

Remembering a trail blazer - Francis Crick

By DAVID EAGLEMAN, PH.D.

Francis Crick, one of the premier biologists of the 20th century, passed away July 28, 2004, in San Diego. On his 88th birthday last June, I brought him chocolates and spent the day with him in his home in La Jolla.

As with all our meetings, he jumped straight into a discussion of theories about brain function. He was increasingly frail, his hair had thinned from chemotherapy, and he wobbled on his cane unsteadily. But intellectually, he was still the dominating leviathan of biology.

From the obituaries, most people know that Francis Crick, with his colleague James Watson, uncovered the structure of what sits in the middle of every cell of every animal on the planet: DNA. The double helix they deduced led quickly to an unraveling of all the secrets of the genetic code.

It had long been known that you inherit traits from your parents – but no one had any good idea how your father's nose shape and your mother's eye color were encoded in invisibly small molecules. By the 1960s, thanks largely to the work of Francis Crick and his circle of friends, the molecular basis of inheritance was worked out.

For the DNA work, he and Watson won the Nobel Prize in 1962. As the biologist Jacques Monod said of him, "one man dominates intellectually the whole field [of molecular biology], because he knows the most and understands the most."

The popular media offered depictions that assumed the public would appreciate, declaring, for example, that the work of Dr. Crick laid the groundwork for genetically engineered tomatoes. While such tomatoes can trace far-away roots to Crick's discoveries, the journalists were digging in the wrong place: Crick cared about the deeper questions, the questions about life itself. In molecular biology, he blazed trails and laid the groundwork for everything that would happen over the next half-century. Having pretty well answered what he set out to answer, he turned his voracious intellectual appetite to his second scientific goal: an understanding of the brain. In 1977, he moved to the Salk Institute in La Jolla, Calif.

Specifically, he wanted to know how the brain produces consciousness. In the field of neuroscience, consciousness was forbidden territory. It took someone with the gravitas of Francis Crick to establish consciousness as a real scientific problem. It *feels* like something to have pain. It *feels* like something to see the color indigo. Somehow, these conscious perceptions are underpinned by neural activity – but how, where, what? By asking penetrating questions, rallying others to perform experiments, and inspiring thousands, he opened up new directions in brain research. He even published on dream sleep and the origin of life on Earth. Nothing was outside his intellectual ken. He once told me the dangerous man is the one with only one theory, because he'll fight to the death for it.

James Watson famously commenced his book "The Double Helix" with the line, "I have never seen Francis Crick in a modest mood." I have yet to find a more flawed opener. Francis Crick was always in a modest mood. He was one of the few people always willing to criticize his own ideas. He never filtered beliefs through his own ego and never hesitated to applaud other people's theories. He laughed freely and often. When asked about Watson's meaning in the opening line, Crick smiled and said it must have reflected that



The author with Dr. Crick

he (Crick) always wanted to get to the bottom of things.

I cannot escape the feeling that those who discover life's secrets should be immune to life's fatality. But in the end, Francis Crick was made only of the molecules he illuminated. He was the victim of uncontrolled cell division; he was consumed by the microscopic scales of which he was composed; the molecules he discovered were the sewn-in seeds of his own destruction. This description would appeal to Francis. His crusade was to teach that we are a vastly sophisticated network of trillions of cells; a tour de force of biological sophistication with no other magic in the

machine. Some people worry that scientific understanding somehow diminishes the beauty of nature. To this Francis once answered, "It seems to me that what you lose in mystery you gain in awe." What we have lost in Francis we gain in inspiration.

I first met Francis when I moved to the Salk Institute in 1999. He was quite a bit taller than I had expected. Beneath a head of silver hair he had sparkling eyes and an impish smile and the most impressively winged eyebrows I have seen to date. The first time I saw him in the auditorium during a talk, he sat alone in the front row. As the talk went on, his head began to sink and his eyes began to close. I felt the sad intuition that senescence was taking its toll on a great mind. But then the speaker made some seemingly innocuous interpretation of his results, and a small smile grew on the corner of Francis' lip. He leisurely raised his hand, and in a rapid-fire Cambridge-accented karate-chop analysis, the speaker was re-educated. I came to recognize this as a regular occurrence. Francis was never mean-spirited, just incisive. He detected microscopic flaws in logic. In a room full of smart scientists, Francis continually re-earned his position as the heavyweight champ.

One of the finest things in my life was his friendship and tutelage. Francis Crick influenced me in the way that only a young person near the beginning of his career can be by someone near the end of theirs. I was born 18 years to the day after Watson and Crick published the double-helix structure on the pages of *Nature*, a journal where I would come to publish my own work 51 years later. Arriving on the planet so long afterward, I was inestimably fortunate to have shared orbits with him for the past six years. His influence on me was deep, and his loss for much of the field marks the passing of an era.

He was an inspiration to all who knew him, a brainstorming intellectual powerhouse with a mischievous smile. He listened carefully, engaged ideas, sought robust debates, and hunted for the tough problems. At the age of 88, he continued to work every day on important unsolved problems in the field. He continued to publish major papers and read all the journals in the field at an age when most people are playing bridge and intellectually melting away. He was working on a manuscript the day he died. As a scientist, thinker, author, mentor, friend, and colleague, one would be hard pressed to find someone who could outshine the twinkly-eyed Francis Crick. It will be some time before the world sees another like him.

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