The Back Story

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Koji Nakanishi (May 11, 1925-March 28, 2019), Magician Supreme

When I look back at the most recent Golden Era of Organic Chemistry, I am struck by the overabundance of characters, the mavericks who populated the most elevated ranks of our community. These include, of course, the rock star R. B. Woodward. The contentious H. C. Brown. The anecdote-blessed Vladimir Prelog. The ego-driven, always-marketing Carl Djerassi. The belligerent Michael Dewar. The unconstrained Barry Sharpless. The Mahatma Albert Eschenmoser. The classicist Rolf Huisgen. The towering John D. Roberts. And the magician Koji Nakanishi.

Why do I call Nakanishi a magician? First, his chemistry was magical. Nakanishi and his groups—one at Columbia University, the other at the Suntory Institute for Bioorganic Research—specialized in organic chemistry of highly unstable, short-lived biologically-relevant systems present at vanishingly low concentrations. As summarized by his long-time collaborator Nina Berova (Columbia), Koji "developed microscale isolation and identification protocols for structural and mode of action studies of over 200 molecules, many being endogenous factors or members of new classes of natural products." He invented a exciton-coupled circular dichroism method to determine relative and absolute configuration of polyhydroxyated compounds, especially oligosaccharides. He was attracted to unusual pigment biological properties controlled by chemical processes. For example, he explained the chemistry of a pigment from the tunicate, a marine filter-feeder invertebrate, that sequesters vanadium and phenolic peptide pigments. He studied the structure and function of proteins responsible for visual transduction, responses to light, and proton and chloride pumping. He discovered that porphyrins enhanced night vision in bovine rhodopsin, a pigment found in the rods of the retina. Koji also helped reveal the relationship between ginkgolides and memory. He studied mitomycin C-DNA adducts, juvenile hormones and crustacean molt-inhibiting hormones, antisickling and desickling agents, brevetoxins, radioligands for ecdysone receptors, shark repellants, antimutagens from plants, and so on. Does all of this not sound magical?

Nakanishi practicing a new trick with his wife and two children, 1960.

Koji was a much sought after as a seminar speaker. But he also, literally, was a magician. What was extraordinary, indeed unique about Koji's lectures was the magic show he'd perform afterwards. It took no effort for a seminar organizer to get Koji to agree to a performance. And did the audiences ever howl with joyful appreciation. It was like bringing pizza and beer to a fraternity house! As Koji related in his autobiography (1)

> Before a magic performance for a big audience, I become very nervous until it starts; I seldom become nervous before a lecture. Yasuko [Koji's wife] does not like for me to perform; she says she feels like she is married to a migrating circus entertainer, and says that I perform because I like the limelight. This is not so. Performing magic with tiny, seemingly innocent objects, under a variety of conditions, is a challenge. When I manage to distract an audience of more than 200 by simply moving one hand a mere 20 centimeters, this gives me a feeling of accomplishment. Probably I like to please people, and therefore seeing the audience enjoying themselves satisfies me. The greatest satisfaction comes from mystifying people with tricks based on very simple principles that could be explained in seconds, especially when the trick is one that I have devised. When I have a new trick, either newly bought or a variation of my own, I perform it first for Yasuko. Because over the years she has acquired a fine feeling for how I misdirect people, she is a good litmus test.

Friendships are also magical. I miss my friend. But fortunately, Koji's magic remains.

I thank Nina Berova for helpful discussions.

1. K. Nakanishi, *A Wandering Natural Products Chemist*, In *Profiles, Pathways and Dreams* (J. I. Seeman, Ed.) American Chemical Society, Washington, DC, 1995.