

## Biographical Note



### Elsie L. Garvin

Miss Elsie Garvin, longtime head of the Research Library at Kodak Park Works and friend and colleague of hundreds of laboratory scientists, retired July 8, 1960, after forty years with Eastman Kodak Company.

As Librarian for Kodak Research Laboratories, Miss Garvin was in charge of an internationally famous reference center on photographic and related sciences. When she became Librarian, in 1923, there were 5000 technical volumes in the library; at the time of her retirement the library contained 30,000 books and thousands of articles and reports on microfilm.

Miss Garvin was born in Danville, Vermont, and was graduated from the University of Vermont in 1920. After her graduation she joined Eastman Kodak Company as Editor of the Monthly

Abstract Bulletin of Kodak Research Laboratories. Shortly thereafter she became Editor of Abridged Scientific Publications and Monographs, a post she held until her appointment as Librarian.

Long active as Chairman of the Science-Technology group of the national Special Libraries Association, she helped organize a Western New York Chapter in 1945. She served as President of the Chapter for a two-year term beginning in 1952. She is also a member of the Monroe County Library Association; the Chemical Literature Division of the American Chemical Society; and the American Association for University Women.

Among other publications to her credit is an extensive bibliography on high-speed photography, published in 1951, of which she is co-author. In 1955 she undertook a revision of this volume for special distribution at the Third International Congress on High-Speed Photography held in London.

During an interview at the time of her retirement, Miss Garvin noted that a recognizable trend in recent years has been the importance of translations of scientific reports from Russian and Japanese. The library's translations of articles from all foreign languages, which in 1923 was "only a handful," has grown to several thousand. Another addition to the library, which she mentioned as being of importance, is the large collection of government reports on scientific subjects.

Her plans for her retirement include travel and special attention to her favorite sports of bowling and golf.

## Obituaries



### Peter Mole

Peter Mole, President of Mole-Richardson Co. of Hollywood, died August 2, 1960, at La Jolla, Calif., at the age of 68. He was Past-President of the SMPTE (1951-52) and recipient of the Progress Medal (1948).

He was born in Termini, Sicily, Italy, in 1891 and came to the United States in 1907. He became a naturalized citizen in 1930. He was graduated an electrical engineer from Union College in 1915 and from 1915 until 1923 he was design engineer for General Electric Co. where he was active in the development of the General Electric searchlight and a high-intensity rotating carbon-arc theater projection lamp.

In 1923 he left General Electric and moved to California where he was General Manager of Creco, Inc., and soon became interested in motion-picture studio light-

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**High Speed Camera Facilities**

DAVID C. OAKLEY, Lawrence Radiation Laboratory, University of California, Livermore, Calif.

The high-speed camera facilities at the University of California Ernest O. Lawrence Radiation Laboratory include five firing sites using framing cameras with framing rates up to 3.3 million/sec, Kerr cell cameras of 0.005 $\mu$ /sec exposure time, and smear cameras with writing rates up to 15 mm/ $\mu$ sec. These cameras are coordinated with other techniques for simultaneous recording. Techniques have been developed for using two discontinuously writing cameras simultaneously. High explosive light sources are used and electronic light sources have been developed that allow photography in color at 1.2 million frames/sec. Termination of the record is done with a simple mirror cutoff which takes only three  $\mu$ sec to go from open to closed.

The camera arrangements and auxiliary equipment have been designed for maximum flexibility and fail-safe operation. The safety of personnel is very carefully considered. Annoyance of nearby residents has been minimized. This work was supported by the U.S. Atomic Energy Commission at Lawrence Radiation Laboratory.

**The Evolution of Techniques for Ultra High-Speed Photography and Cinematography at the Laboratoire Central de l'Armement Since the Paris Meeting of 1954**

PAUL DEVAUX, Laboratoire Central de l'Armement, Arcueil, France

Well before the war of 1939-1945 the Laboratoire Central de l'Armement with its Engineer-General Libessart was already interested in techniques for ultra high-speed photography and cinematography. In 1946, after an interruption of several years, a new team was put on this subject. The period from 1946 to 1954 was utilized to train engineers and technicians in these very special techniques, mainly in the area of study rather than of practice. The Paris Meeting of 1954 marked the end of this period of adaptation and the new orientation was towards the following objectives: Research on the precision limits of different types of existing equipment, development of new instruments and the establishment of new processes for industrial requirements which would lead to very reliable equipment of high performance and simple operation. The trends and accomplishments in the following two fields will be reviewed: Photography and cinematography by transparency and reflection of nonluminous objects, and the photography and cinematography of self-luminous objects.

**High-Speed Photography Applied to High-Speed Aerodynamic Research at the National Physical Laboratory**

R. J. NORTH, National Physical Laboratory, Teddington, Middlesex, England

An account is given of the spark-light source systems used in Aerodynamics Division, National Physical Laboratory, for the photography of high

**Un exemple d'installation de caméras à grande vitesse**

DAVID C. OAKLEY, Lawrence Radiation Laboratory, University of California, Livermore, Californie

L'installation de caméras à grande vitesse du Laboratoire de Radiation Ernest O. Lawrence de l'Université de Californie consiste en cinq emplacements de prise de vues qui utilisent des caméras multi-images à cadences d'images allant jusqu'à 3,3 million/s, des caméras à cellule Kerr à temps d'exposition de 0,005  $\mu$ s et des caméras maculeuses à vitesses d'enregistrement maxima de 15 mm/ $\mu$ s. Ces caméras sont coordonnées à d'autres techniques en vue d'un enregistrement simultané. On a mis au point des techniques qui permettent d'employer simultanément deux caméras à enregistrement intermittent. On utilise des sources de lumière à explosif brisant et l'on a perfectionné des sources lumineuses de type électronique qui permettent de photographier en couleur à des cadences de 1,2 million d'images/s. La fin de l'enregistrement est commandée par un simple disjoncteur à miroir qui ne prend que 3  $\mu$ s entre l'ouverture et la fermeture.

Les systèmes de caméras et l'équipement auxiliaire ont été conçus en vue d'un maximum de flexibilité et de sûreté de fonctionnement. On a pris grand soin d'assurer la sécurité du personnel. On a réduit au minimum les risques d'ennuyer les voisins. Ces travaux ont été patronés par la Commission d'Énergie Atomique des États-Unis au Laboratoire de Radiation Lawrence.

**L'évolution des techniques de photographie et de cinématographie ultra-rapide au Laboratoire Central de l'Armement depuis le Congrès de Paris de 1954**

PAUL DEVAUX, Laboratoire Central de l'Armement, Arcueil, France

Bien avant la guerre 1939-1945, le Laboratoire Central de l'Armement avec l'Ingénieur Général Libessart, s'intéressait déjà aux techniques de photographie et cinématographie ultra-rapide. Après une interruption de plusieurs années, une nouvelle équipe fut mise sur ce sujet en 1946. La période 1946-1954 fut employée à former ingénieurs et techniciens à ces techniques très spéciales en se cantonnant sur le plan étude avec peu de réalisations. Le Congrès de Paris en 1954 marquait la fin de cette période d'adaptation et l'orientation vers les objectifs suivants: recherche des limites de précision des différents types d'équipements existants, création d'appareillages nouveaux, et mise en place de procédés de réalisation industrielle devant aboutir à des équipements de grande sécurité joignant performances élevées et service simple. Les tendances et réalisations correspondantes seront passées en revue dans les deux domaines suivants: photographie et cinématographie d'objets non lumineux, par transparence et réflexion; photographie et cinématographie d'objets lumineux par eux-mêmes.

**La photographie à grande vitesse appliquée aux recherches aérodynamiques à grande vitesse au National Physical Laboratory**

R. J. NORTH, National Physical Laboratory, Teddington, Middlesex, Angleterre

Il est donné un compte rendu sur les systèmes de sources de lumière-étincelles utilisés dans la

**Hochgeschwindigkeitskamera-Anlagen**

DAVID C. OAKLEY, Lawrence Radiation Laboratory, University of California, Livermore, Kalifornien

Zu den Hochgeschwindigkeitskamera-Anlagen des University of California Ernest O. Lawrence Radiation Laboratory gehören fünf Schiessplätze, die Bildreihenkameras mit Bildfrequenzen bis zu 3,3 Millionen Aufnahmen/s benutzen, Kerrzellenkameras mit Belichtungszeiten von 0,005 s und "Schmier"-Kameras mit Aufzeichnungsgeschwindigkeiten bis zu 15 mm je Mikrosekunde. Diese Kameras werden mit anderen Methoden für gleichzeitige Aufzeichnungen koordiniert. Es wurden Methoden entwickelt, um zwei nichtkontinuierlich aufzeichnende Kameras gleichzeitig zu verwenden. Man verwendet Sprengstoff-Lichtquellen und es wurden elektronische Lichtquellen entwickelt, welche Farbphotographie mit 1,2 Millionen Aufnahmen/s ermöglichen. Die Aufzeichnung wird durch einen einfachen Spiegelabschalter beendet, der nur drei Mikrosekunden braucht um von offen auf geschlossen zu gehen.

Die Anordnungen der Kameras und des Zubehörs wurde im Hinblick auf möglichst vielseitige Verwendbarkeit und verlässlichen Betrieb entworfen. Der Sicherheit des Personals wurde grosses Augenmerk geschenkt. Die Belästigung der Nachbarschaft wurde auf ein Minimum herabgesetzt. Diese Arbeit wurde durch die U.S. Atomic Energy Commission beim Lawrence Radiation Laboratory unterstützt.

**Die Evolution der Methoden für Höchstgeschwindigkeits-Photographie und -Kinematographie beim Laboratoire Central de l'Armement seit der Pariser Konferenz im Jahre 1954**

PAUL DEVAUX, Laboratoire Central de l'Armement, Arcueil, Frankreich

Schon lange bevor dem Kriege 1939-1945 hatte sich das Laboratoire Central de l'Armement mit Ingénieur-Général Libessart für die Methoden der Höchstgeschwindigkeits-Photographie und -Kinematographie interessiert. Nach einer Unterbrechung von mehreren Jahren wurde 1946 eine neue Gruppe von Leuten für diesen Gegenstand eingesetzt. Die Periode von 1946 bis 1954 wurde dazu benützt Ingenieure und Techniker in diesen ganz besonderen Methoden heranzubilden, wobei man sich auf das Studium beschränkte und nur wenige praktische Ergebnisse suchte.

Mit der Pariser Konferenz von 1954 endete dieser Abschnitt der Heranbildung und man wendete sich folgenden Zielen zu: Erforschung der Genauigkeitgrenzen verschiedener Typen bereits existierender Geräte, Schaffung neuer Apparate und Festlegung der Vorgänge für industrielle Herstellung, die zu vollständig gefahrenlose Ausrüstungen hoher Leistungsfähigkeit bei einfacher Bedienung führen sollte. Die betreffenden Richtungen und Durchführungen auf folgenden zwei Gebieten werden besprochen werden: Die Photographie und Kinematographie nichtleuchtender Objekte im transparenten und reflektierten Licht und die Photographie und Kinematographie selbstleuchtender Objekte.

**Die Anwendung der Hochgeschwindigkeits-Photographie zur Erforschung der Hochgeschwindigkeits-Aerodynamik beim National Physical Laboratory**

R. J. NORTH, National Physical Laboratory, Teddington, Middlesex, England

Es wird über die Blitzlichtanlagen berichtet, die

ing, first with the Metro-Goldwyn-Mayer Studios in the electrical department.

After receiving his groundwork training in actual production, he went to work for a motion-picture studio lighting equipment manufacturer. With his technical background plus experience in the studios he was prepared to enter the field of the manufacture of specialized equipment for an industry that was growing so fast its requirements changed almost from month to month. He soon joined forces with Elmer C. Richardson, another design engineer, and Fielding C. Coates, a studio chief electrician, and formed the Mole-Richardson Company.

The citation accompanying the Progress Medal on the occasion of the presentation noted:

"Mr. Mole's success in his chosen field is not due entirely to his ability to organize and operate an engineering and manufacturing organization to meet the needs of a unique industry. He has an unusual insight into the intangibles created by the art form in motion-picture production. He knows that engineering perfection must not transcend utilization in an industry where dramatic effect is the end result; yet he has been able to design and produce highly specialized lighting tools which satisfy both the artist and the engineer . . .

"Mr. Mole and his organization have pioneered in the development of lighting equipment during each of the successive stages in the advance of motion-picture lighting practice for more than twenty years. The wide use of their products manifests the success of their efforts and achievement. Future lighting developments which are currently being studied undoubtedly will reflect the benefits of Mr. Mole's experience as new and improved lighting becomes available for studio use.

"It is fitting to note that Mr. Mole's organization has been the recipient of four Certificate Awards from the Academy of Motion Picture Arts and Sciences, together with recognition by the United Nations Conference on International Organization."

He was the author of a number of papers published in the *Journal* (and earlier in the *Transactions*), one of the earliest being "The Use of Incandescent Equipment in Motion Picture Photography," in the April 1928 *Transactions*.

### Alain Schuller

Alain Schuller, 74, died May 22, 1960, in Antwerp. At the time of his death he was Honorary Manager of Gevaert Photo-Producten, N.V., Mortsel, Antwerp. He held the degree of Doctor of Sciences and was a Chemical Engineer. He was born in Budapest, Hungary, in 1886.

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In 1912 Lieven Gevaert, founder of the Gevaert firm, invited him to join the firm to do research in the field of color photography. At the outbreak of World War I, Mr. Schuller joined the Hungarian Army as an officer. Shortly thereafter he was seriously wounded, and spent the remainder of the war working in a gun-cotton plant where he acquired a thorough knowledge of nitrocellulose. In 1925 he re-entered the Gevaert firm where he was placed in charge of the film-coating department where his knowledge of nitrocellulose proved of great value when Gevaert's coating facilities were changed from nitrocellulose base to nonflammable cellulose triacetate base. He retired in 1951.



### C. E. Kenneth Mees

Dr. Mees died August 15 in Honolulu, Hawaii, at the age of 78. An Honorary Member of the Society, he was recognized internationally as an outstanding authority in the field of photographic science.

He was the author of about 160 publica-

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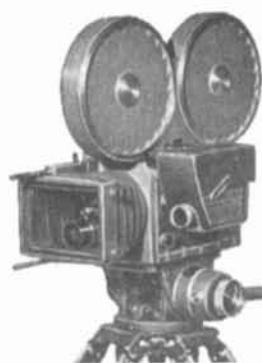
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speed flows in wind tunnels and shock tubes. The systems consist of basic units which can be used in various ways, singly or in multiple units as in a Cranz-Schardin system. Some results obtained with such spark-light source systems are shown and briefly discussed. These include photographs taken on wind tunnels, shock tubes, and shock tunnels with schlieren, color-schlieren and schlieren-interferometer systems.

#### **A Review of Photographic Instrumentation for Ballistic Data Acquisition**

L. E. DAVIDSON, Engineering Laboratories, Development and Proof Services, Aberdeen Proving Ground, Md.

Ballistic data which describe the component or system performance of many kinds of weapons are regularly obtained in widely separated firing sites at Aberdeen Proving Ground. This paper describes the many applications of instrumentation photography used in weapons testing, including high-speed photography, shutterless photography, photogrammetric camera systems, tracking cinetheodolites and flash x-ray techniques.

A film lecture with examples of high-speed cinematography, presented by Werner Kraus, Leverkusen-Bayerwerk, Farbenfabriken Bayer, Germany

### **FRIDAY 8:00 P.M. SESSION: Films — Applications: Medical and Biological**

*Blood-cell measurement:* Dr. P. A. C. Monro, Anatomy School, University of Cambridge, England; presented by A. M. P. Brookes, Dept. of Eng., University of Cambridge, England

#### **Photographic Problems, Techniques and Instrumentation in Sea Animal Locomotion Studies**

IRVING REHMAN, Consultant, Oceanic Research Div., Research Dept., U.S. Naval Ordnance Test Station, China Lake, Calif.

Published reports of researches and observations on sea animal locomotion indicate that many sea mammals and fish are capable of achieving high speeds at very small expenditures of energy over long periods of time with no observable drag. Since the energy requirements for these velocities are far beyond that available from the animals' muscular and vascular systems, the need for accurate data and measurements under controlled conditions of the power requirements to accelerate to maximum speed, maintain top speed, glide and decelerate, was necessary in order to determine objectively whether these inordinately great efficiencies were actually being obtained.

A porpoise was trained to perform a number of tasks on command for this research program. Hydrodynamic, physiologic and acoustic studies of this phenomenon were undertaken by NOTS and also at several associated facilities. High-speed photography (above and underwater), underwater schlieren, specular light, spark, high-powered stroboscopic and synchronized stroboscopic motion-picture photography were used. Additional techniques using neutral density beads, bubbles and dyes were also used to visualize the flow fields and boundary layer control. Extremely accurate timing data were obtained simultaneously.

Studies of the anatomic structures of the porpoise, whale and some fast-swimming fish demonstrated peculiarities that necessitated physiologic studies of vascular flow to ascertain its influence on boundary layer control and flow field. Acoustic data were also taken during the

Division Aérodynamique du Laboratoire National de Physique pour la photographie des débits rapides dans les tunnels aérodynamiques et les tubes de choc. Ces systèmes se composent d'éléments de base qui peuvent être employés de manières diverses, isolément ou en combinaison, comme dans un système Cranz-Schardin. L'auteur indique et évalue brièvement certains des résultats obtenus avec ces systèmes de sources de lumière-étincelles. L'article contient des photographies de tunnels aérodynamiques, de tubes de choc et de tunnels de choc, prises au moyen de systèmes schlieren, schlieren en couleur et schlieren avec interféromètre.

#### **Un compte rendu sur les instruments photographiques utilisés pour l'obtention de données balistiques**

L. E. DAVIDSON, Engineering Laboratories, Development and Proof Services, Aberdeen Proving Ground, Maryland

On recueille régulièrement des données balistiques sur le fonctionnement isolé ou d'ensemble de nombreux types d'armes à feu en des emplacements de tir très disséminés sur le Polygone d'Aberdeen. Le présent mémoire décrit les multiples applications de la photographie à instruments utilisée dans les essais d'armes, notamment la photographie à grande vitesse, la photographie à fente sans obturateur, les systèmes à caméra photogrammétrique, les cinéthéodolites de dépistage et les techniques de rayons X à flash.

bei der Aerodynamics Division, National Physical Laboratory zum fotografieren von Hochgeschwindigkeits-Strömungen in Windtunnels und Stossröhren angewendet werden. Die Anlagen bestehen aus Grundeinheiten, die in verschiedener Weise, entweder einzeln oder in Mehrfacheinheiten wie bei einer Cranz-Schardin-Anlage gebraucht werden. Es werden einige mit einer solchen Blitzlichtanlage erzielte Ergebnisse gezeigt und kurz besprochen. Dazu gehören Photographien über Windtunnels, Stossröhren und Stosstunnels, die mit Schlieren-, Farbschlieren- und Schlieren-Interferenzmesser-Anlagen gemacht wurden.

#### **Eine Übersicht über die zur Erlangung ballistischer Daten verwendeten Geräte**

L. E. DAVIDSON, Engineering Laboratories, Development and Proof Services, Aberdeen Proving Ground, Md.

Auf den weit voneinander entfernten Plätzen am Aberdeen Proving Ground werden regelmässig ballistische Daten aufgenommen, welche die Leistung eines Bestandteils oder einer Bestandteilgruppe vieler Arten von Waffen angeben. Dieser Artikel beschreibt die vielfache Anwendung photographischer Geräte, die zum Prüfen von Waffen verwendet werden, einschliesslich der Hochgeschwindigkeits-Photographie, verschlussloser Schlitzphotographie, photogrammetrischer Kameraanlagen, zielwegverfolgender Kine-Theodoliten und Blitz-Röntgenmethoden

#### **Les problèmes, les techniques et les instruments de photographie dans les études sur la locomotion des animaux marins**

IRVING REHMAN, Oceanic Research Div., Research Dept., U.S. Naval Ordnance Test Station, China Lake, Californie

Il ressort de rapports publiés de recherches et d'observations sur la locomotion des animaux marins que de nombreux mammifères et poissons de mer sont capables d'atteindre de grandes vitesses avec de très faibles dépenses d'énergie pendant de longues périodes de temps sans qu'on puisse observer de résistance à l'avancement. Etant donné que l'énergie nécessaire pour atteindre ces vitesses dépasse considérablement les disponibilités d'énergie permises par les systèmes musculaires et vasculaires des animaux marins, on a jugé nécessaire de recueillir des données et mesures précises, dans des conditions soigneusement contrôlées, de l'énergie qu'il faut pour accélérer jusqu'à la vitesse maximum, pour maintenir cette vitesse maximum, pour glisser et pour ralentir, afin de déterminer objectivement si ces prouesses extraordinaires sont vraiment accomplies.

Aux fins de ce programme de recherches, on a entraîné un marsouin à effectuer un certain nombre de manoeuvres sur commandement. Des études hydrodynamiques, physiologiques et acoustiques de ce phénomène ont été entreprises par NOTS, ainsi que par plusieurs centres associés. On a employé la photographie à grande vitesse (en surface et sous l'eau), la photographie schlieren sous-marine, celle à lumière spéculaire et à étincelles, ainsi que la photographie stroboscopique à grande puissance et la cinématographie stroboscopique synchronisée. On a eu recours aussi à d'autres techniques utilisant des bulles, des colorants ou des sphères de densité neutre, afin de rendre visibles les zones de déplacement et le contrôle des nappes limitrophes.

#### **Photographische Probleme, Methoden und Geräte bei der Untersuchung der Fortbewegung von Seetieren**

IRVING REHMAN, Fachberater, Oceanic Research Div., Research Dept., U.S. Naval Ordnance Test Station, China Lake, Kalifornien.

Es wurden Berichte über Forschungen und Beobachtungen der Fortbewegungsweise von Seetieren veröffentlicht, nach denen viele Säugetiere und Fische in der Lage sind durch lange Zeitperioden hohe Geschwindigkeiten bei sehr geringem Energieaufwand und ohne sichtbare Behinderung zu erzielen. Der Energiebedarf für diese Geschwindigkeiten ist weit grösser als die Muskeln und Gefässsysteme der Tiere leisten können und es war daher notwendig objektiv festzustellen, ob diese übermässige Leistungsfähigkeit wirklich erzielt wurde; man musste unter kontrollierten Bedingungen genaue Daten erhalten und Messungen des Kraftbedarfs für die Beschleunigung zur Höchstgeschwindigkeit, Beibehaltung der Höchstgeschwindigkeit, Weitergleiten und Verlangsamung vornehmen.

Es wurde für dieses Forschungsprogramm ein Delphin dazu abgerichtet verschiedene Aufgaben auf Befehl durchzuführen. Sowohl bei NOTS wie bei verschiedenen anderen angeschlossenen Stellen wurden hydrodynamische, physiologische und akustische Untersuchungen des Vorgangs gemacht. Man verwendete Hochgeschwindigkeits-Photographie (auf und unter dem Wasserspiegel), Unterwasser-Schlieren, Spiegellicht, Funken, Hochenergie-Stroboskopie und synchronisierte stroboskopische Kinematographie. Weitere Methoden mit Perlen neutraler Dichte, Blasen und Farbstoffen wurden ebenfalls benützt um die Strömungsfelder und die Grenzschichtenregelung sichtbar zu machen. Gleichzeitig wurden ausserordentlich genaue Zeitmessungen gemacht. Untersuchungen des anatomischen Baues des Dalphins, des Walfisches und einiger

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. Mecs 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 re-

search. He was also interested in the development of practical and inexpensive equipment for amateur motion pictures and home use.

During his career Dr. Mecs 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 7½- and 3¾-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

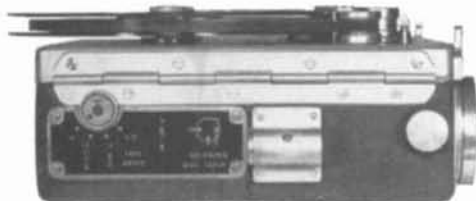
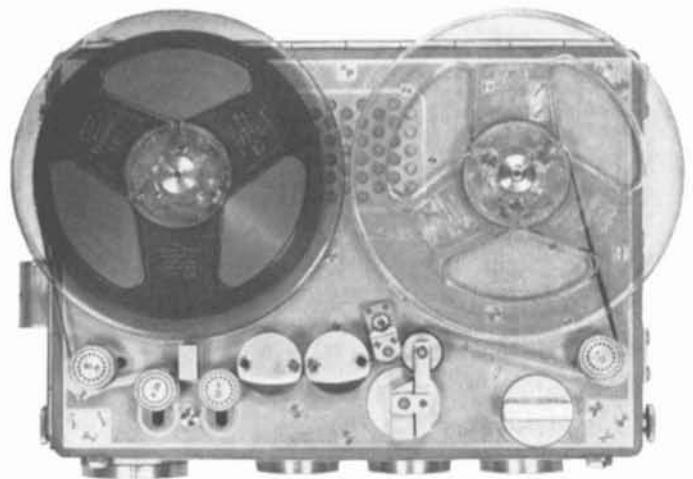


# NAGRA IIIb

## IS THIS THE WORLD'S FINEST?

Merely to list its features and detail its specifications, without the use of a single superlative, takes four pages. The men who use NAGRA will give you the answer in one word: INCOMPARABLE!

Highlights: Completely portable and self-powered, yet NAGRA rivals the finest rack-mounted studio equipment / Wow and flutter  $\pm 0.15\%$  peak-to-peak at NAB professional speeds (all products measured) / Speed constant within 0.2% at temperatures from  $-12^{\circ}\text{F}$  to  $+120^{\circ}\text{F}$  / Response 30 to 15,000 cps  $\pm 2$  dB / Weighted signal-to-noise ratio better than 60 dB / Speeds 15, 7.5 and 3.75 ips / NAB and CCIR equalizations / Wired and wireless mikes / Provision for condenser-mike preamp-power-supply driven by stabilized internal 10V / Two mixing inputs / Self start triggering by preset sound pressure levels / Twelve 1.5V flashlight batteries power all functions / Provision for external AC and DC power supplies / Weighs 15 pounds and performs in any position / Distinguished functional design and precision Swiss craftsmanship / Limited but steady supply at \$1045.



In short, NAGRA IIIb takes the studio beyond the power lines. For the four pages of features and specifications that make it a standard in many audio labs, write or 'phone the USA agents: Electronic Applications, Inc., Stamford, Conn. / DA 5-1574.

