

Million Watt Broadcasting Station

Radio

Broadcasting stations with a million watts power, twenty times as much as the most powerful stations licensed today, were forecast by Edgar H. Felix, radio consultant of the National Electric Manufacturers Association, speaking before the Institute of Radio Engineers.

"It is quite within the scope of the engineer's imagination to visualize ultimately a broadcasting system comprising transmitters of a million-watt power," said Mr. Felix. "Compared with other systems in daily use this is by no means a large unit; the power bill for such a broadcasting station might run from fifty to one hundred dollars an hour. We use several hundred times that power in transporting week-end excursionists to a single metropolitan bathing beach, and certainly radio broadcasting is of at least comparable importance in our daily lives. While a million watts represent a substantial increase in the power of broadcasting, such power need not be feared as a dangerous monster.

"A system of broadcasting with transmitters of this order of power would require somewhat altered receiver design. Obviously we would employ less sensitive receivers, and instead of an exposed aerial system we would use an adjustable pickup means shielded from incoming impulses to a degree determined by the field strength of the nearest broadcasting station. Stations of such power could serve the centers of population with antennas located at some distance from congested centers. It is quite conceivable that receiver development could keep pace with progressively increased powers of the order suggested.

"Allocations of wavelengths under these conditions would be simplified because the high-grade service range of such stations might well be as much as five hundred miles. Ninety such stations spread geographically over the country would give ten or twelve program choices at any point, and may be compared with present conditions where perhaps less than 40

per cent. of the area of the country is within the wide high-grade service range of any broadcasting station. Furthermore, the initial and maintenance cost of receivers would be lessened, and quality or reproduction improved, with the consequent result that the radio listening public would be enormously increased. This, in turn, would have a healthy effect on the economic position of the broadcaster.

"But such a system of broadcasting would also be considerably more costly than the present annual maintenance expense of approximately thirty or thirty-five million dollars. It might cost one hundred fifty million to two hundred million a year or more to maintain ninety stations of this order of power."

This is one way of reducing the annoyance of man-made interference, from electrical apparatus in the home, power lines, etc. If the signals are sufficiently powerful, then such relatively weak interference will have little effect. (*Turn to next page*)

Colorado Sun Effective

Physiology

Colorado sunshine has a high degree of efficiency in curing rickets. The great feature is that the sunshine in Colorado is as efficient in winter as in summer. White rats were fed on a diet calculated to produce rickets and were kept in the dark for all but short daily exposures to the sunshine in Denver. X-ray pictures of the bones and teeth of the rats showed that from ten to twenty minutes' exposure to this sunshine was enough to prevent the development of rickets, reported Prof. Robert C. Lewis, Herman B. Stein and Gerald M. Frumess, of the University of Colorado, at the meeting of the American Chemical Society.

The lack of seasonal variation in the antirachitic action of Colorado's sunshine is due to the fact that a large amount of ultraviolet light reaches the earth there in winter as well as in summer. The high percentage of winter sunshine, the relatively thin atmosphere, the low humidity and the comparatively small amount of smoke in the air account for this.

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Now Tinted Film for Talkies

Motion Pictures

Tinted motion-picture films, with red for fire scenes, blue for night scenes, green for forest scenes or yellow where artificial light is represented, will now return to the theaters, from which they were forced for technical reasons with the advent of the talkies.

This is made possible with a new series of films announced at the meeting of the Society of Motion Picture Engineers at the Bell Telephone Laboratories. Dr. L. A. Jones, head of the physics department of the Eastman Kodak Laboratories, under whose direction the tinted film was developed, described their advantages.

Before the days of the talkies the familiar tinted films were obtained by printing on tinted stock, furnished by the various film manufacturers. This was like the ordinary positive film on which the pictures were printed, except that in its manufacture a dye had been incorporated into the celluloid base.

Most of the sound or talking movies today are produced with the sound record on a strip alongside the individual picture frames which carry

the visual record. This strip varies in transparency. A beam of light passes through it as it runs through the projector, and thence to a photoelectric cell, which converts the variations of light to variations in electric current. This current is amplified, and operates loud speakers, where it is converted to sound.

Just as photographic plates are very sensitive to blue or violet light, and very insensitive to red light, for which reason a red light is used in their development, the photoelectric cell is also most sensitive to blue-violet light. Thus, when red tinted film was used, the color of the film prevented the light getting through to the cell. Yellow stock, though it did not absorb as much of the active light rays, also absorbed some of them, and even the blue film was not exactly the right color for the maximum sensitivity.

Sixteen separate tints have now been developed, running the entire range of the spectrum. A seventeenth is without color, but imparts a silvery hue to the picture. The peculiar thing about these new colors, however, is that (*Turn to next page*)

TUNE IN

on Science Service's Radio Talks

Every week a radio talk on science, prepared by Science Service, is given from each of the stations listed below at the times mentioned. Times are in standard time of the locality.

- KFMX** NORTHFIELD, MINN.; Carleton College; 1250 kc., 1000 watts. Monday, 11:00 to 11:15 a. m.
- KFRU** COLUMBIA, MO.; Stephens College; 630 kc., 500 watts. Tuesday, 5:00 to 5:15 p. m.
- KGBU** KETCHIKAN, ALASKA; Alaska Radio and Service Co.; 900 kc., 500 watts. Wednesday or Friday, 7:00 to 7:15 p. m.
- KGU** HONOLULU, T. H.; The Honolulu Advertiser; 940 kc., 500 watts. Irregular times.
- KGW** PORTLAND, OREGON; The Portland Oregonian; 610 kc., 1000 watts. Sunday, 5:00 to 5:15 p. m.
- KOAC** CORVALLIS, OREGON; Oregon State Agricultural College; 560 kc., 1000 watts. Friday, 7:30 to 7:45 p. m.
- KUOA** FAYETTEVILLE, ARKANSAS; Roy E. Burton; 1390 kc., 1000 watts. Monday, 8:30 to 8:45 p. m.
- KVOO** TULSA, OKLA.; Southwestern Sales Corporation; 1140 kc., 5000 watts. Monday, Tuesday or Thursday, between 12:45 p. m. and 1:30 p. m..
- WCAD** CANTON, N. Y.; St. Lawrence University; 1220 kc., 500 watts. Tuesday, 12:30 to 12:45 p. m.
- WCAJ** LINCOLN, NEBRASKA; Nebraska Wesleyan University; 590 kc., 500 watts. Friday, 4:30 to 4:45 p. m.
- WDAE** TAMPA, FLORIDA; Tampa Daily News; 620 kc., 1000 watts. Irregular times.
- WEAO** COLUMBUS, OHIO; Ohio State University; 550 kc., 750 watts. Friday, 12:50 to 1:05 p. m.
- WGR** BUFFALO, N. Y.; W G R, Inc.; 550 kc., 1000 watts. Thursday, 6:15 to 6:30 p. m.
- WHAS** LOUISVILLE, KENTUCKY; Courier-Journal and Louisville Times; 820 kc., 6,500 watts. Tuesday, 10:00 to 10:15 a. m.
- WHAZ** TROY, N. Y.; Rensselaer Polytechnic Institute; 1300 kc., 500 watts. Monday, between 9:00 and 11:00 p. m.
- WHBY** WEST DE PERE, WISCONSIN; St. Norbert College; 1200 kc., 100 watts. Friday, 7:30 to 7:45 p. m.
- WHO** DES MOINES, IOWA; Bankers Life Co.; 1000 kc., 5000 watts. Tuesday, 11:45 a. m. to 12:00 m.
- WMAL** WASHINGTON, D. C.; M. A. Leese Radio Co.; 630 kc., 250 watts. Thursday, 7:15 to 7:30 p. m.
- WMAQ** CHICAGO, ILLINOIS; Chicago Daily News; 670 kc., 5000 watts. Saturday noon or Thursday afternoon.
- WSM** NASHVILLE, TENNESSEE; National Life and Accident Insurance Co.; 650 kc., 5000 watts. Wednesday, 5:45 to 6:00 p. m.
- WWVA** WHEELING, WEST VIRGINIA; West Virginia Broadcasting Corp.; 1160 kc., 250 watts. Thursday, 6:00 to 6:15 p. m.

If none of these stations are within reach of your radio set, write to the Program Director of your favorite radio station, suggesting that he add Science Service's radio talks on "Science News of the Week" to his schedule. Full information from

SCIENCE SERVICE
2101 B Street Washington, D. C.

Million Watts—Cont'd

Now, however, and until such unprecedentedly powerful stations are built, the solution of the interference problem must rest principally in proper design of electrical apparatus.

"The real difficulty lies in the modernization of household equipment such as electric fans, oil burners, cash registers, electric refrigerators, vacuum cleaners, and violet-ray machines," he said. "All of these must be designed with elimination of radio interference in mind. It is difficult to estimate the cost to the electrical industry of the necessary modification of such devices to accomplish this objective, but as nearly as can be estimated, the equipment of all vacuum cleaners, washing and ironing machines, oil burners, and sewing machines with chokes and filters so that they can be operated from the same power circuit as a radio receiver of the sensitivity at present used without noticeable interference would have cost the electrical industry ten million dollars for 1928."

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The highway that links the Nile and the Congo is pronounced one of Africa's most notable economic achievements in many years.

New Film—Cont'd

while they appear blue, green, yellow, etc., to the eye, each of them contains some blue-violet as well, and so transmits the color required for the photoelectric cell. Dr. Jones demonstrated this by superimposing pieces of the film of the different tints on each other in piles of six or eight. No matter what combinations were used, blue-violet light penetrated in every case, showing that they were all transparent to this color.

According to Dr. Jones, the use of these tints will aid the movies in arousing the desired emotional moods of the audience. With the use of tints the actual lighting of outdoor or indoor scenes can be simulated, and there is added realism, even though the color is a solid one over all parts of the picture, and not true color photography, where each object has its proper color. The person seeing such a tint tends to associate it with one of the main parts of the picture. Thus green, for a forest scene, suggests young foliage, grass, gardens, etc., but it may also be used in quite different scenes to suggest the freshness of youth, stated the speaker.

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