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MESSAGE FROM NEIL B. GODICK

The number of Russians who have traveled outside the Former Soviet Union is negligible. Because people have little first-hand knowledge of other cultures and ways of life, Russia is often ignorant and frequently stagnant. Of all the post Soviet states, Russia is one of most untraveled. In a world that is becoming more and more globalized, Russia is isolated and in some ways a closed country.

Russian's population overwhelmingly perceives the world outside its borders as mysterious and hostile. Television, the only information source for many, reports on crises and catastrophes. Government officials and bureaucrats frequently manipulate their "foreign experience" as an argument to support an idea or position they are supporting. These foreign experiences are either retold in an incomplete manner or outright distorted.

Foreign travel, before the economic crises, was repressed as 80% of Russians believed they could not afford to travel. 5% of Russians have traveled outside the Former Soviet Union. More astonishingly, within the past 3 years only 6% of Russians have traveled within the Former Soviet Union. According to official statistics, less than 9% of Russian citizens hold a passport for foreign travel.

Domestic travel, before the economic crises, was limited. Intra-Russian migration, including employment related migration was very small. Sociologists' estimate that employment related migration within Russia is 6%-7%. Compared to job-hopping Americans these numbers are trifle.

Russian's lack of travel encourage its xenophobic and fortress under siege psychology.

I share with you this experience - When I first started visiting Russia (1991) I met scores of scientists. They were all genuine, sincere, honest, and smart. When they described their technology they impressed me with their claim that "*this technology has no world analogs*". I accepted the claim. When I returned home I tested the claim and learned that the claim was not valid. On my next visit with these same scientists I presented my information. These scientists were shocked, they felt bad, they apologized, and they were distraught. The problem was the definition of the word *world*. The

world in 1991 for many Russians was limited and it remains so.

We do not intend for these reports to solve any need our readers may have. We do intend to keep everyone current on technology developments in Russia. If you would like any additional information on any of the developments reported – send us a note.

Energy – Micro Power Station

Free-flow hydroelectric power micro-station

A group of scientists from **Siberian Federal University (Krasnoyarsk, www.sfu-kras.ru)** has developed an original free-flow hydroelectric power micro-station for use as a renewable power source.

The micro-station requires an air-tight generator with a direct drive from the turbine. This requirement is solved by an air-tight, low-speed, end-mounted synchronous generator. The generator was developed by this group.

The micro station's principal advantages are:

- lower cost of the power plant and the power it generates (2 -3 times compared to low-head power micro-stations, and 3-10 times compared to diesel power stations);
- reduced design, manufacture and installation time;
- low environmental impact;
- due to its modular design, which enables erection at the site, installation and power delivery to remote areas is possible;
- no need for maintenance of the immersed part of the micro-station.

Oil Extraction

Unique technology for oil extraction from hard-to-work deposits

In February **OOO NTTs Volnovye GeoTechnologii (Moscow)** took part in the 5th International Exhibition & Conference *Middle East Artificial Lift Forum 2009* sponsored by Bahrain's Ministry Of Oil Industry and held in Manama. At this exhibition the Company presented a unique technology - 'dilatation wave action' (DWA or wave method) for increasing and stimulating oil recovery.

This technology's wave method is most effective in oil fields with a falling recovery or those considered exhausted when using traditional technologies.

DWA's advantages are:

- high processability and simplicity in implementation;
- its 100% use of standard oil field equipment and well-tested process techniques and operations.

These advantages obviate the need for large material, power and labor inputs. The DWA technology has low environmental impact as it uses natural stimulants to increase the yield from oil-bearing strata.

Material Sciences - Glass Imaging

New technology for deposition of monochrome images onto glass, ceramics and other silicate materials

Scientists from Irkutsk State Technical University (Irkutsk, www.istu.edu/ru) have developed a new technology for semi-industrial deposition of monochrome images onto the surfaces of products made of glass, ceramics and other silicate materials.

Applying the technology does not require great expense or special conditions for surface treatment. This method changes the glass surface, which makes the image especially fast – it is not washed away and it is also resistant to mechanical damage. The image remains intact indefinitely.

The technology's principal advantages are:

- applying this technology does not require highly skilled personnel or acquiring expensive equipment,
- the process equipment can be set up in a small space,
- image deposition does not require any special conditions.

The technology results in image deposition onto both flat and some curved surfaces. Unlike hot-pressing and laser engraving, this technology combines low cost and process automation.

Special Composite Material

New composite material with a specific strength at the level of «nibs» and threads, and heat resistance up to 1000°C for manufacturing tools and parts in machine-building.

Specialists at the **Research Institute of Natural and Synthetic Diamonds and Tools (Moscow, www.vniialmaz.ru)** have developed a new composite material based on powder-like non-metallic components. Specifically, diamond, cubic boron nitride, etc. powders are used. The material has a specific strength at the level of «nibs» and threads and heat resistance up to 1000°C. The material is intended for tools used in heavy-duty operations. The material is used as structural parts in the aerospace equipment, in machine-building, etc., e.g., to manufacture sliding bearings, end-thrust bearings, nozzles, and various guides. The development is patented - Russian Federation Patent RU 2216435 and an additional patent application has been filed (2007119326).

Bio Composites

New mechanochemical technologies of liquid-phase biocomposites based on natural polysaccharides

Institute of Chemistry of Solutions (Ivanovo, www.isc-ras.ru) has developed mechanochemical technologies from functional biocomposites and nanobiocomposites. These composites are based on natural polysaccharides. The technologies are distinguished by their low specific power and material consumption, compactness and flexibility.

The technology for obtaining liquid-phase biocomposites is intended

for use as a component in drilling mud in the oil and gas industry, for making liquid wallpaper, putties, and plasticizing additives in the construction industry. Applications for Russian patents have been filed (2007136091, 2007136092, and 2007136094).

Surfactants

A new class of surfactants

The **Institute of Organic and Physical Chemistry (Kazan, www.iopc.knc.ru)** has synthesized a new class of surfactants – water-soluble amphiphilic pyrimidinophanes. These surfactants contain uracil fragments. These substances are the first macrocyclic amphiphiles examples based on nucleosides non-glycoside analogs described in scientific literature. The macrocyclic surfactants obtained have high antibacterial activity. Their minimum values inhibiting concentrations relative to Gram-positive bacteria are below 1 $\mu\text{m}/\text{mL}$, and they are capable of self-organization at concentrations much below 1 mM. In aqueous solutions, pyrimidinophanes form nanosized aggregations with inhibiting or catalytic effect relative to hydrolysis of esters of phosphonic acids.

Health Sciences - Diagnostics Biochip

New biochip test-system for detecting pathogens of three tick-borne infections

Siberian scientists have developed a nanotechnology-based diagnostic biochip test-system for rapidly and simultaneously detecting the pathogens of three tick-borne infections — encephalitis, borreliosis, and rickettsiosis. The test-system was developed by researchers of the **Institute of Microbiology and Epidemiology, East-Siberian Center, Russian Academy of Medical Sciences (Irkutsk, www.vsnz.nm.ru)** jointly with their colleagues from the **Limnological Institute, RAS (Siberian Branch) (Irkutsk, www.lin.irk.ru)**. The biochip's key element is an invisible-to-the-eye nanocomposite film applied onto a solid surface (glass, metal, ceramic, or plastic). It is there that the pathogens' genetic material process identification occurs. The developers state that this method is capable, in a single analysis, of detecting the carriers of all basic tick-borne infections. Diagnosis time is reduced; accuracy is increased. The system does not require costly equipment, is user-friendly, and can be widely used in practice.

Endorphin Producing System

***Transair* - a device for activating endorphins production in the human brain**

St. Petersburg Science and Production Center TES organized under Pavlov Institute of Physiology, RAS (www.infran.ru) has developed a device called – *Transair*. *Transair*'s key operating principle is based on the activation of endorphin production in human brain. The discovery that led to developing this device was made as far back as 1996. The researchers started its commercialization process only two years ago. The device's action is based on the discovery made by a group of scientists headed by Prof. Valery Lebedev. They found that by exposing the brain to weak electrical pulses the protective (endorphin) system is activated. In this state the

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human body initiates self-regulation and triggers its own «health factory» activity. The scientists claim the device has are over 100 indications for application including coping with many diseases including gastric ulcer, diseases of the liver, chronic fatigue syndrome and dipsomania.

Scientists in Belarus and Russia have implanted the human lactoferrin gene into goat DNA and produced transgenic kids

The Russian and Byelorussian scientists' scientific experiment on implanting human lactoferrin gene into goat DNA has been a success. The studies are conducted within the joint Byelorussian-Russian program *BelRosTransgen*. The Byelorussian partners is the **Science and Practice Center for Animal Husbandry, National Academy of Sciences of Belarus (Minsk)**, and the Russian partner is the **Institute of Gene Biology, RAS (Moscow, www.genebiology.ru)**.

Producing transgenic kids is a breakthrough in genetic engineering. This result was achieved after five years of joint scientific experiments. Worldwide scientists obtain and use cow milk lactoferrin. However, many scientists think that, in terms of its medicinal properties, cow milk is inferior to human milk. The scientists claim that goat milk with human protein will be more curative and therefore in greater demand. On 8 October, 2008 the first transgenic kid was born, and on 21 October – the second. Both of them are doing well. The transgenic kids were the products of different genetic constructs on human lactoferrin. During *BelRosTransgen's* three year program, over 100 embryo transplantation operations were performed with 30 transplant-recipient animals obtained.

The second stage of *BelRosTransgen* will include producing drugs based on milk from transgenic goats. In the presence of a built-in gene, goat milk will contain human lactoferrin. Lactoferrin is a natural antibiotic and has a wide spectrum of properties, including anti-tumor properties. The scientists claim, from transgenic goat milk drugs can be developed for treating cancer and diseases of the immune and digestive systems.