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FCC SWAMPED WITH ADVICE ON ULTRA-HIGH FREQUENCIES

The Federal Communications Commission was so snowed under with gratuitous advice this week on what to do with the ultra-high frequencies that indications were it will take months for it to reach any conclusions. And the expert recommendations of technicians were just beginning.

So many witnesses appeared with carefully prepared papers that Chairman Anning S. Prall about the middle of the week suggested that most of them merely file their reports without reading them.

Television, and its possible effects on aural broadcasting and other radio services, was far and away the favorite topic. All speakers agreed that visual broadcasting, on a broad scale at least, is still several years ahead despite the approaching inauguration of ambitious experiments by the Radio Corporation of America, the Columbia Broadcasting System, the Don Lee Broadcasting System (already begun), and others.

The principal obstacle to more immediate public acceptance of the new art, it was brought out, is that receivers will be very expensive at the outset. James M. Skinner, President of the company that makes Philco radios, suggested that they may cost as much as a small automobile and that they will never come down to the level of radio receivers.

Caution in assigning channels in the ultra-high frequency bands was urged upon the Commission on all sides while at the same time government services, educators, organized police, and commercial interests clamored for substantial blocs of the unproved waves.

The FCC, it appeared, will need many more channels than those available above 30,000 kilocycles to meet the demands of all groups that have appeared at the hearing.

Even the commercial interests were fighting among themselves as well as collectively against the government services and the educational organizations represented by the U. S. Office of Education and the National Advisory Council on Radio in Education.

Warnings against monopoly in television and other new radio fields, such as facsimile broadcasting, came from the organized broadcasters, through James W. Baldwin, Managing Director of the National Association of Broadcasters, and from Samuel E. Darby, Jr., a spokesman for 11 so-called independent radio set manufacturers.

David Sarnoff, President of the RCA, which is leading the field in television and facsimile experimentation, was more aggressive than most of the witnesses in suggesting that advance reservations of frequencies be made for future services, such as television, facsimile, and high-frequency broadcasting. He stated, however, that individual allocations, save for experiments, should be reserved until public service is possible.

Dr. Frank Jewett, of American Telephone & Telegraph Company, protested, with others, loudly against the demand of Dr. J. H. Dellinger, speaking for the government services, for about 60 per cent of the frequencies between 30,000 and 200,000 kc.

Both Dr. Jewett and Mr. Sarnoff urged the Commission to give the industry ample latitude for experimentation, unrestricted by bureaucratic regulations.

William S. Paley, Columbia Broadcasting System President, who is watching RCA's experiments closely, warned the Commission against leaping into the dark "just for the sake of leaping" and advised against too hasty removal of the experimental ban on television.

Labor organizations, through Edward N. Nockels, of Chicago, warned against allowing "powerful corporations" or "selfish interests" to "hog the air".

"Whoever controls the allocation of radio channels in the future", he said, "will control the destiny of the land for good or evil."

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COAST GUARD TESTS NEW EMPLIFIER DEVICE

A newly-constructed public address equipment light enough to be installed in airplanes, yet sufficiently powerful to shout hurricane warnings over a radius of one mile, was demonstrated this week by the U. S. Coast Guard at Fort Hunt, Va.

The new equipment is to be installed in several selected Coast Guard airplanes and cutters in the principal hurricane areas to facilitate the spread of warnings to fishermen of the sudden approach of a storm. The loud speakers also will be used in flood-stricken areas and to direct rescues at sea.

Weighing only 115 pounds, the equipment, consisting of an amplifier, microphone, loud speaker and mountings powered by a single 15 volt battery, giving off 55 watts of current, is sufficiently powerful to be heard for a mile around an altitude of 3,500 feet.

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FREQUENCY MODULATION EXHIBIT SENSATION AT HEARING

A demonstration of a frequency modulation device by Maj. Edwin H. Armstrong, Professor of Electrical Engineering at Columbia University, and noted radio inventor, proved a sensation at the FCC engineering hearing this week.

Commissioners and FCC engineers showed an intense interest in the exhibit as Major Armstrong ran off disk recordings of both amateur and long wave broadcasts to show the superiority of frequency modulation to the amplitude modulation now in use by long wave stations.

Commr. T.A.M. Craven, FCC engineer, was quick to point out, however, that the development could not be adapted to the regular broadcast band at this stage in radio transition as it would mean the scrapping of millions of dollars worth of transmitting and receiving equipment.

Major Armstrong ran off records of broadcasts from a Yonkers (N.Y.) ham station and a network long-wave station. The frequency modulation produced programs free from all static or noise, while the same records played with amplitude modulation were full of static, whistles, and other noises.

The recordings of the network programs were made, he said, during a severe thunderstorm in New York, yet they were reproduced with the clarity of a ringing bell.

Major Armstrong admitted that the frequency modulation, developed during the past two years, is impractical for adaptation to regular broadcast stations at this stage. He said it would require extremely wide band, so wide, in fact, that hardly more than one station could be established on the present regular broadcast band. He visualized the time, however, when the ultra-high frequencies will play a leading role in the field of aural broadcasting and when his invention will greatly improve the technical quality of radio transmission.

An amateur in radio in 1906, Major Armstrong is the inventor of the super-heterodyne and super-regenerated circuit and other radio developments. He has made a fortune in the radio industry but still is vitally interested in its technical progress at Columbia University, where he has been on the faculty for 20 years.

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Station WTIC (The Travelers Broadcasting Service Corp.,) Hartford, Conn., has filed an application with the Federal Communications Commission for an extension of special experimental authorization to change frequency from 1060 kilocycles to 1040 kilocycles, hours of operation from sharing with WBAL, to simultaneous with KRLD (unlimited) for period from 8/1/36 to 2/1/37.

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McCOSKER URGES LATITUDE FOR TELEVISION

An appeal for "logical latitude" in the control of television experimentation was made by Alfred J. McCosker, Chairman of the Board of the Mutual Broadcasting System and President of the Bamberger Broadcasting Service (WOR, Newark, N. J.) before the Federal Communications Commission hearing this week.

"The radio industry has reached the ripe old age of fifteen years and many of us who are before you today are the pioneers of yesterday", he said. "Therefore, our observations are taken from the pages of fact and not from the text of fiction.

"In the early twenties, transmitting equipment was very expensive and approximately one person in each 1000 population had a radio receiving set. At that time, radio had no immediate or definite prospective commercial value. Scores of stations similar to WOR undertook enormous expenditures in the spirit of adventure typical of our forebears in a field which gave promise of contribution to the public weal.

"For the first five years it was a continued expenditure with not one penny of revenue. During that period WOR spent a million dollars. What we did was duplicated by KDKA, WGY, the Chicago Tribune station WGN, the Detroit News, the Atlanta Journal and scores of others.

"In recent years, revenue has been obtainable but concurrently has come the need for improved equipment, enlarged operating personnel, extensive non-revenue public service programs and an army of costly talent.

"However, the real dividend, which we, the broadcasters, have received, exists in the fact that the U. S. admittedly has led the world in this new art. Other countries have adopted systems unlike ours; systems ranging from government ownership to government control and subsidizing stations to a listeners' tax. Whatever criticism may be directed at our system has its complete answer, not only in the comparison or progress, but greater still in the comparison of the availability of radio to education and every political and religious creed. The valued freedom of the press has, I contend, been personified in the American system of radio.

"Mindful of what I have said as to the early days of radio, may I point out that we are again facing a long series of pioneering in television, facsimile and kindred activities? Not one of these has commercial possibilities for many years to come. There are today fewer receiver sets capable of receiving the high frequencies than there were receiver sets capable of receiving the broadcast band in the early twenties.

"Unless the experiments we are now conducting and are about to conduct reveal something which has a tangible public value and public appeal, our efforts will have failed. If this experimentation be successful, it will require several years to build and distribute the receiving sets. Without the audience, the commercial possibilities are nil.

"How these new public services shall be controlled, it is not my purpose here to discuss. The serious problem of how

facsimile and television will be launched and controlled will be vibrant in giving concern to thoughtful minds.

"The important 'New York Times' in its Sunday editorial - yesterday (June 14) discusses the subject in a most capable fashion commenting on a study of television and the movies conducted by the Scientific Committee of the Research Council of the Academy of Motion Picture Arts and Sciences. 'The Times' propounds the question 'But who will guide the destiny of television when it does come? Will the radio companies assume control as their affiliation with sound pictures seems to indicate? Or will the Motion Picture industry simply evolve into a television organization which will concern itself with the transmission of images and leave the making and selling of receivers to the radio companies? Even now, the strategists must be laying their plans to wage a struggle that will decide which of the two conflicting groups is to entertain the continent.'

"It is obviously prudent to cross each bridge as we reach it. The bridge immediately ahead is that of experimentation. If the critics and debasers had prevailed, we would have had no Columbus, Pasteur, Bell, Edison, Byrd or Marconi.

"We, therefore, earnestly bespeak of this Commission to give the greatest logical latitude towards the interested and courageous individuals and corporations who now propose to hazard additional money to make available to the public the new wonders of facsimile and television."

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TELEVISION STANDARDS RECOMMENDED BY RMA WITNESS

Declaring that the time has arrived for the radio industry to recommend tentative television standards and to suggest frequency assignments to the Federal Communications Commission, Albert F. Murray, one of the Radio Manufacturers' Association's expert witnesses at the engineering hearing this week said the RMA considers the following to be important basic television requirements:

- "1. A single set of television standards for the U.S.A.
- "2. Frequency channels of adequate width, 6 Mc., necessary for the transmission of high-definition pictures - pictures which experience has shown possess sufficient detail to afford sustaining interest - pictures which will approach the quality of home movies.
- "3. Television, with its accompanying sound, should be in that portion of the ultra-high frequency spectrum best suited to this service (the 42-90 Mc. region). This band must be wide enough for a sufficient number of channels to permit the simultaneous broadcasting of a reasonable number of programs in a given territory.

- "4. The television frequency band, or bands, should be as continuous as possible because of the convenience this affords in tuning, and because this permits the design of simpler, cheaper home television receivers.
- "5. A space in that experimental region above 120 Mc. for television relaying, pick-up work and expansion. This space is to be shared with other services until that time arrives when, in the opinion of the Commission, definite assignments should be made. Then there will be required the allocation of a continuous band wide enough for a sufficient number of channels for future television service."

Turning from purely technical consideration to the economic and social side of television, he said:

"In order that television may avoid the difficulties now being experienced in aural broadcasting, let us plan at the outset channels of sufficient width and proper arrangement. This means that plans for high-fidelity television, based on the standards suggested by the radio industry, must be laid now. Any other course will later lead to the obsolescence of television receivers.

"How will this new art affect our national life? Television, supplementary to, but not taking the place of sound broadcasting, will some day win for itself a place of importance in our national life approaching that of present-day aural broadcasting. We say this because we engineers have observed with keen interest the reaction of individuals to whom we have shown television. The groups have been small but sufficiently varied to present a cross-section of public opinion. With one accord they have expressed deep interest.

"We believe television, when it reaches the commercial stage, will form the basis of a new industry, an industry producing television equipment in our factories and producing programs in the studios. Thousands of workers will be required to manufacture, distribute and maintain television service in the U.S.A.

"Naturally television will some day become the useful and valued servant of a large portion of the American people. The number of our people to be served will be limited by (a) the range of television transmission on ultra-high frequencies, averaging about 25 miles, (b) the initial cost of transmitters, receivers and programs, and (c) the yet unsolved problems of utilizing for transmission the higher end of the ultra-high frequency band.

"In asking for the frequency band beginning at 42 Mc. we point out that this part of the spectrum is now, and for years has been allocated by the Commission to experimental visual broadcasting. It has been found that in this band the peculiar requirements for television (that is, wide channels and metropolitan coverage) can be met, at least at the lower frequency end. It is logical, therefore, to ask for the continued use of these frequencies. The wisdom of the Commission in designating, five years ago, this particular band for this particular service is shown by the radio industry's recommendations today contained in the formal report from the Radio Manufacturers' Association."

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POLICE CHIEF RAPS COMMERCIAL GRAB AT ULTRA-HIGH FREQUENCIES

Declaring that the ultra-high frequencies are in danger of being "gobbled up" by commercial interests, Capt. D. S. Leonard, of the International Association of Chiefs of Police, told the Federal Communications Commission at the engineering hearing that it was the duty of the organized police to seek a just share of the new wave bands.

The amateurs are entitled to the "lion's share of credit", he said, for developing communication in the ultra-high frequencies.

"I wouldn't have the fortitude even though representing the important service I do", he added, "to stand before you in an attempt to confiscate this important band between 30 and 42 megacycles to the exclusion of commercial and other interests who have just needs for such channels in promoting good and welfare.

"And if any service, governmental or otherwise, thinks they are going to get away with that without hearing from the service which protects the lives and property of citizens in times of peace as well as war, they are mistaken.

"We would betray a sacred trust if we didn't seek our just share of frequencies."

Dividing police needs into four classes, Chief Leonard said that the State Police system, which now has 12 frequencies, seven of which are shared with Canada and two with municipal stations, should have at least 16 additional channels.

"Municipal police have 22 frequencies of which 10 are shared with Canada in 2310-2490 kc.", he continued. "There are now 230 municipal stations. The present conditions are far from satisfactory and with a 2-way development a 300 per cent increase in messages has resulted.

"We admit we must make our frequency tolerance more rigid and that selective receivers will have to be manufactured and used by police."

In the ultra-high frequencies, the Police Chief added, a city operating 250 cars needs five fixed and ten mobile stations. For the intercity policy radio system, eight fixed stations, ten mobile, four fixed mobile, and one special mobile stations are required.

Television and facsimile, he said, will aid in the transmission of photographs of criminals and finger-prints from one city to another.

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LIST OF REPRESENTATIVES AT FCC HEARING

Partial list of those attending the informal engineering hearing before the Federal Communications Commission:

John Aitkenhead, Jr., Akron, Ohio, Station WADC; Fred W. Albertson, Radio Lawyer, Washington, D. C.; R. D. Armiger, Short Wave Institute of America, Washington, D. C.; Edwin H. Armstrong, Columbia University, New York City; Isaac Z. Bachwalter, Mason-Dixon Radio Group, Inc., Lancaster, Pa.; J. Wm. Bein, Canadian Government, Ottawa, Canada; I. R. Baker, RCA, Camden, N. J.; James W. Baldwin, Managing Director, National Association of Broadcasters, Washington, D. C.; Thomas Baker, Press Wirless, Inc., Hicksville, New York City.; John H. Barron, Consulting Radio Engineer, Washington, D. C.; W. E. Beakes, Tropical Radio Co., Boston, Mass.; Carroll O. Bickelhaupt, American Telephone & Telegraph Co., New York City; Harold R. Blomquist, United Electric Railways Co., Providence, R. I.; H. L. Blatterman, Chief Engineer, Station KFI, Los Angeles, Cal.; L. F. Bockerem, Western Electric Company, New York City; Ralph Bown, Bell Telephone Laboratories, Maplewood, N. J.; John B. Brady, Lawyer, Washington, D. C.; Wm. M. Brandon, Central Broadcasting Co., Davenport, Ia.; B. F. Brooke, Penna. R.R. Co. (Retired), Philadelphia, Pa.; Elmer L. Brown, Chief Engineer, Brown Rayphones, San Francisco, Cal.; J. Stanley Brown, President, Washington Radio Club; Observer PEPCO, Washington, D. C.; Carl H. Butman, Radio Consultant, Washington, D. C.

Martin Campbell, Gen. Mgr., WFAA, Dallas, Texas; E. K. Cargill, Pres., WMAZ, Macon, Ga.; H. K. Carpenter, V.P., Gen-Mgr., Radio Air Service Crp., Cleveland, Ohio; Howard A. Carter, Sec. of Council on Physical Therapy, Chicago, Ill.; Lloyd N. Chatterton, Cleveland Police Dept., Cleveland, Ohio; Ralph Clark, V. Pres., Television Corp. of America, New York City; Robert L. Coe, Station KSD, St. Louis, Mo.; E. K. Cohan, Columbia Brdcastg. System, New York City; J. O'R. Coleman, Edison Elect. Inst., New York City; F. B. Coles, Canadian Pacific RR., Montreal, Canada; Ray Collins, Station WFAA, Dallas, Tex.; A. L. Colston, N. Y. C. Board of EA, New York City; H. L. Cornell, Amer. SS Owners Assn., New York City; H. P. Corwith, Western Union Telg. Co., Watermill, L. I., N.Y.; A. J. Costigan, Radiomarine Corp. of America, New York City; Homer B. Courchene, Downers Grove, Ill., Station WLS; Andrew W. Cruse, Dept. of Commerce, Washington, D. C.; L. G. Cumming, Engr. Metropolitan Dist. Com., Boston, Mass.

Raymond Dalton, Station WDNC, Durham, N. C.; C. F. Daugherty, Station WSB, Atlanta, Ga.; Jas. F. Davenport, Supt. of Hydro Generation, Los Angeles, Cal.; C. E. Davies, Western Union; Dr. J. H. Dellinger, Bureau of Standards, Washington, D. C.; Paul A. deMars, Yankee Network, Boston, Mass.; G. J. Dempsey, Engineer, FCC, Washington, D. C.; Edw. C. Denstaedt, Detroit Police Dept., Detroit, Mich.; Jno. D. DesRocher, Supervisor of Police Station, WRDR, Grosse Pointe, Mich.; Hon. C. C. Dill, radio Lawyer, Washington, D. C.; F. M. Doolittle, Manager, WDRC, Hartford, Conn.; Jas. G. Drysdale, Chief of Police, Grosse Pointe Park, Mich.; J. D. Durkee, Western Union Co., Chief Engr., Bartlesville, Okla.; H. W. Eales, Rep. Edison Elect. Inst., Chicago, Ill.; E. W. Engstrom, RCA Mfg. Co.; Walter Evans, Westinghouse E & M., Springfield, Mass.

F. B. Falkner, Col. Brdcastg. Syst., Chicago, Ill.; Philo T. Farnsworth, Farnsworth Television, Inc., Philadelphia, Pa.; Capt. Chas. D. Farmer, Capt., State Highway Patrol, Raleigh, N. C.; John E. Fetzer, Pres., WKZO, Inc., Kalamazoo, Mich.; W.G.H. Finch, Finch Telecommunications Labs., New York City; Ben S. Fisher, Radio Lawyer, Washington, D. C.; Donald Flamm, Pres., Station WMCA, New York City; Wm. L. Foss, Cons. Engineer, Washington, D. C.; Lt. F.R. Furth, U.S. Navy, Washington, D. C.

D. W. Gellerup, Milwaukee Journal Co., Milwaukee, Wis.; Glenn D. Gillett, Cons. Radio Engr., Washington D. C.; Theo R. Gilliland, Amer. Section Inter. Natl. Scientific Radio Union, Washington, D. C.; Earle D. Glatzel, Edison Elec. Inst., Detroit, Mich.; Paul F. Godley, Cons. Engineer, Montclair, N. J.; G. N. Goldberger, Chf. Engr. Television Research Corp., Brooklyn, N. Y.; Paul Goldsborough, Aero. Radio, Inc., Washington D. C.; Dr. P. C. Goldmark, CBS, Brooklyn, N. Y.; Paul J. Gollhofer; Emil J. Gott, Hearst Radio, Inc., and E. J. Gough, same, New York City; V. Ford Greaves, Chief Insp., FCC, San Francisco, Cal.; William Green, Amer. Fed. of Labor, Washington, D. C.; S. D. Gregory, Westinghouse E. & M., Springfield, Mass.; Gerald C. Gross, Engineer, FCC, Washington, D. C.; James W. Gum, Radio Lawyer, Washington, D. C.

C. D. Haigis, Haigis Labs. & Dept. of Con. & Dev. Forest Fire Service, of N.J., Maple Shade, N. J.; Hugh A. L. Halff, WOAI, San Antonio, Tex.; J. T. Hallman, Plant Engr., WOAI; R. V. Hamilton, St. Louis Star Times, Station W9XOK, St. Louis, Mo.; James H. Hanley, Radio Lawyer, Washington, D. C.; E. H. Hansen, 20th Century Fox Film Corp., Hollywood, Cal.; Harry Harvay, Chf. Engr., KFAB-KOIL, KFOR, Lincoln, Neb.; Herman Haverkamp, N.Y.C. Bd. of EA, New York City; Volney D. Hurd, Christian Science Monitor Boston, Mass.; J. G. Haycock, Haigis Labs., Inc., Maple Shade, N.J.; Alan Hazeltine, Hazeltine Corp., Hoboken, N.J.; Ralph Heintz, Globe Wireless, Ltd., San Francisco, Cal., Palo Alto, Cal.; P. J. Hennessey, Jr., NBC, Washington, D. C.; Jas. M. Herring, Univ. of Penna., Lansdowne, Pa.; Walter R. Hoffman, Detroit News Station WWJ, Detroit, Mich.; Hamilton Hoge, Television Corp. of America, New York City; Paul W. Hord, Lt., U.S. Navy, Washington, D. C.; C. W. Horn, Engineer NBC, New York City; L.C.F. Horle, Cons. Engineer, New York City; Harvey Hoshour, A. T. & T., New York City; G. Porter Houston, Baltimore, Brdcastg. Corp. WCBM, Baltimore, Md.

E. C. Immel, Engr. in Charge, Mich. State Police, E. Lansing, Mich.; Geor K. Jacobsen, Ch. Engr. Stations WDGY WIXAT KIRI, Minneapolis, Minn.; J. F. Jarman, Jr., WDNC, Durham, N.C.; Dr. Frank Jewett, A. T. & T., New York City; Edw. R. Johnston, WIP, Philadelphia, Pa.; W. R. Johnston; Dr. C. B. Jolliffe, RCA of America, New York City; Ralph D. Jones, Engineer FCC, Washington, D. C.; Alexander Kahn, WEVD, New York City; Lambdin Kay, Atlanta Journal, Atlanta, Ga.; Wm. D. Kelly, WFBR, Baltimore, Md.; Bruno W. Kern, Asso. Engrs., Newark, N. J.; Kern Emil A., same; Ralph H. Kimball, Western Union, New York City; S. M. Kintner, Westinghouse E. & M., Pittsburgh, Pa.; Glenn Koehler, Asst. Prof. of Elec. Engr., U. of Wis., Madison, Wis.; Chas. C. Kolster, Inspector in Charge, FCC, Boston, Mass.; F. A. Kolster, International Tel. & Tel., New York City.

Glen G. Langdon, American Gas & Elec. Co., Danville, N. J.; Leroy G. Leighton, Aviation Division, State Road Dept., Jacksonville, Fla.; Leroy J. Leishman, Independent Research, Los Angeles, Cal.; John G. Leitch, WCAU Brdcstg. Co., Philadelphia, Pa.; R. D. LeMert, V. P., DeForest Television Corp., Hollywood, Cal.; Walter S. Lemmon, International Business Mach. Corp., New York City; Capt. D. S. Leonard, International Asso. Chief of Police Detroit, Mich.; G. F. Leydore, WLW, Mason, Ohio; Fred M. Link, Radio Consultants, New York City; Donald K. Lippincott, Farnsworth Television, Inc., San Francisco, Cal.; W. B. Lodge, Columbia Brdcstg. System, New York City; Philip G. Loucks, Radio Lawyer, Washington, D. C.; P. A. Loyet, Tech. Director WHO, Des Moines, Ia.; Harry R. Lubcke, Director of Television, Don Lee Brdcstg System, Los Angeles, Cal.; Leon Levy, WCAU, Philadelphia, Pa.; G. F. Luydorf;

Mark L. MacAdam, Technician, Construction & Maintenance, Brockton, Mass.; J. O. Maland, V.P. WHO, Des Moines, Ia.; T. P. Mathenson, Amateur radio, Richmond, Va.; Tech. Dir. Mason-Dixon Radio Group, Inc., T. E. Mathief, Lancaster, Pa.; Maynard Marquardt, WCFL W9XAA W9XI, Chicago, Ill.; John Marshall, Rockefeller Foundation, New York City; Frank Marx, Station WMCA, New York City; Clair R. McCollough, Gen. Mgr., Mason-Dixon Radio Group, Inc.; Alfred J. McCosker, WOR, Newark, N. J.; Jas. C. McNary, Radio Engineer, Washington, D. C.; G. O. Milne, Eastern Division Eng., NBC, New York City; J. M. Moroney, WFAA, A. H. Bele Corp., Dallas, Tex.; Laurence F. Mott, Wisc. Conservation Dept., Tomahawk, Wis.; Frank E. Mullen, RCA, New York City; J. D. Munton, Atlancit Communications Corp., Upper Darby, Pa.; Adrian Murphy, CBS, New York City; Albert F. Murray, Philco Radio & Television Corp., Philadelphia, Pa.

W. D. Neil, Canadian Pacific Ry. Co., Montreal, Canada; Eliot Neww, Director of Public Safety, Cleveland, Ohio; John L. Niesse, Detroit, Mich.; E. N. Nockels, WCFL, W9XAA W9XI, Glencoe, Ill.; G. S. O'Connor, Md. State Dept. of Forestry, Baltimore, Md.; Harold L. Olesen, Western Elect. Instr. Corp., W. Orange, N. J.; H. S. Osborne, A. T. & T., New York City.

William Pabst, Brooklyn Technical High School, Garden City, L. I.; E. C. Page, Cons. Engr., Evanston, Ill.; William S. Paley, Pres., CBS, New York City; Herbert M. Peck, WKY Oklahoma City, KLZ, Denver, Oklahoma City, Okla.; Harold G. Peery, Don Lee Brdcstg. Syst., Los Angeles, Cal.; Armstrong Perry, Washington, D. C.; R. M. Pierce, WJR WGAR, Cleveland, Ohio; James V. Piersol, Detroit News, Detroit, Mich.; J. R. Poppele, WOR, Newark, N. J.; Haradon Pratt, Mackay Radio & Telg. Co., New York City; M. L. Prescott, General Elec. Co., Schenectady, N. Y.; Arthur G. Previn, Elect. & Exporter, Washington, D. C.; Walter J. Quick, Jr., Md. State Dept. of Forestry, Baltimore, Md., Catonsville, Md.; E. J. Quinn.

Wm. Q. Ranft, Chf. Engr. WFBR, Baltimore, Md.; Geo. P. Rankin, Jr., WMAZ, Macon, Ga.; Robt. Robins, New York City; R. J. Rochwell, Crosley Radio Corp., Cincinnati, Ohio; Reed T. Rollo, Attorney, Washington, D. C.; Paul Rosekrans, Communications Engr., State of N. C., Raleigh, N. C.; Harold Rothrock, Attorney, Washington, D. C.; Comdr. W. J. Ruble, Bureau of Engr., Washington, D. C.

Edw. R. Sanders, Development Engr., WTIC, Hartford, Conn.; David Sarnoff, Pres. Radio Corp. of America, New York City; Lt. C. J. Scavarda, Mich. State Police, E. Lansing, Mich.; Arthur Scharfeld, Attorney, Washington, D. C.; Wm. J. Scripps, Station WJW & W8XWJ, Detroit, Mich.; G. Richard Shafto, WIS, Columbia, S. C.; H. G. Shrode, Coast Guard Hdqrs., Washington, D. C.; A. G. Simson, U. S. Forest Service, Portland, Ore.; Lloyd H. Simson, Bureau of Air Commerce, Washington, D. C.; Hector R. Skifter, Natl. Battery Brdcstg. Co., St. Paul, Minn.; G. W. Spaulding, Penna. Water & Power Co., Baltimore, Md.; John W. Starke, Washington, D. C.; L. W. Stinson, KVOO, Tulsa, Okla.; A. A. Stuart, Aviation Div. State Road Dept., Jacksonville, Fla.; Jno. W. Studebaker, U. S. Commissioner of Education, Washington, D. C.

T. DeWitt Talmadge, Tenn. Valley Authority, Chattanooga, Tenn.; G. L. Taylor, W9XBY, Kansas City, Mo.; Wm. Edw. Taylor, Lt. Balto Police Dept., Baltimore, Md.; Kern Tips, Manager KPRC, Houston, Tex.; F. E. Travis, Ch. Engr. W4XAU, Nashville, Tenn.; Seymour Turner, Farnsworth Television, Inc., Philadelphia, Pa.; G. H. Underhill, Edison Elect. Inst., Poughkeepsie, N. Y.; J. H. Uhalt, Pres. Station WDSU, New Orleans, La.; Harold C. Vance, RCA, Chicago, Ill.; E. J. Vandewall; Irving Vermilya, Gen. Mgr. WNBK, Owner Police Radio WPFN, New Bedford, Mass.; S. M. Viele, Penna. RR Co., Swarthmore, Pa.

H. J. Walls, Immigration & Nat. Service, Washington, D. C.; K. B. Warner, American Radio Relay League, Inc., W. Hartford, Conn.; Sydney E. Warner, Ch. Engr. Station W1XBS, Waterbury, Conn.; Chas. V. Wayland, Radio Lawyer, Washington, D. C.; Fred Weber, Mutual Broadcasting System, New York City; C. H. Wesser, Chief E8XWJ, Detroit, Mich.; Wm. H. West, Station WTMV, St. Louis, Mo.; John H. Wharton, Atty. for Mackay Radio & Telg. Co., New York City; Lynde P. Wheeler, Consulting Physicist, Washington, D. C.; J. E. Whitehouse, Chf. Trans. Eng. WLW, Crosley Radio Corp., Mason, Ohio; L. E. Whittemore, A. T. & T., New York City; Horatio B. Williams, Columbia Univ. (Amer. Medical Assn.), New York City; Ralph O. Williams, Engr. Radio Project Dept. of Conserv. Mich., E. Lansing, Mich.; John E. Wing, Chicago, Ill.; Dr. Frank Wolff, Telephone Engr., Bureau of Standards, Washington, D. C.; F. W. Wozencraft, RCA, New York City; Grant Wrathell, Ass. McNary & Chambers, Washington, D. C.; Comdr. F. A. Zeusler, U. S. Coast Guard, Washington, D. C.

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GOVERNMENT TELEGRAPH RATES CONTINUED ANOTHER YEAR

The Telegraph Division of the Federal Communications Commission this week issued an order continuing the government telegraph rates of up to 40 per cent of commercial charges from July 1, 1936, to June 30, 1937.

Copies of the order may be obtained from the FCC offices in Washington.

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HEARST SPOKESMAN SUGGESTS BROADER BROADCAST BAND

Expansion at both ends of the broadcast band was proposed at the Federal Communications Commission hearing this week by J. C. McNary, consulting engineer, on behalf of Hearst Radio, Inc., which is rapidly becoming an important factor in the broadcasting field.

The broadcast band, now 550 to 1500 kc., might be lowered to include 520, 530, and 540 kc., channels, Mr. McNary said, and be raised to include up to 1600 kc., now used for experimental broadcasting only.

The expansion, he insisted, would alleviate the present congestion of broadcasting stations and at the same time provide facilities for new stations, chiefly 100-watters, although possibly a high-power clear channel outlet.

Objection to the lowering of the band was raised immediately, however, by Haraden Pratt, of the Mackay Radio and Telegraph Company. He pointed out that it would endanger the efficiency of SOS signals on 500 kc.

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ZENITH GETS GRUNOW PLANT, PLANS EXPANSION

The \$410,000 bid of the Zenith Radio Corporation for certain properties of the Grigsby-Grunow Company in Chicago was accepted this week by a referee in bankruptcy upon recommendation of creditors and bondholders.

Plans for an expansion of the Zenith Corporation were immediately announced by Hugh Robertson, Vice-President and Treasurer. Increased production and a concentration of facilities are contemplated.

The Grigsby property consists of four factory buildings and office and a warehouse. Mr. Robertson said present Zenith plans contemplate establishment of emergency manufacturing lines in the new space. The company now has three plants in Chicago which, he said, eventually would be transferred to the new location so that Zenith's manufacturing operations would be centralized.

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U. S. LEAD IN RADIO COMMUNICATION CITED BY JOLLIFFE

The United States, linked as it is by radiotelegraph with most of the nations of the world, large and small, is leading the world in developing this modern type of communication, Dr. C. B. Jolliffe, former FCC Chief Engineer, and now with R.C.A. Communications, Inc., told the Federal Communications Commission this week.

In discussing the activities and research of the corporation he represents, Dr. Jolliffe laid stress on the contributions made by RCA engineers and their constant efforts to improve the art of radio communication.

"The importance to the United States of radiotelegraph for international communication has been demonstrated so conclusively in the sixteen years since RCA entered the field that it would be superfluous to restate here the facts so well known to this Commission. It is sufficient to say that radio provides the United States with direct communication with all the major nations and most of the smaller nations of the world. This service is, of course, completely dependent on the assignment of radio frequencies.

"RCAC provides direct radio contact between the United States and 47 nations and between eleven cities within the United States. This service is open to the general public and therefore available to everybody in the United States.

"Frequencies which are useful for international communications are by their very nature capable of producing international interference. Consequently, in considering the allocation of frequencies to international services the interests of the entire world must be given consideration.

"High frequency waves are useful for long distance radio communication solely because ionized layers of extremely rarified gases exist many miles above the earth's surface. The layers, known as the 'Heaviside Layer', or more recently as the 'Ionosphere' are able to bend back radio waves which encounter them. When the waves which have been bent back by the ionosphere reach the earth's surface, they are again reflected upward toward the ionosphere and this process continues indefinitely until the energy of the waves has been dissipated. This ability of the ionosphere to bend radio waves depends upon the degree of ionization, upon the frequency of the radio waves, and upon the angle at which the waves enter the ionosphere.

"The intensity of ionization and the effective height of the ionosphere depends on the degree of exposure in the sun. Maximum intensity and minimum effective height occurs around midday in midsummer and minimum intensity and maximum effective height occur early in the morning just before sunrise in midwinter. Consequently we have a continuing diurnal change of highest possible and lowest usable frequencies for any circuit, relatively high frequencies being required for daylight service and relatively low frequencies for night service.

"The conditions in the ionosphere also change with the seasons as the proportion of daylight to darkness varies. Consequently we have an annual range of frequencies for use at any particular time of day. In addition to this there is superimposed a change brought about by change in the sun spot activity in an eleven year cycle. This means that the best frequency for a given distance varies daily, with the seasons and with the position in the eleven year sun spot cycle, and that for continuous service over a long period between any two distant points not one but several frequencies must be available to provide even a single channel of communication between such points.

"The frequencies assigned to RCAC are distributed throughout the usable portion of the radio spectrum. The number of frequencies assigned cannot be considered as the number of channels available since the condition of the ionosphere dictates the proper frequency to be used at a given time. RCAC circuits cover varying distances and have different conditions of daylight and darkness so that if a frequency is not useful for one circuit it may be useful for another. Full use is made of this possibility and the frequencies assigned are used as fully as the conditions of the ionosphere and the circuits permit."

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JETT EXPLAINS STATUS OF PRESENT RADIO SPECTRUM

As groundwork for the Federal Communications Commission, as well as commercial radio engineers, to work on in considering an allocation of new frequencies and a possible shakeup of bands now utilized, Lieut. E. K. Jeff, FCC Assistant Engineer, this week explained the present general status of the radio spectrum.

"Throughout the development of radio a fundamental problem has been the increasing demand for frequencies to care for the growth of individual services", he said. "To show the tremendously rapid growth in the use of radio frequencies during the last few years, a comparison with the original International Frequency List established by the Berne Bureau in December 1928 is illuminating. In the original list of December 1928, a total of approximately 1700 stations were listed. Five years later the number of stations were approximately 17,000, or a ten-fold increase. A rough check of the latest list dated March 1936 shows a total of 25,000 stations. These figures are for stations at fixed locations and do not include ship, aircraft, amateur and portable stations.

"Prior to the adoption of the International Radiotelegraph Convention of Washington in 1927 there was a general policy of freedom of operation throughout the radio spectrum. Today, however, as a result of extensive development and international agreement, we have a well-organized system of channeling of the ether which permits the allocation of radio channels in much the same manner as telephone and telegraph wires are assigned for private use.

"The Washington Convention was superseded in 1932 by the International Telecommunication Convention of Madrid. Article 7 of the General Radio Regulations annexed to this Convention provides for the use of frequencies from 10 to 60,000 kilocycles (wave lengths from 30,000 to 5 meters). All frequencies throughout this range, except between 30,000 and 56,000 kilocycles are reserved for specific classes of services.

"The radio spectrum is now generally believed to extend in frequency from 10 to several million kilocycles; however, since most of the activity to date has been reported on frequencies below 200,000 kilocycles (wave lengths above 1.5 meters), I will confine this discussion to these frequencies only.

"It is convenient to divide the radio spectrum into five major bands which are:

- (a) Low-frequencies; 10 to 100 kc.
- (b) Medium-frequencies; 100 to 550 kc.
- (c) Broadcasting; 550 to 1600 kc.
- (d) Medium-high frequencies; 1600 to 6000 kc.
- (e) High-frequencies; 6000 to 30,000 kc.
- (f) Very-high frequencies; 300,000 to 200,000 kc. and above.

"Low-frequency Band (10 to 100 kc). The low-frequency band is divided into 207 standard telegraph bands or channels

"The low-frequency band is best adapted for high-power long-distance communication necessitating extensive transmitting and receiving sites. The band, therefore, must be considered as being international in its service range and is used for fixed service. This band is occupied by 47 United States stations and 348 foreign stations, or a total of 395 stations in the world.

"Medium-frequency Band - (100 to 550 kc). These frequencies were the first to be made available for practical use. The band is now used throughout North America by government stations, stations engaged in fixed service communication; ship and coastal stations; aircraft, aeronautical and airport stations; and radiobeacon and direction-finding stations. The frequencies 530 and 540 kilocycles are also used for regional broadcast service in Canada, subject to no interference resulting to the mobile services.

"There are 369 standard-telegraph channels in the medium frequency range. There are about 6800 United States stations in this band. Reliable information is lacking as to the approximate number of foreign mobile stations operating on frequencies throughout the spectrum; however, according to the Berne frequency list there appear to be about 2750 foreign fixed and land stations operating on the medium frequencies; therefore excluding the thousands of foreign mobile stations there are roughly 9500 stations in the band.

"Broadcast Band - (500 - 1600 kc). The regular broadcast band extends in frequency from 500 to 1500 kilocycles. The band, however, was recently extended by the Commission to 1600 kilocycles in order to permit experimental operation on certain frequencies.

"Medium-high Frequency Band - (1600-6000 kc). This band is usually referred to as the continental band because the frequencies therein are considered as being regional in their

service range. Except for night operation on frequencies between 4000 and 6000 kilocycles, it is practicable to simultaneously use the medium-high frequencies on the various continents of the world without the possibility of serious interference resulting between continents.

"The band is used by maritime and aviation stations, police, amateur, point-to-point, government stations, and special stations including geophysical and motion picture stations. Until recently experimental television stations were assigned two channels, each 100 kilocycles wide, in the band between 2000 and 3000 kilocycles. However, unless protests are filed requesting a hearing the action of the Commission in shifting these stations to the very-high frequency band will become effective on July 1, 1936.

"High-frequency Band (6000-30,000 kc). The 1376 standard channels between 6000 and 28,000 kilocycles are world-wide in their service range, the higher frequencies, above approximately 16,000 kilocycles being useful only over a daylight transmission path.

"It is recognized in the Madrid Regulations that frequencies between 6000 and 30,000 kilocycles are very efficient for long-distance communications. The administrations are required to make the greatest possible effort to reserve these frequencies for this purpose except when their use for short or medium-distance communication is not likely to interfere with long-distance communication.

"The skip-distance characteristics of frequencies vary from a few miles to more than a thousand miles, depending upon the frequency of operation, time of day, season, etc. Transmission is affected at times by magnetic storms, fading, and round-the-world echoes.

"Very-high Frequency Band (30,000 to 200,000 kc. and above). Except for the commercial use of frequencies above 30,000 kilocycles for inter-island public telephone service in Hawaii, which has been in successful operation since September 1931, all frequencies above 30,000 kilocycles have been licensed for experimental use only.

"Although the frequency characteristics of this band, for which commercial apparatus has been designed, are sufficiently well known at this time to leave no doubt as to their usefulness in many of the established services, the Commission has not received enough data to date to enable it to determine which particular frequencies within the entire range are most suitable for specific services. This hearing should be of assistance to us in this matter. These frequencies, however, are known to be best suited for short-distance communication, the exact distance being dependent upon the height of the receiving and transmitting antenna. Reports have been received indicating reliable reception during favorable daylight hours over long-distances such as across the ocean when using frequencies below 60 megacycles. Interference from electrical machinery and ignition systems of aircraft and automobiles is a serious factor to contend with in communication on these channels in congested areas, but appears to decrease in intensity as the frequency increases. Some reports indicate that this type of interference becomes almost negligible at approximately 200,000 kilocycles.

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"There is no reliable information available as to the amount of activity on frequencies above 110,000 kilocycles. In order to encourage the development of these frequencies the Commission on June 22, 1934, adopted Rules 309-a and 374-a, which permit the regular licensees of all classes of stations in the experimental service, including amateurs, to operate on any frequency above 110,000 kilocycles without separate authority therefor, provided such stations are operated only in the particular class of service for which the licensee holds a license for operation on the lower frequencies, and provided further that such operation is restricted to matters pertaining to fundamental research or amateur service as the case may be."

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BRIEFS

Trade representations unfair to competitors are alleged by the Federal Trade Commission in a complaint issued against Federal Enameling & Stamping Co., of McKees Rocks, Pa., and Pittsburgh, manufacturer of porcelain enamel kitchen utensils sold under the trade name "Federalware". The respondent advertises by radio and other media.

Station WFIL, of Philadelphia, Pa., has been granted a construction permit to install new equipment, move transmitter locally, install new vertical radiator, increase power to 1 KW, unlimited time.

J. R. Poppele, Chief Engineer of WOR, Newark, has been elected to the Board of Directors of the station and appointed Secretary of the Bamberger Broadcasting Service. Mr. Poppele has been with WOR since February 18, 1922, four days before it went on the air.

Nathan Burkan, ASCAP counsel, who died on June 6th, left his estate in trust to his widow and son, it was disclosed Monday in New York City when his will was filed for probate in Surrogate's Court. It was reported that the estate would exceed \$1,000,000.

Radio market reports were issued this week by the Bureau of Foreign and Domestic Commerce for the following countries: Argentina, Yugoslavia, Brazil (new regulations), Newfoundland, and Germany. Copies may be obtained at 25 cents.

The Zenith Radio Corporation, of Chicago has applied of the Federal Communications Commission for a construction permit for a new general experimental station to be operated on 31600, 35600, 38600, 41000, 86000-400000, 401000 kilocycles, 100 watts, portable-Mobile.

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