Editorial

Khalil D. Hanna, MD (1944–2013)

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Innovation... Many aspire to innovate... Khalil Hanna lived innovation.

A unique, multi-talented genius, Khalil was a citizen of the world—born in Safita, Syria, educated as a physician in Damascus, and living his adult life in Paris, with extended periods of professional collaboration in Atlanta and Miami. A meticulous surgeon, comfortable with anterior segment and vitreoretinal and ophthalmoplastic techniques, his real love was penetrating corneal transplantation that led to the invention of the Hanna mechanical corneal trephine, for which he is best known. His artistry was not limited to surgery; his special talent with pen and ink produced dark, brooding images of nature; his intense artistic originality created a technique of crocheting patterns on canvas that guided his overlay painting. He loved gardens and often said if he were not so enamored of eye surgery, he would be simply a full-time gardener. Many an evening found him engrossed in his kitchen, creating superb gastronomic delights, such as the warm foie gras that I personally enjoyed with him in his self-designed Parisian flat.

In 1971 he left his family and his orthodox religion in Syria and moved to Paris, a bold step, since he could not speak French and had no personal friends in Paris. After a few weeks of French lessons, he joined the Ophthalmology Department at the Rothschild Foundation and, being impressed at the imprecision of corneal trephination during keratoplasty, he designed an adjustable suction mechanical trephine that created elegant circular incisions in the host and matching-shaped donor buttons on his artificial anterior chamber, both with consistent, nearly perfect vertical edges.

In 1980, he went to work with Professor Yves Pouliquen, who was among the world’s most famous corneal specialists, at the Hotel Dieu Hospital. He knew that having his trephine, which was manufactured and sold by the venerated French instrument company Moria, adopted at the Hotel Dieu would significantly increase its impact in the profession. In 1985, Khalil became a French citizen; he loved Paris.

Then followed one of the chance occurrences that characterize scientific progress. Khalil successfully repaired a retinal detachment on the wife of Herb Budd, PhD, the Director of the IBM scientific centers in Europe. Says Budd: “My doctorate was in physics and I had rarely met medical doctors who could go into as much depth as I was hearing from Khalil.” IBM held the basic patents on excimer lasers. In 1986, Budd and his colleague Louis Asfar, PhD, established an excimer laser research project at the IBM center in Paris and at Hotel Dieu, which yielded Hanna’s original design of a rotating/translating slit delivery system coupled to a commercially available Lambda Physik ArF excimer laser—a first among clinical excimer laser systems. It was used initially to do photorefractive keratectomy in rabbits, with subsequent histological and ultrastructural analysis of the corneas.

With Francois Jouve, PhD, he created a series of finite element mathematical models of excimer laser photoablation and of corneal incisions—among the first attempts at biomechanical analysis of the cornea. Khalil’s mind was in constant ferment—it was never quiet. He was always working on the next generation of the instruments he invented and of the projects he undertook—a continuous source of innovation with many patents to his name.
Seeking further application of his inventions, Khalil moved to the Emory University Department of Ophthalmology in Atlanta, from 1987 to 1991, as an international scholar, doing photorefractive keratotomy in monkeys in my National Eye Institute-funded laboratory, which resulted in a series of papers about instrument design and histopathology, ultrastructure, and histochemistry of corneal wound healing after excimer laser ablation acutely, at 18 months, and after re-treatment. Our friendship deepened, in the lab, over long meals, and around my dining room table editing manuscripts long past midnight.

In 1992, I received a National Institutes of Health Fogarty Senior International Fellowship, which led to a wonderful sojourn with Khalil and Yves Pouliquen at Hotel Dieu as a Research Associate with the French Ministry of Research and Technology, intensely engaging in our excimer laser research, and especially enjoying our 3-hour lunches replete with fine wine.

Homesick for America, Khalil moved from Paris to the Bascom Palmer Eye Institute in Miami from 1994 to 1996 where, as Associate Professor of Clinical Ophthalmology, he was a major influence in instituting refractive surgery and where he refined his “Arcitome,” which was a suction mechanical instrument using two diamond blades that could be set at individual depths, lengths, and diameters to create arcuate transverse incisions to correct corneal astigmatism. Taking his biomechanical analysis further, Khalil brought fractal mathematics to bear on the cornea as well.

Not limiting his interest to the cornea, Khalil designed a potentially accommodating intraocular lens, the 1CU, which was used clinically in Europe with modest success.

Unable to resist the siren call of Paris, Khalil returned to Hotel Dieu where he continued his dual roles of clinician and inventor until his death from disseminated lung cancer in 2013. Today he rests in the 200-year-old Pére Lachaise Cemetery in Paris among Bizet, Chopin, Dupuytren, Rossini, Oscar Wilde, and Proust.

Yves Pouliquen elegantly encapsulates the real Khalil: “Although apparently open to others, to friends all over the world, Khalil leaves us with the image of a secret being protecting his private life. Of Khalil, we keep the image of a small silhouette covered by an imposing head of indocile hair dominated by large lively eyes lit with a great smile.

Few knew the gardener, the painter, the gourmet chef. Separated from members of a dispersed family, we knew that he suffered, thus living life the way he did. He loved his solitude and socialized with friends at his convenience and not theirs. Khalil would come, would leave, and everyone liked him the way he was. Ophthalmology will always be marked by his intelligence, personality, name, work.” And his innovations.

**SELECTED BIBLIOGRAPHY**


