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MESSAGE FROM NEIL B. GODICK

The following is an edited and abridged story written by Galina Masterova.

According to the Russian constitution Russian citizens are entitled to free health care. The 1993 constitution guarantees universal health care.

Yet, when Yevgeniya Ivanovna's mother went into the hospital her daughter, Zoya knew that she should pay the nurse an *unofficial fee in cash*. The hospital was public, not private. The amount was small, $20. But it's the principle not the size of the *fee* that is the problem.

In reality, Russia has a split system. A mix of private medical care and a state system that is broken. Years of underfunding have left the healthcare system in a precarious state with decrepit hospitals staffed by demoralized and woefully underpaid staff. The staff encourages patients to make ad-hoc payments.

Russia is a society which produces world leading doctors and scientific researchers. At the same time, a few hundred miles outside Moscow, patients' families can be expected to buy their own gauze, needles and bags of saline and other needs for a hospital stay. The press reports that they sterilize instruments in soup pots on electric coils.

The Russian government is embarking on a huge reform which promises an influx of cash, over $28 billion, to outfit the country's hospitals with new high-tech equipment, better salaries, and improved care by 2013. The spending boost should see Russia increase its healthcare spending from 3.9% to 5% to approach EU levels.

The dire state of Russia's health care and its precarious mortality rate have acted as catalysts for the reform.

The government is building a series of health centers around the

country with a focus on cardiovascular disease and cancer. The reforms will place an emphasis on preventative care.

One of the programs in the new reforms will set up nine high-tech perinatal centers around the country. These centers are expected to save the lives of 1,000 children each year.

Russians have little confidence in their healthcare system, and some are opting for private insurance. The rich often head abroad for top medical treatment. Israeli hospitals, which are often staffed by émigré Russian doctors, advertise for patients in Russian newspapers.

As Zoya found out, it is standard practice to pay this vague tax that has no price list and no official recognition. The minute you arrive you pay everyone: you pay nurses, the people who clean the floor, the doctor, and the surgeon. The only way you know how much to pay is by asking people around you.

The reforms will raise doctors' salaries by up to 30 percent, but with wages so low, the medical profession is not yet impressed.

We do not intend for the following 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.

Russian scientists increase oil well productivity

To increase oil well productivity, technicians treat wells with acid compositions. The treatment agent often used is mud acid – a mixture containing hydrochloric and etching acids with various additives. Though production increases – there are negatives. This low-pH liquid can be a human health hazard. It also causes equipment corrosion and is difficult to mix. Moreover, it is not suitable for all oil-bearing rocks. For example, in high carbonate rock, mud acid causes additional sediments to form instead of dissolving them. If applied under unsuitable geological or temperature conditions, mud acid can also prematurely destroy the well.

Scientists from I.M. Gubkin State Oil and Gas University (Moscow) developed an alternative mixture for treating oil-bearing rocks to overcome these negatives. . They developed a dry acid

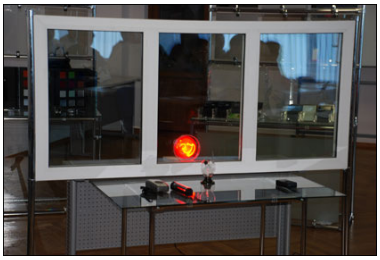
composition that is less corrosive to materials it contacts. Its application requires a longer treatment time but reduces the risk of damaging the well and equipment. The composition is also less dangerous for human health. It includes three basic parts:

- An acid that affects quartz and clay rock;
- A chelating agent that binds calcium and iron ions there by preventing their settling-out,
- A surfactant that promotes oil inflow into the well and protects equipment against corrosion.

The dry acid composition is a powder that is dissolved in hydrochloric acid before use. The new composition was tested at the Institute of Industrial Chemistry. It was pumped into oil-bearing rock at 95°C. After 24 hours, when the pores were filled with the solution, the rock permeability increased by 8%.

Tambov nano-windows keep in the warmth

The **Tambov State University Nano-Center** has demonstrated its energy-saving nano-windows.



Windows with nano-coatings do not transmit IR light.

They look like ordinary double-glazed windows. However, nanoparticles deposited on the glass surface reflect IR light that shines onto the particles from inside the room back into the room. Tests showed that, unlike ordinary windows that let 50% of the warmth pass through the window, this double-glazed window maintains up to 95% of the heat. This does not affect the window's visible light transmission. The new nano-windows are already mass-produced by *Spektr+*, a Tambov company. They will be on sale this summer. Their price is about 15–20% higher than the average price of double-glazed windows in Russia.

Russian radar can find people buried by detecting their breathing movements

Special radar that can detect people under rubble has been tested at the **Ministry of Emergencies' Noginsk proving ground near Moscow**. The device can detect people under piled concrete structures that are several meters high. It can be used in rescue operations after earthquakes, to detect miners after cave-ins, or snowboarders buried by an avalanche.

Tests compared this new instrument with three other similar devices. The radar successfully coped with all the tasks and was able to detect people under four different objects, including underground shelters and multi-meter concrete block piles. The device emits radio waves that detect any human movements, even slight thorax vibrations from breathing.

The Life Sensor Company that developed the technology says, “As to detection in open spaces, the device can detect human breath (by sensing thorax vibrations) at 50–70 meters. For detection under rubble, this distance would naturally be shorter, usually 5–10 meters. The device can detect human movements in real time. To detect breathing 15–30 seconds is needed. The radar can give readings on the distance to an object and on breathing frequency and amplitude. On that basis, rescue workers can judge the victim’s location and current state.” Further, according to the Company, using breathing frequency rescuers can distinguish between man and animal under the rumble. The device is user-friendly. It has just one button; power on/off. The search process is completely automated. The device is placed on the rubble and the scanning process starts. Data transferred via wire or wirelessly, are displayed on a monitor. The radar is lighter and more compact than its international analogs, weighing only 6 kg.

Kazan scientists develop an installation for comprehensive wood processing

Logging, plank production, and furniture making produce large amounts of wood waste. A promising wood waste processing technique is explosive autohydrolysis.

Wood-fiber mass obtained by explosive autohydrolysis is used for wood-based panel production. To make the cellulose that it contains

suitable for chemical industry, it must be further purified.

Researchers from the Chair of Wood Material Processing, Kazan State Technology University designed an installation for comprehensive wood processing. It involves explosive autohydrolysis and subsequent cellulose separation in the wood-fiber mass from sugars and lignin. Cellulose purification is accomplished by two-stage extraction. During the first step explosive autohydrolysis products are mixed with a water-ethanol mixture and heated to 90°C. Sugar molecules contained in the wood-fiber mass are dissolved in this mixture. This sugar solution can later be used to produce low-molecular weight substances (e.g. furfural). Wood mass separated from the first extractant is mixed with 2% sodium hydroxide solution in the second step. During this step cellulose is freed from lignin. After washing and drying, it can be used to produce glucose, levulinic acid and other products.

The technological solutions that reduce energy consumption include:

- The dynamic "shot" energy released during the reactor pressure drop that is used for additional mechanical material comminution.
- Steam released during the first extraction stage is directed to a loading unit and preheats untreated wood material before feeding it to the installation.
- Explosive autohydrolysis in the installation takes the same time as sugar and lignin extraction from the treated mass.

Russian scientists reinforce titanium implants

Russian scientists developed a method for forming nanosized grains within pure titanium structure, which enhances several mechanical properties. **Researchers from the Research, Education and Innovation Center of Nanostructured Materials and Nanotechnologies and Belgorod State University in cooperation with scientists from the All-Russian Research and Design Institute of Medical Instruments (Kazan)** studied nanostructured titanium's structural and mechanical properties. To form nanosized grains with the titanium structure they applied a novel plastic deformation technique. It combines helical and lengthwise rolling. After exposing the metal to forming roll pressure, titanium was annealed to eliminate internal stresses. This produced variously sized grains. Some were less than 100 nm, while their average size was 290 nm. The specialists compared the strength of treated pure titanium and titanium doped with aluminum and vanadium. Mechanical tests showed almost a two-times increase in strength compared to the source titanium. Moreover, the values obtained were close to doped titanium strength values.

Significantly, the end product (titanium screws for traumatology) test results. They showed that nanostructured titanium has an extremely high plasticity. The sample's maximum breaking twist angle was 410 degrees. This is about 60% higher than doped titanium plasticity values.

Biocorrectors from food-grade and medicinal vegetable raw materials for human body prophylaxis and comprehensive treatment

N.I. Lobachevsky Nizhni Novgorod State University developed a production technology for nutrition biocorrectors. These are products from vegetables, fruits, cereals, berries, mushrooms and green vegetable tops. They can give a new taste and also prophylactic and medicinal properties to any dish.

This new cryogenic technology:

- preserves the raw materials' useful natural components, taste, color and smell after processing;
- gives the resultant biologically active agents high availability and assimilability compared to source raw materials.

The cryogenic production process includes:

- low-temperature vacuum drying;
- cryogenic comminution;
- obtaining a biologically comminuted product.

With this method high concentration and high biological availability is achieved for biologically active agents (BAA). Compared to natural products, the BAA concentration is 10 to 200 times higher.

The Author's claim that using biocorrectors can:

- correct a person's health status without medication, or speed recovery with minimal drug administration;

- prevent vitamin-mineral insufficiency in a safe, ecological manner, while reducing the toxic load on the body due to the sorption effect;
- correct useful intestinal flora (all biocorrectors are prebiotics).

All three effects are present in any biocorrector and produce beneficial synergy. The products' safety allows their use in separate treatment courses or continuously. To date over 100 biocorrectors affecting human health have been registered and are produced in accordance with this patented technology. The biocorrectors have foodstuff status.