OSTAP STEPANOVYCH PARASIUK
(to the 85th Anniversary of his Birthday)

On December 20, 2006, the outstanding scientist in the field of mathematical physics, the organizer of science, Academician Ostap Stepanovych Parasiuk was 85 years old.

O.S. Parasiuk was born in the village of Bilky located near the small town of Peremyshl' in the Lviv region. He attended firstly the grammar school in Peremyshl' and then the lyceum in Lviv, which he left in 1939. From January 1940, he was a student of the Faculty of Physics and Mathematics at the Lviv University. It was the period when such stars of the European and world mathematical science as S. Banach, A. Mazur, H. Steinhaus, and others worked there. A regular scientific seminar directed by S. Banach was organized at the faculty. The young student tried not to miss even one session and excitedly listened to the reports on the latest progress in mathematics. Recollections about this romantic period of his life and about the atmosphere of high creativity remained with Ostap Stepanovych forever.

Nevertheless, the studies at the university did not last for long. In 1941, German troops occupied Lviv, and the University was closed. But Ostap Stepanovych continued to study without assistance. Besides mathematics, he took a great interest in physics, studied the fundamentals of quantum mechanics and electrodynamics. In 1944, when the Soviet Army had marched into Lviv, local youths were mobilized, and O.S. Parasiuk was among them. His military unit was included into the 4-th Ukrainian Front. He met May

1945 in the environs of Prague... The same year, in December, owing to the order about the demobilization of soldiers who had been mobilized from students, Ostap Stepanovych returned back to the Lviv University. He eagerly continued his education and, after two years, took an external degree.

In 1947–1949, O.S. Parasiuk was the post-graduate student at the Lviv branch of the Institute of Mathematics of the Academy of Sciences of the UkrSSR. He worked in the field of mechanics under the supervision of Academician G.M. Savin, and no later than in September 1949 he defended his PhD thesis on the topic "Plastic zones under the concentration of stresses around holes".

In 1949–1951, O.S. Parasiuk was the senior scientific researcher at the Lviv branch of the Institute of Mathematics. Besides the scientific work, he lectured on mechanics and hydrodynamics at the Lviv University, actively participated in the organization of the functioning of a new Institute of Engineering Science and Automatics. From 1952, he occupied the position of the deputy director of this institute. In spite of a great load associated with the settlement of practical problems, which the Institute of Engineering Science and Automatics had been made responsible for, Ostap Stepanovych did not abandon "great science". He took an interest in the problems of quantum electrodynamics and general theory of quantized fields, got acquainted with M.M. Bogolyubov's works, in particular, with those, where the author tried to comprehend the problem of divergences in the quantum field theory from the mathematical point of view.

The happy destiny brought O.S. Parasiuk and Academician M.M. Bogolyubov together in January 1953. According to B.M. Delone's recommendation, the talented scientist from a province obtained the invitation to the doctoral courses at the V.A. Steklov Moscow Mathematical Institute. The acquaintance of O.S. Parasiuk with M.M. Bogolyubov happened on the first day of his stay in Moscow, in the office of I.M. Vinogradov, Director of the institute. Ostap Stepanovych turned out to be abreast of the problems, which M.M. Bogolyubov was interested in; therefore, the problem, which concerned the divergences in the quantum field theory, had been formulated quickly.

Not later than in half a year, the young candidate for doctor's degree (the second scientific degree after PhD) obtained important results: a new technique for the elimination of divergences was developed, and the theorem about a renormalizability of quantum electrodynamics in an arbitrary order of the perturbation theory was proved. The results of those researches were published in a number of papers. Nowadays, those publications comprise the classics of quantum theory famous around the world.

In May 1955, at the V.A. Steklov Institute of Mathematics of the Academy of Sciences of the USSR, O.S. Parasiuk successfully defended his thesis for a doctor's degree on the topic "Theory of Field Operator Multiplication". After defending the dissertation, he came back to Lviv and worked at the position of the senior scientific researcher at the Institute of Mathematics of the Ukrainian AS, simultaneously lecturing at the Lviv University.

In 1956, O.S. Parasiuk was transferred to the Institute of Mathematics in Kyiv, where he became the Head of the Functional Analysis Department and, from 1963, the Head of the Theoretical Physics Department. In 1966, O.S. Parasiuk directly participated in the organization of a new academic institution – the Institute for Theoretical Physics of the Ukrainian AS – and headed there the Department of Mathematical Methods in Theoretical Physics. At this institute, Ostap Stepanovych has been working till now.

In 1958, O.S. Parasiuk was elected the Corresponding member and, in 1964, Academician of the Ukrainian AS. From 1966 to 1970, he was a member of the Presidium of the Ukrainian AS, the Academician-Secretary of the Division of Physics and Astronomy. Just during that period and owing to Ostap Stepanovych's active assistance, the Academy of Sciences became increased by two new institutions – the already mentioned Institute for Theoretical Physics and the Institute for Nuclear Research of the Ukrainian AS.

The scientific activity of Ostap Stepanovych is related with many domains of mathematics and theoretical physics. The first cycle of scientific works, which was executed by him under the supervision of Academician of the Ukrainian AS G.M. Savin, dealt with the problems of classical mathematical physics and mechanics.

In 1949, O.S. Parasiuk together with D.T. Maizler and E.L. Rvacheva proved the limit theorem of probability theory in the multidimensional case.

In 1952–1953, the cycle of works devoted to the statistical theory of dynamic systems was fulfilled. In particular, an elegant proof was given for the theorem of the horocyclic flow mixing on the surfaces with constant negative curvature, and the conditions were found for this dynamic system to be ergodic. These results were generalized onto three-dimensional manifolds in the following works. The latter contained many profound ideas and technical findings which were developed later by other authors and nowadays comprise an essential part of stochastic dynamics.

The most important scientific achievement of O.S. Parasiuk is the construction – in the coauthorship with M.M. Bogolyubov – of the subtraction procedure for eliminating the divergences in the quantum field theory (the Bogolyubov–Parasiuk R-operation). Parasiuk's approach to the problem of divergences from the viewpoint of the theory of the multiplication of generalized functions revealed a deep physical nature of this "mathematical paradox", as it was regarded earlier. After the papers of M.M. Bogolyubov and O.S. Parasiuk, as well as the papers of some other authors, concerning the interpretation of the subtraction procedure in the framework of the renormgroup theory, it became clear that the emergence of divergences is a natural manifestation of the scale hierarchy which objectively exists in the nature. The quantum field theory, which engages the concept of local field and pretends to describe the nature at arbitrary small scales, would be inevitably faced with the problems of interrelation between the quantities used by the theory and the observables. Therefore, renormalizability becomes an important heuristic principle in the modern quantum field theory. This was brightly demonstrated while constructing the unified theory of electroweak interactions (the authors of which, S. Weinberg and A. Salam, were awarded the Nobel Prize).

Since the theory of R-operation appeared, the interest of researchers to the problem of renormalizations in the quantum field theory has not been fading. Hundreds of papers, where the basic ideas of M.M. Bogolyubov and O.S. Parasiuk were developed and applied, have been published. Nevertheless, the Bogolyubov–Parasiuk theorem and the procedure of R-operation do not lose the permanent and actually "working" status. New non-trivial and efficient schemes of renormalizations have been proposed; and every new scheme is granted "civil rights" only after its having passed the verification on the coincidence with R-operation.

O.S. Parasiuk combined his scientific and organizational work with the pedagogical activity at the

Lviv and Kyiv Universities. His course "Introduction to the Quantum Field Theory" he lectured at the T. Shevchenko Kyiv National University served as the basis for the training of several generations of scientists, which fruitfully work today in the field of the quantum field theory both in Ukraine and abroad.

In 1957, a scientific seminar on the mathematical problems of the quantum field theory has been organized in Kyiv under the guidance of O.S. Parasiuk. This seminar, being devoted to challenging problems of mathematical and theoretical physics, became an excellent school for many young physicists-theorists who worked in Kyiv. Among the disciples of Ostap Stepanovych, there are 5 Doctors of science and over 20 PhDs, who successfully work in the fields of mathematics and theoretical and mathematical physics.

The scientific, pedagogical, and public activity of Ostap Stepanovych was highly appreciated by the state. For the participation in the Great Patriotic war, he was awarded an Order of Patriotic war. For his scientific and pedagogical activity, O.S. Parasiuk was decorated with two Orders of Labor Red Banner.

On the occasion of his 85-th anniversary, we wish Ostap Stepanovych a sound health, creative enthusiasm, and further creative progress for the prosperity of science.

Colleagues, friends, and disciples