

ANNIVERSARIES AND DATES



IGOR IOGANNOVICH GRANDBERG

(On his 75th birthday)

Igor Iogannovich Grandberg was born on 19 February 1930 in Moscow. In 1948, he entered the Chemistry department of M. V. Lomonosov State University, from which he graduated with distinction in 1953. In less than three years, he completed and defended his Candidacy dissertation on "Some reactions of azines" (1956, advisor A. N. Kost). Since then, his scientific interests have involved heterocyclic chemistry. Within 6 years, he brilliantly defended his doctoral dissertation on "Investigations of pyrazoles" at Moscow State University. The results of this research made a fundamentally new contribution to the chemistry of nitrogen-containing heterocycles (A. N. Kost and I. I. Grandberg, "Progress in pyrazole chemistry," *Adv. Heterocycl. Chem.*, **6**, 347 (1966)). In 1965, Professor I. I. Grandberg was invited to K. A. Timiryazev Moscow Agricultural Academy to head the organic chemistry department, which he has continuously directed for 30 years, and since 1995 he has been a Professor in this department.

I. I. Grandberg's research is of fundamental importance for a number of divisions of the chemistry of heterocyclic compounds. He has systematically studied problems of the correlation between electronic structure, conjugation, and reactivity of molecules containing two heteroaromatic rings. In the organic chemistry department of the Moscow Agricultural Academy, I. I. Grandberg discovered a novel reaction: a one-step synthesis of tryptamines, which are very important biologically active compounds in the indole series (I. I. Grandberg, T. I. Zuyanova, N. I. Afonina, and T. A. Ivanova, "A novel method for synthesis of very important biogenic amines," *Dokl. Akad. Nauk*, **176**, 583 (1967)). Based on this reaction, methods were developed for synthesis of azatryptamines, homotryptamines, tryptophols, homotryptophols, thiotryptophols, and also cyclic indole compounds containing a tryptamine moiety: eserines, homoeserines, physovenines, β -carbolines (I. I. Grandberg, "Tryptamines and related compounds from γ - and δ -halocarbonyl compounds,"

Organic Chemistry Department, K. A. Timiryazev Moscow Agricultural Academy. Translated from *Khimiya Geterotsiklicheskikh Soedinenii*, No. 2, pp. 310-311, February, 2005.

Zh. Org. Khim., **19**, 2439 (1983); *Selected Methods for Synthesis and Modification of Heterocycles* [V. G. Kartsev, ed.], IBS Press, **1** (2003), p. 79). This method for synthesis of tryptamines is currently called the Grandberg reaction.

Generalizing data from study of the mechanisms of this reaction, I. I. Grandberg suggested the hypothesis, later confirmed experimentally, that the key step in the familiar Fischer indole synthesis (formation of a carbon-carbon bond) is a concerted process and occurs according to an acid-catalyzed [3,3]-sigmatropic shift (I. I. Grandberg, "Fischer indole synthesis and some related reactions as sigmatropic rearrangements," *Izv. TSKhA*, No. 5, 188 (1972)). This hypothesis proved to be extremely productive, since it made it possible to predict and carry out a number of new rearrangements and to explain the mechanism of several known reactions (I. I. Grandberg and V. I. Sorokin, "Asymmetric ketones in the Fischer reaction and cyclization of O-phenyloximes," *Usp. Khim.*, 266 (1974); N. M. Przheval'skii, L. Yu. Kostromin, and I. I. Grandberg, "New data on the mechanism for the Fischer indole synthesis," *Khim. Geterotsikl. Soedin.*, 867 (1988); N. M. Przheval'skii and I. I. Grandberg, "Aza Cope rearrangement in organic synthesis," *Usp. Khim.* **56**, 814 (1987)).

In recent years, I. I. Grandberg's scientific interests have involved the chemistry of 7-aminocoumarins (effective media for laser technology) and with development of novel synthesis routes for derivatives of indole, pyrazole, and other heterocycles (S. K. Gorozhankin, M. A. Kirpichenok, and I. I. Grandberg, "Synthesis of 4-alkyl functionally substituted 7-dialkylaminocoumarins," *Khim. Geterotsikl. Soedin.*, 1326 (1990); G. P. Tokmakov and I. I. Grandberg, "Rearrangement of 1-arylindoles to 5H-dibenz[b,f]azepines, *Tetrahedron*, **5**, 2091 (1990); I. I. Grandberg and N. L. Nam, "Condensed systems based on amino- and hydroxypyrazoles," in: *Selected Methods for Synthesis and Modification of Heterocycles* (V. G. Kartsev, ed.), IBS Press (2003), **2**, p. 113)).

I. I. Grandberg has published nearly 500 scientific papers and has been granted more than 50 Inventor's Certificates. More than 40 Candidacy dissertations have been prepared and defended in the organic chemistry department of the Moscow Agricultural Academy under the direction of I. I. Grandberg; and as group leader and scientific consultant, he has provided considerable help in completion and defense of five doctoral dissertations. Many of his students currently direct scientific groups, laboratory, and companies. Several generations of students as well as teachers in agricultural and biological specialties are grateful to I. I. Grandberg for his excellent textbook and laboratory manual on organic chemistry. The *Organic Chemistry* textbook has gone through 6 printings (most recently in 2004) and is quite popular.

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