Albert I. Meyers (1933–2007)

On October 23, 2007, Professor Albert I. Meyers died in Fort Collins, Colorado. He had suffered periodically from a congestive heart condition for more than twenty years, which, as was evident to many in the synthetic organic community, he had denied most courageously without it seeming to interfere with his work or affect his persona.

Al Meyers made carbanion chemistry—aliphatic and aromatic, first achiral, and then asymmetric—an indispensable tool for both academic and industrial chemists. As a long-standing colleague stated: "*Al's work on asymmetric synthesis, initially in 1974 …, provided the breakthrough results that made the community aware that high enantiomeric ratios could be routinely achieved. Prior to his reports, e.r. values of 60:40 were regarded as notable; after, … 95:5 became expected. He dramatically raised the bar and thereby initiated a modern era in asymmetric synthesis.*" Another distinguished carbanion chemist remarked, "*He realized that a rigid conformational bias by complexation in the anion was the key to success*".

As timelessly documented in his unique book, *Heterocycles in Organic Synthesis*,[1] he was the first to recognize and then systematically exploit the utility of heterocycles as synthetic intermediates in total synthesis. "*I told the students in my lecture last week that they should have a look at Al's book on this topic before studying all the now widely used methods,*" recalled another colleague and old friend after Al's death. In 1968, Al Meyers' report that dihydro-1,3-oxazines can be converted by metalation, reduction, and hydrolysis into substituted aldehydes awakened organic chemists to contemplating heterocycles as metalatable substances in which hidden functionality lurked.

Over thirty years ago, he introduced the chiral auxiliary approach and thus initiated a modern era in asymmetric synthesis. Asymmetric synthesis of amino acids, isoquinoline, indole, and quinolizidine alkaloids became dependably feasible, and mechanistic insight was provided. The results may be seen as a forerunner to the currently highly active field of catalytic asymmetric synthesis.

Starting from his observation that the oxazoline is a masked carboxy group, Al demonstrated in the late 1970s that this heterocyclic moiety activates *ortho* deprotonation and thereby allows regiochemical control in the synthesis of polysubstituted aromatics. This result, together with Peter Beak's contribution on metalated tertiary benzamides, propelled the directed *ortho* metalation reaction into a position of high prominence. Al also showed that chiral *ortho*-haloaryloxazolines promote nucleophilic addition to the aromatic ring, which allows the construction of atropisomeric biphenyls and binaphthyls. This alternative to cross-coupling of biaryls, a modern nucleophilic aromatic substitution, deserves name-reaction status.

The first chiral oxazoline-mediated Ullmann coupling was also achieved. Using this reaction, the absolute configuration of biaryl terpene natural products could be secured and provides insight into limitation of size of groups for resistance of atropisomerism. A result of these studies is the complex induced proximity effect (CIPE), a postulate introduced by Meyers and Beak to rationalize metal coordination as an important phenomenon in many unexpected metalation reactions.

Meyers and his co-workers reported more than 35 total syntheses of many classes of natural products, including maytansine, trichodiene, madumycin, and griseoviridin. Several classes of alkaloids were obtained in highly enantioenriched forms with known absolute configuration. In several cases, previous misassignments of absolute configuration were clarified. From the beginning of his academic career onwards, Al Meyers published "must read" papers in methodology with impeccable experimental procedures.

Research results from his laboratories were presented with the Meyers fervor that we all easily picture. He surprised nervous assistant professors at conferences by asking about, listening to, and commenting on their chemistry rather than talking about his own work. His interest and graciousness is remembered by young colleagues. If, at a meeting, a group of organic chemists was to be seen enthusiastically discussing chemistry, Al was likely to be at its center.

Al Meyers held the highest standards for accomplishment in general, and especially in mentoring his over 80 graduate students and 200 postdoctoral fellows. His dictum was: If you give your best efforts, I will give my best effort to you. "*Thus, when you do not perform research … with diligence, dedication, and efficiency, is it any wonder your advisor seems to always climb all over you?*" and "*your responsibility to your career should be your major concern, while mine is to see that a fine effort here is rewarded by a good permanent position when you leave. One cannot occur without the other,*" are representative quotes from memos that appeared regularly on the desks of his students on Saturdays. He read the organic chemistry literature religiously, and loved nothing more than to spend a couple of hours with his journals. Naturally, he instilled this habit into his group, as in another memo, "*You'll be amazed how many new and helpful ideas you will acquire by a weekly encounter with the literature.*"

He was the major force which led to the meteoric rise of the Colorado State University Chemistry Department to international prominence. "*One of Al's best traits was that even if he disagreed with you on an important departmental issue, he would never be disagreeable and would never let the issue at hand become a problem for personal relations,*" commented a colleague and friend. He was an active and advisory editor for journals of the American Chemical Society. Al was always ready to assist the chemical community, share ideas and information, listen to the alternate point of view, and give credit to others. In accepting one of the more than 75 awards and honors that he received, he generously mentioned his mentors Kurt Mislow, J. J. Ritter, Ted Taylor, Harry Wasserman, and Harry Walborsky.

Very shortly after Al Meyers died, Joan, his wife of 50 years, fell victim to cancer. He left behind his sister Florence Meyers, three children—Harold Vernon Meyers, Jill Bombel, and Lisa Thompson—and seven grandchildren.

Around the fume hood, when carbanion chemistry is discussed, “Meyers’ chemistry” is immediately recognizable. He was a chemist of wide influence, an exceptional role model, and a generous colleague. All who knew Al held him as a man of optimism and courage, as was especially evident in the last years. Al Meyers exuded joy for chemistry and life, and he offered thoughtful advice, encouragement, fairness, and kindness to all with the irrepressive Meyers enthusiasm, smile, and gregarious nature.

With warm appreciation to Hal Meyers and the following dear friends and chemist colleagues, of various generations and associations, who shared insightful reminiscences of Al Meyers: Tony Barrett, Peter Beak, Elliot Bernstein, Iain Coldham, Dieter Hoppe, Ralf Koslow, Gary Maciel, Dieter Seebach, Rod Skogerboe, and Bob Williams.

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[1] A. I. Meyers, *Heterocycles in Organic Synthesis*, Wiley, New York, **1974**.

DOI: 10.1002/anie.200800294