

ANNIVERSARIES AND DATES



IGOR IOGANNOVICH GRANDBERG
(On his 80th birthday)

Igor Iogannovich Grandberg was born in Moscow on February 19, 1930. After finishing school he entered the chemical faculty of M. V. Lomonosov Moscow University, which he finished in 1953 with a "red diploma", and after two and a half years (1956) he defended a Candidate's thesis on "Some reactions of azines". Having devoted his activity to the chemistry of heterocycles, I. I. Grandberg after only six years brilliantly defended a doctoral thesis on "Investigations of pyrazoles" at Moscow State University. The results of this fundamental research made a fundamentally new approach to the chemistry of nitrogen-containing heterocyclic compounds [1].

In 1965 the young doctor of sciences was invited to the K. A. Timiryazev Moscow Agricultural Academy to head the Department of organic chemistry. (The job was vacant due to the sudden death of Prof. V. V. Vil'yams.) From this time the whole of Igor Iogannovich's life and research and educational activity was associated with this institute. He led the department for 30 years and was professor from 1995.

The researches of I. I. Grandberg furthered the development of the chemistry of heterocyclic compounds in no small degree, and this was due largely to his creative writing: his rigorous logic in the solution of synthesis tasks, struggle to understand the mechanism of a chemical reaction, the combination of theory and practice – such an approach to scientific research accompanies all I. I. Grandberg's researches and becomes determining in the researches of his students.

He was the first to investigate systematically aspects of the correlation between electronic structure, conjugation, and reactivity of systems containing two heteroatomic rings [2].

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At the Department of organic chemistry of the Moscow Agricultural Academy, Igor Iogannovich Grandberg discovered a new single-stage synthesis of tryptamines – highly important derivatives of indole [3]. By means of this reaction in recent years, it has been possible to obtain previously unknown or difficultly obtainable biologically active derivatives of tryptamines, including azatryptamines, homotryptamines, physovenines, eserolines, tryptophols and homotryptophols, eserines and homoeserines [4, 5]. While summarizing data from study of the mechanism of this reaction, I. I. Grandberg put forward the idea [6] that the key stages of the Fischer reaction (the synthesis of indoles) and the formation of tryptamines take place by a single mechanism (a 3,3-sigmatropic shift). The hypothesis was later confirmed experimentally and proved extremely useful since it made it possible to predict, explain, and realize a series of reactions [7-9].

A series of practical problems for various branches of the national economy were solved under the guidance and with the participation of I. I. Grandberg. For the chemical and petrochemical industry a prospective method was developed for the purification of sulfurous liquors from harmful organic impurities – phenols and mercaptans [10, 11]. A process for photochemical degradation of a series of pesticides widely used in agricultural practice was studied [12]; a new method was developed for the analysis of essential oils [13].

Fundamental investigations were carried out on the synthesis and luminescence spectral characteristics of the derivatives of 7-aminocoumarins [14]. As a result new compounds that have proved promising as media for laser technology were found.

An unusual rearrangement of arylindoles to dibenzazepines – an important class of biologically active compounds – was discovered [15].

An original method was developed for the synthesis of new condensed heterocyclic systems based on amino- and hydroxypyrazoles and β -dicarbonyl compounds [16].

The teaching skills of Igor Iogannovich Grandberg became evident with the compilation of the textbook "Organic Chemistry" (1974) and the practical work "Organic Chemistry. Practical Works and Seminar Activities" (1973), which have been reprinted many times and are used to this day as the basis for the instruction of specialists not only in agriculture but also in biological and medical specialties. In 2009 an unrevised version of the textbook from co-authorship with N. L. Nam (7th edition) came to light.

The creative longevity of I. I. Grandberg has been helped substantially by occupation with sport. The competition named "Sorokobor'e" (competition in 40 disciplines), thought up and organized by him and his friends, at the Chemical faculty of Moscow State University has nowadays gained great popularity.

The Department of organic chemistry at the Russian State Agrarian University / K. A. Timiryazev Moscow Agricultural Academy has a strong scientific reputation and tradition and preserves the continuity of the generations during the training of highly specialized staff for an agroindustrial complex and chemical science. This makes it possible to speak of the scientific school of Prof. I. I. Grandberg. His works are of fundamental importance for many areas of the heterocyclic chemistry. The "Grandberg reaction" is a shining achievement of the school, in recognition of its service to global chemical society.

On the results of scientific investigations I. I. Grandberg published more than 500 papers and received 53 inventor's certificates. Series of papers of Prof. I. I. Grandberg were twice awarded first prizes at contests conducted by the D. I. Mendeleev All-Union Chemical Society (1961, "Synthetic investigations and the search for new medicines in the pyrazole series"; 1972, "Investigations in the region of the most important biogenic amines of the indole series"). In 2006 Prof. I. I. Grandberg was awarded the Prof. A. N. Kost medal for outstanding achievements in the chemistry of nitrogen-containing heterocycles. In 1995 he was given the title of "Honored science worker of the Russian Federation".

More than 40 graduates and science workers have defended Candidate's theses under the guidance of Igor Iogannovich. As team leader and scientific consultant he has afforded assistance in the execution and defense of five doctor's theses. Many students of Prof. I. I. Grandberg's school of organic chemistry are leaders of research and teaching establishment, laboratories, and companies.

Igor Iogannovich Grandberg continues to work successfully at the department of organic chemistry, fulfilling scientific and educational work, and remains an active member of the team.

REFERENCES

1. A. N. Kost and I. I. Grandberg, *Progress in Pyrazole Chemistry, Adv. Heterocycl. Chem.*, **6**, 347 (1966).
2. I. I. Grandberg, *Zh. Obshch. Khim.*, **33**, 513 (1963).
3. I. I. Grandberg, T. I. Zuyanova, N. I. Afonina, and T. A. Ivanova, *Dokl. Akad. Nauk SSSR*, **176**, 583 (1967).
4. I. I. Grandberg, *Zh. Org. Khim.*, **19**, 2439 (1983).
5. I. I. Grandberg, in: V. G. Kartsev (editor), *Selected Methods for Synthesis and Modification of Heterocycles* [in Russian], Vol. 1, p. 79, IBS PRESS (2003).
6. I. I. Grandberg, *Izv. TSKhA*, No. 5, 188 (1972).
7. I. I. Grandberg and V. I. Sorokin, *Uspekhi Khimii*, **43**, 266 (1974).
8. N. M. Przheval'skii, L. Yu. Kostromina, and I. I. Grandberg, *Uspekhi Khimii*, **56**, 814 (1987).
9. N. M. Przheval'skii and I. I. Grandberg, *Khim. Geterotsikl. Soedin.*, 867 (1988). [*Chem. Heterocycl. Comp.*, **24**, 709 (1988)].
10. N. M. Przheval'skii, I. I. Grandberg, and A. L. Libin, *Izv. TSKhA*, No. 2, 198 (1975).
11. N. M. Przheval'skii, I. I. Grandberg, and A. L. Libin, *Izv. TSKhA*, No. 3, 201 (1975).
12. E. S. Brodsky, N. A. Kluev, B. V. Bocharov, A. V. Dovgilevich, N. P. Melnikova, and I. I. Grandberg, *Toxicolog. & Environmental Chem.*, **34**, 105 (1992).
13. V. A. Zamureenko, N. A. Kluev, L. B. Dmitriev, and I. I. Grandberg, *J. Chromatography*, **303**, №1, 109 (1984).
14. S. K. Gorozhankin, M. A. Kirpichenok, and I. I. Grandberg, *Khim. Geterotsikl. Soedin.*, 1326 (1990). [*Chem. Heterocycl. Comp.*, **26**, 1102 (1990)].
15. G. P. Tokmakov and I. I. Grandberg, *Tetrahedron*, **5**, 2091 (1990).
16. I. I. Grandberg and N. L. Nam, in: V. G. Kartsev (editor), *Selected Methods Synthesis and Modification of Heterocycles* [in Russian], Vol. 2, p. 288, IBS PRESS (2003).

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