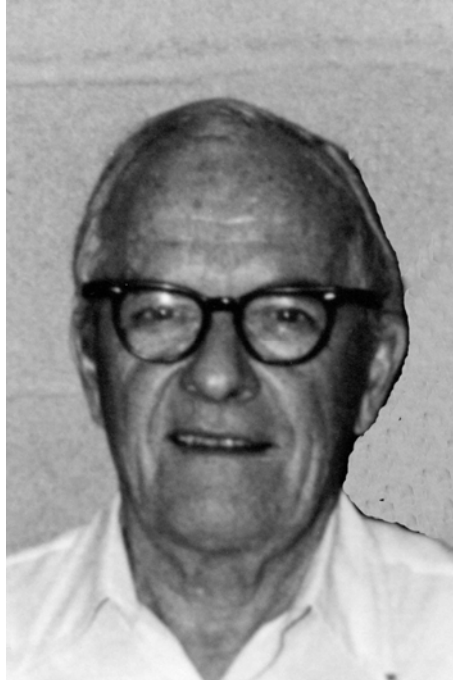


David Sinclair
1 December 1901 – 24 October 1987



The impact of David Sinclair's work in aerosol science, starting in 1940, can be seen in the following three quotations:

1. *“The generation of monodisperse aerosols of high-boiling liquids using foreign nuclei was first achieved by Sinclair and La Mer. The generator designed by them in 1941 was later widely used in aerosol investigations”* (Fuchs and Sutugin, 1966).
2. *“Monodisperse aerosols, in which the sizes of the particles lie within ± 10 per cent of the mean value, were first prepared by Sinclair and La Mer (1949) by carefully regulated condensation of vapour upon suitable nuclei”* (Green and Lane, 1964).
3. *“The Sinclair and La Mer aerosol generator made possible the laboratory preparation of aerosols consisting of a narrow distribution of liquid droplets with radii in the tenths of micron range and opened up a new era of experimental work”* Kerker et al, 1972.

Unquestionably, the development of the Sinclair-La Mer aerosol generator was a pivotal point in the history of aerosol science. Sinclair (1979) described the circumstances surrounding this work and further information can be found on the internet. In the early days of World War II, the U.S. government called on the country's scientists and engineers to tackle a number of projects that would benefit the U.S. military. Professor Victor La Mer established the Central Aerosol Laboratory in the Chemistry Department at Columbia University and took on a project regarding the optical properties of military screening smoke. David Sinclair, then 39 years old, joined this work in the autumn of 1940.

David Sinclair earned a BA degree in physics from the University of Wisconsin in 1924 and a PhD in physics from Columbia University in 1937. In between, he studied music, became a family man, held several non-tenured teaching positions at colleges in New York City and made an extended visit to the Soviet Union. From 1937-40, Sinclair was employed as an assistant in the Columbia University School of Mines. Throughout, he lived in the shadow of his famous and controversial father, Upton Sinclair.

At first, accounts of Sinclair's work at the Central Aerosol Laboratory appeared only in closed government reports. Open-literature reports appeared after WWII. The thrust of these papers is optics, both fundamental research on light scattering by aerosols (Sinclair, 1947) and applied research on devices to measure aerosol properties using light scattering (Sinclair and LaMer, 1949). It is clear that the aerosol generator was not the end-point of this work, but rather a means to the end. The description of the aerosol generator is relegated to the last pages of Sinclair and LaMer (1949).

In 1950 the U.S. Atomic Energy Commission published the *Handbook on Aerosols*, comprising selected chapters from a government summary technical report. Sinclair authored 4 of the 11 chapters. He described the aerosol generator and several optical devices for aerosol measurements. This handbook served aerosol research well during the 1950s and 1960s.

The working relationship between Sinclair and La Mer is of interest. Their separate roles are alluded to in an editor's footnote in Sinclair (1979):

“David Sinclair was Victor LaMer's principal associate in the scientific enterprise that diverted LaMer from his earlier work in solution physical chemistry to colloid and interface science...”

This indicates that LaMer did not have previous experience in the study of airborne fine particles. Quite clearly, LaMer and Sinclair were both novices in this field. Sinclair (1979) stated that only three books and one proceedings report existed for guidance, although there were a number of journal articles.

Consider also this excerpt from a short biography of David Sinclair by Knutson (2005):

“A further insight into this period and David's role in it was obtained in a conversation with Milton Kerker (private communication, June 4, 1991), also a Columbia alumnus. He indicated that LaMer was a fine organizer who pulled together a research group, including a physics instructor named David Sinclair, to tackle an important wartime question, the optical properties of smoke.”

Perhaps the two men were equal partners in the research. More likely, LaMer was the organizer and Sinclair was the innovator.

Sinclair left the Central Aerosol Laboratory in 1944, taking a full time position as an industrial scientist in New Jersey. He did, however, remain in touch with aerosols, as shown by his 1947 and 1949 papers. He returned to aerosol science in 1966, at age 65, and for the next 18

years he worked on the generation and measurement of submicroscopic aerosols. This work is summarized in another review (Sinclair, 1986).

Sinclair and LaMer's generator has received great acclaim as a contribution to aerosol science, but their great contribution was probably at a deeper, more visionary, level, namely that *monodisperse aerosols are essential for precise aerosol experimentation*. A case can be made that the two men, and especially Sinclair, launched modern experimental aerosol science.

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