

ANNIVERSARIES AND DATES



THE 65TH BIRTHDAY OF ACADEMICIAN EDMUNDS LUKEVICS

On December 14, 2001, the Editor-in-Chief of the journal "Chemistry of Heterocyclic Compounds" Academician Edmunds Lukevics will be 65 years old.

Edmunds Lukevics is a widely known extremely versatile chemist of vast experience, whose works both in organometallic and heterocyclic chemistry and in medical chemistry have received international recognition. For almost 20 years he has been director and chairman of the scientific council of the Latvian Institute of Organic Synthesis, and from 1985 he has headed the international journal of heterocycles. In the past years he has been able to overcome a great deal, including the enormous difficulties of the transitional period, and to defend the scientific stands and achievements of the Institute. Among all the institutes of contemporary Latvia the Institute of Organic Synthesis remains the largest and has the greatest scientific potential (in 2000-2001 270 research workers, including 107 doctors of science).

A highly erudite person, distinguished by his perseverance, adherence to principles, and versatility, beset by a love of chemistry, capable of discovering new trends and applying scientific achievements to various fields of life, and enviable persistence in the achievement of positive aims, Lukevics has become one of the most outstanding members of the Latvian school of organic chemists, drawing his principles from P. Walden, G. Vanags, and S. Hiller.

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Edmunds Lukevics was born in Liepaja, and even in his years at school chemistry became the passion of his life. The choice of this path was largely determined by the talented school chemistry teacher Jekabs Grinbergs (who taught many future chemists) and, later, the unforgettable Prof. Gustavs Vanags, whose student Edmunds Lukevics became after entering the chemistry faculty of Latvian State University in 1953. His first chemical experiments were carried out in the school chemical group and then in the organic chemistry group of the Students' Scientific Society, headed by Prof. Vanags. Even in his student years Edmunds published four papers. The first (Journal of General Chemistry, 1956) was devoted to the Liebermann color reaction, which is used for the detection of nitroso compounds. The young student established that the reaction is given not only by nitroso compounds but also by nitro compounds, such as phenylnitromethane, that can release nitrous acid and that it is better to perform the reaction not with phenol but with resorcinol.

We note one particular aspect of Edmunds Lukevics' work – unlike the majority of his fellow students, who started their scientific careers with research into the subjects favored by Prof. Vanags (derivatives of 1,3-indandione), even in his student years he chose a field where he could be completely independent, i.e., the chemistry of organosilicon compounds, in which nobody in Riga in 1956 had yet been engaged.

He continued to engage in this field of chemistry after he finished university, when in August 1958 he was appointed engineer in the newly created Institute of Organic Synthesis of the Academy of Sciences of the Latvian SSR, initially in the laboratory of Academician S. A. Hiller and then, after M. G. Voronkov had moved from Leningrad to Riga, in the Laboratory of Heteroorganic Compounds. From the beginning Edmund's work was extremely intensive and highly independent, without recognition of authority or, from time to time, the unwritten conventions of the scientific media; consequently, maybe, in his youth he had some bitter moments, but he endured them stoically and did not change his principles.

The whole scientific destiny of Lukevics was continuously tied up with the institute initially created and led by S. A. Hiller. Here he passed through all the stages of the scientific road, beginning from the most junior scientific worker to leader of the Laboratory of Organometallic Chemistry (1970), Assistant Director of Scientific Research (1980), and Director of the Institute (from 1982). After M. G. Voronkov had moved to Irkutsk Lukevics undividedly headed all the work on organometallic chemistry at the institute and subsequently became worthy successor of Hiller – leader of one of the foremost institutes of organic chemistry.

In 1996 Lukevics defended a Candidate's Thesis on "Organosilicon Derivatives of Furan" and in 1973 a Doctoral Thesis on "Investigations in the Region of Biologically Active Organosilicon Compounds." Once again I emphasize that he was the first to engage in this branch of chemistry in Riga as far back as the student days, and he remained faithful to it, although his investigations subsequently diversified and included in addition the compounds of other elements of group IVB.

Among the main directions of the investigations carried out and directed by Lukevics over a number of years it is necessary to mention the development of methods for the synthesis of silicon- and germanium-containing derivatives of furan, thiophene, and nitrogen-containing heterocycles; study of the effect of organosilicon, organogermanium, and organotin substituents on substitution and addition reactions in the series of furan and thiophene compounds; study of hydrosilylation and hydrogermylation; the use of alkenylsilanes and alkenylgermanes in the synthesis of nitrogen-containing heterocycles; the application of phase-transfer catalysis and ultrasonic irradiation to organometallic synthesis.

New approaches that have now become familiar in the synthesis of compounds with five- and six-coordinated silicon and germanium atoms were proposed and put into practise. There were systematic investigations into multinuclear NMR spectroscopy (at ^{13}C , ^{15}N , ^{17}O , ^{29}Si , ^{73}Ge , ^{119}Sn atoms) for characterization of the structural features of various organic derivatives and the study of extensive series of derivatives in order to establish the specific relationships characteristic of the various types of compound. It was possible to make a large number of unusual finds, to establish nontrivial structures, and even to discover new reactions.

Lukevics is one of the pioneers in the synthesis and study of the physiological activity of the biologically active silicon and particularly germanium compounds. As a result new types of biologically active compounds with various types of activity (antifungal, antitumor, stimulating the healing of wounds, etc.) were

produced, and the principles governing the "structure–biological activity" relation were discovered. Also largely developed at the Institute was the silyl method for the synthesis of physiologically active compounds (in the series of β -lactam antibiotics, nucleosides, and their analogs). Lukevics' group of research workers was extended and included 25 candidates and eight doctors of sciences. No less broad was the geography of his scientific contacts, coming from far beyond the borders of Latvia and the former USSR.

After appearing at the fortieth Nobel symposium in 1977 Lukevics participated as invited lecturer at many prestigious scientific symposia and conferences in various countries (Belgium, China, Great Britain, France, Israel, Japan, Italy, Sweden, Malaysia, Poland, Finland, USA, Portugal, Australia, Slovenia, and others) and gave lectures at universities in Germany, Japan, France, Sweden, and India. The number of such conferences over the years approximates to 100.

Lukevics is an Academician of the Latvian Academy of Sciences (from 1987), member of the New York Academy of Sciences (1993), member of the Department of organometallic chemistry at the Federation of European Chemical Societies (1995), member of the American Chemical Society (1997), member of the editorial boards of a number of journals: "Bioorganicheskaya Khimiya" ("Bioorganic Chemistry"), "Applied Organometallic Chemistry", "Main Group Metal Chemistry", "Metal-Based Drugs", "Silicon Chemistry", "Mendeleev Communications", "Advances in Heterocyclic Chemistry", "Latvijas Kimijas Zurnals" ("Latvian Journal of Chemistry") From 1982 to 1987 he headed the Scientific Council on the chemistry and technology of organic compounds of sulfur at the State Committee of the USSR for Science and Technology.

Edmunds Lukevics has always been noted for his sporting ardor, both in his scientific research and in the direct sense of the term – he was greatly interested in mountaineering, where he conquered peaks, and played and continues to play in a basket ball team. Another of his passions is opera and particularly the works of Verdi. His creativity is also displayed in his popular essays; an interview with Lukevics also points to his precision of word, precise editorial correctness, and to his ability to write succinctly and logically and to evaluate the data for reviews and for his personal papers.

In total Lukevics has published more than 1300 works, including 27 treatises, about 600 scientific papers, reviews, and chapters in collective works. He holds 130 author's certificates and international patents. He has done much work on the improvement and refinement of chemical terminology in the Latvian language. Some books by Lukevics and co-authors have been translated and published in the USA, Rumania, and Germany.

In the course of many years Lukevics has headed the Dissertation council of chemical sciences at the Institute of Organic Synthesis, which even in the former USSR was distinguished by a high level of work and great authority. In recent years he has headed the Expert Commission on Chemistry at the Latvian Science Council, and he is a member of this Council.

He has directed numerous scientific projects and programs, such as "The synthesis of heterocyclic organosilicon and organogermanium compounds," "The asymmetric and catalytic synthesis of heteroaromatic compounds," and "The development of modern methods of organic chemistry, aimed at development of the pharmaceutical industry of Latvia."

He has carried out and still carries out much work with the leading pharmaceutic companies of the world (Japan, Switzerland, Germany, France, Finland) with the aim of organizing trials of the products created at the Institute and concluding financially favorable agreements of collaboration. The pragmatic activity of Academician Lukevics has made it possible to preserve the Latvian Institute of Organic Synthesis and its scientific potential at a time when finance from the State was not sufficient to secure the full potential of the Institute. This has made it possible to preserve and magnify the prestige of chemistry in Latvia, a relatively poor nation, among the chemical and pharmaceutical society of the world.

Edmunds Lukevics is one of the most outstanding and scientifically active members of the Latvian Academy of Sciences. Our academy can be justly proud of Academician E. Lukevics, and it is therefore particularly pleasant to me as President of the Latvian Academy of Sciences to add to the congratulations of the editorial team of the journal the warmest congratulations and best wishes of the Latvian Academy of Sciences.

We wish him on his birthday good health, vitality, many new concepts in his science and in his life, and real prospects for fulfilment of his ideas and aims, including his ideas for the management and advancement of the international journal of heterocyclic chemistry.

J. Stradins

The editorial team felt compelled as a supplement to this birthday article, which opens an issue devoted to the 65th birthday of E. Lukevics, to give a selected bibliography of his principal publications. We note that a full bibliography (up to 1996) has been published in a separate brochure "Academician of Latvian Academy of Sciences Edmunds Lukevics. Bibliography" (1996), while the bibliography "500 Papers and books by Professor E. Lukevics" appeared in 1992.

LIST OF PRINCIPAL PUBLICATIONS IN 1997-2001

1. E. Lukevics and O. Pudova, *Four-Membered Rings with One Silicon, Germanium, Tin, or Lead Atom, Comprehensive Heterocyclic Chemistry II: A Review of the Literature 1982-1995* (Eds.-in-chief, A. R. Katritzky, C. W. Rees, and E. F. Scriven), Vol. IB (Vol. Ed. A. Padwa), Pergamon, (1996), p. 867.
2. E. Lukevics and O. Pudova, *Four-Membered Rings with One Boron or Other Atom, Comprehensive Heterocyclic Chemistry II: A Review of the Literature 1982-1995* (Eds.-in-chief, A. R. Katritzky, C. W. Rees, and E. F. Scriven), Vol. IB, (Vol. Ed. A. Padwa), Pergamon (1996), p. 887.
3. E. Lukevics and O. Pudova, *Four-Membered Rings with Three Heteroatoms, Comprehensive Heterocyclic Chemistry II: A Review of the Literature 1982-1995* (Eds.-in-chief A. R. Katritzky, C. W. Rees, and E. F. Scriven), Vol. IB (Vol. Ed. A. Padwa), Pergamon (1996), p. 1189.
4. V. Gevorgyan, L. Borisova, and E. Lukevics, *Organylsilatrane from the reaction of tetraorganylsilanes with triethanolamine, J. Organomet. Chem.*, **527**, 295 (1997).
5. V. Gevorgyan, L. Borisova, A. Vyater, V. Ryabova, and E. Lukevics, *A novel route to pentacoordinated organysilanes and -germanes, J. Organomet. Chem.*, **548**, 149 (1997).
6. E. Lukevics, S. Belyakov, P. Arsenyan, and Yu. Popelis, *1-Fluorogermatrane – Germatrane with the shortest intramolecular N→Ge bond, J. Organomet. Chem.*, **549**, 163 (1997).
7. I. Iovel, Yu. Popelis, M. Fleisher, and E. Lukevics, *Trimethylsilylcyanation of aromatic aldehydes catalyzed by Pybox-AlCl₃ complex, Tetrahedron. Asymmetry*, **8**, 1279 (1997).
8. E. Lukevics, M. Veveris, and V. Dirnens, *Synthesis, vasodilating and antithrombotic activity of pyridyl-substituted silylisoxazolines, Appl. Organomet. Chem.*, **11**, 805 (1997).
9. E. Lukevics and O. A. Pudova, *Furan derivatives of elements of group VII, Khim. Geterotsikl. Soedin.*, 151 (1997).
10. E. Lukevics and O. A. Pudova, *Furan derivatives of elements of group VII, Khim. Geterotsikl. Soedin.*, 154 (1997).
11. E. Lukevics, P. Arsenyan, S. Belyakov, and J. Popelis, *Addition of nitrile oxides to germyl-substituted ethylenes, J. Organomet. Chem.*, **558**, 155 (1998).
12. I. Iovel, Yu. Popelis, A. Gaukhan, and E. Lukevics, *Hydrosilylation of unsaturated (hetero)aromatic aldehydes and related compounds catalyzed by transition metal complexes, J. Organomet. Chem.*, **559**, 123 (1998).
13. I. Iovel, G. Oehme, and E. Lukevics, *Catalytic enantioselective addition of diethylzinc to (hetero)aromatic aldehydes, Appl. Organomet. Chem.*, **12**, 469 (1998).

14. E. Lukevics and O. Pudova, *Molecular structure of compounds with silicon-silicon bonds: Review, Main Group Met. Chem.*, **21**, 123 (1998).
15. E. Lukevics, P. Arsenyan, S. Belyakov, and J. Popelis, *Synthesis of polyisoxazolinylgermanes, Main Group Met. Chem.*, **21**, 557 (1998).
16. E. Lukevics and O. Pudova, *Molecular structure of sila-heterocycles: Review, Main Group Met. Chem.*, **21**, 649 (1998).
17. E. Lukevics, P. Arsenyan, and M. Veveris, *Synthesis, vasodilating, antithrombotic and cardioprotective activity of pyridyl substituted 5-silyl(germyl)isoxazolines-2, Metal-Based Drugs*, **5**, 251 (1998).
18. I. G. Iovel and E. Lukevics, *Hydroxymethylation and alkylation of compounds of the furan, thiophene, and pyrrole series in the presence of H⁺-cationites, Khim. Geterotsikl. Soedin.*, **3** (1998).
19. E. Lukevics, *Unsaturated germanes and stannanes in the synthesis of nitrogen-containing heterocycles by [2+3] cycloaddition, Khim. Geterotsikl. Soedin.*, 1155 (1998).
20. E. Lukevics, P. Arsenyan, M. Fleisher, J. Popelis, and O. Pudova, *Addition of nitrile oxides to silyl- and germlyl-disubstituted ethylenes, Main Group Met. Chem.*, **22**, 655 (1999).
21. E. Lukevics, P. Arsenyan, S. Belyakov, J. Popelis, and O. Pudova, *Cycloaddition reactions of nitrile oxides to silyl- and germlyl-substituted thiophene 1,1-dioxides, Organometallics*, **18**, 3187 (1999).
22. S. Belyakov, L. Ignatovich, and E. Lukevics, *Concerning the transannular bond in silatranes and germatranes: a quantum-chemical study, J. Organomet. Chem.*, **577**, 205 (1999).
23. E. Abele, K. Rubina, R. Abele, J. Popelis, I. Mazeika, and E. Lukevics, *Fluoride-ion-mediated reactions of trimethylsilylacetylene with carbonyl compounds and terminal acetylenes, J. Organomet. Chem.*, **586**, 184 (1999).
24. E. Lukevics, V. Dirnens, N. Pokrovska, I. Zicmane, J. Popelis, and A. Kemme, *Addition of nitrile oxides to 2,3-dihydrofurylsilanes. Crystal and molecular structure of tetrahydrofuro[2,3-d]isoxazolylsilanes, J. Organomet. Chem.*, **586**, 200 (1999).
25. E. Lukevics, L. Ignatovich, and S. Belyakov, *Synthesis and molecular structure of phenyl and tolylgermatranes, J. Organomet. Chem.*, **588**, 222 (1999).
26. G. Oehme, I. Iovel, and E. Lukevics, *Asymmetric alkylation of aromatic aldehydes with dialkylzinc catalyzed by novel amino derivatives of hydroxytetrahydropyran, Appl. Organomet. Chem.*, **13**, 481 (1999).
27. E. Lukevics, P. Arsenyan, S. Germane, and I. Shestakova, *Neurotropic and antitumor activities of silyl- and germlylisoxazolin-2-yl derivatives, Appl. Organomet. Chem.*, **13**, 795 (1999).
28. E. Lukevics and O. Pudova, *Molecular structure of organosilicon compounds with Si-M (M = Ge, Sn, Pb, Ti, Zr, Hf) bonds: Review, Main Group Met. Chem.*, **22**, 385 (1999).
29. E. Abele and E. Lukevics, *Reactions of carbon tetrachloride and carbon tetrabromide with anions and carbanions: Review, Organic preparations procedures int.*, **31**, 359 (1999).
30. L. Leite, D. Jansone, M. Veveris, H. Cirule, Y. Popelis, G. Melikyan, A. Avetisyan, and E. Lukevics, *Vasodilating and anti-arrhythmic activity of heteryl lactones, Eur. J. Med. Chem.*, **34**, 859 (1999).
31. E. Lukevics, *Organometallic compounds in heterocyclic chemistry, Khim. Geterotsikl. Soedin.*, 1011, 1012 (1999).
32. A. Mishnev, I. Iovel, J. Popelis, I. Vosekalna, and E. Lukevics, *Synthesis, characterization and X-ray structure of N-2-pyridylmethylidene-1-phenylethylamine - PdCl₂ complexes, J. Organomet. Chem.*, **608**, 1 (2000).
33. E. Lukevics, V. Ryabova, P. Arsenyan, S. Belyakov, J. Popelis, and O. Pudova, *Bithienylsilanes, Unexpected structure and reactivity, J. Organomet. Chem.*, **610**, 8 (2000).
34. I. Iovel, L. Golomba, S. Belyakov, J. Popelis, S. Grinberga, and E. Lukevics, *Trimethylsilylcyanation of heterocyclic imines catalyzed by Lewis acids, Appl. Organomet. Chem.*, **14**, 721 (2000).
35. E. Abele and E. Lukevics, *Recent advances in the synthesis of heterocycles from oximes, Heterocycles*, **53**, 2285 (2000).

36. E. Lukevics, P. Arsenyan, S. Belyakov, J. Popelis, and O. Pudova, *Nucleophilic addition of amines to silyl- and germyl-substituted thiophene 1,1-dioxides*, *Eur. J. Org. Chem.*, 3139 (2000).
37. E. Lukevics and O. Pudova, *Molecular structure of organosilicon compounds with Si-Fe, Si-Co and Si-Ni: Review, Main Group Met. Chem.*, **23**, 207 (2000).
38. E. Lukevics, P. Arsenyan, and S. Grinberga, *Unusual transformation of germylisoxazolines in the reaction with LiAlH₄*, *Main Group Met. Chem.*, **23**, 239 (2000).
39. E. Abele, K. Rubina, P. Arsenyan, S. Grinberga, J. Popelis, and E. Lukevics, *Fluoride ion-mediated reactions of disubstituted acetylenes Me₃SiC≡CMMe₃ (M = C, Si, Ge, Sn) with aldehydes and ketones*. *Main Group Met. Chem.*, **23**, 243 (2000).
40. E. Lukevics, L. Ignatovich, L. Golomba, J. Popelis, and S. Belyakov, *A new reaction of 1-hydrosilatrane*, *Main Group Met. Chem.*, **23**, 761 (2000).
41. E. Lukevics, P. Arsenyan, I. Shestakova, O. Zharkova, I. Kanepes, R. Mezapuke, and O. Pudova, *Cytotoxic activity of silyl- and germyl-substituted 4,4-dioxo-3a,6a-dihydrothieno[2,3-d]isoxazolines-2*, *Metal-Based Drugs*, **7**, 63 (2000).
42. E. Abele and E. Lukevics, *Recent advances in the chemistry of oximes*, *Org. Prep. Proc. Int.*, **32**, 235 (2000).
43. L. Ignatovich, S. Belyakov, Yu. Popelis, and E. Lukevics, *E-β-Styrylgermane*, *Khim. Geterotsikl. Soedin.*, 688 (2000).
44. E. Lukevics, J. Barbarella, P. Arsenyan, S. Belyakov, and O. Pudova, *Molecular structure of compounds containing 2,2'-bithienyl fragment, Review, Khim. Geterotsikl. Soedin.*, 725 (2000).
45. E. Abele and E. Lukevics, *Recent advances in asymmetric phase-transfer catalysis*, *Latv. Kim. Zh.*, **3** (2001).
46. E. Lukevics, P. Arsenyan, S. Belyakov, J. Popelis, and O. Pudova, *Cycloaddition reactions of nitrile oxides to 2,4-silyl- and germyl-substituted thiophene-1,1-dioxides*, *Organometallics*, **20**, 2487 (2001).
47. K. Rubina, E. Abele, P. Arsenyan, R. Abele, M. Veveris, and E. Lukevics, *Synthesis of silicon and germanium containing heteroaromatic sulfides as cholesterol level lowering and vasodilating agents*, *Metal-Based Drugs*, **8**, No. 2, 85 (2001).
48. I. Iovel, L. Golomba, J. Popelis, A. Gaukhman, and E. Lukevics, *CsF-Si(OEt)₄ catalyzed addition of (hetero)aromatic amides to ethyl acrylate*, *Appl. Organomet. Chem.*, **15**, 67 (2001).
49. I. Iovel, L. Golomba, S. Belyakov, A. Kemme, and E. Lukevics, *Addition of Me₃SiCN to trifluoromethyl derivatives of N-(pyridylmethylidene)anilines catalyzed by Lewis acids*, *Appl. Organomet. Chem.*, **15**, 733 (2001).
50. E. Abele and E. Lukevics, *Recent advances in fluoride ion activation of silicon bonds in organic synthesis*, *Main Group Met. Chem.*, **24**, 315 (2001).
51. E. Lukevics, P. Arsenyan, I. Shestakova, I. Domracheva, A. Nesterova, and O. Pudova, *Synthesis and antitumour activity of trimethylsilylpropyl-substituted benzimidazoles*, *Eur. J. Med. Chem.*, **36**, 507 (2001).
52. E. Lukevics, K. Rubina, E. Abele, M. Fleisher, P. Arsenyan, and S. Grinberga, *Fluoride ion mediated reactions of disubstituted acetylenes Me₃SiCsCMMe₃ (M=C, Si, Ge, Sn) with terminal acetylenes*, *J. Organomet. Chem.*, **634**, 69 (2001).
53. E. Lukevics, S. Belyakov, P. Arsenyan, and O. Pudova, *Theoretical aspects of the cycloaddition of acetonitrile oxide to tert-butyl-, trimethylsilyl-, and trimethylgermyl-substituted thiophene 1,1-dioxides*, *Khim. Geterotsikl. Soedin.*, 1299 (2001).

Most of the articles in this issue, dedicated to Prof. E. Lukevics' birthday, relate to the organometallic chemistry of heterocycles; it is proposed to publish the remaining material in future issues.