Center of Ecological Systems and Technologies (ECOST)
Ministry of Immigrant Absorption of Israel

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SOLUTION OF PECULIAR ECOLOGICAL PROBLEMS OF ISRAEL

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PROGRAM OF THE CONFERENCE
"SOLUTION OF PECULIAR ECOLOGICAL PROBLEMS OF ISRAEL"

Registration of participants	**9.15 – 10.00**
Greetings	**10.00 – 10.90**
Reports:	
Prof. N. Manusov *Solution of Peculiar Ecological Problems of Israel*	**10.30 – 11.15**
Dr. Ya. Sosnovsky, B.Marash *Energy Supply and Ecology*	**11.15 – 12.00**
Prof. B. Anfimov, Prof. M. Tanklevsky *Air Pollution Caused by Transport Vehicles and its Impact on the Public Health*	**12.00 – 12.45**
Dr. A. Tzikerman, Dr. B. Brudnik *Solid Waste Products and Ways of its Extermination*	**12.45 – 13.30**
Coffee break	**13.30 – 14.00**
Dr. M. Levitzky *Reduction of Toxic Exhausts by Means of Combustion Process Improvement*	**14.00 – 14.45**
Dr. I. Lirisman, Dr. M. Milov, I. Edelzon, A. Popadin *Plants for Water Desalination and Rectification*	**14.45 – 15.30**
Discussion and Accepting Decisions	**15.30 – 16.30**

TABLE OF CONTENTS

INTEGRATIVE APPROACH TO WATER RESOURCES UTILIZATION IN ISRAEL

NONNA MANUSOV

Israel has three main resources of sweet water: the Sea of Kinnereth and the two underground aquifers, the coastal and the mountainous, with general annual debit exceeding 2 milliard m^3 (1, 2). The water is consumed as follows:

1. 30% for domestic needs.
2. About 10% for industry.
3. 60% for agriculture.

Until now, we have studies the impact of underground water sources allocation on sustainable development of Israel, as well as protection of these sources from pollution (3). The only aspect, though perspective, remained without having been studied: substitution of sweet water used in agriculture by desalinated water. To solve this problem, we used the results of analysis related to utilization of desalinated water in agriculture for the purpose of watering soils similar to those in Israel, with 10-30 mg-equ/100g rate of the absorbing complex.

Acceptability of using desalinated water is estimated in the Table above by the corresponding class (5), as follows: Class 1 – not dangerous, Class 2 – less dangerous, Class 3 – reasonably dangerous, Class 4 – dangerous.

The danger of development of general salting due to the scope of desalinated water mineralization was estimated to determine the watering conditions for soil with an average mechanic composition of 15-30 mg-equ/100g (dry steppe or semi-desert zones).

The integrated results of studies enable to state as follows:

At the present level of technological development, no one of the desalination methods (electro-dialysis, reverse osmosis, ion exchange) can provide soil watering with average granular composition of 15-30 mg-equ/100g meeting the requirements of Classes 1-2 (not dangerous and less dangerous) due to all criteria simultaneously, since there exists the danger of general ecologic salting.

For all methods of desalination and estimation of irrigation properties of processed water, the above criteria are dispersed between Classes 1-2 and Classes 3-4. Economic and ecologic expediency of using desalinated water requires to envisage its conditioning and/or implementation of other meliorating processing preventing or compensating the possible damage.

Estimation of desalinated water quality used for soil melioration

Method of water desalination	Estimation of desalinated water quality related to the danger of development of processes:									
	General salting / Water mineralization		Chlorine salting		Sodium salting		Magnesium salting		Sodium formation	
	M, g/l	Class	Cl^+, mg-eq/l	Class	Na^+/Ca^{2+}	Class	Mg^{2+}/Ca^{2+}	Class	$(CO_3^{2}+HCO_3^{-})$ / $(Ca^{2+} + Mg^{2+})$	Class
Distillation	0.09	1	0.1	1	> 5	4	>8	4	0.1	1
Helio-desalination	0.12	1	0.3	1	2.2	4	2.7	4	0.3	1
Electro-dialysis	0.5 1.0-1.1 1.6	1 2 4	4.4 -5.6 24.2	3 4	0.7 2.6-14.9	2 4	0.2-0.9 6.0	1 4	0.2 1.0	1 2
Reverse osmosis	1.1-0.6 0.6-1.0 1.1-1.2	1 2 3	0.5-1.4 4.4-8.5 15.6-17.2	1 3 4	0.8 1.65 4.1-13.2	2 3 4	0.6-1.0 1.0 2.3	1 2 3	0-0.5	1

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ECOLOGICAL DISASTER AS PLANNED BY THE "ROTEM AMFERT NEGEV" CO. NEAR ARAD

ADEL ABLATIPOV

1. The unique natural climatic conditions of the Judea desert near Arad are accepted by professionals as possessing high health-resort qualities.
2. The history of open-pit phosphate mining by the "Rotem Amfert Negev" Co., 3-4 km away from Arad, in Sdeh-Barir.
3. The "Rotem Amfert Negev" Co. is interested in developing an open-pit phosphate mine near Arad because of exhaustion of previous sites and expediency of developing phosphate deposits allocated near the surface.
4. The negative impact of phosphate mining on ecology:
   - roar of rock explosions in the process of phosphate mining and noise of machines and appliances;
   - appearance of a mass of dust caused by pit works;
   - presence of uranium in the local phosphate deposits and further contamination of vast territories;
   - opening of outlet for radioactive gas rhodonite which the bowels of the earth in the Sdeh-Barir region is abundant with;
   - destruction of the Sdeh-Barir region natural landscape;
   - damaging the regional fauna and flora.
5. The Health Ministry experts in their conclusion maintain that the planned phosphate pit is mortally dangerous for Arad residents and those of surrounding settlements, which may cause increase in sickness rate, especially among children.
6. Destruction of a section of the ancient Edom road crossing the Sdeh-Barir territory, and blocking of the convenient access for tourists to the natural pearl of Israel, Nakhal Kinah.
7. Impossibility of development of tourism under conditions of the phosphate pit works near Arad;
8. Impossibility of implementation of projects promoted by the municipal administration with the purpose of attracting youth and professionals to settle in Arad under conditions of the phosphate pit works.

9. The municipal administration objects to the possible delay in construction and development of Arad and planned settlements as a result of the pit development.
10. Objections of the "Motorola" Company situated in the Arad industrial zone against increase in dusting as a result of the phosphate pit development.
11. 80% of the Arad residents expressed their objection to phosphate mining within the municipal borders. Active joining of the Israel population to this position of the Arad residents.
12. Technology of using fertilizers based on 80% of the mined phosphate. Modern technology of cattle breeding using additives produced from phosphate. Worldwide foodstuff production using additives produced from phosphate.
13. The true reason of the "Rotem-Amfert Negev" Co. persistence in standing up for its project of phosphate mining on the territory of Sdeh-Barir. Proposal of compromising solutions by the "Rotem-Amfert Negev" Co.
14. The reasons for delay of the decision related to the phosphate pit development on the territory of Sdeh-Barir by the Commission of planning and construction of the Ministry of Internal Affairs.

To be healthy, to develop international balneology, to travel observing unique nature and visiting numerous historical memorials, archeological digs, the Dead Sea.

AIR POLLUTION CAUSED BY TRANSPORT VEHICLES AND ITS IMPACT ON THE PUBLIC HEALTH

VALERY ANFIMOV

On 08.10.2007 the "Yediot Achronot" newspaper published for the first time a map of cancer diseases rate in 14 Israeli towns. The highest increase was registered in Tel Aviv, Haifa and Beer-Sheva. For these 14 towns the rate pollution caused by transport vehicles and industrial enterprises was estimated on the basis of the Israeli statistical reports. It must be noted that the newspaper did not provide data related to pollution. Provided below are the corresponding data of annual pollution rates per capita as related to some kinds of waste products.

Town	*CO_2*	*CO*	*NOx*	*Unburned fuel*	*The annual rate of diseased per 100,000 residents*
Tel Aviv	12.5	0.075	0.043	0.0107	355
Haifa	11.0	0.045	0.036	0.0065	377
Beer-Sheva	12.2	0.028	0.032	0.0041	348
Jerusalem	10.0	0.026	0.031	0.0038	298

The population of the above 14 Israeli towns comprises 2.5 million residents. The annual rate of cancer diseases reached 7.735 residents, i.e. 0.304% of the population. To compare, the US annual rate of cancer diseases is 169.400 cases, i.e. 0.0626% of the population. Thus, the risk of cancer disease in Israel is five as much. In the four towns included in the Table above, more than 1 million motor vehicles move daily. This amount comprises 48.2% of the all-Israeli fleet of cars, which means there is a need in cartography reflecting urban pollution caused by transport vehicles and industrial enterprises in Israel, with further elaboration of concrete measures for each town to decrease pollution.

The author developed such elaborations aimed at determination of pollution rate in towns, detection of dangerous places, and further reduction of pollution cause by transport vehicles. A computerized model was elaborated to determine pollution rate depending on the amount, type and age of vehicles, their speed, the situation with traffic jams, tire wear,

the state of the road and its strength, its smooth and rough sections, declivities, wear of paving, as well as climatic factors. Besides, the model enables to determine the volume of exhaust and waste products absorbed by trees and plants, as well as those interacting with precipitations and producing acids.

HOMOGENIZER – APPLIANCE FOR FORMATION OF HOMOGENEOUS GAS-AIR MIXTURE

YURI BAK

Fuel combustion in internal-combustion engines – piston, gas-turbine and jet-propelled engines, as well as in furnaces of steam-boilers and water heating boilers – takes place with extremely high speed (thousandth of second). During this short period liquid fuel (petrol, kerosene, diesel oil) fed to the cylinders, combustion chambers and furnaces have no time for full evaporation, even intermixing with air and complete burning down. Subsequently, the fuel burning in the working zone of engines/boilers produces only partially efficient work, which results in low efficiency coefficient.

The homogenizer developed by the author of the herewith proposal, enabling to evaporate the liquid fuel and to intermix it evenly (in a desired proportion) with air (i.e. to prepare for intensive combustion), is placed at the input the combustion zone. Correspondingly, the combustion zone gets a gaseous **homogenous fuel mixture**, which burns down completely providing the highest available efficiency coefficient of engines and boilers.

Fuel preparation by means of the homogenizer enables to reduce fuel consumption (correspondingly, there decreases outlet of gases to atmosphere), as follows:

- piston engines 20-30%
- gas-turbine and jet-propelled engines 30-40%
- boiler furnaces 50%

STORAGE BATTERIES FOR ELECTROMOTIVE VEHICLES

YURI BAK

Electric storage batteries produce direct current due to the tension of potentials appearing between materials of various compositions in the electrolyte medium. The electrolytes can be both liquid and dry.

The disadvantages of electric storage batteries are generally known. These are their high cost, limited electro-capacity, long-term recharge, poor functioning under conditions of hard and quickly changing regimes.

The supplementary stabilizing appliance developed by the author enables to increase the functioning period (capacity) of electric storage batteries 2-3 times as much without recharge, preserving the principle of their functioning.

A block of storage batteries assembled in the electromotive vehicle, supplied with the supplementary stabilizing appliance as proposed herewith, will be competitive with vehicles functioning on hydrocarbon fuel both in term duration and in mileage run, without recharge and refueling. Moreover, in urban conditions it will even surpass it in mileage.

Use of electromotive vehicles with supplementary stabilizing appliances will enable to eliminate exhaust in urban areas and on dense automobile routes.

CREATION OF THE HIGHLY ECONOMIC DESALTER OF THE SEAWATER

LEV BOROSHOK

The proposed device allows to produce the sweet water out of the sea-water for technical and household needs.

The desalting is produced in two stages. Rupture of electric connections of molecules of water with ions of the solute salts is put into practice on the first stage, and the separation of the freed and free molecules of water from ions of the solute salts is put into practice on the second stage.

Oscillations with frequency which is equal to a resonant frequency of oscillations of molecules of water in the given concrete medium, are created in the sea-water. Oscillations in a resonant regime lead to peak increase of amplitude. The centripetal force, which arise at oscillations of molecules of water concerning a point of their electric communication with ions of solute salt, act at these molecules into the opposite side from a direction of act of attractive force to ions of the solute salt. Release of water molecules from electric communications with ions of the solute salt will occur, if the centripetal force will be above an attractive force.

It is enough simply to reach a mode of stabile cavitation at use of hydrodynamic waves and presence of air in the processing medium. Peaks of pressure, which in tens times above the pressure created by hydrodynamic waves at usual regimes of processing, appear thus. It leads to rupture of molecular links. Even disintegration of molecules H_2O on the free radicals OH and H is noted.

Positive technological and constructive habit of the offered installation is the union in one device of the function of the sea-water supply in desalter and the function of processing of this water by hydrodynamic waves. The feeding of the sea-water into desalter takes place through an emitter of hydrodynamic oscillations for this purpose. Such union assures the most effective affecting of the energy of high-frequency hydrodynamic waves on the sea-water stream. Full processing of all volume of sea-water which is fed into desalter is being produced. The energy of the water stream to the desalter is also the energy source for work of a hydrodynamic emitter of oscillations. Such combining abates a power demand from an external source for work of the desalter.

The cost price of the sweet water that is producing by means of the developed device, not less than in 2,5 times below of the cost price of the sweet water which is producing on the modern desalinating equipment, uses the principle of a reverse osmosis (RO).

DEVELOPMENT OF OPTIMIZATION AND AUTOMATION OF ELECTROCHEMICAL WASTEWATER TREATMENT

ISRAEL EDELSON

The present report was fulfilled in accordance with the Detailed Work Plan of the research activity elaborated by the Center of Ecological Systems and Technologies.

The Report consists of three parts.

The first part sets forth the results of experimental studies related to electrochemical wastewater treatment plant, including the scheme of the plant, data array of parameters, determination of most information parameters and preferable control actions for the technological process.

To determine the most information parameters and preferable control actions, the method of extremal grouping of parameters was used, supported by corresponding software. 35 values of 21 parameters were processed.

The second part of the Report provides specification of measurement and control devices.

Corresponding devices are suggested for measurement of the direct current strength and voltage, water flow and pressure, tanks level, salts content in the water.

Processing appliances include two- and three-position valves, water pumps.

To provide control of the technological process, a programmable logic controller and I/O modules are suggested.

The third part of the Report sets forth a design for plant control system, including the automation functional scheme.

ECOLOGICAL ENLIGHTENMENT IN NETIVOT

ALEXANDER FURMAN

This year ECOST started educational activities among immigrants. The forms of educational activities are internal studies in regional clubs, seminars, outside studies.

Netivot population is 25.000 residents (among them an audience of about 3.500 comprising the Russin-speaking community).

Ecological environment of Netivot: the town is situated in the transitional desert-subtropical zone, and is characterized by considerable erosion of loess soils. There are two small forest lots (coniferous and eucalyptus), a large number of river-beds drying up in summer. The largest river-bed is Grar.

The relief type is that of a flat plain.

Various subjects related to ecology were elaborated at the Netivot regional ECOST department, including practical activities, such as substitution of several cultivated garden species.

(Succulent and coniferous species were planed with the purpose of water economy; to slow down soil erosion and ravine formation bushes were planted).

The Netivot residents engaged in ECOST studies are acquainted with flora species used for greenery planting in the town and with flora species of the surrounding forests, with the scheme of the rock strata disposition and the underground water bedding, with methodology of folk medical treatment.

Under specific conditions of Netivot ecological enlightenment is extremely important for improvement of the local ecological situation.

THE JERUSALEM COMMUNITY GARDEN PROJECT

ANNA GODNEVA, VICTORIA KOVALEVA

At present, over 10 community gardens already exist in Jerusalem in the framework of this project. This project will establish an urban gardening program, giving Jerusalem communities the opportunity and tools to turn “wasteland” info thriving and fruitful community gardens. Vacant plots will be identified in low-income neighborhoods where local residents will plan, plant and grow trees, vegetables and flowers on the community bases.

The recent boom in urban development throughout Israel has intensified the need for maintaining open public space as a local amenity for the health of a city's inhabitants.

There is also a need to return to the values of community, where families and individuals living in the same neighbourhood meet and work together to produce a positive change in their relationships.

In the present economic climate, community gardens in depressed neighborhoods will also provide residents with the opportunity to supplement their diet with fresh organic vegetables grown with pride, and for children to learn the value of healthy food through the fun of growing it for themselves, and tending the plants through the cycle of the seasons.

The Jerusalem SPNI provided training to the participants of the first Community Garden when it was established in 1999 in the city's Baka neighbourhood .It continues to thrive and encouraged the launch of two other Community Gardens: a pensioners project in Neve Ya'acov and a Permaculture project in Kiryat Yovel.

The problems facing Israeli society in general, and the Jerusalem community in particular, are acute. Here we offer a positive and pro-active solution to the stresses of urban living in order to improve the quality of life.

Project Mission

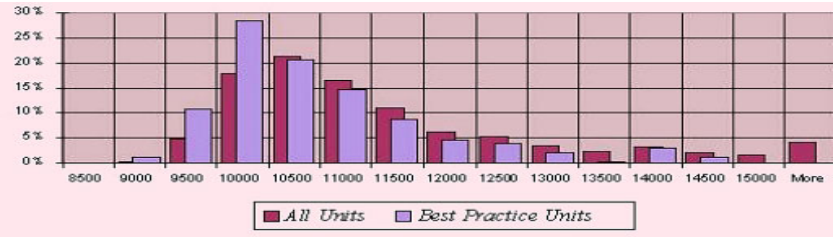
- To establish an active community garden in each Jerusalem neighbourhood, that is planned, created and cared for by the residents themselves in order to meet the needs of each specific community.
- To teach people how to grow food using ecological methods.

- To foster cooperation between Jerusalem's diverse multi-cultural population in order to advance community participation in solving local problems by implementing local solutions.
- To improve the quality of the environment by turning wasteland into fertile and beautiful green space.

COMPUTER MONITORING OF THE POWER UNIT OPERATION QUALITY AND EFFICIENCY AS A TOOL OF AN ELECTRICAL ENERGY SAVING AT THE PRODUCTION STAGE

ANATOLY GORDINSKY

The Heat Rate is a natural and officially recognized by the American Society of Mechanical Engineers (ASME) criterion of an efficiency of the electrical energy production. This index has the constant component and the variable component. The first one depends on the initial thermodynamic properties of the equipment and the quality of its manufacturing and mounting. The second component depends on characteristics of the used fuel, electrical capacity of the power unit and the quality of its operation. The quality of the operation is understood as a degree of maintenance of technological parameters in optimal intervals in stationary and non-stationary modes, quality of execution of the start-up modes, timeliness and conscientiousness of a performance of preventive and repair work, etc. Thus, Heat Rate is not only the criterion of efficiency, but it also is the criterion of quality of operation in a broad sense. To understand a situation with this index, we will consider the histogram, published in [1] and constructed according to 1,098 coal power units in USA. There is mid-annual Heat Rate in BTU/KWh on the abscissa axis.



The huge scatter of this index is obvious. If all power units would have the best Heat Rate for the given histogram, namely, 9,000 BTU/KWh, it would give a reserve about **20** %. However, this best index is considerably worse than mid-annual Heat Rate of the best power units, that approximately equals to 7,540 BTU/KWh. It is possible to reduce heat losses and fuel losses about **40 %** if to achieve such a level of the Heat Rate for all power units. Let us take into account that the data were received by authors [1] in 1998 year, and the fuel prices have grown several times since then. Thus, it is logical to raise the following question. Should the world community to prevent such waste in the future?

Furthermore, is not it time to return to the government regulation of the efficiency of the electric power production, as suggested by authors [2]?

However, in order to improve something, you should be able to measure and to analyze result. And, it is necessary to carry out all in the on-line mode, with a high accuracy and with a high qualification in thermodynamics. In publications [3,4] as well as in some previous works and in this paper the author argues in favor of two statements.

1. *Installation of the On-Line Heat Rate Monitoring System at each power unit is the most perspective approach to save the energy at the production stage. This monitoring is maximally operative. It makes it possible to lay into the Software the experience of the most qualified power engineers, and, thus, to increase a quality of the analysis of the power unit effectiveness by the special groups. The Heat Rate has the highest sensitivity to any changes in the equipment condition. Finally, this is the most impartial monitoring.*

2. *The on-line Heat Rate Monitoring System developed in last ten years and carefully tested during five years by Israel Electric Corporation personnel [3, 4, etc.] completely satisfies the requirements formulated above.*

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TECHNIQUE OF OXIDIZER DOSAGE ESTIMATION BY OPTIMIZATION OF OXIDIZING DESTRUCTION PROCESSES IN LIQUID INDUSTRIAL WASTES CLEANING FROM ORGANIC POLLUTIONS

DAVID GUREVITZ

By optimization of the processes of industrial wastewaters cleaning from organic pollutions with use of oxidation processes, the oxidizer doze is the major parameter demanding optimization [1]. In these work the method of a tentative estimation of this parameter on the basis of analytical aprioristic data is offered.

Total dose of oxidizer for liquid waste or industrial wastewater treatment may be estimated on the base of the following data, received by experimental measurements:

Chemical Oxygen Demand (**COD**) equals the total mass of Organic Substances (**OS**) contained on treated liquid waste, g/L;

Total Organic Carbons (**TOC**) is Carbon mass contained on OS, g/L.

Assuming that the difference between OS mass and TOC mass approximately equals

$$M_{(O+H)} = COD - TOC, \quad (1)$$

The mass of organic hydrogen can be estimated:

$$M_H \approx (TOC * 2):12 \approx 0.17*TOC, \quad (2)$$

The mass of “organic” oxygen is, accordingly,

$$M_O \approx M_{(O+H)} - M_H = (COD - TOC) - M_H = COD - (TOC + M_H) \approx COD - 1.17*TOC, \quad (3)$$

The stehiometric quantity of oxygen need to oxidize the organic carbon into carbon dioxide may be evaluated as:

$$M_{OX} = (TOC * 32): 12 \approx 2.7*TOC, \quad (4)$$

To introduce value “Oxygen deficit” that is the difference between stehiometric quantity M_{OX} and “organic” oxygen quantity M_O we receive parameter for evaluation of optimal oxidizer dosage:

$$M_{OX/def} \approx M_{OX} - M_O \approx 2.7* TOC - [COD - 1.17 *TOC] = 3.87*TOC - COD, \quad (5)$$

If we use Hydrogen peroxide 35 % mass water solution as oxidizer this quantity of oxygen corresponds to approximately oxidizer dosage (OD):

$$OD \approx \{[(M_{OX/def} * 34):32]:0.35\}: d_{HP} \approx 2.7*M_{OX/def} = 2.7*(3.87*TOC - COD) \quad (6)$$

Example of the method use:

Liquid waste of a hospital biomedical laboratory was neutralized by oxidation with use of hydrogen peroxide 35 % mass solution. The liquid waste had the following parameters: **COD = 100,000 ppm; TOC = 30,000 ppm.** To use for oxygen dosage calculation the ratio (6) we received: **OD ≈ 44 mL/L or L/m^3 liquid waste.** To add this dose of the oxidizer into the liquid waste we have received the final result for treatment of liquid waste of a hospital biomedical laboratory: **COD = 1,500 ppm; TOC = 360 ppm.**

Thus, the offered technique allows estimating preliminary the doze of an oxidizer necessary for deep clearing of industrial sewage from organic pollution.

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ON PERSPECTIVES OF CONSTRUCTION AND ECOLOGY IN JERUSALEM

YULI ILYEVSKY, ALEXANDER KIMBERG, EVGENY BELANOV

Modern town-planning in Israel, likewise in other countries, cannot be limited by implementation proper of functional requirements related to building of residential, communal and industrial buildings. At present special attention is paid to the choice of architectural and ecological solutions aimed at establishment of comfortable conditions for everyday human activities, including substantiation of using raw materials and productions technologies, erection of nature-protection objects. The specific problem of town-planning in Jerusalem is that of determining the areas for construction, since the available areas are mostly those with complex relief and, as a rule, limited in their dimensions, as well as areas set free after the old constructions and other objects have been demolished. But development of territories characterized by relief variety for the purpose of construction of buildings and nature protection objects by means of modern engineering does not comprise particular difficulties. It is important to indicate that any available plot in Israel is supplied with the indispensable minimum of properly maintained engineering communications. Neglect of areas set free after demolition of old constructions brings about unauthorized dumps, soil erosion, overgrowing with weed and other constantly increasing dangerous phenomena. It is natural that construction using areas with complex relief characteristics is connected with additional expenses. But, first, it provides solutions related to nature protection within the existing urban borders, and, second, the possible rise in the cost of construction is incommensurable with expenses spent for development of new territories. Thus, the project proposed by the architect Savdi envisaging the westward development of Jerusalem means destruction of the Jerusalem forest ("light towns") and the plough-lands in the Beit-Shemesh direction. Further building up of hilly areas by cascades of 1-2-storied houses will naturally be followed by arrangement of a "reinforced-concrete armor" causing damages to flora natural growth. These and other facts induced the ECOST ecologists and other Israeli organizations engaged in nature protection to express their anxiety and deep concern. The late Knesset member Yuri Shtern claimed a bill concerning banning of the city borders expansion and obligating to accomplish construction projects in areas set free after demolition of old constructions.

It would have been wrong to assert that at present no new objects are being erected in Jerusalem in free areas including those with complex relief, as

well as activities connected with reconstruction and completion of different objects. Quite frequently rocky and hilly plots are built up with cascades of one-two-storied buildings, partially providing housing solution and refining the landscape. Many-storied buildings are also being erected (as, for instance in Mamilah, Har-Nof). In Malkha a 12-storied "Holy land" building has be erected expanded with a cascade of one-storied houses down the slope, which brought about destruction of 40 *dunam* of fertile land.

The project of a public-residential complex elaborated by the architect E. Belanov as applied to the steep slope in Kiryat Yovel is fundamentally different from projects generally used in Jerusalem (such complex is also applicable for other plots with similar relief, as well as for plots based on artificial mounds). The complex includes a 2-storied circle-shaped community center with adjacent towers arranged at the angle of 120^0 to each other, containing 60-70 apartments each (the apartments planning and the number of floors can vary). Allocation of apartments in the towers contributes to their aeration, proper illumination, and their density and congestion is not felt. On the tower roofs solar batteries mounted to supply the entire complex with heat and electric power. In the community center and in the basement premises offices, shops and various engineering services (including departments for primary waste processing), and garages are located. The roof of the community center is a park zone serving the residents of the complex and its maintenance personnel. The complex occupies an area of 3.5 *dunam*, i.e. about 10 time as small as that occupied by the Holy Land complex or other constructions with commensurable actual living spapce. Correspondingly, this expands the possibilities of allocation of parks, swimming pools, playgrounds and other nature protection objects.

The technology of construction was elaborated by Prof. A.Kimberg. It envisages use of prefabricated reinforced concrete elements in combination with further armature straining and monolith formation upon completion of the assembling works. Production and assembling of elements can be implemented directly at the construction site. The structural design of the building enables to assemble most of the internal walls from self-bearing constructions by using ecologically pure materials.

Actual testing of A. Kimberg's technology was undertaken in Georgia as applied to the administrative building erected in conditions of an extremely complex relief with 33 m height drop. The architectural design included a combination of 3 towers (17, 13 and 7-storied buildings) with 5 horizontal 2-storied buildings (the cantilever ledge reaching 12.5 m). The tower

foundation enables to allocate the complex in areas with any kind of relief (including those based on artificial mounds) preserving the landscape. Rationality and efficiency of this construction with simultaneous solution of ecological problems (the river and the riverside flora were preserved) won high estimation of the architects, who included it in the list of the most prominent construction objects of the 20th century (New York, 1999). In Russia Prof. A.Kimberg was awarded the State prize. The constructive technological solutions can be applied to construction of new and reconstruction of existing buildings, as well as to implementation of anti-seismic fortification.

Realization of A. Kimberg's technology in Israel is quite natural, since its main building material is the traditionally accepted concrete mixture with a wide range of physical-mechanical characteristics enabling to produce bearing, self-bearing and thermo-insulating constructions. The Israeli builders have a significant experience in production of various kinds of strained armature for construction of bridges, high-rise buildings, enterprises… In long-range planning, use of ferroconcrete details, technologies of monolithic and prefabricated monolithic elements will increase alongside with expansion of the range of concrete elements produced. An even more extensive use of concrete elements in construction industry is expected with further development and introduction of nano-technologies, when strength characteristics will be commensurable with the corresponding indices of steels. Among other raw materials used in construction, which meet the requirements of ecology, glass, dense ceramics and alloyed steel must be mentioned. Inadmissible materials are those characterized by residual radio-activity, asbestos, bitumen materials. Requirements related to ecological security are also asserted to the technologies of construction works.

Specific choice of materials and technologies for erection of "complex buildings" (E. Belanov), as well as control of works at the construction site and the adjacent nature protection objects according to the ecological requirements can be implemented by ECOST specialists.

Erection of the "complex buildings" elaborated by the architect A. Belanov on the basis of technologies proposed by Prof. A. Kimberg is not just a forced decision determined by complex relief and limited dimensions of free plots for construction sites. Residential quarters of this type can be combined with other projects and nature protection objects in the course of perspective urban development of Jerusalem, regardless of expansion plans of the city.

THE FUTURE OF HYDROGEN POWER ENGINEERING IN ISRAEL

ARIE LEVIN, MICHAEL MILOV, VALERY MALOFEYEV

Power engineering is one of the fundamentals in economics in any country, Israel has no natural resources for energy production, thus it has to rely on the import from potentially hostile countries.

One of the possible ways of overcoming dependence on the policy of suppliers is development of hydrogen production technology, which is one the most preferable power resources, both in terms of ecology and energetic efficiency.

Methods and means of using hydrogen are studied throughout the world. Leading companies (GM, Ford, BMW etc.) already develop and produce engines using hydrogen as fuel due to that or another scheme. Advantages of hydrogen are generally known. The only problem preventing its wide use for the time being is the fact that its obtaining (due the generally accepted scheme of water electrolysis) requires considerable consumption of energy.

The technology proposed herewith is that of extracting hydrogen from the earth bowels, which is a revolutionary and accessible approach, especially in Israel.

A few years ago a new immigrant from the former USSR defended his Ph.D. thesis related to “Hydride Earth”. This theory maintains that in certain regions non-oxygen alloys, “silicides” (mainly Si, Mg, Fe compounds in proportions 3:2:1) are deeply bedded. In the regions of deep cavities, like the Syrian-African one, they are available at the depths of 2-3 km. After having been flooded, the reactivate discharging a huge amount of hydrogen (1.200 l per 1 dl of alloy).

The study implemented in Israel showed allocation of such compounds at accessible depths. At present further studies are proposed for the purpose of more precise definition of the coordinates specifying allocation of the silicides.

Pre-mining probes must be implemented by Russian geophysicists equipped with specific appliances. These probes will enable to mine one or two boreholes to provide an access to the compounds and show the possibility of obtaining hydrogen directly from the earth.

In case hydrogen is disclosed, this will promote development of a new industry and obtaining a new ecologically pure resource of energy, which will be cheaper than those used. This will release Israel and the West on the whole from dependence on the carbonic raw material.

REDUCING THE POLLUTION IN COMBUSTION PROCESS – ONE OF THE PROBLEMS FOR ENVIRONMENT PROTECTION

MICHAEL LEVITSKY

Atomization of liquid media is among the most required fields of technology. It is primarily determined by the need to develop heat power generation with regard to both meeting the standards for environment protection and reducing specific fuel consumption. The problem of improving fuel atomization is also urgent for internal combustion engines with diverse types of feed systems (from carburetor to Diesel engines), whose share in environment pollution is among the largest. To increase combustion efficiency and decrease pollutants, it is necessary to improve atomization of the supplied fuel.

Providing for high-dispersion fuel atomization results in fuller combustion and thereby reduces noxious waste emission. New atomizer designs are being intensely developed by the leading international companies in the field: Spraying Systems (USA), Lechler (Germany), PNR (Italy) etc. The effectiveness of this R&D is determined not only by knowledge of combustion processes and by providing optimal conditions for them, it also needs profound understanding of the outflow dynamics of liquid and two-phase media and of the effects involved in interaction between different media.

Analysis of characteristics of mechanical atomizers after their tests at the hydraulic laboratory of the Israel Electric Corporation has shown that even under water supply pressures of 6-6.5 MPa the SMD (mean diameter) of the atomized particles is 120-140 microns. Further reduction in particle size is envisaged by experts in this field only if supply pressure is raised, which is realized in Diesel engines, where the value of fuel injection goes up to tens of MPa.

For improving environmental in Israel were carried out works, which had a solution enabling to reduce pollution in combustion process by atomized particle size to be reduced by 40-50% under the same liquid supply pressures. After numerous hydraulic tests the SMD value of 65-75 microns was obtained. A number of preliminary technical solutions have been found which are expected to provide for the atomized particle size to be reduced even with the liquid supply pressure lowered by 30-40%. Note that halving the particle size increases the combustion surface by 4 times, which is highly effective for fuller fuel combustion. Reduction of supple pressure greatly facilitates the operation of the entire fuel supply system of the installation, particularly with regard to prolonging the atomizer's

service life by decreasing the erosion wear of its ducts and maintaining the stability of its flow-rate characteristics.

The persistent endeavor has yielded a successful design of a two-phase atomizer operating on the principle of using the novel hydrodynamic effect of interaction between the liquid and the atomizing medium. For that purpose the gaseous medium is fed into a vortex chamber, where its flow is swirled. The liquid is also fed into the vortex chamber, but in a different way - through radial ducts in the central bushing installed co-axially with the chamber. The outer diameter of the bushing corresponds to the radius of the vortex chamber at which the tangential velocity of the gas stream is maximal. The outlet from the atomizer is shaped by two conical surfaces, whose angle corresponds to the required liquid spray angle. The outlet space of the atomizer is divided into sectors by ribs installed in it. The above-described atomizer design is protected by patent.

After numerous laboratory tests a set of newly-designed atomizers was installed on a 220 MW boiler at the Eshkol heat power plant in Israel. The use of the new-designed atomizers enabled the NO_x content to be brought down from 1,100-1,150 to 380-550 mg/Nmc, fuel consumption was reduced by 0.7-0.5%, the usual drop in boiler capacity after prolonged work (11 months) was practically eliminated, and so on. The Israel Electric Corporation experts estimate the annual effect of using this atomizer design on a single boiler as over $400,000. *Installing these atomizers on a boiler built by the German company Babcock in Poland enabled the amount of unburned particles to be reduced from 250 to 95 mg/Nmc.*

Work on raising the quality of fuel atomization has also yielded positive results when tested on an internal combustion engine with fuel injection feed system. The structural adjustments introduced to improve the quality of fuel mixture preparation in a 4-cylinder Peugeot engine enabled the noxious component content in the exhaust gases to be reduced by more than half, while the specific fuel consumption dropped by 10-15%.

ON METHODOLOGY OF ELABORATION AND INTRODUCTION OF NOO-SPHERICAL ECOLOGIC CONSTITUTION OF MANKIND

DINA LEVSHTEIN, EFIM MANUSOV

Elaboration of the noo-spherical ecological constitution requires taking into account the contradiction between constitutional unification and biologic diversity. As Goethe wrote, "People obey the laws of nature even when acting against them".

Biology is a peculiar science, since its laws are ambivalent. That is why each one requires individual approach.

On choosing ecologic restitution as the first stage of introducing noo-spherical ethic-ecologic constitution of mankind, it is necessary to solve two problems. The ethic one, connected with the necessity of overcoming national, racial and other ethnic prejudices (1), and the ecologic one, connected with obtaining a sustainable structure for eco-systems of different levels, from bio-sphere up to bio-geo-cenosis.

It is generally known that solution of the second problem requires use of the eco-system tendency to formation of a sustainable state, a climax or, at least an anthropogenic sub-climax (2).

Implementation of ecologic restitution, i.e. allocation of ethnic units due to Vernadsky-Bauer law, as well due to the first, the second and the third laws of eco-dynamics, enables to obtain sustainable eco-systems and to estimate the psychological readiness of the society to global legislative initiative.

The above mentioned ecologic laws and principles enable to appreciate the availability noo-constitution and the possibility to follow the fourth law of eco-dynamics, the law of self-control of the living creature. The living systems must be capable of self-control and self-regulation, as well as of adaptation to the changing conditions of the environment (2, 3).

This is the only way for mankind to preserve sustainable state of the surrounding abode.

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INNOVATIVE SCRAP TIRES RECYCLING TECHNOLOGY

MARK LUBARSKY, BORIS TISHIN, ALEX GLOZMAN, BORIS BRUDNIK

It is estimated that some 70,000 tons of waste tires (9 million passenger tire equivalent) are produced in Israel annually. These tires mounds pose fire hazards that result in air pollution and release of oils to nearby groundwater. In addition, used tires, in which water is allowed to accumulate, serve as breeding sites for mosquitoes, including the Asian tiger mosquito, a vector of disease. In 2004, the Ministry of the Environment initiated a national campaign aimed at regulating the disposal of used tires from tire shops and dealers. In the next stage, the ministry intends to promote the development of tire recycling for the purpose of creating new products and saving in the import of raw materials. Despite more than 40 years of research and development, the use of pyrolysis to process scrap tires and related materials has yet to achieve commercial success in the World. Traditionally, products resulting from tire pyrolysis have been of a comparatively low quality and have thus had limited marketability.

WASTOIL Technologies, Ltd Israel, have jointly developed the Recycling Technology for commercial use in converting organic based waste materials into gas, oil and carbon char products. This Recycling Technology is the culmination of many years of research and development from the processing of numerous feedstocks, including tires and plastics.

TABLE 1. Comparison of WASTOIL Pilot-Plant Oil and Commercial Oils

Characteristic	Units	Oils		
		Russian Export blend Crude oil REBCO (Urals)	Azeri Light Crude oil	Tire Derived Oil
Density at 20º C	kg/cm^3	0.8950	0.8505	0.9512
Sulfur Content	%	1.8	0.15	0.75
Pour Point	º C		–21	
Flash Point	º C			<33
Aromatics	% wt			36
Naphthenes	% wt			
Viscosity at 40º C	cSt		6.27	2.87

Fractional yield, % vol			
Up to 200º C	21	22	40
Up to 300º C	41	43	73
Up to 350º C	50	55	80

Wastoil laboratory and pilot tests for search of optimum conditions of process have been conducted. Pilot plant has been constructed, by productivity up to 3 scrap tires (~21-27kg) per hour and was spent more than 10 tests. It is established that in pyrolysis process it is possible to receive a products comparable on properties with crude oil. The tire derived oil generated by pilot plant is much batter by fractional composition than Azeri and REBCO (Urals) oils (see Table 1). Positive result is higher than in compared oils content of light fraction to 2000C (40 %) and considerable percent of aromatic hydrocarbons (36 %) that allows to use pyrolysate as a raw materials for petrochemistry. Now continuously operating pilot plant by productivity to 10 scrap tires-per-hour is close to end.

Wastoil company developed a commercial plant design with the productivity up 72 tons per day.

A commercial pyrolysis plant 72-tons-per-day should generated 25 - 30 tons of tire derived oil, 7 - 10 tons of steel/tire wire, 20 - 30 tons of carbon, and 5 - 10 tons of noncondensable gases. This basic plant would likely cost $5 million to 6 million. As for a projected return-on-investment, those operators realize a 70% return-or more-after two years. That's a normal timetable for scrap-tire ventures, and a two-to-three-year period is typical in the scrap industry to take a startup business to the point where it's generating positive cash flow.

GLOBAL WARMING AND EARTHQUAKES

BORIS MAVASHEV

The global warming of climate the last decades of the 20th and at the beginning of the 21th century accompanied by weather cataclysms and seismic activity in various areas testifies to a connection between atmospheric and seismic-tectonic processes. According to the diffusion-dilatational model, the preparation of an earthquake is accompanied by an increase in volume and a dome-shaped bending of the earth crust. The increasing elastic deformations end drastically increasing inside temperature of rocks in the seat zone is conducive to an avalanche-like creation of fissures. Their nature and development over time in the surface layer would be the same as in the epicenter. This brings about a varation in pressure level and temperature of underground water. Hence, Radon and other gases are emitted. A direct proof for that are recorded increasing temperature of sea-water, of underground water, and of the air atmospheric activity on the eve of earthquakes in different regions of the world. The weather anomalies preceded the catastrophic earthquakes in China (2008), Pakistan (2005), Indonesia (2004), Japan (2004-2005, 1999), Turkey (1999) and many others.

The conclusive obtained of the statistical data about the interrelation between earthquakes and weather anomalies shown that a nature is single and the processes in the mere geo-cover are affected an the others. As a final result, seismic-tectonic energy is transformed into changed atmospheric circulation processes and meteorological energy. This allows to consider the problems of weather anomalies from a new scientific point of view and also to solve the urgent problem of earthquakes prediction and this will reduce to a minimum the of casualties among the population and the material damage in dangerous seismic regions.

FORMULATION AND SOLUTION OF THE PROBLEM RELATED TO OPTIMIZATION OF FUNCTIONING OF WATER RESOURCES MANAGEMENT SYSTEM

EFIM MANUSOV, NONNA MANUSOV

The stages of elaboration and preparation of solutions related to development of water resources management system are important and indispensable, since efficiency and perfection depend on the implementation quality of these solutions.

Besides, the extreme complexity of design and further planning of development of the water resources management system as one of the main types of large-scale systems of water supply is evident.

All this stipulates for the necessity of a systemic approach to management of such development. With certain conventionality, it may be assumed that the systemic approach to the problem of water supply in the Middle East integrative system includes components as follows:

1. Hierarchic approach to management of development and functioning of water resources (forecasting, planning and design of development, economic and operational dispatching management) taking into account common and specific properties and interrelations of different subsystems.
2. Integrative consideration including external interconnections of the water resources management system (and of its subsystems), as well as ecological, social and other non-economic restrictions.
3. Appropriate control of incompleteness (vagueness of information, human functions in management etc.).
4. Improvement of practical methodology of water resources management including establishment of automated management systems.

Further on, for appropriate substantiation of decisions related to development of the water resources management system it is indispensable to formulate the actual tasks of its functioning, which in modern conditions must be based on mathematical methods and computer engineering techniques.

Formalized tasks of substantiation of decisions related to development of the water resources management constitute another aspect of systemic studies.

WATER DEFICIENCY IN ISRAEL CAN AND MUST BE FOUGHT AGAINST

ALEXEY POPADIN

The front line of this fight is not that of unrestrained increase in prices of drinking water. It is generally known that only an insignificant part of drinking water is used for foodstuffs. Even the everyday routine of food preparation and dish washing comprises only about 30% of the general amount of water consumed, while generally in the country this quota is even lower. Thus, it is quite practicable to change the water consumption structure and to solve the problem of water supply in Israel by using deeply purified and desalinated water instead of sweet drinking one. While the technology of sewage purification from mechanical admixtures has been thoroughly developed and implemented, biological pollution prevents this purified product from being used for watering agricultural plots. Desalinated water or that obtained form sea water by means of desalination without conditioning is not applicable to be used for foodstuff, especially over a long-term period of time. Obtaining drinking water from sea water is an expensive process. Its cost is based on expenses related to conditioning and power consumption for desalination. Abandoning the idea of using desalinated water for foodstuff, we can exclude its conditioning. Thus, the only problem is that of power supply of the desalination process.

As appears from the above, solution of the problem related to water supply in Israel renders to two issues:

1. Development of an infrastructure for non-drinking water supply including everyday domestic needs (cleaning, bathroom, lavatory).
2. Power supply for processes of sewage deep purification and desalination.

While solution of the first problem is supposed be related to the competence of architects and constructors specializing in water supply, the second one is a matter of a wide spectrum of solutions. The following solutions seem to the most attractive among them:

1. Application of background heat. The Israeli climatic conditions enable to obtain a temperature pressure at least 20°C. The advantage of background heat is its being a renewed power source.

2. Application of low-potential heat brought by sewage to the purification constructions. Its temperature does not descend below 20°C, which enables to preserve temperature pressure at least 50°C. The advantage of this power source is its constant parameters in the course of the whole year.
3. Outlet heat of industrial enterprises, in the first place that of thermal and nuclear power stations. About 70% of the fuel caloric value is ejected to the environment. The main advantage of this power source is its constant parameters in the course of the whole year and extremely high thermal energy capacities.

The mutual distinctive feature of the above three sources of thermal energy is that they do not depend on the state of the market related to power bearers, and they are absolutely **free of charge**.

The modern technologies and highly efficient equipment enable to reduce expenses for exploitation of these power sources 8-10 as much as compared to the thermal energy used.

USE OF INTERRELATION BETWEEN THE LETTER FORMS AND THEIR REFLECTION IN NATURE FOR ECOLOGICAL MAPPING

GARIK RAIKHMAN

Provided herewith are the results of studies in the field of written languages. The studies indicated that the written languages, notwithstanding the differences between them, have mutual components, and the letters are but a kind of reflection of natural objects surrounding us, trees, mountains, river bends and details of the urban landscape (1).

The component is referred to as a generalized term which, depending on corresponding conditions, can designate a surface, a plane, a line, a dot (2, 3).

The basic logic of alphabet formation has been analyzed at the Californian Technological College (4). To compare different alphabets, the scientists referred to topology, a section of mathematics studying properties of figures. At that, there is no difference between letters written by calligraphic copy-book hand, by a rough piece of chalk, or extracted from a printer – regardless of the manner of putting down the topology of each letter remains permanent. Thus, there can be found out an interrelation between L, X, V silhouettes and branches of trees; they resemble tents, shelters, roofs of rural houses etc. This revealed interrelation between letter silhouettes, branches of trees and simple constructions promoted elaboration of universal signs for landscape classification, which was thoroughly studied and developed by Prof. A.I.Perelman, Prof. V.A.Alekseyenko an others (5), as related to all taxonomic levels of classification.

The author undertook an attempt to determine interrelation between the letter forms and symbols existing in written languages worldwide, as well their reflection in the realm as applied to technical writing.

The combining key word “facial” (“торцовое” in Russian) is a logical carrier of a datum plane being perpendicular to a wheel axis. The first letter of the word “facial” is roman **F**, while the first letter of the word “торцовое” is cyrillic **Т**. Author’s attention was drawn not to the form of the first letters (**Т** and **F**), but to the way how their elements (lines) combine. The letter **Т** consists of two mutually perpendicular lines, while the letter **F** consist of three lines, two of them being parallel one to the other and both being perpendicular to the third one.

The scientists' conclusions are fair not only for alphabetic letters, but also for the symbols used to logotypes.

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COLLECTION OF ARBORESCENT PLANTS OF ISRAEL FLORA IN THE GARDEN OF THE MUSEUM OF NATURAL HISTORY IN JERUSALEM AND ITS SURVIVING WITHOUT WATERING

TATIANA SHIMMEL

Arboretum of the Museum of Natural History in Jerusalem is placed on the territory of 2 dunams (2 acres). The principal planting of the arboretum was realized in 50-ties of the XX century. It represents the fine collection of trees, bushes and semi-shrubs of several woody vegetative associations of natural flora of Israel. In the garden of the Museum are presented the trees of the next woody associations: **the Mediterranean /Common/ Oak Forest** – the most familiar and important type of local arboreal vegetation (includes: *Quercus calliprinos, Pistacia palaestina, Laurus nobilis, Arbutus andrachne, Crataegus aronia*, and *Ceratonia siliqua*); **the Tavor Oak Forest** (*Quercus ithaburensis, Styrax officinalis, Pistacia atlantica*); **Aleppo Pine Forest** (*Pinus halepensis*); **Carob and Mastic Pistacia Scrub Forest** (*Ceratonia siliqua*, *Pistacia lentiscus*); elements of **Hydrophytic Vegetation** (*Nerium oleander, Tamarix tetrandra*); and other woody plants – trees, shrubs and vines from the named and other woody associations and they are:*Acer obtusifolium, Amygdalus communis, Cercis siliquastrum, Fraxinus syriaca, Hedera helix, Lonicera etrusca, Myrtus communis, Parkinsonia aculeata, Phyllyrea latifolia var. media, Pyrus syriaca*.

It is worth to take into consideration that during last 20 years minimum the vegetation of the Museum's garden survived practically without watering. This fact is optimistic for the gardeners of Jerusalem.

THE NEGATIVE INFLUENCE OF VARIOUS ECOLOGICAL FACTORS ON THE ISRAEL POPULATION MORBIDITY RATE

ROZALIA SLOBODOVA

One of the main problems among the Israel environment protection problems is the air pollution. To live normal active life, human beings need pure air first of all. A range of various pollutants causing respiratory diseases development may be described. These pollutants may have sometimes combined influence.

It is known that in Israel the morbidity rate due to combined influence of those factors amounts to about 1000 persons per year. However sometimes the interrelation between certain diseases morbidity rate and certain pollutants should be revealed. In that case the hypotheses theorem, or the Bayece Formula (2), may be used. Performing certain rather simple calculations one can find that the probability of a disease induced by the *i*-th factor is the highest. This analysis allows to estimate the synergetic influence of the pollutants mixture and to determine the dominant reason of the decease morbidity.

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ON CONNECTION BETWEEN BIOLOGY AND DEMOCRACY

OLGA SOROKINA

A lot of discussions are being carried on state power pattern that fits better to various human societies. Many people for some various reasons refer to some advantages of autocracy system. Often they refer to long-time traditions of those..., to the folk immaturity that would lead to disaster in lack of wise state power...etc.

However when an optimal pattern of the state power is regarded, one can't miss that while speaking on the state pattern a community of specimens of the same single biological species is considered. Hence this biological specimens community is affected by the same evolutionary laws as each of its species that require the feedback to adjust the species to the surrounding condition changes.

As the main democracy plus a system of reliable periodical society-government feedback is regarded, which the elections are supposed to be. In this case the biological sense of the democracy is clearly seen.

Indeed the society might be immature, just like a child, but nobody would get mature without some sovereignty.

An immature person is ruled mainly by its instincts, such as hunger, avoiding discomfort, sex etc and certain social instincts as well. These are domination instinct – leadership, – its opposite instinct of subdominating – obeying the stronger one. A child would never get matured without developing its ability to control these instinctive impulses by reason. However being left without certain independence level a child would never get matured. The pedagogy had already gathered many examples of it.

So, let’s return to feedback. The very biological evolution process is based on conditions-features changes feedback. It’s biodiversity engine, that let species react on condition changes. But when species «in general» are spoken such a feedback is lethal, the looser either die or just leave no descenders – what is the same, isn’t it?

Human being, Homo sapiens is a part of nature, a biological species. Hence it must follow the same biological laws. However human society is all way long trying to minimize the mortality rate by any ways and hence the “traditional” biological feedback stop affecting human beings. Hence a new mechanism of the this feedback providing is to be established. As it was said above, it is democracy. Democracy which is regarded not as primitive as a power of the majority, but s a power of law elaborated with participation of several various parts, which are selected among the bests.

Sometimes it's called “meritocracy”, however here nothing can be got “by the right of origin” only.

Well, and then what could be done with folk culture traditions, how to make a folk matured enough to keep that responsibility?

For gradual conversion to such an independence – that is definitely better than any sovereignty, only one way may be found.

Like in order to develop a child we do it through applying enlightenment and upbringing technics so to develop a mature folk a wide program of juvenile public education is to be established. That system for juvenile peoples (of 10-20 years old) would provide them not with just “technical knowledges” but with certain thinking habits, ie the habits of analytical attitude to any question.

With no such a program establishing no expansion of the current biotope capacity would be possible and hence the only way of population density regulation left for human population, the humanity would be the so-called “lemmings way”.

ENERGY ECONOMY AND ECOLOGY ON OPTIMAL LEVEL OF ELECTRIFICATION IN ISRAEL

YAKOV SOSNOVSKY, BENIAMIN MARASH

Electric power engineering constitutes an important source of harmful exhaust (1).

At that, the rate of growth of electric power production and consumption in Israel exceeds 1.5 times as much as the economic rate growth. The share of electric power engineering in the national economy increased from 31.3% in 1980 to almost 52% in 2005. The increase in consumption of primary electric power is due to the factor of 43% population growth and a 12.3% increase in the level of electrification.

In this respect the issue related to the level of electrification deserves special attention. This level is characterizes by dynamic increase, exceeding corresponding data of many countries poorly provided with thermoelectric power stations. Thus, in Italy with its climatic conditions and provision with own thermoelectric power stations similar to those of ours, the share of electric power engineering in the general national energy consumption was 17.5% in 2005, while in Israel the corresponding index was 28.8%. Losses of primary thermoelectric power stations connected with transformation, transportation and distribution, as well as with internal needs of the thermoelectric power enterprises, comprised 20% and 37.9% correspondingly (2).

The dynamics of these data in Israel (3) are provided in the Table below.

YEARS	*LOSSES (% of primary energy consumption)*
(actual)	
1980	31.3
1990	34.5
2000	34.3
2005	37.9
(forecasted)	
2010	38.8
2015	41.9
2020	41.7
2025	43.1

In this respect it seems expedient to study all the aspects of the integrated problem "power engineering – economics – ecology – energy economy" within the complex of researches related to perspective development of power engineering, and to determine the ways of optimal utilization of primary thermoelectric power stations. Specifically, to determine the technological process enabling to obtain efficient direct utilization of thermoelectric power stations proper, instead of the electric power produced.

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WAYS OF REDUCTION OF HOTBED GASES EMISSION CAUSED BY MOTOR TRANSPORT

MICHAEL TANKLEVSKY

The motor transport engines burn about 30% of the total world-wide oil production. Oil is a product of the extractive industry, and its CO_2 component fills up the atmosphere causing the "hotbed effect" and global warming.

Hopes were cherished for utilization of renewable resources in thermal power stations (alcohol, bio-diesel oil) extracted from plants, which could diminish violation of carbon balance in atmosphere. But there is no clear ground confirming that use of bio-fuel reduces emission of hotbed gases, while its production as food has already brought about complications in the foodstuffs market. It is efficient to use agricultural waste, wood pulp bio-mass and plants cultivated on degraded soil for bio-fuel production.

Hopes for forthcoming utilization of hydrogen fuel in thermal power stations providing ejection of water only to the atmosphere were neither justified. Besides technical difficulties in using hydrogen, for the time being this technology requires more power than that obtained.

Use of natural gas as fuel for thermal power stations decreases CO_2 emitted. But what still lies ahead is to overcome the difficulties in organization of storage and transportation of gas, and, besides, it must be taken into account that gas, like oil, is a renewable resource.

The main way of hotbed gases emission reduction in thermal power stations is their electrification simultaneously to development of ecologically pure (e.g. solar) power stations. In spite of endless discussions, practically nothing is undertaken in Israel in this direction. To speed up wide use of electromotive vehicles in order to achieve ecologically pure urban zones, we proposed together with Professor Mark Lurie a system of automating hire of electromotive vehicles. We believe in efficiency of the system proposed, but for the time of being we cannot realize it.

It is indispensable to pay special attention to development of cycling transport.

One of the most efficient ways of reducing hotbed gases emission caused by motor vehicles for the time being is their more rational utilization. This is less discussed, since it requires scrupulous everyday activities, involvement of attention of the entire society. Specifically, it is necessary to provide a more comfortable public transport, to take measures aimed at

considerable decrease in interurban trips of one person in a car with five seats, to stimulate purchase of up-to-date economical compact cars instead of second-hand worn ones, to promote studies for decrease in fuel consumption by motor vehicles, and development of ecologically pure travel facilities.

There is no doubt in the necessity to decrease emission of hotbed gases ejected by travel facilities. At that, it seems interesting to study carbon circulation in the atmosphere with the purpose to apprehend the role of motor vehicles in global processes. Tentative estimations (due to average data) indicate that the amount of carbonic acid ejected annually by motor vehicles comprises less that a quarter of percent of its total content in the atmosphere, and less than 1.5% of the annual bio-mass growth. Thus, it seems quite reasonable to admit that the impact of human activities on natural processes is sometimes exaggerated.

ECOLOGICAL FOUNDATIONS OF CERTAIN JEWISH TRADITIONS

MARINA TURKINETS

Any tree in the Garden of G-d…
Prophet Ezekiel

The Jewish tradition considers the tree as Divine creation (Genesis). The primary intention of G-d was that of creating the tree as entirely edible, including its rind, stem and fruits. But the earth disobeyed, and the trees grew with edible fruits only. Among the multitude of trees growing in the Garden of Eden was the prohibited Tree of Knowledge. Its fruit happened to become the reason for sin committed by Adam and Eve and their exile from the Garden of Eden.

In Judaism the tree as Divine creation is not an object of worship. Anxious, cautious, solicitous attitude to the tree is not determined by worshiping, idolization. At the same time the tree image is much more complicated than just another component of nature.

In the Bible the tree is mentioned 329 times, beginning from Genesis up to the Book of Esther, where it is referred to as a high tree in the narrative of hanging Amman the villain and his sons.

Oases, savior trees. One of the first oases, the miraculous tree which grew during one night and favored Jonah the Prophet with its shade.

"…For is the tree of the field man" (Deuteronomy). Isaiah the Prophet compares himself with a dried up tree. The righteous are compared with trees on the river bank, and water symbolizes the Torah. On the Feast of Tabernacles we are cautiously holding in our hands the four varieties of plants personifying different types of Jews. Citron, palm, myrtle and willow brought together symbolize the diversity of the human society.

The image of the Garden of Eden is interpreted as the source of Divine wisdom. The citrus garden – Pardes – is the symbol of exclusive human wisdom accessible to the chosen. At the same time Pardes is a kind of abbreviated formula expressing different levels of apprehending Torah. Thus out of the four sages who entered the Garden of Divine wisdom, the only one who survived was Rabbi Akiva.

Blooming trees are priceless treasures connecting human generations. When old people plant trees, their grandchildren enjoy the fruits, and they themselves plant gardens for future generations. Blooming gardens are like

the Jewish tradition which has been created and developed for thousands of years.

The Jewish tradition treats the tree with thrilling senses, as Divine creation, but it does not serve an object of worship. First of all it is a living creature. It is not by chance that man as Divine creation is compared with the tree. The tree's fate is similar to that of man. “Every blade, every tree sings its song to G-d” (Rabbi Nachman of Breslav).

Only human being can and must preserve this symphony of nature.

TO THE PROBLEM OF SOLID DOMESTIC WASTE PRODUCTS PROCESSING

ALEXANDER TZIKERMAN

During the recent years in different countries worldwide special attention has been paid to the problem of municipal waste products processing and utilization of solid domestic waste products. The main means of "struggle" against garbage widely spread in the course of the last 100 years is its burial in specially singled out sites, which causes considerable pollution of the environment, damaging nature and, consequently, human health.

In Israel the widely known dump site is Khiriya located actually within the Tel Aviv urban area. When it grew 86 m high, and the number birds nesting there exceeded 1 million, under the pressure of international airline companies it was transferred southwards to Dudaim, 5 km from Beer-Sheva. For the time being, above 5 million solid waste products are brought to burial ground without preliminary sorting and, certainly, without preliminary processing. It is known that, besides these sites, there is a huge number of illegal dumps throughout Israel, which cause an irreparable damage to the country.

The worldwide generally accepted way of extermination (not processing!) of solid waste products, which is incineration in various kinds of furnaces, is considered as unacceptable, since the dioxins emitted are extremely strong toxic substances. It is expected that in the nearest future technologies connected with incineration will be prohibited in civilized countries by corresponding legislation.

It must also be noted that the most efficient technologies of neutralization and destruction of waste products, such as plasma-chemical, electro-slag, or those processed in the "boiling layer" and others, have not yet obtained wide application for different reasons, among then that of considerable rise in cost of the process and requirements related to sharp increase in culture of waste processing.

In light of the said above, of special interest is the recently proposed and already implemented new concept of strict certification of waste products of each (!) enterprise within the industrial area, beginning from any random group of enterprises and up to large-scale industrial zones of towns, districts, countries…

Practically any industrial object has an INPUT of initial materials needed for production and an OUTPUT of the product and wastes (solid, liquid and gaseous), while the industrial object itself at the first stage can be

referred to as "the black box", i.e. its level and technological specifications of its production can be neglected. This information on functioning enterprises and those constructed anew is supplied to the DATA BASE permanently supported by a group of professionals constructing a STOCK EXCHANGE of waste products.

Practical experience indicates that quite frequently (!) the products required as Input in one industrial object can be obtained as waste product, i.e. as Output in another one.

The concept set forth hereinabove is especially vitally essential for countries like Israel, deprived of natural treasures of the soil.

Realization of the herewith proposed concept enables to obtain comprehensive utilization of waste products.

ECOLOGY AND CLEAN ENERGY

ILYA ZLATKIS

Interaction of Ecology and Energy Production

Enlargement of the consumption in the modern world and consequently an increase of energy production deepen negative tendency of the environmental situation, in soil, water, air and electromagnetic surroundings.

The tendency, weaken population health, and causes additional increase in pharmacological and medical industry and another means that aimed to compensate an environmental deterioration, for example, water and air filters, cleaning constructions etc. These industries are also request additional energy.

Population growth, developing countries industrialization and increase in weapon production also bring necessity of additional energy and strengthen negative tendencies in the environmental situation.

All this brings the steep, badly controlled processes and calls for irreversible results, such as a global ecological and energetic crisis, as a result of exhaustion of a natural resources.

Let's Blow Up the Visious Circle!

It is necessary to act in several directions:

1. To use widely effective clean technologies, without departures, in the first place in energy productions and transport.
2. To educate children and adults, preparing them to the new ecological reality with optimal energy consuming norms on true value base.
3. To create a legislation supporting a development of clean energy technologies according to the ecological criterions.

Clean Energy

The most effective direction of energy production development is wide use of solar and wind energy. This is a universal and natural way, for each place.

Optimal structure solution is a distributive system on a base of local autonomous power grids (1), including several power stations, using clean renewable energy in the common construction, producing electricity and warm (2).

The structure supplies solutions in fields of energy economy, improvement of environment state and education.

A carefree consumer turns to a responsible producer, owner of a little energy system and an educated user of natural resources.

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