

CURRICULUM VITAE
JOSEPH V. SWINTOSKY, Ph.D.
303 S. MAIN STREET
NICHOLASVILLE, KENTUCKY 40356

Professional: Professor of Pharmacy, College of Pharmacy, University of Kentucky, Lexington, KY. Retains professional office at the College of Pharmacy.

Personal: Born, December 14, 1921 in Kewaunee, Wisconsin.
Married to Dorothy (Zevnik) Swintosky.

Education: Public Schools, Kewaunee, Wisconsin.
Started pharmacy school education at the University of Wisconsin-Madison, 1938
B.S., Pharmacy, University of Wisconsin, 1942.
Ph.D., Pharmacy, University of Wisconsin, 1948.

Employment:

1942 Started graduate studies in pharmacy with annual stipend of \$300 at the University of Wisconsin (UW)

1945-48 Assumed position of Part-Time Instructor (Lecturer) in pharmaceutical organic chemistry and pharmacy, while continuing graduate study at UW. Carried some responsibilities of Full-Time Faculty when, during and after WWII, faculty ranks were depleted.

1947-48 American Foundation for Pharmaceutical Education (AFPE) Fellow.

1948-53 UW Assistant Professor of Pharmacy and Pharmacognosy.

1953 Joined Smith Kline & French Labs (SK&F) in R&D, in Philadelphia, Pennsylvania, on July 1, 1953, after taking leave of absence from UW.

1953-66 Started as Senior Scientist, and then in 1954 became R&D Group Leader for Tablets, Capsules, and Powders. For various prolonged periods during 1954-66 became Program Team Director for research programs in a) Time Action Principle (oral sustained release product theory and technology), b) Formulation Principle, c) Prodrugs, and d) Drug Absorption Principle.

1960-66 Served as Principal Research Pharmacist for several years, then as Section Head for Pharmaceutical Research in R&D, SK&F. Regarded as a pioneer and founder in fields of preformulation research, biopharmaceutics, and clinical pharmacokinetics applied to drug product

development; and an authority on oral sustained and controlled release methodology.

- 1967 Became Dean and Professor, University of Kentucky (UK), College of Pharmacy, January 1, 1967 – June 30, 1987. Retired as Dean at the age of 65.
- 1987 Professor of Pharmacy, July 1, 1987.
- 1989-Present Emeritus Dean and Professor, UK College of Pharmacy.

Professional Organizations; served as a member for prolonged periods in the following:

Kentucky Pharmacists Association
 Bluegrass Pharmaceutical Association
 American Pharmaceutical Association
 Academy of Pharmaceutical Sciences (APhA)
 American Association of Pharmaceutical Scientists (AAPS)
 American Chemical Society (ACS); also Lexington Chapter
 American Association for Advancement of Science (AAAS)
 American Institute for the History of Pharmacy
 American Public Health Association
 Conference of Teachers, American Association of Colleges of Pharmacy
 Academy of General Practice (APhA)
 International Pharmaceutical Federation (FIP)
 American Board of Diplomats in Pharmacy
 Council of Deans, AACP (since 1987, Council of Faculties)
 Kentucky Academy of Science (KAS)
 Honor Societies: Rho Chi, Phi Eta Sigma, Phi Lambda Upsilon, Phi Sigma, Sigma Xi, Omicron Delta Kappa National Leadership Honor Society.
 Professional Fraternity: Kappa Psi

Academic, Professional and Scientific Awards, Appointments, and Accomplishments:

- 1939 Elected after freshman year into membership into Phi Eta Sigma Fraternity, National Honor Society (at Wisconsin) for good scholarship.
- 1941 Elected member of Rho Chi, National Honorary Pharmacy Society.
- 1942 Elected as the first President of the University of Wisconsin Pharmaceutical Society. This was the name given to the newly formed student branch of the APhA and the WPhA at UW-Madison. Graduated with a B.S. in Pharmacy; and started to study toward a Ph.D. in Pharmacy in September; the major area of study was in Pharmacy with major

Professor Louis W. Busse; the minor area of study was in Biochemistry with minor Professor Karl P. Link, discoverer of Warfarin.

- 1942-43 Began taking courses in physical pharmacy, mathematics, and other advanced courses in preparation for a new more highly scientific preparation for graduate research in pharmacy. Introduced the term “physical pharmacy” to his newly conceived area of pharmacy education at Wisconsin, involving learning and applying of physical chemical and analytical science principles to the teaching and research on drug compounds and pharmaceutical products; and in studies on the formulating processing, developing, storing, and evaluating in human subjects of pharmaceutical dosage forms.
- 1943-45 Spent about two years in a Tuberculosis Sanitarium at Statesan, Wisconsin overcoming a tuberculosis infection in right lung. Completed by correspondence four college-level semester courses through UW Extension Services. These included College Algebra, Analytic Geometry and two courses in Calculus.
- 1945-46 Originated the idea of applying low-temperature nitrogen adsorption technique (Brunauer-Emmett-Teller Method) to the study of specific surface areas of pharmaceutical powders; built the (BET Method) equipment at the UW School of Pharmacy which equipment then was not available commercially; and began the first physical pharmacy thesis research problem at the University of Wisconsin (measuring specific surface areas of pharmaceutical powders using low-temperature nitrogen adsorption technique).
- 1942-53 Was a principal person at UW in a) conceptualizing and evolving the discipline of physical pharmacy with administrative assistance and decisions of A.H. Uhl and L.W. Busse, and b) bringing his astute physical-organic-analytical chemist friend (Takeru Higuchi, Ph.D., 1943) to the School of Pharmacy, University of Wisconsin for a visit in 1946; encouraging him to a) accept in 1947 a faculty position at UW-Madison in physical pharmacy and b) help him give leadership and guidance to this newly emerging discipline in pharmacy education.
- 1948 Introduced a biochemical natural-product perspective to the teaching of pharmacognosy, at the University of Wisconsin School of Pharmacy.
- 1948-89 Member of many professional and scientific pharmacy committees at local, state, and national level.
- 1948 Was the senior author of the first three published physical pharmacy research papers (using BET Method) to emerge from the University of

Wisconsin; and helped to give international visibility to the start-up of teaching and research in physical pharmacy.

- 1953 Took one-year leave of absence from UW School of Pharmacy.
- 1953 Joined Smith Kline & French Laboratories (SK&F), Philadelphia, Pennsylvania. Was one of the first Ph.D. graduates in pharmaceuticals to join a pharmacy R&D section in pharmaceutical industry. Was the first person with a Ph.D. in Pharmacy (Pharmaceutics) in R&D at SK&F. Was asked to direct much attention to formulation theory and practice, applicable to making and marketing oral sustained release products, then a budding new product area.
- Introduced for the first time hydrogenated castor oil and ethylcellulose as useful agents for coating pellets and for effecting oral sustained release from coated drug pellets, from embedded granules and from tablets. These agents are now widely used for such purpose.
- Reported to SK&F scientific leaders his observations of first-order elimination rate in humans of drugs including theophylline, penicillin G, sulfas, etc., and revealed the importance of biologic half-life and first-order drug elimination rate in rational design of dosage forms and regimens and their evaluations in human subjects; with applications especially to controlled drug release products.
- Helped to establish the concept of drug bioavailability from oral sustained release dosage forms, and evolved methods and began publishing papers later; especially reported upon the bioavailability of drugs from oral sustained release and also enteric-coated products. These methods are illustrated in publication number 25 and 33.
- 1953-87 Referee for journal articles especially Journal of Pharmaceutical Sciences.
- 1954-70 Invented and developed the double-layered oral sustained release tablet, and later received a patent for it, along with numerous other patents.
- 1955-56 Invited AACP lecturer on “Illustrations and Pharmaceutical Interpretation of First-Order Drug Elimination Rate From the Bloodstream” and the importance of such kinetic concepts to drug product development and use. Lectures given at Colleges of Pharmacy at Purdue, Florida A&M, and South Carolina. Paper with the above title was published in 1956, and was runner-up for Ebert Prize in 1957.
- 1957 Fellow, American Association for Advancement of Science (AAAS).

- 1958 Ebert Prize (American Pharmaceutical Association) for introducing a) the biologic half-life ($t_{1/2}$) concept to American pharmacy, b) $t_{1/2}$ applications to rational dosage form design using sulfaethylthiadiazole as the drug for study, and c) the use of physical pharmacy concepts in in vivo study aspects of drug absorption-distribution-metabolism-excretion, product development, and clinical drug product evaluation. He initiated in 1954 the earliest reported biopharmaceutical and human pharmacokinetic studies emerging from an industrial pharmacy product development group; and the public scientific lectures he gave in 1955 with the published reports starting in 1956, of his data and methods, changed profoundly the directions of academic and industrial pharmaceuticals studies. They changed from only traditional in vitro pharmaceuticals studies to include much more encompassing in vivo studies involving physical pharmacy, preformulation studies, biopharmacy, and clinical pharmacokinetic development studies in pharmaceutical R&D.
- Introduced at SK&F the prodrug concept into search for new patentable and marketable therapeutic agents.
- 1958-67 Adjunct Professor, Temple University School of Pharmacy in addition to full-time employment at SK&F.
- 1960-61 Vice-President of AAAS, and Chairman AAAS Pharmacy Section.
- 1961 George Beecher Kauffman Lecturer, Ohio State University.
- University Honorary Citation, University of Wisconsin.
- 1961-62 President, American Pharmaceutical Association (APhA), Philadelphia branch.
- 1963-67 Visiting Scientist of the American Association of Colleges of Pharmacy (AACCP).
- 1963 Pharmacy Achievement Award of the American Pharmaceutical Association (APhA).
- Pharmacy Achievement Award of the American Pharmaceutical Association (APhA), Philadelphia branch.
- 1964 American Pharmaceutical Association (APhA) Foundation Award in Physical Pharmacy.
- Honorary Member, University of Wisconsin School of Pharmacy Alumni Association.

- Gave invited scientific paper on Drug absorption at meeting of Japanese Pharmaceutical Society, Tokyo, April.
- 1964-65 Chairman, Scientific Section of the American Pharmaceutical Association (APhA).
- 1964-69 Editorial Advisory Board, Journal of Pharmaceutical Sciences.
- 1965-67 Vice-President, Rho Chi National Honorary Society.
- 1965-68 Executive Committee Member, and co-founder of the Academy of Pharmaceutical Sciences of the APhA.
- 1965 Initiated and evolved the concept at SK&F of an experimental in situ rat gut technique for studying factors effecting rates and amounts of drug absorption from a gut in which the vascular system was intact. The technique was perfected at Kentucky during 1967-68 with research colleagues. First-order kinetics of drug absorption was frequently observed and the data published. This experimental method and variations of it has had considerable use in many laboratories in America and abroad.
- 1966 Kremers Memorial Lecturer, University of Wisconsin.
- Invited scientific paper on Prodrugs, Polish Pharmaceutical Society, Lublin.
- 1967 Became Dean, University of Kentucky College of Pharmacy. Initiated clinical pharmacy education at Kentucky and also in America, through major curriculum overhaul and by obtaining administrative sanction to a) use the University of Kentucky Hospital for attaining objectives of integrated clinical teaching, research, and services in pharmacy, and b) having the Director of Pharmacy Central Supply of the University Hospital report administratively to the Dean of the College of Pharmacy. The above actions had a profound effect on how professional pharmacy education in America would evolve.
- 1967-68 Opened the gates to experiential education by using hospital and community pharmacy settings, establishing voluntary faculty titles and responsibilities for pharmacy practitioners in our College teaching, service and research programs. Brought a strong patient health care and scientific emphasis to pharmacy teaching and research programs; provided a precedent and model for other colleges of pharmacy to follow which helped to influence other colleges of pharmacy in America (and a few abroad) to adopt a model for pharmacy patient health care education. This has resulted in pharmacists being educated to be the authorities on the appropriate use of drug products; and enabled them to become active

participants on the health care provider teams in patient care; and in monitoring patient use of drug products, and in evaluating therapeutic outcomes.

President, (APhA) Academy of Pharmaceutical Sciences (APS).

1967 Elected Active Member, New York Academy of Sciences.

1968 Pharmaceutical Research Discussion Group, Best Paper Award for 1968, of paper appearing in Journal of Pharmaceutical Sciences.

Took steps to give administrative order and bring high morale to the UK College of Pharmacy family; and set the stage for change, rapid academic achievement, and progress. Adopted some aspects of industrial administrative techniques to the academic setting. Established for the UK College of Pharmacy, a) organization, including a committee structure, b) plans and goals for the college family and expectations for progress, c) job descriptions for faculty d) annual performance evaluation procedures, e) annual synopsis of faculty member's work load, distribution of effort, and accomplishments in teaching, research, and professional and public service, f) newsletter, The Spatula, as a public information and public relations instrument for maintaining college contact with students, faculty, staff, alumni, Kentucky pharmacists, and friends, g) policies for time away from the college, meeting attendance, consulting, and vacation, and h) an annual report of the College of Pharmacy for higher University administration, and an abbreviated annual report for publication in the Kentucky Pharmacist (journal). These were major administrative accomplishments benefiting especially the personal and collective development of pharmacy faculty at a time when such administrative approaches were not commonplace in academia.

Established at the College a Ph.D. research program, an optional Pharm.D. professional program, and a residency managed and conferred by the College, but with strong inputs from the University Hospital and practice sites.

Became registered pharmacist by examination through Kentucky State Board of Pharmacy.

Recommended establishment of the Annual Higuchi Research Seminar, which then became a reality for the University of Kansas College of Pharmacy where Takeru Higuchi maintained a professorial appointment from 1967 until his death in 1987.

1970 Fellow, Academy of Pharmaceutical Sciences of the American Pharmaceutical Association.

- Honorary Member, Polish Pharmaceutical Society.
- 1970-85 Appointed Member, United States Adopted Names Review Board (USAN Review Board).
- 1971 Invited to give scientific paper on absorption-distribution-metabolism-excretion of sulfaethylthiadiazole at Foresta Hotel Medical Seminar, Stockholm, Sweden, March.
- Invited to present professional and educational paper on Clinical Pharmacy Education sponsored by AACP-ASHP Clinical Pharmacy Conference, Kansas City, Missouri.
- Lecture on Trends in Pharmacy Education, College of Pharmacy, Poznan, Poland, March.
- Lecture on Trends in Pharmacy Education, College of Pharmacy, University of Ljubljana, Yugoslavia, April.
- Discussion Leader, National Industrial Pharmaceutical Research Conference, Land O' Lakes, Wisconsin, June.
- 1972 Duke of Paducah Award, City of Paducah, Kentucky.
- Discussion Leader, Higuchi Research Seminar, Lake Ozark, Missouri, March.
- Lecturer, Seminar on Clinical Education and Practice, College of Pharmacy, North Dakota State University, Fargo, ND, March.
- Participant, Advisory Panel for Merck, Sharp and Dohme concerning needs of pharmaceutical education today, North Wales, PA, June.
- Member, Section for General Practice of Pharmacy, Working Group 3, International Pharmaceutical Federation, Lisbon, Portugal, September. Elected Secretary of Working Group 3.
- 1972-74 Appointed member, Kentucky Drug Formulary Council, State of Kentucky.
- 1974 UK Alumni Association Award (for the College) for being selected by pharmacy deans across the country as one of the best colleges (4th) among all colleges of pharmacy in America.

Speaker for the investiture of Dr. William Owen Foye at Massachusetts College of Pharmacy as Sawyer Professor of Pharmaceutical Sciences; and Commencement Address speaker to Massachusetts College of Pharmacy students on same occasion.

- 1975 National Industrial Pharmaceutical Technology Award, San Francisco, CA, April.
- 1975 USA Steering Committee Member, General Practice Section, FIP.
- 1976 Participant, International Symposium on Bioactivation and Controlled Drug Release, Stockholm, Sweden, April.
- Invited scientific paper on Biopharmacy, Theory and Practice, Budapest, Hungary, September, and at Hungarian Pharmaceutical Association Meeting.
- Participant, and Secretary of Working Group 3, General Practice of Pharmacy Section, International Pharmaceutical Federation (FIP), Warsaw, Poland, September.
- 1976-77 Member, Nominations Committee, Academy of Pharmaceutical Sciences.
- 1976-80 Member, VA Health Manpower Grants Review Committee.
- 1976-84 Member, The American Board of Diplomats in Pharmacy – International.
- 1976-85 U.S. Coordinator, Academic Section, International Pharmaceutical Federation (FIP).
- Consultant, International Consultant, Inc. Advisory Council Committee.
- 1977 Invited Lecturer on Progress in Pharmaceutical Education to Jordan Pharmaceutical Society, Amman, Jordan, February.
- Participant, presented three lectures, Pharmacy Postgraduate Course, Ministry of Health, Kuwait, February.
- Invited presentation at National Health Insurance Hearing sponsored by HEW, Lexington, Kentucky, October.
- Honorary Member, Association of Pharmacy Teachers in India (APTI Council).
- 1978-80 Member, Editorial Board, RPh Journal.

- 1978-85 Member, Selections Committee for Honorary Membership in Academy of Pharmaceutical Sciences.
- 1979 Invited paper on safety in medicine, FIP meeting, Brighton, England, "Inclusion of Safety Testing on Drugs in the Pharmacy Syllabus: Chemical and Pharmaceutical Aspects," September.
- 1979-87 Member, Kentucky Pharmacists Association Legislative Committee.
1980 Appointed, University/Health Science Advisory Committee, UK.
- 1980-87 Appointed Member, Tobacco and Health Administrative Advisory Committee, University of Kentucky (UK).
- 1981 Invited presentation of the paper entitled, "Origination and Application of the In Situ Rat Gut Technique. A Way of Using It for Evaluating the Effect of Adjuvants on Drug Absorption" in colleges of Pharmacy in Gdansk, Poznan, and Warsaw, Poland, September; also at FIP Meeting, Vienna, Austria.
- 1981-83 Member, Time and Place Committee, District 4 NABP-AACP.
- 1982 Moderator of Session on Drug Product Quality Control, 2nd Drug Symposium at King Saud University College of Pharmacy, Riyadh, Saudi Arabia, March.
- Invited presentation of paper entitled, "Personal Experiences in the Early Days of Biopharmacy and Pharmacokinetics," Sidney Riegelman Memorial Symposium, San Francisco, CA, April.
- Invited presentation, "The need of Pharmaceutical Education in Kuwait," The First Kuwait Conference of Pharmaceutical Sciences, Safat, Kuwait, November.
- Chairman, APhA Academy of Pharmaceutical Sciences Committee on Honorary Members, 1982-83.
- Member, Kentucky Pharmacists Association Continuing Education Advisory Committee, 1982-83.
- 1983 Invited presentation, "Prodrugs and the Potential of SKF 26070," Smith Kline & Bechman Laboratories, Philadelphia, PA, May.
- Host and Delegation Leader for professional delegation of pharmacists and pharmaceutical and biomedical scientists to USSR and The People's Republic of China. The delegation, organized by People-To-People, July 2-23.

Participant, FIP Meeting in Montreaux, Switzerland during September 3-9; also presented lecture on “Directions of Pharmaceutical Education” (at college of pharmacy at the University of Ljubljana, Yugoslavia).

Initiated construction planning for a new College of Pharmacy building.

Panelist, University of Wisconsin Centennial Symposium, Madison, Wisconsin, October 2-4, “Education of the Pharmaceutical Scientist; Needs of Schools of Pharmacy”.

1984 National Rho Chi Lecture Award, Montreal, Quebec, Canada.

1984-87 Elected Member, Electorate (Pharmaceutical Sciences) Nominating Committee, American Association for Advancement of Science.

1985 Member, Kentucky Academy of Science.

Invited Presentation of paper “An Off-Campus Post-Baccalaureate Professional Doctoral Teaching Program”, FIP Meeting, Montreal, Canada, September.

1986 Invited Participant, Symposium, “Educating Health Care Professionals; The Next Twenty-Five Years”, Lexington, Kentucky, April.

Acquisition of new Pharmacy Building. Address at Dedication Ceremonies, May.

Lecturer at Universities and Colleges of Pharmacy in Poland, “A Vision of Pharmacy and Pharmaceutical Education for the Future’. Received Honorary Doctorate degree from Poznan Medical Academy, September.

Lecturer, “Research in Colleges of Pharmacy” Charles University Pharmacy School, Hradec Kralove, Czechoslovakia, September.

Invited Lecturer and gave three presentations at the University of Ljubljana, Ljubljana, Yugoslavia, September; Titles of papers given in Poland, Czechoslovakia and Yugoslavia were: “Vision of Pharmacy and Pharmacy Education for the Future”, “How A Clinically Oriented Curriculum was Evolved in Pharmacy Education at Kentucky and Its Value to Pharmacy”, and “Recent Trends in Pharmaceutical Research and Development – Programs Within the UK College of Pharmacy”, September.

Presented paper, “A Statement Opposing Specialty Status for (the name) Clinical Pharmacy; And in Support of a Curriculum With a Strong

Clinical Emphasis for Meeting the Requirements for the General Practice of Pharmacy”, at the American Society of Hospital Pharmacists Midyear Clinical Meeting, Las Vegas, Nevada, December.

Initiated into membership of Omicron Delta Kappa, National Leadership Honor Society.

Distinguished Service Award, Kentucky Pharmacists Association.

Charter member and one of the founders of American Association of Pharmaceutical Scientists (AAPS).

1987

Japan Society for the Promotion of Science, Fellowship for Research, April 1-15, and invited speaker at several universities and industries in Japan.

Presented invited paper, Japanese Pharmaceutical Society (JPS) Meeting, Kyoto, Japan, entitled, “Pharmacy and Pharmaceutical Education: Future Change and Growth,” April 3, 1987.

Presented lecture, Academy of Pharmaceutical Science and Technology of Japan (APSTS), Hoshi University, Tokyo, Japan, April, entitled, “A Lifetime of Personal Experiences in Pharmaceutical Education and Science and Their Influences On Pharmacy and Pharmacy Education”, April.

Invited lecture, Sankyo Co., Tokyo, Japan, April. “Pharmacy and Pharmaceutical Education: Future Changes and Growth”.

*** Invited Lecture, “Development of Clinical Education at Kentucky”, Kitasato University, Tokyo, Japan, April. Also, gave same paper as one given at Hoshi University, Tokyo**.

Invited lectures at China Pharmaceutical University, Nanjing, China. Same titles as three lectures given in Japan during April, 1987.

Invited lectures, College of Pharmacy, West China Medical University, Chengdu, China, titles as given in Japan, April, 1987.

Fellow, American Association of Pharmaceutical Scientists, June.

The Merck Sharp & Dohme Award for Outstanding Achievement in Profession of Pharmacy, June.

Blue Grass Pharmacists Association Award for Distinguished Service to Pharmacy and the Community.

- 1987 Distinguished Alumnus Award, University of Wisconsin Alumni Association.
- Received Distinguished Scientist Award for 1987 from the Kentucky Academy of Science, November.
- 1988 Dean Joseph B. Sprowls Lecture Award, Temple University, September.
- Chairman, Fellows Selection Committee of AAPS.
- 1989 Received the Host-Madsen Medal Award of the FIP at the Munich Meeting in September, 1989. In an international competition, the award is given by the FIP Board of Pharmaceutical Sciences to a pharmacist whose work in pharmaceutical sciences has been distinguished. In 1989 was only the third American pharmaceutical scientist to receive this gold medal award.
- 1990 Received the Volwiler Research Achievement Award Medal at AACP Meeting in Las Vegas, Nevada, September 10, 1990. Gave Volwiler Award Lecture at this meeting. Also gave lecture at Abbott Laboratories who sponsors the award, on September 28, 1990.
- 1991 Received the 1991 AFPE Former Fellow Distinguished Service Profile Award at the January 24, 1991, AFPE Board meeting in New York City. This award is given to honor Former Fellows who have made outstanding contributions to pharmacy during their career.
- Received the Distinguished Kentuckian in Pharmacy Award on April 24, 1991 at a dinner held at the Hiliary Boone Faculty Club, Lexington, Kentucky. The nomination for this award came from the University of Kentucky College of Pharmacy faculty.
- 1992 Invited contributor to series of published books comprising a Memorial Tribute of which my chapter was entitled, "Takeru Higuchi, Esteemed Pharmaceutical Scientist".
- 1993 Invited Presentation, "How and Why the University of Kentucky College of Pharmacy Took A Primary Leadership Role in The Drive Toward Patient Care Oriented Pharmacy, Teaching, Research, and Professional Services", Kitasato-Kentucky Joint Clinical Pharmacy Symposium, Kitasato University, Tokyo, Japan, September 3, 1993.
- 1994 Endowed Lecture Series, Dr. Joseph V. Swintosky Distinguished Lecture Series established at the University of Kentucky College of Pharmacy in honor of Emeritus Dean Joseph V. Swintosky.

1983-99 Persuaded and encouraged Dr. Eunice Bonow Bardell to write the “History of our UK College of Pharmacy Covering the Period of 1970-85”. Publication of a book on this subject with Dr. Bardell as author occurred in 1999.

Editorial Activity

1964-69 Editorial Advisory Board, Journal of Pharmaceutical Sciences.

1978-80 Editorial Board Member, RPh Journal.

1957-87 Reviewer, American Journal of Pharmaceutical Education, and Journal of Pharmaceutical Sciences.

Research and Other Academic Interests

1. Curriculum development. Standards of education in pharmacy.
2. Pharmacist professional development, and ethics in pharmacy.
3. Administration in pharmaceutical industry and education.
4. Developing new roles for pharmacists.
5. Pharmaceutics, biopharmaceutics, and pharmacokinetics.
6. Drug product design – development – stabilization – evaluation. Concepts and suggestions for new products.
7. The processes of pharmaceutical technology and formulation.
8. Sustained and controlled drug absorption, distribution, metabolism, and excretion.
9. Making and evaluating new prodrugs.
10. Drugs from living sources.
11. Developing technology for controlled release of drugs from oral dosage forms.

Patents

10 distinct U.S. pharmaceutical patents, each listed in several countries, for a total of about 40.

Publications

Approximately 130 scientific and educational articles (including 10 U.S. patents).

Pastimes

Gardening, picnicing, fishing, spectator at baseball-basketball-softball-football games where sons and grandchildren participate, sports generally, traveling, and spending leisure time with family; compiling and studying family geneology.