. Our study has demonstrated that the influence of urban pollution was revealed as a decrease of the sprout length, leaf sizes and variation range of these features.



*Acer Ginnala*

Under urban conditions *Acer ginnala* demonstrated increase of all leaves of the sprout, decrease of leaf sizes and increase of mesophyll density.

Radmila Glebova

DRAWINGS: STINA MARSH

## Demography of *Bithynia tentaculata* populations as an indicator of environmental conditions

In the connection with worsening of environmental conditions for aquatic animals the study of natural processes in ecosystems is of great importance now. Molluscs are an essential component of any aquatic ecosystem. This work is devoted to the population structure and its dynamics of the freshwater mollusc *Bithynia tentaculata* (Linné, 1758).

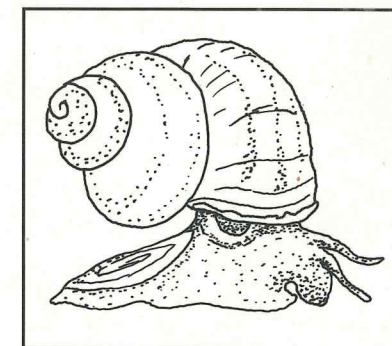
Three *B. tentaculata* populations situated in St. Petersburg and its suburbs were investigated. Data on the density, age-size and sexual structures were analysed. This study was led by Eugeni Kozminskii (International Scientific Centre "Bioecological control").

In the park-forest "Sosnovka", a gradual alteration of the population age structure from 1991 to 1994 was recorded. Owing to the high youth mortality in 1992-1993, the cohort of molluscs born in 1991 predominated in the population in

the investigation period. In the population in the Tavria Garden in 1994 molluscs 1+ and 2+ predominated; a pronounced gap of 0+ individuals was recorded.

The population structure in *B. tentaculata* from Strelina in 1993-1994 was more stable and coincided with the "classic" type (with gradual decrease of the quota of individuals in the elder age groups).

The data obtained permit us to propose that the demographic structures of the *B. tentaculata* population is unstable. Fluctuations of the numbers are connected with changes of the environment (temperature, chemical composition of water) or/and mollusc diseases. *B. tentaculata* may be used as a indicator species for estimation of the environment state.



*Bithynia tentaculata*

Ilia Dukhavinov

## Influence of city pollution on *Picea pungens* needle structure

The problems of influence of environmental contamination of the plants is urgent now. In the city, plants are influenced by numerous agents atypical of natural habitats. Studies of the both character and degree of injuries of plants may be useful for evaluation of urban contamination.

The purpose of this work was to study the total influence of urban contamination on needle morphological structure and stem development in *Picea pungens*, and to determine the interaction between degrees of needle structure variability and city site. 40 biennial stems (ten in each district) were sampled in four districts of St. Petersburg; the Kirovskii, the Kalininskii, the Vasileostrovskii and the Moskovskii.

We evaluated tree age, similar positions of the sampled stems in the crown, etc. The needles collected demonstrate the following injuries: chlorosis, complete or in-

complete necrosis, presence of black spots and spider mites. The trees subjected to trembling down. The firs in districts containing numerous industrial plants and factories have many black spots on the needles and they demonstrate a heavy necrotic alteration of the needles.

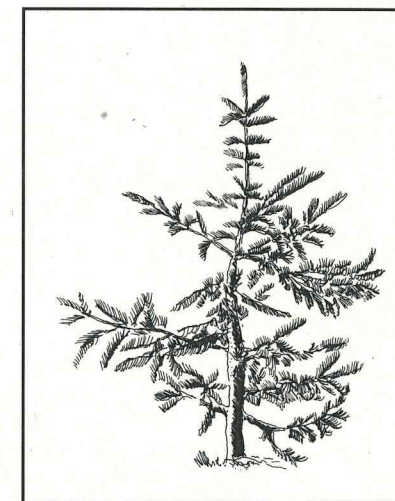
The injury type in each city district differs in respect to needle number on stem, bud number on stem and percentage of injured needles. The most diverse injuries were recorded in the Moskovskii district, whereas the heaviest ones occurred in the Kirovskii district – the Vasileostrovskii region is the cleanest.

This is also confirmed by the following data: in the Moskovskii region the firs suffer due to trembling down and nearness of avenues with heavy traffic; the main heavy industry plants are situated in the Kirovskii district.

In general, in all investigated

regions we reveal a wide range of injuries of the needle structure which confirm that city conditions are unfavourable for *Picea pungens*.

Anna Saschenko



*Picea pungens*



## COOPERATION BETWEEN LIEPAJA, LATVIA AND EKSJÖ

In April 1991 I took part in a UNESCO seminar in Esbo, Finland, Bengt Åkerblom writes. Many contacts were made with teachers from the Baltic states. Back home I managed to make my fellow teachers interested in an exchange of experience within the environmental area with a school in one of the Baltic states.

Shortly afterwards we were invited by a biology teacher in Liepaja, Latvia to visit them to plan our future work – and 11 teachers from Eksjö visited Liepaja in 1992.

An exchange of letters between the pupils and the teachers began. Latvian pupils visited Eksjö and Swedish students visited Liepaja. The letters contained the results of the environmental studies in the two schools but also information about the history of the countries and facts about nature and geography. The Vidus school in Liepaja reported on the health of pine-trees in different parts of the city and on the situation for the lake Liepaja.

**Studying the Emå river system**

Since Eksjö is situated in the drainage area of the Baltic Sea, the pupils at Prästängsskolan found it suitable to study the Emå river system, which has its outflow into the Baltic Sea. They gathered information about discharges of toxins and nutrients into the river all

## A whole river system studied by pupils from Sweden

along the river from its sources down to its outflow. These results were presented during the visit to Liepaja.

**Shared history**

For our next trip to Latvia pupils are studying the history of the Baltic countries, which is a shared history in so many ways. Since the choice of energy sources are im-

portant for the environment we have also had a project on Energy and Environment.

Many subjects in our school have been involved in the project – English and German for the translation of the project but also biology, geography, physics, civics, Swedish and history.

An important result of our project is that the pupils are trained in international cooperation. The pupils also make many personal friends and keep up their contact by letters.

**Bengt Åkerblom, teacher**

**Prästängsskolan (Secondary School), Eksjö**

In the next issue of the newsletter, the environmental studies of the Vidus school will be presented.

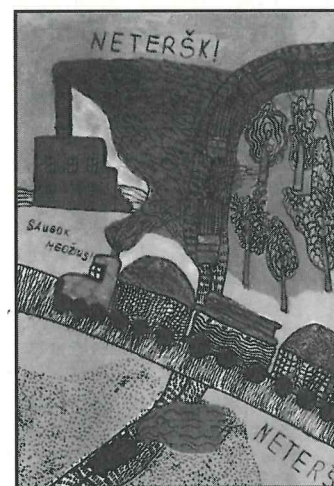


*Latvian and Swedish students on a walk in the rain in Eksjö, a little town situated on Emå River.*

## PROJECT WORK AT PRÄSTÄNGSSKOLAN

## Energy and environment

A group in our class 8a, has been studying energy and environment in geography. In burning oil, coal etc., different kinds of compounds are formed that can influence the environment, i.e. dust, sulphur oxides, nitrogen oxides, carbon dioxide and organic compounds are emitted into the air.



*Zydrūnė Stankūnaitė made the drawing.*

**Sulphur oxides**

□ Sulphur discharges contribute to the acidification of the environment, and this is a problem in connection with burning of oil and coal.

The sulphur discharges can be reduced by using low sulphur fuels or by cleaning at, or after the burning.

**Nitrogen oxides**

□ Nitrogen oxides are formed by burning of nitrogen compounds contained in fuels and by oxidation of nitrogen in the air. Acidification and eutrophication are the influences on the environment because of the nitrogen oxides.

To stop the creation of nitrogen oxides, you have to think about these things:

- Fireplaces that are suitably constructed
- Modifying of the construction of the furnace
- Reduced total air surplus
- Multiple step burning
- Smoke dilution with fresh air in order to reduce the temperature and oxygen consumption.

**Minola A. Manea & Elisabeth K. Hagström, 8A**  
**Prästängsskolan, Eksjö**

## Energy in Scandinavia

We are a group in class 8A who have studied energy in Scandinavia.

**Sweden**

Sweden is one of the countries that uses most nuclear power in the world. It is also one of the countries which has the highest energy consumption per inhabitant. Hydropower has long been important in electric power support.

**Finland**

Finland has hydropower but it accounts for only 1/4 of the

electricity needed. Because of this, Finland must import oil from Russia.

**Norway**

Norway is one of the few countries that can export energy and, in addition lots of gas. All the Norwegian electricity comes from the hydropower.

**Denmark**

Denmark hasn't got any hydropower and is forced into large coal and oil imports. Denmark has wind power and also

natural gas deposits in the North Sea.

**Iceland**

Iceland has hydropower and access to geothermal heat from hot springs (geysers). About half the electricity Iceland needs comes from imported oil.

**Charlotte Karlsson, Lisa Offenbartl, Emma Jonsson, Frida Eek**

**Prästängsskolan, Eksjö**



## COOPERATION BETWEEN SWEDISH AND GERMAN SCHOOLS

## Bottle message led to river watch

A bottle with a little letter was floating in the Öresund waves in May 1988. At the same time students from the 7<sup>th</sup> grade, Norrevångsskolan in Eslöv, southern Sweden, were walking along the beach of the island of Ven, in the middle of Öresund. Ven is a traditional excursion area for the school. One pupil saw the bottle, caught it and opened it.

The letter was from a family with two children living in Schwerin in the former GDR.

In April the same year the German family had been walking along the beach in their country. The children threw the bottle with the letter in the sea hoping for contact with someone in another country.

The Swedish class and its teacher, whose subject is German, started corresponding with the family in Schwerin. When "the wall" fell they met in Sweden. In this way we began the contact with

the 32<sup>nd</sup> school in Schwerin. Pupils, teachers and headmasters visited each other alternately in Schwerin and Eslöv.

## River watch programme

In September 1994 it was once again time for a visit in Schwerin with the 9<sup>th</sup> grade. The Swedish pupils had previously done the "River watch program" from "the environmental-workshop" in Helsingborg. The pupils had a lot of things for water studies with them: hoops, pots, ropes, test rods and so on.

We were met by the German teachers in Travemünde and transported by car to a very beautiful district outside Schwerin. There was also a little river, the Warnow, which flows to Warnemünde. After eating, talking, and sleeping we went around in this beautiful, pastoral landscape and enjoyed everything very much except for all big horned wasps living inside the building, nesting in the bathroom.

After this we began our River watch. Three German and three Swedish pupils worked together.

They had also to speak with each other. The Germans knew the language and the Swedes knew the river program.

## Good health of the water

Thanks to the fact that there are no big factories or large farms in the neighbourhood, the health of the water in the river was quite good. Pondskaters (*Gerris*) and whirling (*Gyrinus*) were on the surface, pH was 7, and we found only small amounts of nitrogen-containing substances.

After this we went to the school, visited the town and had a small school-disco in the evening. The days passed quickly, and then it was time to go to Warnemünde for the ferry ride back to Sweden. We hope to continue working together with this river program. It is a good way of meeting and discussing environmental issues.

Students in the 9<sup>th</sup> grade and biology teacher Kerstin Lennerstedt

Norrevångsskolan (Secondary school), Eslöv



German and Swedish boys on their way to the river.

*It is not always so easy to catch the water in the little river Warnow.*

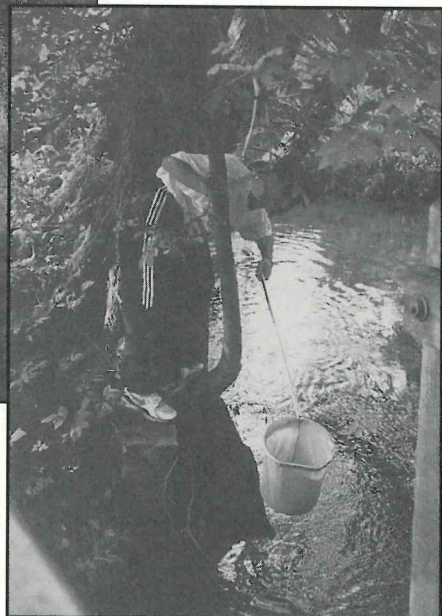


PHOTO: KERSTIN LENNERSTEDT

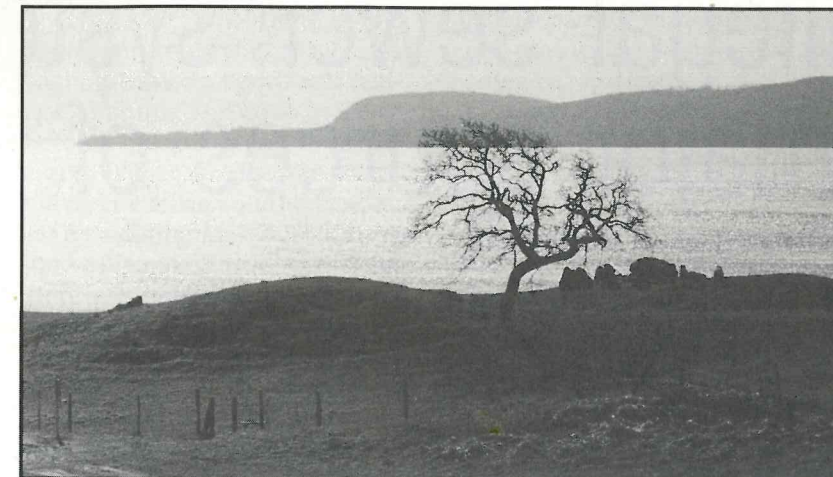
## The old forest at the bottom of the Baltic Sea



In the Hanö-bay in eastern Scania in the south of Sweden the archeologists have made several finds from pre-historical living. The erected stones behind the tree in the picture is the Haväng dolmen, an ancient grave which has been buried by sand for hundreds of years, but was suddenly brought into daylight by a storm in the beginning of this century.

As far from the coast as some kilometers, at the depth of 28 meters old tree-roots, still fitted into the sea bottom, are rests from a forest in a time when the sea level was much lower than today. The roots have been analyzed using the Carbon-14 method to decide their age.

This method uses the weak natural radioactivity inherent in all living materia. When the organism dies, the activity decreases with a half-life of 5570 years. The activity of the tree-



The erected stones behind the tree in the picture is the Haväng dolmen.

roots in the Hanö-bay amounted to 33% of that in a living tree.

The concept of half-life means that starting with 100%, the activity reaches 50 % after 5570 years, 25% after another 5570 years, then 12,5% and so on.

If you plot these values in the special semilogarithmic dia-

gram below, you may join the points by a straight line. From that line you may then read the age corresponding to 33% activity in the roots from the Hanö-bay.

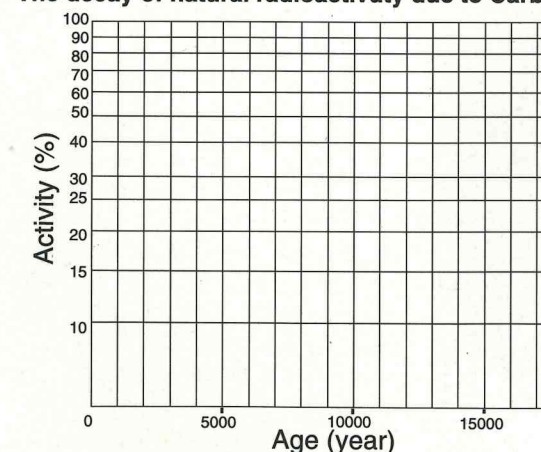
Mats Areskou, Malmö

School of Education, Sweden

## Question

How old are the roots from the ancient forest at the bottom of the Baltic sea?

The decay of natural radioactivity due to Carbon-14

Answers to the problems in  
NEWSLETTER No 2 1994 p 25

• • Thank you for your solutions to the problems "The Baltic Sea and the greenhouse effect". The first answer to be sent in came from Marcin Krzesiak, II Konopnicka grammar School, Katowice, Poland. He will get a copy of the BSP Learners Guide No 1.

## Answers

1. Total sea area of the earth:  $3.5 \times 10^8 \text{ km}^2$
2. The area of the Baltic Sea amounts to 0.1%
3. About  $5 \times 10^6$  tons (5 millions of tons) of carbon dioxide is absorbed by the Baltic Sea every year.

Please send the solutions to the above problem before October 15<sup>th</sup> to  
Siv Sellin  
National Agency for Education  
106 20 Stockholm  
Sweden



## THE RIVER PROJECT AT KAMIENNA RIVER POLAND

# Illegal sewer systems major sources of pollution

The students at the Marian Raciborski Complex of Secondary Schools in Cmielów have studied the water quality in the local rivers and streams – the Kamienna river and its inlets and streams, Przepasc and Pobocznica, headmaster Regina Piotrowicz writes.

The Kamienna river is not big. It is one of the left-bank inlets of the Vistula river. The river has its source in the forest, 355 m above sea level. Its length – 138.3 km, the river-basin 2 007.9 km<sup>2</sup>. The beginning of the Kamienna river is 123 m above sea level near Solec. The Kamienna inlets in the area are streams: Cmielowka and Przepasc. The main town on its banks are: Skarzyska Kamienna, Starachowice, Ostrowiec Sw. and Cmielów.

These towns are the centres of iron, steel and engineering industries, and the home of the Cmielów China factory. From the 17<sup>th</sup> to the 19<sup>th</sup> centuries this region was the

centre of the mining industry because there were silver, zinc, copper and lead there. Many building materials were also produced here. It was also the oldest industrialized area in ancient Poland. In those days, the forest was a source of fuel and the river was the transport route to the Vistula river and to the Baltic.

## Two groups of pollutants

Our students have researched the water quality in the local rivers and streams in our area – the Kamienna river and its inlets and streams, Przepasc and Pobocznica.

The students found the water pollution in the Kamienna river can be divided into two groups – point sources of pollution and non-point sources of pollution.

- **Point sources** of pollution is pollution that comes from the sewer systems, municipal sewage and sanitation. This kind of pollution causes alkaline reactions in the water.

- **Non-point sources** of pollution are confluences having their sources in the rural exploitation

of soil. Flowing water carries the pollution on its way through the watercourses. Contributors to this pollution may also include airborne pollution falling into the water (acid rain).

## Water testing four times

In the last school year (1993-94), we tested the water four times, comparing research based upon temperature, pH, nitrates, and unchanging substance contents.

Water in the river changes cyclically. Therefore, we tested it several times during the year and in various places. We noted, with the initial results of our temperature test, that the water in the Kamienna river does not have a thermic anomaly.

The temperature stayed at 0°C, so the banks were not being damaged by humans but by pollutants, and the forest maintains itself sufficiently (the river flows by a large forest with the polluted water).

Thus the entire content of unchanging substance in the river is 500 mg per dm<sup>3</sup> and it maintains the same level.

Among the soluble components are: calcium and hydroxide ions and nitrogen, sulphur, phosphorus compounds such as a number of clay and loam molecules coming from soil outlets.

## Illegal sewer systems

The major sources of nitrates are illegal sewer systems and town and village pollution. Some of the nitrates come into the river with the rain water, which eventually comes through the soil that is being polluted by fertilizer or manure. Comparing the test results of the Kamienna river, where there is 9.9 mg/dm<sup>3</sup> NO<sub>3</sub>, we notice that the Kamienna has more nitrate pollution with anthropogenic sources.



A student on her way to take water samples in the Kamienna river.

And we said the Kamienna river water shows a weak alkaline reaction, pH 7.31, which is constant. We have tested it several times and we continue to get the same results.

## Pollution may increase

This is very important to many plants and animals living there, because a great number of them are dependent on the pH level in the water, and may die if the pH changes. Furthermore, our tests

conclude that our river cannot dissolve heavy metal ions such as chrome, copper, mercury.

Thus far, pollution of the Kamienna river and its streams has only caused proportional damage, but this will soon increase because of the shortage of purification plants and the misuse of nitrogen fertilizers and herbicides.

By joining the BSP "River Project" we believe that we can further improve our understanding of ecological issues surround-

ing our environment, as well as help to educate and learn from others and their environments. Together our information will provide motivation to improve the ecological system.

**Regina Piotrowicz, headmaster**

**Marian Raciborski Complex of Secondary schools, Cmielów, Poland**

# The international ecological Olympiad

□□ Within the frameworks of the programme, measures devoted to the 50-th anniversary of UNESCO, the St. Petersburg UNESCO Center together with the University of Economy and Finance, The Forestry Technical Academy, The Pedagogical University and other organizations plan to conduct the international Ecological Olympiad (26 06 - 2 07 95). The realization of the Olympiad will be carried out within the framework of the international educational ecological programme "The Baltic Sea Project" which is coordinated in Russia by the St. Petersburg UNESCO Center. A number of European countries have agreed to participate in the Olympiad. The Olympiad is supported by the St. Petersburg and The Leningrad Region Administrations.

## Instructions for "The First International Ecological Olympiad Project"

### 1. Work on an ecological project.

Each team receives a map of a territory with instructions about the conditions (relief, hydrosystem, speciality protected natural territories, resources etc.) A task regarding an ecological examination of storage and construction of industrial objects is formed. For example: Nuclear power Station, Hydroelectro Station, fertilizer manufacture, production complex, oil well, garbage landfill, etc. It is necessary to give ecological substance to the project, or prove that there is a danger. Operating time for the project, two days – one day discussion of work.

### 2. Game on stations.

A computerized test about various parts of ecology and nature protection is available on computer. A whole group works. Number of questions – up to 100.

### 3. Work on drawing up an ecological map of a territory.

Territory around the base of accommodating will be divided into sites depending on the size of the groups. The task will be to make a map of the ecological condition of a territory – to note areas destroyed by human activities, to indicate the polluting objects, etc. Activity time – two days.

### 4. Work with teachers (round table).

New technologies in work with ecological information will be shown. The express-methods of control, principles of processing field information will be introduced to teachers – heads of groups. There will be exchange of opinions about the organizations of children's ecological education.

### 5. Defense of projects.

Takes place in the form of report, followed by questions from students. A press conference will be held. A poster will be designed on a computer.

Each team must submit written work on the problems of cities. The themes can be the following: Energy, Water and Air, Green areas, Housing, Everyday refuse. Social problems (Drugs, crimes, the homeless). Preservation of city cultural surrounding.

Each group has to be represented by students (age 15-20) and 1 teacher.

**Accommodations:** Expenses for accommodation, meal, and cultural programme of all participants will be paid by the St., Petersburg UNESCO Center.

**Travel:** The travel expenses to and from St. Petersburg are to be borne by the participants themselves.

**Application:** The application must contain: name and address of the school, name, birth date of teacher and students.

## The application should be sent to:

UNESCO Center in St. Petersburg 28 • Chaikovsky str. • 191194 St. Petersburg  
Fax +7 - 812 - 273 27 12



## ESTIMATION OF AIR QUALITY BY LICHENS

# The beginning of an ecological adventure

Together with the members of the UNESCO school club, students from the Spoleczne Upper Secondary School, Ogólnokształcace in Krasnystaw, Poland, trekked through the forests surrounding the town. Krasnystaw is a small town situated in the south-east of Poland, with a population of 25,000.

We decided to go on a trip around the town in order to examine the relationship between occurrence of lichen and air pollution. The region by no means belongs to the most industrial ones, so we expected the air to be clean and we hoped to find lichens easily.

There are three green patches on the map around Krasnystaw: the Borek, Namule and Niemienice forests. We started our search for lichens in Borek.

Unfortunately, we were disappointed with what we found there: the forest was dirty and we could easily notice a vast gradation of pests. Numerous trees were barked. This sad sight was enlivened only by a few woodpeckers we managed to find. We took several pictures and, surprised at the forest's poor condition, we wondered what was the cause of it.

## Hardly any lichen

Pine trees are dominant in the forest which is particularly monocultural.

The situation in Borek was tragic. Devastated stand of trees, pest gradation, dying trees and

hardly any lichens – this was the sight we found there. Only on the forests fringe did we meet a few stands of *Parmelia physodes*.

We visited the Borek Forest Inspectorate to ask the employees about the causes of such state of the wood. The forest inspector, Mr. Stanislaw Szpak, blamed it on the neighbouring factories; "Ceramit" and tobacco fermentation works.

Apparently there are observations of pollution and its influence on the trees carried out in Borek on the "experimental surfaces", but our interviewee complained they are strenuous and time-consuming. There are no observations made, however, on the influence of pollution on green plants, moss or lichen.

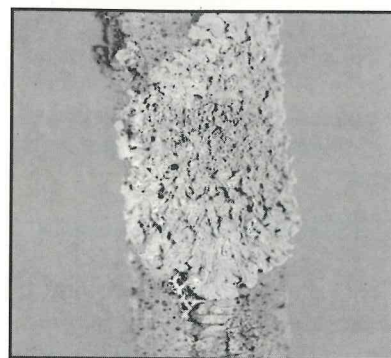
## Garbage in the forest

We also wanted to know why there was so much garbage in the forest. The forest inspector explained that it is not easy to catch anybody red-handed. Besides, the fines for leaving garbage in the forest are ridiculously low – 200,000 Pzł.

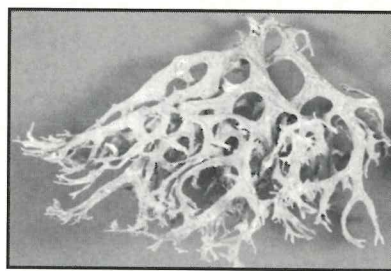
We wanted to talk to people who are responsible for polluting the air with "Ceramit", but we did not manage to reach them.

We think that our UNESCO club should take care of Borek and draw people's attention to its problems by publishing the materials we have gathered and organizing events that will promote preservation of the environment.

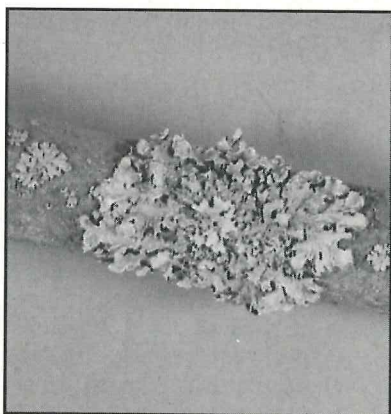
We were much less optimistic when we started the second trip to Namule. However, we were surprised. We found thick layers of lichen on the oaks growing along the road near the forester's lodge.



*Xanthoria parietina*



*Evernia prunastri*



*Parmelia sulcata*

PHOTO: ANNE KIVINUKK

The stand consisted mainly of oaks and hornbeams.

This forest looked completely different from the previous one. We managed to find *Parmelia physodes* and *Evernia prunastri* stands in Namule forest. Their thallus constituted wonderful thick coatings on tree bark and the smell of fungi could easily be noticed. There were no trees attacked by pests.

## Resin ran trough the cuts

The Niemienice forest was different in comparison with Borek and Namule. We could not see as many pests as in Borek. However, nu-

merous old pine trees had been damaged by human beings.

They had a lot of cuts, through which resin ran down. These long deep cuts which sometimes extended down half the trunk made us feel depressed. We kept asking a question: was this really necessary? Cannot resin be replaced with synthetic materials? Some of the trees were half-dead already.

We wondered why it was in Namule that we found the largest numbers of lichen stands, and not in Niemienicewchich. The latter is closer to the bakery and the powdered milk factory – a well-known Krasnystaw's "poisoner". What is more, it turned out that we found many stands of *xanthoria parietina* orange thallus and a few of *parmelia acetabulum*.

These lichens are nitrophilous, and they occur in places having an abundance of ammonia compounds. We suspected the factory nearby emitted nitro-compounds but the winds, which are advantageous for Namule, bring them towards Krasnystaw.

## Decrease of sulphur

The factory employee who is responsible for environment preservation willingly gave us the detailed information we needed. He told us that the basic problem was

polluting the air with NO<sub>2</sub>, SO<sub>2</sub>, CO<sub>2</sub> and with dust produced in the process of burning "mazut" (fuel oil) and coal. They use dust extractions which is effective to 85 per cent.

Until recently mazut from the former USSR was used. It contained about 3 per cent sulphur. Now the factory uses mazut containing approximately 2-2.2 per cent sulphur. The factory burns 3,000 tons of mazut a year and it produces 20,395 kg of SO<sub>2</sub>. Fortunately, the factory is being supplied with gas, and since July 1993 only one mazut burner has been used. The gas burner burns 390 m<sup>3</sup> of gas and emits 80 kg of SO<sub>2</sub> yearly. It is fuelled with gas containing less than 60 mg sulphur/m<sup>3</sup>.

There is one serious problem for the time being. The factory cannot be supplied with gas completely because the town would be emptied of its source of natural gas.

## Pollution blows to the town

In 1993, the factory emitted: 9 tons of dust, 158 tons of CO<sub>2</sub>, 14.5 tons of NO<sub>2</sub>, 18.3 tons of CO, 1 ton of hydrocarbons, 4.5 tons of cancerigenous benzene pyrene and 250 kg of soot.

The factory does not have any

protection on the chimneys but it does not exceed the limits of pollution permissible, as was proved during the inspection of September 1993.

The winds blow the pollution towards the town, which is fortunate for the Namule forest, but not for the people of Krasnystaw.

All the trips allowed us to draw the following conclusions:

1. We do not live in as clean an environment as we had expected.
2. We have to visit Krasnystaw's factories in order to talk about air pollution.
3. Our UNESCO club will constantly watch lichen populations near Krasnystaw.
4. Students who will take part in the Olympiad in biology will thoroughly examine the relationship between the air condition and the occurrence of lichen.

We treat our present work as the beginning of an ecological adventure.

Jaroslaw Garbowski, Monika Kulimowska, Anna Mlynec, students at Spoleczne Upper Secondary School Ogólnokształcace, Krasnystaw

## EXTRACT FROM HELCOM NEWS, 1995, NO 1

# 124 hot spots in the Baltic region

HELCOM has decided to remove four Swedish and four Finnish industrial hot spots - pulp and paper mills - from the list of hot spots. They could be taken off the list thanks to decreased discharges of oxygen-consuming organic matter, nitrogen, phosphorous and chlorinated organic substances. 124 hot spots now remain in the Baltic region.

The opinion has been voiced that new hot spots should be

added. Former Soviet Union military sites in countries in transition could, for instance, be added since they are now considered environmental risk areas.

Concerning certain hot spots, remedial actions have resulted in some cases - particularly at municipal priority hot spots - in considerable reductions of the pollution load. The sewage treatment plants in Koszalin and Gdansk/Gdynia, and the Riga

biological waste water treatment plant are examples.

There are also some possible success stories. The Tallinn Waste Water Treatment Plant is under construction. Many small Municipal Environmental Projects in Estonia have got loans and other support and will now improve municipal sewage treatment. The situation for water and waste water will also be improved in Klaipeda, Lithuania and Liepaja, Latvia.





# The influence of ethnoculture on the ecological culture of pupils

Man differs from animals – and the man in paradise – in that he creates culture, the crust of it being Human Civilization. Unfortunately, because of the decline in our morals, very soon we will suffer from breaking-off civilization from culture, Povilas Andrulis, Kaunas Upper Secondary School, Lithuania, writes.

This tendency can be clearly seen when watching our barbarian behaviour as far as nature is concerned.

The ecological culture of man is a result of the moral position which man has taken. That is why when we form any young person's moral position, which consists of knowledge, feelings, estimations and views, we influence positively his or her ecological consciousness.

In other words, if you have an honest person, no ecological problems will appear. Consequently, bringing up highly moral human beings, who live according to the ten commandments and who create culture is the main aim of the school system at present.

## High moral personality

The personality of a teacher, the microclimate and the content of development – these are the main conditions for the development of a high moral personality at school.

According to the Lithuanian educational concept (having an aim of coordination), universal programmes of development are integrated into all subjects. These programmes would be Ethics, Aesthetics, Ethnoculture, Civic duty and Ecology.

These subjects are being

taught in our school as independent ones. Special attention is given to Ethnoculture. We suppose that the culture of the nation, which includes ethics, customs and their development, is the basis of forming the moral position of young people.

## Customs and morality

The object of Ethnoculture is the Baltic Ethnos, which formed during some thousand years in the woods South-East of the Baltic sea, a cultural development. The cultural of the Balts is matrixcentric, has more essence than form, and is called an Ethos culture (the culture of custom and morality).

In its essence it is an ecological culture, because the Balts lived in woods and forests. They knew, according to Mythology, fern blossoms secret, to speak in terms of energetics, knew all kinds of se-

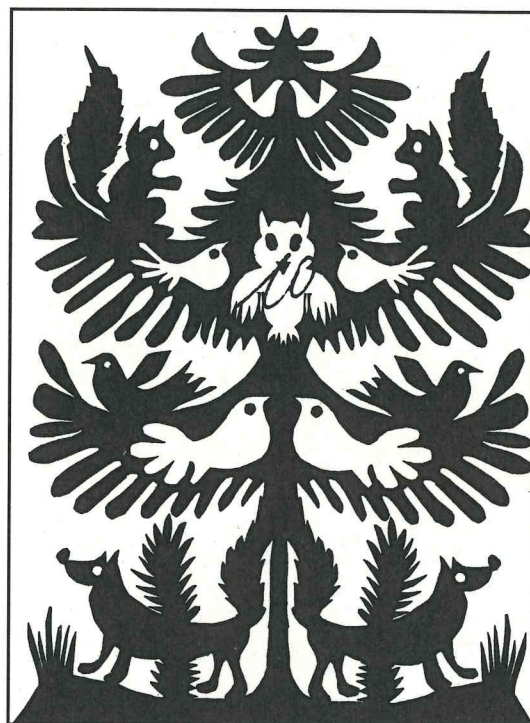
crets about optimum usage of energy, too.

## Sacred nature

Since the advent of Christianity we have observed the 5th command of the God "Thou shalt not kill". This order was applied to nature as well. Our ancestors thought nature to be sacred and alive, they thought nature could feel pain and what is good.

From birth, children knew that they were not allowed to trample down grass, fell trees. You could not spit upon water, pour dirty water on fire. It was not good to point at the sky, Sun or Moon with your finger.

Ethnocultural teaching in our school starts in the 5th form and it continues for four years, one lesson a week. The second teaching stage begins with the 9th form. The syllabus, on the whole, is the same,



The drawing is made by Neringa Kvasiliūtė.

but it is taught more deeply by and more scientifically as the years pass.

## Folkmusic band

The second teaching stage takes four years, too. The pupils like this subject very much, because there are many folklore elements in the lessons. By the way our school has a very nice folkmusic band.

I should like to look over the themes of the course of Ethnoculture. They are in close relations with ecology and help greatly when speak about educating pupils ecologically.

In the beginning we speak about the influence of biosphere for the formation of Ethos. "Names of places", "Names of water sources", "The Balts and forests" – themes are near Ecology.

## The Balts' philosophy of life

During the second year we study these themes: "Man's philosophy of life and nature", "The Balts'

philosophy of life and its relationship with the world".

I must say that the themes concerning calendar festivals have very beautiful links with nature. These festivals are "Gavenia" (before the Easter day) and "Rasa", June 22nd till 24th.

Our school is named "Rasa", too, and the title of the school in itself has something Ethnocultural to it. Then comes "Ilgės" – turning from autumn into winter, which takes a very long time – and Kalėdos – a full numbness before the day starts to be longer, it coincides with the birth of Christ.

It is most interesting that these festivals not only reflect our nature but, on the other hand, shows the main events in peoples lives – births, weddings and deaths – getting into another system of energy, "into the other world".

Povilas Andrulis, headmaster, Kaunas Upper Secondary School Lithuania

The drawings on the page 15, 21, 28, 34, 35 and 43 were published in the Catalogue made for the Drawing and Poster Contest 1995 "Natures Fairytale, City and tree" in Lithuania.



## INDIVIDUEL CHOICES AT HARALDSBO UPPER SECONDARY SCHOOL

### International environmental studies

□ □ In the Swedish school system the students have a possibility of making their own individual choices of subjects for up to around 60 classroom hours per year. Many local subjects have therefore been developed. The following is an example from Haraldsbo Upper secondary school.

## SYLLABUS

The purpose of the course is to survey large-scale and global environmental problems. They are analysed in many different ways – with respect to the history of ideas and man's attitude to nature. In particular, attention is paid to transborder pollution problems in air and water.

Environment problems in countries and areas are given attention for their own sake. Networks of teachers of natural science, social studies and languages offer knowledge that leads to solutions of problems and action plans.

In order to fulfill its purpose, it is essential for both teachers and students involved to have personal international contacts.

After having passed the course the student will have:

- surveyed an areabackground with respect to culture and physical geography
- had a personal contact in the area surveyed
- a comprehensive knowledge of a local problem in an another country
- a comprehensive knowledge of at least one global environmental problem
- be able to perceive the advantages and disadvantages of different solutions
- obtained knowledge from literature in foreign language(s)
- carried out comparative field and laboratory studies

Birgitta Berggren, teacher



A NEW ROLE FOR THE TEACHER

# Preparing for real life

As a tutor in problem based learning (PBL) you need to be skilled at interpersonal communication processes, group processes, team building and have the ability to cope positively with conflicts, Gunnel Westerberg writes.

The tutor needs to communicate empathetically. To listen and to respond and make the student reflect on ideas and justify why the information is consistent with the evidence.

The role of the tutor in problem-based learning differs greatly from the traditional teacher's role. The tutor must keep in mind that action arises from the motivational state of the student.

The student needs encouragement and guidance from the tutor and should be provided with augmented feedback about the learning strategy and quality of performance.

## The students role

The tutor should also empower the student's role in the assessment of self-directed learning. Expect the student to success and interact frequently in order to support development of awareness, skill and confidence.

Give the student feedback and the opportunity to practice until the student masters the self-assessment skills. Both goals and criteria must be achievable with the resources available.

The student should be aware that the learning process has an advantage in getting actively involved over listening passively. Cooperative teamwork with helpful attitude has an advantage over just being in a group or working alone.

Diverse talent and ways of learning and solving problems have an advantage over one single way of thinking.

## Realistic education

Problem-based learning in school prepares students for real life. In the real world you need to be aware of your goals, values and knowledge.

The main characteristic of the world will be rapid change, so realistic education is no longer transmitting what is known, it is developing the skills of inquiry.

The student needs to acquire new knowledge for the rest of his or her life. It is not possible for people to learn in their youth what they will need for the rest of their lives.

We must learn from everything we do and we must think of learn-

*– I've taught my parrot to talk.*

*– I can't hear him talk.*

*– I said I'd taught him, not that he'd learned.*

ing as being the same as living - a lifelong process.

**Gunnel Westerberg,**  
teacher, Faculty of Health  
Sciences, University of  
Linköping  
Sweden

Literature: Knowles M.  
Self directed learning.  
USA 1975.

## BASIC PEDAGOGICAL PRINCIPLES IN PROBLEM-BASED LEARNING

### Focus on learning

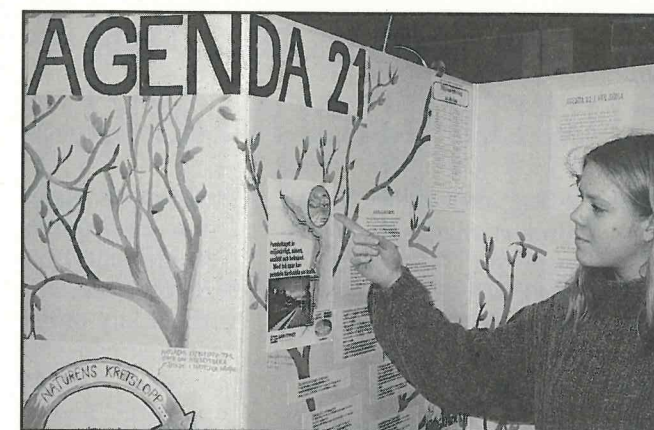
• • The basis for PBL as a method is its view of learning and of knowledge. How do we learn? As the name implies, in PBL the focus is on learning. The prerequisite for learning is to be active, which may mean thinking, considering, taking a stand, trying something out in action, or formulating one's thoughts in speech or writing.

Rote learning of things someone else said or things in books is not sufficient. If we are to learn,

we need to process facts, testing them and integrating them with our previous knowledge, experiences and ideas about the world. This provides a context for and an understanding of what we learn.

**From PBL – an introduction by the Faculty of Health Sciences, University of Linköping, Sweden**

# Swedish students start an environmental group on Agenda 21



Sara Sébelins, N3 a, Frederika Bremer Upper Secondary School at the exhibition.

A few weeks ago we started to study Agenda 21 from the Rio conference in our Environmental study course – what does it contain and what is the effect on our municipality and on our school. We have made an exhibition of the result and placed it in the school library to inform other students and teachers.

We also invited Cecilia Lundholm from the non-governmental organization q 2000, which is an organization for young people, mostly university students, working with the

implementing of Agenda 21. She gave us and other interested students and teachers a lecture on how to solve the global environmental problems on grassrootlevel. She stressed that it is important to think of the future with an unlimited perspective.

At this meeting we decided to try to form an environmental group in our school. Several suggestions came up of what this group could accomplish. One suggestion was to collect

paper in the class-room. Another suggestion was to find out what happened to the windows that were being exchanged during the renovation of the school. Could they be used for a greenhouse? We will have a follow-up meeting this spring when we will give our environmental group its final structure.

**Students in Environmental Studies at Fredrika Bremer Upper Secondary School, Haninge**

Please, contact us if you are interested in starting a similar group.  
Fax: +46-(0)8-606 7021

## Theme Air Quality

All BSP schools are invited to work with the theme "Air Quality" according to the following suggestions and then send the results as an essay (max. 2 pages) in English before March 15, 1996 to the national coordinator. The best contributions will be published in the next Learners' Guide No 2 "Air Quality".

### Suggestions for contents of the theme work

- Field-studies** according to the protocol "Estimation of air quality by bioindicators" or some other method.
- Interpretations** of the results.
- Find out** (if possible)
  - the air pollution sources in your area (factories, traffic, energy production plants, other countries etc.)
  - the laws and standards concerning these sources
- Visit a factory or energy production plant.** What are the outlets? What are the laws and standards? Plans for the future?
- Does any of the sources have an **impact on the Baltic Sea**?
- Study the air pollution problem in **newspapers**. Write summaries in English. Send the original article with the results to the national coordinator.
- What can be done?**
  - What can I do myself to decrease discharges?
  - What is being and can be done locally, nationally and internationally to decrease discharges.
- Presenting results.**
  - Make an exhibition in the school, the city library, etc.
  - Write an article for the local newspaper
  - Invite local politicians for a discussion.



## SWEDISH PROJECT IN ESTONIA

## Environment and rural development

During the 1980s I was project manager responsible for "The whole of Sweden shall survive" – campaign in the county of Jönköping, Sweden. We designed what now is called the Jönköping Model, which briefly means the education and activation of municipality managers – politicians and officials – in the fields of rural development.

My county has been asked to support Estonia in their campaign KODUKANT "The whole of Estonia is our home". We began in 1992 with a pilot project together with Rapla county in Estonia. We are "exporting" knowledge and experience obtained earlier in Sweden by giving courses and seminars. The budgets for the last three years was a total sum of SEK 1.2 million.

**Environmental effects**

The freedom campaign in Estonia began in 1987 when Moscow had decided that the phosphorus mining in east Estonia should be increased by 40 times the current amount. Even the current mining was too much, and was having terrible effects on the environment. The local regional associations began a massive protest and as "perestroika" was in its beginnings,

the Moscow plan was postponed. Other environmental problems were effluents from towns and villages that were being discharged without any purification into the nearest stream. The situation was the same concerning the huge "colchozes" and "sovchozes" with animal production units of 2,000 milk cows and hog production with 50-60,000 animals. They destroyed all the healthy streams in the neighbourhood.

**Small scale enterprises**

One of the principal parts of the work of the Pilot Project is directed towards small scale enterprises, with the thought that family farming will lead to more careful consideration of the environment than the large scale production. Family farms are closer to natural ecological circulation than the others.

Within the concept of small scale enterprises, we have placed some stress on the woman as an entrepreneur. Women are very important in the planning of the rural regions because usually the women are the first ones to leave rural regions – they cannot find jobs. Without women the environment is not viable for any kind of development. Therefore, it is im-

portant to stimulate women as entrepreneurs.

**Municipal schemes**

The Pilot Project also includes a municipal scheme in which two municipalities in Jönköping county (Tranås and Aneby) are working together with two municipalities in Rapla county (Kehtna and Raikküla). Their mutual topic is ECO-cooperation. The ecological prospect is very important in all countries, but especially in a country which is rising from a 50-years dependence on the Soviet Union.

We have a specific example of an environmental connection in the concept of the development of local democracy. There Värnamo municipality has had a successful project.

In the activation of villages and parishes study circles are making economic plans for their district. At the grass roots level they are taking up the possibilities of discussing and dealing with questions concerning environmental development.

**Vikar Säfvestad, project manager**

**Jönköping Sweden**

## STUDENTS' SOLUTIONS AT THE KARLSKRONA CONFERENCE

## 15 different suggestions about agriculture

**Governmental level:**

- More support from the governments to environmentally friendly farmers.
- Make laws that require environmentally friendly cultivating and forbid the most harmful pesticides.
- High taxes for using unnatural fertilizers and pesticides.
- Every country should have its own environment consultant.
- Increase cooperation among various countries.
- Make a stronger support to environmental thinking.
- Subsidize and mark ecological products so they become cheaper and more visible.

- More research about natural fertilizers and old technics. Use them.
- Punish farmers & companies who break environmental law.

**Local level**

- Create wetlands as catchment areas.
- Recycling the nutrients contained in water (irrigation systems).
- Introduce systems with continuously repeated land resting.
- Create preservation zones.
- Vote for politicians that take action against these problems.
- Buy environmentally sound products.

## Agriculture for the future

**Agriculture is our ability to live on renewable resources. However, in industrial countries, agriculture consumes more energy, based mostly on fossil fuels, than the amount of energy which is produced in agricultural food products, professor Artur Granstedt writes.**

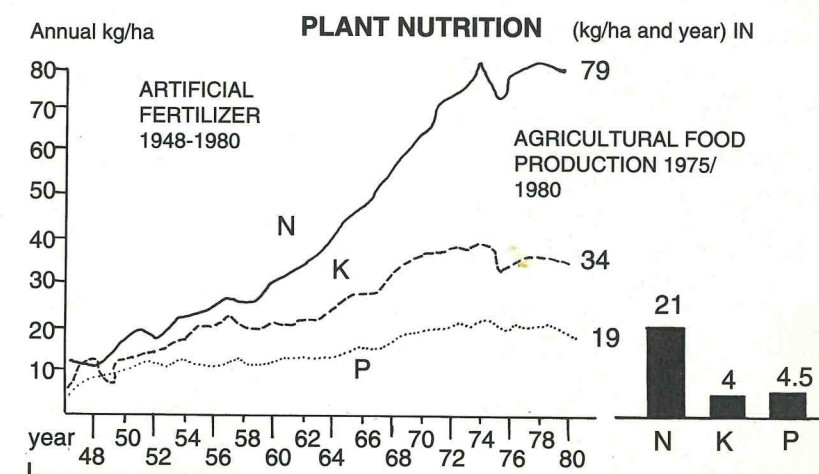
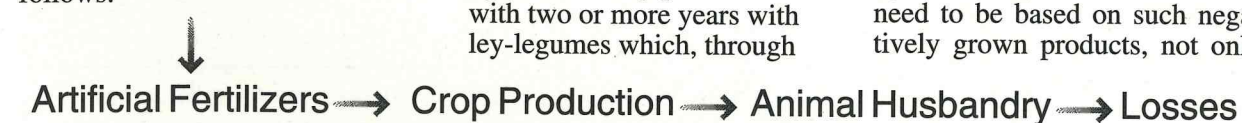
The amount of plant nutrients supplied in the form of artificial fertilizer increased greatly between 1950 and 1980 in Sweden and in other Nordic countries. The amounts of N and P applied in Sweden were four times higher than those recovered in agricultural products. N losses from arable land have been estimated on average at 100 kg/ha and year.

The situation is basically similar in Finland with slightly higher losses, and was also similar in Estonia a few years ago. This difference between input and output not only represents a burden on the environment but also a loss to farmers.

**Losses of nutrients**

There are, however, large regional differences, with the largest losses occurring in areas with intensive live stock farming. The high losses of plant nutrients from the agricultural system are a consequence of the increased separation of crop management from animal husbandry.

Much of the cultivated area is used for feed production, whereas animal husbandry is now concentrated to specific areas. The flow of plant nutrients through the agroecosystem can be represented as follows:



*Mean losses have increased as the degree of farm specialization has increased. Losses are primarily to the atmosphere, surrounding lakes and streams, and the soil.*

**Ecological farming**

In near future we have to minimize nutrient losses, recirculate our resources and be in balance with the rebuilding processes through green plants. We have to return to a production system based on natural laws.

Only 40 years ago, agriculture in the Nordic countries was a net producer of energy and nutrients in food products and also a lot of other important things for society. This does not mean, however, that we need to go back to the tough days of pre-World War II agriculture.

Results from field studies and case studies indicate that yields obtained through ecological farming based on sound ecological principles and tailored to local climate conditions can approach those obtained through conventional farming.

The main principles of ecological agriculture are very briefly presented as follows:

- Diversified crop production with two or more years with ley-legumes which, through

symbiosis with rhizobacteria, can fixate atmospheric nitrogen.

- The recycling of plant nutrients and minimization of nutrient losses based on a balance between animal and crop production on local level.
- Measures designed to reduce nutrient losses through runoff, leaching, and volatilization.
- Measures to increase the physical, chemical and biological soil fertility properties.

**Healthier food**

In recent years, there has been a sharp rise in concern over our present environment and the environment our children will inherit. Pollution caused by the overuse of pesticides and commercial fertilizers is among the serious environmental problems associated with conventional agriculture. Farmers, practising ecological agriculture, have demonstrated that agricultural production does not need to be based on such negatively grown products, not only





Pijus Aizina made the drawing.

because we want to protect the environment, but also because soundly grown food is healthier. The shift in public opinions has forced politicians to sit up and take note.

So far, the greatest increase in the amount of area cultivated according to ecological principles occurred in connection with direct subsidies offered to farmers converting from conventional to ecological farming. The 1980s were a breakthrough decade for ecological farming in Sweden. The area increased from 1,500 hectares in 1980 to 33,000 hectares in 1990 and to 56,700 hectares in 1994 ( $\approx 2\%$ ).

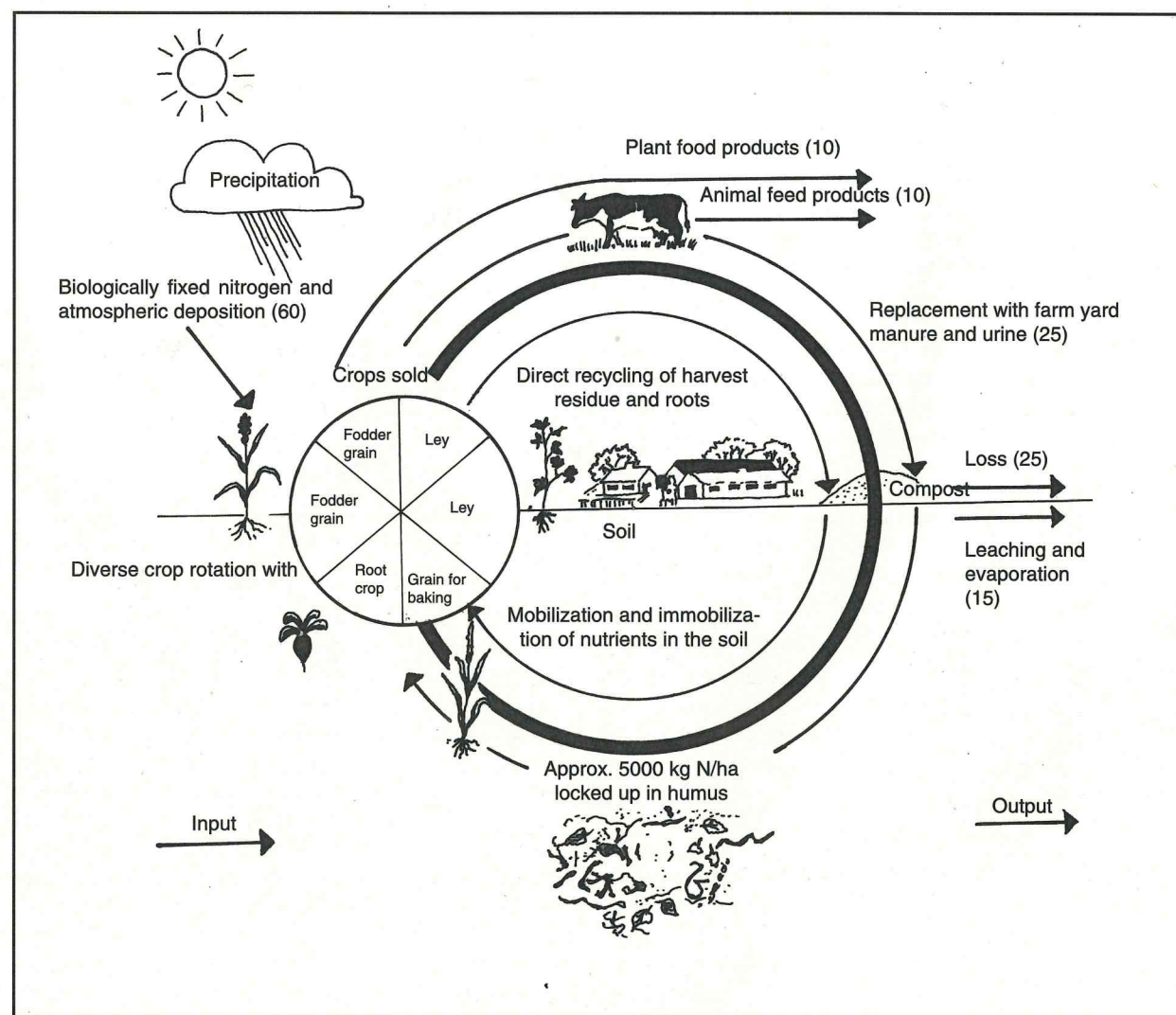
The conversion goal set by the Swedish Parliament is ten per cent by the year 2000. It should be noted that in horticulture, about

nine per cent of the total production area is already under ecologically sound management.

Although the Finnish government has been somewhat slower in supporting ecological agriculture than the Swedish, the situation has improved greatly during the past three years. Only about 2,000 hectares was under ecological cultivation in 1989, whereas by 1993, the figure had risen to 22,137 hectares.

A similar development has occurred in the other European countries with Germany, Austria and Sweden as the trend leaders.

**Artur Granstedt, Research Professor, Partala Research Station for Ecological Agriculture, Juva, Finland**



Cykling of plant nutrients (kg/ha 7 year) on a farm self-sufficient with regard to fodder and manure.

**Our "welfare state" originated in an ambition to eradicate poverty and injustice, suffering and misery. One might say that it originated in a moral stance: we should treat every human being fairly, Sten Philipsson writes in this short introduction to ethics for the environment.**

No-one could have predicted that the growth of the industrial society would give rise to such serious threats to the physical environment, and might even threaten the continued existence of the human race.

Questions relating to how to cope with environmental problems and technical development are difficult ones to answer. They are not just technical or political issues, they also implicate deep ethical issues. Our old moral code provides no real guidance – we no longer know what is right and wrong.

Although we do not want to damage the environment with contemporary technology, we do not wish to return to the old agrarian society, with all its faults and shortcomings.

#### Need for environmental ethic

Today, we need legislation with associated systems of sanctions, in combination with economic instruments, to impact on human behaviour in our natural surroundings. This would mean, at least to some extent, that human behaviour would be regulated by external forces.

Human behaviour is more an expression of compliance with the rules established by external authorities than of internal conviction.

It is desirable that human behaviour in relation to the natural surroundings should be determined, more than it is today, by public awareness of the law, and an environmentally-oriented ethic. If we are to find a new way of relating to nature, it must really reflect changes in human values.



DRAWING: KARLIS ZIEDINS

## Ethics for the environment

In this context, we may discuss the need for an ethical code, a core of values that will help us to behave with awareness. The important thing is not what we *have to* do, but what we *choose to* do.

#### The concept of ethics

What is ethics? A simple definition is a *systematic perception of which actions are right and which are wrong*. Most people have their own ideas about what is right and wrong, but such ideas are not sufficient for us to say that each person has an ethical code, or an ethi-

cal approach to life. However, when a person begins to seek a more consistent way of considering right and wrong, we can say that the individual is trying to develop an ethical code or approach.

In order to describe a person as ethical, we do not necessarily have to regard him or her as having an exhaustive and completely thought-through system of values and positions as to what is right and wrong. It is often an honest ambition to strive for actions which express a sufficiently consistent application of fundamental values



# May 1995 to October 1995

- **May 9 - 11, 1995** The 5<sup>th</sup> Estonian BSP annual meeting will be held on the island Saaremaa(Ösel). Guests from other BSP countries are welcome.
- **May 17 - 20** Students camp in Naukseni, Valmiera, Latvia
- **May 28-June 2, 1995** International environmental camp school organised by Meri-Pori Upper Secondary school
- **June 8 - 10, 1995** Launching of the Western Mediterranean Project in Alicante, Spain
- **June 26 - 30, 1995** An international course on interdisciplinary teaching: The Baltic Sea, Our Common Responsibility – Environment, Culture and History, Skåvsjöholm, Sweden.
- **June 27 - July 2, 1995** The International Ecological Olympiad "City and Nature" in St. Petersburg.
- **September - October 1995** Meeting of the editing committee for the BSP Learners' Guide No 2.
- **October 9 - 13, 1995** A European course for BSP-teachers in Wittenberg with the title "The Baltic Sea – a historic, economic and cultural European area" organized by Bundeszentrale für politische Bildung in Bonn.
- **October 24, 1995** Celebration of the creation of the UN 50 years ago.

► to be able to characterize the person as ethical.

Perhaps it is also necessary to have acquired some ability to predict what may be ethically controversial, what issues are morally sensitive, what actions may be considered ethically dubious. This, in turn, requires some kind of imagination, an ability to empathize in relation to situations one might never have experienced personally.

## The value of nature

In establishing an environmental ethic, or an ethical code regarding the environment, attempting to discern some of the values that should be considered might be a good starting point, after which one might examine whether or not these values are reconcilable, i.e. whether or not actions that imply striving to satisfy them are in conflict with one another, are mutually exclusive.

If we discover a conflict between values in a given approach to nature, we can attempt to find ways of setting-off or balancing values that appear to be in conflict.

Nature is often assumed to have two kinds of values for mankind, an instrumental value and an inherent value. When nature is ascribed a value on the basis of its being a prerequisite for something else important to mankind, such as human health, physical survival, of satisfaction of the need for light and heat, we may refer to the *instrumental* value of nature.

This implies that nature is a valuable means to achieving something else which is valuable in itself. However, nature can also be ascribed a value on the basis of how we experience it directly, without its leading to or being a prerequisite for anything else. This is the *inherent* value of nature, and is comparable, for example, with the inherent value of a beautiful work of art.

## Intrinsic value

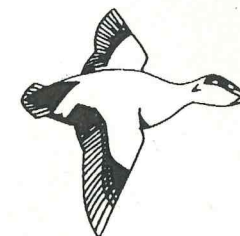
It should be noted that some phenomena, beings, situations or objects may have both an inherent and an instrumental value simultaneously. Nature is one such phenomenon. Nature is important to

mankind as both a means and an end.

The values we have discussed above may be referred to as *anthropocentric* values - the values of human beings. Some people also claim that nature has a value not attributed to it by mankind, an *intrinsic* value. The intrinsic value of nature may be described as the value of nature irrespective of mankind's assessment, a value unto itself.

The assumption that nature has an intrinsic value may appear quite sophisticated, but it is theoretically that human beings have a value unto themselves. If we regard it as rationally acceptable to assume that human beings have a value independent of the value other human beings ascribe to them, then it is equally rationally acceptable to assume that nature has an equivalent intrinsic value.

**Sten Philipsson, Associate professor of the Study of Faiths and Ideologies at the University of Uppsala Sweden**



# Proceedings in the Baltic Sea Project

## The objectives of the BSP are to:

- increase the awareness of the students about the environmental problems in the Baltic Sea area and to give them an understanding of the scientific, social and cultural aspects of the interdependence between man and nature
- develop abilities of the students to study changes in the environment
- encourage students to participate in developing a sustainable future

## The BSP works by the following means:

- building network of BSP schools and educational institutions in the Baltic Catchment Area
- creating and developing educational approaches and joint programmes for environmental and international education
- organising joint activities and events and publishing the BSP newsletter and other relevant information.

## The educational approach for the BSP is to:

- achieve a balance between a holistic view and individual subject studies
- change the role of the student from passive recipient to active constructor
- change the role of the teacher from supervisor to guide in a learning process
- use network to provide participants with opportunities to learn and pass along new ideas
- use international cooperation as an inherent element of school work

## Main activities December 94 to March 95

□ The Baltic Sea Project was represented by the Finnish coordinator at the third meeting of the HELCOM Programme Implementation Task Force Working Group on Public Awareness and Environmental Education in Helsinki, Finland December 7-8. The meeting decided to cooperate with the BSP in order to better coordinate the school/educational projects.

□ The general coordinator took part in and presented the BSP at the **European Seminar in Environmental Education** 27-31 March, 1995 arranged by the CIRCEE ( Centre International de Rencontres et de Coordination en Education à l'Environnement)

□ The 7<sup>th</sup> **International Consultation** was held in Vilnius, Lithuania March 30 to April 2, 1995. The consultation was organized by the Ministry of Cul-

ture and Education in Lithuania in cooperation with the national Agency for Education in Sweden. It was attended by the general coordinator, the national coordinators, one teacher from each country and Dr. Evaldas Vebra, Chief Advisor of International Division at the Lithuanian Republic Environmental Protection Committee.

It was agreed upon that the BSP had a firm basis for its work with its six common programmes, interested and active schools and many experienced teachers. The meeting dealt therefore mainly with the developing of new aspects on Environmental Education.

The following decisions were taken:

- The development of field-study methods in **environmental education** with the local environment as a starting point will continue. The field trips should also sensitize the students to the diversity, beauty and power of nature. The BSP will strive for problem-oriented and interdisciplinary environmental education and introduce ethical reflection. A more active, empowering role for the students will be further developed.

- These new educational approaches will be implemented through courses, seminars, camps, books and the BSP Newsletter.

- A questionnaire about **Learners' Guide** no 1. will be distributed to all BSP schools. The following editorial committee for Learners' Guide No 2 on Air Quality was elected: Birgitta Berggren, Sweden, Laima Galkute, Lithuania and Anne Kivinukk, Estonia and the respective coordinators. The reference group will consist of the remaining six coordinators.

- A theme study on Air Quality will be presented to the BSP schools for the 95/96 school year.

- A special catalogue with **e-mail addresses** will be distributed with the next issue of the BSP Newsletter.

- A plan for **cooperation with HELCOM** was adopted.

- It was agreed that **democracy** is a prerequisite for a good environment and that democracy is the basis for EE. Several means of educating the students for democracy and training them to use their democratic rights were suggested.

**Siv Sellin**



## The Blue Danube River Project

□ The general coordinator made a messenger tour to three of the countries in the project, Romania, Czechia and Slovakia. The main aim of the tour was to strengthen the national network, get more schools involved, encourage the work of pilot schools and national coordinators, give impetus for international contacts through partnership and best of all to promote the ideas of the Blue Danube River Project.

The tour involved meetings with resource persons from different institutions, visit lectures, discussions of initiatives of future actions with pilot teams of teachers, innovative approaches and contributions to the River Emphathy book etc.

*Yordanka Nenova, Coordinator for the Blue Danube Project, Bulgaria*

## The North Sea Project

□ The North Sea Project (NSP) is conducted by the National Education Office, Aust-Agder County. The leader of the Project is Karen J. Ohldieck.

The Project is currently under review. We wish to focus more clearly on the school system rather than the individual school. The UN Conference on the Environment in Rio de Janeiro in 1992 urged each country to



*The tjekian coordinator in the Blue Danube Project.*

devise a strategy for countries strategy and in this way help each other to attain a action-based environmental education..

The Rio Conference also urged the individual local authorities to formulate their own Agenda 21. NSP wishes to examine how the education sector can be an active partner in developing and implementing the local Agenda 21.

This modification of the Project is currently being considered by the Ministry. We shall take the initiative in contacting the North Sea countries as soon as the Project has been given political approval.

*Hans G. Toreskaas*

*The National Education office in the Agder County, Norway*

## South Eastern Mediterranean Project

□ Within the framework of this project the participation procedure of the countries of the South Eastern Mediterranean Sea as well as the nomination of national coordinators have already started. A meeting of the national coordinators will be held in order that they take decisions and discuss additional activities.

The Greek organization for Vocational Education and Training (OEEK-OVET) is working out material of the newsletter which is scheduled for publication next month. A lot of interesting articles have already been sent by participating countries.

A summer school will run July 9-16 1995 in Thessaloniki, Greece. Special emphasis will be laid on the theme "City and Sea". Five students and two teachers will participate from each country.

We believe that this activities along with the action of the participants in the SEMEP meeting on 13-15 November 1994 in Athens who will disseminate the SEMEP in the region will be the basis for the success of the project.

*Theodoros Christides, president OEEK, Athens, Greece*

## The Caribbean Sea Project

□ The CSP was launched November 8-11, 1994. It will be important in sensitizing young people of school age of their critical role in the sustainable development process. Sensitivities acquired in the context of this project will enhance the probability that as adults these leaders of tomorrow will function in ways consistent with the goals of sustainable development.

Examples of objectives:

- To sensitize children and young people to environmental problems facing the Caribbean Sea.
- To facilitate in-service teacher training on environmental education
- To prepare and experiment with a practical handbook on environmental/intercultural education for teachers in the Caribbean.

*Sandra Gift, Secretary General, Trinidad-Tobago National Commission for UNESCO*

## DENMARK

□ In 1994/95 are 6 primary and lower secondary schools and 6 upper secondary schools taking part in the Danish part of the BSP.

Most of the schools have good contacts with BSP schools in the other BSP member countries and a lot of activities are taking place.

At national level there has been meetings with the two groups and we have had a very successful two day conference at the Nature house at Stevs.

*National coordinator: Mr. Johannes Bang  
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Ministry of Education  
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## ESTONIA

□ There are 22 BSP schools in Estonia. Among these there are 18 gymnasiums, 2 nature houses and 2 lower secondary schools.

There have had different activities in winter too, but always the spring time is the most active period for environmental studies.

The Karlskrona conference in September 1994 was the most interesting event for the BSP schools. The Estonian delegation consisted of 19 teachers and students from 8 different schools.

In-service trainings for teachers interested in lichen studies was held in three different places in Estonia in September and October. In September there were two seminars – one in Tartu and the other in Pärnu – for teachers participating in Coastwatch, Riverwatch or Lakewatch programmes. In cooperation Estonian Youth Nature House – Karlshamn's Gymnasium there will be organized a teacher training seminar for Estonian schools at the end of April 1995.

The BSP meeting in Karlskrona was a starting point for the cooperation between the scientists from Northern Vidzeme Regional Nature Protection Complex (Latvia) and Estonian pupils from Saaremaa Ühisgümnaasium and Nature House (Tallinn). The common lichen studies between the Latvian and Estonian pupils took place at Saaremaa in October, 7th to 8th, 1994 by the guidance of scientists from Vidzeme – Ms. Sandra Berzins and Mr. Andris Urtans and Ms. Anne Kivinukk from Nature House. The aim of the work was to compare the different methods and to estimate the state of air in the town Kuressaare. Later the pupils from Saaremaa Ühisgümnaasium used the methods in several parts of the island and wrote the final report.

Mr. A. Urtans introduced the principles of riverwatch programme to the students at the end of the day.

Three schools from Estonia: Lilleküla Secondary School, Tartu Secondary School No 16 and Toila Secondary School participate in the pine needle studies together with the schools from Finland and Sweden. The studies are coordinated by Meri Pori Secondary School (Finland).

A students' group from Meri Pori Upper Secondary School visited Estonia by the guidance of Mr. Simo Korpela in February, 15 to 19. The pine

needle and water samples were taken in several parts of Estonia. The Finnish and Estonian pupils worked together 5 days. The final results will come from Finland soon.

The participation in Phenological studies (coordinator Ms. Anne Kivinukk) was the most active in 1994: 10 schools and 56 individual observers participated. We had 7 objects to observe. On the basis of the graphs it could be seen that the spring was the earliest in Tallinn and it's surroundings. The latest spring was in Jyväskylä (Finland). Comparing the data of different years it is interesting to note that in spite of the cold winter 1993/94 the spring came practically at the same time as the year before. The reports in English and in Estonian were published and sent to the participants. 2000 new instructions in Estonian were printed and handed out in winter 1995.

Estonia is participating in Coast Watch Europe (coordinator Ms. Reet Kristian). The most of the BSP schools did the survey - 120 questionnaires were filled in and 60 km of coastline were examined in autumn. There were more schools participating in 1994 than the year before. The main push for that was the teacher training course financed by the WWF Sweden just before the survey. In the last years the risk of erosion on our coasts has grown. Also the amount of litter and drinks containers has increased.

The Lake- and Riverwatch (coordinator Ms. R. Kristian) started in Estonia in 1993. In 1994 there were 34 schools participating in Riverwatch and 18 schools examined lakes. There are not only the BSP schools participating in these projects.

There have been organized different interesting activities by the BSP teachers in many schools and counties in Estonia.

In May, 9 to 11, 1995 there will be the annual spring seminar for the Estonian BSP schools on the island Saaremaa. Teachers and students from the other Baltic Sea countries are invited.

*National coordinator: Ms. Maris Laja  
Hobby Center Telo Nature House  
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Estonia*

*Phone+372-2-493960, 493980, Fax +372-2-237 557*

## FINLAND

□ Common situation in Finnish schools It is a busy time for teachers. All schools are planning and implementing their curricula and upper secondary schools prepare for the non-graded system.

Due to the recession savings in the education sector continue. The teachers strike was avoided in the last minute.

BSP-schools There are no changes in the list of participating schools

Activities Some BSP-schools are attending the international GLOBE-project. A national meeting will be organized in September 1995. The themes of the meeting are BSP-common programmes and new regional networks. The Ministry of Environment supports the meeting.

## Happy 50th Anniversary UNESCO

□ □ The United Nations was founded on 24 October 1945 and UNESCO on 16 November 1945.

The United Nations Educational, Scientific and Cultural Organization (UNESCO) initiated the Baltic Sea Project in 1989 and has always been very supportive.

BSP is an innovation in the UNESCO Associated Schools Project (ASP). It is the first sub-regional project to promote both environmental education on a specific environmental issue, i.e. the Baltic Sea, and intercultural learning. Now many similar projects, sister projects, all over the world are following in its footsteps.

The ASP was started in 1953 to further international understanding and peace through school. In 1975, in the aftermath of the 1972 Stockholm conference, the theme "Man and his Environment" was added to the other themes in the ASP. The focus was on the environment and community. In the guidelines there were four main stages: identification of the problem, investigation in the local community, community action and the international dimension. These ideas were practised at the Karlskrona BSP conference and are basic thoughts in the development of new educational approaches.

This anniversary is something we should celebrate. What are your plans?



**Effects of the BSP** Many schools have got influences from the BSP when planning their curricula.

**Cooperation with HELCOM** There have been several discussions concerning the future cooperation between HELCOM and BSP. The national coordinator has participated in the national HELCOM/PITF-work group.

**Future plans** A three year plan for BSP was drafted in the end of 1994.

## 3-YEAR PLAN FOR 1995-1997

**THE GOAL** • The goal is to develop environmental education and its methods as well promote the protection of the Baltic Sea.

**RESULTS** • Models for action, research knowledge, trained teachers, new curricula. New local, regional and international cooperation.

**ACTIVITIES** • Activities are based on regional networks, where the river projects are essential. National and regional meetings.

**RESEARCH** • Action research done by the participants will be part of the activities. There will be need for coordination and resources for this.

**TEACHER EDUCATION** • Teacher education will be linked with the project. Production of materials and seminars are part of teacher education.

**RESOURCES** • National Board of Education and the Ministry of Environment have supported the project this year.

**MEMBERS** • Old BSP-members will continue. New members will participate from new regional projects.

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## GERMANY

□ In 1995 now 11 schools are involved in the BSP, one school is interested to join the BSP.

The greatest event in 1995 will be a national summer course for German pupils and teachers in Timmendorfer Strand from May, 21 till May, 25. The camp will take place on the Baltic Sea. The 100 participants will stay in a youth hostel because of the uncertain weather conditions on the coast in May. The topic of the course is "Umwelt begreifen - Umwelt schützen" (Understanding environment - protecting environment). The participants can choose between 5 workshops: water quality, orchid biotop, theatre, economic aspects of the ferry traffic and work of mass media (radio and TV). The workshop leaders are teachers or professionals.

For the first time we try to integrate cultural aspects into environmental education to make clear that culture and nature work together for the protection of the Baltic Sea. On the last day there will be a great performance on the coast at sunrise.

In January we had a preparing meeting with all

BSP-teachers in Timmendorf. Every person took over a task for the camp. In Germany this is the only way to organize such a camp because I have to manage the coordination job without any relief beside my full school job. I think that this is a good way to give responsibility to each teacher. Unfortunately we couldn't find any sponsor so that the participants must pay board and lodging for themselves. I hope the camp will be a great event for all participants and a new motivation to go on.

After coming back from Karlskrona I tried to motivate more German schools to take part in an international programme. I hope this will turn out to be successful because more international contacts are important for our schools.

In autumn 1995 (October, 9-13) there will be a European course for BSP-teachers in Wittenberg with the title "The Baltic Sea - a historic, economic and cultural European area" organized by the Bundeszentrale für politische Bildung in Bonn. I hope that some teachers from the other BSP countries will take part. The coordinators will get more detailed information.

I'm sure you have heard about the flooding of the Rhine. After this catastrophe many discussions were held on TV and in the newspapers. Experts suppose the reasons in wrong building in the natural flood areas, sealing of ground with asphalt and the felling of wood. There was another flood catastrophe one year before, but nobody really did anything to protect against another flooding. I hope that now something will happen!

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## LATVIA

□ The seminar for Latvian BSP teachers was held on 20 March in Riga. The fourth questionnaire for BSP schools in Latvia was filled in. It gave more detailed information about every schools individual activities in the BSP.

It is very important to notice that the number of schools participating in the BSP are the same, but the number of students participating in the work from every school have increased every year. More teachers have been involved in project work in many of the schools.

A very successful work with students have been done by Northern Vidzeme Regional Nature Protection Complex. It will continue all the year. The 1st international students camp was held last summer in Jaunburtnieki. This experience was found very successful. The next students camp will take place in Naukseni, Valmiera district 17-20 May 1995. The programme will include: Bioindication with lichens, Small rivers recultivation, Water chemistry analysis, Storks watching etc.

The small camp for some schools for seaside recultivation will be planed in Lani Basic school in

the August, 1995. This work mostly will be lead by specialists from nature protection complex.

At the same time the teacher training was held in Jaunburtnieki. Now it is time to change a teachers training practice. BSP schools in L Latvia is partly participating in all Common programmes. It will be important for teachers to have good teachers training. Being specialized mostly in one subject teachers want to be more educated in the Baltic sea problems.

Latvian Coastwatch schools had their annual students and teachers meeting in Roja in November 1994.

Many teaching materials have been prepared for the international student camp. The next step we plan is to translate "Learners guide" and to add to it methods prepared by our environmentalists.

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## LITHUANIA

□ After the Meeting in Karlskrona, two seminars for Lithuanian BSP teachers were organised in September 1994. For the Coast watch participants a three day workshop was organised in Nida. Participants of the workshop had possibility to listen to lectures about the present ecological situation in Lithuania, to meet with the representatives of nature protection organisations and to practice field studies.

Another workshop for the new BSP teachers was organised in Vilnius. The workshop was as an introduction to THE RIVER and WATER QUALITY programmes. These programmes were tested in some BSP schools last autumn. More students in Lithuania have started phenological observations this year.

It should be emphasised the fruitful cooperation with NGO. Participants of THE RIVER programme collaborates with Lithuanian Green Movement, developing a network for small river monitoring. Preparation of teaching material was supported by ECOLOGIA (USA) and CCB.

Lithuanian Green Movement is preparing bike tour "Save the Baltic Sea" in July from the Vilnius along the biggest rivers NERIS and NEMUNAS and coast of the BALTIC till Liepaja (Latvia). Different cultural and environmental events, meetings and discussions with local authorities and environmental officers are planned. Special programme for BSP schools will be organised including water quality investigations and propagation of the outcomes of Karlskrona Meeting.

BSP was the first EE project in Lithuania. It was a source of ideas for our national projects (SMALL RIVER, CULTURAL IDENTITY AND ENVIRONMENT).

Some BSP schools participate in Lithuanian -

USA project PEACE. American students enjoyed studying nature according to the BSP programmes last year. This year Lithuanian students are spreading information about BSP in America.

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## POLAND

□ Among the nearly 20 schools being members of BSP, more than half of them are very active. Most schools are involved in investigating air quality using lichens, some other schools are interested in studying water quality using chemical and biological methods.

In the first decade of June the conference and workshops for teachers will be held in Szczecin. The meeting will be devoted mostly to development and improvement of teaching methodology concerning the environmental issues and sustainable development.

There are some good example of creating network of schools. In Walbrzych District, in south west Poland, one upper secondary school, member of BSP, cooperate in environmental education with 82 different schools (primary, secondary and vocational), which are not the member of BSP. Local environmental authority financially support these activities.

Some BSP schools intend to join American project GLOBE (Global Learning and Observation to Benefit the Environment). Using Internet will stimulate cooperation between Polish and foreign schools. The experiences obtained from BSP will be very useful in the process of creating of the National Strategy of Environmental Education.

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## RUSSIA

□ Present situation in Russia is very much the same as it was in a lot of European countries in 1970-th.

At the edge of 1980-90th switch deterioration of the quality of the environment condition occurred.

Resources problems became aggravated. As a result, the concern of different serial groups, including politicians and businessmen about the future development of the situation was growing.

Russian Federal Government and member of local authorities noticeably changed their policy in the ecological situation management in the beginning of 1970th. Also the population became much



more informed about the air, water and provisions qualities, the problems of industrial, chemical and nuclear waste products.

Considerable efforts in changing the approaches to the ecological education are undertaken. Since 1995 the obligatory ecological education is implemented in all secondary schools. The ecological subjects are thought in all higher Educational Establishments of St. Petersburg, which are more than 30.

UNESCO Center - St. Petersburg, being the coordinator of the BSP in the North-West of Russia takes active part in the formation of the approaches in environmental education, paying special attention to the environmental problems of the cities.

At the beginning of 1994 5 St. Petersburg's schools were taking part in the BSP. At the present we attracted more than 10 schools of St. Petersburg and Leningrad region as well as the several higher educational establishments to the active work.

And before several schools had non-ecological specialization such as culture, economics, philology.

Based on the main ideas and provisions of the UN Conference on Environment "Agenda 21" in Rio de Janeiro in 1990, the system, when every school is specialized on the investigation of the separate environment problems in a whole, and city ecology in particular elaborated by UNESCO Center - St. Petersburg.

More than 10 St. Petersburg schools held in October 1994 complex investigation of the airspace state based on the indication methods. Coordinator of this section in St. Petersburg is the Municipal Children's Center (Principal Mrs. Zubcova), executive methodologist, Mrs. Kuchinskaya.

Investigations were held on the basis of methods Prof. B. Berggren (Falun) and also original methods of the Center and methods for the city ecology by professor M. Ufimtzeva (St. Petersburg State University).

Much attention we draw to the sociopolitical and cultural problems of the environment. Active work in the frames of this investigation is held by associated schools of UNESCO, such as N 1 (Principal Mrs. T. Vlasova) - medical problems, N 61 (Principal Mrs. M. Lebedeva), N 185 (Principal Mrs. E. Gness).

The leading role in this section belongs to the Lyceum of Traditional Arts (Principal Mr. Heifetz). On the basis of this Lyceum the exhibition dedicated to the preservation of cultural traditions the seminar of the UNESCO associated schools of the North-West of Russia will be held in May 1995.

Prospective work on the investigation of traffic problems of the big cities started in school "Business Wave" (Principal Mrs. I. Korolkova).

The investigations of the problems of city consumer and industrial waste products which in held by school N 273 (Principal Mrs. L. Gladysheva) on the basis of original methods, elaborated in the school by the teacher Mrs. Drozdova is of exceptional interest.

Now the top priority of the UNESCO Center, St. Petersburg is the preparation of the ecological Olympiad "City and the Nature" which will take place in 26 06 - 02 07 1995.

Active part in the methods provision is played by the school N 642 (Principal Mr. O. Drugoveiko) which specializes in information and computer software of ecological investigation and training programs, by Russian Geographical Society and by several city universities.

Olympiad is supported by the authorities of St. Petersburg and Leningrad region.

Now UNESCO Center - St. Petersburg attracting to the participation in the ASP, BSP - the number of schools from North-West of Russia: the cities of Vyborg, Pushkin, Sosnovy Bor, Kaliningrad, Murmansk, etc.

Taking in the consideration the sizable interest to the ecological education in a lot of schools and universities and the support of local authorities, UNESCO Center - St. Petersburg sees substantial prospects of the BSP development in the North-West of Russia.

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## SWEDEN

□ There are 58 schools involved in the Baltic Sea project. A department at a university, an environmental center and a municipality environmental office are also involved. The Swedish schools work with many of the BSP-programmes like Water Quality of the Baltic Sea, Rivers, Air Quality by Bioindicators, Phenological studies and Coastwatch BSP.

To fulfil the objectives in the BSP there is a strive to develop the project in many respects: More subjects in the schools must be involved. A thematic method is advocated to create a holistic view on environmental questions. The knowledge of Problem-based learning is spread. The schools are encouraged to find knowledge not only from books but also directly from reality - the nature and the society. A more active role for the students is implemented.

There are 8 subregional groups in which even many non-BSP schools take part. The groups have approximately one meeting per year. An international summer course will be arranged in Sweden in cooperation with the Swedish Environmental Protection Agency and the University of Uppsala. The name of the course is "The Baltic Sea, Our Common Responsibility - Environment, Culture and History".

The development of sub-networks will continue and the many programmes in the BSP will be implemented.

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## The Baltic Sea Project

# Baltic-eco-survey

### Questions for industries/shops - What are you doing to...

1. Increase the number of environmentally sound products in the shops?
2. Develop refill systems for washing powder, soap, shampoo?
3. Develop closed systems in production in industries, which means no pollution comes out because it is recycled or reused?

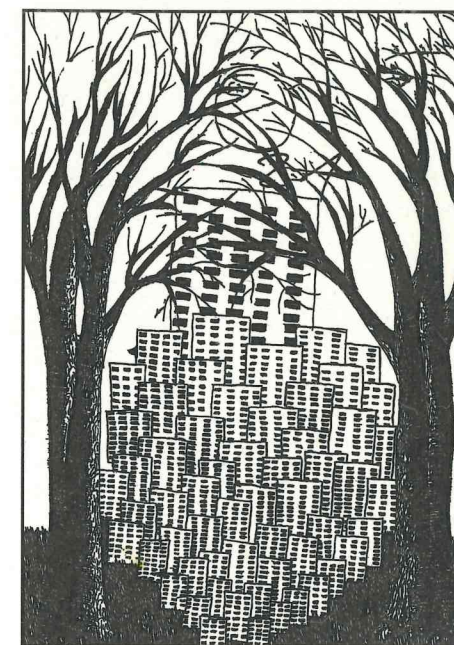
### Questions for local governments - What are you doing to...

4. Support mixed forests (not mono-cultures) that can maintain high biological diversity?
5. Make the military responsible by law for their environmental damage?
6. Encourage the use of bicycles, by building special roads, informing people, allowing bikes on trains, etc.?
7. Decrease transport by developing production of food and goods closer to the consumers?

### Questions for the public sector, schools, industries, local governments - What are you doing to...

8. Increase the use of environmentally sound energy sources?
9. Increase the energy savings of energy to decrease emissions from coal, oil and nuclear power plants?
10. Realise recycling-systems or reuse of paper, glass, compost, metals and plastics, and make people positive about this?

Please add any questions of your own that you find interesting and report the results to The Baltic Sea Project. See also page 14 in this edition.



The drawing is made by Inga Bareckaitė.

## APPEAL

Will you contribute to the Newsletter? We welcome

- short notices about the situation in the Baltic Sea from newspapers in your country
- articles about your work with environmental problems in your school.
- suggestions for solutions to environmental problems in the Baltic Sea
- educational ideas

The next issue will be published in December 1995.

Press stop: October 15.

Please write in English. If it is possible send the article on disc as well. Send pictures too. If there are people in the picture, please name them. Thank you.

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