

OBITUARY

Richard Langton Gregory (1923–2010)

Cognitive scientist who excelled at communicating science.

I met Richard Gregory when I was an undergraduate at Cambridge in 1964, after a lecture on the differences between computers and brains. My nervousness was immediately dispelled by a string of jokes and puns. Shaking with laughter, he told me that he was planning a series of historical recipe books, starting with *Cooking in Ancient Greece*. Eventually we talked science, discussing whether the perceived distance of a sound source influences how loud the sound seems. “Why don’t we do an experiment?” he said, welcoming me into the grotto of wonders that was his lab.

Gregory was a pioneer in cognitive science. He worked in an era dominated by neurophysiologists revealing the ‘bottom-up’ processing of sensory signals in the eye, the ear and the brain. Yet he championed the role of ‘top-down’ influences in perception — those based on experience and understanding. Although he won many honours (he held 11 honorary degrees and was a fellow of the Royal Society), the significance of his work has yet to be fully recognized. This may be partly because many of his most important ideas were communicated in popular writing and editorials, rather than through academic papers.

Gregory, who died on 17 May, was the son of Christopher Gregory, the first director of the University of London Observatory, and his wife Helen Patricia. He learned simple electronics in the ‘radio club’ at King Alfred School in Hampstead, north London, and his knowledge of instrumentation grew during six years of work on communications and radar in the Royal Air Force (RAF).

He arrived in Cambridge in 1947 on an RAF scholarship to read ‘moral sciences’. In his first two years, dominated by philosophy, he “just missed Wittgenstein” but was tutored by Bertrand Russell. In his final year Gregory concentrated on experimental psychology, and was one of the last students of Frederic Bartlett — his “most revered intellectual grandfather”.

Bartlett asked Gregory to stay on after graduation, and from 1950 to 1953 Gregory worked at the Medical Research Council’s applied psychology unit in the department of experimental psychology. Like Bartlett, Gregory was captivated by the idea of the former director, Kenneth Craik, that ‘internal models’ of the outside world are physically implemented in the brain and used predictively to direct behaviour.

In 1953, Gregory (without a PhD) was given a staff position. He created a ‘special senses laboratory’ with British and US grants, and filled it with fancy equipment and talented



researchers and engineers. I remember his crowded workshop — with his solid-image microscope and a three-dimensional drawing machine; his image-aggregation telescope for overcoming the effects of atmospheric disturbance; and, over in a corner, devices for transducing tidal power.

Gregory’s delight in translating mental concepts into physical devices mirrored his fascination with the translation of retinal images into mental concepts. Although he viewed the neurophysiologists in the adjoining laboratory as “superior beings”, Gregory saw perception as “creatively intelligent”, not just automatic analysis.

Two lines of evidence particularly influenced him. The first was his study of a 52-year-old man, blind from an early age, who received corneal transplants. As soon as his bandages were removed, he could interpret by sight things he had learned to understand through touch — capital letters and the face of a clock. But he was perceptually blind to things outside his tactile experience. “Vision depends on knowledge derived from active exploration giving meaning to the eyes’ images,” Gregory wrote.

His second source of inspiration was his work on visual illusions. This was partly pursued in his hugely popular undergraduate classes — often conducted in total darkness — in which twisted luminous pieces of wire apparently changed shape as they were passed around. Gregory saw such illusions as the effect of top-down influences that were normally needed to resolve the ambiguity of retinal images. He argued that many illusions of shape and size result from

the inappropriate scaling of apparent size, triggered by unconscious interpretation of perspective cues in the pattern or object being observed.

On the basis of his work on illusions, Gregory proposed that perceptions are like predictive scientific hypotheses — the theme of his best-selling books *Eye and Brain* (1966), *The Intelligent Eye* (1970) and *Mind in Science* (1981).

In 1967, he moved to Edinburgh to help found the department of machine intelligence and perception. Here, an offer of a deconsecrated church as lab space was withdrawn when the Church of Scotland discovered that the scientists intended to make robots! Tensions between the lab leaders, however, spurred Gregory to move to Bristol in 1970, to establish the Brain and Perception Laboratory.

At Bristol, where he continued to work until his death, Gregory studied eye–hand coordination in patients with Parkinson’s disease; perceptual ‘filling-in’ of the blind spot; and his beloved illusions. He also focused his creativity increasingly on public communication, in which he’d shown considerable flair years before: when, in 1946, he was given the job of explaining radar to the public at a bomb site on Oxford Street in London, he drew 4 million visitors in 6 months.

An encounter in 1970 with Frank Oppenheimer — founder of the Exploratorium in San Francisco — inspired Gregory to create the Exploratory in Bristol. This was Britain’s first interactive science centre and most of the exhibits were designed by Gregory himself. He also collaborated with art historian Ernst Gombrich in designing a major exhibition, ‘Illusion in nature and art’, for the Institute of Contemporary Arts in London, in 1973. Throughout his career, Gregory delighted non-specialists with his entertaining lectures and outpouring of books. “The adventure of science,” he once wrote, “should be a major basis of general culture.”

Despite his impressive physical stature and penetrating intellect, Richard was entirely without hubris — blind to age or class. The only thing that mattered to him was enthusiasm, and his own was highly infectious. On 30 May, his friends and family gathered in Bristol to celebrate his life. The event was fittingly entitled a FUNeral. Richard would have shaken with laughter.

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