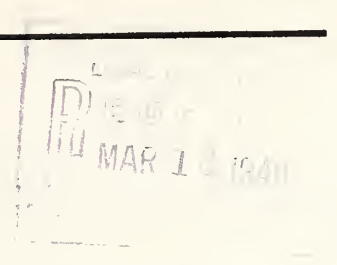


HEINL RADIO BUSINESS LETTER

2400 CALIFORNIA STREET

WASHINGTON, D. C.

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"F.M." HELD PROMISING FOR MILITARY COMMUNICATIONS

Frequency modulation, which will be the subject of a hearing before the Federal Communications Commission beginning next Monday, March 18th, has distinct possibilities for military communications, according to Capt. K. M. Soukaras, of the U. S. Signal Reserve Corps, Washington, D. C.

Writing in the current "Signal Corps Bulletin", Captain Soukaras discussed the new form of radio transmission in non-technical language.

"Transmission of intelligence by radio is normally effected by radiating into space a modulated carrier wave which, when received at the point of service, is suitable transformed back into the original intelligible signal", he said. "In the past amplitude modulation has been used almost exclusively. At the present time considerable interest has been aroused in the use of frequency modulation, which is thought to possess far-reaching possibilities in the communications field, both for commercial and military application.".....

"A radio carrier wave is a sinusoidal alternating electro-magnetic wave of high frequency. As such, it has, in common with all natural waves, amplitude, frequency, phase angle, and speed of propagation. For radio the last is a natural constant and cannot be changed. The other three properties of the wave, however, may be subjected by suitable means to a periodic change which is slow compared to the carrier frequency, thereby giving rise to amplitude, frequency, and phase modulation.

"In pure amplitude modulation, the period and phase of the high frequency carrier remain constant, while the amplitude of the carrier is made to vary in accordance with the instantaneous amplitude of the modulating signal wave.

"In frequency modulation, the carrier amplitude remains constant, while the frequency of the carrier is made to vary above and below its nominal unmodulated value in accordance with the instantaneous amplitude of the modulating signal wave.

"At the transmitter end either one of the above methods for modulating the carrier may be used. The propagation in space is carried out by well known natural laws and is beyond the control of man. At the receiver the reproduction of the original signal can normally be effected by only one means, that of the well known rectification process, regardless of the method originally employed for modulating the carrier. This means that phase and frequency modulation must be changed to amplitude modulation at the receiver in order to recover the original signal.

"There are many military situations and instances in which radio by necessity becomes the only satisfactory means for signal communication. For example, distances between points may be great, the terrain may be unfavorable for the employment of some other means of signal communication, or there may arise an urgent necessity for the immediate transmission of a message. In such cases radio is extremely useful and effective. Nevertheless, radio appears to suffer from two distinctly serious disadvantages: (a) it is not secret, and (b) transmissions may be interfered with by enemy jamming. Here is where it is believed that frequency modulation will find its greatest usefulness for military application. Frequency modulation is seriously thought to possess distinct possibilities in providing secrecy of messages and in greatly reducing all types of interference, whether man-made or nature-made.

"Frequency modulation is well adapted to radio communication utilizing the ultra-high frequencies, that is, that part of the radio spectrum above 30 megacycles, where transmissions are normally along the line of sight and do not go appreciably below the horizon. For radio telephony, secrecy of messages may be insured by employing single side band transmission in conjunction with the inversion of speech. On the other hand, unwanted noise and interference may be suppressed by employing wide frequency swings of the frequency modulated carrier, which in regard to adequate channel separation is a problem of rather small consequence when ultra-high frequencies are used. For military application, frequency modulation has additional advantages over those already mentioned. The cost, weight and bulkiness of the frequency modulation transmitter are considerably reduced in comparison to the ordinary amplitude modulation transmitter without adding in any way to the complexity of transmitter-receiver operation which is just as straight-forward as that of the well known amplitude modulation case. In addition, for the same effective carrier output, the input of a radio-telephone frequency modulation transmitter is one-half of the corresponding input of an amplitude modulation transmitter. This is of particular significance to airplane radio-telephone sets.

"In addition to the Armstrong system of modulation there are other, and perhaps simpler, methods to produce frequency modulation at the transmitter. For example, it is well known that the frequency of oscillation in a vacuum tube oscillator is mainly determined by the inductance and capacitance of its tank circuit. Frequency modulation is readily accomplished by periodically varying either the inductance or capacitance of this circuit, the rate of frequency variation and the magnitude of the variation from the mean nominal frequency being small in comparison with the natural frequency of the circuit.

"A frequency modulation receiver is similar to a conventional superheterodyne receiver with the addition of the conversion circuit or slope filter and of a limiter, so-called because it limits or cuts off any unwanted amplitude modulation in such a way that only the frequency modulation components of the signal may be received. The frequency modulation receiver consists of

the conventional radio-frequency amplifier, first heterodyne detector, intermediate frequency stages, limiter, frequency-amplitude conversion circuit, and second detector followed by the audio output stages. The limiter is simply an overloaded or saturated amplifier tube such that its output remains constant regardless of the changes in its input. In this manner all unwanted amplitude modulation that may have found its way into the desired frequency modulation may be removed.

"In frequency modulation, it is the wide frequency swing of the carrier at the transmitter and the limiter action in the receiver which provide the fundamental means of noise and interference suppression.

"When two adjacent channel frequency modulated signals have their carrier frequencies separated by less than the total signal band width occupied by each signal, interference does exist. Therefore, to prevent mutual interference between two adjacent frequency modulated signals, the respective carriers must be separated by a frequency interval at least equal to the total signal band width occupied by each signal. Since in radiotelephony employing frequency modulation, in order to provide adequate noise suppression, a wide frequency shift of the carrier is required which is normally of the order of 80 to 100 kilocycles, a channel separation of 200 kilocycles wide has been assigned by the Federal Communications Commission for frequency modulation broadcasting. Another reason for using such wide frequency swings with ultra-high frequency carriers is to provide the equivalent of 100 per cent frequency modulation analogous to the 100 percent modulation of the corresponding amplitude modulation case. A frequency modulated wave is said to be completely modulated when the resulting side frequencies are sufficiently large with respect to the carrier as to produce at the receiver 100 percent modulation in amplitude, after frequency modulation has been suitably transformed into amplitude modulation.

"Frequency modulation will probably find its greatest all-round usefulness when employed at the ultra-high frequency end of the radio spectrum, particularly the centimeter range. The simultaneous operation at the ultra-high frequencies of frequency modulation transmitters separated from each other by comparatively short distances without producing mutual interference is possible provided the respective carriers are separated by frequency intervals equal to the total side band width occupied by each signal. Separation of the carriers by less than this amount will produce particularly strong interference. On the other hand, due to the optical transmission properties of the ultra-high frequencies, it is possible to operate several transmitters simultaneously on the same carrier frequency provided the physical separation between transmitters is such as to sufficiently attenuate the unwanted signal, which is then rejected by the frequency modulation receiver as unwanted interference. Cross modulation does not obtain with frequency modulation. Finally the problem of frequency allocation when ultra-high frequencies are used is generally considerably simplified. The demand for frequency modulation will inevitably become more insistent with time, both for commercial and military application."

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"F.M." HEARING TO RECESS FOR WEEK-END

The Federal Communications Commission announces that its informal engineering hearing on aural broadcasting, to begin Monday, March 18th, will be adjourned Friday and Saturday in order to devote that full time to Commission meeting and other routine business.

The "F.M." hearing is expected to last ten days or two weeks and will decide for the present the fate of nearly 100 applications now pending before the Commission from broadcasting groups which seek licenses to establish "F.M." stations in their territories. Many of the nation's oldest and best-known broadcasters are represented in the roster of applications.

Among the matters sought by the F.M. exponents at their Washington hearing are an equal status with present broadcasting stations using conventional "amplitude modulation", the establishment of a new "F.M." band in the ultra-high frequency spectrum, a power maximum of 50,000 watts instead of 1000 watts, and the use of 200 kilocycle separation between stations for best results.

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G.O.P. OR NEW DEAL, RADIO WILL WIN IN 1940

Regardless of whether the Republicans return to power or the New Deal remains entrenched in Washington, the radio broadcasting industry stands to win some substantial earnings in 1940.

Estimates that "several million dollars worth of political time placements" will be made on the nation's radio stations between now and the November elections are carried in the current Broadcasting magazine.

A check at Republican and Democratic party headquarters, the trade periodical states, shows that at least as much money will be spent for radio time in the Summer and Fall as was expended in 1936. That was \$850,000 by the Republicans and \$600,000 by the Democrats. This does not include money expended on local contests.

Independent stations stand to gain by the inability of the networks to clear commercial hours for the political candidates, it was said. Many transcriptions are to be used in spot broadcasting throughout the country. Network billings in 1936 for national campaigns aggregated \$1,275,000.

Robert I. Berger is expected to handle radio contacts for the Republicans and Wells (Ted) Church for the Democrats again, the magazine stated.

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CROSLEY GRANTED C.P. FOR "F.M." STATION

The Crosley Corporation this week was granted a construction permit by the Federal Communications Commission for a new experimental high frequency broadcast station to employ frequency modulation, to be located in Cincinnati, Ohio. The applicant proposes a broad investigation of the relative merits of frequency modulation and the present standard broadcast system, and of wide and narrow band frequency modulation in transmitting high fidelity programs, with attention to receivers suitable for dual operation.

The station proposes to operate on 43200 kilocycles, 1 kilowatt special emission for F.M., unlimited operation. The antenna is planned atop the Carew Tower, Cincinnati. The permit is granted upon an experimental basis only, subject to change or cancellation by the Commission at any time, without notice or hearing, if need for such action arises.

This application was filed by the Crosley Corporation pursuant to announcement by the Commission on December 19, 1939, that, pending outcome of the informal engineering hearing on aural broadcasting to begin March 18, it would grant the following classes of applications:

(a) Applications for permission to carry out programs of fundamental research not authorized in the past and which show satisfactory promise of being able to contribute substantially toward the development of aural broadcasting service, and

(b) Applications filed by existing licensees to experiment with aural broadcasting on frequencies above 25000 kilocycles, provided the request to operate additional stations involved a program of experimentation directly related to the existing station.

At the same time the Crosley application was granted, the Commission authorized Westinghouse Electric & Manufacturing Co. high frequency broadcast station WLXK to move its transmitter from Boston to Hull, Mass., for operating on 42600 kilocycles, 1000 watts, special emission for F.M., and approved request by General Electric Co. to move the transmitter of its high frequency broadcast station W2XOY from Albany, N.Y., to New Scotland, N.Y., to increase its power from 150 to 1000 watts and install new equipment for operating on 43200 kilocycles, special emission for F.M.

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Grant of a construction permit to the Presque Isle Broadcasting Co. for a new station at Erie, Pa., was affirmed by the Federal Communications Commission this week. The action was taken after consideration of exceptions and briefs filed by Stations WLEU at Erie, and WWSW, at Pittsburgh. The Presque Isle Broadcasting Co. is authorized to operate unlimited time, using the frequency 1500 kc, with daytime power 250 watts, nighttime 100 w.

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MACKAY DENIED PERMIT FOR ROME SERVICE BY FCC

Existing cable and radiotelegraph facilities between the United States and Italy are adequate to handle present or prospective traffic, the Federal Communications Commission asserted this week in denying the application of Mackay Radio & Telegraph Company, Inc. (Dela.), for modification of the fixed public service licenses of point-to-point telegraph stations WJD, WDU, WMK and WID to add Rome, Italy, as a primary point of communications.

Upon consideration of all the facts of record the Commission concludes in its Findings of Fact and Conclusions that:

"The applicant does not propose to lower the existing rates or to offer new classes of service, but proposes to render a service similar to that now available to the public over existing routes. There has been no complaint from the public as to the service now available to it by means of existing systems. It does not appear that the proposed service of the applicant would be superior to the service of the existing carriers, or that the effect of the proposed operation would be to improve the existing service. Nor does it appear that the needs of the national defense would be better met by the addition of the proposed circuit. The record does not provide any sound basis upon which it may be determined that any substantial increase in the traffic between the United States and Italy will occur through the proposed operation or that the added facilities will create new traffic. The traffic and revenue secured by the applicant would for the most part come through diversion from and at the expense of the carriers now in the field. There is at the present time keen competition for the Italian traffic between American carriers. The traffic and revenue available do not justify intensifying the existing competitive situation or the resulting reallocation in view of the other facts of this case. Under the provisions of the agreement between the applicant and its foreign correspondent, traffic from the United States to Egypt, Palestine and Syria, handled via the proposed circuit, would be carried by the applicant at a substantial loss to itself, and traffic to all of the hinterland countries referred to in these findings would produce less revenue for the applicant's system than the same traffic would produce if handled via the facilities of the Commercial Cable Company. The proposed circuit has not been shown to be necessary to the continued existence and public service of the applicant or its affiliated companies as competing factors in international communications.

"In light of the foregoing facts and of the entire record in this proceeding, the Commission concludes that public interest, convenience, or necessity will not be served by the granting of these applications."

Commissioners Walker and Thompson dissented.

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TIME EXTENDED FOR MAKING POWER MEASUREMENTS

While the State Department waited for Mexico to file with the Cuban Government at Havana its ratification of the North American Radio Treaty, the Federal Communications Commission this week notified all standard broadcast stations that the time for making required power measurements has been extended.

The State Department has been advised that the Mexican Ambassador to Cuba is enroute to Havana to deposit the signed treaty and thus pave the way for a general reallocation of frequencies in this country.

The FCC in its notice to licensees said:

"Under date of January 25, 1940, Mexico ratified the North American Regional Broadcasting Agreement. In order to place the allocation plan set forth in this Agreement in effect, the frequency assignments of a majority of standard broadcast stations must be changed. Resistance measurements made in accordance with the Standards of Good Engineering Practice for the presently assigned frequencies will not be sufficiently accurate for the frequencies assigned under the Agreement.

"The time within which existing standard broadcast stations shall have made the necessary measurements and obtained authority to determine the operating power by direct measurement of the antenna power as required by Section 3.51(a) (2) is hereby extended from July 1, 1940, to December 1, 1940.

"This in no way affects the requirements as now set forth in Section 3.51 with respect to new standard broadcast stations, nor does it affect the requirements of the Standards of Good Engineering Practice in that the power shall be determined by the direct method when making field intensity measurements."

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KWBD SHOW CAUSE ORDER ISSUED BY FCC

On the ground that he apparently made false and misleading statements relative to his financial condition, the Federal Communications Commission has ordered W. B. Dennis to show cause on or before March 29, why the construction permit issued to him July 12 last for a radio broadcast station at Plainview, Texas, should not be cancelled.

The call letters KWBD were assigned to the station, which proposed to operate on 1200 kilocycles, 100 watts power, daytime only.

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WALKER INSPECTS DON LEE TELEVISION STATION

Paul A. Walker, member of the Federal Communications Commission, last week inspected the Don Lee television station W6KAO.

The Commissioner's visit followed closely upon the heels of another test given Thomas S. Lee's plant a few weeks ago by Bernard H. Linden, FCC Inspector in charge of the Southwest District.

Mr. Walker's arrival marks the first visit of an FCC member to the West in several years, and the fact that he is the only Commissioner who has inspected every television station in the country added much importance to his official inspection.

Since going on the air December 23, 1931, Mr. Lee has presented 6,000 hours of entertainment in more than 2,550 separate programs to Los Angeles' several hundred home television receivers

During his visit in Hollywood Commissioner Walker was conducted through the television studio of W6XAO by Harry R. Lubcke, Director of Television, and Inspector Linden. The party also observed transmissions on several receivers, one seven miles from the transmitter. Close observers declared that Mr. Walker was impressed by both the quality and quantity of program content and the production technique of the nightly shows.

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UNITED STATES-ECUADOR RADIO SERVICE IN PROSPECT

Establishment of direct radiotelegraph service between the United States and Ecuador is in prospect as a result of the Federal Communications Commission adopting Proposed Findings of Fact and Conclusions looking toward R.C.A. Communications, Inc., adding Quito, Ecuador, as a primary point of communication for its point-to-point stations WBU, WES, and WKO, at Rocky Point, N.Y., and as a secondary point of communication for its other fixed stations.

"There are material advantages to be gained by; and, as a matter of international communications policy, there are sound reasons for; the establishment of a direct radiotelegraph service between the United States and Ecuador", declares the Commission. It points out that the only public telegraph service of standard message classification now available between the two countries is offered over the cable system by AACR. Establishment of the proposed service, it adds, would not imperil or seriously affect the ability of AACR to continue its public telegraph service.

Besides offering an efficient public radiotelegraph service of standard international message classifications between the United States and Ecuador, R.C.A. Communications would provide facilities for the transmission of addresses program material for broadcast.

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 ::: TRADE NOTES :::
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The Federal Communications Commission this week adopted an Order granting the application of Southern Bell Telephone and Telegraph Company, Atlanta, Ga., for a construction permit for a coastal harbor station near Charleston, S.C., to operate in the public service using the frequency of 2566 kilocycles with a maximum power of 400 watts, unlimited time, with A2 and A3 emission.

An injunction restraining the publication of a magazine called "Information Please" was granted Wednesday by New York Supreme Court Justice Carroll G. Walter on application of Golenpaul Associates, staggers of the radio skit "Information Please". The court held that the defendants had lost their right to the name after the magazine had ceased publication about two years before the radio production started.

The principal defendants in the suit were Stanley S. Boressoff and Information Publications Corporation. Mr. Boressford is the principal stockholder of the corporation. It issued two numbers of the magazine under the title "Information Please", in 1936. Recently it proposed reissuing the publication.

Revenue from spot and local advertising carried over the 15 stations programmed by NBC in February, 1940, amounted to \$502,400, an increase of 31 percent over February, 1939, when the figure was \$383,100, according to James V. McConnell, National Spot and Local Sales Manager of NBC. The February figure shows the same upward trend of the January, 1940, total of \$516,400, which broke all previous records for the month and marked up a gain of 31 percent over the January, 1939, figure of \$392,700.

Methods of calculating interference as embodied in the Federal Communications Commission's propagation curves, being recognized by the industry as a whole, take precedence over limited measurements, the Commission held this week in affirming its Proposed Findings of Fact and Conclusions of September 16th last, looking to authorizing the Salt River Broadcasting Co., licensee of Station KOY, Phoenix, Ariz., to change that station's frequency from 1390 to 550 kilocycles, the authorized power to remain at 1 kilowatt. The contemplated grant was opposed by the Oregon State Agricultural College, on the ground that it would interfere with operation of the latter's station, KOAC (550 kilocycles, 1 kilowatt), at Corvallis, Ore.

Stations KYUM, Yuma, Arizona, and WFMJ, Youngstown, Ohio, will join the National Broadcasting Company networks on March 15 and 24, respectively, bringing the number of NBC affiliates at that time to 186.

Crosley Corporation and Subsidiary report for 1939 a net profit of \$84,949, equal to 16 cents each on 545,800 no-par capital shares, against \$84,901, or 16 cents, the year before.

Contending the District of Columbia is one of the areas in the United States considered to be receiving the best radio service from a technical standpoint, the American Broadcasting Co., operator of Radio Station WOL, has challenged the authority of the Federal Communications Commission in issuing a license for a new radio broadcasting station in Washington to Lawrence J. Heller. It has asked the Commission to reopen the proceedings and to set the application down for a hearing. Mr. Heller asked the Commission to deny the petition of WOL, holding that a hearing would be but an "empty gesture".

James L. Fly, Chairman of the Federal Communications Commission, and Alfred J. McCosker, President of WOR and Chairman of the Board of the Mutual Broadcasting System, will be heard over WOR Tuesday (April 2) from 9 to 9:30 P.M., in a recorded rebroadcast of the addresses they delivered earlier in the day at the Radio Day luncheon of the Advertising Club of New York. Topics of both speakers will be announced later.

Proposed grant of a construction permit for a coastal harbor radiotelephone station at Cape Girardeau, Mo., to be operated in the public service by Eddie Erlbacher, was announced by the Federal Communications in its Proposed Findings of Fact this week. In connection with his towboat service, Erlbacher proposes to maintain a constant listening watch covering an area of approximately 20 miles. Distress calls, emergency calls, weather reports, river data, lock news, and similar information will be handled without charge. In addition, the station will provide two-way telephone communication between boats within the range of the station and land telephone stations.

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BYRD EXPEDITION RADIO CONTACTS AUTHORIZED

Authority to add the Byrd Little America antarctic and Fahnstock South Sea expeditions to R.C.A. Communications, Inc., point-to-point radio telegraph transmitting station at Rocky Point, N.Y., to enable those expeditions to receive programs especially addressed to them and broadcast by radio stations in the United States, has been granted by the Federal Communications Commission.

It was in the form of special temporary authority for the R.C.A. station to communicate with United States Antarctic Service Division, Department of the Interior, at Little America, and with the Fahnstock South Sea Expedition aboard the yacht "Director II" for contact control purposes only, for a period not to extend beyond the current year, provided that no interference is caused to the regular point-to-point service for which the Rocky Point station is primarily licensed. Additional R.C.A. point-to-point stations at Bolinas, Calif. and Kahuka, Hawaii, are to furnish contacts to the Fahnstock expedition under the same terms.

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RCA MOVES TO EXPAND TELEVISION SERVICE

Applications for licenses to construct and operate television transmitting stations in Philadelphia, Washington and Chicago were filed this week with the Federal Communications Commission by the National Broadcasting Company, it was announced by David Sarnoff, Chairman of the NBC Board, and President of the Radio Corporation of America.

These applications are one feature of a coordinated plan to advance the public services of television on all fronts, Mr. Sarnoff explained.

The initial phase of this plan was launched Tuesday when 400 RCA television merchants met in New York City. New television receiving sets, prices, and program plans were announced at this meeting.

"R.C.A. Communications, Inc., will shortly file applications to cover television relay service between New York and Philadelphia, supplementing the radiotelegraph and facsimile service which this company now renders", Mr. Sarnoff stated. As soon as the New York-Philadelphia television relay service is in operation, additional applications will be filed with the FCC to extend this service to Washington, D. C.

"Our successful experience in the production of satisfactory television programs, and the dependable performance of television receiving sets within a radius of 70 miles from the NBC television transmitter on the Empire State Building, together with the recent favorable action of the Federal Communications Commission with respect to television programs, enable us now to proceed to establish television on a broad public service basis", said Mr. Sarnoff.

The plans of RCA call for three major developments, Mr. Sarnoff stated.

"First, an active merchandising campaign has been announced by the RCA Manufacturing Company, in which the new RCA-Victor television and radio receivers will be offered at moderate prices. The new receivers have been priced on the basis of quantity production before volume sales have been reached, a reversal of usual merchandising methods.

"Second, the present television program service of the National Broadcasting Company, which in the past few weeks has included a Broadway play, an intercollegiate track meet, a panoramic view of New York City from an airplane, and the first television performance of Grand Opera by the Metropolitan Opera Company, will be expanded and improved in variety and extent as rapidly as practicable.

"Third, our invention of an efficient television radio relay system provides the means for interconnecting television transmitters for simultaneous delivery of programs in centers outside New York. Our initial step, the construction of such a relay system between New York and Philadelphia, will enable these two great metropolitan centers to exchange news programs, and the varied forms of education and entertainment made possible by television."

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