

PROFESSOR ALEXANDRU T. BALABAN'S 75th ANNIVERSARY



The present issue of *Revue Roumaine de Chimie* is dedicated to Professor Balaban's 75th anniversary, and accompanies other journal issues dedicated to this anniversary: *Arkivoc* (guest editor I. Ghiviriga) and *Revista de Chimie București*. It should be mentioned that in 1991, for his 70th anniversary, along with *Revue Roumaine de Chimie*, four other journals had special issues dedicated to that anniversary: *Internet Electronic Journal of Molecular Design* (head editor O. Ivanciuc), *Croatica Chimica Acta* (editor-in-chief N. Trinajstić, guest editors A. Graovac, B. Pokrić, and D. Vikić-Topić), *SAR and QSAR in Environmental Research* (editor-in-chief J. Devillers, guest editor O. Ivanciuc), and *MATCH, Communications in Mathematical and Computational Chemistry* (editor-in-chief I. Gutman, guest editors M. V. Diudea and O. Ivanciuc).

Professor Balaban was appointed tenured professor at Texas A&M University at Galveston in September 2000 and continues to teach organic chemistry (web page: <http://www.tamug.tamu.edu/mars/faculty/balaban.htm>).

In 2000, professor Balaban was elected Honorary Member of the Hungarian Academy of Sciences along with two Nobel Prize winners (J.-M. Lehn from France, and J. C. Polanyi from Canada), and he presented in Budapest in the following year an acceptance address. In 2005, he was elected in Dubrovnik President of the newly formed International Academy of Mathematical Chemistry, which so far has 60 members. In 2004, he was invited to lecture in Tokyo, Kyoto, and Shizuoka (Japan) and participated in the symposium dedicated to Professor Haruo Hosoya's 65th anniversary and retirement from the Ochanomizu University.

The synthesis of pyrylium salts by diacylation of alkenes is listed under the name "Balaban-Nenitzescu-Prail reaction" in "*Organic Syntheses Based on Name Reactions*" 2nd ed. by A. Hassner and C. Stumer, Pergamon, Amsterdam, 2002, but two editions of "*The Chemistry of Heterocycles*" by T. Eicher and S. Hauptmann, Thieme, Stuttgart, 1995, and Wiley-VCH, Weinheim, 2003 list it as the "Balaban reaction". The former name is probably the better.

At present, Professor Balaban is a member of the Editorial Boards of the following journals: *Revue Roumaine de Chimie*; *Revista de Chimie București*; *Internet Electronic Journal of Molecular Design* (USA); *Scientometrics* (Hungary); *Advances in Heterocyclic Chemistry* (USA); *Organic Preparations and Procedures International* (USA); *Journal of Radioanalytical and Nuclear Chemistry* (Hungary); *Heterocyclic Communications* (England); *Current Computer-Aided Drug Design* (USA); *Central European Journal of Chemistry* (Poland); *Fullerenes, Nanotubes, and Carbon Nanostructures* (USA), and for this journal he co-edited a special issue with papers from Romanian authors. For *Polycyclic Aromatic Compounds* (France) he is the topical editor for theoretical chemistry.

Professor A. T. Balaban's name is mentioned in several *Who's Who* monographs such as: *Marquis Who's Who in America 2005, 2006*; *Marquis Who's Who in the World 2005, 2006*; *International Who's Who in Education, 3rd Ed.*; *Who's Who in Science in Europe, 4th Ed.*, *Contemporary Who's Who 2002/2003*; *Strathmore's Who's Who 10th Ed.*; *Men of Achievement*; as well as in corresponding Romanian monographs such as: *Românii din America, 500 Personalități din S.U.A. și Canada* (by D. Fornade, Dunway Publ., Montreal, 2001); *Membrii Academiei Române 1966-1999*; *Dicționarul specialiștilor în știința și tehnica românească 2000*; *Nemuritorii. Academicieni Români 1995*; *Personalități românești ale științelor naturii și tehnicii*; *Repere ale ingineriei românești 2000*.

The present Addendum to Professor Balaban's bibliography for 2001-2005 continues the two preceding ones (*Rev. Roum. Chim.*, **1991**, 36, 289-311, and **2001**, 46, 265-275). The references published in the latter list starting with 568 should be replaced by those in the present one because they had been in print in 2001. A few comments on several publications in this Addendum follow.

Three former Ph.D. students of Professor Balaban were granted post-doctoral fellowships by the Texas A&M University at Galveston: Ovidiu Ivanciuc, Teodora Ivanciuc, and Marc Antoniu Ilieș. With Dr. O. Ivanciuc and Dr. Teodora Ivanciuc, several joint papers may be seen in the present list (Nos. 569-572, 579, 585, 587, 603-605, 607, 610, and 644); they involve molecular descriptors, quantitative structure-activity or structure-property relationships (QSAR and QSPR, respectively), and graph-theoretical studies of fullerene-related structures. With Dr. Ilieș, a new research field was initiated, namely the synthesis and testing of cationic lipids as gene transfer agents: starting from pyrylium salts and primary amines having hydrophobic chains, a cationic lipid is obtained without involving quaternization reactions, and this non-viral vector is then associated with a DNA into a liposome that can penetrate cell nuclei (Nos. 593, 606, 616, 636, 647, and the U. S. Patent).

It is with deep sadness that a lifelong collaboration with M. D. Banciu (Nos. 597, 610, 640) was ended by Acad. Prof. Banciu's passing away in 2005. Two of these papers are the result of the collaboration with Professor Ionel Haiduc. Also, Professor Maior's premature end (Nos. 576-578) is deeply regretted.

Other collaborations with Romanian chemists may be seen under Nos. 590 (Cornelia Uncuța), 580, 582, 594, 601, 613, 630, 631, and 640 (T. Constantinescu and coworkers), 646 (Mihaela Hillebrand and coworkers), 581 (P. Ioniță), Ileana and V. Drăgușan (Nos. 595, 672), I. Schiketanz (Nos. 598, 600), M. T. Căprioiu (No. 614 and many previously mentioned papers), Daniela Popovici (Nos. 576-578), Anca and G. Marton (No. 608).

Also, collaborations involving Romanian chemists residing abroad may be seen in the list: a comprehensive review on pyrylium salts published in *Science of Synthesis (Houben-Weyl)* by a son-and-father collaboration (Book chapter No. 62); a review on aromatic heterocycles co-authored with Daniela Oniciu and A. R. Katritzky (No. 634); several papers in collaboration with Dr. I. Ghiviriga who manages the NMR instruments of the University of Florida at Gainesville (Nos. 623, 625, 631); a paper with Prof. C. Supuran (No. 639).

With Professors P. von R. Schleyer (Univ. of Georgia, USA) and H. S. Rzepa (Imperial College, London) a paper was published in *Chemical Reviews* arguing that although the catch-phrase "aromatic sextet" was coined by Armit and Robinson as mentioned in all textbooks, the forgotten American E. Crocker had first discussed this problem a few years earlier (No. 660).

New applications of the topological index J (frequently cited as Balaban's index) in polymer chemistry have been published in collaboration with D. Bonchev and T.S. Balaban (No. 586). With chemists in the Natural Resources Research Institute of the University of Minnesota, Duluth (where Professor Balaban was invited during the summer months) several papers were published using index J as a "sharpened Wiener index" (No. 599), reporting that J and its congeners for molecules containing heteroatoms and/or multiple bonds clusters apart from other molecular descriptors (No. 573, 637), and describing new topological indices and their applications for QSAR/QSPR (Nos. 572, 573, 588, 589, 639). One should also mention book chapters Nos. 60 and 61 in this regard. One of the three papers published in the *American-Romanian Academy Journal* (No. 620) was honored by the Best Paper Award for 2003.

The *Encyclopedia of Organic Synthesis* edited by L.A. Paquette now has an electronic version, for which Professor Balaban was invited to contribute the monograph on 2,6-di-tert-butyl-4-methylpyridine; this sterically hindered non-nucleophilic base has numerous applications in organic synthesis (Book chapter 63). Another sterically hindered non-nucleophilic base (2,6-diisopropyl-4-ethyl-3,5-dimethylpyridine) was prepared by a simple procedure starting with the diacylation of the alkene derived from triethylcarbinol; the

double Janus effect due to the buttressing methyl groups keep the isopropyl groups in such a conformation that makes them behave like *tert*-butyl groups (No. 625).

Professor Milan Randić, who introduced one of the most frequently utilized topological indices, has recently made public the fact that his epiphanic "conversion" from a mathematician/quantum-theoretical chemist to a graph-theoretical chemist happened in May 1973 after hearing Professor Balaban's lecture about chemical applications of graph theory at Harvard University where he was a post-doctoral fellow (M. Randić, *Croat. Chem. Acta*, 2004, **77**, 1-15). In turn, Professor Randić created the Croatian and Serbian school of graph-theorists which includes Professors Nenad Trinajstić, Sonja Nikolić, Ivan Gutman, D. Babić and others. Professors Balaban and Randić have recently published several papers in collaboration in two distinct fields: (i) representation of DNA primary sequences using a four-dimensional approach, or a three-dimensional cubical representation of the triplet-based genetic code (Nos. 612, 635, 642, 655, 669); (ii) partitioning of π -electrons in rings of polycyclic conjugated hydrocarbons, allowing a simple approach to understanding why Clar's selection of some of the most significant Kekulé structures accounts for many manifestations of aromatic character chemical in chemical reactions and physical properties (Nos. 626-630, 651, 653, 658, 670).

It has been recently proved that the smallest graph with the smallest circuit (girth) having 11 vertices is the unique (3,11)-cage on 112 vertices published by Professor Balaban in 1973; details about it have been published in collaboration with Dr. D. Babić (Zagreb, Croatia, No. 584). Interestingly, Balaban's (3,10)-cage illustrates the cover of the book *Pearls in Graph Theory* written by N. Hartsfield and G. Ringel (Academic Press, 1990); this is the most symmetrical of the three (3,10)-cages. The collaborations of Professor Balaban with graph-theoretical mathematicians in Romania (S. Marcus and I. Tomescu) and abroad (F. Harary) are reminisced in a Festschrift paper written by Professor Balaban for Professor Marcus's 80th anniversary (No. 649).

With Professors D.J. Klein (Texas A&M Univ., Galveston) and N.H. March (Oxford), correlations of fusion temperatures were explored (Nos. 618, 645). Also with Prof. Klein joint papers were published on topological nanocones (No. 671) and fullerene-like structures (No. 618). Reviews on nanocones and on the complexity of nanotubes and fullerenes were published as book chapters (64, 65).

Scientometric papers discussed co-authorship in connection with Erdős numbers (No. 602) and the newly proposed Hirsch index h (No. 663). Prof. Balaban's h -index is approximately 49.

Galveston and Texas A&M University have proved to be for Prof. Balaban a stimulating environment where he can continue to enjoy teaching motivated students and doing active research. He has constantly published well over ten research papers each year since being in Galveston (actually almost twenty for the years 2004 and 2005) in spite of not having a large research group. Worldwide collaborations and many friendships, kept alive with occasional traveling, allow Sandy to drive at constant speed his research interests. He still takes two steps at a time while climbing stairs and he is in a constant hurry for achieving long term goals as *Ars longa Vita brevis* is a citation he often uses. His knowledge, not only in science, but also in Art and History is impressive and has sharpened with the years. Favorite leisure activities are reading or watching film thrillers. Especially listening to symphonic music and talking walks in the company of his wife Cornelia on the Galveston Seawall, while admiring the flights of seagulls or pelicans, are cherished moments when he can take deep breaths, think, and forge new projects. His friends, collaborators and family wish both of them good health, a *sine qua non* condition for continuing to enjoy life and science well after half a century of prolific scientific output.

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