

The Fifth International Congress on High-Speed Photography



TWO YEARS OF Society activity preceded the Congress held on October 16-22, 1960. The first major planning began during the Society's Convention at Detroit in October 1958. The chronicle of the Fifth Congress in the *Journal* began in the August 1959 issue (p. 550) with the announcement of key chairmen and general plans. These were Max Beard, Chairman of the Congress—to be assisted by Richard O. Painter as Associate Papers Program Chairman, J. S. Courtney-Pratt as Associate Program Chairman for Papers From Abroad, and James A. Moses as Associate Program Chairman in Charge of Film Showings.

Subsequent reports appeared in the issues of September 1959 (p. 638); October 1959 (p. 706); November 1959 (List of Topic Chairmen beginning on p. 771); December 1959 (p. 839); January 1960 (p. 49); February 1960 (p. 122); April 1960 (p. 247); July 1960 (an extensive report on the organization of the Fifth Congress beginning on p. 489); August 1960 (p. 548); and September 1960 (Advance Program beginning on p. 609).

The gathering together of topflight scientists from all over the world, under the auspices of the SMPTe, was an event of international importance, recognized by the United States government by its support of the Fifth Congress and expressed in the resolution introduced by Senator Warren C. Magnuson (*Journal*, October 1959, p. 706, and April 1960, p. 274), and in a welcoming letter by President Eisenhower to SMPTe President Norwood L. Simmons.

Committee of Honor

A special feature of the Fifth Congress was the appointment by President Simmons of a Committee of Honor. Some of the greatest names in science—men representative of the caliber of the individuals who are making history in the many fields of science were appointed. Those on the Committee of Honor were: Detlev W. Bronk, President, National Academy of Sciences; John M. Clark, General Manager, Photo Products Dept., E. I. du Pont de Nemours & Co., Inc.; Edward P. Curtis, Vice-President, Eastman Kodak Co.; Donald W. Douglas, Sr., Chairman, Board of Directors, Douglas Aircraft Co.; Harold E. Edgerton, Dept. of Electrical Engineering, Massachusetts Institute of Technology; James B. Fisk, President, Bell Telephone Laboratories, Inc.; T. Keith Glennan, Administrator, National Aeronautics and Space Administration; G. K. Hartmann, Technical Director, U.S. Naval Ordnance Laboratory; Theodore Von Karman, Chairman, Technical Advisory Board, Aerojet General Corp.; James R. Killian, Jr., Chairman of the Corporation, Massachusetts Institute of Technology; Paul E. Klopsteg, Chairman, Board of Directors, American Association for the Advancement of Science; William H. Pickering, Director, Jet Propulsion Laboratory, California Institute of Technology; Simon Ramo, Executive Vice-President, Thompson Ramo Wooldridge Inc.; C. Guy Suits, Vice-President, General Electric Co.; Herbert F. York, Director of Defense Research and Engineering, Department of Defense.

Organization of the Congress

Compared with the usual SMPTe Semiannual Convention, the Congress was larger, longer and in many other ways different; however, the successful staging of the Congress owed much to its being administered in a way corresponding as much as possible to the Society's convention procedures which were the responsibility of Reid H. Ray, Convention Vice-President in 1959-60. The organization of the papers program was under Editorial Vice-President Glenn E. Matthews.

The responsibility of the Fifth Congress Arrangements Committee, doubly heavy, was carried out with the apparent smoothness that is achieved only by hard work and meticulous planning. Byron Roudabush was Arrangements Chairman.

The special efforts to make a large international congress were made possible by a government grant to complement the Society's usual activities for a Semiannual Convention. The liaison and special planning were accomplished for the Society by Wilton R. Holm, then Secretary of the Society; Ethan M. Stifle, Financial Vice-President; and Max Beard, Chairman of the Congress. The support given by the Department of Army, Navy and Air Force was administered by the Chief Signal Officer of the Army. Admiral Robert S. Quackenbush, Jr., was Government Liaison Chairman.

The Arrangements Committee Chairmen appointed by Messrs. Roudabush and Ray were chiefly experienced Society workers. Howland Pike handled registration



D. Max Beard, Chairman of the 5th Congress, receives a Certificate of Appreciation from Norwood L. Simmons, SMPTe President.



Members of the Committee of Honor. Left to right: Harold E. Edgerton, Massachusetts Institute of Technology; John M. Clark, General Manager, E. I. du Pont de Nemours & Co.; G. K. Hartmann, Technical Director, U. S. Naval Ordnance Laboratory; Paul E. Klopsteg, Chairman of the Board of Directors, American Association for the Advancement of Science.

smoothly and efficiently. Hospitality activities were the responsibility of Chairman Fred W. Gerretson. Entertainment was under the auspices of Dean F. Lawson and banquet arrangements were handled by Dudley Spruill. Hotel arrangements were handled by Arthur Rescher. Nathan D. Golden was Reception Chairman. Stuart Cameron was Publicity Chairman. The Ladies Program was arranged by Henry M. Fisher. Mrs. Keith Lewis and Mrs. Garland C. Misener fulfilled the duties of hostess with competence and charm.

Projection and Public Address and Recording — areas in which "slip ups" are prone to occur — were in the capable hands of Wilson E. Gill and J. Clinton Greenfield. Transportation arrangements were made by Jack Jiruska. Frank Havlicek was Administrative Assistant during Congress week. The auditor was Charles E. McGown, assisted by Mrs. C. B. Smith of Byron Motion Pictures, Inc. The Awards Session (described later in this issue) was arranged by Joseph E. Aiken. Keith Lewis was Exhibits Chairman. Joyce Towles and Mrs. Ruth Ashton were on hand to expedite secretarial and other matters for Messrs. Roudabush and Ray.

Interpretation

One of the special services to be supplied by the Congress planners was that of interpretation. Garland C. Misener, as Interpretation Chairman of the Congress Arrangements Committee, handled the multifaceted problem skilfully. An expert from Georgetown University, Dr. Stefan Horn, was chosen to supervise the simultaneous interpretation of all technical papers into the three official languages of the Congress, English, French and German. Copies of each author's paper were studied beforehand by the translators to permit their simultaneous delivery in the two languages other than the author's, then simultaneous interpretations were given for all the discussion following a paper. Prof. Horn also provided the three teams of interpreters at work during all sessions. Individual transistorized 4-channel radio receivers were issued to each registrant to permit him to "tune in" the language he preferred. An additional channel was used for directly tuning in the speaker, moderator, or voice from the floor. About 800 units of the IBM wireless equipment were used.

Of special assistance in this part of the program, as well as in preceding months, was Mrs. Lena Mans, of the Naval Ordnance Laboratory. She coordinated the manuscripts and supplied copies for the interpreters. She also assisted with copies for the press room and helped authors and Dr. Horn whose work and efforts went beyond the call of duty.

Closed-Circuit

Another useful feature of the Fifth Congress was the use of a closed-circuit television system. Monitors were placed in suitable locations throughout the hotel, including near the Registration Desk and in the Exhibit Area, so that delegates and visitors could be informed at any time as to what paper was being presented. The equipment was made available through the courtesy of Walter Reed Army Hospital. Lewis Blair was Closed-Circuit TV Chairman.

Some Special Assistance

Considerable credit for the smoothness of the functioning of the technical sessions is also due R. T. Van Niman who, without formal title, coordinated the mechanical aspects of the work of the Sessions Vice-Chairmen. Also, Ed Beckman, projectionist, spent the entire week, day and night, projecting motion pictures and slides, managing matters to obtain smooth operation and accomplish the speakers intent. Miss Lisa Löper supervised and coordinated the procurement of the discussion questions and contributions supplied written on a special form for the Congress.

Photographs of the Congress have been supplied through the extensive and helpful efforts of scientific photographers from the Naval Ordnance Laboratory: Roy Simpson, John Arena and Francis Smith.

Motion-picture footage of the Congress was shot by William E. Youngs of the U.S. Information Agency. It is being edited and prints made by Reid H. Ray.

Development of the Papers Program

Begun nearly two years ago was an intensive correspondence campaign by Chairman Beard, who is Chief of the Photographic Division of the Naval Ordnance Laboratory. This correspondence not only solicited papers for the program but also generated interest in the Congress

among government research personnel throughout the country, and in universities and industry.

Dr. J. S. Courtney-Pratt, in his capacity as Associate Program Chairman for Papers From Abroad, corresponded with more than 900 individuals in all parts of the world outside the U.S. It was largely due to his efforts that nearly half the 106 papers and film presentations on the program came from overseas and Canada.

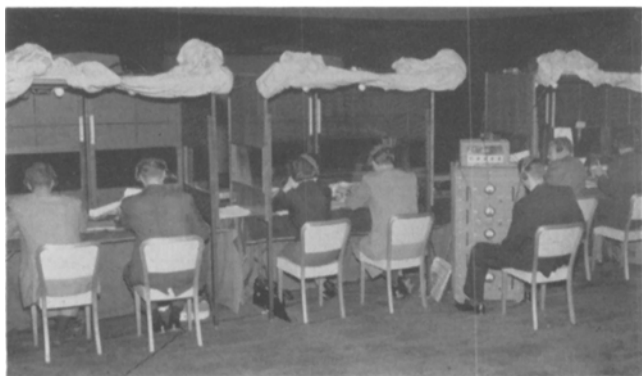
More than 5000 copies of a four-page announcement with general information about the Congress were sent out early in 1960. Nearer the Congress date some 17,000 copies of a handsome 20-page brochure, in two colors, containing full details and including a summary of the technical program and registration forms for the Congress, were distributed far and wide. Besides all members of SMPTE, the members of the Society of Photographic Scientists and Engineers received this brochure, which was produced in Washington under the able direction of Byron Roudabush, with text supplied by Max Beard and others.

The SPSE Symposium on Rapid Processing was briefly announced in this brochure.

Assisting Mr. Beard on the Technical Program Committee, besides J. S. Courtney-Pratt who has the continuing responsibility of Editorial Chairman for the *Congress Proceedings*, were Richard O. Painter, Associate Papers Program Chairman; Morton Sultanoff, Associate Program Chairman for Congress Sessions; and James A. Moses, Associate Program Chairman in Charge of Film Showings.

National Delegates

Papers from foreign countries were solicited by the fifteen National Delegates, each an internationally recognized authority in his field. The Delegate from Belgium was Dr. Franz Topfer; from Canada, Alexander Easson; Czechoslovakia, Vaclav Kolar; France, Ing. Mil. en Chef de 1^oCl. P. Fayolle; Germany, Prof. Dr.-Ing. H. Schardin; Greece, Prof. Dr. P. Santorini; India, Dr. Kartar Singh; Israel, G. Nahmani; Japan, T. Uyemura; Netherlands, Dr. J. G. A. de Graaf; Norway, Kaye Weedon; Sweden, Civ.-Ing. Tryggve Ramqvist; Switzerland, Prof. Dr. J. Eggert; Union of Soviet Socialist Republics, Dr. A. I. Tchernyi; United Kingdom, Dr. R. F. Saxe.



The teams of simultaneous interpreters at work in their booths overlooking the session auditorium.



Max Beard, 5th Congress Chairman (right), and Dr. Schardin, Chairman of the 4th Congress (left), talk with Dr. J. G. A. de Graaf, Chairman of the 6th Congress.

Topic Chairmen

Topic Chairmen for Solicitation of Papers in the United States were Robert Betty, Willard E. Buck, Lincoln L. Endelman, William C. Griffin, Guy H. Hearon, Jr., William G. Hyzer, Glen H. Jones, John H. Niemeyer, Harry L. Parker, Nelson W. Rodelius, Loren E. Steadman, Morton Sultanoff, Vernon E. Taylor, John H. Waddell, Willett R. Wilson, Charles W. Wyckoff and A. M. Zarem.

For scheduling the papers in sessions and for carrying out the timing of the sessions a great deal of credit is due Morton Sultanoff.

Technical Program

From a report by BERLYN BRIXNER

The uniformly high caliber of the papers and the excellent arrangement of the Sessions make it difficult to single out any Sessions or group of papers as "outstanding" or to point to one more than another as representative.

The meeting was especially notable for its very broad coverage of the field, along with the presentation of some real advancements.

The bulk of some 106 papers and film presentations at the technical sessions came, as would be expected, from the U.S.A. In order of numbers, other papers came from England, France, Germany, Belgium, Switzerland, Czechoslovakia, and Japan. Proposed papers from India and Australia had interesting titles but were presented only by abstract. Some seven papers from Russia were summarized in a special presentation by Dr. A. I. Tchernyi arranged for the end of Friday morning's Session. It is expected that several of these papers will be published in full, others as abridgments. They will appear in the *Congress Proceedings*, and some may also soon appear in the *Journal*.

The largest class of papers was that which reported the application of high-speed motion-picture photography to industrial engineering investigations and to basic scientific research. In these studies the framing rates ranged from a few hundred to a few million frames per second. The lower speeds were used to study canning machinery, outboard marine operation, coal pulverizing machinery, and atomic reactor engineering mechanisms. Speeds in the thousands of frames per second were used for the study of underwater pneumatic and spark sound generators and, especially, for macrophotography of such subjects as the action of a metal-cutting tool and the bubble formation in a liquid. Macrophotography studies of liquid sprays, fuel atomizers, and cellulose fiber suspensions required similar frame rates but a much shorter exposure time. The shortest exposure times and highest speeds were required for studies of exploding wires, dynamic strains in opaque materials (using photoelastic coatings), stereoscopic studies of shaped-charge-liner jet formations, the shock loading and compressibility of solids, the structure of ultrasonic air jets, liquid/solid impacts, hypersonic flow (using a differential interferometer), and the expansion of turbulence areas in gaseous shock phenomena. Two novel ballistic studies pointed the way toward more



National Delegates to the 5th Congress. Front row, left to right: Ing. Mil. en Chef de 1^o Cl. P. Fayolle, France; Dr.-Ing. Hubert Schardin, West Germany; D. Max Beard, United States; Dr. A. I. Tchernyi, Union of Soviet Socialist Republics. Back row: Dr. P. Santorini, Greece; Dr. R. F. Saxe, United Kingdom; Dr. Franz Topfer, Belgium; Alexander Easson, Canada; Civ.-Ing. Tryggve Ramqvist, Sweden; Dr. J. G. A. de Graaf, Netherlands; Kaye Weedon, Norway; Nikolai Zandin, Union of Soviet Socialist Republics.

extensive applications of old velocity synchronization techniques.

A mechanism was described which increases the frame rate of intermittent pin-registration cameras to a maximum of 9600 pps. A break-through in rotating-mirror frame cameras gives a practical method of focal plane shuttering which permits a very short exposure time without loss of aperture in the million-frame-per-second range. A portable million-frame-per-second camera with twelve frames has been developed.

The cameras of highest time resolution are the rotating-mirror sweeping-slit type. Intensive study of these has resulted in significant gains. Outstanding was an $f/1$ streak camera, especially for the study of sparks, with reflection optics for use in the ultraviolet or visible. Two other designs described had reflection optics of small aperture. Several papers described cameras of conventional but refined design. One paper revealed some novel properties of beryllium for radically diminishing the surface distortion of rotating mirrors.

The Kerr cell shutter has been improved by the development of superior control circuits which permit, in one case, repetitive and, in another, more efficient cell pulsing and better synchronization with flashtube light sources, especially for reflected light photography. The image-converter tube, although it has been subject to development, continues to have low overall resolution potentialities at the highest speeds. However, there is considerable progress in the use of some classes of these tubes for image intensification, and claims have been made for enormous light gains in certain applications. For instance, the intensifiers have been used successfully with flash x-ray techniques. And a novel optical scheme for intensifying underexposed negatives was described.

A number of papers described the production and use of improved light sources. There were reports (1) on new measurements of the characteristics of

spark gaps and gaseous discharge lamps; (2) on intense, short-duration light flashes with surface brilliance up to perhaps one hundred times the Sun's brightness and time durations shorter than a hundred millionth of a second; and (3) refinements in controlling the electric power exciting the lamps, which refinements make possible the above-mentioned amazing light outputs. Long-duration explosive light sources have been improved in ease of fabrication and constancy of illumination. There were reports on several novel applications of these lights to the photographic solution of research problems.

Remote-control operation of high-speed cameras was the subject of papers describing part or all of the facilities at such American, British and French research centers as the Argonne National Laboratory, the Lawrence Radiation Laboratory, Aberdeen Proving Ground, the U.S. Naval Ordnance Test Station, the Atomic Weapons Research Establishment, the National Physical Laboratory, and the Laboratoire Central de l'Armement. Reports on these facilities continued on down the line to unit installations for the operation of rotating-prism cameras, including both an underwater installation and a clever speed control permitting several runs per film roll; and the reports covered such control equipment details as automatic speed control for rotating-mirror turbine drives, a pulse program generator adjustable over an enormous range, and a quenched spark gap repetitive trigger scheme.

Flash x-ray equipment has been increased in power, in one case to the megavolt range. Emphasis was on repetitive high-powered pulsing to produce a series of images at rates up to 12,000 per second. Several applications of these techniques were described.

Outstanding among sensitive materials is a direct-recording paper on which the latent image, formed by high-intensity light, is developed by exposure to low-intensity light. The speed of the paper makes possible fast recording with vibrating



Crawford H. Greenewalt, President, E. I. du Pont de Nemours & Co., guest speaker at the Congress Opening.

mirror oscillographs. In addition, valuable information was given about the forced development of various high-speed films; and there were reports on two new studies of reciprocity failure.

Valuable for the researcher who uses photographic instrumentation were reports on the interpretation uncertainties, information content, resolution limits, and even on the economic savings resulting from high-speed photography.

The technical papers program was for practical purposes complete and in order as published in the September *Journal*, pp. 609-682. The Final Program also showed the Session-opening short films, Session Chairmen, and the exact delivery time for each paper.

An atypical Session, but one of unusual popular interest, took place Friday evening and consisted of films showing medical and biological applications of high-speed photography. The Session opened with a film on Blood-Cell Measurement presented by A. M. P. Brookes, Dept. of Engineering, University of Cambridge, for Dr. P. A. C. Monro, Anatomy School, University of Cambridge, England. A film on High-Speed Photography in Medical Research by E. S. Gurdjian, H. R. Lissner and L. M. Thomas, neurological surgeons, of Detroit, was presented by Dr. Thomas. One sequence of the film showed a human cadaver dropped onto a sheet of plate glass, with records obtained of the fall at 16 frames/sec and again at 1500 frames/sec. The audience could see quite plainly the breaking of the glass and the movements of the head striking the glass. Some interesting points about rigor mortis were brought out during the discussion.

Irving Rehman, a consultant to the Oceanic Research Division of the Naval Ordnance Test Station, presented a film on Photographic Problems, Techniques and Instrumentation in Sea Animal Locomotion Studies. The sea animal chosen for study was the porpoise, an animal of almost alarming intelligence. Trained to swim upon signal through a long, narrow, shallow tank, the porpoise was photographed by high-speed cameras which recorded velocity, acceleration, drag, behavior patterns and characteristic segmental and sequence movements.

An extremely interesting film presented by Eric Lucey of the Dept. of Animal

Genetics, University of Edinburgh, Scotland, showed motion-pictures of vocal cords.

Films, Session Opening Short Subjects

In addition to the films shown as part of the Technical Sessions, an extraordinary and appropriate collection of short films shown at the beginning of various Sessions was a tribute to the devoted efforts and ability of the Associate Program Chairman in Charge of Film Showings, James A. Moses.

The Monday morning Session was opened with the showing of two short films: *Living in Space*, a 13-minute color film by Aero-Space Division of Boeing Airplane Co.; and *Space Pioneer*, a 10-minute production by the U.S. Information Agency.

An especially impressive and delightful film—*Donald in Mathmagicland*—preceded the Monday afternoon Session. Produced by Walt Disney, this 27-minute film has gained wide acclaim as “poetic,” “original,” and as “visual excitement.” The Tuesday morning session was preceded by a 10-minute film produced by Convair Astronautics, *High-Speed Cineradiography*.

A timely and extremely impressive color film, *Count Down at White Sands*, was shown preceding the Tuesday afternoon Session. This film was produced by the U.S. Army Signal Missile Support Agency, White Sands Missile Range, N.M. Two extraordinary films, both with philosophical overtones, were shown on Wednesday: *T Plus Infinity*, produced by the Missiles and Space Division of Lockheed Aircraft Corp., was shown Wednesday morning; and *Day Before Tomorrow*, a 24-minute color film was shown Wednesday afternoon. This film was produced by the Ballistic Research Laboratories, Aberdeen, Md. Another film produced at the White Sands Missile Range was shown Thursday morning—a highly technical and informative film, *Photo-Optics at White Sands*, is a 12-minute color film. Shown before the Thursday afternoon Session was *Schlieren*, a 19-minute film in color, a production of the Shell Oil Co.

Another film on science, shown before the Friday morning Session, was *Solids in the World Around Us*, a 14-minute color film produced by the Central Scientific Company of Chicago.

Another strange, not exactly “off-beat,” but highly original film was *The Revealing Eye*, shown preceding the Friday afternoon Session. This is a 19-minute color film produced by the Shell Oil Co.

The wonderful Walt Disney film, *Mysteries of the Deep*, was shown before the Friday evening Session. This 24-minute film is in Technicolor. The Saturday morning Session was preceded by an informative and technically excellent film, *Principles of Digital Communications*, a 16-minute production by Calvin Productions, Inc.

The film scheduled before the final (Saturday afternoon) session was *The High-Speed Photography of Liquid/Solid Impact* produced by Laboratory for the Physics and Chemistry of Solids, Cavendish Laboratory, University of Cambridge, England.

A special showing of *Harvest Time in the Pacific Northwest* was arranged on Saturday afternoon. This was an example of cinematography to show modern farm combines working on the steep slopes of the rich wheat-lands of Washington, Oregon and Idaho. It is an 18-minute film in color produced by Reid H. Ray Film Industries.

Ceremonies and Entertainment

On Sunday afternoon two films were shown, a full-length feature, *I Aim at the Stars*, and a half-hour film, *Man in Space*. The feature film, produced by Columbia, is based on the life of Wernher von Braun, world-famous rocket scientist. It was filmed in Munich and had its world premiere there. The short film was produced by Walt Disney. It combines live action and animation to dramatize suggested methods of getting Man into Space, including demonstration in detail of the launching of an Earth satellite.

The official opening of the Congress took place Monday evening with addresses of welcome followed by a reception. Guest Speaker was Crawford H. Greenewalt, President, E. I. du Pont de Nemours & Co. who, in his spare time from running the du Pont Company, has gained wide fame for his photographs of humming birds and insects in flight. He is the author of a book, recently published by Doubleday & Co. Entitled *Hummingbirds*, it is lavishly illustrated with many astonishingly beautiful photographs. He is also a contributor to *National Geographic Magazine*. A friendly, informal talk by Mr. Greenewalt was illustrated by a film. A paper by W. O. S. Johnson in the July 1960 issue of the *Journal* (pp. 485-488) acknowledges the “generous assistance” of Mr. Greenewalt, for whom one of the two cameras described in the paper was originally produced. The camera built for Mr. Greenewalt, a 16mm high-speed camera, was first built for use in studying the flight of birds.

The Fifth Congress “party circuit” was unusually noteworthy, not only in terms of the variety of entertainment offered the Delegates and other distinguished persons attending the Fifth Congress, but also for the formal occasions and the “fun-type” events. The first important social event was the reception which took place Monday evening in the Florentine Foyer, after Mr. Greenewalt’s talk.

The following evening (Tuesday) was given over to the Awards Session, reported in later pages of this issue of the *Journal*. A special part of that evening was an entertaining and enlightening presentation of “Muscles to Missiles” by J. Lewis Powell of the office of the Assistant Secretary of Defense. Wednesday evening was fun night: a charmingly informal evening planned for relaxation and amusement was highlighted by a floor show given by top entertainers supported by an 11-piece orchestra under the direction of Jack Minovich.

The Fifth International Congress dinner was the main event for Thursday night, preceded by a cocktail party. The same careful planning that made previous social events so outstandingly successful resulted in a dinner of consequence. Following the dinner the guests were entertained by the U.S. Army Chorus of

35 male voices, under the direction of Captain Samuel Laboda.

A Farewell Party was given Friday evening. This was an informal gathering at which old friends met to strengthen the ties of friendship and new friends made plans for the future.

Interspersed with the main social events were tours and special occasions planned for the ladies. One of the most successful of these occasions was a three-hour Embassy Tour, during which the group was received at the Embassy of Israel and the Embassy of Japan. Embassy staff members welcomed the ladies and conducted them on a tour of the buildings. Many of the tour members commented on the atmosphere of graciousness and hospitality at both Embassies. The schedule allowed time for sightseeing by individuals or small groups on a basis of personal preference. With so much to see and so many spots of historic interest to visit in Washington, many of the ladies described themselves as "thrilled" with the visit.

Registration

Registration began early with a very heavy pre-registration and also a large registration beginning at 2.00 P.M. on Sunday. Including those attending the Equipment Exhibit, described below, over 2000 registered at the Congress. Besides the National Delegates, substantial numbers of visitors traveled to the Congress from 18 foreign countries, the largest contingents coming from England (32), France (22) and Germany (19).

Congress registrants received a plastic briefcase which contained working materials, the Final Program and information about Washington. Special enclosures were a *Bibliography on High-Speed Photography*, compiled by Elsie L. Garvin and distributed by courtesy of the Eastman Kodak Co.; and the SMPTE Reprint Volume 1, Series II, of "Instrumentation and High-Speed Photography," a 187-page book.

Distinguished Foreign Visitors

Lending excitement to the total picture of the Fifth Congress were numbers of



At dinner with the guest speaker before the Congress Opening. Front row, left to right: Harold E. Edgerton, Massachusetts Institute of Technology; Wilton R. Holm, Secretary; Crawford H. Greenewalt, President, E. I. du Pont de Nemours & Co.; Norwood L. Simmons, President; Dr.-Ing. Hubert Schardin, German-French Research Institute. Back row: Reid H. Ray, Convention Vice-President; Ethan M. Stifle, Financial Vice-President; G. Carleton Hunt, Treasurer; Glenn E. Matthews, Editorial Vice-President; Paul E. Klopsteg, Chairman of the Board of Directors, American Association for the Advancement of Science; John W. Servies, Executive Vice-President; Deane R. White, Engineering Vice-President; Garland C. Misener, Sections Vice-President.

distinguished foreign visitors, many of them internationally known for their scientific achievements.

One of the most interesting of these visitors was Mlle. Marie Merle of the Centre de Recherches Scientifiques, Industrielles et Maritimes de Marseille, France. Although many women have made many significant contributions in many branches of science, a scientist of the importance of Mlle. Merle in this particular field is still sufficiently unusual to be worthy of note. Mlle. Merle is co-author with F. Canac of a paper on "A Study of the Structure and the Ultrasonic Emission of a High-Speed Air Jet With an Ultra-High-Speed Electronic Camera," which was presented during the Session on Applications — Flow Dynamics, held Saturday.

Mention of a few other distinguished

foreign visitors is made on a "spot check" basis to set forth examples that may be representative of the type of achievement and recognition accorded the many scientists at the Fifth Congress from countries other than the United States.

One visitor, who might be described as a "veteran" of High-Speed Congresses, was W. D. Chesterman of the Royal Naval Scientific Service, who served as an active and extremely successful organizer of the Third High Speed Congress held in London. He is best known as an authority on flash tubes and underwater applications of high-speed photography and has conducted extensive research in this field. He is Chairman of the United Kingdom Committee on High-Speed Photography and is the author of a well-known treatise, *Photographic Studies of Rapid Events*.

Another distinguished visitor from Great



The high table at the Banquet in Honor of Foreign Delegates. Left to right: Glenn E. Matthews, Editorial Vice-President; Mrs. Matthews; Dr.-Ing. Hubert Schardin; Mrs. Beard; D. Max Beard, 5th Congress Chairman; Mrs. Simmons; Byron Roudabush, Local Arrangements Chairman; Norwood L. Simmons, President; Mrs. Servies; John W. Servies, Executive Vice-President; Mrs. Ray; Reid H. Ray, Convention Vice-President; Mrs. Roudabush.

One of the government displays adjoining the Equipment Exhibit. Below: two of the six aisles of commercial exhibits.



Britain was John Hadland of John Hadland & Co., whose interest in high-speed photography and recognition of its importance to the progress of science has led him to take an active interest in research and promotion activities.

Government activities in Great Britain in the high-speed field were represented by a distinguished group. E. W. Walker, who is world-renowned for his work in high-voltage x-ray equipment and high-speed Kerr cells, is presently conducting research at the Atomic Weapons Research Establishment at Aldermaston, Berks, where ultra-high-speed rotating mirror cameras have been installed.

A well-known name in high-speed circles is that of Dr.-Ing. Frank Früngel, who has influenced the advancement of high-speed photography both as a science and as a business, especially in the field of stroboscopic light sources.

A distinguished visitor from France was Paul Devaux of the Laboratoire Central de l'Armement, Arcueil, France. One of the long-time great names in the high-speed field, M. Devaux told the Second High-Speed Congress, held in Paris in 1954, of research, then in the initial stage, in techniques, equipments and possible applications of high-speed photography. Continuing research engaged in by M. Devaux has resulted in the finding of solutions of many of the early problems uncovered by the previous stage of the research project.

R. J. North of the National Physical

Laboratory at Teddington, Middlesex, England, (whose Fifth Congress paper on "High-Speed Photography Applied to High-Speed Aerodynamic Research at the National Physical Laboratory," appears in the October 1960 *Journal* on pp. 711-719) is well known in high-speed and government circles for his achievements in the use of schlieren and interferometric techniques in connection with aerodynamics and wind tunnel studies.

Another visitor, Karl Vollrath of the Institut Franco-Allemand de Recherches, St.-Louis, France, has long been recognized as an able scientist specializing in this particular field.

A noted (and charming) visitor from Japan was Kiyohiko Shimasaki, Editor of *Motion Picture Engineering* (the journal of the Motion Picture Engineers Society of Japan). Representing the Japanese Society at the Convention, his three-fold activities of listening, learning and reporting were ably carried out.

Among the many "visiting neighbors" from Canada was Spencer W. Caldwell of S. W. Caldwell Co.

Besides Dr. A. I. Tchernyi, who is with the Research Laboratory of the State Optical Works, Leningrad, and was National Delegate for the Fifth Congress, the USSR sent a distinguished delegation under Nikolai Zandin as Delegation Chairman. Mr. Zandin came from the State Scientific Technical Committee, Moscow, as did Victor Baikov, Georgi Chnirman, M. Kudriashov, Juri Nesterik-

hin, Vladimir Technikrysov, Georgi Voitsekhorski and Krmian Vorazdat. Migkhat Kazimov came from the Kasahis Scientific Academy, Alma-ata, USSR.

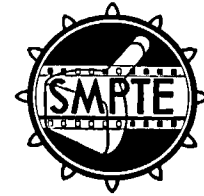
Equipment Exhibit

The special nature of the Congress, in contrast to a regular SMPTE convention, showed up prominently in the size and in the make-up of the Exhibit. The sixty booths available in the area were all filled, and a few additional ones had to be put in at the last minute for late-comers.

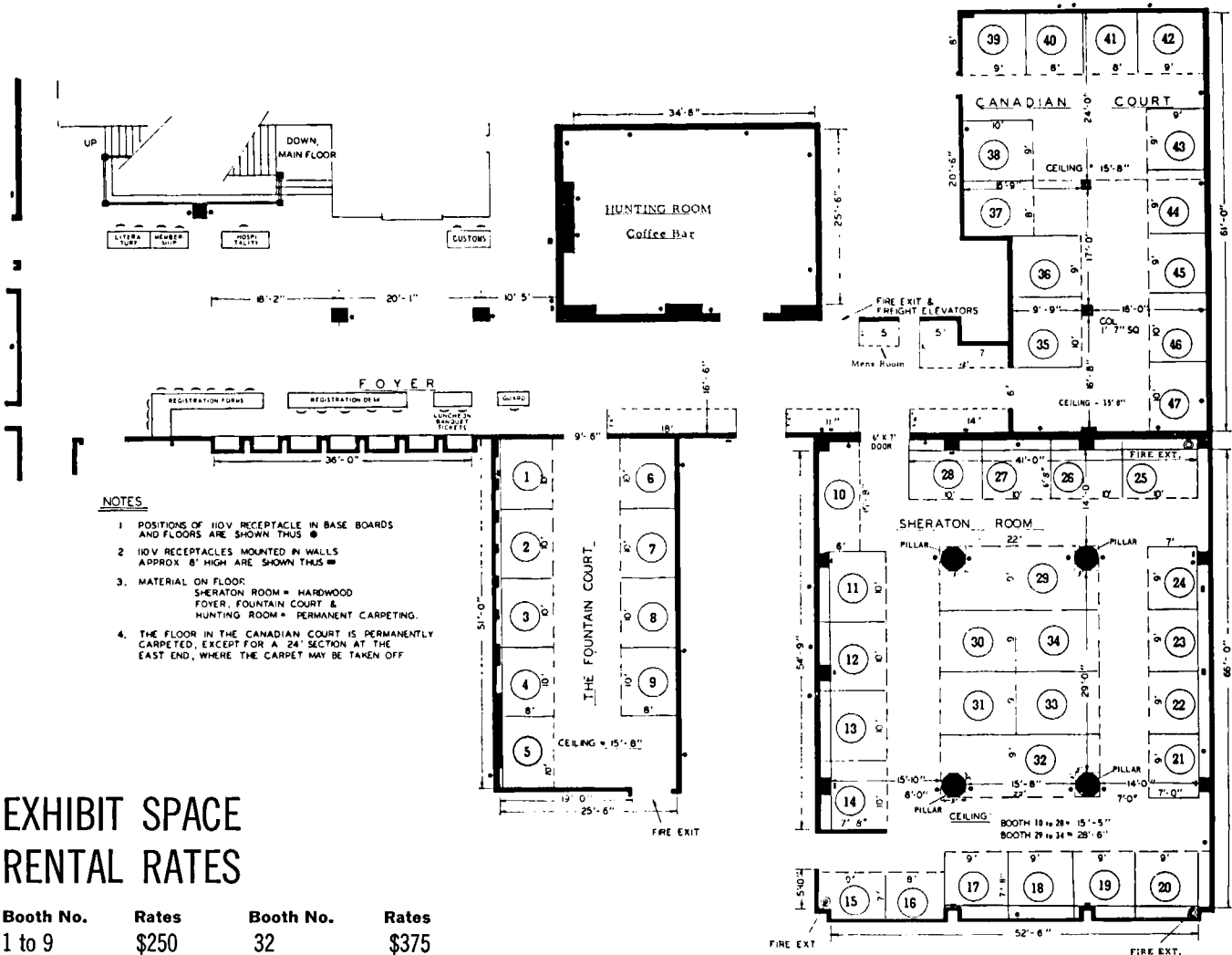
The equipment shown was probably the largest collection of laboratory, studio and field devices for photographic instrumentation ever assembled in one place. Products of major U.S. manufacturers in this specialized field, alongside many from Britain, Germany, Canada and Japan, ranged all the way from small precision components to great multi-ton interferometers. The companies represented were:

Animation Equipment Corp.
 Ansco Div., General Aniline & Film Corp.
 Arriflex Corp. of America
 Avco Corp., Research & Advanced Dev. Div.
 Barr & Stroud Ltd.
 Beckman & Whitley, Inc.
 Bell & Howell Co.
 Benson-Lehner Corp.
 Camera Equipment Co.
 Canadian Applied Research Ltd.
 Computer Measurements Co.
 Consolidated Systems Corp.
 E. I. du Pont de Nemours & Co.
 Eastman Kodak Co.
 Edgerton, Germeshausen & Grier, Inc.

Exhibit



89th SMPTE Semiannual Convention



NOTES

1. POSITIONS OF 110V RECEPTACLE IN BASE BOARDS AND FLOORS ARE SHOWN THUS ●
2. 110V RECEPTACLES MOUNTED IN WALLS APPROX. 8' HIGH ARE SHOWN THUS ■
3. MATERIAL ON FLOOR:
SHERATON ROOM = HARDWOOD
FOYER, FOUNTAIN COURT & HUNTING ROOM = PERMANENT CARPETING.
4. THE FLOOR IN THE CANADIAN COURT IS PERMANENTLY CARPETED, EXCEPT FOR A 24' SECTION AT THE EAST END, WHERE THE CARPET MAY BE TAKEN OFF

EXHIBIT SPACE RENTAL RATES

Booth No.	Rates	Booth No.	Rates
1 to 9	\$250	32	\$375
10	200	33 & 34	270
11 to 14	250	35	260
*15 & 16	150	36	250
17 to 24	250	37 to 42	240
25 to 28	260	43 to 45	250
29	385	46 & 47	260
30 & 31	270		

*Booths 15 & 16 are very small; therefore, both spaces will be rented as one unit for a total of \$260.00.

FOR RESERVATIONS:

contact the Exhibit Chairman:

KEN S. OAKLEY, Bell & Howell (Canada) Ltd.

88 Industry Street, Toronto 15, Ont.

May 7-12, 1961 • King Edward Sheraton Hotel • Toronto, Canada

Fairchild Camera & Instrument Corp.
 Field Emission Corp.
 Filmline Corp.
 Oscar Fisher Co.
 Flight Research, Inc.
 Florman & Babb, Inc.
 Dr.-Ing. Frank Früngel GmbH
 Heico, Inc.
 Karl Heitz, Inc.
 Hi-Speed Equipment, Inc.
 Hollywood Film Co.
 Philip A. Hunt Co.
 Kelvin-Hughes Ltd.
 Kenyon Products, Inc.
 L. W. Photo Products Co.
 D. B. Milliken Co.
 Minnesota Mining & Mfg. Co.
 Motion Picture Enterprises, Inc.
 Neumade Products Corp.
 Nissei Sangyo Co., Ltd.
 O'Connor Engineering Laboratories
 Photo-Sonics, Inc.
 Peterson Sales & Engineering, Inc.
 Photo Animation, Inc.
 Precision Laboratories Div.
 Prestoseal Mfg. Corp.
 Polaroid Corp.
 Sylvania Electric Products, Inc.
 Traid Corp.
 Westinghouse Electric Corp., Lamp Div.
 Wollensak Optical Co.
 Carl Zeiss, Inc.
 Zoomar, Inc.

The man responsible for organizing this impressive display, Exhibit Chairman Keith Lewis, capped the months of preparation by ensuring smooth and efficient operation all week long. Keith and his good right hand, Rosemary Butler, between them expertly juggled the innumerable details necessary for the comfort of visitors and exhibitors.

A special section had been set aside for displays by government agencies, arranged for by the Department of Defense. The Naval Ordnance Laboratory, the Naval Propellant Plant and the Army Ballistics Research Laboratory at White Sands, N.M., all had extensive exhibits of equipment and photographs.

On Wednesday morning, October 19, the Equipment Papers and Demonstrations Session, where exhibitors had an opportunity of presenting some of their new products, drew an unusually large audience. The session was very ably conducted by Harry Teitelbaum of Hollywood Film Co., an exhibitor himself as well as SMPTE Convention Vice-President Elect. Representatives of the following companies made brief presentations:

Carl Zeiss, Inc.: Zeiss Interferometer
Beckman & Whitley, Inc.: Model 339 Continuous Writing Streak Camera
Benson-Lehner, Inc.: Puppet Timing System; Ultra-High-Speed Framing Camera
Traid Corp.: Traid 180° Lens for 35mm Cameras and Photo-Sonics 16mm High-Speed Prism Camera
Eastman Kodak Co.: New Color Films for High-Speed Motion-Picture Photography
Wollensak Optical Co.: Lightweight Reversal-Negative 16mm Film Processor; Fastax-Fastair High-Speed Camera Improvements
Polaroid Corp.: Polaroid-Land Film Products with 10-sec Development
AnSCO Div.: AnSCO Automatic Recording Microdensitometer
Florman & Babb, Inc.: Acmade Mark II Editor
Karl Heitz, Inc.: Kinoptik Lenses
L. W. Photo Products, Inc.: L-W Industrial-

ist 16mm Stop-Motion Instrumentation Projector

Nissei Sangyo Co., Ltd.: Hitachi High-Speed Motion-Picture Camera

Prestoseal Mfg. Corp.: 16-35-70mm Butt-Weld Splicer for Intermixed Material

Activity and interest were high in the Exhibit area each day of the Congress and many individuals who were not attending the Congress came from considerable distances to see the equipment. By the end of the week the number of visitors had reached 1000, in addition to registrants at the Congress. For those who may be interested, a list of these Exhibit visitors can be obtained on request from SMPTE headquarters.

Symposium on High-Speed Processing

Immediately preceding the Fifth Congress, on October 14-15, a two-day Symposium covering all phases of high-speed processing was conducted by the Society of Photographic Scientists and Engineers at the Shoreham Hotel. The importance of, and interest in this specialized field was shown by the large registration — more than 500.

Specific areas of the broad, general topics of fundamental studies, fast and simple methods, new fast processing materials and advances in equipment design were explored in 26 papers presented during four Sessions. The Friday Morning Session was opened by an invited paper by George T. Eaton on "The Revolution in Photographic Processing." Another invited paper, by Edward K. Kaprelian on "Future Military and Commercial Applications of Short Access Time Photography," was presented at the Saturday Morning Sessions. Other papers discussed new equipments and processes specifically and in detail.

The papers are planned for publication by the SPSE in its journal, *Photographic Science and Engineering*, Box 1609, Main Post Office, Washington, D.C.

Proceedings

All of the papers presented at the Fifth Congress will be reviewed by the Board serving under Dr. J. S. Courtney-Pratt, Editorial Chairman for the *Proceedings*. Papers will be printed in English with abstracts in French and German. The Discussions (questions and answers) which followed presentations of the papers will be published in the *Proceedings*. The copy for the Discussions was gathered and supervised during the Congress by Miss Lisel Löper from the Institut Franco-Allemand de Recherches, St.-Louis, France. The discussions were also recorded in three languages on tape as an additional guide for preparing the *Proceedings* copy.

A considerable number of the papers will appear in the *SMPTE Journal* before publication of the *Proceedings*. These are chosen from the Sessions on other than special applications.

The Editorial Board for the *Proceedings* is:

Max Beard, U. S. Naval Ordnance Laboratory
R. M. Betty, Lockheed Missiles
Berlyn Brixner, Los Alamos Scientific Laboratory, Univ. of California
W. E. Buck, Boulder, Colo.
H. E. Edgerton, Massachusetts Institute of Technology

Carlos Elmer, Traid Corp.
Lincoln L. Endelman, Martin-Orlando
A. M. Ericson, U. S. Naval Ordnance Laboratory
David C. Gilkeson, Wollensak Optical Co.
William C. Griffin, U. S. Naval Ordnance Test Station
Guy Hearon, Benson-Lehner Corp.
John H. Helt, Hett Associates
Thomas E. Holland, Beckman & Whitley, Inc.
W. G. Hyzer, Janesville, Wis.
Sigmund J. Jacobs, U. S. Naval Ordnance Laboratory
W. O. S. Johnson, E. I. du Pont de Nemours & Co.
Karl Leistner, U.S. Army Signal Research and Development Laboratory
Glenn E. Matthews, Eastman Kodak Co.
Albert May, U.S. Naval Ordnance Laboratory
Richard O. Painter, General Motors Proving Ground
F. H. Perrin, Eastman Kodak Co.
A. C. Robertson, Eastman Kodak Co.
Th. W. Schmidt, Office of Ordnance Research
Morton Sultanoff, Aberdeen Proving Ground
Vernon Taylor, U.S. Public Health Service
L. R. Teeple, Beckman & Whitley, Inc.
H. I. Trenary, General Electric Co.
Willett R. Wilson, Westinghouse Electric Corp.
A. M. Zarem, Electro-Optical Systems, Inc.

Publication is expected by mid-1961; the exact date of publication and the price of the volume will be announced as soon as the final schedule is laid down. Many requests for information about the *Proceedings* have been received at SMPTE Headquarters and a Tentative Order Form is available upon request to facilitate indications of interest.

A number of inquiries have also been made about the published proceedings of previous Congresses. In some instances, papers presented at the Fifth Congress described the continuation of experiments or the results of research first described in papers presented at previous Congresses. These Congress Proceedings have been published:

First International Congress on High-Speed Photography (Symposium at the 72d SMPTE Convention, October 1952, Washington, D.C.): All available papers were published in *High-Speed Photography, Volume 5*, SMPTE, New York, 1954. 359 pp. 6 × 9 in. Price \$4.50. Papers are printed in English.

Second Congress (2ème Congrès International de Photographie et Cinématographie Ultra-Rapides), September 1954, Paris: *Proceedings (Photographie et Cinématographie Ultra-Rapides)* published (1956) by Dunod, 92 rue Bonaparte, Paris 6. 455 pp. 8½ × 11½ in. Price \$17.25. Papers are printed in the language in which they were given, with summaries in English, French and German.

Third Congress on High-Speed Photography, September 1956, London: *Proceedings* published (1957) by Butterworths Publications Ltd., 88 Kingsway, London WC2; in U.S. by Academic Press Inc., 111 Fifth Ave., New York 3. 417 pp. 9½ × 6 in. Price \$13.00. Papers are printed in English.

Fourth Congress (IV. Internationaler Kongress über Kurzzeitphotographie und Hochfrequenzkinematographie), September 1958, Cologne: *Proceedings (Kurzzeitphotographie)* published (1959) by Verlag Dr. Othmar Helwich, Darmstadt, Hoffmannstr. 59. 340 pp. 7 × 10 in. Price \$22.00. Papers are printed in the language in which they were given, with summaries in English, French and German.