# Douglas R O Morrison 1929–2001

A distinguished and conscientious physicist and a popular figure at CERN, Douglas R O Morrison died on 25 February 2001. He was born in 1929 in Glasgow where, in 1944, aged just 15, he obtained the Scottish "Certificate of Fitness", which qualified him for university entry. As yet too young to take full advantage of this achievement, Morrison took a job in the research department of a dye and colour factory. Three years later he began studying physics at Glasgow.

Morrison obtained a BSc with honours in 1951, and started research under Philip Dee using a cloud chamber at the Glasgow synchrotron. He was exempted from his national military service because of his industrial research on rockets and explosives, and he formally received his PhD in 1957.

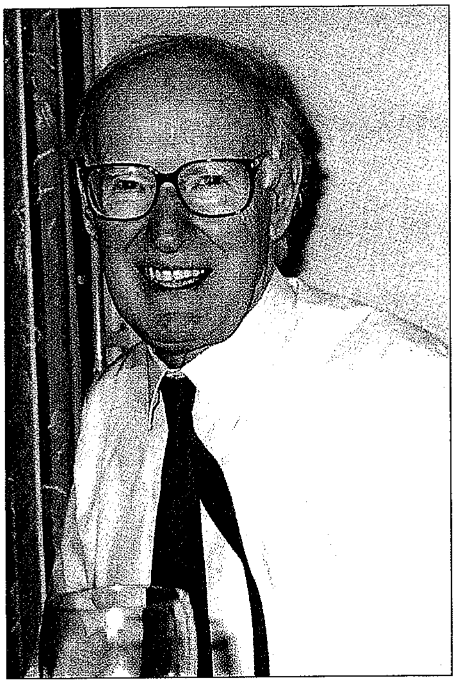
CERN had just been created when Morrison obtained a CERN fellowship in 1956. From this date until his death – a period of some 45 years – he dedicated heart and soul to the laboratory. He was one of the first to initiate and lead large international collaborations that spanned political and ideological boundaries, mainly in bubble chamber experiments but also at the ISR.

Although he was a natural recruit for a number of CERN committees, Morrison had a dread of bureaucracy and was never tempted by managerial tasks. His domain was the battlefield of science: researching, debating, attending conferences and publishing his findings. He put his name to more than 300 publications in many fields.

Noteworthy among his many activities and achievements are his founding of the journal *Nuclear Physics B*, to which he contributed over many years, and the HERA data compilations; and he must be considered the father of the Multiparticle Dynamics Conferences of which he was secretary from 1973 to 1996.

Morrison's long career at CERN was never interrupted. Even during his sabbaticals in Vienna (1963), Brookhaven (1967) and Hawaii (1988), he continued to give guidance to his collaborations.

Beginning in 1954, Morrison's field of research encompassed the entire range of hadronic physics, from the discovery and study of resonances, peripheral reaction mechanisms, diffraction dissociation and multiparticle production, to the solution of many of the questions of their translation into quantum chromodynamical terms.



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After a first series of experiments with pions, protons and stopping antiprotons in hydrogen, Morrison made it his principle to work at the high-energy frontier, always using hadron beams at the highest available energies and thereby breaking new ground.

Morrison's work led to the first observation of the anti-$\Lambda$ isobar resonance in 1962 and the anti-$\Xi^-$ in 1961, the discovery of the L resonance at 1800 MeV in 1966 and the study of the $\Omega^-$ in K-p interactions in 1973. Morrison demonstrated that, with rising energy, most reactions become peripheral, leading to the rich field of t-channel exchanges, Regge poles and, in particular, diffraction dissociation.

The Gribov–Morrison rule $\Delta P = (-1)^{\Delta J}$ would soon become a beacon in this diffuse domain. The detailed partial wave analysis of particle systems would finally solve a number of puzzles in many reactions, in particular for the diffractively produced states in the A1 and Q regions.

With increasing energy, the mechanisms of multiparticle production became a dominant theme of Morrison's research, with many innovative analysis techniques (e.g. Van Hove plots) and detailed comparisons with theory (e.g. first studies of the Hanbury Brown–Twiss effect in pion production).

With the arrival of a high-energy neutrino beam at the CERN SPS in 1977, Morrison and his group joined forces with the team that had discovered neutral currents at CERN. A rich programme with the Big European Bubble Chamber (BEBC), which was filled with neon or hydrogen in a series of exposures to wide- and narrow-band neutrino beams (as well as a number of beam-dump experiments), began a new chapter in quark physics.

The results obtained with BEBC, although they gave lower event statistics, were complementary to the counter experiments and quite competitive. Total neutrino cross-sections as a function of energy, neutral currents, nuclear structure functions, quark fragmentation functions and charm production were the rich harvest of this research, which provided confirmation of the Standard Model well before its apotheosis at LEP. Some pictures of these neutrino events, in particular those showing charm production, have become textbook classics.

Driven to try to detect charmed particles by observing their tracks in bubble chambers – in spite of their short lifetimes – Morrison pursued the application of holography vigorously, both at CERN and at the 15 ft bubble chamber at Fermilab. Some beautiful events could be observed in hadronic interactions at CERN. Seeing them in neutrino interactions, however, was too formidable a challenge.

Morrison maintained a keen interest in scientific questions well beyond his immediate field of research. No matter what the problem, he would critically review the evidence available and draw incisive conclusions. As more time became available to him later in his career, he drafted notes on these investigations, distributed them among his colleagues and fostered debate. Many of these investigations were described at conferences and special events, and published in scientific and popular magazines.

The mass of the neutrino and, as a consequence, neutrino oscillations was a passion for Morrison. Evidence of a 17 keV neutrino claimed by an experiment on tritium decay, the solar neutrino problem, the solar model in general and the physics of the 1987A supernova all benefited from his attention.

Analysing the claims made by some in the scientific community that they had discovered evidence for cold fusion occupied Morrison's critical faculties over many years. Although he was initially very much impressed by this phenomenon, he quickly spotted many weak points and contradictions in the arguments of his colleagues and became a vocal and dedicated opponent of such claims.

His strong feelings on the subject led Morrison to testify in a court case that had been launched by a group of physicists against the Italian newspaper *La Repubblica,* which had been critical of the idea of cold fusion. The newspaper won the case. Taking cold fusion as a key example, Morrison expanded his criticism of "pathological science" in a series of articles and presentations.

When bovine spongiform encephalopathy (BSE) appeared in the UK, Morrison plunged into the study of this disease and, on discussing it with experts, became convinced that it was caused by wrongly folded prions. He wrote prolifically on the subject, organized a conference and, finally, analysed the epidemiological aspects of the likely transmission of the disease to humans.

Other recurring topics of study were the extinction of the dinosaurs and a survey of treatments and cure rates of prostate cancer. Having been a member of the Pugwash movement for many years, he also discussed questions of disarmament, energy supply and climatic changes.

Douglas Morrison will be remembered as an excellent and conscientious scientist, and as an enthusiast who shared his extensive knowledge and critical prowess with great pleasure and generosity. His social gatherings - like "tea" in the office at 10 p.m., wine-tasting at his house and regular excursions - contributed greatly to the dedication of his collaborators and to the amicable atmosphere in his many collaborations.

His loss is a hard blow for his family and for his numerous friends and colleagues all over the world.

*Peter Schmid and Gottfried Kellner, CERN.*