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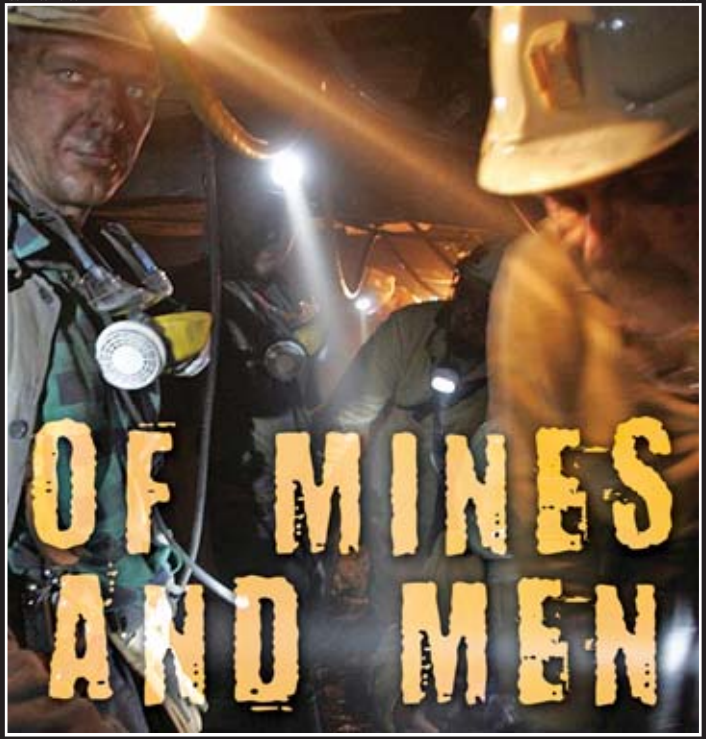

From the Publisher

It was naive of me to think that the Central Mining Institute (GIG) was all about mining and mining only. And I took it for granted that coal mining, a huge part of the Polish economy, should have a powerful institute of its own. After all, even kids in Polish preschools are taught that their country is founded on coal. Coal mining constitutes the bedrock of the country's economy, with industry, households and exports dependent on it. Whenever a crisis loomed over Poland, before World War II and afterwards, the coal industry has led the country out of it. Coal miners were glorified as saviors of the nation, a status they took advantage of. Even in the grim communist days, their privileged status meant that stores in Silesia, the coal heartland of Poland, sold goods that were never available in other parts of the country. Anyone who wanted to stay in power in Poland needed to have the miners on his side. And then, 20 years ago, it turned out that the Polish and international markets demanded reforms to the mining sector, which meant it would become much less important. Poland's first democratic government after World War II, installed in 1989, thus faced a challenge that surpassed even that taken on by Britain's Margaret Thatcher. The reforms in Poland were by no means painless, but they were effective and today, instead of 400,000 people, the coal mining sector employs 100,000 and is far more efficient.

Still, coal mining is not all there is to the Central Mining Institute. Our interview with Prof. Józef Dubiński, the director-general of the institute, shows that we should beware of stereotypes. "We are not focused exclusively on coal mining; the mining sector accounts for only 20-25 percent of our revenue," Dubiński says. "Our technical and technological experience in mining can be successfully transferred to other areas of the economy, which is why today GIG provides services to companies from practically all industrial sectors."

GIG could easily stand for "gigantic," because with a staff of 540, the Central Mining Institute is one of the largest institutes of its kind in Poland. The staff includes 12 professors, 14 academics with postdoctoral degrees and 90 with Ph.Ds. The Scientific Council of the Institute has been authorized to confer doctoral and postdoctoral degrees in mining and engineering geology since 1961 and in environmental engineering since 1998.

A lot has been said in Poland about a knowledge-based economy, innovation and technology transfer between science and business. A lot has been done in this department too. These topics occupy more space in *The Polish Science Voice* than all other subjects put together. The Central Mining Office and what Prof. Dubiński tells us about it stand as testimony to how plans and ideas can become reality.

This issue of *The Polish Science Voice* also carries a series of reports on the international successes of young Polish researchers. These include a Gdańsk academic working to develop new methods to treat infectious and neurodegenerative diseases; a young scientist in Cracow researching the transformation of matter after the Big Bang; and a Ph.D. conducting research on third-generation solar cells.

Andrzej Jonas

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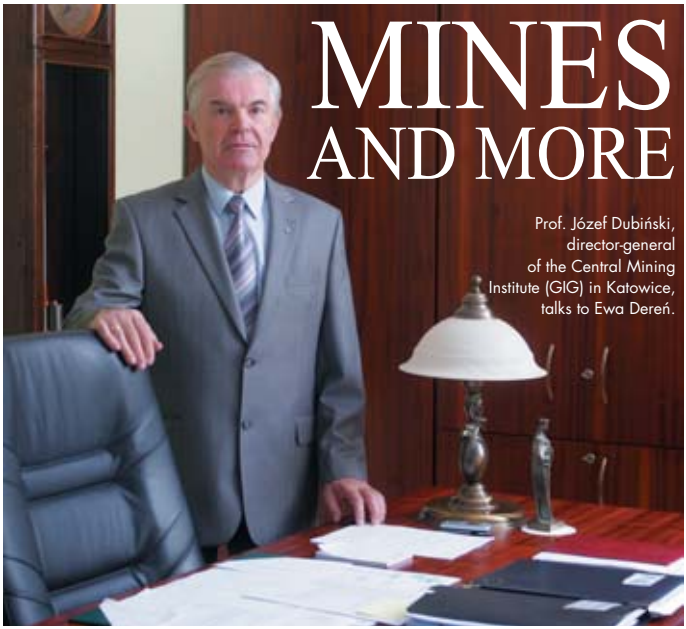

MINES AND MORE

Prof. Józef Dubiński, director-general of the Central Mining Institute (GIG) in Katowice, talks to Ewa Dereń.

The Central Mining Institute is a research and development center that provides services to many other industries, not just the mining sector. Why the name then?

We provide fundamental research for the mining industry, and our key specialties are mining and geoengineering. In these fields, the institute works with mines, coal companies, companies working for the mining sector, universities and research institutes. However, in its search for new areas of business, GIG has also developed other research fields, especially those related to environmental engineering. This has significantly expanded our market. Environmental engineering includes waste management, water management and air protection—the market in this case isn't just Silesia and the mining sector but the whole country. Furthermore, GIG is an EU Notified Body in the area of three directives: machinery, explosions (ATEX directive), and explosives for civilian use. That also extends our customer base, as explosion risk exists in all kinds of factories. Methane explodes in mines, grain dust may explode in agriculture, and coffee may pose an explosion risk in the food industry, for example. In all these cases, the EU's ATEX directive imposes the need to check out the potential for such an explosion through risk analyses. These are performed by our specialist laboratories dealing with industrial safety.

Thus, even though the mining of mineral resources is GIG's strategic area of research and development, we don't have just one strategic customer. We are not focused exclusively on coal mining; the mining sector accounts for only 20-25 percent of our revenue. Our technical and technological experience in mining can be successfully transferred to other areas of the economy, which is why today GIG provides services to companies from practically all industrial sectors. This

diversification of research fields and market products in the form of research services is an effective instrument of financial stability for us, especially in this time of crisis.

Our partners also include local governments and state administration bodies. We have foreign partners all over the world. The market of buyers for our services is growing all the time, in terms of both the subject matter and geography.

■ Can only a large research center handle such an extensive range of business?

I believe that research centers shouldn't be too small because they simply won't cope in a tough market situation. Most research and development centers benefit from government financing to the tune of only 20-30 percent, which means they have to earn the remaining 70 percent or so on the market. That's not so easy, unless you have a large group of specialists educated in different fields. Without this, it would be hard to handle larger projects and nearly impossible to take part in several major projects at a time. Furthermore, many projects require financial contributions from the institutions involved, something that small institutes can seldom afford. GIG doesn't have these problems; with a staff of 540, we are one of the largest institutes in Poland. We have a highly qualified staff and experience in a broad range of areas, which allows us to carry out large projects and join various consortia. GIG also has unique databases and specialist laboratories and testing grounds. This gives us a leading scientific and market position and a good financial standing. That the situation is stable is proved by the fact that we keep hiring new staff. Last year, we hired 30 people, and this year we have taken on 45 so far, most of them recent university graduates. All of them meet our stringent qualification requirements, also in terms of fluency in foreign languages. We offer them excellent conditions for professional growth and for developing their skills and careers.

■ Few research and development centers or government-run institutes in Poland are allowed to confer scientific degrees and titles. Why is GIG an exception?

The GIG Scientific Council has been authorized to confer doctoral and postdoctoral degrees in mining and engineering geology since 1961 and in environmental engineering since 1998. We can also make official requests to have professorial titles conferred on our staff members. This fact alone testifies to the high qualifications of our staff. The institute employs 12 professors, 14 academics with postdoctoral degrees and 90 with Ph.Ds. Among the other staff, 256 employees are university graduates. The number of university graduates among our employees has been growing consistently for years.

This hiring policy has produced tangible results; every year the institute's employees win prestigious prizes in both domestic and foreign competitions and at various international innovation exhibitions. We at GIG have adopted a

special strategy of scientific staff development whereby scientific dissertations are strictly connected to the institute's research agenda. At the same time, we enable our employees to work closely with other research centers in Poland and abroad, for example in the course of foreign research visits. We give publishing priority to postdoctoral dissertations and professorial monographs, and we also grant special prizes to dissertation supervisors. Employees receive one-off prizes for obtaining a Ph.D. and a postdoctoral degree, and those holding such degrees are eligible for regular bonuses. GIG employees constantly upgrade their qualifications by undertaking Ph.D. and postgraduate studies and by taking part in training courses, in particular courses on quality, environmental and occupational health and safety management systems. Last year, training courses financed by the institute cost over zl.120,000.

■ GIG is known for its efficient management system. What is the secret behind it?

The institute includes a Certification Unit that is authorized by the Polish Center for Accreditation to certify goods, personnel skills and management systems. We also have 17 laboratories accredited by the Polish Center for Accreditation, including 15 research labs, two calibration laboratories and one research lab that additionally has a certificate of approval from Lloyd's Register Quality Assurance for its quality management system meeting the ISO 9001 standard.

GIG was the first research institute in Poland to launch an Integrated Management System for quality, occupational health and safety, and environmental protection.

■ What are GIG's main research directions and tasks?

Our most important statutory goal involves work safety in mining; a large part of the institute's scientific and intellectual capacity is concentrated there. This special experience in dealing with work safety in mining can be successfully used in industrial

ZERO-EMISSION ENERGY PROJECT

In September, the Central Mining Institute launched a new project dedicated to zero-emission energy management in Poland until 2050. The project will be financed using funds available under the European Union's Innovative Economy Operational Program.

In the project, scientists from the Central Mining Institute and a team of experts from other research centers will study the prospects of generating energy without causing carbon dioxide emissions. The aim is to stimulate the development of Poland's energy sector on the basis of technology that would allow energy producers to rely on locally available resources while reducing greenhouse gas emissions.

According to experts, zero-emission energy sources, such as renewables and nuclear power, play a growing role in limiting carbon dioxide emissions from energy generation processes. The same goes for energy conservation methods. In many cases, though, applying such technologies and methods causes extra social costs and has an impact on sustainable development.

The Central Mining Institute project focuses on studies of the most probable scenarios for the development of Poland's zero-emission energy sector. According to experts, the project's results will be put into practice if there is public approval for the technology and an interest among businesses.

The project will include opinion surveys to determine just to what extent the Polish energy sector is open to changes and if it is capable of making them happen. The government and the public must be prepared to pay for energy generated without carbon dioxide emissions, experts say. The project is expected to contribute to preparing long-term development plans for companies in the energy sector. Identifying possible areas of social conflict should make it easier to make strategic decisions and plan new investment projects.

Special foresight methods will be used to carry out the tasks involved. Foresight is a research tool for predicting the future. It is different from classic forecasts in that it attempts to influence the course of events. Scientists say foresight methods help create a vision of the future. In this case, the method should show just how realistic it will be in technological and social terms to replace coal with other technologies in Poland's energy industry.

The first energy foresight project carried out in Poland was completed at the Central Mining Institute in 2007. It outlined scenarios for the development of the fuel and energy sector to ensure the country's energy security.

Ewa Dereń

safety in a general sense. The system of work safety management support developed at GIG can be used in any large company.

Another research field involves improving the efficiency of mining and minimizing its impact on the environment. Our priority is sustainable development, a principle under which the production of minerals must not only be efficient but also meet the requirements of occupational safety and environmental protection and be acceptable to the community. This means there is a need for an interdisciplinary research that encompasses geoengineering, environmental engineering in mining and post-mining areas, social issues as well as energy security based on using coal as fuel.

Today, Clean Coal Technologies (CCT) are a special challenge. These are different industrial technologies that use coal as fuel. CCT are mainly energy technologies, but GIG is taking an active part in researching and developing them because new advanced technologies combine issues related to energy, mining and chemicals.

The choice of research topics at the institute at a given time is also influenced by our revenue structure. This particularly involves revenue from research services based on the application of research results in business. This form of activity allows GIG to apply the results of its research and development work in industry. The priority research topics are those for which there is market demand.

How many projects does the institute handle annually?

Last year, our research teams carried out over 100 statutory tasks, 91 research projects of various kinds and over 6,000 research service jobs for both Polish and foreign customers. We carried out 20 projects of our own and seven commissioned projects, including one as part of a consortium of 14 research institutions where GIG was the main contractor. We also handled four development projects and 15 special-purpose projects in Poland, in addition to a total of 21 projects as part of various European programs.

What kind of work does the institute handle for external customers?

Our research services cover a broad spectrum of areas. In mining and geoengineering, our research work is related to issues such as work safety management, combating gas and dust hazards and endogenous fires, blasting safety, explosion-proof protection, rock bursts and rock mechanics, mining geology and geophysics, utilization of methane from mines, mineral enrichment and utilization, solid fuel quality evaluation, mining technology, testing of mechanical devices, protective equipment, and surface and structure protection. We also deal with problems related to issues such as the need to shut down a mine. In environmental engineering, GIG carries out research projects involving problems such as environmental monitoring, water and sewage management, waste management, air protection, radiological protection of the environment, the use of plastics and

non-metal materials in environmental engineering, environmental inspections and reports.

Some of these general topics are worthy of special note. In studies of mining-induced seismic risk, GIG has developed a unique tomography method that allows us to monitor changes occurring in the structure of rock burst-generating rock mass layers as a result of mining. The seismological observation system developed by GIG's specialists is highly valued across the world, including China. The institute has also developed an original hydraulic rock mass fracturing technology that effectively reduces the danger of rock bursts. We are also working to develop an integrated hazard management method for coal mines.

In the area of combating fire hazards, GIG specialists have developed an original innovative method for the early detection of endogenous fires. The method makes it possible to monitor and predict fire hazards.

In environmental engineering, GIG has developed a technology for removing radium from mining waters and sediments; the technology has gained worldwide recognition. GIG also takes credit for developing advanced technologies for utilizing mine waste dumps.

■ A lot of the safety research is carried out at GIG's Barbara Experimental Mine, the only site of its kind in Europe. What makes the mine special?

Apart from a testing ground on the surface, the Barbara Mine has an underground testing area, which is in fact unique in Europe, so we conduct research for foreign partners there as well. The mine is in Mikołów, less than 20 kilometers from the center of Katowice. It has two levels where various phenomena can be studied in real conditions. The main aim of the work there is to investigate methane and dust hazard, including that involving industrial dust, to study explosives and the safety of spark-protected devices.

Controlled coal dust explosions are carried out in the experimental drift. Analysis of these makes it possible to determine the effectiveness of methods for protecting mines from explosions. This is also where we prepare various expert opinions and assessments related to this major mining hazard. Another system determines the explosiveness of industrial dust.

GIG also tests the effectiveness of dust extraction systems and measures dustiness at workstations. Another group of studies at the Barbara Mine involves developing new and improving existing blasting agents. Our specialists assess the risk of blasting jobs, prepare expert opinions and certify blasting agents and equipment. We also carry out certification tests of equipment, protection systems and explosion-proof systems. Work is in progress to improve methods for assessing industrial disaster risk. Today every industrial facility has to have an explosion protection document as required by the ATEX directive.

■ You became GIG's director in 2001; Poland joined the European Union a few years later. How has the country's EU entry changed the institute's position in relations with foreign partners?

Even before that, the institute took part in various joint projects with partners from the EU15. We were there as observers; we were invited to take part in various projects, but we didn't have any real influence on many matters, nor could we receive any funding. That changed when Poland became an EU member. We developed intensive international ties right away. We take part in various opinion-forming European groups, bodies that develop EU legislation; our employees are members of technical committees that draw up European directives. One of our employees was transferred three years ago to work at the Joint Research Center Institute for Energy in Petten in the Netherlands. He comes up with many new ideas there, and we have quite a few European projects in the works.

We take an active part in EU Framework Programs. We carried out seven projects under the 6th FP and have three projects under way as part of the 7th FP, though this particular program is tough for Polish research institutions because it focuses on really big topics. We are currently carrying out eight projects under the Research Fund for Coal and Steel. There are many other specialist programs we take part in. I think that at present we have achieved quite a strong position in the European Research Area in mining and environmental engineering as well as in work to find new uses for coal. GIG employees take part in the work of major international bodies, such as the Coal Advisory

Group, the Advisory Council of the European Technology Platform for Zero-Emission Fossil Fuel Power Plants (ETP ZEP), and the Executive Committee of the International Energy Agency (IEA) Clean Coal Center.

What countries does the institute work with outside the European Research Area?

With all the leading mining countries around the world, such as China, the United States, Australia, India, Mexico, Vietnam, Russia, South Africa and many others. One of the most recent developments was the signing, in February 2009, of a letter of intent between GIG and the Australian government's Department of Resources, Energy and Tourism on establishing the Global Carbon Capture and Storage Institute (GCCSI). Under this letter of intent, GIG is a founding member of the GCCSI. Setting up the GCCSI is an initiative by the Australian government, which plans to assign 100 million Australian dollars annually for its operations. The institute's main aim will be to support a program to build 20 CCS demonstration facilities around the world to accelerate the application of the technology for carbon capture and storage in the energy sector.

In June last year, GIG and the Institute for the Chemical Processing of Coal in Zabrze signed a memorandum on cooperation with the U.S. National Energy Technology Laboratory (NETL). This is the only agreement of this kind that the U.S. institute has signed in Poland. The cooperation involves the exchange of information, scientists as well as joint research and development projects, especially in the field of coal gasification, advanced technologies for handling carbon dioxide, its storage and joint combustion of coal with other fuels, and also production of liquid fuels from coal. The NETL has four research laboratories that lead the way in carrying out the U.S. clean coal program. We hope this cooperation will contribute to a more effective use of our research teams.

The Institute for the Chemical Processing of Coal is GIG's partner in the largest clean coal program currently in progress in Poland—the planned construction of the Clean Coal Technology Center in Silesia. How advanced is this work?

It's very advanced. As the beneficiary and coordinator of the project, GIG has already invested substantial funds, but the project has faced delays for various reasons. This isn't a research project but an investment project involving the construction of buildings, process lines, laboratories and so on. Research won't begin until later. The facility has been planned as a clean coal technology research center for all of Europe, with unique pilot systems, including those for coal gasification under pressure, coal combustion in oxygen, and underground gasification. These pilot systems are a key part of the project because Poland has no testing ground of this kind. Other countries in Europe also have few of them because these are very costly projects. Combustion under pressure, or oxycombustion, is still a new thing in the world, just like gasification under pressure for special purposes. All this is supposed to be ready in 2011. No university in Poland has this kind of system and won't have one by that time, so we have signed agreements with the Silesian University of Technology and the Chemistry Department of the University of Silesia stating that future engineers will be trained there. These are completely new things, and if clean coal technologies are to be widely used in industry, specialists will have to be trained somewhere.

Clean Coal Technology is a broad concept; it also covers issues such as underground coal gasification, geological storage of carbon dioxide, new methods of producing hydrogen, energy efficiency, effective processing of biomass into fuels and chemical products. Will GIG be involved in all these fields of research?

Most of these issues are part of the energy industry, which uses coal as fuel, but in advanced technology the energy, mining and chemical aspects are closely related and intertwined, while these technologies are an opportunity for the entire economy. Poland's energy sector is based on coal. We cannot afford to switch the country over to gas, as that would make us almost completely reliant on gas imports. On the other hand, we have substantial coal and lignite resources that can be a source of energy for a long time to come, guaranteeing energy security for the country. That's why I think that, since we are condemned to coal, developing CCT is fully justified. Even that won't help, though, unless we improve the efficiency of the energy sector. Power units at Polish power plants are old and run down; they are about 31-33 percent efficient, whereas the figure achieved elsewhere in the world is anything up to 50 percent. The amount of coal used is proportional to the efficiency of energy generation. So, it's yes to developing CCT, but also yes to investing in the modernization of the energy sector.

What kind of CCT research is GIG pursuing at the moment?

One of the most important projects right now is Hydrogen Oriented Underground Coal Gasification for Europe (HUGE), in which the focus is on obtaining hydrogen. It is being co-financed by the European Commission under the Research Fund for Coal and Steel. GIG is coordinating the project, which has 10 other partners. As part of this project, a pilot coal gasification system has been built at the Barbara Mine, and a series of experiments are currently under way, involving coal gasification in a ground-based reactor that simulates the conditions of deposits under ground. Aboveground experiments should provide information needed for an underground experiment that we will begin by the end of this year. The aim of HUGE is to develop a model for a mine of the future where coal will be gasified underground and where gas rich in hydrogen will be the energy source transported to the surface. Together with the gasifying agent, calcium oxide will be supplied to the coal deposit, to bind carbon dioxide. Thanks to this, gas rich in hydrogen will be transported to the surface, while carbon dioxide—the gas responsible for the greenhouse effect—will be stored in caverns formed

where the gasified coal used to be. This kind of technology would offer a chance to utilize coal from deposits that are not mined due to excessive costs caused by unfavorable geological conditions. The project started two years ago and is due to end in June 2010.

The institute is also working on the geological storage of carbon dioxide. We are taking part in a major project commissioned by the Ministry of the Environment and aimed at identifying the geological impact of carbon dioxide storage in Poland. The coordinator here is the Polish Geological Institute. We are tasked with studying the Silesia, Podbeskidzie and Opole regions. We recently took part in a study involving the Bełchatów power plant, which will probably be the site for one of the EU's pilot zero-emission power plants. The area where holes for carbon dioxide injection will be drilled has been chosen; we will soon see how the operation works in practice.

■ **What is the state of research on producing liquid fuels from coal? Doesn't GIG have substantial experience in this field?**

It's not just GIG; such attempts have a long history in the world. Today South Africa can boast of sizable production of liquid fuels from coal, but it's important to note that their coal is cheap because it comes from open-pit or shallow mines.

GIG has a complete, fully developed coal liquefaction technology. In the 1970s, the institute had a carbon chemistry center working on coal liquefaction as part of the Maria Skłodowska-Curie Fund; it even worked with partners in the United States. The result was a technological project for producing methanol. Two of the institute's cars were test-driven with this fuel. This program was terminated in 1993 because funds ended due to economic changes in Poland. We didn't manage to get a new grant, and nobody wanted to buy the fuel because it was four times as expensive as regular gasoline. The installation was dismantled. However, this is still a popular problem and once in a while someone approaches us with a proposal to analyze the profitability of building a coal liquefaction system. At the current development stage of technology and given the coal prices in Poland, this project is still unprofitable. Nevertheless, the future CCT Center will include an experimental station for coal liquefaction. Perhaps solutions will emerge one day that will reduce the costs of such production. Besides, we want to take advantage of the know-how of people who worked on the 1970s project.

Your institute has developed a number of inventions that have made their mark around the world. Could you give some examples?

Let me mention a few more recent ones. In 2007 and 2008, we won gold medals at the Eureka World Exhibition of Innovation, Research and New Technologies in Brussels, first for our noise monitor—a system for monitoring noise in the outside environment, and then for a laser system for controlling the geometric parameters of mineshaft pipes and mineshaft reinforcements. Also in 2008, we had a huge success at the International Exhibition of Inventions in Shanghai when GIG's ultraviolet radiometer with a laser distance finder won a gold medal at the World Cup of Computer Implemented Inventions, a competition held by the International Federation of Inventors' Associations (IFIA).

Other awards include a European Medal for a project called "A Method and System for Monitoring Noise in the Outside Environment" and a special mention in the Polish Ecology Pantheon competition for our geothermal system for using mine waters to heat the Silesian Museum.

Last year, we also won an award from the Katowice branch of the Business Center Club for maintaining a leading position on the market for many years. This year, GIG was the only research center to win plaudits in the Ambassador of the Polish Economy competition organized by the Business Center Club under the auspices of Poland's foreign minister. The aim of this competition is to reward companies and institutions that are successful in international markets, are reliable business partners and promote high economic and financial standards and best business practice in foreign contacts. We received an award in the Creator of 21st-Century Solutions category.

All these prizes and awards are satisfying but they are mostly about prestige. We care more about commercial success. One of the biggest successes of this kind in recent years was the sale of our Seismological Observation System (SOS) to Chinese mines. We also set great store by the patents we obtain. Every year we submit over 10 invention designs to the Polish Patent Office; last year we submitted 12. We obtain a similar number of patents and protection rights for utility patterns every year; last year these numbered 19.

What will be the main directions of GIG's work in the near future?

Forecasts show that coal will continue to play an important role in the Polish economy in the coming decades, so our main goals will be linked to mining and geoengineering. Here, I would like to mention work on introducing effective technologies for mining thin coal deposits. The mining sector still follows the rule of selective extraction whereby we tend to mine thicker deposits that are better in terms of quality and efficiency. Whole batches of coal in thin seams remain unmined; there's about 1 billion tons of thin-seam coal in operating mines at present. If we shut these mines down, those resources will be lost. That's why they need to be utilized alongside mining in thicker coal seams. Mining from thin seams requires special technology instead of using mechanical coal miners. Such a system is being launched at one mine. We will be interested to see the results.

Of course, our strategic goal is CCT. We would like to be successful in underground coal gasification when we transfer this technology—after the experimental stage at the Barbara Mine—to a real mine in an operation that is planned for 2011. Legislation will have to be put in place to regulate these matters, as none exists today.

Another new area that we will develop is materials engineering, or more specifically, nanotechnology in mining. In recent years, the military has come up with the idea of a nanosoldier, or a soldier outfitted with clothing and equipment made from latest-generation materials. It is our ambition to work on similar problems with regard to miners; they would get completely different clothing, different helmets, different equipment. This will be due not only to nanomaterials but also new information transfer systems.

Bringing information technology to mining on a wider scale is another long-term goal of the institute. Design in mining, assessing mineral deposits from digital models, digital maps of coal beds—these are just some of the ideas we want to work on.

Developing new technology is also GIG's objective with regard to environmental engineering. For example, we want to modify the current technology for removing radium from mine waters to make it more effective. We are still working on new methods for desalinating mine waters so that they don't have to be pumped out and discharged into rivers. We also plan to develop geoengineering construction; this may not be a particularly complex scientific discipline, but there is a constant need for such services.

Polish Firms in EU Biotechnology Project

Two Polish companies, Selvita in Cracow and the BioInfoBank Institute in Poznań, have joined a European research project that aims to develop an innovative technology for the solid-phase synthesis of peptides, complete with equipment to conduct the process.

The project, called Peplaser, is scheduled to last three years as part of the European Union's Seventh Framework Program. Together with nine research groups in three other European countries, the two Polish companies have started work on state-of-the-art equipment to enable synthesis of long polypeptide chains on solid phase material.

The researchers are aiming to find a method to allow growing protein molecules to be bound on the surface of solid phase material.

The project's budget is approximately 4 million euros, including 3 million euros from the EU's Seventh Framework Program, which aims to support scientific research and innovative projects in many fields of science.

"The objective is to improve the competitiveness of European industry by developing new technologies that match market demand and the needs of society," said Nicolas Beuzen, Ph.D., director for science at Selvita.

Mateusz Nowak, Ph.D., Selvita's project manager, seconded, "This project will mark a turning point in proteomics the way the DNA microarray technology did in genomics."

Research consortium

The research consortium working on Peplaser comprises 11 research groups in four European countries, Germany, Austria, Poland and Bulgaria. Alongside the Polish companies, the project involves five partners in Germany (Deutsches Krebsforschungszentrum, KMS Automation GmbH, Pepperprint GmbH, Aims Scientific Products GmbH and Fraunhofer-Gesellschaft zur Foerderung der Angewandted), two in Bulgaria (Microsystems Ltd and the Technical University of Varna), and two in Austria (Upper Austrian Research GmbH and Akatech Produktions- und Handels GmbH). All work is being coordinated by Frank Breitling, Ph.D., from the Deutsches Krebsforschungszentrum (German Cancer Research Center) in Heidelberg, one of the world's five largest institutes of molecular biology. Breitling is well known in the research community because he has helped develop a breakthrough peptide printing technology and a prototype peptide printer.

"The work of this prestigious consortium and scientific discoveries we all made earlier independently of one another will translate into the development of new technologies," said Beuzen.

Each partner is in charge of a different part of the project. The Selvita research group is expected to perform analyses of available sequences of antibacterial peptides, search for peptide fragments responsible for cytokine induction and predict the toxicity of bacterial peptides and the cytotoxicity of peptides which induce apoptosis, or programmed cell death (PCD).

Research conducted by BioInfoBank will, in turn, focus on protein engineering, molecule design for new drugs and the application of bioinformatics methods to aid genome sequencing, design new enzymes and new, simple organisms with therapeutic properties.

Selvita

Selvita was established in 2007 in Cracow. The Selvita research team are scientists from universities in Poland and abroad who are experts in chemistry, pharmacy, molecular biology, biotechnology and computer science. The company provides comprehensive solutions to the pharmaceutical and biotechnological industries, allowing them to cut the costs of putting innovative compounds on the market.

In its strategy, Selvita focuses on synthesizing innovative, biologically active structures of its own design and develops IT solutions to facilitate research and minimize the risk of research failure. It also shares its expertise with other research organizations and provides pre-clinical research services. Selvita laboratories have been recently working on several projects, including a new drug against several types of leukemia and prostrate, breast, kidney and brain cancers. The company is also working to develop a molecule with a strong antipsychotic effect to treat symptoms of schizophrenia.

BioInfoBank

The BioInfoBank Institute is a nonprofit, research-and-development organization in Poznań. It specializes in designing software for genomics and proteomics. It studies the structure and functions of proteins, develops generic drugs and software for bioinformatics. It also trains specialists in biotechnology and information technology and promotes the commercial application of scientific discoveries.

In 2001-2004, BioInfoBank was named one of the eight most innovative institutions in Poland. Most of the BioInfoBank's work is funded by subsidies from the Ministry of Science and Higher Education, grants from the Foundation for Polish Science and EU subsidies. BioInfoBank researchers took part in the second, fifth and sixth Framework Programs of the EU and are now involved in the seventh.

Julia Pawłowska

Tracking Down Toxins

Monika Słomińska-Wojewódzka, a Gdańsk researcher working to develop new methods to treat infectious and neurodegenerative diseases as well as arteriosclerosis has received a scholarship as part of the Foundation for Polish Science's Homing program. The program is designed to benefit researchers returning to Poland after a time spent abroad.

Słomińska-Wojewódzka, Ph.D., works at the University of Gdańsk's Faculty of Molecular Biology. In her research work, she deals with ricin, one of the most toxic substances known to mankind.

Ricin, a toxin found in the beans of the castor oil plant, is considered to be one of the most dangerous substances in the world, inhibiting protein synthesis in cells. Słomińska-Wojewódzka is studying the transport of ricin in human cells, trying to establish how ricin finds its way from the endoplasmic reticulum into the cytosol and what proteins are involved in the process.

Setting sights on malformed proteins

Finding out how toxins work is of tremendous importance to medicine and research on basic processes in cell biology. Toxins, especially those produced by bacteria, are a serious medical problem and so learning the mechanisms which govern the transport of toxins in human cells may help develop methods to treat infectious diseases. Ricin itself may also find application in cancer treatment, Słomińska-Wojewódzka says. Her research work is designed to help explain the mechanisms that cells use to identify pathological proteins synthesized in the endoplasmic reticulum and ways in which such proteins can be degraded. This is of great significance to the diagnostics and treatment of diseases caused by the build-up of such malformed proteins in cells. These findings might one day serve as the basis to develop new methods to treat the arteriosclerosic vascular disease and neurodegenerative diseases, Słomińska-Wojewódzka says.

When she started her career in science as a postgraduate student, Słomińska-Wojewódzka studied the role which a bacterial protein known as SeqA (extracted from *Escherichia coli*) played in regulating the replication, transcription and growth of the lambda bacteriophage. She examined the effect SeqA had on the replication and expression of the bacteriophage's genetic material and the protein's influence on the growth of the bacteriophage.

Bacteriophages are viruses that attack bacterial cells and play a vital role in nature. They can be harmful when they attack beneficial bacteria, but they are nevertheless of great use to humans. Studies on bacteriophage genes have contributed to the rise of genetic engineering, and bacteriophages are also used in diagnostics, because those that only attack a certain bacterial strain allow for precise identification of bacterial species. Scientists are pinning a lot of hope on the therapeutic applications of bacteriophages. The viruses, which are commonly present in the human body, destroy bacteria and seem totally harmless to the cells of mammals, including humans.

Research conducted by Słomińska-Wojewódzka has contributed to a better understanding of the processes which regulate genetic information expression in bacteria.

Learning from the best

Słomińska-Wojewódzka developed her career in science at laboratories in Germany, Denmark and Norway. Last year, she received a scholarship from the Foundation for Polish Science as part of its Homing program. During her research work abroad, she learned about new laboratory techniques and performed experiments as part of various projects. She says she was able to use equipment that, for financial reasons, was unavailable at Polish laboratories at the time, and she also got an opportunity to learn from the vast experience of researchers working abroad. When she did her postdoctoral internship at the Institute for Cancer Research in Oslo, Norway, she got to acquire techniques that were entirely new to

her, including work with human cells and methods to research protein transport in cells. The knowledge she acquired while in Oslo enabled her to continue her research at the University of Gdańsk's Faculty of Molecular Biology.

Słomińska-Wojewódzka wants to continue and broaden her studies, form a small research group and obtain funds to buy the equipment and material she needs to conduct experiments. She says her dream is for her research to find practical application in the development of new pharmaceuticals and therapies to treat various diseases. Her studies may also contribute to a better understanding of what proteins do in cells and how. This could help explain all the complicated mechanisms that govern the functioning of cells.

Piotr Bartosz

What Happened After the Big Bang?

Mikołaj Chojnacki, a young Ph.D. at the Institute of Nuclear Physics of the Polish Academy of Sciences in Cracow, has received a cash boost from the Foundation for Polish Science to continue his research into the transformation of matter after the Big Bang.

Chojnacki writes computer programs and builds mathematical models to determine the properties of the primordial form of matter that existed in the universe milliseconds after the Big Bang.

Along with a group of colleagues, Chojnacki has described experimental data from the Relativistic Heavy Ion Collider (RHIC) project in a single mathematical model.

At the start of the 21st century, scientists discovered that quark-gluon plasma, or the form of matter than existed after the Big Bang, resembled a fluid that could be described by means of a hydrodynamic model. This form of matter can be produced in heavy ion colliders at the CERN center in Switzerland or at Brookhaven National Laboratory on Long Island, New York. The devices enable researchers to recreate a small-scale Big Bang for a short while and examine the properties of the matter generated in the process.

It is impossible to observe plasma because it does not last long enough, Chojnacki says. But huge detectors enable researchers to see the particles into which plasma turns—protons, neutrons, pions and kaons. The detectors register huge amounts of these particles. Researchers study their distribution and get an insight into what was going on during the first few microseconds after the Big Bang. The experiments are supplemented with calculations made on powerful computers.

Chojnacki works at the Polish Academy of Sciences' Institute of Nuclear Physics in Cracow. He deals with relativistic hydrodynamics and recently won a scholarship in the Start program run by the Foundation for Polish Science.

Although he works in Poland, Chojnacki mostly uses data from experiments made abroad. He works in a team with Assoc. Prof. Piotr Bożek and two doctoral students. Prof. Wojciech Florkowski and Prof. Wojciech Broniowski have set research directions for the team.

"At a certain moment, my computations contradicted the main concept which had existed in our narrow field, heavy ion physics. Some properties of the matter had been regarded as obvious, but we challenged this dogma and started to do research our own way," Chojnacki says. "We managed to do a marvelous thing—we described the experimental data from the RHIC accelerator in a single model."

Piotr Bartosz

Third-Generation Solar Cells

A group of researchers including Jacek Doskocz, a Ph.D. financially supported by the Foundation for Polish Science, is conducting research on third-generation solar cells as a more efficient alternative to traditional devices of its kind.

The researchers are working to develop low-cost and high-efficiency cells that they hope will contribute to the global fight against global warming.

Conductive polymers

A conductive polymer contains a conjugated system of double bonds, Doskocz says. The material may be used to make thin conductive films, which find application in solar cells as the layer which collects positive charges. Conductive polymers can also be used to produce textiles that do not pick up static electricity, in electronics as printed circuit boards, in optoelectronics as organic light emitting diodes (OLED), and in sensors.

Doskocz, who has won a scholarship from the Foundation for Polish Science's Start program, began conducting research into conductive polymers while working on his doctoral thesis. He used the latest molecular modeling techniques to design materials with the required properties. He gained experience in material synthesis and learned the latest chemical preparation methods during his stays at the University of Florida in Gainesville, in the United States.

Doskocz now works at the Institute of Low Temperature and Structure Research of the Polish Academy of Sciences in Wrocław where his research field is solar cells. He is also one of the editors of the biggest Polish website on nanotechnology run by the Nanonet Foundation for Nanosciences and Nanotechnologies. Although Doskocz is a chemist, he is a member of an interdisciplinary team of physicians led by Prof. Wiesław Stręk.

Luminescent solar concentrators

"We are working on third-generation solar cells in which a polymer is placed on a layer of nanoporous titanium dioxide, which in turn is placed on conductive glass," Doskocz says.

Traditional solar cells are inefficient because they do not use solar radiation to the full, Doskocz says. This explains why researchers have set their sights on luminescent solar concentrators (LSC), plastics that convert the radiation which cannot be used by a solar cell into a wavelength that the cell can use. An added advantage of the concentrators is that they make it possible to reduce the active surface of the solar cell—the cell can be mounted along the edges of a panel made of such a material.

"In my work, I make nanocomposite materials based on PMMA (Plexiglas), which I dope with nanopowders, quantum dots and organic compounds to improve the conversion process in which one wavelength is converted into another one," Doskocz says.

Many research projects are being carried out in this field across Europe, Doskocz says. The research is encouraged by organizations such as the European Union and environmental protection policies. For the time being, there are no cheap commercial alternatives to silicon solar cells, but many research teams, using different methods, are trying to develop such a technology, Doskocz says.

Piotr Bartosz

Fuel from CO_2

Every year, Poland produces around 340 million metric tons of carbon dioxide (CO_2). Some of this greenhouse gas could be converted into liquid fuels—gasoline and diesel fuel. Scientists from the Faculty of Chemistry at the Maria Curie-Skłodowska University in the eastern city of Lublin have developed a new CO_2 management method.

With Prof. Dobiesław Nazimek at the helm, the researchers are working on a technology to produce liquid fuel from CO_2 through artificial photosynthesis.

The average temperature on Earth has risen by 0.6-0.7 degrees Celsius since 1880 and the anticipated increase by another 0.57-0.6 degrees is expected to cause intense weather phenomena, raise the sea level and reduce drinking water resources. The global warming is due to growing emissions of greenhouse gases, hence the efforts to develop ways to manage these gases.

Two phases

The technology for producing fuel from CO_2 comprises two phases:

- conversion of CO_2 (generated by coal combustion, for example) into methanol using water and a catalyst;
- methanol conversion to fuel.

The technology is modeled after the photosythesis effect that occurs in plant cells. Using solar energy, water and CO_2, plants produce carbohydrates and use them as raw materials to synthesize other chemical compounds.

"The first process in our technology is based on artificial photosynthesis, that is synthesis of CO_2 and water vapor, the

FACTFILE

Prof. Dobiesław Nazimek heads the Environmental Chemistry Unit at the Maria Curie-Skłodowska University in Lublin. Nazimek was born in 1945 in Rzeszów. He obtained his master's in chemistry from the Maria Curie-Skłodowska University in 1969 and earned a Ph.D. in 1976. In 1989, he obtained a postdoctoral degree in physical chemistry.

His interests in science include the use of catalysis in environmental protection: catalytic nitric oxide reduction, photo-oxidation of organic water pollutants and flue gas desulfuring.

two cheapest and most commonly available substrates," says Nazimek. It is a highly endothermic process that necessitates extra energy that cannot be obtained from burning hydrocarbons or coal mass, he adds. The missing "energy complement" is provided by the methanol-to-gasoline (MTG) process. Methanol produced in the process is separated from water and, through MTG, it is concentrated to higher hydrocarbons, that is different kinds of gasoline and diesel fuel.

MTG synthesis is a highly exothermic reaction (the energy does not come from combustion) and employs a catalyst based on ZSM-5 zeolite, a compound classified as synthetic aluminosilicate.

"The MTG process gives us what we were missing, the extra energy," Nazimek says. "The cycle closes almost entirely, which is extremely important from the energy point of view."

The new technology offers high production efficiency and is clean, because the fuels are free from toxic sulfur and nitrogen compounds. Before the process begins, CO_2 has to be cleared of sulfur compounds and particulate matter. Chemically clean substrates are the prerequisite for a contamination-free end product.

Method with a difference

Global research on artificial photosynthesis started in the late 1970s. Similar technologies have been studied by research centers around the world, including in countries such as the United States and Japan, but they differ from the Polish method in the type of energy used in the photosynthesis, for example. The Polish researchers patented their method in September last year, ahead of their American colleagues from the Massachusetts Institute of Technology.

"Mastering artificial photosynthesis allows the production of any amount of cheap motor fuel, employing the MTG process developed by the Mobil company back in the 1980s," says Nazimek. Even though industrial production has not been launched yet, the project has met with interest. In June, the university in Lublin signed a letter of intent with the Lublin-Wrotków Heat and Power Plant to test the CO_2 conversion installation in a real industrial environment rather than a laboratory.

The Lublin-Wrotków Heat and Power Plant produces around 500,000 metric tons of CO_2 per year. The technology developed by the Lublin researchers will enable the plant to produce around 180-220 tons of gasoline and diesel fuel. The researchers hope that the conversion of CO_2 into liquid fuel will become a strategic national project that will ultimately be available to all businesses countrywide.

Nazimek says the research will take three more years and cost zl.20.5 million to complete. The researchers are yet to study the impact of pollution on methanol production and check the course of the process whereby CO_2 mixes with air. For the time being, the CO_2 has to be separated from other gases, including oxygen and nitrogen, and the photocatalyst is only efficient in the presence of high-energy photons (5eV).

The economy ministry has supported the idea and is ready to join the project, according to Nazimek.

"Chances are good for a strategic project designed to develop the artificial photosynthesis technology and increase its efficiency," says Nazimek. "The project will also activate the process in what are known 'soft photons' and thus make the technology more commonly available."

MB

Cocaine Detector in the Works

Researchers at the Wrocław University of Technology are building a device to detect cocaine in the sweat of car drivers. The device is part of a European Union project called Labonfoil.

The detector is a chip-on-strip kind of tester, or a miniature laboratory placed on the skin of the person under examination to determine the presence of cocaine in their sweat.

"The kit consists of two parts, a chip that looks like a patch placed on the person's shoulder and a data reader fitted with a sensitive optical system to scan the chemical content of the patch," said the manager of the project, Rafał Walczak, D.Sc., from the Microengineering and Photovoltaics Unit of the Microsystem Electronics and Photonics Faculty at the Wrocław University of Technology. The test will not only make it possible to determine whether a driver has taken cocaine, but also when that happened and what the dose was. The researchers are planning to further develop the sensor to detect other kinds of drugs.

All together now

The Labonfoil project was launched in May 2008 and has been conducted by research and development institutes and non-profit companies in Spain, Denmark, Germany, Austria, Sweden, Britain, Ireland and Poland. Alongside Walczak, other Polish researchers taking part in the project include Prof. Jan Dziuban and Patrycja Szczepańska, M.Sc.

The project, under way as part of the EU's Seventh Framework Program, aims to design and build four cheap and easy-to-use devices based on state-of-the-art microengineering and biotechnological technology.

"The cocaine detector we have been building is one of four devices of this kind that are being developed," says Walczak. The other three detectors are designed as lab-on-chip devices where samples will not be analyzed in chip strips stuck to the skin, but on chip pads made of silicon, glass or plastic. The analyzed values will be read in docking stations for dispos-

able pads. Depending on the type of material under analysis, different reagents will be introduced into the miniature lab. Miniaturization will make the analysis cheaper and test results will be obtained faster.

Another device under development will enable quick sample analysis in a doctor's office rather than in a lab where samples are traditionally sent for examination. This device will be used to monitor the condition of patients suffering from colon cancer. Quick analysis of the colon cancer marker (a chemical substance) in a patient's saliva will show if the disease is progressing or not.

The third researched device will be used to test patients' blood and the food they eat for the salmonella and campylobacter bacteria which cause food poisoning. "This device is supposed to detect the bacteria and also show what strains exactly we are dealing with," Walczak says. "This will make it possible to choose the right therapy."

Inside the nail-sized chip, the bacteria will be multiplied using the polymerase chain reaction (PCR). Then they will be selected and concentrated. The chip will be used with a docking station encapsulated in a casing sized two-by-two centimeters. The only disposable part in every test is the small and inexpensive chip."

The Labonfoil project is also expected to result in the development of a detector to determine the amount of algae in coastal waters. "This part of the project is being carried out for Britain and Ireland," says Walczak. "The project is important because the amount of algae testifies to the quality of littoral waters, water oxygenation and the content of carbon dioxide in the air. So far, such monitoring has necessitated large and expensive apparatus. When measuring stations become miniaturized and less expensive, there will be more of them in coastal areas."

The project is scheduled for completion in 2012 when all four devices will undergo clinical tests, so that they do not remain just theoretical designs, but prototypes that are fit for application in practice. "We hope to find a company to produce such detectors," Walczak says. "We also hope Polish manufacturers will be interested in producing components for the devices."

MB

Secondments for Scientists

Eleven young Polish scientists will be able to work in research centers in the United States, Britain and Germany as part of the latest round of the Foundation for Polish Science's Kolumb (Columbus) scholarship program.

Columbus scholarships are available to young Polish scientists who hold Ph.D. degrees and have not had a secondment abroad for more than six months since they obtained their degree, says Elżbieta Marczuk from the Foundation for Polish Science.

Under the program, six- to 12-month secondments are available for young scientists at leading research centers around the world. Candidates are rated according to their accomplishments in science and the work they plan to carry out at the foreign research center of their choice. The status of the chosen research center plays an important part in the evaluation as well.

This year, a total of 113 candidates applied for Columbus scholarships. Once


Krzysztof Rębała

the applications had been evaluated, 28 people were invited to interviews in the second stage of the competition. The 11 winners were selected by the managers of the Foundation for Polish Science.

The Columbus scholarships are worth between 3,000 and 6,000 euros per month, depending on where the second-

Karol Kamiński

ment is to be served. The foundation pays the scholarship holder's travel costs as well as those of their spouse if the couple are planning to stay together for more than half of the secondment period. Insurance for the entire stay abroad is paid for as well. After returning to Poland, the scientists can apply for a grant for holders of the foundation's foreign scholarships and funds as part of the Homing program, which encourages Polish researchers working abroad to return to Poland. Those taking part in the Homing program receive funds to continue international collaboration while doing research in their home country.

Most of the latest batch of Columbus winners are chemists, medics and physicists, and there is also an archeologist and a linguist among them. The young Ph.D. degree holders from across Poland will embark on research journeys they have been dreaming about, getting to know internationally famous experts in their fields and putting themselves to the test as members of reputed research teams.

Designing drugs for schizophrenia

Agnieszka Kaczor, a young Ph.D. from the Medical University in Lublin, is gearing up to go to Spain to help patients suffering from schizophrenia.

The disease affects around 1 percent of the population and is usually a life-long condition, says Kaczor. In most cases, the health of patients deteriorates as years go by and full recovery is only recorded in 25 percent of the cases, and it is believed that such patients would recover with or without taking antipsychotics. Another 25 percent of patients are able to live independent lives, have regular jobs and even families as long as they receive appropriate therapy. The remaining 50 percent spend their lives in nursing homes, daycare centers, mental hospitals, prisons or end up homeless, Kaczor says. Scientists have been trying to fight diseases with complex etiology by identifying and attacking several molecular targets at a time. Kaczor will seek such new targets in schizophrenia therapy at the Computer-Aided Drug Design Laboratory of the Pompeu Fabra University in Barcelona and the Barcelona Biomedical Research Park. In a group led by Prof. Manuel Pastor, she will analyze ways to treat schizophrenia through protein receptors that could become the target for more efficient antipsychotics. Kaczor will try developing such medication.

"To use the familiar analogy in which the receptor is a lock and the drug is a key, you could say that contemporary specialists in medical chemistry are trying to simultaneously open several doors leading to health by using copies of one key," says Kaczor. "The trick is to design the key."

The new thing about Kaczor's research is that she is looking for a substance that has a pharmacological effect on several kinds of receptors at a time—unlike older drugs that only work on one type. According to Kaczor, this will help keep the disease at bay and produce pharmaceuticals with fewer side effects.

Atypical drugs such as clozapine are efficient in the treatment of drug resistant schizophrenia, Kaczor says. Drugs like these are becoming increasingly popular in medical chemistry.

Kaczor's work will involve computer-aided drug design techniques which, according to estimates, can cut the costs of introducing a pharmaceutical to the market by up to 50 percent. The results that Kaczor obtains will be checked in experiments by research groups at the University of Santiago de Compostela.

Regional genes

The other 10 Columbus scholarship holders will do equally intriguing research.

Krzysztof Rębała, a Ph.D., from the Forensics Faculty of the Medical University of Gdańsk, is going to Barcelona to join what he says is the world's largest genetics and anthropology research project. During his secondment at the Institute of Evolutionary Biology/Spanish National Research Council (CSIC) and the Pompeu Fabra University in Barcelona, Rębała will study the genes of indigenous ethnic groups inhabiting the Kashubia, Kociewie and Kurpie regions in northern Poland. This huge project aims to explore the genetic diversity of indigenous human populations around the world, an attempt to trace and reconstruct the genetic history of humankind. The researchers will try to find out the timeline and the routes of prehistoric

migrations and determine how and when people arrived and settled in individual continents. The largest project of this kind in the world, it involves the world's best science and research centers which deal with genetic anthropology, Rębała says.

Rębała's research will kick off a project as part of which DNA samples will be gathered from anonymous donors, members of indigenous ethnic groups inhabiting different regions of Poland. In the future, the database may become a valuable complement of ethnographical, historical, genetic and epidemiological research, Rębała says.

Going west

This year's Columbus winners also include Wiesław Laskowski, Ph.D., from the Gdańsk University Institute of Theoretical Physics and Astrophysics, who will go on a six-month secondment at the Faculty of Physics of the Ludwig-Maximilians-University of Munich. Laskowski will conduct research in optics and quantum information. In Germany, he wants to concentrate on "non-classic properties of quantum states of light and ways to use the properties for safer and more efficient communication."

Łukasz Dobrzycki, a Ph.D. from the University of Warsaw's Faculty of Chemistry, will spend 12 months at the Department of Chemistry, University of Duisburg-Essen, Germany.

Another chemist, Bartosz Lewandowski, Ph.D., from the Institute of Organic Chemistry of the Polish Academy of Sciences, will spend a year in Britain at the University of Edinburgh's School of Chemistry.

Answering questions at Harvard

A young scientist from Białystok, Karol Kamiński, Ph.D., will go to Harvard University, where he plans to seek answers to questions that baffle many people around the world.

What is the key to a slim figure? Does the amount of sleep and physical activity and the duration of meals influence human metabolism? Do people regulate their circadian rhythm themselves or is it all in the genes?

Kamiński, who hails from the Faculty of Cardiology of the Medical University in Białystok, will probe all these questions during his stay in the United States. Recent research shows that genes that regulate the circadian rhythm, including physical activity, sleep, meal times and the amount of food people consume, also have a considerable influence on the metabolism of the fat tissue, muscles and adjustments of the amount of energy obtained from fat burning, Kamiński says. A reverse correlation has been established as well and it turns out that genes in charge of metabolism influence the daily cycles of physical activity and sleep.

The project which Kamiński will conduct at the Harvard Medical School aims to analyze the interdependence of circadian rhythm regulation and metabolic disorders such as obesity. Kamiński will try to determine which organs play the central role in the interaction between energy metabolism and the circadian rhythm.

Date with the Danes

Łukasz Albrecht, a young chemist from the Institute of Organic Chemistry of the Technical University of Łódź, will spend a year in Denmark joining the research team of Prof. Karl Anker Jørgensen at the Center for Catalysis, Department of Chemistry, Aarhus University. Albrecht will study the use of chiral organic catalysts in the synthesis of biologically significant compounds with a strictly defined spatial structure.

Albrecht's research work is well known at home and abroad. His scientific achievements won him a scholarship from the Ministry of Education and Science, and in 2002 he spent several months at the University of Ghent, Belgium, on a Socrates-Erasmus scholarship.

Łukasz Albrecht

Stateside

Two more scientific minds from Poland will visit universities in the United States. Adam Bzdak, Ph.D., from the Henryk Niewodniczański Institute of Nuclear Physics of the Polish Academy of Sciences is getting ready for a 12-month secondment at the Lawrence Berkeley National Laboratory, while Piotr Przytycki, Ph.D., from the Institute of Mathematics of the Polish Academy of Sciences, will spend 10 months at the Department of Mathematics, University of Illinois at Urbana-Champaign.

Piotr Bartosz

"We simply like teaching gifted kids" – Górniak

Medals for Math Buffs

A team of young Polish mathematicians won 11 medals, including five gold, at the 23rd International Championships in Mathematical and Logical Games in Paris Aug. 28-29.

The 30-member Polish team was selected through preliminary rounds organized by the Faculty of Fundamental Problems of Technology at the Wrocław University of Technology and the Wrocław Chapter of the Polish Mathematical Society.

Beautiful minds

The Polish team won five gold, three silver and three bronze medals, competing in a total of eight categories in Paris. Marcin Dublański came in first among college students, while Daniel Malinowski was first and Tomasz Dobrzycki second among high school students. Among junior high school students, Maciej Dulęba took the gold and Kamil Musiał grabbed the bronze. Among 5th and 6th grade elementary school students, Polish contestants bagged all the medals, with the gold going to Adam Nałęcz-Jawecki, silver to Damian Czarnecki, and bronze to Beniamin Stecuła. Among 3rd grade elementary school students, Daniel Murawski won the gold and Cezary Bednarz took the bronze.

A few preliminary rounds were held in Poland before the Paris finals, with the first round attracting 1,500 or so contestants. The semifinals were held in 20 cities in March. The best contestants were selected at national finals in Wrocław in May. They later represented Poland in Paris, accompanied by their tutors.

The International Championships in Mathematical and Logical Games have been held in Paris since 1987 and Poland has taken part since 1992. The competition is intended for outstanding students who receive individual guidance and attend extracurricular math classes. Competition finalists gain easier access to universities and free access to the Institute of Mathematics and Computer Science at the Wrocław University of Technology.

Passion for teaching

Janusz Górniak, Ph.D., chairman of the Polish organizing committee for the championships, says that gifted students need teachers with a passion. Passion makes it possible for the teachers to "discover rough mathematical diamonds and polish them," Górniak says.

The competition is intended for math enthusiasts and all those who take pleasure and satisfaction in logical thinking and treat it as an intellectual exercise, says Górniak. The Polish organizing committee also includes Assoc. Prof. Marian Hotloś, foreman of the jury; Prof. Krzysztof Kołodziejczyk, director of the Institute of Mathematics and Computer Science; Prof. Zbigniew Olszak, dean of the Faculty of Fundamental Problems of Technology; and Rościsław Rabczuk, Ph.D., honorary chairman of the organizing committee and member of the International Committee of Mathematical Games.

The Wrocław University of Technology is behind several educational projects that have helped spot the most talented students, Górniak says. Over the past 20 years, the university has provided special Talent Courses to around 2,000 high school graduates annually.

"Young people are fun to work with," Górniak says. "We teach them to think and try to show them that mathematics and physics are not so dreadful. But in order to inspire young people, the teacher needs to have a passion. Of my 120 associates at the institute, no more than five can be selected to work with children. They need to be superteachers, people who put their heart and soul into teaching, are able to inspire their students and are ready to give a free lecture at the crack of dawn on a Saturday for 500 students."

Math teachers committed to educating young people are becoming an extinct species these days, Górniak says. He adds that his own passion for working with young people is shared by Zbigniew Romanowicz, an expert in setting math tests for children, and Rościsław Rabczuk, another mathematician at the Wrocław University of Technology who was the first to establish contact with the French Federation of Mathematicians in Paris 23 years ago.

"We simply like teaching gifted kids," Górniak says.

Piotr Bartosz

PRAISE and PRIZES in Paris

A group of budding Polish researchers stole the show at this year's EU Contest for Young Scientists. The competition's finals took place at the Palais de la Découverte in Paris for the 21st time Sept. 15.

An international panel of judges granted three first prizes, each of 7,000 euros, to research papers from Ireland, Switzerland and Poland.

The authors of the prize-winning Polish paper are Aleksander Kubica from Bystra, Silesia province, a graduate of High School No. 5 in Bielsko-Biała and a University of Warsaw freshman; and Wiktor Pilewski from Skępe, Kujawy-Pomerania province, a graduate of the T. Kościuszko High School No. 4 in Toruń and a freshman at the Electronics Faculty of the Poznań University of Technology. They wrote their paper, *Spiral Diffractive Lenses*, following research workshops organized by the Polish Children's Fund. They were tutored by Prof. Czesław Radziewicz from the Faculty of Physics of the University of Warsaw.

Kubica and Pilewski also received honorary awards in the form of invitations to the Stockholm International Youth Science Seminar and the London International Young Scientists Forum.

This year's finals of the EU Contest for Young Scientists featured 77 papers written by 122 young scientists in 32 European countries, and there were also 10 papers by winners of contests for young scientists in China, Japan, Canada, South Korea, New Zealand and the United States.

Contestants from Poland also included Anna Kornakiewicz from Zawiercie, Silesia province, a graduate of High School No. 1 in Zawiercie and a first-year student at the Medical University of Warsaw. Her paper was entitled *Evolution of Ciprofloxacin Resistance Potential in Escherichia Coli*. Yet another Polish paper that qualified for the finals was *The Content and Distribution of Kynurenic Acid in Medicinal Plants: The Circulation of Kynurenic Acid in Nature*. It was co-written by Michał Tuski from Lublin, a graduate of the city's St. Staszic High School No. 1 and a Warsaw School of Economics freshman, and Monika Turska, a first-grade student at the St. Staszic High School No. 1 in Lublin.

Both these papers received high ratings from the judges, who included scientists from different EU member states and members of the European Patent Office. The panel was presided by Prof. Chris Philips from the Imperial College in London.

National heats

The papers representing Poland had been selected in a qualifying round by the Polish Contest Committee from among submissions that previously won nationwide contests or were specially recommended by scholars.

Before joining the contest, all the authors took part in a Polish Children's Fund program for gifted youth. The fund organizes the Polish qualifying round, which is supervised by the Polish Contest Committee, a body that was appointed in 1994 by the education minister together with the chairman of the State Committee for Scientific Research. The Polish Contest Committee consists of university professors and members of research institutions. The committee's chairman is Prof. Henryk Szymczak from the Polish Academy of Sciences' (PAN) Institute of Physics. The panel of judges appointed by the Committee includes researchers from universities and PAN institutes. Since 1998, it has been chaired by Prof. Jan Madey from the University of Warsaw's Institute of Computer Science.

The costs of the qualifying round and other preparations for this year's finals were covered by the Ministry of Education and the Ministry of Science and Higher Education. Since 2001, winners of the qualifying round have been able to enter the University of Warsaw without taking exams; since 2003 they have been eligible for the same privilege at the Warsaw University of Technology and several other universities.

Community contest

The EU Contest for Young Scientists has been organized by the European Commission since 1989 and at present it is part of the EU's Science in Society program. The contest covers exact sciences, natural sciences, technology, economics and social sciences. Contestants have to present the results of their research or technical papers. Participating countries can submit up to three papers selected in national competitions and enter no more than six contestants to the European finals. Contest participants have to be aged from 14 to 20 and must complete their papers before entering university. One paper can be authored by no more than three individuals. The research work cannot involve invasive experiments on animals.

This year was the 15th time Polish scientists took part in the contest. So far, Poland has won 17 main awards, including five first prizes, six second prizes and six third prizes, as well as 10 special awards. Papers for the next Polish qualifying round for the EU Contest for Young Scientists must be submitted by Oct. 31, 2009. The Polish finals will take place in the first half of January 2010, while the next European finals will be held in September next year.

Promoting Technology Transfer

Matching partners to exchange know-how and work together for new technology is the main aim of the Regional Network for Technology Promotion and Transfer (RSPTT) in the southern Silesia region. The project, in part financed by the EU's European Social Fund, was launched in June.

The Regional Network for Technology Promotion and Transfer is a network of specialist research centers, a joint effort by regional organizations supporting business and enterprises operating in Silesia province. The project has been carried out by five institutions: Górnośląska Agencja Przekształceń Przedsiębiorstw SA (Upper Silesia Agency for Enterprise Transformation) in Katowice as the project leader and Agencja Rozwoju Lokalnego Sp. z o.o. (Local Development Agency) in Gliwice, Agencja Rozwoju Regionalnego SA (Regional Development Agency) in Bielsko-Biała, and the Silesian Castle of Art and Enterprise in Cieszyn.

Companies working with research centers as part of the project have a chance to boost their rate of development, while for research centers, collaboration with enterprises is an opportunity to spread the results of their work and apply them in practice.

Keeping up the good work

The Regional Network for Technology Promotion and Transfer is a follow-up to a project that was carried out in Silesia province from 2005-2008. The project was handled by the same institutions and aimed to design a mechanism to enable efficient communication between enterprises and research and development institutions. The project resulted in the development of regional databases of companies, technologies and experts. The databases went on to become an efficient tool to combine business with science. More than 1,250 people took part in the project and the database features around 500 companies.

Other components of the project included a regular event called Information on Technology Transfer Days, training sessions and technology workshops attended by entrepreneurs and personnel from research and development centers. A quarterly newsletter was published as part of the project with descriptions of innovative technology and noteworthy initiatives in Silesia.

The network formed in 2005-2008 was the basis for the 2009-2011 project, which aims to provide a broader network for cooperation, technology promotion and transfer and stimulate the exchange of information through various initiatives, meetings and database updates. The project also seeks to promote technology and research projects, keeping entrepreneurs informed about research and development work at research centers and the results of these projects. Another goal is to provide enterprises with access to services offered by research and development institutes, identify enterprises' technology needs, and match partners interested in carrying out joint technology projects and in exchanging know-how.

Leading the Charge

According to the Polish Business and Innovation Centers Association, Silesia is home to the largest number of innovative companies in the country, ahead of the Mazovia and Wielkopolska regions.

For many years Silesian innovators have been winning top awards at the Brussels-Eureka World Exhibition of Innovation, Research and New Technologies. Over the years, the winners have included the Institute of Medical Engineering and Equipment in Zabrze and the Welding Institute in Gliwice, in addition to a number of private businesses, colleges and individual inventors. Studio Calsky Design from Tychy, for example, has won the Young Inventors' gold medal at the Brussels exhibition for designing hi-tech equipment to help blind people.

A league table of Poland's 500 most innovative businesses, compiled every year by Polish newspaper Gazeta Prawna, includes many companies from Silesia, which specialize in the design and production of industrial machinery, power automation systems and equipment, and mining and metallurgical technology.

In 2007-2013, Silesia expects to receive more than 296 million euros for technological research and development as part of an EU Regional Operational Program. This money is earmarked for increasing the region's attractiveness to investors, aiding the modernization of small- and medium-sized businesses, and for technology and innovation transfer.

Ambitious agenda

In order to achieve these goals, project consultants will visit companies to expand the project databases, identify the technology-related needs of enterprises and gather information on demand for different technologies and see to what extent the enterprises are working with the research and development sector. This will make it possible to match services and products provided by enterprises with potential users, experts say. The project will also include exhibitions of innovative technology, organized to demonstrate real technological achievements resulting from joint efforts undertaken by companies and research and development centers.

Conferences and seminars organized as part of the project will facilitate face-to-face meetings between entrepreneurs and scientists who work for research and development centers. All initiatives will be described in a quarterly newsletter of the Technology Transfer Network, an electronic version of which will be available at the project's website (www.rsptt.pl). The newsletter will be compiled by outside experts and contain articles on technology and innovation in individual sectors of the economy.

The Regional Network for Technology Promotion and Transfer will consistently expand its databases of services and technology-related needs. Plans also call for the development of a database of services, equipment and laboratory facilities available from Silesia's research and development centers. This will build a communication platform to give enterprises access to professional, innovative services and information on technology provided by research and development centers and experts in Silesia province. Projects undertaken as part of the RSPTT are not only targeted at enterprises, but also nongovernmental organizations, communities, individuals and university students. This means that initiatives planned as part of the RSPTT are open to anyone with an interest in innovation and technology transfer.

The RSPTT project is being held as part of the European Year of Creativity and Innovation.

Ewa Dereń

Supporting Inventors

The Warsaw University of Technology is preparing to launch an Enterprise Development Center, an institution designed to support inventors at every stage of their work.

Andrzej Rabczenko

Institutions of this kind help inventors by taking care of the entire project development process, says Prof. Andrzej Rabczenko, one of the academics behind the idea to establish the Enterprise Development Center.

The center will operate as a technology incubator, Rabczenko says, promoting the development of prototypes and the transfer of inventions to business. It will foster contacts with experts and help determine the target group of customers, find manufacturers ready to produce innovative devices on an industrial scale and check if some of the devices' parameters are not protected by a patent.

The Warsaw University of Technology's partners in the project are the Confederation of Polish Employers and the Polish Chamber of Commerce for High Technology.

The Enterprise Development Center aims to develop relations with partners abroad. It will work with Stanford University, North Carolina State University and the University of Maryland. According to Rabczenko, the U.S. market is an excellent source of knowledge about technology transfer for European countries, South Korea, Taiwan, China and other nations.

In the United States, more than 20 universities offer master's courses in intellectual property management, according to Krzysztof Świtalski, a member of the U.S.-Polish Trade Council, an organization that offers its members help in obtaining know-how from U.S. universities and global corporations. Top-ranking U.S. universities, such as Stanford and UC Berkeley, and leading scientists dealing with the transfer of know-how to business in the United States are a good example to follow for European schools when it comes to teaching IP management, Świtalski says. This will allow prospective graduates to learn about standards that have been well tested in the U.S. economy and that can also be applied in the European Union. "There are possibilities for building a bridge between Silicon Valley and Poland by promoting IP management," Świtalski says.

Few patents

Not many researchers patent their inventions in Poland, Rabczenko says. Will the number of patent applications increase in the future?

"Better patent registration statistics will not solve Poland's problem with innovation," Rabczenko says. "A patent is only a tool, not a success in its own right. The main goal is the practical implementation of an idea."

According to Rabczenko, the strength of an economy depends on technology and research results that can be translated into specific products. Technology incubators contribute to the transfer of research results to business.

The Warsaw University of Technology's Technology Transfer Center works to promote the idea of technology brokerage, or the business of bringing partners together to promote technology transfer. Bogusław Węgliński, who works at the Technology Transfer Center and is chairman of the IP Management Poland company, says that the key to a successful technology transfer is demand for innovation rather than the supply of inventions that no one has ordered. "I believe in innovations that are needed in business," Węgliński says. "If a company has a problem and researchers are able to solve it by increasing productivity or reducing costs then such cooperation will certainly become a fact."

Prof. Wiesław Kotarba, a deputy dean at the Warsaw University of Technology's Faculty of Management and former head of the Polish Patent Office, says that it makes sense to limit patent protection to one's home country if the inventor does not plan to offer their product abroad. Such patent protection does not cost much and guarantees a monopoly for the inventor, Kotarba says. Holding a patent in Poland means that no one else in the world should receive a patent for an identical product and even if such a patent is issued it can be invalidated, he says.

"On the other hand, if one wants to target foreign markets it is reasonable to seek a European or international patent," Kotarba says.

When and how

According to Kotarba, the problem of intellectual property management boils down to knowing when exactly this property needs to be protected and how. In evaluating scientific careers, credits should be given to researchers not only for patent registrations but also for licenses granted and patents sold, he says.

The best way to protect an invention is to refrain from disclosing it publicly rather than seek patent protection, Kotarba says. Keeping one's know how secret is the best policy in intellectual property management.

But not all solutions can be kept secret, Kotarba concedes. In the case of products where—after they have been disassembled into pieces—it is easy to see how they have been made, a patent is necessary.

"Another strategy is to patent one's inventions in the United States, despite the high cost involved, because there will always be someone there ready to pay big money to buy the patent," Kotarba says. "American researchers patent the largest number of inventions in the world, and foreigners patent the largest number of inventions in the United States."

Master's in IP management

Six Polish universities—the Warsaw School of Economics, the Warsaw University of Technology, the Medical University in Łódź, the Jagiellonian University in Cracow, the University of Warsaw, and the Warsaw University of Life Sciences—have formed a consortium to develop a master's course in intellectual property management. The course will offer specialist interdepartmental education and will be one of the most innovative in Europe. The universities are working to develop IP management standards as part of the Innovation Creator program of the Polish Ministry of Science and Higher Education. The Warsaw University of Technology is the coordinator of the project.

According to Prof. Marzenna Weresa, head of the World Economy Research Institute at the Warsaw School of Economics (SGH), U.S. universities are a good model when it comes to educating IP managers. Not many university courses in Europe concern intellectual property protection, Weresa says, and those that exist focus on the legal aspects of the issue. Meanwhile, IP management is an interdisciplinary problem—not just legal, but also economic, technological and managerial, Weresa says.

"Most services today are based on intellectual property," says Weresa. "Both scientific research and services in sectors such as education, consulting, telecommunications, logistics and banking require physical infrastructure; but it's knowledge that matters most to the customer. Protecting knowledge in the service sector is much more difficult than in industry."

Where to get the money

Krzysztof Pietraszkiewicz *(pictured below)* , head of the Polish Banks' Association, says that few banks are interested in financing risky projects even if these involve innovation. Banks are not eager to grant loans against the collateral of intangible assets, Pietraszkiewicz says.

According to experts, the innovativeness of the Polish economy could be enhanced by measures designed to support, stimulate and encourage innovation.

"There are several kinds of innovations: product, process, marketing and technological innovations," says Pietraszkiewicz. "Those seeking financial support for their projects must be able to prove that their research findings will be successful on the market. Government programs and programs carried out by regional authorities are essential to enhancing the innovativeness of the economy. The range of instruments encouraging risk taking should be expanded."

Public institutions and special guarantee institutions need to accept part of the risk involved in a project to enable companies to obtain loans for innovative projects, Pietraszkiewicz says. Companies should be encouraged to set up consortia and work with the scientific community and the government in this area. Initiatives such as the Enterprise Development Center help enhance the innovativeness of the Polish economy, Pietraszkiewicz says.

Blazing the trail

As they look for ways to sell their inventions to business, Polish researchers are taking part in an international debate on intellectual property management. Earlier this year, a host of scientists, entrepreneurs and academics from around the world discussed intellectual property management at an international conference in Warsaw and Cracow.

The meeting featured a number of conferences and symposia that attracted many foreign researchers experienced in working with industry and academics from universities that have blazed the trail in transferring inventions to business.

According to Prof. Józef Modelski, a director at the international Institute of Electrical and Electronics Engineers (IEEE), universities need bigger budgets to put the results of their research to commercial use. "Universities should only pay for patents that pass the test on the market," Modelski says.

Prof. Piotr Moncarz from Stanford University says that researchers need more information on intellectual property protection and the principles of technology transfer.

According to Prof. Tadeusz Pietrucha from the Medical University in Łódź, the Polish market needs experts in managing intellectual property. "Graduates of these courses will work with companies and will be able to tell them whether they should apply for a patent for a specific project or keep it as a trade secret," says Pietrucha. "They will advise companies on who should be the owner of a trademark: whether this should be the company that makes the product, or whether it would be better to transfer this intellectual property and trademark ownership to another company. In such a case, if something goes wrong and the manufacturer goes bankrupt, the trademark will retain its value and the intangible asset will be preserved."

According to Prof. Władysław Włosiński, chairman of the Polish Academy of Sciences' technical sciences division, many scientists are emotionally involved with their research and often disclose details of their achievements even though these should be kept secret and protected by a patent. "An ability to skillfully write a paper or conference presentation so as not to reveal valuable information is what IP management is all about," Włosiński says.

Prof. Piotr Wolański from the Warsaw University of Technology says that researchers need to make efforts to get industry interested in their achievements.

Prof. Alojzy Szymański, rector of the Warsaw University of Life Sciences, says teachers should try to create an environment for innovators in which their ideas would receive legal protection as well as financial and specialist support. "Technology parks should help transfer worthwhile projects developed by young scientists to the economy," Szymański says, adding that the Warsaw University of Life Sciences has signed an agreement to establish such a park in Warsaw together with the University of Warsaw, the Warsaw School of Economics, the Warsaw University of Technology, and City Hall. The plan provides for using EU funds to build facilities including laboratories, institutions and offices to help young people put their ideas into practice, Szymański says.

Piotr Bartosz

Conference

A major conference on technology transfer will be held in Cracow Oct. 28-30 as part of an annual meeting of the Association of European Science and Technology Transfer Professionals (ASTP), an international organization with 22,700 members.

16th-Century Shipwreck Found

An archeological expedition headed by Waldemar Ossowski from the Marine Archeology Department of the Central Maritime Museum in the northern city of Gdańsk has found an almost complete wreck of a boat that was used to transport bulk cargo. The boat, dated to the 16th century, has been uncovered in the old Vistula river bed in Czersk, 25 kilometers south of Warsaw. It lies at the bottom of a pond dug in the old river bed near Lake Czerskie.

Thirty meters long and 7 meters wide, the boat was one of the largest vessels used on the Vistula River until the end of the 18th century, experts say.

Punts were the most popular means of transportation on the river from the 15th century onward and could carry up to 100 tons of grain.

The wreck is tilted to the port side and fractured in the middle section. The best preserved parts are the flat bottom without a keel and the remnants of the sides. Inside the hull, the archeologists have found the remains of ceramic vessels, nails and a horseshoe.

Dendrochronological dating studies based on the measurements of annual tree rings indicate that wood used to build the punt was cut in the latter half of the 15th century. Further research will make it possible to more precisely estimate the boat's age. Another chronology marker for the Czersk wreck are clasps used to seal the boat. Relying on available typology, the clasps can be classified as produced some time between the end of the 15th century and the first half of the 16th century, the archeologists say.

The bottom is made of seven-centimeter thick oaken staves 34-48 cm in width, butted together and sealed with moss and plaited animal hair. The sealing is pressed into the joints along the bottom with strips of wood and metal clasps.

The wreck shows signs of numerous repairs and so the researchers believe that the boat, originally built in the latter half of the 15th century, might have been still in use at the beginning of the 16th century.

Castle from a Millennium Ago

Archeologists have found the remains of a castle and a settlement from the times of the Piast Dynasty in the village of Susk Nowy near Ostrołęka in northeastern Poland.

"This is the earliest settlement of its kind in this region of Poland," said Jarosław Ościłowski from the Institute of Archeology and Ethnology of the Polish Academy of Sciences, who manages the research. The excavations are being carried out by archeologists from the institute and the Cardinal Stefan Wyszyński University in Warsaw.

The archeologists believe the castle dates back to the 10th-12th centuries. It stood near a village with a marketplace, an inn and craftsmen's workshops. The castle was around 90 meters in diameter and was surrounded by 4-meter-tall embankments. Sections of the embankment have also been uncovered, along with a relatively wide moat that encircled the castle. The archeologists have found numerous broken clay vessels, a bone spoon, a whetstone, and a knife.

Although no known historical records mention a settlement in this location, the traditional name of the place, Okop, Polish for "trench," speaks for itself, the archeologists say. The castle was most likely destroyed at the beginning of the 13th century alongside many others in the area as a result of Prussian, Yotvingian and Lithuanian invasions. Human settlement then relocated to the sparsely populated southern Mazovia between today's Sochaczew, Warsaw and Czersk. Northeastern Mazovia was colonized again starting in the late 14th century.

Protecting Whitefish

Wildlife experts at the Słowiński National Park, aided by researchers from the city of Olsztyn, have set out to protect the common whitefish population in Lake Łebsko in northern Poland.

The researchers aim to foster both natural and artificial reproduction of the fish in a bid to preserve the natural biodiversity of the lake.

"We have been working on a new model of restocking the lake with the species," said Anna Wiśniewska, Ph.D., from the Faculty of Environmental Protection and Fishery of the Warmia-Mazuria University in Olsztyn. "The idea is to develop and launch educational programs to make the public more aware of whitefish conservation."

The common whitefish of Lake Łebsko is an endemic species with a unique gene pool that is only found in the lake. Many years of observation have shown that the population keeps shrinking and that is why experts say the species needs immediate conservation action.

The Convention on the Conservation of European Wildlife and Natural Habitats, adopted in Bern in 1979 and ratified by Poland in 1996, lists whitefish (*Coregonus*) as a protected animal species.

New Finds in Byzantine Basilica

During their 10th archeological exploration season in Marea, a city 45 km southwest of Alexandria, Egypt, Polish archeologists have found an unexplored baptistery and hundreds of bronze coins.

The Polish expedition, headed by Prof. Hanna Szymańska and Krzysztof Babraj, Ph.D., has been organized by the Mediterranean Archeology Center of the University of Warsaw and the Archeological Museum in Cracow.

The baptistery is sized 4.5 by 2.5 meters and is 1.5 meters high. The structure, made of large stone blocks, was adjacent to a well with hollows cut

in the walls by people who cleaned the well inside. The water used during baptism ceremonies came from a lake or underground springs.

The baptistery is the second place of this kind found in the Marea basilica.

The archeologists have also uncovered two massive structures that most likely used to separate a small space sheltering the entrance to either a church or a side shrine. Pieces of a marble basin for holy water were scattered there.

The archeologists from Cracow have also unearthed the foundations of a pulpit that was accessed directly from the shrine. Two passages, paved with a mosaic, led from the pulpit to the south and north. The ancient builders had used bits of amphorae as a stabilizing layer.

In the northwestern corner of the basilica, the archeologists have found a cellar consisting of two chambers that were in part carved out from solid rock. When it was unearthed, the cellar contained 100 or so small water vessels and oil lamps and a deposit of several hundred bronze coins. The cellar used to be aired through two ventilation ducts.

Medieval Chapel Unearthed

In another project, Poznań archeologists have discovered the foundations of a chapel that was built in their city by Dobrawa (Dąbrówka), the wife of Poland's first historical ruler Mieszko I. Dated to the 10th century, the building was the earliest Christian chapel in Poland, the archeologists say. It adjoined Mieszko I's stone residence.

According to Prof. Hanna Kócka-Krenz, who heads the archeological team, the chapel had an unusual shape for that period. "The presence of parallel foundations indicates that the chapel was built on a square or rectangular plan with an apse—rather than in the form of a rotunda, as was usually the case in those times," Kócka-Krenz says. "We are at the stage of uncovering the chapel's apse. The only question is whether it was the main and only apse or whether we have to do with a more complex design."

Compiled by Tadeusz Belerski

Helping Hedgehogs

Sick and injured hedgehogs will undergo treatment at a new facility under construction at Kopna Góra in the Knyszyn Forest near Supraśl, Podlasie province. Experts say the hedgehog therapy center is needed because a growing number of hedgehogs, a protected species, are killed and injured by cars. Financial support for the new facility comes from the "Our Hedgehogs" Polish Association for Hedgehog Protection that was recently registered in Białystok.

The location follows an agreement with the Regional Forest Authority in Białystok. The local arboretum, managed by the forest district office in Supraśl, will become home to hedgehog rehabilitation trails and educational paths for visitors to watch hedgehogs, while a small building nearby will host educational activities for children and youth, in addition to exhibitions and seminars.

The first hedgehogs will be brought to the center before they start winter hibernation. In the spring, they will be released in selected sites in the Knyszyn Forest.

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