

OBITUARY - RAYMOND DAUDEL (1920-2006)

Raymond Daudel was born in Paris, France, on February 2, 1920, the only child in a middle-class French family. As early as eight he was fascinated by scientific experiments, and at ten he was deeply impressed by a visit with his father to a Museum of Chinese Arts in Paris. From these early experiences he kept, throughout his life, a common interest in the arts and the sciences.

In 1942, Raymond Daudel received a first-class degree in engineering from the prestigious *Ecole Supérieure de Physique et Chimie Industrielles de la Ville de Paris* (ESPCI). Then he became an assistant of Irène Joliot-Curie (the daughter of Pierre and Marie Curie and the wife of Frédéric Joliot, all Nobel Laureates), who was at that time a Professor of Chemistry at the *Sorbonne*, and of Antoine Lacassagne, a Professor of Medicine at the *Collège de France* (known for discovering carcinogenic effects of female hormones). His two supervisors were co-directors of the *Institut du Radium* (now part of the *Institut Curie*). While helping them in their research on the applications of radio-elements to the treatment of malignant tumours, Raymond Daudel prepared a *Thèse de Doctorat ès-Sciences* on chemical separation of radio-elements formed by neutron bombardment, which he presented in 1944.

After following the lectures of Louis de Broglie (who received the Nobel Prize for his discovery of matter waves: $\lambda = h / p$), Raymond Daudel realized that wave mechanics was becoming an essential tool in the understanding of the structure and dynamics of the large molecules from which living beings were built. In 1944, he founded the *Centre de Chimie Théorique de France* (CCTF), with the backing of Irène Joliot-Curie, Antoine Lacassagne, Louis de Broglie, and famous chemists, in order to foster scientific research on the applications of wave mechanics in chemistry and medicine.

In 1954, CCTF became the *Institut de Mécanique Ondulatoire Appliquée à la Chimie et à la Radioactivité*, under the sponsorship of the *Centre National de la Recherche Scientifique* (CNRS); and, in 1957, this body changed its name to *Centre de Mécanique Ondulatoire Appliquée* (CMOA), with Louis de Broglie as the President of the Board of Directors. In 1962 the *CMOA du CNRS* was transferred to a location closer to the large computers of the *Institut Blaise-Pascal*.

CMOA then involved about 40 academics, half of them originating from 10 different countries, especially the USA. There Daudel, Lefebvre and Moser had become known through one of the first textbooks in Quantum Chemistry that was widely used in American universities. CMOA was at that time structured in four main teams:

- That of Raymond Daudel proper, mostly oriented towards (bio) chemical reactivity, with Odilon Chalvet, Simone Odiot, Federico Peradejordi, Georges and Nadine Bessis and a few others, from France and abroad.

- That of Carl Moser, rather oriented towards elaborated methods for the computation of smaller systems. In the late 1960's, Moser was to found the *Centre Européen de Calcul Atomique et Moléculaire* (CECAM), whereas his co-worker Hélène Lefebvre-Brion joined the newly founded *Laboratoire de Photophysique Moléculaire* (PPM) at Orsay.

- That of Roland Lefebvre, especially involved in the interpretation of magnetic resonance spectra in condensed phases with, e.g., Philémon Kottis and Jean Maruani, but also in open-shell methodology, with Yves Smeyers at Madrid, and in molecular dynamics, with M. Garcia Sucre at Caracas. Roland Lefebvre was to become a cofounder of the PPM, with Sydney Leach and a few others.

- That of Savo Bratos, especially involved in the interpretation of infrared spectra in condensed phases. In the late 1960's, Bratos founded the *Laboratoire de Physique Théorique des Liquides* (PTL). Then, in 1984, his former co-worker Marcel Allavena founded the *Laboratoire de Dynamique des Interactions Moléculaires* (DIM). This latter attracted other researchers from Pullmans' and Salem's groups and became the *Laboratoire de Chimie Théorique* (LCT).

In the mid-1970's, other teams emerged within the framework of the former CMOA: Earl Evleth (an organic chemist from UCSB); Jean Maruani (symmetries and properties of nonrigid molecules); Pierre Becker (molecular structure by X-ray and neutron diffraction); Nicole Gupta (band structure in metal alloys); and other groups from existing teams.

During its 30 years of existence, the *CMOA du CNRS* developed a broad activity in scientific research, education, and animation. Over a thousand papers and twenty volumes were published, and 80 doctorate theses presented, between the late 1950's and mid 1980's. Numerous workshops, congresses and Summer schools were organized under the auspices of the CMOA. The *International Academy of Quantum Molecular Sciences* (IAQMS), which has held tri-annual congresses since 1973, was founded in 1967 by Raymond Daudel, together with the Pullmans and scientists from Sweden (Löwdin), England (Coulson, Pople), the USA (Parr, Roothaan), and other places. The *World Association of Theoretical Organic Chemists* (WATOC), which also organizes a congress - alternating with those of IAQMS - every three years, was founded in 1982 on the same pattern.

Hundreds of scientists from all over the world have paid visits to CMOA, and dozens have worked there, for periods ranging from a few days to a few years. One remembers, for instance: Atkins, Bader, Bagus, Barojas, Beveridge, Christov, Cizek, Coope, Csizmadia, Dannenberg, Goodman, Heilbronner, Jaffe, Karplus, Kaufman, Lorquet, Ludeña, Löwdin, Lund, Lunell, Matsen, Mezey, McConnell, McDowell, McWeeny, Mulliken, Nesbet, Pople, Pyykkö, Richards, Smeyers, Verhagen, Wilson

By 1984, most of the former members of CMOA had joined other laboratories, except a few (S. Besnainou, G. Giorgi, J. Maruani) who were invited by Pr Christiane Bonnelle to follow Pr Raymond Daudel in her *Laboratoire de Chimie Physique* (LCP), close to the *Institut Curie*. A strong impulse in theoretical and

computer-oriented methods was then given to this mostly experimental laboratory. But the name of CMOA was retained by Jean Maruani to found an international, non-profit organization devoted to the promotion of scientific exchange and the organization of scientific meetings.

Raymond Daudel was a man of the cities: he disliked the countryside and wild life and was inclined to sedentarity and meditation. On June 18, 1944, he had married his student, Pascaline Salzedo, who initiated him into mountain climbing and stimulated his interest in exotic journeys and artworks. She was a rather tiny woman but with a strong will, who gave him a steady help throughout his career although she was also working as a scientist at the *Institut Curie*. When she was hit by cancer, an illness on which she had worked for years, she insisted on going regularly from her room at *Hôpital Curie* to her office at *Institut Curie*. After Pascaline died, in 1976, Raymond Daudel went through a depressive period in which he lost nearly all interest in his scientific activities. Another blow came when his long-time rival, Bernard Pullman, was elected as a full member of the *Académie des Sciences* in succession to Daudel's mentor, Louis de Broglie, thus putting an end to his hope of getting into that prestigious body.

At that time Senator-Mayor Francis Palmero, who had known Pr Raymond Daudel since the first IAQMS congress, held at Menton in 1973, was a political friend of the painter Nicole Lemaire D'Aggagio, who was a municipal counsellor at the nearby city of Antibes-Juan les Pins. He asked her to involve Pr Raymond Daudel in some common project. Mrs Lemaire was then President of the National Commission of Fine Arts at the Women's Professional Union and, as such, had been invited, in 1972, to a meeting in the Soviet Union. She was received at the Kremlin and, in the midst of the Cold War, she advocated the creation of an international and interdisciplinary academy to foster peace through cooperation, between scientists and artists from both Western and Eastern Europe. After trying to involve various academics, she came to Pr Daudel. It was as if a heavenly voice had told him: "If you can't join them, beat them".

The *European Academy of Sciences, Arts and Humanities* was founded, in 1979, at the very same address (60 rue Monsieur-le-Prince in Paris) where Pierre de Fermat had created, three centuries earlier, the informal group that was to become the French *Académie des Sciences*. The founding members of the *European Academy* were Armand Lanoux from *Académie Goncourt*, René Huygues from *Académie Française*, Jean Bernard from *Académie de Médecine*, Louis Leprince-Ringuet from *Académie des Sciences*, and such foreign scientists as Ilya Prigogine (Belgium), Per-Olov Löwdin (Sweden), and Camille Sandorfy (Canada) - now all dead. Today the *European Academy*, under the new presidency of Pr de Thé, from the *Pasteur Institute*, involves about 300 full members (academicians in their own country), including 40 Nobel Laureates, and 700 corresponding members, from all over the world. It has the status of a non-governmental organization and acts as a consultant for such international bodies as UNESCO and WHO.

I have a personal debt towards the *European Academy*. It was through this body that I was invited, in 2002, by the President of the *Tunisian Academy* to give a talk at one of the *European Academy* meetings, held at Carthage. This allowed me to visit again, for the first time since forty years, the country where I was born. There I approached some Tunisian colleagues, whom I had never met before, and convinced them to organize the tenth QSCP workshop at Carthage.

In recent years, Pr Daudel was mainly involved in establishing a world network on research against retroviruses, together with Luc Montagnier (whose team discovered the virus of AIDS), and also in promoting the teaching of global issues and cultural diversity to engineering students, in the context of rising concern for sustainable development.

Raymond Daudel passed away in Paris, France, on June 20, 2006, at the age of 86. He leaves two sons, both married and having children: Olivier (working in computer science in Paris) and Sylvain (involved in education for management in Singapore). A short ceremony took place in his honour during the eleventh QSCP workshop held at *Kochubey Palace*, St Petersburg, Russia, on August 23, 2006, and a larger one was organized by various bodies, on November 30, at the *Royal Chapel* of Versailles.

Raymond Daudel was *not* a religious man, in the sense that he did not belong to any creed - even though he respected even the weirdest creeds. He was, I would say, rather close to the philosophy of the Stoics. But he *was* religious in the original sense of *religare*: to *link*. To link men of different backgrounds and cultures; and also to link the visible world, which can be accessed by Science, and the invisible realm, which - he thought - could be best approached through Art.

Jean Maruani

*Honorary Director
of Research at CNRS
President of CMOA*

(approved by Olivier and Sylvain Daudel
and by Nicole Lemaire D'Aggagio)