

Available from ANSI and from SMPTE.

ANSI/IEEE Standard 100-1988: IEEE Standard Dictionary of Electrical and Electronics Terms — Fourth Edition, November 1988. This dictionary defines over 24,000 technical words from the fields of electrical and electronics engineering, with each definition being an official standard of the IEEE. Although useful, it contains relatively few image-related terms. Many of those most relevant to the WGHDEP have been collected herein.

CCIR Vocabulary (CMV): Reports of the CCIR, 1986, Vol. XIII. International Radio Consultative Committee, International Telecommunications Union, Geneva, Switzerland.

CIE International Lighting Vocabulary: CIE Publication N° 17.4. Bureau Central de la Commission Electrotechnique Internationale, Genève, Suisse.


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SMPTE/EG11 (1986): "Nomenclature for 19-mm Type D-1 Cassette for Component Digital Video Recording." Prepared for use with the standards evolving from CCIR Recommendation 601, the glossary includes the following: General Definitions; Track Pattern Allocations; Electrical Signal Allocation; Subsets of Binary Data; Error Protection Strategies; Error Protection-Data Organization; Other Electrical Definitions; Mechanical Terms; Editing Definitions. Available from the SMPTE.

"Television Tape Recording Nomenclature": *SMPTE J.*, 97:928-936, November 1988. A general reference glossary to terms used in video tape recording, prepared by the SMPTE Television Recording and Reproduction Committee.

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- [CIE] Commission Internationale de l'Eclairage. (International Commission on Illumination), Geneva, Switzerland.
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- [ISO] International Organization for Standardization. Geneva, Switzerland.
- [Wyszeki et al.] G. Wyszeki, W. S. Stiles, J. W. Goodman: *Color Science, Concepts and Methods, Quantitative Data and Formulas*, 2nd ed., John Wiley & Sons; New York, 1982. 

An SMPTE Classic Reprint Originally published March 1930



The Development of Television and Radiomovies to Date

By C. Francis Jenkins

Radiomovies for entertainment in the home have progressed rather satisfactorily during the year. Our audience on 46 meters has grown in a year to some 18,000 or 20,000. To distinguish them from the radio fan with a set which covers only the entertainment band from 200 to 550 meters most of this audience are known as amateurs.

This limitation of visual radio to short wave channels comes about because the Federal Radio Commission does not at present permit visual

broadcast in the audible entertainment band. That is the reason we cannot encourage the purchase of a television attachment for your present set.

The surprising quickness with which our radiomovie audience has been built up is largely accounted for by the fact that the amateur already had his radio set for code communication on 40 meters, and all he had to do was to attach a radiovisor to his receiver, tune 6 meters farther along on his dials, and pick up our radiomovies, broadcast from W3XK, Washington. Because we published a broadcast schedule on which he could depend, he rigged up his visual radio receiver with confidence.

Our broadcasts were well received rather widely over the United States, very dependably as far west as Denver; occasionally we got reports from California, Canada, Cuba, and Puerto Rico of reception on the 46-meter channel. But as 46 meters gave double images in local territory, we also simultaneously broadcast on 186 meters for Washington, Baltimore, and other nearby receivers. As with audible radio there are locations in which reception is better than in other places.

An amateur in Cold Springs, Iowa, explained that he happened to tune in on our initial radiomovies broadcast, July 2, 1928, and that he had missed very few of our broadcasts since, and

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then only because of absence from home at our broadcast hour. We believe his reports authentic for we have checked him up; which we easily do by comparing reports from amateurs with the order of picture sequence in the broadcast on that particular evening.

All the broadcasts have been in photographic silhouette, or in black-and-white cartoon drawings. But those cartoonists we have patronized don't seem to be able to grasp the requirements of radiomovies, and so, after spending considerable money with them, we abandoned the cartoonist as an undependable source of picture story for us.

I had, however, designed a silhouette studio equipment which was already working excellently, and with which we can produce radiomovie stories in silhouette as fast and as satisfactorily as is usual with regular movie negative in regular movie studios, and at small cost.

When I first designed this equipment and worked out the operation methods, I really did not think of it as new; but it seems on search of available motion picture references that this is a new attainment.

We also discovered scenario writer talent in our laboratory staff, and so we are a self-sufficient institution, from story concept to the reproduction of this movie story in your house, delivered there over radio channels.

All of these broadcasts were on ten kilocycle channels. Some months ago the Federal Radio Commission, on the showing of what we had already accomplished, and the explanation that radio transmission of the halftones of television and regular theater movie film required a broader channel than the ten kilocycle width employed in audible radio, set aside eight channels, each one hundred kilocycles wide for visual radio.

We then immediately proceeded with the erection and equipment of a powerful station in the country about five miles north of Washington. The broadcast frequencies were 2850 to 2950 kilocycles and 2000 to 2100 kilocycles, for distant and for local reception, respectively. This station's broadcasts are well received by those who have rebuilt their radio receivers for the new frequencies, but I am doubtful that we shall build up as large an audience on these frequencies as quickly as we did on the old frequencies.

Of the little kit set receivers we sold many thousands at \$2.50 each. They cost \$3.10, but I made money because I sold so many of them.

That is literally true, for we built up a demand for a better receiver, and a public confidence that television and radiomovies was a practical thing, possible of wide usefulness as development progresses.

To date, the quartz or glass rod drum scanner continues to represent the best type of receiver. It makes a larger and brighter picture with simpler mechanism, and less amplification, than any other form yet produced.

How long it will remain the best form of receiver no one knows, for thousands of engineers, my own staff included, are feverishly at work on the problem.

A different type of receiver is used on occasions, namely, the lens scanning disk (U.S. patent No. 1,679,086) used in the General Electric television demonstration at the New York Radio Show last winter. This receiver with a high intensity neon light source projects a rather creditable size and brightness of picture, as those of you who saw it will remember.

But all the different mechanisms demonstrated to this time have a common limitation, fatal to extended development, in this art, namely: they all depend upon persistence of vision for success. While interesting results have been attained with the old scanning disk, there is not much opportunity for extended practical development.

It is quite surprising to figure out the efficiency of the light source on the eye of the observer, and find that it is only about one-fifty thousandth ($1/50,000$) of one per cent, which probably accounts for the slow development of this art.

This extremely low efficiency comes about because of two basic errors of concept of the problem involved, namely: (1) that each elementary area light-source should be at least as large as the whole area of the picture itself; and (2) that persistence of vision of the eye should be depended upon for an assembly of the elementary areas of the picture.

Theoretically, (a) no more light-current is actually required than that needed to illuminate a single elementary area at any moment considered; and (b) a real picture should exist in the receiver whether there is a human

eye to see it or not, that is, it should be possible to photograph the received picture with a snapshot camera. This cannot be done with the disk scanner method.

Plate Receiver. — The plate receiver, however, is designed and built to embody both these essentials and consists of a picture plate divided into 2304 elementary areas, that is, 48 lines with 48 picture elements in each line.

In the construction described the picture area consists of 48 horizontal rows of flash-light lamps, with 48 lamps in each row. These lamps are inserted in a corresponding number of holes in a plate supported, preferably, in a vertical position, each lamp being an element of the picture.

The lamps are divided, electrically, into four banks. Each lamp is individually wired to its particular contact of the switching gear. All the lamps in each bank have a common return connection, and the lamp face is, for certain uses, covered with ground glass or the like, for soft diffusion in the finished picture.

The switching gear is a four-part device, each of the parts being connected to its particular bank of lights. Such a division permits the construction of a commutator but one-fourth as large as if it were a single commutator structure. A 3600 rpm., $1/2$ hp. synchronous motor is quite suitable for driving the commutator brush in city service.

In operation, the motor being started, the incoming amplified radio signals are distributed to the several lamps in succession, fully lighting some of them, lighting others to partial brilliancy, and leaving others unlighted. The result is a picture built up in lights and halftones and shadow on the face of the plate, or the glass diffusion cover.

The picture on the plate is made up of glowing lamp elements, which persist in light value for an appreciable time, say, a tenth of a second. But as the exciting impulse is applied every fifteenth of a second, the lamp is aglow for the whole time the corresponding elementary area of the scene at the transmitting station is a light.

That is, in this scheme, persistence of light is substituted for persistence of vision, and the whole of the received picture is on the plate all the time instead of only a fractional part ($1/2304$) — an elementary area time of the picture.

The amount of light available is the average light of a single lamp multiplied by the number of lamps. The average light of a single lamp can be approximately the normal lumens of the lamp because it can be flashed with a very much higher voltage than if the voltage is applied continuously.

Assuming a $\frac{1}{2}$ inch diameter lamp, the multiple lamp plate would be 2×2 feet square, as we built it. In front of this light source a lens is mounted for projecting it onto a theater screen. As

the light source is the picture itself, the only loss of light in the projection is the reduction in foot-candles which results from the magnification. And fortunately the light is the usual color, that is, white light, not the pink light characteristic of neon.

Such a receiver-projector will ultimately enable the producer to distribute motion pictures to the theaters by radio instead of film, doing away with the present profit-consuming film exchange.

A transmitter is also made on this same principle, in which light sensitive elements are substituted for the lamp elements in the receiver.

I am confident this principle, broadly illustrated and first described by me in *The Electric Engineer*, of July 25, 1894, will ultimately be universally adopted. I am encouraged in this belief because the Patent Office has officially declared eleven other inventors to be in interference with my application.

Minutes of the Special Meeting of the Voting Members of the SMPTE

White Plains, New York, December 14, 1990

A special meeting of the Society of Motion Picture and Television Engineers, Inc., was held at 2:00 p.m., local time, December 14, 1990, at 595 West Hartsdale Avenue, White Plains, New York.

The purpose of this meeting was to vote on a proposed amendment to the Society's Bylaws. This amendment was processed by the Revisions Committee and unanimously approved by the Board of Governors at its October 12, 1990, meeting. The Executive Director having in her possession 1142 signed proxies, a quorum was declared to be present in person and by proxy.

The proposed amendment to the Bylaws was read and the meeting proceeded to vote. The approved amendment and the total votes follow.

Amended to read: **Bylaws, Article XII, Engineering Documents**

Sec. 1. Purpose. The Society's Engineering Documents, including SMPTE Standards, SMPTE Recommended Practices, and SMPTE Engineering Guidelines, as well as American National Standards sponsored by the Society, are adopted in the public interest; they are designed for the purpose of promoting and futhering the interests of the general public through the statement

and dissemination of technical and engineering principles applicable to the motion-picture, television, and related arts and sciences.

Sec. 2. Definition. The Society's Engineering Documents and American National Standards sponsored by the Society describe a product, process, or procedure with reference to one or more of the following: nomenclature, composition, tolerances, safety, operating characteristics, performance, testing, and the service for which designed.

Sec. 3. Use. Existence of an Engineering Document of the Society does not in any respect require that any member or nonmember adhere to it, and such persons are free to accept or reject any adopted Engineering Document as they see fit in the exercise of their individual discretion.

For: 1122

Against: 20

There being no further business, the meeting was declared adjourned at 2:15 p.m.

Respectfully submitted,
Lynette Robinson, Executive Director