



Professor Bogolyubov, who celebrated his sixtieth birthday in August, out walking with his grandson.

(Photo Yu. Tumanov)

Professor Bogolyubov 60th birthday

The distinguished Soviet theoretical physicist Nicolaj Nicolaevich Bogolyubov celebrated his sixtieth birthday on 21 August. For the past forty six years (his first work was at the age of 14!), he has devoted himself to research, developing new trends in theoretical physics and founding a large school for mathematicians and physicists.

Bogolyubov was born in 1909 in Nizhnij-Novgorod (now Gorkij). In 1923, he joined a seminar under N.M. Krylov and by 1924 had written his first scientific paper. A year later, he started his post-graduate course in the Department of Mathematical Physics of the Ukrainian Academy of Science. In 1928, he submitted his thesis and became a scientific member of the Ukrainian Academy. In 1930, the Presidium of the USSR Academy of Science conferred on him the degree of Doctor of Mathematics.

In later years, Bogolyubov was involved not only in scientific research, which he continued without interruption, but also with the organization of science and with teaching. He held the posts of Head of the Department of Mathematical Physics at Kiev State University (1936-1950), Professor at Moscow State University (1943-1950), Dean of the Mechanical Mathematics Faculty at Kiev University (1946-1949). Starting in 1949, he directed the Department of Theoretical Physics at the Mathematical Institute of the USSR Academy of Science; he then (1953) directed the Department of Theoretical Physics at the University of Moscow, and was Director of the Institute of Theoretical Physics (from 1967).

In 1939, Bogolyubov was elected corresponding Member of the Ukrainian Academy of Science, becoming an 'Effective Member' in 1948. In 1947, he was elected Corresponding Member of the USSR Academy of Science, and became a Full Member in 1953. In 1956, he was appointed Director of the Laboratory of Theoretical Physics at the Joint Institute for Nuclear Research, Dubna, and was appointed Director of Dubna in 1964.

Bogolyubov's scientific work has covered a great number of problems in theoretical physics. He is one of the founders (with N.M. Krylov, in 1932) of the theory of non-linear oscillations. The methods he devised have had a decisive influence on the subsequent development of the statistical theory of irreversible processes.

To solve problems concerning the statistical mechanics of classical systems, Bogolyubov proposed methods using distribution functions and generating functions. A distribution function system was used for the analysis of non-equilibrium processes and led him to a general method for the construction of kinetic equations for interacting particle systems on the basis of the general premises of statistical mechanics. The solution of kinetic equations was based on a generalization of his asymptotic methods of non-linear mechanics.

This method proved most effective in the solution of problems in ferromagnetism. He studied the problem of the degeneration of non-ideal gases and showed that a weakly non-ideal Bose gas may exist in a degenerate state, in which case it will be superfluid, whereas an ideal gas does not possess this property. In this way, a theoretical model was evolved for

the phenomenon of superfluidity. Bogolyubov brought out the decisive role of the interaction of correlated pairs of particles. He showed that the same type of excitation also occurred in superconductors, where a decisive part is played by the interaction of electrons with lattice oscillations. Overcoming considerable mathematical difficulties, Bogolyubov was able to construct a consistent microscopic theory of superfluidity and to show that superconductivity may be considered as superfluidity of the electron gas.

During the 1950's, Bogolyubov produced a series of papers dealing with quantum field theory, building a theory, not by means of the traditional Hamiltonian formalism, but on the basis of explicitly formulated basic physical requirements, the most important of which is the condition of causality. Bogolyubov's new formulation of quantum field theory is set out in the monograph 'Introduction to the theory of quantized fields'. A major landmark in the development of modern theory was Bogolyubov's work on dispersion relations, which are now widely used in particle physics.

The wide range of Bogolyubov's research, his profound ideas, and the powerful mathematical methods which he has developed, together with his exceptional ability as a teacher, have had a considerable influence on contemporary theoretical physicists. Pupils of Bogolyubov are carrying out research at scientific centres in many countries. He has been elected a Member of the Academy of Science of Bulgaria, the German Democratic Republic, Poland and the USA, and Doctor of Science 'Honoris Causa' at a number of Universities.

Nikolaj Nikolaevitch Bogolyubov, Member of the Soviet Academy of Sciences and an outstanding theoretical physicist, celebrated his 70th birthday on 21 August.

Non-linear mechanics, problems of statistical physics, the theory of superconductivity, quantum field theory, elementary particle interaction symmetries, are but a few of the topics linked with the name of Bogolyubov.

In the theory of imperfect quantum macrosystems, he introduced a mathematical scheme (the Bogolyubov transformation) which was subsequently used to describe the energy spectrum of superfluid and superconducting systems. A deeper knowledge of superconductivity and superfluidity of Fermi systems led him to discover a fundamental effect — the superfluidity of nuclear matter — which is one of the cor-

nerstones of current nuclear theory.

At the beginning of the fifties, he turned his attention to axiomatic formulations of quantum field theory. This work subsequently exerted a strong influence on thinking in physics and it became clear that new standards of mathematical support and more convincing models would be required to develop quantum field theory further.

N.N. Bogolyubov is also a talented teacher and organizer. Many well-known physicists acknowledge him as their mentor with pride and respect. He established Schools of Theoretical Physics and Non-linear Mechanics in Kiev, and Schools of Theoretical and Mathematical Physics in Moscow and Dubna.

He has been presented with many awards, including the Lenin Prize and State Prizes in the USSR, the M.V. Lomonosov Prize and various international prizes. He is also an

honorary member of many foreign academies. His creative power continues to flourish as he enters his seventieth year, and for his many friends, 21 August was a day for celebration.



On 21 August, leading Soviet mathematician and theoretical physicist Nikolai Nikolaevich Bogolyubov, Director of the Joint Institute for Nuclear Research, celebrated his 75th birthday. His name is linked with milestone discoveries in the field of mathematical physics, quantum statistical physics, quantum field theory and the symmetry of elementary particle interactions, covering non-linear oscillation theory, time ordering in statistical physics, his chain method in classical statistical physics, the Bogolyubov transformation in quantum statistical physics, axiomatic quantum field theory and particle symmetries.

N. N. Bogolyubov's many fundamental scientific achievements, the diversity of his interests, the depth of his physics ideas, the richness of his methods in theoretical physics, his skill as a teacher, his scientific generosity and, of course, his personal charm provided fertile ground for the creation of a number of successful schools of mathematical and theoretical physics in Moscow, Kiev, Dubna and other cities. He has been honoured for his work as an outstanding scientist and organizer of science by many awards and scientific prizes, both in the Soviet Union and abroad.

The distinctive full colour shot of the Brookhaven radiofrequency quadrupole that adorned the cover of our April edition has gone on to win a number of awards for Brookhaven photographer Mort Rosen, including category winner in this year's national convention of the Professional Photographers of America.

On 13 February, the eminent Russian theorist and mathematician Nikolai Nikolaevitch Bogolubov, Director Emeritus of the Joint Institute for Nuclear Research, Dubna, died aged 82.

A whole era of contemporary mathematics, mechanics and physics is connected with his professional life, which began when he wrote his first scientific paper at the age of 14.

He made pioneer contributions to the new field of non-linear mechanics, leading to applications for nuclear reactors, plasma stability, etc. After World War II he turned to theoretical physics, where his work on statistical physics, quantum field theory, superfluidity and superconductivity became classical. He also made fundamental contributions to the quark picture of elementary particles.

For over 25 years he headed the Joint Institute for Nuclear Research in Dubna, and led scientific seminars at other Institutes.

