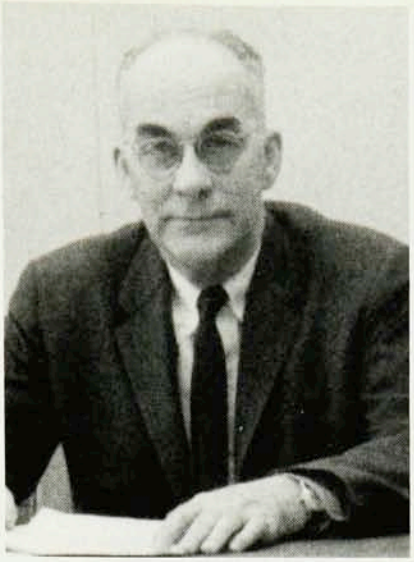

Julian H. Webb

neering at Clemson College. He continued his studies at the University of Wisconsin, receiving a master's degree in electrical engineering in 1925 and a PhD in physics in 1929. His thesis research with Warren Weaver was in mathematical physics. Webb's graduate student contemporaries at Wisconsin included Lee DuBridge and Guy Suits.

In 1931, after two years as an instructor in physics at Williams College, Webb joined the research laboratories of Eastman Kodak. At Kodak Webb became interested in the physics of latent-image formation—the fundamental basis of the photographic process. He was a pioneer in the application of the quantum mechanics of crystalline solids to silver halides and to the photographic process.

Webb's experimental work was characterized by a strong analytical foundation. His early publications discussed an experimental study of the photographic intermittency and reciprocity-failure effects. These effects, which are responsible for the dependence of photographic speed on the individual values of the intensity and time of exposure instead of just the product of the two, greatly complicated the practical application of photography. These effects are now largely under control in commercial photographic emulsions. Webb was able to use insight gained from these studies to separate the effects of the electronic and ionic processes involved in latent-image formation. His subsequent experiments supported the Gurney–Mott quantum mechanical theory of latent-image formation and permitted the understanding of many important photographic phenomena, including reciprocity failure, intermittency, the Herschel effect, solarization, dye sensitization and, above all, latent-image formation, in terms of concepts that pointed the way to improved photographic films.

During World War II Webb worked on the electromagnetic separation of uranium isotopes in the Manhattan Project, spending time in Berkeley and Oak Ridge. During this time he also contributed to the development of a process to mold high-precision optical elements, which has become important in the large volume manufacture of high-quality glass lenses.

With the end of the war Webb again turned his attention to studying the formation of the photographic latent image. He concentrated on experimental studies of photographic effects in order to develop a statistical model for latent-image formation. From this model and the known size-distribution of grains in an emulsion, he confirmed that one to ten absorbed photons can render a photographic grain developable. In 1949 he concluded that two silver atoms can form a stable sub-latent-image site. This led to the useful suggestion that pre-exposure of astronomical plates to low-intensity light, to form stable sub-latent-image specks, can greatly increase the sensitivity of the plates.

Webb also became interested in the formation of image tracks by energetic particles and in nuclear track emulsions, and these interests led to his solving several serious fallout-related problems that occurred in the manufacture of film. In one such instance, during late 1945, spots began to appear mysteriously in x-ray film. An affected film would typically show from 10 to 100 small, black spots after processing. By a careful set of experiments, which had to be carried out quickly because of the urgency of the problem, Webb showed that the spots were caused by the presence of a radioisotope in cardboard packaging for the x-ray film made by a particular paper mill in Indiana. He deduced that the isotope (probably Ce^{141}) had been produced in the first atomic bomb test in July 1945. It was subsequently washed as fallout into the Wabash River, from which process water was taken by the paper mill. This discovery permitted solution of the fogging problem and minimized its impact on medical diagnostics.

During the 1950s Webb assumed increasing responsibility for the management of the physics division of the Kodak Research Laboratories. He played a central role in strengthening the solid-state physics and analytical bases for photographic science, to complement an already strong photographic chemistry effort at Kodak. He established the solid-state physics laboratory and, with George Higgins, built a strong program in what is now known as image science, the information theoretic approach to image structure and the analysis of imaging system performance.

The work of Julian Webb was instrumental in making practical photography available to us for our profession and our pleasure.

BENJAMIN B. SNAVELY
Eastman Kodak Company
Rochester, New York

A. Vibert Douglas

A. Vibert Douglas, an astrophysicist and university educator, died in Kingston, Ontario, on 2 July 1988 at age 93. One of Canada's most distinguished citizens, she was made a member of the Order of the British Empire by King George V in 1918 for her work in the War Office, and an Officer of the Order of Canada in 1967. Her great zeal for astronomy, keen interest in her students and involvement in fostering international relations made her widely admired and loved.

Born in Montreal, Douglas started her university education at McGill University, interrupted it for war work and then returned to receive her bachelor's degree in 1919 and her MS a year later. Her postgraduate work at the Cavendish Lab of Cambridge University with Rutherford and her work with Arthur Eddington, also at Cambridge, whetted her interest in astronomy, and in 1926 she received her doctorate in that field from McGill. She remained on the McGill staff for 17 years. She and John

A. Vibert Douglas

Stuart Foster investigated the spectra of A- and B-type stars and the Stark effect with the 72-inch telescope of the Dominion Astrophysical Observatory. In 1939 Douglas was appointed dean of women at Queen's University, Kingston, where she continued to work until her retirement.

Despite her heavy university duties, she found energy for remarkable international achievements. A citation accompanying her receipt of an honorary degree from Queen's University described her as an "inveterate internationalist." She became the first Canadian president of the International Federation of University Women in 1947, and she represented Canada at the UNESCO conference in Montevideo in 1954.

A member of the International Astronomical Union, she held the Canadian record for attendance at its triennial General Assemblies. When the IAU met in Germany in 1964, a special bus trip was arranged to take some members to East Berlin for a few hours. The fear of the Berlin Wall was then near its height. At dinner that night we bus travelers learned in astonishment that Allie Douglas (a nickname she preferred to the more formal "Alice") had walked through Checkpoint Charlie all alone and had spent the day crisscrossing the city on public conveyances, because, as she said, "I think that's the best way to see a city."

Douglas's many writings will continue to spread her knowledge. Her most outstanding literary contribution was *The Life of Arthur Stanley Eddington* (1956), a project started at the request of Eddington's sister, Winifred. Probably Douglas's Quaker background, which she had in common with the Eddingtons, made her specially attuned to this task, and her erudition shines through it, as in her use of the first four bars of Schubert's Unfinished Symphony to introduce the chapter on Fundamental Theory. Her other publications appeared in the *Journal of the Royal Astronomical Society of Canada*, *Hibbert Journal*, *Atlantic Monthly*, *Discovery* and several university quarterlies, among other places.

In 1984 the Canadian Astronomical Society held a special session at the Herzberg Institute of Astrophysics in Ottawa in honor of Douglas's forthcoming 90th birthday on 15 December. To attend, she traveled alone by bus from Kingston to Ottawa. For many of us, this was our fond farewell to her.

HELEN SAWYER HOGG
David Dunlap Observatory
University of Toronto ■