95th BIRTHDAY ANNIVERSARY OF THE NATIONAL ACADEMY OF SCIENCES OF UKRAINE AND PATON BORIS EVGENIEVICH, ITS PRESIDENT

Boris Evgenievich Paton is an outstanding Ukrainian scientist in the field of welding, metallurgy and technology of materials and materials science, prominent public figure and talented organizer of science, academician of the National Academy of Sciences of Ukraine, Academy of Sciences of the former USSR and Russian Academy of Sciences, professor, honoured personality of science and technology of the Ukrainian SSR, laureate of the Lenin Prize and State Prizes of the USSR and Ukraine, twice Hero of the Socialist Labour of the USSR, Hero of Ukraine, participant in the Great Patriotic War, and liquidator of accident at the Chernobyl NPP.

Boris Paton, together with his father Evgeny Oscarovich Paton, established a world-known Paton's scientific school.

The international authority of B.E. Paton is a result of his extensive and extraordinary fruitful scientific and engineering activity, and of his great effort to direct the results of fundamental scientific investigations to solving the urgent problems of the society.

For over 60 years B.E. Paton has been heading the world-recognised R&D centre — the E.O. Paton Electric Welding Institute of the National Academy of Sciences of Ukraine — and already more than 50 years he has been a permanent President of the Academy of Sciences of the Ukrainian SSR (now the National Academy of Sciences of Ukraine).

Boris Paton was born on the 27th of November, 1918 in Kiev. By origin he came from known noble family of Paton, the tradition of which was service for the Motherland and military service. His great-grandfather, Peter Ivanovich Paton, joined the army of M.I. Kutuzov when he was sixteen years old and participated in the Patriotic War of 1812. He was awarded the order and completed service as infantry general and senator of Russian Empire. Grandfather, Oscar Petrovich, military engineer, guard colonel, consul of Russian Empire. Father, Evgeny Oscarovich Paton, outstanding scientist and engineer, founder and head of the Electric Welding Institute, man of high civic duty, Hero of socialist Labour, participant of the Great Patriotic War of 1941–1945, contributed greatly to the victory over the fascism, awarded by military orders. Natalia Viktorovna Budde, the mother of Boris Evgenievich, originated from ancient noble family. She was a pupil of Froebelev Lady Pedagogical Institute. During the time of revolution, hard times of civil war and formation of the new state, in the years of Great Patriotic War she was the most devoted friend and assistant of Evgeny Oscarovich.

The manufacturing and scientific activity of B.E. Paton started at the Uralvagonzavod Plant in Nizhnij Tagil in 1942. Since that time, Boris Paton was working together with his father for 11 years; these were the years of his growth as a scientific worker and researcher, and then a leader of a large scientific team.

Boris Paton proved to be one of the most talented pupils and worthy successor of his father. He continued and brilliantly developed the work started by E.O. Paton.

Along with a large and intensive work at defence factories, the team of the Institute continued the research works. In 1942, V.I. Dyatlov discovered the phenomenon of self-regulation of

electrode melting in electric submerged-arc welding. The further investigation of this phenomenon by B.E. Paton together with A.M. Makara, P.I. Sevbo and M.N. Sidorenko allowed the design of a simple and reliable automatic welding machine. The application of automatic welding machines could increase by many times the efficiency of jobs in manufacture of tanks.

Tank T-34, manufactured on enormous scales by Uralvagonzavod and other factories of the country, was recognised by experts to be the best medium-weight tank of the Second World War, and predetermined to a considerable degree our victory over fascism. Lives of many thousands of the tank crews were saved thanks to the reliable welded armour.

For the achievements in mechanization and automation of welding operations in fabrication of military equipment, B.E. Paton was awarded the Order of the Red Labour Banner in 1943.

During war years Boris Evgenievich carried out a number of important investigations of static properties of automatic machines for submerged-arc welding, becoming the basis of his thesis for a Candidate of Technical Sciences degree, which he defended in 1945. In the later studies he showed that optimum characteristics are typical of the automatic machines with a constant speed of wire feed, completed with power sources having a quick-response voltage controller.

For the development of semi-automatic machines for submerged-arc welding, B.E. Paton, specialists of the Electric Welding Institute and also «Elektrik» plant in Leningrad were awarded Stalin Prize in the field of science and technology in 1950. Later this principle of control was used as a basis for design of semi-automatic machines for shielded-gas welding.

B.E. Paton was working fruitfully on completing investigations connected with conditions of stable burning of arc and its control. He successfully defended his thesis for Doctor of Technical Sciences degree and was elected a Corresponding Member of the Academy of Sciences of the Ukrainian SSR in 1951.

In these years the investigations of welding power sources were made under the supervision of B.E. Paton. The topicality of these works was predetermined by the fact that the automatic submerged-arc welding was one of the most high-efficient processes and industry had a great need in new developments in this field. And the Institute started the comprehensive studies of metallurgical processes of submerged-arc welding. For a short period of time the fundamentals of theory of metallurgy of submerged-arc welding and surfacing were created, a series of different-purpose fluxes was developed. New technologies and powerful production of fused fluxes were developed.

Basing on these developments the first in the country production of high-quality large-diameter pipes was implemented at the Khartsyzsky Pipe Plant. B.E. Paton is one of the founders of this production. This work was a fundamental basis for organizing and development of up-to-date mass production of large-diameter pipes for powerful gas-transportation systems of the USSR at Khartsyzsky, Chelyabinsky, Volzhsky,Vyksunsky and other plants.

At the Institute a new process of submerged-arc welding of joints, located in different spatial positions, was developed. For the first time the method was applied for erection of span structures of the Kiev Bridge across the Dnieper River, which was named after Evgeny Paton, the chief ideologist of welded bridge construction and technical supervisor of designing and construction of this unique structure. Later on, the method for flux-cored wire arc welding with a forced weld formation was developed, which was widely applied in construction of span structures of the Moskovsky and Yuzhny bridges across the Dnieper River in Kiev, a bridge across the Volga River in Saratov, in construction of main pipelines, metallurgical facilities, chemical apparatuses and ship hulls.

After the death of Paton Evgeny Oscarovich in 1953, Boris Paton was appointed to the post of the Director of the E.O. Paton Electric Welding Institute of the Academy of Sciences of the Ukrainian SSR.

Boris Paton developed the planned organizing of research works of the Institute. He established business contacts with head officials of enterprises, National Economy Councils, Ministries, and GOSPLAN of the USSR. He organized and headed the preparation of proposals about development of welding in the USSR. In June 1958, the Central Committee of the Communist Party of the Soviet Union and the Council of Ministers of the USSR issued the resolution «On Further Industrial Application of Welding Engineering». The resolution envisaged the progress of fundamental research in the field of welding processes, development of equipment, materials and technologies, foundation of new research institutions and factory laboratories, construction of specialised facilities for production of welding equipment, consumables and welded structures. Other similar resolutions were adopted during the five-year periods that followed. Their implementation predetermined the progress of welding science and technology in the second half of the 20^{th} century not only in the USSR, but also in a number of foreign countries. The USSR became the leading country in the world in the field of welding, and our American colleagues called Kiev the world capital of welders.

Boris Paton has an exceptional ability to work with people. He is always ready to support an interesting idea and estimate a work done at its true value. His genuine enthusiasm, rare capacity for work and attention to every staff member create a good creative atmosphere at the Institute. An example of this is the development of electroslag welding. G.Z. Voloshkevich, associate of the Institute, discovered that the molten slag, through which the electric current is passed, can serve as a source of heating the metal being welded. The process was called the electroslag one. Boris Paton could predict a great future for this process. The efforts of the working team were concentrated by him for the solution of the most important problems of electroslag welding. In the shortest time a new promising method for welding heavy sections of metal was developed, which was tested under production conditions and made ready for the wide implementation.

Application of electroslag welding radically changed the technology of production of such components as drums of high-pressure boilers, frameworks of heavy presses and rolling mills, wheels and shafts of hydraulic turbines, etc. Large-size cast and forged components were replaced by welded and welded-forged ones, which were considerably more cost effective.

In 1957, B.E. Paton and G.Z. Voloshkevich were awarded the Lenin Prize for the development of the electroslag welding process and manufacture of large-size special-purpose parts on its basis. This achievement was marked by the Grand Prix in 1958 at the International Exhibition in Brussels.

In November 1958, Boris Paton was elected a full member of the Academy of Sciences of the Ukrainian SSR.

In the opinion of Boris Paton the arc welding will continue to be the main welding process in the foreseeable future. He is paying much attention to further improvement and development of this process, and directs the team of the Institute to the solution of actual problems in this area.

By the initiative of B.E. Paton the processes of formation of welding aerosols were investigated and a new generation of low-toxic welding electrodes was developed. The wide implementation of this development allowed improving radically the labour conditions, reducing greatly the professional deceases of welders. In the 1950s, the Electric Welding Institute started developing

a new area, namely the automation and mechanisation of the processes of hard-facing the surfaces of working elements of mining machines and equipment with different materials to increase their wear resistance. Fundamental research was conducted to study the hard-facing processes under flux, in shielding gases, using self-shielding flux-cored wire and plasma jet. Unique surfacing equipment, consumables and technologies were developed. Industrial manufacture of surfacing flux-cored wires was organized. This area proved to be highly promising and the Institute is still active in it, and the technologies are widely applied in different branches of industry and construction.

In 1958, Boris Paton initiated the development of new methods for mechanized welding of structures under the field conditions, at erection sites, on building berths, and under the water, and suggested to apply the flux-cored wire for these purposes. A large complex of studies of metallurgical and technological peculiarities of this method of welding was carried out. A series of self- and gas shielding flux-cored wires of different purposes was developed and production of flux-cored wires was organized. Now this area is among the leading ones in the world welding science and technology.

Research and development efforts on the method of semi-automatic underwater flux-cored wire welding opened up the new opportunities for exploration of the continental shelf, construction and repair of port systems, pipeline transitions across rivers and other objects.

Boris Paton made a great contribution to the development of flash-butt welding. For the first time the effect of short-circuit resistance of machines for flash-butt welding on stability of melting and weldability of metal was studied. The high efficiency of welding current feedback was found. The unique designs of transformers were suggested and theoretical bases of their calculation were developed. Systems of multifactor control of the flash-butt welding process were developed for the first time in the world practice under the supervision and at the direct participation of B.E. Paton. Several generations of ingenious machines were designed, which have been in use for a few decades in many countries throughout the world. Among them are the rail welding machines, unique inside-pipe flash-butt welding machines «Sever», machines for welding of rocket elements made of aluminium alloys and many others.

The application of electron beam occurred to be challenging in welding of different thick-walled vessels of steels, high-strength alloys on aluminium and titanium base, and also other materials. The complex tasks were solved for providing the stability of electron beam in atmosphere of metallic vapours, peculiarities of formation of narrow and deep welds were revealed, the control methods were found providing the reproducibility of optimum welding conditions. All this allowed designing equipment and developing technologies, having the world recognition. The method of arc welding by tungsten electrode along the layer of activated flux-paste, named later A-TIG, was developed at the E.O. Paton Electric Welding Institute in the middle of the 1960s. Due to evaporation of the flux-activator it is possible to constrict the arc column, several times increase the penetration depth, increase the welding efficiency and improve the shape of welds. In the recent years B.E. Paton initiated the investigations directed to the creation of theoretical fundamentals of arc welding processes using activating fluxes. The main regularities of arc constriction influence on characteristics of thermal and dynamic effect on welding pool were established and mechanism of deep penetration of metal was explained. This unique technology found the further development in the USSR and CIS. The «Paton» technology PATIG was also recognized in the foreign countries.

At the end of the 1980s, B.E. Paton supervised the research efforts of the Electric Welding Institute to study hybrid (laser-arc and laser-plasma) processes of welding and treatment of materials. Designs of the laser-arc plasmatrons of direct- and indirect-action were offered, and

a series of plasmatrons of different technological purposes was manufactured. New processes of hybrid laser-plasma welding and surfacing were developed, including the process of hybrid laser-microplasma welding of metals of small thicknesses.

In the 1960s, B.E. Paton headed the research efforts to study technologies for producing different coatings and composite materials by electron beam evaporation of components and condensation of vapours on surfaces of products or special substrates. The electron beam technology for deposition of coatings, which found application in a number of engineering areas, allows many times extension of service life of different parts, in particular gas turbine blades.

In the 1980s, B.E. Paton initiated investigations at the Institute on the methods of thermal spraying of coatings using gas-oxygen flame and arc plasma; equipment and consumables were developed to produce protective layers with different properties.

In 1969, the first welding in space around the Earth was realized under supervision of Boris Paton. Experiments on electron beam, plasma-arc and consumable electrode welding were carried out by cosmonaut V.N. Kubasov in the «Soyuz-6» piloted spaceship. Peculiarities of weld formation under the zero gravity conditions were studied, and the possibility of producing tight and well formed welds in space was proved.

In 1979, the idea of depositing various metallic coatings on surfaces of elements of the space station and devices was successfully verified. Special unit «Isparitel» was designed, a versatile hand tool (VHT) for welding, brazing and deposition of coatings was manufactured. VHT was tested in the open space in 1984 by cosmonauts S.E. Savitskaya and V.A. Dzhanibekov. Then, a cycle of systematic multipurpose experimental investigations on optimizing structural elements and technology of construction of large-size orbital structures and objects followed. In 1986, a structure in the form of a dismountable girder was constructed in space («Mayak» experiment). In 1991, the brazing of elements of truss structures was performed for the first time and a unit was manufactured for deployment of multiuse solar cells in «Mir» orbital station.

Results of many-year investigations in the field of space technologies were described in monograph «Welding in Space and Related Technologies» by B.E. Paton and V.F. Lapchinsky, which was published in 1997 in Great Britain, and then summarised in book «Space: Technologies, Materials Science, Structures» edited by B.E. Paton and published in 2000.

When assessing the contribution made by B.E. Paton to the development of the USSR space program, Yu.P. Semyonov, Academician of the Russian Academy of Sciences and former Chief Designer of rocket-space systems at RPC «Energiya», who had been working with S.P. Korolyov for many years, wrote: «*B.E. Paton belongs to that Grand Pleiad of Soviet scientists and designers that made the USSR in the years of its existence a mighty and great power... B.E. Paton is a prominent scientist of the 20th century. His distinctive and unique feature is to embody ideas into reality...*»

At the beginning of the 1970s the first samples of systems, using the experimental-statistic models of welding processes were manufactured under the supervision of B.E. Paton. The rapid progressing of these works led to the development of automatic systems of control of welding processes, equipment and mechanized lines with use of microprocessor engineering.

Under his supervision, a large complex of fundamental and applied studies was carried out in the field of static and cyclic strength of welded joints, their resistance to brittle and fatigue fractures, performance under conditions of low temperatures. Several famous constructions were created. They include, first of all, the E.O. Paton all-welded bridge across the Dnieper. Principles, approaches and design-technological solutions, optimized at its designing and construction, opened up the way to the wide application of welding in bridge construction. This

bridge was recognized by the American Welding Society as a prominent welded structure of the XX century. Experience in construction of E.O. Paton bridge was used in construction of bridges across the Dnieper in Kiev (South, Moscowsky, Gavansky, Podolsky-Voskresensky, road-transport and railway), in Dnepropetrovsk and in Zaporozhye, as well as a bridge across the Smotrich River in Kamenets-Podolsk.

A striking example of the new approach to construction of welded structures of high factory readiness became the development of technology of uncoiling the coiled tanks for storage of oil and petroleum products, due to which the problem of restoration of tank park of the country, ruined during the World War II, was solved in the short terms.

In collaboration with Research and Design Institute (Ukrproektstalkonstruktsya) the projects and technologies of construction were developed, which were successfully realized in construction of unique TV towers in Kiev, St.-Petersburg, Erevan, Tbilisi, Vitebsk, Kharkov. The monument «Motherland» in Kiev should also be referred to the outstanding welded structures.

B.E. Paton is initiator and scientific supervisor of the purposeful research-technical program «Problems of Life and Safe Operation of Structures, Constructions and Machines». Many academic and branch institutes, higher educational institutions and a large number of industrial enterprises were involved into accomplishment of this program. Important scientific-technical and practical results were obtained for the working out of methodological bases, technologies, methods and means for evaluation, and also for extension of service life of structures. The plans of Academy envisage the further development of these works.

A large attention is paid to the development of methods of non-destructive quality testing and diagnostics. Available are the automatic units for ultrasonic testing of welded joints of large-diameter pipes, bodies of drilling bits, components of power equipment, welded joints of light alloys and non-metallic materials. The studies with applying of low-frequency ultrasonic waves and contactless introduction of acoustic waves into test objects are underway.

For the first time in Ukraine the systems of continuous monitoring of welded structures, to which the increased requirements to safe service are specified, have been developed.

Methods of prediction of mechanical properties, life of safe service of welded joints and components in the presence of crack-like defects in them and degradation of materials during service have been developed.

Over many years the investigations on materials science are carried out at the Institute. New structural materials and technologies of their production are developed, the link «composition-structure-properties» is investigated as applied to different-purpose materials. The Institute became a large materials science centre, in which the highly-qualified specialists on metal physics, metals science, electron microscopy, mass-spectroscopy, Auger-spectrometry, gases analysis in metals and welds, X-ray spectral element analysis and other specialties are working and carrying out the most complicated materials science investigations.

In 1954 B.E. Paton headed the investigation on applying the electroslag process for improvement of quality of metals and alloys. This resulted in the radically new direction of metallurgy, namely electroslag remelting, which found its wide application and world recognition for the shortest periods of time. It is used for improving the properties of heat-resistant, stainless, tool, ball bearing and other steels and special alloys. Metal of electroslag remelting is used at present in manufacture of rotors of powerful turbines, mill rolls, high-pressure vessels, stop valves of heat and nuclear stations, cast stamping tools and other critical products.

As far back as 1959 the works were started on refining of metals and alloys using electron beam. The electron beam melting occurred to be an effective method of improving the quality of special steels and alloys on nickel and iron base, effective technological process of producing extra-pure niobium, titanium and many alloys on their base.

Over the recent years the electron beam technology is successfully developed for producing titanium ingots. New high-strength titanium alloys, alloyed with aluminium, zirconium, niobium, iron, were developed and industrial electron beam cold hearth units were designed. Many of them have no analogues in the world practice.

Method, equipment and technologies of plasma-arc remelting of metals and alloys have been developed. The opportunities of application of plasma-arc technology were especially widened after the design of AC plasmatrons, that allowed increasing greatly the reliability of designs of melting units and power sources.

In the recent years the ladle treatment of metallurgical melts is widely used in the world metallurgical practice. At the E.O. Paton Electric Welding Institute the new types of flux-cored wires have been developed, which contain the highly-active elements for microalloying, modifying and desulphurization of steels and cast iron. Technology and equipment have been developed for manufacture of large-diameter flux-cored wires. These investigations were further developed at the I.N. Frantsevich Institute of Problems of Materials Science, Donetsk Polytechnic Institute and other institutes and enterprises. Today, the method of injection metallurgy is widely used at metallurgical plants of Ukraine and Russia. With its use the tens of millions of tons of steel melts were treated.

At the E.O. Paton Electric Welding Institute the investigations in the field of brazing of metals and alloys are successfully developed. New materials and technologies of brazing are used in manufacture of latticed wings of rockets and parts of aircraft engines, space and drilling objects.

In the post-war years the huge deposits of oil and gas were discovered in the USSR. They are mainly located in Central Asia, Western Siberia, North Urals and other remote regions. So, it was necessary to construct the high-capacity main gas and oil transportation systems to transport oil and gas to the western regions of the USSR and abroad.

Under the supervision of B.E. Paton a complex of works was carried out for the development of technologies and equipment for pipelines welding. Ingenious technologies and equipment for flash-butt position welding of pipes, namely complexes «Sever», were developed. More than 70 000 km of pipelines, including about 6 000 km of large-diameter gas pipelines, were welded under conditions of the Extreme North.

The unique technology of automatic arc position butt welding of pipes by using the self-shielding flux-cored wire with a forced weld formation, namely complex «Styk», was developed. Using this technology, more than 10 000 km of main gas and oil pipelines were constructed, such as: «Druzhba», «Central Asia–Centre», «Urengoy–Pomary–Uzhgorod», «Khiva–Beineu», «Shebelinka–Izmail», «Yamal–Western Border», «Yamal–Povolzhye», etc.

Professor Nikolai K. Baibakov, a major authority in the oil and gas complex of the country, outlined that «*Boris Evgenievich Paton, as the President of the Academy of Sciences of Ukraine, as Director of the E.O. Paton Electric Welding Institute had a tremendous influence on the progress of oil and gas construction, on the development of oil and gas industry of the former Soviet Union...*».

Boris Paton pays a great attention to the realization of achievements of the present science and technology in a practical medicine. In the 1990s he suggested to apply the methods of welding

for joining of live tissues and organized a creative team with participation of associates of the E.O. Paton Electric Welding Institute of the NAS of Ukraine, A.A. Shalimov Institute of Surgery and Transplantation of NAMS of Ukraine, Central Hospital of SSU and other medical establishments. This cooperation has led to the development of a new method of joining (welding) of soft tissues, which allows quick cutting almost without blood and joining of biological tissues, preserving their vitality. Healing of wounds in this case occurs much quicker than in use of traditional surgery methods, operation duration is significantly reduced, blood losses are decreased, period of post-operation rehabilitation of patient is reduced. Methods of electric welding of live tissues are used in more than 50 hospitals of Ukraine, as well as in hospitals of Russia and Belarus. More than 100 000 different surgical operations has been successfully accomplished : in general, thoracic and paediatric surgery, oncology, urology, gynaecology, otolaryngology, treatment of internal organs and other directions of surgery. At the E.O. Paton Electric Welding Institute the up-to-date equipment for welding live tissues has been designed and its manufacture organized. More than 130 surgery procedures have been developed and applied in practice.

In 2004 the complex of works on welding live tissues, fulfilled under the supervision and active creative participation of Boris E. Paton, was awarded the State Prize of Ukraine in the field of science and technology.

The Institute has a fruitful cooperation with the A.A. Shalimov National Institute of Surgery and Transplantation, Donetsk Regional Antitumoral Centre, P.L. Shupik National Medical Academy of Post-diploma Education, A.A. Bogomolets National Medical University, Military-Medical Administration of SSU, Kiev City Centre of Electric Welding Surgery and New Surgical Technologies at Kiev City Hospital No.1, V.P. Filatov Institute of eye diseases and tissue therapy, N.M. Amosov National Institute of cardiac-vascular surgery, A.P. Romadanov Institute of Neurosurgery, Kiev City Hospitals Nos. 1, 12, 17, 18 and many other medical establishments of Ukraine.

B.E. Paton pays a large attention to the international activity of the Institute and its scientists. The E.O. Paton Electric Welding Institute is the permanent member of the International Institute of Welding (IIW) and European Welding Federation (EWF). Under Boris Paton supervision the journals «Avtomaticheskaya Svarka» («The Paton Welding Journal»), «Advances in Special Electrometallurgy», «Technical Diagnostics and NDT» are published and translated into English. This allows informing the scientific and technical community about the results of research and new developments of the Institute.

Dozens and hundreds of talented scientists and engineers have grown at the Institute. Among the Patonovites there are many academicians and correspondent-members of the NAS of Ukraine. The Institute associates defended more than 138 theses for scientific degree of Dr. of Techn. Sci. and more than 716 theses — for Cand. of Techn. Sci. Many works, mentioned above, are the efforts of large and amicable team, solidarity of which was greatly contributed by the personal features of B. Paton, its leader.

One of the main principles, set forth by E.O. Paton in foundation of the Institute and developed by B.E. Paton, is the carrying out of purposeful fundamental investigations and close cooperation of science with industry. This principle is continuously embodied into life during the 80-year history of the Institute.

The research departments of the Institute, designing department, experimental work shops, experimental design-technological bureau, engineering centres, experimental productions, pilot plants were organized during all the history of the Institute. They are the indispensable links of the system for organizing investigations and implementation of their results in industry.

Realization of this system allowed creating the unique structures, equipment, materials, technologies, implementation of which greatly influenced the progressing of many branches of industry: machine building, ship building, rocket-space complex, aircraft construction, power engineering, mining complex, metallurgy and chemical industry, systems of pipeline transport, building industry, etc.

Self-sacrificing efforts of the Institute staff members were highly appreciated by the government. The Institute was awarded by the Orders of Lenin, October Revolution, Labour Red Banner, and many Institute employees were awarded the orders and medals of the USSR and Ukraine.

Nine works, in which the Institute members were participated, were awarded the Lenin Prizes in the field of science and technology, 24 works were awarded by the State Prizes of the USSR, 34 works — by the State Prizes of the Ukrainian SSR and Ukraine.

The many-year self-sacrificing efforts of the Institute staff members under the leadership of B.E. Paton received the world recognition.

In 1962 B. Paton was elected a full member (academician) of the Academy of Sciences of the USSR. At the same year the scientists of the Academy of Sciences of the Ukr.SSR elected B.E. Paton the President of the Academy of Sciences of the Ukr.SSR (now the National Academy of Sciences of Ukraine). Profound understanding of the role of science in society, its aims and tasks, high international authority of scientist, devotion to the science, inexhaustible energy and moral standards, social and political activity, experience in management of large scientific staff became decisive arguments in election of Boris Paton to the post of the President of the Academy of Sciences of Ukraine. In accordance with the Charter of the Academy the election of its president is carried out each five years and Boris Paton was nine times re-elected to this post. At this key position his talent of the science organizer became even more evident. Under his leadership a new structure of the Academy of Sciences and its new Charter were developed, directed to the most rational use of scientific efforts and funds, their concentration to the solution of the most important fundamental problems of science, which have a decisive importance for the country economy.

By the initiative of B.E. Paton and at his active support in the system of the Academy of Sciences of the Ukr.SSR the dozens of new institutes and organizations, widening and intensifying the research in the most important scientific directions were established. Thus, in 1965 by the initiative of B. Paton an academic research centre was founded and university was opened in the city of Donetsk. Later on a number of other research centres of the Academy of Sciences of the Ukr.SSR were established, namely Western (Lvov), South (Odessa), North-East (Kharkov), Pridnieprovsky (Dnepropetrovsk) and Crimean (Simferopol), which fulfil the functions of regional inter-industry bodies for coordination of the scientific activity. He constantly tries to define clearly the scientific profile of each institute, takes care of them to become the leading one in its direction in republic, state and world.

The Academy of Sciences is the major scientific centre of the country, where research works on actual problems of natural, technical and social-humanitarian sciences are widely carried out. Establishments of the Academy take worthy positions in separate sections of mathematics, theoretical physics, physics of solid-body and low temperatures, in radio physics and radio astronomy, materials science, cybernetics and computer engineering, neurophysiology, molecular biology, microbiology and virology, genetic engineering and in a number of other areas of knowledge.

A pilot-production facilities are created in the Academy and new types of relations between science and manufacturing are developed.

In 1963 B.E. Paton was elected a Member of the Presidium of the AS USSR. His work in this position allowed him to become familiar with activities of institutes of the AS USSR, to study the experience of functioning of the Presidium of the USSR Academy and its departments.

The close cooperation between the AS Ukr.SSR, AS USSR, State Committee on Science and Technology, Russian Academy of Sciences, academies of sciences of Soviet Union republics promoted the progress in the Ukr.SSR of many new research directions, establishment of new institutes, consolidation of the international reputation of the Academy of Sciences of Ukraine.

Boris Paton initiated the organizing of large integrated scientific-technical programs on separate branches of industry, transport, communication and agriculture. While fulfilling these programs, the scientists of the Academy made great contributions directly into the solution of urgent problems of development of the country economy. This form of organization of the scientific activity was universally recognized.

B. Paton organized the Scientific Council at the Presidium of the AS USSR on the problem «New processes of producing and treatment of metallic materials», which united the scientists of academic institutions with specialists of many other establishments and promoted the progress of science about materials in AS USSR, RAS and NAS of Ukraine. Many scientists of materials science and metallurgy, actively working in this Council, were elected to the Academy of Sciences of the USSR and Russian Academy of Sciences by recommendation of B. Paton and made great contribution into the development of science about materials.

B. Paton profoundly understands the role and place of science in the solution of humanitarian problems of society progress. By paying the large attention to the development and implementation of updated technologies in industry, he simultaneously tried to obtain the grounded estimations of their effect on environment and humans. Under his leadership the large teams of scientists of the Academy fulfilled the prediction evaluating the negative ecological and social-economic consequences of large-scale draining and irrigative melioration in the Ukr.SSR, intensive use of chemical agents in agriculture, transfer of a discharge part of the Denube and Dnieper Rivers. B.E. Paton took a principle position in the problem of construction of the nuclear power station in the Chernobyl region. Unfortunately, the events of 1986 at the Chernobyl NPP, known to the whole world, confirmed completely his warnings.

The outstanding talent of Boris Paton as a leader, scientist and organizer were fully revealed during the memorable days of the Chernobyl tragedy. Teams of many institutes of the Academy of Sciences of the Ukr.SSR, its Presidium became involved in the activities on liquidation of consequences of the accident from the very first days. Hundreds of scientists, specialists of the Academy of Sciences, ministries, departments and enterprises of Ukraine took part in this work. B.E. Paton headed the preparation of proposals for decision-making authorities of Ukr.SSR and Governmental Commission of the USSR. Later on, in September 1997 B.E. Paton headed newly organized Advisory Board of independent experts at the President of Ukraine for the integrated solution of problems of the Chernobyl Nuclear Power Plant.

In 2004–2005 Publishing House «Academperiodika» of the NAS of Ukraine published two volumes of «Chernobyl 1986–1987». Documents given in this fundamental work describe objectively and rather comprehensively the role of the Academy of Sciences of the Ukr.SSR and self-sacrificing labour of teams of the Academy Institutes under the leadership of its President.

After disintegration of the Soviet Union and formation of independent Ukraine under conditions of long-term economic and financial crisis, which touched the Academy as well, the President of the NAS of Ukraine could preserve the Academy, its major scientific schools. It was managed

at the legislative level to remain the Academy status as a supreme governmental scientific organization, to preserve principles of its academic self-administration, to realize its restructuring in accordance with new conditions, to direct the fundamental and applied research to the solution of urgent problems of the state formation.

New priorities were identified in the field of natural, technical and social-humanitarian sciences. A number of new institutes and centres of a social-humanitarian profile was organized.

As to directions of mathematics, informatics, mechanics, physics and astronomy, materials science, chemistry, molecular and cell biology, physiology, it was managed to preserve the world level of investigations. The contribution of scientists of the Academy to the development of fundamental and applied studies in Ukraine is growing. New technologies, materials, computer engineering have been developed, new deposits of minerals were discovered, etc.

Institutes of economy and forecasting, economic-legal investigations, problems of market and economic-ecological investigations, regional investigations, demography and social investigations, Ukraine studies, oriental studies, political and ethnic studies, sociology, Ukrainian archaeography and source studies, Ukrainian language and some other departments, institutes and centres have been organized and are now successfully working.

The Institutes of the Academy take an active part in the development of innovation program of development of economy of Ukraine, in study of its history, culture and language.

Organization of fundamental and applied studies is updating, priorities are defined in the development of separate scientific directions and inter-discipline investigations. Among them is the program «Nanosystems, nanomaterials and technologies», «Sensor systems», «Intelligent information technologies», «Hydrogen Power Generation», «Energy Saving», «Problems of Demography and Development of Mankind», etc.

Much efforts are applied by B.E. Paton in preserving and developing the international cooperation, foreign economic relations with businessmen of foreign countries.

Scientists of Ukraine participate in fulfilment of many international programs. The joint competitions of scientific projects with Ukrainian scientific-technological centre, Russian foundation of fundamental studies, Russian humanitarian scientific foundation, Siberian Department of Russian Academy of Sciences are carried out.

B.E. Paton is one of initiators of creation and preserving of common scientific space within the frames of CIS. In 1993 The International Association of Academies of Sciences (IAAS), uniting the National Academies of 15 countries of Europe and Asia was established. Already 20 years Boris Paton is its continuous President. Under his leadership the Scientific Council of IAAS on new materials is working.

Academician B.E. Paton is the Honorary President of the International Engineering Academy, member of the Academy of Europe, Honorary Member of the Roman Club, International Academy of Technological Sciences, Honorary Member of the International Academy of Sciences, Education and Arts, International Astronautic Academy, Foreign Member of the academies and scientific-technical societies of many countries. Dozens of domestic and foreign universities elected academician B. Paton an honorary Doctor, including M.V. Lomonosov Moscow State University, Taras Shevchenko Kiev National University, St.-Petersburg State Technical University, National Technical University of Ukraine «Kiev Polytechnic Institute», Moscow State Physical-Technical University, etc.

B.E. Paton carried out and continues to carry out extensive public work. He was many times elected a Deputy of the Supreme Soviet of the USSR and Ukrainian SSR, Deputy Chairman

of the Council of the Union of the Supreme Soviet of the USSR, member of the Central Committees of the Communist Party of the USSR and Communist Party of the Ukr.SSR, he was a leader and member of different high committees and commissions. The list of his positions is very impressive. He is successfully working in these positions owing to the great personal responsibility to the state, people and his own conscience.

In addition, he is characterized by an outstanding self-discipline, efficiency, rare ability to distinguish exactly the main points and take immediately the right decisions.

When characterizing Boris Paton, academician Yu.S. Osipov, the ex-president of the Russian Academy of Sciences said: «*The life of B.E. Paton — in science, in the sphere of research organization and practical realization of scientific achievements, his public and state activity — is truly a great feat for the sake of the science progress and for the sake of the future*».

For his great services to the science and state, B.E. Paton was awarded high titles of the twice Hero of Socialist Labour, Hero of Ukraine. He is a knight of four Orders of Lenin, Orders of October Revolution, Labour Red Banner, Friendship of Nations, Liberty, Prince Yaroslav the Wise of the 1, IV and 5 degree, Orders «For the Services to Motherland» of the 1 and II degree and «Order of Honour» (RF), Order of «Friendships» (China), Order of Frantsisk Skorina and Friendship of people (Belarus), «Order of Honour» (Georgia), «Dostyk» (Republic of Kazakhstan), «Shikret» (honour) (Republic of Azerbaijan) and many other awards of CIS countries. B.E. Paton is the laureate of Lenin and State Prizes of the USSR and Ukraine in the field of science and technology. He was awarded by the International Prize «Global Energy». He was awarded by M.V. Lomonosov, S.I. Vavilov, S.P. Korolyov Gold Medals, A. Einstein Silver Medal of UNESCO and many other awards and decorations.

Boris Paton is utterly devoted to the Science, Institute, Academy and Motherland.

Today, it is impossible to imagine the Electric Welding Institute and National Academy of Sciences of Ukraine without B.E. Paton. His worldly wisdom, great experience, international authority in science and society allowed preserving the scientific potential of Ukraine.

Boris Evgenievich Paton is the leader, fighter, creative personality, deeply decent and kind man, possessing fantastic energy and capacity for work, enormous experience, deep knowledge in many fields, and ability to learn continuously. He has a generous nature and quick analytic mind. He is democratic, well-wishing, open for communication, affable, and always ready to support a person in need and help him.

It is symbolic that Boris Paton was born on the day of foundation of the National Academy of Sciences of Ukraine in 1918. In 1998 when celebrating the 80th anniversary of the Academy and its President, the huge hall of the «Ukraine» palace applauded after announcement that B.E. Paton was the first person in the country to be awarded the title of the Hero of Ukraine.

Such a man is our dear Boris Evgenievich Paton!

Let us wish him from the bottom of our hearts new successes, strong health and a good luck.

I.K. Pokhodnya
Academician of the NAS of Ukraine