tions including books and technical papers, a number of these being published in the Society's *Transactions* and *Journal*. One of his better known books is *The Theory of the Photographic Process*, published in 1942 and revised in 1954. His long and distinguished professional career in the United States began in 1912 when he left England, his native country, to join Eastman Kodak Co. where he first organized a research department. He became a vice-president in 1934. He retired in 1955. An extensive Biographical Note, written on the occasion of his retirement, by Glenn E. Matthews, was published in the January 1956 *Journal* (pp. 59-60).

The son of a Wesleyan minister, Dr. Mees was born at Wellingborough, England, May 6, 1882. He studied at English schools and St. Dunstan's College. In association with Samuel E. Sheppard, he engaged in research at University College, London, where he was granted the degree of Doctor of Science in 1906.

During the following six years he was partner and joint managing director of Wratten & Wainwright, a photographic firm of Croydon, England, and in 1912 he accepted George Eastman's invitation to join the Kodak company.

He is particularly noted for his work in the development of the infrared photographic plate which greatly advanced the use of photography in astronomical research. He was also interested in the development of practical and inexpensive equipment for amateur motion pictures and home use.

During his career Dr. Mees received numerous scientific awards. A few of the more noteworthy of these awards were the SMPTE Progress Medal, the Progress Medal of the Royal Photographic Society of Great Britain, the Medal of the Franklin Institute, the Janssen Medal of the Société Française de Photographie, the Henry Draper Medal of the National Academy of Sciences, the Progress Medal of the Photographic Society, the Rumford Medals of the American Academy of Arts and Sciences, and the Adelskold Medal of the Swedish Photographic Society.

He was an Honorary Fellow of the Royal Photographic Society, A Fellow of the Royal Society of London (the highest award to scientists of the United Kingdom), an Honorary Fellow of the Photography Society of America, an Honorary Master of Photography of the Photographers Association, and Honorary Member of the Optical Society of America, and a member of a number of other organizations.

He became a member of the Society shortly after it was founded. His paper on "Color Photography" appears in the May 1922 issue of the *SMPE Transactions*, the first of a number of significant papers published in subsequent issues.

section reports

The Rochester Section meeting report for May 19 (June 1960 *Journal*, p. 454) stated that Richard Burkhart received First Prize in the four-year student division for the paper "Development Determination by Infrared Densitometry." Co-author of the paper, who shared in the First Prize, is Conrad A. Strub whose name was inadvertently omitted from the report of the meeting.

The San Francisco Section met on August 16 at the Ampex Corp. plant in Redwood City to hear R. A. Isberg describe the S-3300B Tape Duplicator.

This recorder was designed particularly for the production of $7\frac{1}{2}$- and $3\frac{3}{4}$-ips four-track stereo tapes. The master reproducer operates at either 120 or 60 ips and the slaves operate at 60 or 30 ips. This new duplicating speed is twice as fast as that of previous models of Ampex duplicators. The cost of the production of these tapes has been reduced by the savings in the amount of tape required for a given length of recording and by improvements in tape duplicating equipment. Superior quality

course of these hydrodynamic and physiologic tests. A motion picture of the test facility, equipment (timing and photographic, etc.) and some of the results obtained are shown.

On a obtenu simultanément des données de chronométrage extrêment précises.

On a mis en lumière par des études de la structure anatomique du marsouin, de la baleine et de certains poissons à nage rapide, certaines particularités de ces animaux qui ont nécessité des études physiologiques de leur circulation vasculaire dans le but de déterminer l'influence de cette dernière sur le contrôle des nappes limitrophes. On a également recueilli des données acoustiques au cours de ces essais hydrodynamiques et physiologiques. Il est présenté un film cinématographique montrant les installations utilisées pour les essais, l'équipement mis en oeuvre (photographique et de chronométrage, etc.) et une partie des résultats obtenus.

schnell schwimmender Fische zeigten Besonderheiten, welche physiologische Studien der Blutzirkulation erforderten, um deren Einfluss auf die Grenzschichtenregelung und das Strömungsfeld festzustellen. Im Lauf dieser hydrodynamischen und physiologischen Versuche wurden auch akustische Daten aufgenommen. Es wird ein Kinefilm gezeigt in dem man die Versuchsanlage, die Ausrüstung (für Zeitmessung, Photographie usw) und einige der erzielten Resultate sehen kann.

A nine-minute film: presented by D. L. Murray Thomas, associated with Dr. E. S. Gurdjian in neurological surgery, Detroit, Mich.
A film: presented by Eric Lucey, Dept. of Animal Genetics, University of Edinburgh, Scotland

9:00 P.M. Farewell Party

OCTOBER 22 — SATURDAY 9:00 A.M. SESSION: Applications — High-Speed Flow Dynamics

A Study of the Structure and the Ultrasonic Emission of a High-Speed Air Jet With an Ultra High-Speed Electronic Camera

F. Canac and M. Merle, Centre de Recherches Scientifiques, Industrielles et Maritimes de Marseille, France

A high-speed air jet creates an ultrasonic acoustic field which can be visualized by the schlieren method. In this manner certain relations between the emitted frequency and the generating pressure can be determined. Besides, the shadowgraph method supplies, for a given pressure, two types of information according to the duration of the exposure: 1) With exposures of the order of one second one observes, by integration, a characteristic cellular structure of a pressure interval; 2) with exposures of the order of one millionth of a second one observes, at a given moment, this structure and — using an ultra high-speed electronic camera (e.g. at 10^{-6} sec.) — a periodic oscillation of the jet is shown. It is found that this period is the same as that of the emitted frequency. If each single frame of the electronic camera is repeated a number of times on a film, it is possible to project all the details of these phenomena in slow motion.

Etude de la structure et de l'émission ultrasonore d'un jet d'air à grande vitesse au moyen d'une caméra electronique ultra-rapide

F. Canac et M. Merle, Centre de Recherches Scientifiques, Industrielles et Maritimes de Marseille, France

Un jet d'air à grande vitesse crée un champ acoustique ultrasonore. La méthode des stries permet de le visualiser. On détermine ainsi certaines relations entre la fréquence émise et la pression génératrice. D'autre part, la méthode d'ombrographie donne, pour une pression donnée, deux types de renseignements suivant la durée de la pose: (1) pour des poses de l'ordre de la seconde on observe, par intégration, une structure cellulaire caractéristique d'un intervalle de pression; (2) pour des poses de l'ordre du millionième de seconde, on observe, à un instant donné, cette structure et, en utilisant une caméra électronique ultra-rapide (au 10^{-6} s par exemple) on met en évidence une oscillation périodique du jet. On constate que cette période est égale à celle de la fréquence émise. En répétant au préalable sur un film un certain nombre de fois chaque vue séparée de la caméra électronique, on peut projeter au ralenti ces phénomènes dans tous leurs détails.

Untersuchungen der Struktur und der Ultraschallwellen eines Luftstroms grosser Geschwindigkeit mittels einer Höchstgeschwindigkeits-Elektronenkamera

F. Canac und M. Merle, Centre de Recherches Scientifiques, Industrielles et Maritimes de Marseille, Frankreich

Ein Luftstrom grosser Geschwindigkeit ruft ein Feld von Ultraschallwellen hervor, das durch die Schlierenmethode vorstellbar gemacht werden kann. Auf diese Weise lassen sich gewisse Beziehungen zwischen der ausgesandten Frequenz und dem verursachenden Druck bestimmen. Anderseits gibt das Verfahren der Schattenphotographie für einen gegebenen Druck zwei verschiedene Typen von Angaben, je nachdem wie lange die Belichtungszeit ist: Bei Aufnahmen von ungefähr einer Sekunde lässt sich eine charakteristische Zellenstruktur eines Druckintervalls beobachten; bei Aufnahmen von einer Millionstel Sekunde kann man, zu einem gegebenen Moment, diese Struktur beobachten und eine periodische Oszillation des Strahls darlegen, indem man eine Elektronenkamera höchster Geschwindigkeit (z.B. von 10^{-6} s) verwendet. Man stellt fest, dass diese Periodenzahl der ausgestrahlten Frequenz gleich ist. Indem man jede einzelne Aufnahme der Elektronenkamera auf einem Film mehrfach wiederholt, kann man diese Erscheinungen in allen ihren Einzelheiten in Zeitlupenform auf den Schirm werfen.

Photographic Investigation of a Pulsating Jet Impinging on a Heated Plate

G. F. Cochrane, Jr., and R. G. Nevins, State University, Manhattan, Kansas

The purpose of this investigation was to develop a technique to obtain photographic records necessary to check the validity of approximate equations involving arbitrary assumptions which are used to describe the thickness of the thermal boundary layer formed when a pulsating air jet impinges upon a flat, heated plate.

To detect the temperature gradients, which vary with time, a multiple slit-grating schlieren apparatus was used. For recording the temperature gradients made visible by the schlieren apparatus, a high-speed motion-picture camera was used. Films were obtained which show the

L'investigation photographique d'un jet pulsatoire au point d'impact avec une plaque chauffée

G. F. Cochrane, Jr., et R. G. Nevins, State University, Manhattan, Kansas

Le but de cette investigation a été de mettre au point une technique permettant d'obtenir les enregistrements photographiques nécessaires pour vérifier la validité d'équations approximatives impliquant des hypothèses arbitraires qu'on emploie pour définir l'épaisseur de la couche-limite thermique formée quand un jet d'air pulsatoire se heurte contre une plaque chauffée à surface plane.

Pour déceler les variations de température, qui sont fonction du temps, on a utilisé un appareil schlieren avec treillis à fentes multiples. Pour l'enregistrement des variations de température

Photographische Untersuchung eines pulsierenden Strahls der auf eine heisse Platte auftrifft

G. F. Cochrane, Jr., und R. G. Nevins, State University, Manhattan, Kansas

Es war der Zweck dieser Untersuchung eine Methode zu finden, mittels welcher man die nötigen photographischen Aufzeichnungen machen kann, um die Richtigkeit ungefährer Gleichungen zu prüfen, die mit willkürlichen Annahmen gemacht wurden und die dazu dienen die Dicke der thermischen Grenzschicht zu beschreiben, die gebildet wird, wenn ein pulsierender Luftstrom auf eine flache geheizte Platte auftrifft.

Um die Temperaturgradienten zu finden, die zeitveränderlich sind, wurde ein Mehrfachschlitz-Gitterschlierenapparat benützt. Um die

stereophonic tapes may be purchased at prices that are comparable with stereophonic disks.

Also on display for our inspection was the new MX-35 four-position two-channel mixer with switching facilities for stereo and monophonic applications. A question-and-answer period followed the formal presentation by Mr. Isberg.—Frank Mansfield, *Secretary-Treasurer*, 57 Stoneyford Ave., San Francisco 24.

The San Francisco Section met on July 12 at KGO-TV Studios with an attendance of 27. Guest speakers were Charles Coates, Fairchild Camera and Instrument Co., and E. Carroll Moran, Brooks Camera Store, both of whom discussed the Fairchild Cinephonic 8mm Camera and Projector.

Mr. Coates explained the operation of the camera and projector and stated that it was developed to bring to the amateur a new device which will help him to obtain more professional results. This camera is the first of its kind using 8mm prestriped magnetic track, which allows a single-system lip-sync sound recording to be made. Two films were projected using this system and sound recordings with the audience participating were made.—Frank Mansfield, *Secretary-Treasurer*, 57 Stoneyford Ave., San Francisco 24.

The Washington Section met on June 11 at Colonial Williamsburg, Virginia, with an attendance of more than 40. Speakers were Loren L. Ryder, President, Magnetic Sales Corp., Hollywood, who discussed "Methods of Simplifying and Improving Synchronous Sound Handling"; Arthur L. Smith, Harry Patton, David E. Strom and John C. Goodbody, all of Colonial Williamsburg, who told of "The Use of Audio Visual in Telling the Story of Colonial Williamsburg."

The first part of the meeting included a get-together dinner at the Williamsburg Lodge, which was very successful. Following the introduction of guests, the motion picture, *History Brought to Life*, was shown. The late Cecil B. DeMille appeared in and narrated this film which was used to set the stage for the meeting. Mr. DeMille would have been proud of the results at Williamsburg which it was our privilege to observe.

Through the efforts of Norwood Simmons and James Barker we were fortunate to have Mr. Ryder with us. He supervised the location sound recording for *Williamsburg — Story of a Patriot*, and his presence was most appropriate. Earlier comments by Mr. Ryder in his article "Economic Aspects of Utilizing New Engineering Developments" (SMPTE *Journal*, February, 1956) were very interesting in view of his paper at this meeting. Mr. Ryder brought us up to date on the newer methods of sound recording and especially his new system. In his paper he described a sync generator mountable on any movie camera 8, 16 or 35mm, amateur or professional. The electric signal generated is recorded by echelon synchronizing magnetic heads recording on the outer edges of the tape in phase but in echelon. This does not interfere with the sound signal recorded on the standard position(s). This in general was understood.

The audience was impressed by the speaker's playback system and the demonstration. With the new system it is possible to use either a 16 mm or 8mm projector. The playback tape recorder is fitted with the Ryder Re-synchronizer which has the magnetic heads to play back the control frequency recorded on the track. This signal, is fed to a separate amplifier capable of delivering 60 w at 115 v, is used to power the synchronous motor used to drive the projector. (This motor is added to the projector. The existing projector motor is used to furnish forced air to ventilate the lamphouse.) The original projector motor is disconnected. By threading tape start and film picture start marks in their respective proper places, the two machines will automatically start together since the amplified control frequency on the tape will furnish the power to the synchronous motor on the projector. By shifting the position slowly of the tape "Re-synchronizer" the projector altered during operation. Mr. Ryder continued by describing the many combinations and results which could be obtained with this equipment.

Interest was certainly generated by this discussion. Since the meeting there have been several inquiries regarding these devices.

That every one of the Colonial Williamsburg audio-visual staff had an intense pride in their work was very evident. Arthur L.

temperature gradients in the direction perpendicular to the heated plate and their variation with time.

rendues visibles par l'appareil schlieren, on a employé une ciné-caméra à grande vitesse. Les films obtenus montrent les variations de température dans un sens perpendiculaire à la plaque chauffée et leur évolution en fonction du temps.

Temperaturgradienten aufzuzeichnen, die durch den Schlierenapparat sichtbar gemacht wurden, verwendete man eine Hochgeschwindigkeits-Kinekamera. Es wurden Aufnahmen erzielt, welche die Temperaturgradienten in der senkrecht zur geheizten Platte liegenden Richtung und ihre zeitmässigen Schwankungen zeigen.

High-Speed Photography of Liquid/Solid Impact

J. H. Brunton, University of Cambridge, England

A study has been made using high-speed photographic methods of the phenomena occurring when a solid surface is struck by a small mass of liquid moving at very high speeds. An apparatus has been constructed for projecting small (1-mm diameter) cylinders of water at solid surfaces at velocities up to 1000 m/sec. The flow of the liquid mass and the break-up of the solid target on impact have been photographed, using a Beckman & Whitley rotating mirror camera (Model 189) and also a 6-spark Cranz-Schardin system. Schlieren and photoelastic techniques have been used to determine the stress distribution within the target material during impact.

By using these methods it has been possible to show that most of the deformation of the target is due to compressible behavior within the colliding liquid mass. Failure due to the shearing action of liquid flowing over the surface of the target and to the reflection and interference of stress waves in the target itself is also considered.

La photographie à grande vitesse de l'impact entre un liquide et un solide

J. H. Brunton, University of Cambridge, Angleterre

On a eu recours aux méthodes de photographie à grande vitesse pour étudier les phénomènes qui se produisent lorsqu'une surface solide est frappée par une petite masse de liquide se déplaçant à de très grandes vitesses. On a construit un appareil permettant de projeter de petits cylindres d'eau (d'un diamètre de 1 mm) contre des surfaces solides à des vitesses allant jusqu'à 1000 m/s. On a photographié le déplacement de la masse liquide, ainsi que la désagrégation de la cible solide lors de l'impact, au moyen d'une caméra à miroir tournant Beckman & Whitley (Modèle 189), et aussi d'un système Cranz-Schardin à 6 étincelles. On a utilisé les techniques schlieren et photoélastique pour déterminer la répartition des efforts et des tensions au sein de la matière de la cible au moment de l'impact.

On a réussi, au moyen de ces méthodes, à démontrer que la majeure partie de la déformation de la cible est due à un phénomène de compression au sein de la masse liquide entrant en collision. L'auteur examine aussi les cas d'échec attribuables à l'action de cisaillement de l'écoulement liquide sur la surface de la cible et à la réflexion ou interférence d'ondes de tension dans la cible proprement dite.

Hochgeschwindigkeits-Photographie des Auftreffens von Flüssigkeiten auf Festkörper

J. H. Brunton, University of Cambridge, England

Unter Anwendung von photographischen Zeitdehner-Methoden wurde eine Untersuchung der Phänomene vorgenommen, die sich abspielen, wenn eine kleine Menge einer sich mit grosser Geschwindigkeit bewegenden Flüssigkeit auf eine feste Oberfläche auftrifft. Es wurde ein Apparat gebaut, um kleine Zylinder von Wasser (1 mm Durchmesser) mit Geschwindigkeiten bis zu 1000 m/s gegen feste Flächen zu treiben. Das Strömen der Flüssigkeitsmenge und das Zerbrechen des festen Zieles beim Aufschlag wurde photographiert, indem man eine Beckman and Whitley Rotationsspiegelkamera (Modell 189) und auch eine 6-Funken Cranz-Schardin-Anlage verwendete. Um die Beanspruchung und Spannungen zu bestimmen, die sich innerhalb des Zielmaterials beim Aufschlag verteilen, wurden Schlieren- und photoelastische Methoden angewendet.

Ihre Verwendung ermöglichte es zu zeigen, dass der grösste Teil der Deformierung des Zieles auf das kompressible Verhalten der aufschlagenden flüssigen Masse zurückzuführen ist. Es wird auch die Möglichkeit des Brechens infolge der Scherwirkung der über die Zieloberfläche strömenden Flüssigkeit und der Reflexion und Interferenz von Spannungswellen im Ziel selbst betrachtet.

Photomicrographic Device Applied to the Study of Atomization of Liquid Fuels Within a Combustion Chamber

Willy Diamant, Champigny s/Marne, France

Critical illumination is correctly obtained by means of a very luminous vertical slot of variable width through which the image of any part of the jet is obtained. A microscope carries a precisely balanced rotating mirror whose speed is variable. If the sweeping speed of the mirror is adjusted to that of the droplets moving in the field of observation, their image in the plane of the eyepiece will be immobile, and then their photography, too, will be possible. The optical elements have been carefully determined, for the lowering of contrast is caused, to a high degree, by optical aberrations. It is, on the other hand, maximum contrast which permits the best perception of the droplets.

The experimental part concerns the mechanics of the atomization. It is known that high pressures are directly related to very small droplet diameters. The research made has shown that the phenomenon of resolution of the jet takes place in a zone near the orifice of the injector and also, that from this origin on, the relative speed of the jet with reference to the air plays a fundamental role. This prime factor is localized in what is known as the "passage layer." A toric chamber is arranged around the jet. An interior channel distributes compressed air to the interior of a conical nozzle which extends from this chamber. This funnel creates a very thin layer of air which moves in opposite direction to the jet and whose apex meets the jet region near the nose of the injector. The

Dispositif photomicrographique appliqué à l'étude de la pulvérisation des combustibles liquides au sein d'une chambre de combustion

Willy Diamant, Société Nationale de Fonderie, Champigny-sur-Marne, France

L'éclairage critique est correctement réalisé au moyen d'une fente verticale très lumineuse, de largeur variable, dont on forme l'image dans une partie quelconque du jet. Un microscope — destiné à l'observation — comporte un miroir tournant très bien équilibré, et dont la vitesse est variable. Si la vitesse de balayage du miroir est ajusté à celle des gouttelettes, se déplaçant dans le champ objet, l'image de celles-ci est fixé dans le plan de l'oculaire. La photographie est alors également possible. Les éléments optiques ont été rigoureusement déterminés, car la baisse de contraste est liée, en grande partie, aux abérrations optiques. D'autre part, c'est le contraste maximum qui autorise la perception optimum des gouttelettes.

La partie expérimentale traite du mécanisme de la pulvérisation. On sait qu'à de grandes pressions correspondant des diamètres de gouttelettes très petits. Or, la recherche poursuivie a montré que le phénomène de résolution du jet intéresse une région voisine de l'orifice de l'injecteur, et que, de plus, la vitesse relative du jet par rapport à l'air joue un rôle fondamental dès cet origine. Ce facteur primordial est localisé dans ce qu'on appelle la "couche de passage." Une chambre torique a été aménagée autour du jet. Un canal intérieur distribue de l'air comprimé l'intérieur d'un ajutage conique prolongeant la chambre ci-dessus. Cet entonnoir engendre une nappe conique d'air très fine, dirigée en sens contraire du jet, et dont le sommet se confond avec la

Die Anwendung eines photomikrographischen Apparats zur Untersuchung der Zerstäubung flüssiger Brennstoffe innerhalb einer Verbrennungskammer

Willy Diamant, Champigny s/Marne, Frankreich

Man erhält die kritische Beleuchtung in richtiger Weise mittels eines sehr hellen Vertikalschlitzes verstellbarer Breite, wodurch man das Bild eines beliebigen Teiles des Strahls erzielt. Ein für die Beobachtung bestimmtes Mikroskop trägt einen sehr gut ausbalanzierten rotierenden Spiegel, dessen Geschwindigkeit variable ist. Wenn die Abtastgeschwindigkeit des Spiegels der Geschwindigkeit der Tröpfchen angepasst ist, die sich im Objektivfeld bewegen, bleibt deren Bild in der Okularebene unbeweglich, womit dann auch das photographieren möglich wird. Die optischen Elemente wurden sorgfältig bestimmt, denn die Senkung des Kontrasts ist grossenteils die Folge optischer Aberrationen. Anderseits ist es ein möglichst starker Kontrast der die beste Beobachtung der Tröpfchen ermöglicht.

Der experimentelle Teil behandelt die mechanische Form der Zerstäubung. Es ist bekannt, dass grosse Drücke sehr kleinen Durchmessern der Tröpfchen entsprechen. Nun haben die durchgeführten Untersuchungen gezeigt, dass die Erscheinung der Zerlegung des Strahls eine Zone betrifft, welche nahe der Düsenöffnung des Injektors liegt und dass weiterhin die Geschwindigkeit des Strahls in Bezug auf die der Luft von diesem Punkt aus eine grundlegende Rolle spielt. Dieser wichtige Faktor ist auf die sogenannte "Durchgangsschicht" beschränkt. Um den Strahl herum wurde eine toroidförmige Kammer angelegt. Ein innerer Kanal verteilt die komprimierte Luft auf das Innere einer konischen Düse, welche eine Verlängerung der erwähnten Kammer darstellt. Dieser Trichter erzeugt eine sehr dünne konische Luftschichte, die sich in entgegengesetzter Richtung zum Strahl bewegt und deren Spitze sich mit der Strahlzone nahe

Smith described the audio-visual program of Colonial Williamsburg and the need of an effective visitor orientation program. The result of this search was the use of a specially produced sound motion picture using the latest techniques and the Information Center which would contain the two theaters designed to show this orientation film which would, in sight and sound, reconstruct a period of history when Williamsburg was at its peak. He went on to describe the continuing changes in plans during construction of the Center to make use of the best of the many suggestions from leaders in the motion-picture and allied industries.

Mr. Strom made known to us the efforts of Williamsburg to make their films available and usable to schools, private industry, government, etc.

Mr. Goodbody, Vice-President, greeted us in the Information Center after we had joined a regular audience in seeing *The Patriot*. The regular audience departed and the theater was closed for the balance of the meeting. This was the first time a professional group had visited there with the primary purpose of studying the Information Center Theaters. After discussing the purposes of Colonial Williamsburg and the use there of audio-visuals, the speaker gave us some of the background material on the production of the film we had just seen. With only the SMPTE group present, Mr. Goodbody described — and because of the very interesting design of the theaters — demonstrated the many features of the auditorium while we remained in our seats.

Following this presentation, we were invited to visit what many consider the finest projection room in the world. Harry Patton and his crew of six projectionists gave a working demonstration of their ultramodern equipment — the horizontal VistaVision projectors and magnetic sound on the release print for six-channel stereophonic Todd-AO sound. We are greatly indebted to the SMPTE members at Williamsburg, not only for providing a meeting but letting us share with them the great pride they have in being a part of this art.—William W. Youngs, *Secretary-Treasurer*, 231 Mayflower Dr., McLean, Va.

SMPTE Test Films

Test films planned by the Society's technical committees and produced under the Society's exact supervision are available from the headquarters office at 55 West 42 St., New York 36. A new catalog is in preparation and will be sent upon request.

These films are used by manufacturers for testing the performance of new equipment, by television station technicians for lining up and adjusting film pickup systems, by maintenance men for "in service" maintenance of projectors and sound equipment, and by dealers for testing and demonstration equipment.

books reviewed

Lichttechnik

By Helmuth Schering. Published (1959) by Fotokinoverlag Halle, Halle (Saale), Germany. 6 by 8¼ in. 64 pp. 51 illus., 10 tables. Price DM 4.60.

This is the first in a series of German-language books under the group heading of "Kinotechnische Buecherei" to come to our attention. Each book in the series apparently covers a single, specialized portion of the motion-picture field. This particular work treats in detail of the elements between the light source and the aperture in the projector. It provides such a brief and easily understandable treatment of its subject that we now look forward with interest to the remainder of the series.

A free English translation of the compact German title might be, "The Technique of