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Last year’s outbreak of West Nile fever has catalyzed authorities to draw up a multifaceted program for prevention and control.

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Environment 2001: International Exhibition for Environmental Technologies
Some 200 companies participated in Israel’s first exhibition of environmental technologies, which was accompanied by conferences and meetings targeted at scientists, entrepreneurs and the general public alike.

African International Seminar on Bird Migration
Research, conservation, education and flight safety brought representatives of 27 countries to Israel for a special conference on bird migration.

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Ministry of the Environment
Mr. Tzachi Hanegbi, Minister
Mr. Yitzhak Goren, Director General

Dear Reader:

The Spring 2001 issue of Israel Environment Bulletin presents Israel’s environmental policy as outlined by Minister of the Environment Tzachi Hanegbi in a World Environment Day message to the public. Unlike previous statements of policy, this year’s message was accompanied by quantified goals which clearly define what is to be achieved and by when. Efforts will focus on reducing pollutants in order to restore
environmental qualities of water, air and soil while, at the same time, increasing public participation through the promotion of environmental education and leadership.

The current issue of the Bulletin focuses on one of the priority areas of the new environmental program: waste reduction and recovery. It highlights the financial and legislative tools along with information and education efforts which are currently being used to bring about a real increase in waste recovery. The initial results are already evident – whether in the form of curbside collection bins for plastic bottles or innovative technologies for the biological transformation of municipal waste into clean energy and compost. By October of 2001, as the new Bottle Deposit Law comes into effect, residents will be able to take an even more active role in reducing the quantities of waste that find their way to the country's already overburdened landfill sites.

With the approach of summer, special priority is being given to preventing and controlling the West Nile virus. Last year’s outbreak of the virus has led to closer cooperation among government ministries. As part of an overall program, emphasis is being placed on prevention through elimination of sites where mosquitoes breed, treatment of areas of standing water with larvicides, increased surveillance of mosquitoes, birds, mammals and humans for infection, and public education.

Finally, the Bulletin covers an essential element in any environmental program: public awareness. This year’s international exhibition of environmental technologies, accompanied by a variety of conferences and events, has definitely made an impact. One of the most exciting events was a Student Forum focusing on the development of environmental products and services as part of an all-out effort to foster environmental stewardship among young people. Without doubt, the commitment of the younger generation to an environmental vision is the country’s best guarantee of progress toward environmental sustainability.

Shoshana Gabbay
Editor
TOWARD WASTE RECOVERY

New initiatives and technologies may well herald a recycling revolution

The average Israeli generates 2.2 kilograms of municipal solid waste per year. Last year, some 4.5 million tons of solid waste (domestic, commercial and industrial) were produced in Israel, 12 million cubic meters in volume. The total quantity of solid waste in the country (including agricultural waste, sludge, contaminated land, building debris) has reached about 7 million tons per year. These numbers, however, are not static. Household waste has been increasing in the order of 4-5% annually. The reasons: population growth of nearly 2.5% annually (higher than any other developed country in the world), rising standards of living and unsustainable consumption patterns.

The situation is exacerbated by the scarcity of land resources. The capacity of current landfills, which are approved within the framework of the National Masterplan for Solid Waste Disposal, will be exhausted by 2003. The addition of two large sites, currently in planning, will allow for regulated landfill volume until 2008.

To address the problem, the Ministry of the Environment has formulated a policy founded on integrated waste management. It calls for reduction of waste at source, reuse, recycling (including composting), waste-to-energy technologies, and landfilling. The goal: to reduce the total quantity of waste that the country generates, in general, and the quantity reaching landfills, in particular. The target: to reach a 35%-40% recovery rate in 2005 and a 50% rate by 2010.

A Glimpse Back

In 1993, some 96% of Israel's municipal waste found its way to about 500 unregulated garbage dumps. Most were poorly managed and many had reached or were soon to reach capacity. The dumps were associated with a motley of environmental problems: risk of groundwater and soil contamination, stench, air pollution (including generation of greenhouse gases), aesthetic blight, threats to flight safety, consumption of expensive tracts of land. Recognition of the severity of the problems led to a government decision mandating closure of the country’s unregulated dumps, their replacement by state-of-the-art regional and central landfills, financial aid to local authorities for transporting their wastes to a regulated landfill for a defined time period, and advancement of recycling and energy recovery.

In light of the 1993 decision, the Ministry of the Environment, in conjunction with the Ministry of the Interior, took action. It shut down or improved about half of the 500 illegal dumps, closed 74 out of the 77 large sites which received domestic waste on a daily basis (the other three – in Retamim, Modi’in and Rishon LeZion – are slated for closure within a year), and rehabilitated ten sites following closure according to strict environmental standards. Perhaps more than any action, the closure of the infamous 84-meter-high Hiriya landfill, adjacent to Ben-Gurion International Airport, marked the beginning of a new era – an era marked by integrated waste management.

Recent years have seen the establishment of state-of-the-art central landfills in Duda’am (northwest of Beersheba), Hagal (in northern Israel southwest of Lake
Kinneret) and Nimra (in the southernmost region near Eilat) – which receive some 4,500 tons of household waste per day. Other sites have been upgraded to comply with the requirements of the Ministry of the Environment, or are in the process of upgrading. An environmental impact assessment is being prepared for a new landfill – Ef’e in Mishor Rotem in the southern part of the country – with a potential capacity of 25 million tons. Financial support has been awarded to 107 local authorities – servicing about half of the population – for transporting waste to regulated sites following closure of dumps.

On the up side, most of the country's waste is currently concentrated in 15 state-of-the-art landfills. More than 80% of the waste is disposed or treated in an environmentally sound manner – in comparison to a mere 10% just a decade ago.

On the down side, progress in implementing the government decision has been slow due, for the most part, to citizen opposition and protracted legal battles based on the NIMBY (Not in My Back Yard) syndrome. As a result, the country is experiencing a deficit in approved and available landfill volume of over 3,500 tons per day – over a million tons per year. Demand for landfill space far exceeds availability.

To compound the problem, environmentalists are aware of the fact that landfilling, no matter how environmentally safe, is not a long-term answer. Landfills “consume” large expanses of valuable land and are associated with both direct and indirect environmental and economic costs. Therefore, the Ministry of the Environment has changed direction. Today, it is actively promoting alternatives to landfilling – source reduction, reuse, recycling, anaerobic fermentation, composting, curbside recycling programs, waste-to-energy plants. Every means will be utilized – financial support, legislation, education – to accelerate the move toward this new and more sustainable path.

Illegal Dumps in Use in Israel

![Graph showing illegal dumps in Israel from 1993 to 2000.](image-url)
Financial Tools

The cost of landfilling in Israel is low; it does not reflect the externalities associated with this disposal practice (air, groundwater and soil contamination, to name but a few), especially in a country characterized by scant land resources. Realistic pricing mechanisms are an imperative in order to promote alternative solutions to the country’s solid waste problem.

As a first step, a decision was made to change the price structure of landfilling by means of a landfill fee. Last year, the Knesset approved this new fee within the framework of the Economic Arrangements Law (Legislative Amendments to Achieve Budgetary Objectives and Economic Policy for the 2000 Budget Year). The law called for the imposition of a landfill fee on the holder or manager of a waste disposal site. The rationale: to internalize the external costs of landfilling and to encourage alternative treatment methods. In accordance with this amendment, the Ministry of the Environment is preparing regulations for promulgation.

In parallel, the Ministry of the Environment has been providing financial aid to some 60 local authorities for recycling projects based on paper and cardboard collection, domestic composting, and plastic bottle collection. In 2000, voluntary collection of plastic beverage containers was initiated by a private recycling company (Aviv Recycling Industries) with financial aid from the Ministry of the Environment. Over 4,000 collection bins are already distributed in nearly 90 local authorities and the number may well double by next year. The initiative is not only decreasing the quantity of trash transported to landfills, but is raising environmental awareness and helping to produce new products – from garden furniture and park benches to PET flakes for the production of fruit and vegetable baskets.

Since a large portion of the country’s waste (nearly 40% in weight) is made up of organic material, composting has been encouraged as a viable means of stabilizing and transforming solid organic wastes into safe and beneficial inputs in agriculture, horticulture and forestry. The Ministry of the Environment subsidizes half of the cost of backyard composting devices for gardening purposes. Dozens of community projects, many promoted by non-governmental organizations, have been initiated in this area.

Most of the country’s agricultural organic waste is treated and used, whether as raw material through direct application, through composting or through pelletization as soil amendment fertilizer. The compost is used for agricultural and gardening purposes including fertilization, improvement of soil structure, canopy to prevent evaporation and runoff, and material for detached substrates. In addition, tens of thousands of tons of compost are recovered from the organic component of the waste transferred to two major recycling plants, servicing dozens of local authorities, in the north of Israel: the Afula plant of Amnir Industries and Environmental Services Ltd. and Western Galilee and Haifa Bay Compost Company Ltd.

The pace of financial support for recycling programs and for the establishment of recycling infrastructures has grown dramatically. The current rate of assistance stands
at NIS 25 for five years for each ton of waste which is not transferred to a landfill and is treated in an environmentally safe manner. Additional financial aid, at a rate of NIS 5 for five years for each ton which is recycled or recovered, is granted for establishing new recycling and recovery facilities.

Thus far, projects were approved which will see the recovery of some 300,000 tons of waste at a scope of NIS 37 million (for five years) in the Drom Yehuda Association of Towns, Kfar Saba and Hadera. Two of the facilities, in Hadera and Kfar Saba, will use an innovative technology developed in Israel by Arrow Ecology Ltd. The anaerobic digestion system does not require presorting, recovers recyclable materials such as metals, plastics and glass, and biologically transforms the organic fraction of the waste into biogas and stabilized compost.

With financial support for recycling projects and infrastructures, coupled by education and consciousness raising, it is hoped that recovery levels will reach some 17% by the end of 2001, more than 35% by 2005 and 50% by 2010.

**Legislative Tools**

In order to mandate an increase in the quantity of waste for recycling and reuse and a decrease in the quantity of waste for landfilling, the following legislation was enacted:

- The Collection and Disposal of Waste for Recycling Law was enacted in 1993 and regulations were promulgated in 1998 which set recycling targets according to the following timetable: 10% by 1998, 15% by 2000 and 25% by 2007.
- The Deposit Law on Beverage Containers was enacted in 1999, amended in 2000 and regulations were promulgated in 2001 which will set up a refund, bottle collection and recycling system. The law will come into effect in October 2001. The system should encompass over 910 million beverage containers, allowing for the reduction of about 8% of the volume and 4% of the weight of the country’s solid waste.
- A packaging recycling bill is being completed designed to substantially reduce quantities of packaging waste.

**Information and Education**

Legislation and financial support will be accompanied by education and information to both local authorities and the general public. The Ministry of the Environment has begun to organize symposiums for mayors and senior officials of local authorities to demonstrate to them the economic benefits of recycling, to remind them of their obligations under the law, and to inform them of the financial aid which is now being provided for the promotion of recovery technologies.

At the same time, the ministry intends to educate and inform the general public about the importance of sustainable consumption patterns. New efforts will also be invested in promoting the eco-labeling system, known as the “Green Label.” To date, some 70 ecolabels have been granted to different products which encourage use of environmentally friendly products.

**The Results**
Recycling rates have grown from 3% of municipal solid waste in the beginning of the 1990s to nearly 14% by the end of 2000 (21% with the addition of post-consumer industrial waste). Rates vary widely in different parts of the country – with the bulk of activity in the north of the country where two recycling plants are in operation (Ammir’s Afula plant and Western Galilee Compost in Haifa Bay with a 30% and 40% recycling rate, respectively). Recently, a new plant was inaugurated in Kalanswa in the center of the country. Similarly, to the existing plants in the north of the country, this plant will collect unsorted municipal waste for the purpose of separating dry components for recycling and transforming the organic fraction for composting. It is capable of handling some 500 tons of municipal solid waste per day.

The rise in recycling in recent years is attributed to the closure of old dumps, establishment of new sorting and recycling plants, advancement of recycling technologies for different raw materials, financial aid to local authorities, local and commercial initiatives and increased public awareness.

**Estimates of Recycling: Israel 2000**

<table>
<thead>
<tr>
<th>Type</th>
<th>Total Recycled Municipal Solid Waste (tons/year)</th>
<th>Percent of Recycling out of MSW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and Cardboard</td>
<td>180,000</td>
<td>4</td>
</tr>
<tr>
<td>Organic Material</td>
<td>70,000</td>
<td>1.6</td>
</tr>
<tr>
<td>Plastic</td>
<td>10,000</td>
<td>0.2</td>
</tr>
<tr>
<td>Glass</td>
<td>7,000</td>
<td>0.15</td>
</tr>
<tr>
<td>Ferrous Metal</td>
<td>250,000</td>
<td>5.5</td>
</tr>
<tr>
<td>Non-Ferrous Metal</td>
<td>40,000</td>
<td>0.8</td>
</tr>
<tr>
<td>Yard Waste</td>
<td>70,000</td>
<td>1.5</td>
</tr>
<tr>
<td>Electronic Equipment</td>
<td>3,000</td>
<td>0.05</td>
</tr>
<tr>
<td>Total</td>
<td>630,000</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Out of a total of 4.5 million tons/year

**A Glimpse at the Future**

Based on current trends, the quantity of municipal solid waste will reach 12 million tons in 2020, while the total quantity of waste will reach 18 million tons per year. At the same time, the organic fraction of the waste will diminish while the proportion of paper, cardboard and plastic will grow. Landfill capacity will be exhausted. Alternative waste treatment will be imperative.

Thus far, the political will to implement the country’s recycling goals has been weak. Few localities have implemented the requisite recycling programs for meeting the goals set in the recycling regulations. With the dawn of the new century, however, it has become increasingly clear that both carrot and stick will be necessary to move the country toward a sustainable path. Education and heightened awareness, financial assistance and realistic landfill prices, and not least of all, intensified enforcement of the regulations will be used to meet, and even to exceed, recycling targets.

The goal may well be within reach. In a recent development, the Ministerial Committee on the Environment decided to establish a waste incinerator in Haifa.
which will produce energy and further reduce the quantity of waste designated for landfills. The plant should become operational within five to ten years, pending the results of environmental impact assessments and other reviews. It is slated to receive up to 1,500 tons of solid waste per day or 450,000 tons per year.

In parallel, plans are proceeding for the establishment of additional sorting and recycling facilities. Thus, for example, a tender will shortly be issued for information on alternative waste treatment technologies for the solid waste of the Dan metropolitan area (including the city of Tel Aviv and surrounding municipalities).

But most important of all, Minister of the Environment Tzachi Hanegbi has placed waste recycling at the top of his agenda and is spearheading a campaign for obligatory recycling in all government agencies as part of a Greening Government initiative.

**The Recycling Revolution may have arrived in Israel at last!**

### Building Debris

The quantity of dry industrial waste and building debris in Israel has risen dramatically. To deal with the problem, designated sites for treating and disposing dry waste have been inaugurated, planning and building regulations have been amended which make permits conditional on environmentally sound disposal of the building debris, and enforcement has been stepped up. As a result, the quantity of building debris and dry industrial waste which reaches designated sites has increased from 300,000 tons/year to 1.5 million tons per year. Efforts are also focusing on the reuse and recycling of building debris by local authorities and contractors.

### What Can You Do?

- Collect plastic beverage containers and discard them in designated recycling bins dispersed on streets in over 35 local authorities throughout the country.
- Dispose of cardboard waste in cardboard collection bins situated in commercial centers.
- Collect white paper waste in offices and public buildings.
- Produce domestic compost to generate fertilizer by purchasing backyard composting devices which are subsidized by the Ministry of the Environment.
- Minimize packaging waste by reusing existing products or packaging, limiting the use of plastic bags in food chains, opting for the purchase of refillable food and cleaning material containers.
- Collect reused batteries for disposal in designated battery collection boxes in such areas as film shops, banks, and schools.
- Collect newspapers and dispose them in designated newspaper collection bins in local authorities.

### Success Stories

**Kiryat Tivon Local Council**
Population: 12,700
Municipal solid waste: 40 tons/day
Recycling method: Voluntary separation at source into a wet and dry stream
Initiation of project: 1989
Citizen Response: Enthusiastic
Results: nearly 40% recycling rate and savings of NIS 400,000 per year.

Misgav Regional Council

Population: 14,500
Composition: 30 towns and villages including 6 kibbutzim and 2 Beduin villages, spanning an area of 200 square kilometers.
Municipal solid waste: 420 tons/month (300 domestic waste and 120 tons industrial waste)
Recycling method: Recycling and composting centers
Citizen Response: Unsatisfactory initially but more active following a widescale education and information effort.
Results: 24% recycling rate and saving of NIS 150,000/year as a result of backyard composting devices which reduced the quantity of solid waste for collection and disposal by 500 tons/year.
ORGANIZING TO COMBAT WEST NILE VIRUS

Israel unveils a comprehensive West Nile virus prevention and control plan

Last summer, 417 cases of West Nile virus were recorded in Israel and 29 patients died from the infection. This was not the first outbreak of West Nile virus in Israel. Sporadic outbreaks occurred in the 1950s, with the largest in 1957 when 419 hospitalizations were recorded including four fatalities.

It may well be that the virus will break out again this summer, but this year, largely due to the tenacity of Minister of the Environment Tzachi Hanegbi, relevant authorities have pulled together to draft and to implement a national response plan. Over and beyond the usual allocation of funds for mosquito control, an additional $4 million package, approved by the Treasury, will be dedicated toward a multifaceted program of prevention and control, which will be carried out by the Ministries of the Environment, Health and Agriculture along with local authorities. Components of the program include an early detection system based on virus surveillance in mosquitoes, birds and other animals, prevention of mosquito breeding, monitoring, inspection and enforcement, public outreach and education, and surveys and research. The goal: to minimize the transmission of the virus while, at the same time, minimizing damage to the environment.

What is West Nile Virus?

West Nile virus was first identified in a woman from the West Nile District of Uganda in 1937. Today, the virus is widespread in Africa, West Asia, Europe and the Middle East. It was first discovered in the United States in 1999.

The West Nile virus is spread to humans by the bite of mosquitoes, and possibly other anthropods, which become infected with the virus by feeding on infected birds. Most people infected with West Nile virus have no symptoms at all or experience mild, flu-like symptoms such as fever, headache and body aches and, at times, mild rash or swollen lymph glands. In some individuals, especially the elderly, West Nile virus can cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). However, since very few mosquitoes – less than 1% - are infected, the chances of severe infection from a mosquito bite are extremely small. Illness, if it occurs at all, usually begins within 3 to 15 days of being bitten by an infected mosquito. Among those with severe symptoms, fatality rates range between 3% to 15%. In Israel, half of the cases identified last year were among adults above the age of 45, and all of the deaths were restricted to this age group.

Prevention and Control: 2000

Although an outbreak of West Nile fever occurred in Israel in the 1950s, major outbreaks have not recurred in subsequent years – until recently, that is.

The Ministry of the Environment was first informed about geese mortality from West Nile virus in the early months of 1999. Concern that these deaths would turn out to be sentinel events preceding human infection led to preliminary analysis and investigation in cooperation with the entomology and virology laboratories of the
Ministry of Health. As part of the effort, adult mosquitoes were trapped to identify primary vectors of the virus in Israel and preventive action aimed at reducing the mosquito population was initiated. Studies implicated *Culex pipiens* and *Culex perixiguus* as the main vectors in the country.

Preventive activities were intensified when the first cases of human disease, including two deaths, were discovered in 1999. In light of this new evidence of infection, the Ministry of the Environment catalyzed the formation of an interministerial expert committee, with representatives from the Ministry of Agriculture (Veterinary Services), Ministry of Health (Entomology Laboratory and Epidemiological Department), and Ministry of the Environment (Pest Surveillance and Control Division). The mandate of the committee was to prepare a plan for reducing the number of mosquitoes that may be vectors of the disease. By the spring of 2000, the recommendations were distributed to all local authorities in Israel. A letter warned each local authority of the possible outbreak of West Nile virus and of the necessary actions to minimize this risk. On its part, the Ministry of the Environment intensified its supervision of local authorities to ascertain adequate treatment of mosquito habitats. Ministerial inspectors visited water sources, evaluated the potential for mosquito breeding and sampled mosquitoes. Based on the findings, owners or tenants of lands in which the potential for mosquito breeding was discovered were alerted to undertake the necessary measures under the Public Health Ordinance to prevent mosquito breeding or to remove the nuisance.

Despite these actions, cases of West Nile virus were reported in the summer of 2000, both in humans and in farm geese. This spurred additional surveillance and control by both the Ministry of the Environment and by local authorities. By September 2000, it became clear that a major outbreak of the disease was underway in Israel. An additional letter was circulated among local authorities and special notices were sent to those local authorities in which the disease was discovered. In parallel, symposiums were held for pest control operators and sanitation workers in local authorities, and the inspection system was intensified, especially in the center of the country, where the greatest number of human cases was discovered. Site visits to mosquito habitats were significantly increased and, in areas where mosquitoes were discovered, orders for habitat modification and insecticidal intervention were issued. Detailed mapping of all major mosquito habitats was carried out by means of a Geographic Information System, with the aid of the Global Positioning System.

In parallel, light traps were used to collect adult mosquitoes and bring them to the Entomology Laboratory of the Ministry of Health where they were classified into species. Tests for the presence of the virus were conducted in the Virology Laboratory of the Ministry of Health. Mosquitoes were also checked to determine their resistance to pesticide products in the market. In light of evidence that some mosquito species were resistant to certain pesticides, the Ministry of the Environment drew up a list of pesticides, which are both safe and effective for use, as well as a list of pesticides which are to be avoided. These lists were distributed among all local authorities. In all cases, recommendations called for habitat elimination or control, biological control using gambusia fish and environment-friendly pesticides such as Bti (*Bacillus thuringiensis israelensis*) in fresh water and mono-layer oil and insect growth regulators in polluted water. Fogging was considered a complementary measure.
against other mosquitoes in areas of dense vegetation which provide resting spots for adult mosquitoes.

Since fogging is only partially effective and presents a risk to humans and to animals, this method was only approved for use in residential areas when there was real evidence of the presence of the virus in a particular area. Despite persistent demands by both citizens and municipalities for fogging, each individual request was carefully reviewed and permits were only issued following professional review in order to minimize adverse impacts on human health.

Finally, in order to provide essential information to both local authorities, professionals and the general public, an Internet site dedicated to mosquitoes and to the West Nile virus was created in the Ministry of the Environment. It provides up-to-date information along with frequently asked questions. An additional site was also set up by the Israel Center for Disease Control which includes important information on the subject.

Preparing for the Summer of 2001

Since there is no vaccine for human use and since destruction of wild and domestic birds, considered to be the primary reservoir hosts for the virus, is not feasible, activities are largely preventive in nature. Efforts are largely focusing on reducing mosquito breeding through environmental management techniques.

In order to better prepare for the possible re-emergence of the West Nile virus in 2001, a steering committee made up of senior representatives of the Ministries of Agriculture, Health and the Environment was set up. Each authority will continue to operate in its own sphere while working in tandem to stem the risk of West Nile virus to the greatest extent possible. The Ministry of the Environment stands at the forefront of the effort to take the most effective action possible while reducing environmental damages to a minimum. Dr. Uri Shalom, Director of the Pest Surveillance and Control Division, is fully convinced that concentrating responsibility for mosquito control in the Ministry of the Environment carries a double benefit – increased efficiency in eliminating the vectors of the disease and decreased environmental risk.

To confront the risk of West Nile virus, a comprehensive surveillance and control plan was drawn up in recent months. It focuses on preventing the breeding of mosquitoes – monitoring mosquito populations to provide data on all breeding sites in Israel, controlling mosquito habitats, reducing larval breeding sites, enhancing virus surveillance in mosquitoes, birds, mammals and humans, and promoting research and public education. Since Israel is a semi-arid country, mosquito habitats are known and easily identifiable. All are targeted for source reduction and larviciding to minimize the adult mosquito population.

Prevention and Control Plan 2001

The West Nile virus prevention and control plan for 2001 includes several components. Following are some of its most important elements:
1. **Early detection and alert system** based on active sampling and laboratory analysis. The system will focus on identifying and documenting West Nile virus infections in birds, mosquitoes and other animals. The purpose: to identify West Nile virus in mosquitoes, birds and mammals as sentinel animals that could predict occurrence of human disease and thus provide early detection and alert.

2. **Prevention of breeding and development of mosquito sites** by a variety of measures including: identification and mapping of all potential breeding sites, draining of standing water bodies, controlling water flow in streams and removing standing vegetation from polluted rivers, applying larvicides where draining or elimination of water bodies is impossible, calling upon citizens to reduce breeding sites around homes and property and to report on mosquito nuisances, and increasing mosquito control where evidence of West Nile virus exists. The purpose: to reduce mosquito populations by preventing their breeding.

3. **Guidance, monitoring, inspection and enforcement**, targeted at both local authorities and owners or holders of land, in order to prevent the development of mosquito nuisances. The aim: to reduce mosquito populations by preventing their breeding.

4. **National and regional interministerial task teams** have been set up to respond to outbreaks of the disease. On a regional level, the teams will collect data and investigate cases of infection in their district and respond to them. On a national level, the teams will analyze the data, compile records of events in particular geographic areas, prepare intervention plans and reach conclusions based on the results of the intervention program. The aim: to review cases of West Nile virus and to formulate and implement improved action plans in case of need.

5. **Public education on a national level** by means of wide scale publicity encompassing all forms of the media as well as information sheets, brochures and posters. The aim: to raise public awareness of the risk of mosquito-born diseases and to provide guidance on prevention, protection and reporting procedures.

6. **Research and assessment** in order to investigate the transmission cycle of the virus, including epidemiological and serological surveys. The aim: to better understand the modes of disease transmission in Israel, to identify the reservoirs of the virus in summer and winter, to develop improved vaccines for animals, and to assess the efficacy of action plans and recommend improvements.

Data collected by each relevant body will be compiled and integrated in a geographic computerized system with comprehensive information on mosquito, bird, animal and human infection to allow for more effective action. On its part, the Ministry of the Environment has tripled the number of its inspectors, organized study days for local authority personnel and pest control operators, and prepared listings of mosquito habitats in different geographic areas. Habitats have been classified into higher and lower risk categories for the purpose of determining the frequency of inspection and surveillance. In addition, finable offense procedures (in lieu of trial) have been set which provide for the imposition of immediate fines on owners or holders of land, public or private, that do not take the required steps to prevent or eliminate mosquito...
breeding. Fines were set at NIS 1500 for an individual and NIS 3000 for a corporation, and will be doubled for each subsequent offense.

**An Emergency Effort to Stop the Virus**

Dr. Uri Shalom, Director of the Pest Surveillance and Control Division, has witnessed a full turnaround in the relation of authorities to the mosquito problem. He notes that “once mosquitoes were related to as mere nuisances, but today they are recognized as potential sources for disease transmission. Since today’s virus may well be more violent that its predecessors, the Ministry of the Environment, in cooperation with other ministries and with local authorities, has significantly upgraded its mosquito control and treatment system.”

Last year, in light of the outbreak of West Nile virus, additional financial aid was granted to local authorities for preventing the breeding of mosquitoes and for mosquito control. This year, aid will be increased tenfold, reaching millions of shekels, for preventive activities and for an intensive public education campaign.

The most effective way to prevent transmission of West Nile virus to humans and animals, or to control an epidemic once transmission has begun, is to reduce human exposure via mosquito control. Israel is intent on introducing and implementing multifaceted programs that emphasize prevention. Increased and improved pest control, surveillance, guidelines, education, research and communication – all will be part and parcel of this year’s action plan. However, if the current effort is to succeed, both local authorities and the general public must play their part.

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**Dr. Yossi Inbar**  
*Deputy Director-General for Infrastructure*

Relevant government ministries and local authorities are more prepared than ever to deal with the threat of West Nile virus. However, the impact of our activities on the reduction of disease is still an unknown. Even if we take all of the “right” steps, problems such as sewage discharge to rivers or standing water may threaten our health and our environment.

I am gratified to see substantial funds go for preventive activities – increased monitoring by local authorities in order to discover mosquito larvae, mosquito trapping for the purpose of isolating and identifying the virus, surveillance of birds, which are known to be carriers of the disease, and monitoring of farm animals with the aid of the Veterinary Services and the Nature and National Parks Protection Authority. These activities will provide an early detection system, an indication of where to begin.

In addition, funds will go toward a major public awareness campaign geared toward educating each individual on what he/she can do. We realized the importance of such a campaign when a survey revealed that many members of the public are unaware of the connection between mosquitoes and West Nile virus. It is essential to emphasize the importance of eliminating standing water in our own private domain – backyard,
Each and every one of us must take preventive action by eliminating these potential mosquito breeding sites – no matter how small – from home and property. At the same time, the public will be urged to prevent or reduce the risk of exposure and to notify local authorities of mosquito nuisances and breeding sites.

Although I do not yet know what the result of this year’s effort will be, I consider it to be a major achievement that we did not spray the entire country in response to last year’s outbreak. We believe that the risk of aerial spraying may well exceed its benefit since it can only be partially effective against adult mosquitoes. Rather than opting for massive spraying with materials that may adversely affect human health, we have chosen the path of prevention. This may be more difficult and more time consuming, but it is based on prevention at source rather than treatment of the result.

The Ministry of the Environment has increased its mosquito control capabilities immeasurably over the past months. Our Pest Surveillance and Control Division has emerged as a foremost division in the overall effort to reduce mosquito populations, playing a vital part in safeguarding both human health and the environment.

### Distribution of Responsibility

**Responsibility for preventing West Nile Fever is divided among different bodies:**

**Ministry of the Environment** (Pest Surveillance and Control Division): Responsibility for surveillance and control of mosquitoes that present environmental health risks or are a direct nuisance to humans through guidance, inspection and enforcement of local authorities. Responsibility for licensing and supervision of pesticides used in the public health sector and licensing, guidance and training of pest control operators.

**Ministry of Health**: Treatment of human infection, prevention of contagion, provision of medical information and identification of morbidity in humans.

**Ministry of Agriculture** (Veterinary Services): Identification and treatment of animal infection.

**Local Authorities**: Responsibility for mosquito control, including treatment of mosquito habitats, in their jurisdiction.

### What You Can Do to Help Fight Mosquitoes?

- Repair water leaks in yard, garden, sewage system, etc.
- Prevent leaks in faucets, cooling systems and air conditioners
- Empty standing water from buckets, barrels, old tires and other containers
- Drain puddles
- Drain water from roofs and shelters
- Stock water ponds with fish species that feed on larvae.
- Keep swimming pools treated and maintained
- Prevent collection of water as a result of over irrigation of gardens
- Call your local authority to report mosquito nuisances and breeding sites.
How You Can Protect Yourself from Mosquito Bites?

- Install tight-fitting screens on windows and doors
- Operate fans to keep away mosquitoes and use mosquito repellent products indoors and outdoors
- Wear long protective clothing from dusk to dawn when mosquitoes are most active
- Use mosquito repellents on exposed skin and follow label directions and precautions carefully
- Reduce time spent outside during evenings in mosquito-ridden areas

Did You Know?

- West Nile virus belongs to the Flaviviridae family (genus Flavivirus)
- Viruses are maintained in nature by a mosquito vector and bird reservoir host.
- The virus is located in the mosquito’s salivary glands. During blood feeding, the virus may be injected into the animal or human, where it may multiply, possibly causing illness.
- If the mosquito is infected, less than 1% of the people who get bitten and become infected will get severely ill.
- West Nile virus is not transmitted from person-to-person
- There is no vaccine for humans against West Nile virus, but several companies are working towards developing a vaccine.
- By law, local authorities and regional councils are required to prevent mosquito breeding and to treat existing nuisances in public areas.
STUDENT FORUM

“Youth comprise nearly 30 percent of the world’s population. The involvement of today’s youth in environment and development decision-making and in the implementation of programs is critical to the long-term success of Agenda 21.”

(From Agenda 21, Earth Summit '92)

Environmental awareness is a prerequisite for environmental improvement and sustainable development. This assumption is self-evident. It stood at the base of Agenda 21; it stands at the base of environmental policy in Israel. Yet the question remains: how to raise environmental consciousness among young people in a manner that combines fun and creativity with education and information?

This very question was raised – and answered – by a handful of dedicated educators and environmentalists in Israel a few years ago. Dr. Richard Lastier, an environmental lawyer, first conceived of an idea that will engage students in designing creative solutions to environmental problems. The idea became reality with the aid of Dr. Ronit Bodner, an educator specializing in the empowerment of young people. Thus the Student Forum was born.

Three years ago, under the sponsorship of the Israel Society for Ecology and Environmental Quality Sciences and the Ministries of Education and the Environment, some 30 middle and high schools throughout the country, participated in a competition to design a model environmental city for the 21st century. The most innovative solutions were chosen and exhibited at the Seventh International Conference of the Ecological Society held in Jerusalem. More than 700 students, Jewish and Arab alike, participated in a student forum at the conference, where their projects were exhibited. They presented their ideas to each other and to the experts attending the conference. Projects and exhibitions focused on such ideas as sustainable urban transport, green building, waste recovery and recycling.

Environmental Stewardship in the Making

The enthusiastic response attested to the success of the concept. The feedback from educators was encouraging as evidenced by the following evaluation of the advantages of the program:

- *It enables teachers to fully engage students* in environmental issues by giving them the opportunity to work on solutions to environmental problems in ways that provide value to the real world beyond the classroom.
- *It allows students to be recognized for their achievements* and to showcase their innovative solutions to professionals who work on these problems.
- *It enables students to interact with environmental professionals* and to learn that almost any profession allows one to become a steward for the environment.

According to Dr. Bodner, “the program is designed to foster environmental stewardship. It builds on research showing that when people are invited to publicly stand for an idea, their commitment grows considerably. In this program students are given an opportunity to develop their own ideas and present them to the professional...
community. In so doing they realize they can actually make a difference and are motivated to do their best”.

Based on the success of the project, it is no wonder that a long-term program was drawn up with ideas for annual competitions in such areas as environmental journalism, education, law, engineering and advocacy. “I chose the program to focus on a different professional discipline in different years for several reasons. It anchors the message that in each profession there is a way to steward the environment, and it offers different teachers an opportunity to contribute their expertise in different years, thus continually building school capacity to deliver quality environmental education,” explains Dr. Bodner.

Gila Madori of the Ministry of Education, who supervises environmental education, says, “This program offers school curricula a tremendous added value. The program is thoughtfully designed to encourage systemic thinking. It also requires schools to reach out into the community to involve parents and other experts, and this has positive educational ramifications.”

**Environmental Entrepreneurship 2001**

This year’s theme was especially challenging: environmental entrepreneurship. Its underlying idea was that social responsibility requires us to raise a generation of entrepreneurs whose mission includes stewardship for the environment. Specifically, students were asked to develop an environmental business with a dual bottom line: saving the environment and making money. The resulting projects included new products and services as well as innovative production processes to help the environment by saving resources and/or reducing pollution. Each project was accompanied by both business plan elements and a visual exhibit. The presentations demonstrated the positive environmental impacts and the economic viability of the idea.

The road from concept to reality was not easy. During the course of the year, Dr. Bodner and newly recruited co-manager Edit Alhasid trained teachers to show students “how to develop the concept, how to do the research, how to do the business thinking and how to do the presentation.” They also trained outside coaches to visit classrooms three times during the year and work with the students.

The effort was well worth it. More than 1000 students – religious, secular, Arab, Druze and Beduin – participated in this year’s competition. The most innovative solutions, by 18 of the 30 participating schools, were exhibited at the International Conference on Environmental Technologies which was held in Tel Aviv.

**Environmental Products Galore**

A stroll through Pavilion 28 of Tel Aviv’s Exhibition Gardens in early May proved a rewarding experience. Hundreds of youngsters and professionals filled the rectangular hall. The excitement was infectious as students enthusiastically described their presentations to interested viewers – participants in Israel’s first International Exhibition for Environmental Technologies, leading industrialists and senior officials of the Ministry of the Environment.
Indeed, when Agabria Saime of Umm-El-Fahm presented the experimental results of her water-based mint extract that suppresses fungus and weed growth and repels mosquitoes to boot, the CEO of a major medical firm was impressed enough to encourage her to conduct a more extensive pilot test. “If she can replicate her results on a wider scale, then Israel’s pesticide producing companies are going to be excited about this,” he said. The project tied for first place along with two other school projects.

The second award-winning project appealed to the palate as well as to the environment. Eighth graders at Petach Tikvah’s Feinberg School created an innovative product: a “no garbage popsicle” featuring edible sticks made from brown sugar or honey, plus a plastic-looking wrap made from cornstarch that melts in the mouth. As part of the project, the students surveyed 150 children, teens, and adults and documented their willingness to pay more for a popsicle that is environment-friendly. Shortly after the conference, the marketing director of Strauss corporation, Israel’s largest ice cream maker, heard of the students’ product and made plans to visit the school.

The third group of winners, tenth graders from Haifa, created an eco-Barbie doll who lives in an ecological house and tells children, via recorded messages, how to be “cool” and to care for the environment.

Culinary delights captured the imagination of several of the schools. A tenth grader from the Ironic Gimel School in Haifa explained: “I was eating a snack and thinking about how to relay the environmental messages to young children. Suddenly I thought of fortune cookies.” This student, along with her classmates, set out to create the classic Chinese cookies – using organic ingredients – that deliver environmental messages, such as to avoid products that damage the ozone layer. “Food is part of day to day life,” she said, “and that helps make the connection that there are actions we should be doing every day.”

At Ulpanit Shacham, a girls’ religious school in Kiryat Ata, students cooked up an idea for edible spoons made from flour and water. “Our class was throwing away 800 plastic soup spoons a month. With our spoon mold, we can make 200 to 300 spoons from a kilogram of flour, so each spoon costs just one agora. It stops the toxic production of plastic – and it could make money,” said their student spokesperson Esther Malka.

When eighth-grader Itai Sigler read that each year Israelis throw away 300,000 tons of organic materials that could be turned into compost worth $20 a ton, and 100,000 tons of glass bottles worth $3 million, he was sure he was on his way to becoming a millionaire. He set out to design a bin for collecting recyclable materials, with compartments for each material and computerized sensors to notify the municipality (by wireless phone) that the bin is full.

The Renee Kassan Junior High School of Jerusalem concentrated on one of the country’s most crucial problems: water scarcity. Three of its four projects related to water: one found a way to save 30% of the shower water by piping it into the bathroom toilet; another developed a filtering system for reclaiming bathroom water
in soccer stadiums; and the third set up a system whereby a sensor would warn a household when its water use exceeded a certain threshold, reminding them to cut back and to start saving money and water. The fourth project featured a home electricity savings device which uses an automatic sensor to turn on lights as a person enters a room and off as the person leaves.

An Added Bonus: Co-existence

Alongside the excitement of developing environment-friendly products and services, the competition highlighted yet another dimension: the environment as a uniting force between secular and religious, between boys and girls, between Jews and Arabs. This was especially evident in the joint venture developed by Arab students from the Agricultural Education Farm at Taibe and Jewish students from the Lod Habanim Junior High School. Together, these seventh and eighth graders decided to focus their business model on the reuse of water in order to solve the regional problem of water scarcity. Personal meetings and e-mails brought the children together and provided fertile ground for ideas to sprout and grow. The results were impressive: a working model of a gray-water purification system, based on growing plants, able to save some two-thirds of the household water supply for reuse. The project had a dual purpose: increasing environmental awareness and water savings and fostering co-existence between people. Both objectives were met. Indeed, as attested to by the dedicated principals of both schools, education toward co-existence is an inherent part of the school curriculum from the lowest grades.

At the exhibition, the schools also presented an album which documents their joint work on art and the environment. During the course of the program, students from both schools met in museums to investigate environmental issues through works of art – whether changes of season as reflected in works of art or the impact of light in Monet’s paintings. Yet the meetings did much more than increase awareness of the environment; they highlighted the common links between the youngsters. As students exchanged photographs and descriptions of their hobbies and favorite foods over the Internet, they were surprised and delighted to discover that computers, football and hamburgers ranked just as high in both groups.

The same commitment to co-existence was reflected in the presentation of the Green Class of Makif Alef High School in Beer-Sheva. The students designed a “Peace Park” to be developed in the Aravah on the border between Jordan and Israel. Shaped in the form of a dove with an olive branch in its beak, the park features a botanical garden with medicinal and spice plants, an artificial lake that will host migrating birds in the area, as well as a variety of wildlife pavilions and safaris. The park will be powered by clean energy, whether wind or solar, and transportation to it will be by electric train to enable visitors and tourists to pass through the safari area without disturbing the wildlife. In an explanatory letter to the King of Jordan, the children described the park and concluded with the following: “We thought that this park will set an example of how two nations can work together, cooperate in starting new friendship between us, attract tourists, and at the same time deal with ecology for the benefit of the whole area.”

A Vision for the Future
During the course of the three-day exhibition, each child was given a ceramic tile to illustrate with images or words representing their vision of an ideal environment. After glazing and firing, Dr. Bodner will assemble the tiles into a mosaic representing the collective vision of Israeli youth. Last year’s student mosaic hangs in the offices of the Environment Ministry as a source of inspiration and reminder of what environmental protection is all about: our children’s future.

Among the many adult visitors to the pavilion was the Minister of Environment who stopped by to discuss the students’ ideas and to present certificates to the participants. Mrs. Bina Bar-On, Deputy Director General of the Ministry of the Environment praised the children for their important work and left them with the following message: “Each of you is an environmental ambassador – at home, with your friends. We have only one world – protect it!”

**Fresh Green Thinking**

Youth exhibits for green products and services also include:

A working model of a grey-water purification system, based on growing plants, a joint venture of Jewish students from Lod and Arab students from Taibe;

A scale model of a “ecological Club Med,” plus a plan for a consulting business for helping similar vacation centers go green;

A Barbie Doll that lives in an ecological house and tells children, via recorded messages, how to be “cool” and care for the environment;

A sound-proofing technology using egg cartons, demonstrated in a phone-booth sized structure which is pleasantly quiet compared to the din of the exhibition hall outside;

A system for reclaiming bathroom water in soccer stadiums, presented with calculations showing how there would be water left over after irrigating the field to sell at a profit;

An ecological day care center;

Green living sculpture for parks that is made from living plants, illustrated by a giant leaf-covered dinosaur;

A concept for a device to be retrofitted onto automobile carburetors to increase fuel efficiency by optimizing the mixture of gasoline and air, presented by a computer featuring an animated talking carburetor.
CONFERENCES AND EXHIBITIONS

ENVIRONMENT 2001: INTERNATIONAL EXHIBITION FOR ENVIRONMENTAL TECHNOLOGIES

Scarcity of water, limited land resources and lack of natural resources have led Israel to base its economy on technological advances, generated by a highly qualified workforce and a network of academic and research institutions. Between May 1st and May 3rd, Israeli companies joined counterparts from around the world in an exhibition designed to showcase some of the country’s – and the world’s – latest achievements in environmental technology.

Some 200 companies, 170 from Israel, presented a motley of environmental technologies at Tel Aviv’s Exhibition Gardens in an event organized by the Environmental Technologies Department of Israel Export Institute, the Israel Trade Fairs & Convention Center, the Manufacturers’ Association of Israel and the Ministry of the Environment. Spread over 11,000 square meters, the wide variety of innovative products underlined the twin facets of environmental technologies: economic potential and environmental improvement. Some 20,000 visitors, including 300 from abroad, showed up to view state-of-the-art technologies and products that promise to provide viable solutions to such problems as growing waste quantities, inadequate water supplies, polluting industrial effluents and global warming. Some of the technologies on display were developed by an environmental start-up incubator (GreenTech) – including a cost-effective solution for rubber devulcanization and recycling, use of iron waste to produce high quality iron oxide pigments as coloring agents, and a compact system for the treatment of wastewater from cowsheds.

The exhibition offered plenty to see even for those not interested in signing deals or making international contacts. One pavilion, dedicated to Israel’s non-governmental environmental organizations, distributed information sheets and brochures to anyone wishing to learn more about the country’s environment and to participate in activities on its behalf. Visitors with a penchant for art were invited to contemplate environmental sculptures – whether a “garbage flower” or a 180-square meter cement stream. Still others marveled at a photography exhibit by the International Center for the Study of Bird Migration, dedicated to the subject of “Migrating Birds Know No Borders.” Most of the visitors were particularly impressed by the Student Forum which showcased innovative ideas by youngsters for environmental products and services (see accompanying article in this Bulletin).

Delegations from abroad met with Minister of the Environment Tzachi Hanegbi who was available throughout the three-day-exhibition, and most joined in a specially-organized tour to the arid Negev desert to see, first hand, Israeli’s pioneer innovations in water conservation and dryland afforestation.

For further information on Israel’s environmental technologies:
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31st Annual Conference of the Israel Society for Ecology and Environmental Quality Sciences: Tel Aviv’s Exhibition Gardens provided a fitting venue for the 31st annual meeting of the Israel Society for Ecology and Environmental Quality Sciences (ISEEQS). Some 600 professionals attended the conference which featured 180 lectures and 100 poster presentations. The ISEEQS has long been committed to an interdisciplinary approach which combines basic and practical research with educational, social and legal dimensions. This year’s sessions were dedicated to environmental themes ranging from policy and planning to education, from soil contamination and remediation to river and watershed management. Special sessions were devoted to the interaction between art and the environment, in association with the Israel Forum for Ecological Art, and to the role of the younger generation in improving the environment, in association with the Student Forum.

Israel Association of Water: The first meeting of the new Israel Association of Water (formerly the Israel Association of Environmental Engineering) was held in collaboration with the ISEEQS. This voluntary professional organization is the national representative of the International Water Association and the Water Environment Federation. Its opening session featured a keynote address by the Israel Water Commissioner, highlighting the current water crisis, as well as presentations by senior representatives of the international organizations. Subsequent lectures, by invited guests from Israel and abroad, focused on water research and development and on advanced water and wastewater treatment technologies.

Environmental Leadership as a Business Strategy: Organized by the Israel Economic Forum for the Environment and Ma’ala – Business for Social Responsibility in Israel, this conference was attended by representatives of local and foreign business, media, government and NGOs. The keynote address on “Sustainable Development within Global Business” was delivered by Mr. Marcel Engel, director of the World Business Council for Sustainable Development Regional Network. Other items on the agenda included the economic benefits of environmental investments, corporate social responsibility, and the role of government incentives in promoting cleaner production processes and environmental technologies.

Start-Up in the Environment: How, How Much and Why? Over 100 inventors, entrepreneurs, academicians, students, investors, environmentalists and journalists participated in Israel’s first environmental start-up conference. Sponsored by GreenTech, Israel’s only environmental start-up incubator, the conference focused on how to establish a high-tech start-up company, how to attract investment, and how global environmental legislation affects demand for new environmental technologies. GreenTech has been helping a new generation of “green” start-ups in Israel in the pre-seed stage, financing their R&D for two years, and helping them to find strategic partners and financial investment.

For further information: www.greentech.co.il
AFRICAN INTERNATIONAL SEMINAR ON BIRD MIGRATION

Participants from 27 countries attended the African International Seminar on Bird Migration which took place in Israel from April 29 to May 11. Four themes stood at the base of the conference – research, conservation, education and flight safety. Discussions were meant to help achieve the following aims:

- Better understanding of the contribution of research – whether satellite transmitter research or ringing and ecological research on interactions between wintering and African species – to the conservation of birds and their habitats.
- Introduction to the Internet and to web site development as a primary educational tool in enhancing partnerships between breeding site countries (Europe and Asia), countries on the migration route (Middle East) and wintering ground countries (Africa).
- Increasing cooperation for the establishment of a web site network which will link different regions and continents under the wings of “BirdLife International.”
- Raising awareness of the linkages between birds and flight safety in order to address the issue of aircraft bird strikes.

During the past decade significant research has been advanced in Israel on bird migration, with the aid of American, European and local aid. On the basis of the joint research, a broad based educational program was founded in which 213 schools throughout the world take part by tracking migration over the Internet while learning about additional subjects – from climate and computer skills to communication with fellow students. The present conference was meant to help develop a multi-disciplinary program which would combine educational programs, bird and habitat conservation and flight safety through the cooperation of 20 African countries and with the help of such leading agencies as BirdLife International and Schools Online (which has linked some 6,000 schools worldwide to the communication and information resources of the Internet).

Participants combined education and country-wide tours during their 12-day visit to the country. By the end of the seminar, an action plan was drawn up for an African initiative, “Wings over Africa.” Hopefully, the positive experience shared by all, coupled with the necessary funds to implement the program, will expedite the fulfillment of the vision.

In a special message sent to the seminar participants, Deputy Prime Minister of Israel and Minister of Foreign Affairs Shimon Peres stated the following: “The exchange of knowledge and cooperation promoted by the participants of this exceptional program transcends borders, just as the migrating birds fly over seas and across continents, able to navigate from Siberia to South Africa and back unfettered by frontiers and barbed wires. What could symbolize tomorrow’s world more appropriately than this kind of freedom, a model to be emulated by man?”

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