



Professor GEORGYI FRANTSEVICH GAUSE

### *Obituary*

Professor GEORGYI FRANTSEVICH GAUSE, eminent scientist, Director of the Institute of New Antibiotics in Moscow died of a heart disease on the 2nd of May 1986. He was 75 years old.

G. F. GAUSE was born in Moscow on the 27th of December 1910 into the family of FRANTS G. GAUSE, Professor of the Moscow Institute of Architecture. In 1927 GAUSE entered Moscow State University and in 1931 he got his University Degree.

Still as a university student GAUSE began experimental studies relating to evolutionary problems. He was the first to develop mathematical and experimental techniques which allowed him to model and analyze relationships between species of microscopic organisms. Studies of GAUSE on the struggle for existence in the world of microorganisms, infusoria and insects received world-wide recognition. In these studies he formulated the principle which became known as the principle of GAUSE or the principle of competitive exclusion. He described the experimental system to analyze the interrelationships between the predator and the prey and provided the quantitative description of such a relationship.

In 1934 his book "The Struggle for Existence" was published in the US. Later this book became a classic. In 1960s~1970s it was reprinted several times in the US in the series "A Classic of Mathematical Biology and Ecology". In 1981 this book was published in Japan by Shisaku-sha Publishing Company (Tokyo, 1981).

By the end of 1930s GAUSE began studies on the action of various optically active isomers of organic substances on microorganisms. These compounds included disinfectants and some poisons. These studies were summarized in his book "Optical Activity and the Living Matter" published in the US in 1940. These studies lead GAUSE to investigations of specific mechanisms responsible for the struggle for existence in the world of microbes. Such studies were a prelude to his interest in antibiotics which were regarded by him as a weapon in the struggle for existence among microorganisms.

In 1942 GAUSE together with his wife MARIYA GEORGYEVNA BRAZHNIKOVA discovered gramicidin S, the first original Soviet antibiotic, which was the second antibiotic (after penicillin) to become widely used in medicine. GAUSE took active part in the organization of the industrial-scale production of gramicidin S. Its use in war hospitals during the World War II saved many human lives. Even now gramicidin S is manufactured by the pharmaceutical industry in the USSR.

GAUSE successfully combined the development of theoretical bases for the search of new antibiotics with the implementation of new antibiotics into medical practice. He developed an original eco-geographical approach in the search for antibiotic-producing strains. This approach was instrumental in a directed search for strains producing antibiotics using the geographical distribution of the corresponding strains as a guideline.

GAUSE and his associates suggested a system for the classification of actinomycetes. Description and classification of lower taxons of actinomycetes greatly facilitated early detection of the strains producing new antibiotics. In 1957 he published a book "Classification of Actinomycetes-antagonists" which received wide recognition. It was translated into German in the GDR and into English in the US. In 1983 a new monograph was published "Key for Actinomycetes. Genera *Streptomyces*, *Streptoverticillium*, *Chainia*", the English translation of this book is now being published in Hungary.

GAUSE directed the work on the development of several antibacterial antibiotics which led to the isolation of original strains producing some antibacterial substances. This provided a basis for the antibiotic industry of the Soviet Union. Monomycin (paromomycin), colimycin (neomycin), albomycin, ristomycin, linkomycin, kanamycin and geliomycin were developed in the Soviet Union on the industrial scale.

GAUSE was a pioneer in the search for antitumor antibiotics. He made an important contribution to the development of a theoretical basis for the search of such drugs. He was active in developing some original techniques for the selection and evaluation of antitumor compounds from natural sources using microbiological models, tumor cells grown *in vitro*, and transplantable animal tumors. The Institute headed by GAUSE developed and implemented into pharmaceutical industry representatives of practically all important groups of antitumor antibiotics used in the world oncological practice *e.g.*, olivomycin, bruneomycin, rubomycin (daunorubicin), carminomycin and bleomycetin (bleomycin A-5). An original procedure was developed for the production of doxorubicin from rubomycin.

GAUSE was the initiator of studies on biochemical and molecular action mechanisms of antitumor antibiotics. He stimulated the work on the production of semisynthetic antitumor antibiotics. His last book "Antitumour Antibiotics" will be published in Moscow in 1987 in the series "Basic Science for Medicine".

Studies of Professor GAUSE in the field of mathematical biology, ecology and evolution on one hand and in the field of antibiotics on the other are well known to the world scientific community. He was elected Member of the USSR Academy of Medical Sciences, Foreign member of the Polish Academy of Sciences, Member of the New York Academy of Sciences, Honorary Member and Member of the Presidium of the International Society of Chemotherapy, Member of the London Zoological Society, Member of the American Society for Microbiology, Member of the Society for General Microbiology of the UK, Corresponding Member of the American Association for Cancer Research. He was board member of The Journal of Antibiotics (Tokyo) and Journal of Basic Microbiology (Jena), Antibiotiki (Moscow).

He was the recipient of several Soviet awards including the Stalin Prize for the discovery and development of gramicidin S.

He always had high standard of requirements to himself and to the results of the scientific experiment. His features were modesty, intolerance to showmanship and advertising, democratic attitude to people, sensitivity to the needs of others.

GEORGYI FRANTSEVICH GAUSE will be missed by his associates, colleagues and co-workers.

His name will remain in the history of science and his image will live in the hearts of men and women who knew him and worked with him.

Dr. M. G. BRAZHNIKOVA  
(Institute of New Antibiotics)