

Y.A. KOZLOVSKY

MINERAL RESOURCES IN RUSSIAN AND WORLD ECONOMY ARTICLE 1. RUSSIAN AND WORLD MINERAL RESOURCES SECTOR

On the basis of economic criteria analysis of different countries all over the world it is shown that their economies are connected to mineral resources, abilities of the countries to build independent politics. It is concluded that the absence of a smart and scientifically based state development strategy and of the exploitation of mineral resources sector based on the self-production pattern with a necessary part of export and restricted import threatens the national security of Russia and leads to the loss of geopolitical priorities in the world mineral resources sector. A number of measures for a crucial breakdown in the state policy in the field of geological subsoil study, in mineral resources reproduction and in directing geological researches are offered. Working out the concept of a new Federal Subsoil Law one should be guided by the main principle - the economic security of the country.

Key words: mineral resources sector, economic security of the country, geological subsoil study, a new Federal Subsoil Law.

V.I. Vernadsky first proved that the Earth's wildlife and inorganic nature interact and make up a unified system. The study, which basis is the concept of a planetary geochemical role of a living material and the biosphere self-organization, was worked out in the first half of the twentieth century.

The openings made by V.I. Vernadsky allowed him to formulate and seek the solution to the problem of what the collision of two discordant powers of the Earth leads to. On the one hand, this is a mechanism of self-regulatory and self-development of the biosphere, and on the other hand, it a rapid progressing ecological disturbance of a technically armed man. In his well-known work «Biosphere» he wrote: «*Chemically, the face of our planet, the biosphere, is being sharply changed by man, consciously, and even more so, unconsciously. The aerial envelope of the land as well as all its natural waters are changed both physically and chemically by man*», and further: «*Now we live in the period of a new geological evolutionary change in the biosphere. We are entering the no sphere. The no sphere is the last of many stages in the evolution of the biosphere in geological history. The course of this evolution only begins to become clear to us through a study of some of the aspects of the biosphere's geological past*».

The sharpening problem of population is on the agenda of the mankind. What is the essence of this problem? In the twentieth century the Earth's population increased from 1.62 to 6.08 billion and the growth continues reaching 8 billion. The necessity to meet the growing material requirement of the mankind conditioned the economic globalization, growth of useful minerals extraction, energy production, agricultural products, consumer goods etc. The cause of it is a rapid increase of the anthropogenic impact on nature and environment.

The rock mass extracted from the subsoil reaches 100 billion tons a year and is intensively oxidized. Fossil fuels make up approximately one-fifth of this amount. By oxidation and fuel and organic matter combustion as well as by industrial processes CO₂, H₂O, SO₂, NO₂ and other volatile and mineral combustion products are inevitably produced. They are able to bring about climate changes, acid rains and pollute atmosphere and nature.

A problem of survival in such conditions and, as a consequence, a rational use of natural resources comes to the fore.

On the assumption of V.I. Vernadsky's numerous statements no sphere may be defined as a biosphere organized by civilization. That is why the temporal coordinate of its origin is vague, connected to the period of appearance of Homo sapiens and continues now. Taking this fact into account V.I. Vernadsky uses this concept in all times: «*We live in the no sphere and form it. What it would be depends on the Man, his intelligence and practical activities conducted by it*».

Unfortunately, all the following materials on economic and mining complex development somewhat remind of the fact that the Man has not changed and has not made any appropriate conclusions from the heritage of the outstanding scientist.

For a number of years I have worked on a monograph «*Mineral resources in Russian and world economies*», having analysed a great amount of material on Russian and world economies. Eventually, I made a conclusion that world economy is connected to mineral resources, abilities of the countries to build independent politics and transform this factor into an element of aggression, a historic view on this problem states authoritatively about it.

Briefly about Russian and world economy

As early as in 2013 The Ministry of Economic Development and Trade (MEDT) published its prediction of the country's development up to 2030. According to this prediction, Russia will become the world's leading power in 17 years and the Russians' life quality will exceed the decent standard of life of the Americans and the Europeans.

What did the authors of these developments promise to us in a couple of decades? The average salary will increase two-fold and the average retired pay will increase threefold. These stunning results will be reached due to the inflow of investment and to the substantial reduction of the public sector. The majority of state corporations will be eliminated as a result of the realization of privatization programme. By 2015 the la-

bour efficiency will increase 1.5 times, 25 million work places will appear, the GDP growth rates will exceed 5%. The experts introduced three strategies of achieving the goal.

— Conservative scenario — a «pessimistic» one. A moderate tempo of economic growth will be achieved due to the active modernization of fuel and energy and mineral sectors. The economy will increase twice by 2030. The orientation on import technologies and knowledge, spending on scientific researches and production will increase not higher than by 1.3% of the GDP by 2030. The real salary will grow at an average annual rate of 4%.

— Innovative scenario. Russia's economy develops more rapidly than the world one. The main source of the economic growth is innovations! Average annual rates of Russia's economy growth are estimated at 4.3% in 2013-2030 without regard to possible crisis shocks in the world economy. By 2030 the middle-class revenue level (those who possess «property, savings, competitive professional skills and take part in creation of civil society» by definition of the MEDT) will make up about 100 000 rubles. «By 2030 the population will reach 150.5 million versus 141.3 million according to the conservative scenario. The number of working population will reduce to a less degree». Thus it was planned by draftsmen.

— Targeted or boosted scenario is the most «optimistic». It has been worked out on the basis of an innovative scenario, but at the same time it is characterized by boosted rates of growth: 25 million highly productive workplaces will be created and modernized by 2020, investments will rise by 25% of the GDP, the production share of knowledge-intensive industries will rise by 1.3 times. Average annual gross domestic products rates of growth will increase to 5.4 % what will allow to raise Russia's share in the world economy to 5.3% of the world GDP by 2030.

The reaction to these productions has naturally appeared immediately. M. Delyagin, Doctor of Economics, Director of the Problems Issued by Globalization Institute, writes: «None of the three scenarios is realistic. In the following 17 years there will be no development, especially innovative one. On the contrary, we will face two deepest crises: in Russia and in the world».

Y. Yasin, Professor, an academic supervisor at the National Research University Higher School of Economics states: ...«Such strategies were published earlier in the presence of E. Nabiullina. They have always been speculated. For instance, a boosted way is a virtuous appeal, an attempt to please the authority's wishes. This variant carries no real basis, no decisions and no resources».

Moreover, reasoning from the necessity of forces and funds mobilization for Russia's economic recovery where we got due to a fault of the leaders of restructuring («perestroika») with their poor understanding of the economy, it is time to consider this question systematically.

In the opinion of many analysts economy usually functions successfully in the capitalist society, if the government controls nearly 50% of the GDP. Particularly in the USA the state spending share in the GDP is floating from 30 to 50%. That is why the vision of some Russian scientists that the participation of the government runs counter to the ordinary functioning of modern market economy is almost incorrect.

How cannot the government interfere with the situation if Russian so called businessmen undermine the state economy? I will give only one example — offshore. In December 2011 V. Putin being the Prime Minister came out against abuse of offshores. «The withdrawal of financial resources from industry through dummy companies is unacceptable», — he stated.

In December 2013 in another Address to the Federal Assembly the President tried to make the government to take de-offshoring measures again. «I will remind you of the great bargain in the current year with a total of \$50 billion, — he grievously reported. — «Selling shares in TNK-BP was out of Russia's jurisdiction, although the salespeople are well-known. They are Russian citizens. The buyer is known as well. It is one of the biggest Russian companies». He added later: «On the assessments of the experts, Russian goods worth a total of \$111 billion went through offshores or semi-offshores. This is one-fifth of all Russian export. Half of \$50 billion of Russian investments into other countries went through offshores as well. Withdrawal of funds which should be operated in Russia and direct losses of this country are behind these figures».

Furthermore, predominate part of the export income is invested into western economy. This is made particularly by industrial magnates themselves.

On the other hand, an essential part of goods made for the domestic market is now produced from imported components delivered at overvalued prices. Almost all the production in our country depends on import deliveries which may be shut off at any moment. As the latest experiment showed, it happened at someone else's intention in connection with escalating situation in Ukraine.

The research conducted by 'Pricewaterhouse Coopers' company showed that in the last two years 60% of Russian companies became victims of economic crimes including raiding. According to the Ministry of Internal Affairs (MIA) the amount of elicited bribes increased by 18% this year, the number of bribes on large-scale and on especially large-scale enhanced 1.5 times, and the average sum of a bribe increased two times and amounted to 145 000 rubles. It complicates business environment in Russia, does not it?

If the capitals went back to this country due to the weakening of tax 'stranglehold' in the period after default, then in recent years it reversed when the government started to tighten it again. The current government seems quite insane in this point.

Although there are other points of view! «The Ruin of Russia» was the title of an article written by a prominent economist J. Stiglitz in 2003 in 'The Guardian', Great Britain. Without mincing the matter he wrote in the preamble: «No rewriting of history can change the fact that neo-liberal reform produced undiluted economic decline». «A transition that lasts two decades, during which poverty and inequality increase enormously as a few become wealthy, cannot be called a victory for capitalism or democracy», — says the author.

Russia is a capitalist country now, a part of the world imperialism system which is connected to the world of transnational corporations via hundreds of inter-bank and intercorporate relations.

That is why, on the one hand, Russia cannot have such social-class support as the USSR had and will never have it, as the EFG editor in chief A. Proskurin says, and on the other hand, the accumulated bulk of relations between Russian and transnational corporations will hinder the development of a conflict confrontation.

Transnational corporations produce more than a half of all the automobiles, almost all amount of beer, all the tobacco products, a great part of electrical and radio electronic goods, computer equipment, approximately 80% of the service in geological prospecting for oil and gas in Russia. Who competes with whom at the Russian 'Ford', 'British American Tobacco' or 'Sun Brew' factories or in the workshops where the assemble of 'red', 'white' and 'grey' 'ASUS'es is carried out?

As A. Proskurin repeatedly highlighted, the USA is a country with a regressive industry being at the same time the world's greatest debtor. Here the US economy no.1 is functioning. On the other hand, there is a «bigger» (or the «second») US economy organized as several hundreds of transnational corporations whose world balance of debt is positive.

That is why careful attention should be paid to the correlation between US economy no.1 and US economy no.2 (the community of US transnational corporations). In fact, 500 greatest international companies provide more than 70% of all the international investments and sell 80% of all the electronic and chemical products, 95% of pharmaceutical and 76% of engineering products.

If we take into consideration the fact that the gross world product (GWP) is estimated at \$75 trillion, then the USA produce nearly 65% of the GWP. Approximately 170 out of 500 world greatest corporations are authentically American, although their manufacturing departments are scattered all over the world. The gross product produced by the USA (something close to American GDP in macroeconomic sense) is estimated at \$20 to \$25 billion which is now exceeds the US GDP and, thus, is much bigger than America's debt. The correspondence between the world debt and this approximately estimated US GDP is 60% to 75% being quite acceptable for the macroeconomic stability. Moreover, many of these transnational corporations (e.g. the ones of the banks) are the world greatest money lenders, including the US Government lenders, what allows to solve biggest debt problems within their narrow (American) circle.

«...That is why professional scientists who bother with at least draft analysis of both American GDP and GNP will naturally not expect an immediate crunch of the United States or the US economy no.2 at reaching a debt ceiling,» — summarizes A. Proskurin.

His fundamental analysis is acknowledged by foreign authorities.

Criticizing Russian approach to restructuring J. Stiglitz gave a very favourable account of the Chinese approach. He thinks the contrast between the strategies (as well as the results of development) of two biggest nations - Russia and China — is quite instructive. Over 10 years (from 1989 to 1999) China's GDP doubled, while Russia's GDP shrank twice. In the beginning of this period Russia's GDP was twice the GDP of China, at the end of it Russia's GDP appeared to be thrice smaller. J. Stiglitz highlighted that China was able to pave its own way of development without using 'recipes' of the International Monetary Fund (IMF) consultants. China succeeded both in providing a rapid economic growth and in creation of an absolutely private sector of collective enterprises.

It is essential to analyse the interconnection between economic and the world mineral resources sector from this point of view (a comprehensive analysis is provided in the indicated book).

Incidentally, according to V.J. Katasonov, Doctor of Economics, a set of documents is being prepared, where hard limiting (or rather removal) of sovereign right of states to regulate investment within their territories is provided. For example, transnational corporations will gain the right to challenge the national laws which reduce corporations' profits from manufacturing investment activities within the territory of some countries in the court, as well as to call for demolition (lost profits) allowance.

The general conceptual issues of supranational moderation of an access of transnational corporations to natural re-

sources of sovereign states were announced at the congress on raw commodities in Berlin in 2010 by Pascal Lamy, the World Trade Organization (WTO) Director-General (this event was reported in Russian mass media. He drew the audience's attention to the fact that there is no special arrangement devoted to moderating raw commodities trade in the documents of this organization. In fact, 20% of the entire world sales turnover appears to be out of scope of WTO 'effective control', as well as many countries which export predominately natural resources. According to WTO there are 21 countries in the world, whose exported goods consist of more than 80% of raw materials.

Lamy provides a 'theoretical base' of it:

— firstly, export duties on natural resources cause differences between internal and external prices for resources;

— secondly, higher external prices lower the welfare standard in other countries which is naturally 'not fair';

— thirdly, lower internal prices foster extra domestic consumption of resources, that causes depletion of this reserves.

The WTO experts' assessment was provided at the same congress in Berlin: 'liberalization' of international trade with natural resources will provide Western countries with additional revenue of \$110 billion per year, and the world capitalism fringe countries — with \$220 billion per year. Russia's currency reserves are over \$500 billion, but we have not become richer. This sum of money is a statement of a deplorable fact that Russia being raw material colony levied on the West a tribute of hundreds of millions tons of oil, hundreds of billions of cubic meters of natural gas, hundreds of tons of non-ferrous metals.

World mineral resources sector

Nowadays more than 200 types of useful minerals are extracted from the subsurface of the Earth. Oil, gas, bauxites, copper, nickel and others are characterized by the highest extracting rates. During the latest decade oil extraction increased by 1.1 times, gas extraction increased by 1.4 times, extraction of uranium increased by 1.6 times, of manganese ore — by 2.5 times, of cobalt — by 2.3 times, of tungsten — by 2.5 times etc.

At the same time the amount of confirmed reserves has not reduced over the last 10 years, but, on the contrary, increased noticeably: the reserves of oil increased by 1.7 times, of gas — by 1.4 times, of manganese ore — by 1.6 times, of copper — by 1.4 times, of nickel — by 1.5 times, of phosphates — by 4.6 times etc.

The current reserves level of the world extraction of the majority of useful minerals (only confirmed reserves) is very high: oil — 63 volumes, gas — 63 volumes, bauxites — 125 volumes, chromium ores — 152 volumes, platinum-group metals — 163 volumes, phosphates — more than 300 volumes, gold — 23 volumes etc.

Mineral resources, especially fuel and energy, take an active part in economy organization of all countries which use them, and may be fundamental for business and economic activity in such countries as Russia etc.

The confirmed oil reserves in world countries (except Russia) made up 229.6 billion tons at the beginning of 2012, which is by 67% higher than in the early 90s and by 0.5% higher than at the beginning of 2011. 76.7% of all these reserves are concentrated in the OPEC member countries, with Saudi Arabia, Iraq, Iran, UAE and Kuwait ahead. Industrial countries including Canada with its «synthetic» oil account

for 12.9%. The reserves of natural gas liquids are estimated at 18.8 billion tons or 8.2% of all liquid hydrocarbon reserves.

Among geographical regions the years of oil reserves are the highest in the Arab Gulf and in the Middle East — 89 years, with 140 years in Iraq, 120 years in Iran, and 104 years in Kuwait. The second place share the CIS countries (without Russia) — 50 years. In other regions the year of reserves are the following: North America — 52 years with «synthetic» oil and 10 years without it, Africa — 43 years, Latin America — 90 years with extra heavy oil and 38 years without it, South and Southeast Asia — 23 years, Pacific basin countries and Australia — 17 years, Central Asia and the Far East — 14 years and Europe occupies the last place — 9 years.

The years of confirmed gas reserves are 48 years in the world. In industrial countries they are 13 years, in third world countries — 65 years, in the OPEC member countries — 98 years. In planned economy countries and countries with economy in transition gas extraction will last 66 years.

Among the world regions with the biggest amount of years of gas reserves are the Arab Gulf and the Middle East with 114 years. Here are some countries whose years of reserves level is much higher: 150 years in Iran, 157 years in Qatar. The second place is occupied by the CIS members — 73 years of reserves. Other regions are classified according to the amount of years of reserves in the following way: Pacific basin countries and Australia — 65 years, Africa — 39 years, Latin America — 25 years, Central Asia and the Far East — 26 years, South and Southeast Asia — 28 years, Europe — 12 years and the United States — 10 years.

In 2011 the escalation of expenditures for geological prospecting work on solid useful minerals appeared almost in every region of the world, but the most rapid escalation was in Latin America and Africa. Latin America (predominately Mexico, Chile, Peru, Brazil, Columbia and Argentina) is now the most attractive region for investment accounting for 25% of the world expenditures for geological prospecting.

Geological business in Canada and Australia (with the world expenditures of 18% and 13% respectively) seem attractive for the investors. Quebec, Ontario and British Canada are the three Canadian provinces that provide 60% of geological prospecting, in Australia half of the expenditures fell on the state of Western Australia. The biggest increase of the geological prospecting level in 2012 fell on Africa. Here one should mention Burkina Faso which moved from the 12th place to the 3rd place in its region due to the increase of expenditures for geological prospecting. Extensive work on gold and copper in the United States provided this country with a top mark in the world ranking. Two thirds of all the expenditures fell on the states of Nevada, Alaska and Arizona. In Eurasia the leaders are China and Russia. Noticeable expenditures for geological prospecting for solid mineral deposits are also registered in Kazakhstan, Mongolia, Finland, Turkey and Poland.

A natural process of mineral resources sector globalization is taking place in the world, in terms of which location of economic activity is optimizing in order to reduce expenditures for extracting, processing and transportation of the raw material and for the production of the end raw product.

Mineral resources sector of Russia

Russia has inherited a status of the most provided with mineral resources country from the USSR. Russia's share in the world oil reserves is 13%, in the world reserves of gas — 32%, of coal — 11%, of lead, zinc, cobalt, nickel, iron —

from 10% to 36% etc. The gross value of explored and inferred reserves is nearly \$28.5 trillion.

After the breakup of the Soviet Union Russia faced the problem of mineral resources self-provision: either an almost complete (manganese, chromium, strontium, mercury, zirconium etc.) or just a great (lead and zinc, fluorite, barite, kaolin etc.) shortage developed from its 21st kind. In connection with this, Russia faced an acute dilemma: either to intensify search for sources of lacking types of useful minerals of its own or (taking into account the outlined entrance into the world market) focus on the import of deficient raw materials from countries of the near and far abroad simultaneously developing export of its alternative types and derived products. This problem must be solved individually every time on the assumption of economic considerations.

Russia dominates in oil and gas extraction, in steel and cast iron production, in production of primary aluminium, refined copper, nickel, zinc and titanium meeting its internal requirements in all of them, as well as supplying the external market with them. Such types of useful minerals as oil, gas, coal, iron ores, copper, nickel, gold, platinum group elements, diamonds, apatite's, potassium salts, and asbestos possess a stable and rather explored mineral resources base and developed extracting and refining capacity. Russia plays a less prominent role in producing manganese and chromium raw material, lead, tin, tungsten and molybdenum concentrates in the world.

Since 2006 geological prospecting investment in solid useful minerals increased at the own cost of users of subsurface resources, and in 2008 it reached almost 32 billion rubles, what is 40% higher than the index in 2007 and 2.5 times bigger than the one in 2006. However, in 2009 non-budget investment in geological prospecting made up only 18.3 billion rubles what is 42% lower than the previous year and by a third less than it was planned. By 2010 the spending on geological prospecting increased to 23.5 billion rubles, in 2011 it doubled the index of 2009 and in 2012 volume of financing was equal to 47 billion rubles.

The leaders in encouraging investment in geological prospecting for solid useful mineral are Siberia and Far Eastern Federal Districts.

Situation is on 2011: Russia dominates in the world by all basic indications of oil and gas industry. By oil productive capacity it is in top ten oil extracting countries, by gas capacity (47.5 trillion cubic meters) it is in the first place. By oil extraction (with natural gas liquid — 527 million tons) it occupies the first place as well, by gas extraction (688 billion cubic meters — general and 603 billion cubic meters — commercial) it is second best after the USA. By raw oil export (242 million tons) in 2011 Russia was second best after Saudi Arabia and by gas export (230 billion cubic meters) it heads the list. By oil and oil products consumption (153 million tons) Russia is in the fourth place after the United States of America, China and Japan; by gas consumption (406 billion cubic meters) it is next after the USA.

For the companies that perform geological prospecting in Russia the most attractive work is the one on reproduction of mineral resources base of precious metals and diamonds. During 2006—2011 more than two-thirds of all geological prospecting funding in the country fell on this course.

By the amount of investment the work on reproduction of mineral resources base of ferrous, non-ferrous and rare metals is in the second place. By 2010 one managed to recover to pre-crisis level, and in 2011 the biggest volumes of investment

were registered — more than 7 billion rubles, what made up almost 20% of all expenditures. The overall amount of money allocated on this course over the last six years is equal to 27.1 billion rubles.

One should mention that 3% of the world expenditures for geological prospecting for solid useful minerals is too little for Russia. Possessing the territory of 10–11% of the whole Earth's land our country must spend on these purposes at least \$1.8–1.9 billion (or 60 billion rubles) per year. Such clear disproportion is an indication that the organization of geological processes is far from ideal in this country.

One should also pay attention to some tendencies appeared in the world mineral resources sector, such as:

— comparing to the crisis period in 2009 when companies froze early stage prospecting works, in 2011 a widening of prospecting works in new places was observed despite the increase of risk by geological prospecting;

— a gradual replacement of unexploited deposits containing free-milling ore, large or even giant fields of low-grade refractory ores is taking place in ore mining industry. For example, copper deposits containing 1-2% of copper were developed in the world 30 years ago, but now the bulk of copper is extracted from porphyry copper-gold deposit containing 0.3–0.9% of copper;

— useful mineral extraction is gradually shifting from industrialized regions with well-developed infrastructure towards less developed areas. Oil and gas extraction is shifting onto the shelf including its abyssal zones which almost all new field discoveries over the last years are connected with;

— need for some types of useful minerals is increasing immensely with the development of new technologies and productions. Rare metals are especially required. In recent years a rapid growth of molybdenum use in devices allowing accumulation of sun energy is observed etc.

— The United States are leading now in production of oil and natural gas liquids in the world leaving Russia and Saudi Arabia behind. The main reason for the soar of oil extraction in the USA is the «shale revolution».

The first to announce the US records were the analysts of Bank of America. It emerges from their report that an average daily production of liquid hydrocarbon in the USA reached 11.5 million barrels in the first half of 2014. In Russia it reached 10.53 million barrels per day and in Saudi Arabia an average daily production of liquid hydrocarbon was 9.45 million barrels. The speed which the United States ramp up production with inspires respect. Last year the increment was 13.5% and over the last five years the extraction level grew by

70%. Herewith almost half of it accounts for the oil extracted from shale.

America uses much more oil than produces. Thus, in 2003 the oil consumption represented 830 million tons, while the oil extraction was only 446.2 million, i.e. the self-production covers only 53% of demand. Although the share of import is shrinking. In the outlook of US Energy Information Administration, by the end of this year America will lose its world oil import leadership, China will take over.

— Non-conventional oil whose cost of production is much higher makes a major contribution to the world extraction. Non-conventional oil extraction in Canada stated only 15 years ago, and now its share of oil extraction accounts for more than a half (herewith Canada's government does not differentiate tax burden on the companies due to the quality of raw material that they extract).

— The extraction of so called non-associated shale gas from low permeable reservoirs (predominately in the USA it increased eightfold from 2006 to 2011). Moreover, the market share of condensed natural gas that starts to oppress the pipeline gas in the European market despite more complicated economy is increasing as well;

— The need for some types of useful minerals began to shrink. Thus, the appearance of food grade plastic in the 1980s–1990s drastically reduced the need for tin for canned-foods industry and called for the crisis in tin extraction. Mercury, which was regarded as a strategic metal 30 years ago, is not required now because of its «toxicity». Analysts predict a crisis in extracting and processing of rough diamonds and platinum group elements in the foreseeable future. In the first case it will be connected with the production of artificial gem diamonds engineering, in the other case it will be connected with the invention of new efficient catalysts capable of platinoid replacement in car industry and oil refining.

— One should emphasize that the ongoing recession of mineral resources production and the production of their derived products, deterioration of raw material bases of operating enterprises, the expected elimination of productive capacity, a disastrous reduction of geological prospecting work volumes are fraught with further devastating consequences for the country's economy. Significant depletion of discovered oil, gas and lead deposits will occur by 2025, and by 2020 we will see a depletion of molybdenum, nickel, copper, tin deposits and reserves of diamonds, gold, silver and zinc.

The Russian State Geological Prospecting University
(117997 Moscow, MiklukhoMaklay st., house 23;
e-mail: igorech@rambler.ru)