

Super-Power in Radio Broadcasting

By LOUIS FRANK

There has been talk of opening super-power broadcast stations. The idea has not been accepted with open arms by all. But to judge sanely one must know the advantages and disadvantages which would accrue from such a scheme. Mr. Frank has covered all the salient points of the subject in this article.

THE most important question that confronts the radio public of the present day is the use of super power in broadcasting. Within the next few years we shall have a chain of powerful stations across the country with a minimum range of 1,000 miles, or there will be innumerable moderately powered stations with an average range of 50 miles. The former supposition seems to be the more logical one, as the tendency is to increase power in every station that goes on the air and in Government Radio Regulations, recently issued, provision was made for this very thing, but only as an experimental measure.

In order to get the proper angle on this question, it is desirable to review some of the considerations involved. In the early days of radio broadcasting, it was purely a local matter. A broadcast station was satisfied to feed its own locality with programs, and stations, therefore, were built with low power capacity, just sufficient for local work. Another reason was that radio equipment was likewise in its first stage of development, both as to power and quality. During this period of development, the type of program broadcast was also more or less of a local character and generally of an inferior grade. However, the public took to broadcasting very rapidly, and progress in the technique of broadcasting was made rapidly. Artists, public performers of all descriptions, people of national and international prominence, noted this rapid development in the art and gradually began using broadcasting either for their own advantage, through its publicity value, or because they had something to say to the public. As a result, the very best entertainment in the country is available to the radio broadcast listeners. In other words, the art of radio broadcasting has developed to the point where it is no longer a local affair, but is a national one and is rapidly becoming international.

Broadcasting having reached this importance, it seems reasonable to say that it should be reorganized on a basis commensurate with its national importance. Present broadcast stations have a maximum power of about one kilowatt, although there are a number of stations doing work on higher power under special experimental licenses. A station with a power output of 1,000 watts is not very powerful, and in spite of numerous so-called DX reports, cannot be relied upon to reach out for any considerable distance. However, this does not mean that these stations are not heard over long distances. It does mean, however, that these stations cannot give good broadcasting service consistently over long distances. A 1,000 watt station cannot be relied on to give good broadcasting service, that is, loud speaker reception on an average good receiver, over a territory having a radius of

over 50 miles. This may sound ultra-conservative, but the reader should bear in mind that we are talking of continued reliable service in the entire territory. It is possible that such a station gives very excellent service at a certain point 100 miles out. However, if there is another point 100 miles out where signals are very weak, then the station is not reliable for service 100 miles away. From the point of view of reliability,

Up to the present time, two methods have been employed for bringing radio broadcasting up to a level of national importance. The first of these is that of short wave transmission and re-broadcasting. Here use is made of the fact that short wave transmission has some advantages over that of the longer wave, it being less subject to fading, seeming to travel as well by day as by night and to cover remarkable distances. Therefore,

what has been done is this: A short wave transmitter has put a program on the air, this program being received on special short wave receivers at different broadcast stations in the country, and the amplified signals of the short wave receiver re-broadcast by the local receiving station. In this way, a program sent out from one part of the country may be re-broadcast simultaneously, by many stations over the entire country, thus securing broadcasting on a national range. Despite optimistic reports of the proponents of this plan of broadcasting, the records do not show it to be successful as yet. There still remains considerable work to be done in this field, before it can be practically utilized for national broadcasting, as it is altogether too uncertain in performance for reliable communication on a large scale.

The second plan, which has been quite successful, is that of linking the various broadcast stations of the country by long distance telephone lines. This is done as follows: If an important address by a government official in Washington were to be broadcast over the entire country, the address would be picked up in Washington and sent over a telephone line to the exchange in Washington. There the address would be transmitted, as though it were a telephone conversation over the long distance telephone lines to the various broadcast stations, which would be linked up with the Washington exchange. Each broadcast station would then broadcast locally. This has been done on a number of occasions, proving quite satisfactory. It is not purely a radio plan, as it involves to a considerable extent, telephone co-operation.

If it were possible to reduce the number of links in a national broadcasting chain to a reasonable minimum, of four or five, we should have a national organization of considerable merit. A plan providing for this has been proposed at the recent Radio Conference. This plan involves the erection of high-powered stations at strategic points in the country.

It is similar to the one followed in the erection of trans-Atlantic radio telegraph stations. Here it was found necessary to increase the power to very high values in order to insure good service through various kinds of interference. It is proposed to increase the power of a broadcast station to the point where it will be able to serve reliably an area within a radius of 500 or 1,000 miles, thereby reduc-



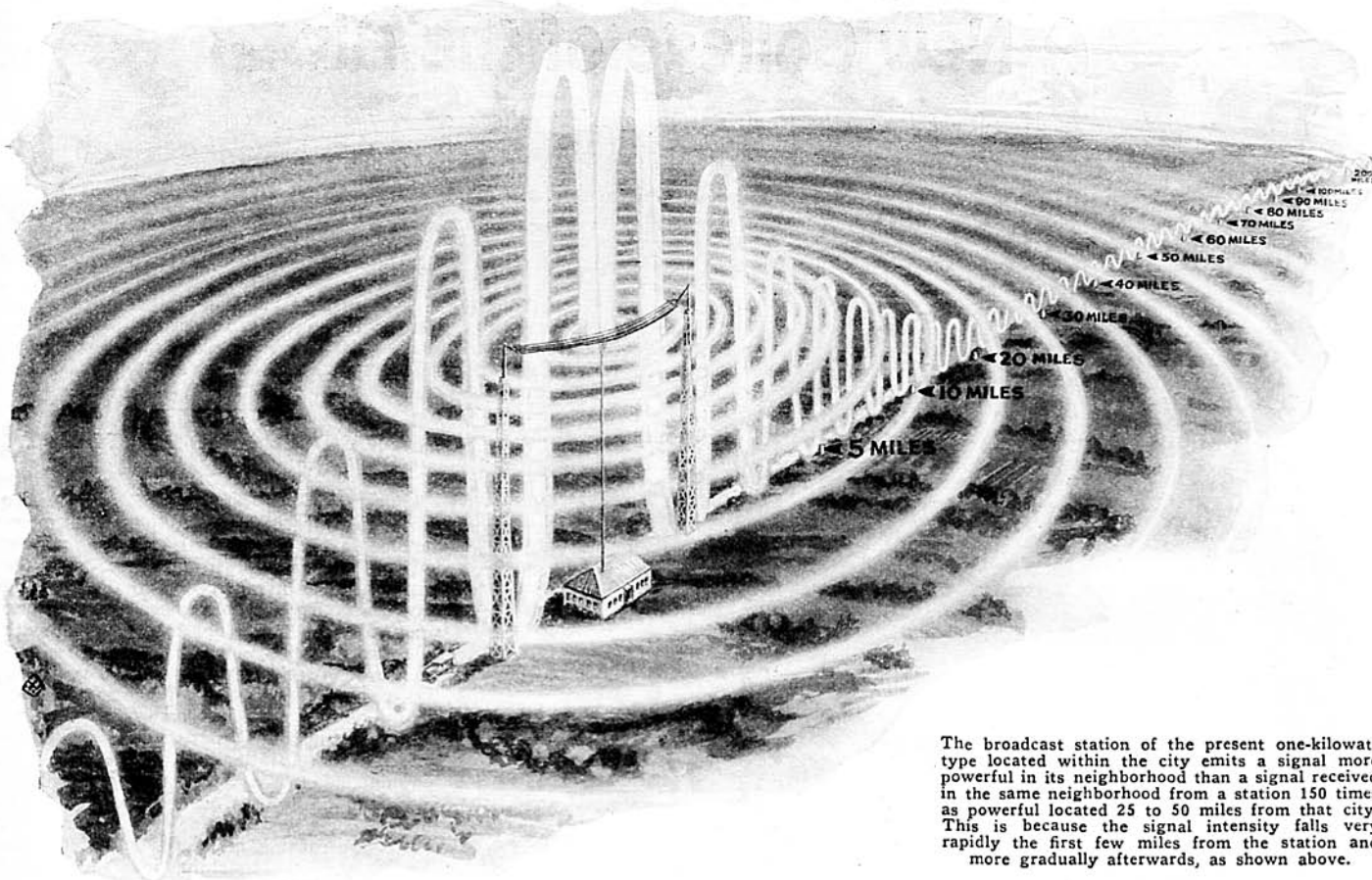
DAVID SARNOFF
Vice-President and General Manager of the Radio Corporation of America

The fear has been expressed by some that a super-power broadcasting system would interfere with the effectiveness and destroy the function of the local station. This is as groundless as would be the belief that a national highway would obviate the need of local roads. The local station will remain the voice of the community which it serves, just as the local newspaper is the expression of its interests.

Moreover, the problem of super power is no longer an academic question. Super-power broadcasting is here. Already stations in Canada are employing between five and ten kilowatts. A station has been erected in England in the vicinity of London employing 25 kilowatts. A 20-kilowatt station has been established in France, and a number of other countries contemplate the early addition to their broadcasting systems of stations having powers into tens of kilowatts. It has been thoroughly demonstrated that those American stations which have utilized the full one kilowatt permitted by the present regulations have afforded a higher degree of all year around satisfaction to the radio listener than those employing lower powers.

The question now is whether the United States shall lead or follow in the development of super-power broadcasting.

even a 50-mile estimate is probably high, but assuming that the existing types of stations have this range of 50 miles for reliable communication, it is seen without argument that transmission is only good for local work. If radio broadcasting is to be utilized on a national scale, it becomes apparent that the business of broadcasting will have to be reorganized on a basis commensurate with its national importance.



The broadcast station of the present one-kilowatt type located within the city emits a signal more powerful in its neighborhood than a signal received in the same neighborhood from a station 150 times as powerful located 25 to 50 miles from that city. This is because the signal intensity falls very rapidly the first few miles from the station and more gradually afterwards, as shown above.

ing the number of units necessary to serve the nation to a few high-powered stations strategically located. Each of these high-powered stations would be linked by telephone lines, so that the same program could be broadcast simultaneously from all of them. It would be possible to build such high-powered stations to give the same good quality as is delivered by the present low-powered stations.

This plan seems to be in line with the logical development of broadcasting. However, a number of arguments against the proposal have been advanced, which it might be well to consider. Such a plan of super-power broadcasting has already been caricatured as a great giant swinging a club over other broadcasters and producing tremendous interference. It has been cited that when station WEAJ increased its power a short time ago to more than one kilowatt, tremendous interference was produced and that if 50 kilowatt stations are erected, interference will make any kind of reception impossible. The uninitiated reader most certainly will be impressed by such an argument, but I believe it falls flat if certain factors are included. That is, if a station with increased power were directly in the heart of the city in which the interference was caused, there is no question that great interference would be created. However, if such a powerful station is placed somewhere in the country, even 25 or 30 miles outside the city, there would be no such interference. This is because the signal intensity falls very rapidly the first few miles from the station and more gradually afterwards. The reason for this is that the signal intensity varies inversely as the square of the distance from the transmitter. That is, two miles from the station the signal intensity is one-fourth what it is at one mile, and three miles out, it is one-ninth what it is at one mile. Fig. 1 shows how the signal intensity drops as the distance from the station increases. The greatest drop occurs at the start and by the time it has reached the

city limits, the signal strength has dropped sufficiently to avoid interference.

It has also been said that the small broadcast stations would thereby be eliminated. If a small broadcast station becomes useless, there is no reason for its existence. Should the art of broadcasting develop to a point where some small stations become useless, is that any reason why the progress of the art should be stayed? Surely, the public would not contend that motor vehicle development should cease because it puts the horse and wagon out of existence, or that subways should not be built because the small trolley cars would then have to go out of business. The same logic applies in both cases. But as a matter of fact, if a small broadcast station really serves some useful purpose to a community, it most certainly would not be put out of business by large super-powered stations. These would only give to large areas that which cannot be

secured in every part of the country. Needless to say a small station in some out of the way town cannot serve its community such fare as the Philharmonic Orchestra's concerts, nor can they serve a speech by President Coolidge. It requires pick-up in central points like New York and Washington, which the small stations cannot have, but which a chain of super-powered stations can accomplish. In other words, there is a sphere of usefulness for both low- and high-powered stations and there is no reason why a small station would have to go out of business if high-powered stations were erected.

The trend of development seems to point to some kind of a national change in broadcasting. It has become so wide in scope and so important that bigger things must be looked forward to than 500 to 1,000 watt stations, which cover a few miles only. Matter is being broadcast which is of vital importance to the country at large, and, therefore, means should be employed by which this matter can surely reach all the people interested. Some available means have been here outlined, and it will be of interest to have further discussion on the subject.

VOTING BLANK

ARE YOU FOR OR AGAINST HIGH POWER BROADCASTING?

In order to ascertain the popularity of the scheme to open Super Power Broadcast Stations it is desirable on the part of the Editor of RADIO NEWS that you cast your vote on this blank and mail it to Radio News, 53 Park Place, New York City, before December 31.

The results of the vote will be published in the forthcoming issue.

Mark cross in one or the other box.

For

Against

BROADCASTERS AUTHORIZED TO INCREASE POWER

The Department of Commerce has announced that licenses will be immediately issued for increasing power of broadcast stations under a plan permitting the addition of 500 watts at a time. Such increases, however, are emphasized as being wholly experimental and entirely at the risk of the station, and at all times under the control and regulation of the District Supervisor of the Department. The announcement specifies a maximum of 5,000 watts and cautions that the announcement does not deal with so-called super-power stations of 25,000 or 50,000 watts.

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