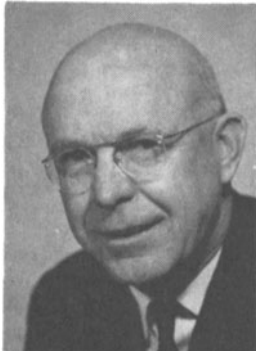


## Biographical Notes

### John Edmund Hayes

John Edmund Hayes retired in July 1969 as Vice-President of Engineering, Canadian Broadcasting Corp., Ottawa, Can., a post he had held since 1964. Mr. Hayes was born in Arcola, Sask., in 1910 and moved to Ottawa in 1920. He was graduated from Queen's University in 1935 with the degree of Bachelor of Science in Engineering and in 1947 he received the degree of Master of Science in Engineering from McGill University.



He joined the Engineering Division of Canadian Broadcasting Corp. in 1936 and during his 33 years with CBC he held successively the posts of Assistant Transmission and Development Engineer; Assistant to the Chief Engineer; Chief Engineer; Director of Engineering and Technical Services; and Vice-President, Engineering. In the preparatory years before the start of CBC television, he visited the United States, England and France to study technical developments in those countries.

During recent years, Mr. Hayes has been especially interested in technical advances in communications and particularly in satellite transmissions. In cooperation with the staff at CBC Engineering Headquarters in Montreal, Mr. Hayes was instrumental in establishing CBC's broadcast requirements for the proposed Telesat-Canada communications satellite scheduled for launching in late 1971. He has also worked with a Canada-Sweden study group which prepared a joint document on broadcasting satellites for presentation to a United Nations working group on the peaceful uses of outer space. He has also been involved with Canadian contributions to the International Telecommunications Union and with the work of the Canadian Standards Association.

He has been a member of the Society since 1953 and he was made a Fellow in 1966. He has served on the Progress Committee and among his publications is a paper on "Television Facilities of the Canadian Broadcasting Corp." which appeared in the November 1952 issue of the *Journal*.

Organizations, other than the Society, of which he is a member include the Engineering Institute of Canada, the Association of Professional Engineers of Ontario, the Institute of Electrical and Electronic Engineers (of which he is a Fellow) and the Corporation of Engineers of Quebec.

During his retirement he plans to find time for his numerous hobbies, including sailing, amateur radio, photography and astronomy. He resides at 2030 Featherton Drive, Ottawa 8, Ont., Can.

### John K. Hilliard

John K. Hilliard retired October 22, 1969, as Director of Research for LTV Research Center, Western Division, Anaheim, CA. He was born in Wyndmere, ND, and attended Hamline University in St. Paul, where he was graduated with the degree of Bachelor of Science, and the University of Minnesota, where he did graduate work. In 1950, the University of Hollywood, Hollywood, CA, conferred upon him the honorary degree of Doctor of Science in Audio Engineering.

In 1928 Dr. Hilliard joined United Artists Studios as Transmission Engineer. He joined MGM Studios in 1933 where he was active in the development of mercury vapor lamp recording and printing processes, push-pull recording and the reduction of phase shift in recording amplifiers. He was also involved in the development of the Shearer two-way loudspeaker system which received an Academy Award in 1936. He remained with MGM until 1942 when he was appointed to the staff of the Massachusetts Institute of Technology where he was engaged in the development of a ship radar system.



In 1943 he joined Altec Lansing as Vice-President of Engineering. Between 1943 and 1960 he was active in the development of the Voice of the Theater system. He also contributed to the development of high-intensity acoustic environmental test systems, miniature condenser microphones and other sound equipments. In 1968 he developed an improved theater and sound reinforcement loudspeaker system. He was involved in the development of many other sound systems and equipments, including intelligence-gathering microphone systems, airport noise monitoring systems, heart microphones, microphones to detect boring insects in pine trees and microphones to detect micrometeoroid particles in space. He also acted as acoustical consultant for a number of structures, including the Mormon Temple at Los Angeles, the Elks Auditorium at Santa Ana, General Motors Recording Studios in Detroit, Braniff Hotel in Acapulco and the Telephone Building in San Diego.

He has been a member of the Society since 1936 and he was made a Fellow in 1938. His many activities in behalf of the

Society include service on a number of committees, among them the Sound Committee (of which he was made Chairman in 1952) and the Papers, Warner Award and Standards Committees. He has also served on the Board of Governors. He is the author of a number of papers, 19 of which have appeared in the *Journal*. He is also one of the authors of *Motion Picture Sound Engineering*, a collection of papers published in one volume in 1938 by the Academy of the Motion Picture Arts and Sciences.

The earliest paper authored by Mr. Hilliard which appeared in the *Journal* is in the July 1936 issue — "Study of Theater Loudspeakers and the Resultant Development of the Shearer Two-Way Horn System."

Between 1936 and 1954, *Journal* papers of which he is the author afford a consistently interesting account of developments in acoustics and sound engineering which will undoubtedly be of value to future students of that important era in that particular branch of motion-picture engineering.

Organizations of which Dr. Hilliard is a member, other than the Society, include the Institute of Environmental Engineers, the Acoustical Society of America, the Audio Engineering Society and the Institute of Electrical and Electronics Engineers. He is the President of Hearing Conservation Services, 5801 E. Washington Blvd., Los Angeles, CA 90022.

### Arthur L. Ingalls

Arthur L. Ingalls has spent almost 40 years in the field, theory and practice of optical science, first as a research engineer and later as a consultant. He was graduated from the University of Rochester in 1932 with the degree of Bachelor of Science with a major in Optics. Following graduation he joined Corning Glass Works as an optical engineer. He has also been associated with Ansco Corp., Bausch & Lomb and Polan Industries (of which he was Vice-President of Engineering and Development).

In 1956 he was appointed Research Engineer at the University of Michigan, Institute of Science and Technology, at Ann Arbor. His work at the university was mainly in the field of coherent optical data processing in which he is regarded as a pioneer. One of his first projects following the university appointment was the design and production of what is believed to be the first successful optical cross correlator for radar data.

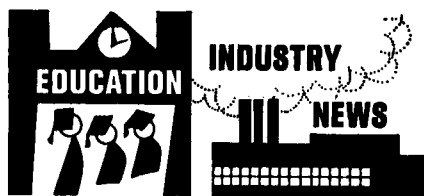


His work in coherent optics included such developments as spectrum analyzers, correlators, matched filters and holograms. Among the inventions for which Mr. Ingalls holds patents is a two-dimensional coherent optical spatial filter equipment called a Laserscan. It was developed especially for processing seismic oil exploration data. More recently he has been engaged in the optical processing of stereoscopic photogrammetric data and he has also worked with optical processing using holograms as data storage units and as filters.

His work in infrared technology included the design of a diffraction limited infrared scanner. His work in the field of laser optics has included the design of special lenses for use in both the visible and infrared regions, laser cavity design and analysis and the study of optical surface quality influence on laser light and its coherence properties, noise and bandwidth.

In 1961 he left the university to become the head of the Department of Optics Research of Conduction Corp. and in 1965 he decided to become a consultant. He opened an office in Ann Arbor and, quite recently, he moved to 2835 Montmart Dr., Orlando, FL 32809. He has equipped an office there with full-size drafting facilities and a Friden electronic calculator.

Mr. Ingalls is the author of a number of technical papers which have appeared in such journals as *Journal of the Optical Society of America* and *Applied Optics*. He has been a member of the Society since 1955.



### SPSE Charter Flight to Photokina

The Society of Photographic Scientists and Engineers (SPSE) is sponsoring a charter flight for the benefit of SPSE members and other interested persons who plan to attend the 1970 Photokina. The flight will leave September 17 from Kennedy Airport in New York and will fly nonstop to Cologne, Germany. The return flight will leave from Cologne on October 11 and will fly nonstop to New York. The roundtrip fare is \$165. The group will arrive in Cologne two weeks before the opening of Photokina (October 3) to give the group members an opportunity to see Europe on their own before the event. There is, of course, no obligation to attend Photokina, if some group member should prefer to continue his travels during the week rather than to attend the 1970 Photokina. Autos will be available for rental. SMPTE members may obtain further information from Fred Garretson, Bywater Rd., Annapolis, MD 21401. He can also be reached by telephone at (301) 268 1518.

**The 1970 Photokina will be held at Cologne, Germany, October 3-11.** Some 650 companies from 23 countries will participate. Twenty-five exhibitors from the United States will show photographic equipment including motion-picture cameras and accessories, protectors, lenses and audio-visual equipments. Among the highlights of Photokina will be an exhibit of historical items of equipment, including antique motion-picture cameras and projectors, to celebrate the 75th anniversary of film projection.

The announcement of the historical exhibit notes that the first film projection by Louis Lumière on March 22, 1895, was an industrial film entitled *Workers Leaving the Lumières Factory* shown to the Société d'encouragement à l'industrie nationale. A few months later Max and Emil Skladanowsky projected the first short film in public. On November 1, 1895, they used the Bioskop designed by them to show short entertainment films as part of a variety program at the Berlin Wintergarten.

A tutorial seminar on the Science and Technology of Information Display will be held September 14-18 at the Long Island Graduate Center of the Polytechnic Institute of Brooklyn, Farmingdale, N.Y. The seminar is under the auspices of the Office of Special Programs, Polytechnic Institute of Brooklyn. There will be 18 sessions designed to provide an understanding of the concepts underlying modern information display and to relate these foundations to contemporary practice. Topics to be discussed include Image Information Theory; Geometrical Optics and Image Formation; Coherent Optics and Holography; Electron Beam Principles and Cathode-Ray Devices; Lasers; and Sub Systems Large Screen Displays. Further information is available from Mrs. Helen Warren, Polytechnic Institute of Brooklyn, Long Island Graduate Center, Route 110, Farmingdale, L.I., NY 11735.

The 38th Convention of the Audio Engineering Society was held May 4-7 in Los Angeles. Session topics were: Motion-Picture Sound Techniques; Acoustical Noise and Noise Control; Disc Recording and Reproduction; Audio in AM, FM and TV Broadcasting; Microphones and Playback Cartridges; Loudspeakers; Electronics Applied to Music; Audio Measurements and Instrumentation; Architectural Acoustics and Electroacoustics; Signal Control and Processing; Magnetic Recording and Reproduction; Music, Speech and Hearing; Amplifiers and Audio Circuitry; Sound Reinforcement; and Audio Applied to Education, Science and Industry. A special feature of the program was a recording studio workshop held in several recording studios in Los Angeles and Hollywood. Audio Engineering Society headquarters are at Room 428, Lincoln Bldg., 60 E. 42 St., New York, NY 10017.

The Illuminating Engineering Society (IES) held its annual Theatre, TV and Film Lighting Symposium May 24-26 in Los Angeles. Highlights of the symposium included roundtable discussions on pro-

duction techniques, light sources, luminaires and control systems and demonstrations of set and studio lighting. A technical paper entitled "Light and Color in a Multiple-Purpose TV Studio," describing the equipping of Studio "A" of WJVA-TV Channel 23, Miami, was presented by the author, George Gill. The paper had previously been awarded first prize in a competition conducted by the IES S.E. Florida Section.

**The Primary Pattern Generator (PPG),** a new machine that makes use of a laser to draw patterns for tiny integrated circuits more intricate than previously possible, has been developed at Bell Telephone Laboratories, Mountain Ave., Murray Hill, NJ 07974. The machine will be used for creating circuit patterns in photolithographic masks, which, in turn, are used by Western Electric Co. in the production of integrated circuits for Bell System equipment. The PPG consists of a moving table to hold an 8- by 10-in photographic plate; an argon laser as the light source; modulators and lenses to control the laser beams and a 10-sided mirror rotating on air bearings to reflect the laser beam and expose selected portions of the photographic plate. The laser beam can be controlled "with pin-point precision" to traverse the photographic plate along 32,000 scan lines and with 26,000 positions per scan line. The beam can be directed with an accuracy of less than one arc-second. The PPG must be operated in a special controlled environment chamber, where the temperature is maintained within 0.25°F and each cubic foot of air contains fewer than 100 dust particles larger than one micron. Operation is so fast that the PPG takes only about 12 minutes to complete a sophisticated circuit mask which formerly required more than 12 hours of machine time.

An holographic system employing sonographic and holographic techniques to produce three-dimensional pictures underwater has been developed at CBS Laboratories by a team of scientists one member of which was Dennis Gabor who developed the first hologram in 1948 and pioneered sonography, the detection of objects in murky water at great depths and long distances by probing with sonar devices.

The "see with sound" system uses an acoustic wave transmitter which illuminates 1/100th of an object field, each 1/100th of a second, with a narrow beam which scans the entire field. The reflected waves of 100 object points in each illuminated portion of the field are sensed by 360 hydrophones arranged in a circular array. The output from each hydrophone is amplified and then modulated by a signal corresponding to an equivalent reference sound wave outside the object field having a frequency equal to that of the transmitted acoustic wave. Each joint signal is then translated into a corresponding light beam for imaging in a corresponding circular array onto an intermittently driven photographic medium with a 1000:1 reduction in scale from the hydrophone array. The photographic medium is devel-