

The National Association of Broadcasters

NATIONAL PRESS BUILDING * * * * * WASHINGTON, D. C.
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NAB REPORTS

Vol. 4 -- No. 51
OCT. 6, 1936

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FCC Allocation Hearing Continues

On the second day of the allocation hearings before the Federal Communications Commission the Radio Manufacturers Association, the Institute of Radio Engineers and the Columbia Broadcasting System were given an opportunity to present their case. Also the clear channel group which made an extended statement yesterday as reported in NAB REPORTS made a full statement from the engineering standpoint.

Most of the members of the Commission whether they belonged to the Broadcast Division or not were in attendance at today's hearing as well as apparently the 300 persons who registered with the Commission.

William S. Paley, President of the Columbia Broadcasting System, made a statement to the Commission on "The Direction of Progress in Radio Broadcasting."

Mr. Paley's complete statement follows:

Mr. Chairman, Members of the Federal Communications Commission: Less than four months ago I stood in this same place, before this same official body, and, I would say, before very much this same audience. And reviewing the program of speakers who have appeared and those still to appear in this hearing, it strikes me forcibly that I am one of much the same group of spokesmen for radio broadcasting who presented their views and offered their counsel to you at that time.

Then we dealt with an adventurous future. Now we are dealing with the practical present. Then we were scanning the newest miracles of the laboratory—weighing the imponderables of television—of aural broadcasting in frequencies so high they are barely within the ken of engineers—of facsimile printing of magazines and newspapers with invisible ink through the air.

Today we are faced with the problems of today—and of a visible tomorrow. We are dealing with practical but far-reaching questions of change in the domain in which we live and work and solve our daily problems—the present band of American broadcasting.

You, the members and the counsel of the Commission, and we, the broadcasters, "are at it again"—restlessly striving to improve the standards and service of American broadcasting, jointly seeking, as your announcement of this hearing phrased it, "to secure maximum service in the public interest" from the use of the frequency band of 550 to 1600 kilocycles.

I believe any thoughtful observer who has attended both the June hearing and this one must realize how striking in itself is the fact of our being re-gathered here now, to attack with fresh impact a wholly different set of problems, re-focussing all the resources of the broadcasting industry on a new field of possibilities and advancements—while the ink is barely dry on the reports of evidence submitted in that recent exploration.

I find, in this sequence, a real significance. I believe it is a tribute to the energy and ideals of both the industry and the Commission. But in it I find something else. I find proof of a grave need for great wisdom.

Searching ourselves, I find an instinctive impatience to be done with the old and on with the new. That is typical. I believe it is wholesome. But, by our very impatience, I believe we are throwing upon you—as stewards of this public domain—a heavier load, a more serious responsibility for wise and far-sighted guidance than we have ever thrown before. I believe that the last few years in the laboratory and the next few years in the field will long be viewed, in subsequent perspective, as the catalytic period of broadcasting in which its ultimate form and function will have been most largely crystallized. I believe that we are forming, in a sense, the present fulcrum of a future lever "long enough to move the world." We must move wisely.

A Triple Approach

Our study of the field of proposed changes in the regulations governing the allocation and use of frequencies in the present broadcast band has followed three lines of approach. One is represented by our technical staff, which has analyzed the engineering facts which bear upon part or all of the contemplated modifications. A second approach has been made by our Market Research Division, which has related the known and the implied effects of this engineering data to population distribution and to the coverage and service of market areas, attempting to orient its conclusions to the economic life of America and to the constructive service that broadcasting renders to American industry.

Our third approach to the problem, while it depended for facts on both the other two, expressly freed itself from the limitations of both. This third approach was, in a sense, a social approach, or a public service approach, and represented the sum of what we feel the Columbia Broadcasting System is and should be—with all the serious responsibilities which it embraces in our network relations with more than a hundred separate broadcasting stations—and with more than eighty million radio listeners. Subsequently, our thinking moved on to still another plane, but I will come to that later.

What I want to say now is that the Columbia Broadcasting System appears at this hearing not as a technical organization, although our technicians will present certain exhibits which I believe the Commission will find to be original and helpful contributions. Nor does Columbia appear here primarily as a business organization, except to the extent that economics are a necessary means to any social end. Surely any stress of economics as an end in themselves would betray a lack of understanding of the vital role which broadcasting plays on every plane of American life. I should therefore like to emphasize the point that further exhibits which will be presented by our Market Research Division are not offered as ends in themselves, but as additional data which may be of assistance to the Commission in its complex problem of interrelating the parts to the whole.

Columbia is appearing at this hearing primarily as a service organization—because our record in broadcasting, and our proper role, is one of service to the public. Only to the extent that we have rendered such a service—broadly and well—have we grown and progressed.

One Star Is Fixed

Of the many suggested topics and sub-topics outlined by the Commission for discussion in this hearing, I have therefore felt free to select only those basic proposals which we believe contain the greatest potential effect on public service. And because we are fundamentally committed to this concept, I should like to say at once that any modification in the Commission's rules, any change in its regulations which will advance the public service which the Columbia Network or the broadcasting industry as a whole can render, must and will receive our enthusiastic support. By the same unvarying compass, any changes which threaten to lower present standards of public service we must as resolutely oppose.

From this viewpoint it seems to me that the most important topics which lie within the scope of this hearing are the increases in power above fifty kilowatts—presumably to five hundred kilowatts—on clear channels, the duplicated use of other clear channel frequencies by two 50-kilowatt stations, and the horizontal increases in power applicable to regional stations and permitting many of them now limited to one thousand watts to operate simultaneously with five thousand watts at night. I do not mean to minimize the

importance of many of the other topics named for consideration in this hearing. But I believe their importance is relative and, in many instances, corollary to or parallel to these three basic shifts of standards.

What Is Public Service In Broadcasting?

I have promised to view these changes from the standpoint of public service. I should now like further to clear the ground by defining what we of the Columbia Broadcasting System believe service to the radio listening public must essentially involve. Stripped of all controversial questions, reduced to the bare essentials which we believe command universal agreement, we define it as two things: a signal service and a program service.

These, we feel, are the two basic dimensions of public service in radio broadcasting—the delivery of a clear signal to radio receiving sets, and the use of that signal to bring to listeners programs of the highest standards of creative art in the field of entertainment, the highest standards of intellectual integrity in the field of education and public affairs, the highest standards of honesty and good taste in the fields of merchandising and advertising. I call these two things—radio programs and radio signals—the two dimensions of *a single thing*, public service, because it is self-evident that public service in broadcasting cannot exist with only one of them. They are related to each other as length and breadth, as form and substance.

It is the essential indivisibility of these two factors which forms the keynote of our thinking about contemplated changes in the present broadcast structure. We have *made* it a keynote because we believe there may be a danger, which I will touch on more fully later, of seeing too clearly the advantages in signal service which more and more power promises, without seeing as clearly the need for searching analysis of any threat to program service which might be the ultimate result.

This note of caution may seem a strange approach to what I am going to say next.

Because I am prepared to state that, subject only to variables which do not permit too specific a prediction, we believe the public service offered by the Columbia Broadcasting System, judged in terms of rendering the greatest good to the largest number, will not be conspicuously affected by the general advent of super-power, of duplicated 50-kilowatt stations, or of horizontal increases in power by regional stations.

That is our best judgment of the changes and counter-changes, the additions and subtractions, the adjustments and readjustments, which we believe would result from those three basic changes in the broadcast structure.

Let me touch separately on our attitude, as a network, toward each of the three moves, because our conclusions as to their combined effect are, of course, based on the separate effects of each. I shall do this briefly, at this point, only to pave the way for a more detailed analysis, which I wish to offer from a fresh and different viewpoint shortly.

Super-power and the Network

First, super-power. To protect our thinking in terms of super-power, it was necessary to make certain assumptions. Since the effect of super-power would naturally vary in degree with the number and location of 500-kilowatt stations, we assumed what seemed to be a probable outside limit for the development of super-power stations. In other words, we asked ourselves the question, "How would the public service which Columbia renders be affected if a *maximum* number of super-power stations were built?" We estimated that maximum, under any general ruling which encouraged super-power on unimpaired clear channels, to permit as many as twenty-five 500-kilowatt stations in the United States.

We then further assumed—although I think I would be justified in calling this "expert opinion", rather than mere assumption—that we would be forced to drop from our network any stations which lay within the primary service area of each new super-power station. Conversely, we assumed that we would *not* be forced to drop any stations in fair-sized or larger cities which lay outside that primary area, but which did lie in the secondary area of the super-power stations—that is, in the area of their distant night-time coverage.

When I say "forced to drop certain stations", I mean simply this: we owe certain things to each station on the Columbia Network. Chief among these things are programs. They are of two kinds, commercial and non-commercial programs. Whichever they

are, they are aimed at so high a standard of entertainment or education or information that they will build and maintain for that network station a large and steady audience. This audience must be large enough and dependable enough to permit the station profitably to render a corresponding local service in its own community.

I am not unmindful of the striking examples of distinguished programs which these stations, out of their own local resources, have frequently originated—some of them so worthwhile that we have been proud to carry them over the coast-to-coast CBS Network. But this in no way alters the fact that the network station depends—and has a right to depend—on the fullest support of network programs. This is a creative, competitive, constructive kind of support and lies at the base of much that is vital to American radio.

I say we *owe* that support to each station on our network. Now it would be obviously unfair for us to undermine the very stations to whom we have pledged that support by providing the same programs to several stations that lay in each other's primary service area. Instead of building audience for each, this would divide it. That is true of both sponsored and non-sponsored network programs, and lest it be overlooked, let me point out that today many of the most popular programs from the audience standpoint, as well as many of the finest musical and educational programs, are sponsored programs.

Need I add, that even were we willing as a network, to supply the same sustaining programs to stations that lie in each other's primary service area, the sponsor of commercial programs would not make the same mistake. He would not and could not buy wasteful duplication. The smaller stations in the primary area of super-power stations, even were they kept nominally on the network, would thus fail to receive the strong schedule of sponsored network programs and would fight a losing battle.

In short, so far as we can estimate its effect on Columbia as a network, it is our reasoned conclusion that super-power would result in the substitution by advertisers of one super-power station for several of the smaller stations now on the network in the area encircling any new super-power station. The net result should increase our service to remote rural areas at night—at the possible expense of providing parts of certain cities with a remote signal wholly satisfactory for reception, but of lower level than the present signal of the network stations now within those cities. So much, for the moment, about super-power.

50,000-Watt Duplication and the Network

Our network viewpoint of the second of the three possible moves I am discussing can be summarized almost in a sentence. In the duplicate use of certain clear channels by two 50-kilowatt stations, we see a real improvement in public service, particularly on those clear channels already impaired by the presence of two stations sharing time, and thereby limiting the over-all public service rendered by each in its area. But here, too, I must point out that any corresponding gain in *our network service* would be reduced by two interlocking factors. (Although we know of no probable area in which both of these factors are apt to occur, we must admit their possibility and be prepared to cope with it.) On the one hand, any such 50-kilowatt stations which lay within the primary area of new 500-kilowatt stations would, like lower power stations, *tend* to be dropped from the network. On the other hand, the gain in service from any station remaining on the network which increased its power to 50 kilowatts under this move would sooner or later force us to drop regional or local stations which lay, in turn, within the enlarged primary service area of the 50-kilowatt station.

5000-Watt Regional Stations and the Network

The third contemplated move is negligible in its effect on network service, compared to the two I have touched on. In the increase of power for many regional stations from 1000 to 5000 watts, we see gains for each station in signal service. It must be remembered, however, that to the extent such stations were forced off the networks by the other two moves, these gains in coverage would not be reflected in the service rendered by the networks themselves.

Revised Network Structure

Broadly then, and still speaking from the viewpoint of the service which we of the Columbia are rendering as a network, we believe that all three moves toward super-power, toward duplication and toward 5000-watt regional stations, combine to force a new pattern of network coverage—a pattern involving the use of fewer stations

of greater power . . . with a stronger signal service in rural areas . . . with a satisfactory, if sometimes lesser signal service in cities where stations must be dropped from the network to maintain a balance of economics and of public service. We foresee no material effect upon our *program service*, in such a network structure. We believe that it is salable, perhaps at somewhat higher cost, to those leaders of American industry whose use of broadcasting as a medium for nation-wide advertising has provided the economic base for the finest program service of any country in the world.

Under the present broadcast structure, \$10,000,000 annually for talent alone is poured into sixteen hours a day of Columbia programs. Under the possible new structure I have outlined, we believe this generous endowment would not be threatened. It is upon this kind of reasoning, based on innumerable maps and charts and work-sheets which I have gone over in the past few weeks, that I venture the statement which I have made that Columbia's service to the public, super-power or no super-power, will be steadfastly maintained.

Another Viewpoint

Up to this point in my comments, I have discussed the contemplated changes in the broadcast structure solely from the viewpoint of the Columbia Network. I have done this deliberately. I have tried to do it dispassionately. I think that it would be less than honest not to admit that this viewpoint must be our first viewpoint. More than that, I believe that the program service Columbia is rendering to the nation is a sufficiently important part of the total public service in radio broadcasting to constitute, if it *did* hang in the balance, a factor to be weighed by the Commission in its review of the entire problem. That we find it does *not* hang in the balance, that we find no *vital* issue involved, from our own standpoint, is the focal point of everything else that I have to say.

I mentioned at the outset of this talk that our thinking moved from one plane onto another, as we progressed in our analysis of the problems. The first plane was the one I have described—the interests of Columbia as a network, in terms of the public service which we render. The second plane was that of Columbia, not as a whole, but as the various parts of that whole.

Our identity is, in reality, the identity of 105 stations which compose our network. Those 105 stations include clear channel stations, regional stations, and local stations. And because we found that Columbia as a whole could view with essential neutrality all or any of the proposed changes, we were placed in a position to study impartially and sympathetically the effect of these changes on our member stations in each classification.

These stations are not, to us, mere kilocycle numbers on the wave-band or power ratings at transmitters. They are station owners and managers. They are people and groups of people who have grown with us and worked with us through the last eight years of broadcasting. They have helped us solve our problems and we have been able to help them with theirs. And I propose to outline briefly here the specific effects, the disadvantages and the advantages, which we believe super-power, as the most drastic single change under consideration, promises to each of these three groups of stations.

In this effort to divide ourselves into the identities of our affiliated stations, I believe we have at once projected our thinking beyond even those boundaries. I mean that our inferences in behalf of Columbia stations on clear, regional and local channels, have necessarily been extended to stations in these classifications regardless of what their network affiliation may be.

A Broader Evaluation

I hope that such a listing of the pros and cons of super-power, from a source within the industry which numbers affiliates in each class of station, will add something of sound perspective to the evidence submitted at this hearing. I should like to offer it without the presumption that we know any station's individual problems as well as it knows its own, but only with the assumption that we are in a unique position to attempt this broad evaluation.

Some of the advantages and disadvantages which we see will be stated as conclusions, some will be stated as questions, either because we believe that more searching and complete data are needed than are now available, or because regardless of data only the play and counter-play of practical experience can write the final answers.

If I seem, in this further analysis, to refer more frequently to the economics of broadcasting from the standpoint of individual

stations, I think you will find, before I have concluded, that again we have given thought to these considerations only as essential strands in the fibers and cross-fibers of the service to listeners which these stations render.

Effects of Super-power on Super-power Stations

First, what are the benefits and dangers of super-power to the super-power stations themselves? Are there pitfalls in the path of those stations which hope to benefit most from super-power?

The *advantages* of super-power to the super-power station itself are self-evident. A stronger signal throughout its entire area, an extension of that area of service, an increase in rural audience, a greater theoretical revenue because its time should be more valuable.

The *disadvantages* are, on one hand, less specific, on the other hand, more numerous. First, if the station's own program standards are not to suffer, its greater theoretical sales revenue must carry the load of an investment in the neighborhood of half a million dollars and an operating cost estimated to be \$150,000 higher annually than that of even a 50,000-watt station. This presumes no profit whatever on the additional investment or operating cost. If its increased sales fail to provide all of this differential, then funds now going into program service and management must be taken out of programs and management and put into transmitter operation.

A second disadvantage emphasizes the first: Except in the largest cities, and except for the largest merchants, the increased card rate necessary to a 500-kilowatt station will tend to make it a prohibitive medium for local advertisers. Single exceptions notwithstanding, the record of local advertising media whose circulation has grown well beyond their trading areas reveals that they have been forced to lose local retail advertising, or to offer it at a special and lowered rate. This is feasible for a newspaper, for instance, which can sell its city circulation at a lowered rate, because it can exclude the local merchants' advertising from its state-wide or inter-state editions. That, however, is impossible for a super-power radio station. If it does lower its rate to local advertisers, while delivering the same coverage as it delivers to national advertisers, the net result is apt to be an actual operating loss on the sale of local advertising, which must be compensated by an artificially high rate to national advertisers. An economic paradox results which makes the super-power station's problems harder.

The third disadvantage for the super-power station lies in the multiplication of its numbers. Here I should like to fall back upon questions. Can twenty or twenty-five super-power stations be as successful as one? Will the existence of many 500-kilowatt stations tend to equalize and nullify the advantages of each, although it does nothing to nullify the heavy investment and operating cost of each? In other words, isn't it dangerous to project the phenomenon of one superpower station into the commonplace of many?

Defensive Necessity

And now I should like to abandon, for a moment, these pros and cons, to make a point which I think is essential to all our thinking about super-power. I said in the first part of this report that in our analysis, we had assumed a maximum number of super-power stations—as many as twenty-five. We assumed this because we believe it is exactly what will happen if super-power is once admitted by new regulations. There has been, I think, some belief that super-power would limit itself, by reason of common sense and economics, to a few of our largest markets. I do not believe this is so. I believe that once the bars are let down, no one can stop it. Stations which do not want it and cannot support it will be driven defensively to apply for it and build it—either to protect their own service areas from invasion or to maintain their competitive position in prestige and sales. I think we must face honestly the almost certain fact that if super-power is generally admitted under the rules, it will appear in cities and in markets that have little possibility of supporting it without detriment to local program service, and will extend so widely that it becomes a commonplace.

Effects of Super-power on Regional Network Stations

Turning now to the effect which super-power stations are likely to exert on regional stations throughout the United States, we find the likelihood of strong repercussions. There appear to us to be definite advantages which should accrue to certain regional stations. It is our belief that regional stations located in the same cities as new super-power stations may well strengthen rather than weaken their competitive position. These regional stations are now competing locally with clear channel stations whose present maximum power is 50,000 watts. For the most part, it is a successful competition. In the field of retail advertising by local merchants, com-

petition with a super-power station should favor the regional station. It will remain a lower-cost medium for reaching the metropolitan market without waste, and should "inherit" the advertising accounts of many local merchants who find super-power prohibitive in cost and wasteful in circulation.

Again, however, the disadvantages of super-power in its effect upon regional stations are more numerous, and, in this class of station, more specific. For instance, the one *advantage* I have just cited in behalf of regional stations in large cities becomes a serious *disadvantage* when we move out of those metropolitan markets. Let's look at the problems of regional stations in medium-size and smaller cities, in which an outside super-power station will deliver a strong signal. Such regional stations have no local business to *gain* from the distant super-power station, but they have a substantial amount of national business to *lose*. The national advertiser who has used these stations for transcriptions or spot announcements will be able to reach the regional station's market satisfactorily with super-power. He will tend, just as the network advertiser will tend, to pay a higher price for fewer stations. How can such regional stations expect to stay on his list?

But perhaps the most serious problem which confronts these regional stations which are now on one of the networks, and which lie within the future service area of a super-power station, is the fact that they must face the probable loss of their network affiliation. Without trying to glorify the importance of network service to regional stations, but looking at this service realistically, its loss is apt to prove a serious detriment to the survival of such stations, or at least to the standard of public service which they now render. This loss is of three kinds. First, a loss of audience, and on this point we need not rely upon theory or opinion. Authentic and authoritative data are available, running back over a six-year period, to show what difference in a station's audience network programs make. Our data cover the addition and subtraction of stations to and from both the Columbia and NBC Networks. The addition of network programs seldom fails to double the habitual audience of a station, even within its own city. The subtraction of network programs seldom fails to reduce that audience by half. I need hardly add that when a station's audience is cut in half, many consequences follow. Its time is substantially less salable, its revenues are threatened, it is faced with the choice, usually, of accepting undesirable business not in the public interest, or for foregoing that business and stinting its own program service.

The second loss involved in dropping a station from the network is the station's loss of actual revenue from the network for its time. This loss in turn has two aspects, a positive and a negative aspect. The positive aspect represents the amount of money which the station no longer receives from the network. The negative aspect is the consequent additional cost to the station in building its own programs to fill the hours previously filled by sponsored network programs, except to the extent that it can sell those hours locally.

The third loss which such a station faces is the loss of many hours a day of non-commercial network programs available to it now, representing many of the high points of station prestige and of audience appeal. It must find the funds, out of a diminishing return, to fill those hours, too, with its own programs.

I have dwelt on these three losses separately, not with any wish to dramatize them, but because they reflect the essential nature of the relationship between the network and the stations which it serves.

Effect of Super-power on Local Network Stations

As to the effect of super-power on *local stations*, we find only disadvantages and dangers. All of the disadvantages which I have mentioned in behalf of regional stations will hit first and hardest at local stations. Obviously, those which lie within the service areas of super-power stations will be the first to be forced off the networks. Because they tend to lie in still smaller communities, their task of finding both local revenue and programs to maintain their service to the public will be still harder.

As an example of the specific effect of super-power in two cities on the present Columbia Network, we found that seven stations would, in all probability, have to be dropped from the network. This was determined by the simple yardstick which I mentioned earlier. We mapped conservative contours of the primary service area of a theoretical 500-kilowatt station in each of these two cities. These contours were based upon careful engineering research, upon carefully chosen transmitter sites, upon detailed knowledge of terrain, soil conductivity, and attenuation. The seven stations of which I speak, both regional and local, fell clearly within the primary service areas of the two super-power stations. May I add that we would have no *desire* to drop these or any

other stations, but that it is our inescapable conclusion, for reasons already set forth, that we should be forced to do so.

Effect of Super-power on Non-Network Stations

It was inevitable that our thinking along these lines, once it was freed from any threat to the service Columbia renders as a network, should go one step further. All of the stations I have considered up to this point are network stations. There remains another group of stations upon whom the effect of super-power would be considerable. These are stations not on any network, nor within the primary service area of any present network station. They are stations, for the larger part, located in cities with populations ranging from less than 1000 to over 100,000. Their average population is 26,173. These stations range in power from 5,000 watts down to 50 watts. Most of them are 500-watt, 250-watt and 100-watt stations. There are 203 such stations in the United States. They are stations which, for the most part, have established a balance, even though a precarious balance, in the economic life of their communities. Taking the broadcasting day as a whole, they rarely command a sizable portion of the audience within their limited trading areas, because in practically all of them they are competing with the distant signal of more powerful stations, carrying outstanding programs. But they enjoy sufficient audience for the local sale of time at modest rates. And for perhaps an hour in the morning, or a half-hour at noon, or in some period early or late in the evening, they do a giant's job for their communities, because they reflect the life and express the pulse of their own people. They deliver, to those communities, a signal which is at least good enough to compete with present signals from outside stations. Moreover, many of these smaller stations render a regular service to outlying farms—a service keyed to the special crops and the special soil of the community, to county agricultural problems, to community blight problems—a service, in other words, which no remote station can render. What will happen to most of these 203 stations if the signal from distant stations sweeps through their communities with three and four times its present strength, and if the number of distant stations now competing with these local stations in their own towns is also substantially increased? Can they continue to hold an average audience large enough for them to preserve their modest revenues from the sale of time? Are we threatening, by means of super-power, the actual existence of these stations, these "innocent bystanders" of super-power—and the splendid role they play in the social and civic life of their communities?

The Strong Will Grow Stronger

I think it will be clear from what I have said that, in contrast with our interests as a network, we are seriously concerned with the many problems super-power raises outside the network field, in the interests of radio broadcasting as a whole. I am not trying to plead two sides of a case, but all the evidence at our disposal and all the logic we can bring to bear on the issue of super-power tends to show simply this: super-power, if awarded to anyone, can only be awarded to the stations which today have the highest power. Its threat lies against the stations with lower power, its worst threat against those of lowest power. In effect, it will make the big fellow stronger, it will make the little fellow weaker.

Unless some way can be found to check or counteract this tendency, it would seem destined to hurt, not to help, the complex local, regional and national service which radio broadcasting now renders, if *all* of America's audience is given equal consideration. In attempting to give farm areas themselves a better national service, it might well undermine the valuable local service which many of those farms now depend on.

In fact, I wonder if there has been any clear evaluation of the *degree* of improvement in signal service throughout the nation generally—and in farm areas specifically—which super-power would, in reality, achieve. I wonder if advocates of super-power have been thinking in terms of black and white, in which the black is too black and the white is too white. If we consider super-power not in terms of the stations which would benefit by it or the stations which would suffer from it, but in terms of *the listening public*, what do we find? We find that the difference between 500 kilowatts and 50 kilowatts is clearly *not* the difference between good service and bad service. Even in deep rural areas, it is rarely the difference between a usable and a non-usable signal. The Commission's own study of farm reception showed that practically every farm home actually listened to three or four stations, and named them as *favorite* stations. Perhaps in one-half of one percent of the radio homes of the United States, and there only

at night, super-power, as such, would make the difference between an adequate and an inadequate signal. And in about half of these homes, the replacement of obsolete sets with new sets could effect an equal improvement, since they are preponderantly farm homes, the only class of homes in which the replacement of old sets has lagged behind.

I believe we should cling, in shaping the direction of progress in radio broadcasting, to the sound principle of providing "the greatest good for the largest number." If, to achieve merely "a moderate good for the smallest number", super-power threatens the full and varied service now rendered to all radio homes in the United States, including the farm homes it is most meant to benefit, it is self-indicted at the outset.

A Familiar Cross-roads

Let me diverge for a moment from the hard ground of cause and effect I have been treading to make a more general observation. Too often in the history of scientific or inventive achievement, the physical development of an invention is allowed to eclipse its proper place in human life. Too often the machine runs away with itself, as it were, instead of keeping pace with the social needs it was created to serve.

I believe that in the indiscriminate use of super-power in radio broadcasting, we may well face the same kind of threat. I hope and believe that, in this enlightened day and in this enlightened industry, we can avoid so needless a mistake. For the progress of radio is already marked by a striking change in interest—a qualitative change from *mechanical* interest to *social and mental and human interest*. Eight years ago we maintained a complete department to answer radio listeners in remote sections of the country who sent in records of the stations they had heard, the call letters of the stations, the wave-length on the dial, the hour at which they tuned it in. These correspondents asked just one thing—that we verify the fact that such a station did broadcast such and such a program on such and such a wave-length at the stated hour. The listener was interested in the mechanical phenomenon as such.

Today that department is no longer in existence. Today listeners write about the significance of a broadcast message they have heard, the validity of a talk they have tuned in, the arrangement of music, the character of a performer, the spiritual quality of a sermon, the performance of a symphony.

Dynamic Equilibrium

That shift from radio's domination by the machines which transmit it—that shift to radio's liberation as an art—typifies not only the listening audience. It typifies the actual work of the broadcasters. Our own energies have found new outlets. Today we are in the middle of a quarter-million dollar program of research into new studio techniques, new acoustical principles for broadcasting, new dimensions of sound to create symphonies which composers of the past could not have dreamed of. We have endowed a group of contemporary composers to do something they have never tried to do before: to write serious music expressly for radio broadcasting, music freed from the intrinsic limitations of the instruments which will play it, by virtue of the microphone and sound control. Instruments of such delicate tone that they could be heard only in the hush of small drawing-rooms of the past may reappear to dominate brasses and drums in great orchestras of the air. New experiments are going on in surges of creative zeal. A dozen young men are seeking new forms of the dramatic art in Columbia's Dramatic Workshop. Millions of children are finding history brought to life through the new artistic forms of Columbia's School of the Air. I may seem to draw too heavily on our own creative work. But I am sure it is typical of the broadcasting field. I am sure it represents the true purpose of radio. I do not mean to infer that vigilance has been relaxed, or should be relaxed, from the physical facilities of radio, but that preoccupation with those physical facilities should not subtract from our contributions in other fields. We have, I am sincerely convinced, struck what might be called a dynamic equilibrium between the physical resources of radio—and the vital and moving forces which promise its fullest social usefulness. Let us not upset that equilibrium. Above all, let us not reverse the nature and direction of the progress broadcasting has made.

Coming back from this foray into the abstract truths which, I believe, lie behind our concrete problems, I should like to urge upon the Commission and the industry one basic consideration on the subject of super-power:

Study it.

I do not believe any of us knows enough about the immediate effects and the subsequent effects of super-power, both in itself and in relation to the progress and welfare of radio broadcasting and radio listening in American life. Many of the doubts I have raised have been, expressly, doubts. Many of them have been questions, not answers. We need those answers. I believe the Commission needs those answers before altering the basic structure of broadcasting. I believe that a dozen studies of the most exhaustive sort are in order. Studies which will tell us more than we know now about listening and signals in rural areas. Studies which will tell us more about super-power as it bounds and rebounds against itself and against regional and local stations. Studies which will tell us whether super-power, held within rigid geographical and numerical limits, might render a service free from the threats of widespread super-power. Studies which will determine if it has a sphere of real usefulness.

We need specific facts to answer such questions as these: Can a 500-kilowatt station located on either seaboard be as efficient as one located in the center of the country? Isn't half the coverage of a super-power station which is squandered on an ocean a proof of self-evident waste? By barring super-power, at least from east and west coasts, how many more channels would be open for duplicated 50-kilowatt stations? Might not these additional 50-kilowatt stations, strategically placed, produce a greater total public service?

Members of our Market Research Division will outline, at this hearing, the specific nature of the further research which we hope may precede any change in the Commission's regulations on this score.

There is one final point which I wish to throw into the balance against any drastic change in the broadcast structure at the present time. That is the threshold of new pioneering into other fields upon which the broadcasters stand. I spoke of the June hearing at the opening of this talk. I would like to close with the same reference—put into more definite terms. The industry as a whole is faced with capital expenditures that many individual broadcasters may still have no conception of. In television alone, it is my opinion, after a study of European developments and a knowledge of television's status here, that the broadcasters are less than two years away from commitments of many millions of dollars. Columbia's budget alone is over \$2,000,000—for experimental broadcasting work in this new field. Many more millions must follow, in the public interest, before there is any hope of return.

Now what about the cost of super-power? Our careful estimates of the cost of 500-kilowatt stations indicate a burden of over \$10,000,000 of capital investment by the broadcasters—with an additional operating cost of between \$3,000,000 and \$4,000,000 per year. These are not guesses, but careful estimates by engineers and accountants. Knowing the economics of broadcasting as well as we do, I feel justified in saying that if the burden of cost of super-power is thrown upon the industry at almost the same time it is faced with costly developmental work in new fields, one or the other is very apt to suffer.

Meanwhile, the Columbia Broadcasting System stands ready to accept its share of the load, if super-power is admitted as a full-fledged member of the broadcast family. If the Commission sees fit, in the light of all the evidence, to sanction super-power, Columbia will apply for its full quota. Three of our affiliate stations, WJR, Detroit, WHAS, Louisville, and KSL, Salt Lake City, have already applied. Certain of our other affiliate stations *will* apply. Six more of the clear channel stations on the Columbia Network, six stations which we own ourselves, will similarly file applications for five hundred kilowatts in New York, Chicago, Charlotte, Minneapolis, St. Louis, and Los Angeles. We have, in fact, no other choice. If the individual station, to protect its own signal from disparity or to protect its signal area from invasion, is forced to build super-power in its *own* market, this is still more true of the network. Because *all* markets are the markets of the network. *All* areas are its service areas. *All* listeners, in a constant creative bidding for their interest, are its listeners. Therefore, if super-power is to come we will build and operate 500 kilowatt stations wherever the Commission will sanction them at strategic points on the Columbia Network.

The engineering conception of the clear channel, Dr. Alan Hazeltine, President of the Institute of Radio Engineers told the Commission, "has always been the absolute absence of duplication of assignments in the North American region during night hours. If more than one station is assigned for night operation on a given channel that channel automatically becomes shared and it is believed that it should be so classified by the Commission."

Dr. Hazeltine said that the Institute recognizes that engineering

problems involved in broadcast allocation are intimately interwoven with problems of social, legal and economic character.

Dr. Hazeltine continued:

In the announcement of this hearing the Commission has outlined in considerable detail the topics on which discussion is desired. Many of these items are essentially technical and quite fundamental in their nature. It has been felt, therefore, that comment by a purely engineering group, such as the Institute of Radio Engineers, should be helpful and would be welcomed. Accordingly, the statement which follows has been prepared by the Institute's Broadcast Committee and is presented to you with the approval of its Board of Directors.

Engineering Problems

At the outset, the Institute of Radio Engineers recognizes that the engineering problems involved in broadcast allocation are intimately interwoven with problems of social, legal and economic character. Such latter problems are inherently less capable of precise formulation than engineering problems; and their tentative solutions are best described under the term general policy.

Among the matters of general policy lies that of maintaining both reasonable stability in the broadcast structure and its healthy growth. On the one hand, no sudden and drastic change, regardless of its technical merits, would be possible from a practical standpoint. For we have a great body of listeners who collectively have an investment in over 25,000,000 radio receivers and behind them a well established industry employing tens of thousands of people and representing a large capital outlay. Thus for the time being at least the country will look to the 550-1600 kilocycle band for the bulk of its broadcast service. On the other hand, provision is needed for the application in service of technical advances, both in improving conditions in the 550-1600 kilocycle band and in making use of other portions of the spectrum that may be found suitable and available for broadcasting. Thus the present policy of granting experimental licenses to qualified applicants for exploratory work is sound and should be continued. The questions that must be answered before a decision can be reached on the establishment of a broadcast service at frequencies remote from the present broadcast band are so wide in scope and so involved that, in general, only actual operation over a reasonable period of time will afford adequate information. The pioneering work that is now being done in the high frequency and very high frequency bands is thought to be particularly worthy of encouragement. It is firmly believed to be in the public interest that such changes as are found desirable in methods of operation or in the bands allocated to broadcasting should be made on an evolutionary basis after experimental trial.

Clear Channels

An important matter of policy is the establishment of *clear channels* and the determination of their number and their geographical and frequency distributions. The engineering conception of the clear channel has always been the absolute absence of duplication of assignments in the North American region during night hours. If more than one station is assigned for night operation on a given channel, that channel automatically becomes *shared*; and it is believed that it should be so classified by the Commission.

Some three years ago, the Institute's Broadcast Committee prepared a statement dealing with the question of the relative number of clear and shared channels. This statement was transmitted to the Radio Commission and subsequently published in the IRE Proceedings (vol. 21, p. 331, March, 1933) under the title "The Clear Channel in American Broadcasting." Subsequent developments have not affected the validity of the conclusions; and the following quotations from it may serve to indicate more clearly the existing situation with regard to such matters and to point out the direction in which remedial measures should be applied.

Statement

The statement first points out that:

1. "The field of the shared channel is to afford broadcasting service to important detached centers of population, such as our cities and larger towns.
2. "The field of the clear channel is to afford service to those vast intervening areas in which the density of population is so low that a broadcast service could not otherwise be supported, and in addition to a single large center."

From these definitions it is concluded that:

1. "Decreasing the number of clear channels by assigning additional stations (for nighttime operation) to channels now used by only one station at a time would have the effect of affording additional services to certain localized urban groups but at the expense of decreasing the service to rural listeners and to those at remote points.

2. "Increasing the number of clear channels at the expense of the shared channels would have the opposite effect, assuming that assignments for the stations thus displaced could not be provided for on the remaining shared channels."

And finally the situation is summarized in the final paragraph as follows:

"Assuming that service to distant listeners is to be maintained it is evident that continued provision must be made for an adequate number of clear channels. Whether the number should be forty, or more, or less, however, is a matter that can be determined only by careful study. The balance of service between the rural listener and the urban listener is determined in considerable measure by the relative number of allocated clear and shared channels. Decision as to the correct balance point is a matter of general policy."

Adequate Channels

From the engineering standpoint, it is believed that the continuance of an adequate number of clear channels is the only economic way of extending broadcast service worthy of the name to the scattered populations of the nation's farms and country towns and thus to comply with the provision of the law that "the Commission shall make such distribution of licenses, frequencies, hours of operation and of power among the several States and communities as to provide a fair, efficient and equitable distribution of radio service to each of the same" (recent revision of the Communications Act, Section 307 (b)). If there were ever any doubt concerning the extent to which rural listeners depend upon clear channel stations for their service, the results of the Allocation Survey recently published by the Commission should serve to remove it.

Define Clear Channels

It is believed that, to avoid confusion of thought and action, it would be helpful to include in the Commission's regulations a definition of a clear channel station as one adapted to serve a substantial portion of the whole country. Essential elements in achieving this purpose are recognized in the "empirical standards" employed by the Engineering Department of the Commission. The incorporation of standards of this character into the regulations is also recommended.

The exclusive nature of the clear channel assignment can only be justified by the night-time service to remote points which is made possible thereby. Such an exclusive assignment, therefore, carries with it a responsibility for extended rural service that should be fully recognized by all concerned. Of prime importance in this connection is the matter of power. After sixteen years of experience there is certainly ample technical evidence with regard to the dependence of satisfactory service on adequate power. Under the circumstances, it seems only logical and consistent to require on channels that are set aside at some sacrifice to serve the more distant rural sections of the country the use of the highest power that is technically and economically feasible. In view of the great success of the experiments with high power at WLW, which is strikingly confirmed by the results of the Allocation Survey, it is evident that a desirable power for at least some clear channel stations is 500 kilowatts or more. Many of the reputed limitations of clear channel coverage which have come up for discussion in recent years are undoubtedly merely the inevitable consequences of inadequate power for this type of assignment.

Allocations

Turning now to the *shared channel allocations*, we are fortunate in having available for guidance the principle embodied in the distance tables of the Commission of affording protection against interference to the good service area of a station. Here the Institute recognizes the policies necessitated by other than engineering considerations of classifying stations in accordance with the different degrees of protection afforded and of modifying the degree of protection in specific instances when this appears to be in the public interest. However, it is felt that distance tables, revised from time to time as the radio art advances and as more transmission data become available, constitute a valuable general guide, and it is

recommended that they be given formal recognition in the Commission's regulations. In applying and in revising these distance tables, the Institute invites attention to the engineering factors outlined in the following paragraphs.

Distance Tables

In applying the distance tables, the data which should determine whether or not a particular assignment is satisfactory from the interference standpoint should preferably not be average values computed to be reasonably representative of conditions throughout the whole country, but actual measurements made within the area under consideration, whenever these are available. The wide variations in earth conductivity known to exist in the country, and the recognized change of attenuation with frequency, combine to produce wide departures from the national average in particular cases. Under the circumstances, it is believed that better balance within the allocations structure and increased capacity for service within the broadcast band will be promoted by allowing the distance tables to be superseded in specific instances by an adequate showing of fact.

In revising the distance tables, it is recommended that the most recent transmission data be employed. In particular, the transmission data resulting from the Allocation Survey is evidently based upon a much greater number of observations and should be much more complete and reliable than those previously available.

Service Area

The good service area of a station is bounded by a contour at which its field intensity has some specified value, as one millivolt per meter, and within which the listeners to that station are protected against interference from other stations. The proper value or values to be selected for the limiting intensities are associated with the general power level of the stations. Engineering considerations call for adequate power as the primary means for minimizing natural and man-made noise. The noise background is an extremely important factor in determining the entertainment value of a reproduced program. This has been very clearly demonstrated in the experience of the radio industry during the past few years with high fidelity receivers. It has been shown that in urban areas under many conditions even the local stations do not establish sufficiently strong fields to bring out the inherent qualities of the apparatus and the artistic excellence of the programs. On the shared channels, for obvious reasons, higher night-time power cannot be regarded as a measure for reaching a larger group of listeners, but rather as a desirable step to improve the service being received by the audience which already exists. It is believed that in many cases 1 kilowatt is wholly inadequate for affording the grade of service which the local communities served by regional stations have a right to expect at the present stage of the art. Doubling the limiting field intensity, as from 1 to 2 millivolts per meter, would permit quadrupling the powers of a group of stations without altering their mutual interference.

Limiting Ratio

The assumed limiting ratio of 20:1 between wanted and unwanted signals is thought to be a fairly representative figure and it is recommended that it be retained as a minimum. A 20:1 ratio represents a fair grade of service when the relatively low fields to which it is applied and the correspondingly high noise levels due to natural and man-made disturbances are kept in mind. To attempt to apply a much higher ratio generally under existing conditions is undoubtedly impractical. It is also recommended that the 20:1 ratio be understood to apply for 90% of the time, or in other words, intermittent interference that does not exceed the specified value more than 10% of the time should be taken to indicate compliance. This procedure is consistent, it is believed, with the practice now being followed by the Commission's engineers.

Receiver Selectivity

There is considerable evidence to the effect that the receiver selectivity curve assumed for the present distance tables is appreciably below the capabilities of modern receivers. It is understood that the Radio Manufacturers Association will present data on this point. In undertaking to establish a new average curve for regulatory purposes, it is felt that the Commission is justified in setting a reasonably high standard in fairness to the owners of the better classes of modern receivers. It seems neither logical nor equitable to base the service for the entire country on the poorest receivers now being bought, nor on receivers that were

bought so long ago that they are effectively obsolete. Since good selectivity must necessarily be reflected in the purchase price, it is practically certain that receivers below any reasonable standard adopted by the Commission will continue to be sold for some time to come. There are undoubtedly locations in which such receivers will give very acceptable service, and, in any event, the listener should be permitted to choose his own price and obtain a curtailed service if he so desires. In so far as obsolescence is concerned, the receiver data resulting from the Allocation Survey are most interesting and seem to indicate that consideration for early types of receivers is not as important as has sometimes been assumed.

Allocation Factor

In recomputing the distance tables, it is believed that special consideration should be given to the "allocation factor." This factor was evidently employed in the original calculations because the data then available were relatively meager and empirical methods were necessary. Since the factor employed in evaluating adjacent channel interference varies over a range of several hundred per cent, however, it is thought to play an unjustifiably prominent part in fixing the minimum geographical spacings. With more adequate information on transmission and on receiver characteristics, it should now be possible to employ more accurate methods and unless its use can be shown to be essential, the avoidance of any arbitrary factor of this character is recommended.

Service Conditions

In the course of its work, the Commission is undoubtedly confronted at relatively frequent intervals with the necessity of deciding upon an appropriate course of action in the absence of adequate information with regard to actual service conditions. There is evidently need for a much more detailed and accurate engineering survey of radio service throughout the entire country than is now available. Such a survey should not only chart the service areas of individual stations but should also endeavor to integrate the service available to listeners in various sections so that some picture may be obtained of the structure as a whole. This is obviously an undertaking of large magnitude which will require the slow and painstaking assembly and analysis of a mass of engineering data relating to conditions at numerous points in the country. It will undoubtedly take years for its completion and will have to be started as a skeleton structure, to be supplemented, clarified and developed in greater detail as further information becomes available. It is firmly believed, however, that this is the course that the Commission and its engineers must follow to make fully effective the provisions of Section 307(h). Radio transmission over a large heterogeneous area such as the North American continent is too complex a phenomenon and is subject to too many exceptions and variations to be fully represented by so rudimentary a concept as the distance tables, useful as these are for obtaining a first approximation to the minimum geographical spacing between stations. No amount of measuring and averaging of conditions throughout the entire country, however, will give a simple formula which can hope to express in the same terms the results achieved by a low-frequency station on the plains of Texas and a high-frequency station in New England. In our efforts to make intensive use of the broadcast band, we have passed the point where nation-wide averages will afford adequate guidance and it is only by recognizing the fact that the phenomena with which we have to deal are subject to wide variations in various sections of the country that we can hope to rectify the service deficiencies which now exist and to effect further improvements.

In conclusion, the Institute of Radio Engineers wishes to express its appreciation for this opportunity of appearing before the Commission and its desire to aid the Commission, whenever possible, in clarifying the technical and engineering principles underlying frequency allocation.

Bond Geddes, Executive Vice-President of the Radio Manufacturers Association at this point read into the record resolutions adopted by the Board on September 24 in New York City in connection with the hearing as follows:

Resolutions

WHEREAS the Radio Manufacturers Association is of the opinion that the clear channel stations render a distinct service to the listening public of the United States, due both to the fact that no other stations are on the same wave length, and, just as important, because the clear channel stations, as a general rule, are high-powered stations serving large territories and affording good re-

ception to communities remote from broadcasting stations. The elimination or impairment of clear channels would thus result in poor and practically unintelligible response to many listeners by reason of the interference of stations who might be on the same wave length, thereby greatly restricting the use and quality of reception of a large majority of people, particularly in the remote and rural areas, and also would tend to restrict the power used by stations.

THEREFORE, *Be It Resolved*, That the Board of Directors of the Radio Manufacturers Association recommend to the Federal Communications Commission that clear channels be retained as they now are; that restrictions as to increase of the power used by these stations on clear channels be withdrawn and that the Commission establish minimum power requirements for such clear channel stations.

Short Wave

WHEREAS the Radio Manufacturers Association is of the opinion that short wave broadcasting in this country is far behind that offered by foreign short wave stations, and that because of this situation many of our nationals residing in foreign countries, as well as citizens of other countries, are thus deprived of the opportunity of listening to the United States programs, and

WHEREAS good short wave broadcasting would reach and serve many locations in this country where, because of remoteness from regular broadcasting stations, bad static conditions, and other natural conditions, day time reception on the standard broadcast band is practically impossible and night time reception is poor, and

WHEREAS the Radio Manufacturers Association is of the opinion that the building of higher-powered, more efficient short wave broadcasting stations with better and more regular programs is being retarded, if not entirely stopped, because licenses for the operation of short wave stations in this country are on an experimental basis only, and commercial use and sale of the time of these stations is denied to their owners and operators,

THEREFORE, *Be It Resolved*, That the Board of Directors of the Radio Manufacturers Association recommend to the Federal Communications Commission that restrictions as to commercial use in the sale of time by the short wave stations of this country be eliminated, and that said short wave broadcasting stations be placed on the same commercial basis as the broadcasting stations on the standard broadcast band.

Pick Up

WHEREAS under the present rules it is unlawful for any broadcast station to pick up a short wave program and rebroadcast it, and

WHEREAS there are many low-powered, local stations serving communities, who because of their lack of power and consequent small coverage are unable to maintain and broadcast good programs, therefore, necessitating the use of phonograph records and in some cases the pick up of programs of larger broadcast stations and their rebroadcast with the permission of the originating station, the latter is very successfully done where the broadcast station whose program is picked up is not too far remote, and where static and natural conditions do not interfere too greatly. In the latter case, if these stations were allowed to pick up good short wave programs from the larger stations with, of course, the permission of the originating station, these programs could be picked up at a greater distance and with greater clarity and less interference from static and other natural conditions.

THEREFORE, *Be It Resolved*, That the Board of Directors of the Radio Manufacturers Association recommend to the Federal Communications Commission that the restrictions regarding the pick up and rebroadcast of short wave programs be eliminated and be on the same basis as those regulations governing the pick up and rebroadcast of programs from stations broadcasting on the standard broadcast band; such pick ups and rebroadcasting only to be done with the expressed permission of the originating station.

Horle On Technical Aspects

L. C. F. Horle who presented the technical aspects of the case on behalf of the Radio Manufacturers Association at today's hearing told the Commission that the Engineering Division of the Association had been instructed by the Board of Directors "to provide all available data of value to the Commission in this hearing and it here presents that data along with certain recommendations based not only on the data that is offered but on its general experiences in apparatus design and its experience in the use of that apparatus in the field."

Mr. Horle stated that several of the research and development groups in its membership which are largely concerned with technical problems of the industry were encouraged to gather this data.

Fidelity of Receivers

The data he stated falls into two categories. "The first concerns itself with the selectivity and fidelity of receivers as commonly defined and, in fact, comprises the results of measurements made on a host of receivers manufactured during the last three years from which measurements the engineering division believes the Commission can make useful deductions as to receiver performance in the field of value in the solution of some of the problems which it faces in the allocation and assignment of frequencies to broadcasting."

Mr. Horle testified that "the engineering division does not feel that its limited experience and familiarity with allocation and frequency assignment problems provide sufficient basis for the interpretation of the data given in terms of suggested rules or regulations."

Chambers Uses Slides

J. A. Chambers, radio technician, appearing at the hearing today on behalf of the clear channel group, showed elaborate lantern slides together with sound effects. He showed during the course of his statement the results of duplication and conditions on duplicated channels. He made an analysis of the results now being obtained under present conditions and stated that it would be most undesirable to change the allocation at once. He spoke in some detail of the present use of the broadcast spectrum and of the geographic distribution of broadcasting stations throughout the country.

Distribution of Stations

Mr. Chambers also talked on the distribution of stations on clear channels and took up the night coverage of a typical 500-kilowatt station. He spoke not only of clear channels but of regional and local stations and stated that all of them are needed. No one of these types, he said, can serve the public exclusively or should be abandoned. The rural and small town listeners, Mr. Chambers said, need the operation of clear channel stations. He contended that the high frequencies will not be good for clear channels.

The present clear channel stations, Mr. Chambers testified, should be allowed to remain as they are. During the course of his illustrated talk he took up the soil conductivity in the United States and also spoke at length on the constant development in radio receivers. He stated that eleven million receivers have been sold in this country from the beginning of 1935 up to the 1st of September this year.

Mr. Chambers spoke also of field intensities and showed by the use of records the absence of blanketing by WLW.

Among those attending the conference were:

A

Abell, Rev. O. L., S.J., Director WWL, Loyola University, New Orleans, La.; Adcock, S. E., Station WROL, Knoxville, Tenn.; Aitkenhead, Jr., John, Station WADC, Akron, Ohio; Alcorn, W. C., V-P. & Gen. Mgr., Station WBNX, 260 E. 161st St., New York City; Allman, Fred L., Graybar Elec. Co., Richmond, Va.; Arnoux, Campbell, Gen. Mgr. WTAR Radio Corp., Norfolk, Va.; Ashby, A. L., Nat'l Broadcasting Co., 30 Rockefeller Plaza, New York City.

B

Bailey, Stuart L., Jansky & Bailey, Nat'l Press Bldg., Washington, D. C.; Baker, I. R., Manager Transm. Sales, RCA Mfg. Co., Camden, N. J.; Baldwin, James W., Managing Director, N.A.B., Nat'l Press Bldg., Washington, D. C.; Barroll, Jr., Hope H., Ex. V-P. Station WFBR, Baltimore, Md.; Bleakley, E. G. C., City Atty. WCAM, Camden, N. J.; Barron, John, Consulting Engr., Earle Bldg., Washington, D. C.; Bartley, R. T., F.C.C., Washington, D. C.; Batchelder, H. W., V-P. & Treas. Station WFBR, Baltimore, Md.; Benson, W. W., V-P. Station WIL, St. Louis, Mo.; Bill, Edgar L., Station WMBD, Peoria, Ill.; Blatlerman, H. L., Earle C. Anthony, Inc., Station KFI-KECA, Los Angeles, Cal.; Bookwalter, L. S., Chief Engineer, Stations KOIN and KALE, Portland, Ore.; Born, Hiram A., WHBL Press Pub. Co., Sheboygan, Wis.; Brackett, Quincy Adams, Conn. Valley Brdcastg. Co. Sta., WSPR., Springfield, Mass.; Bridges, W. C., Gen. Mgr., Head of the Lakes Brdcastg. Co., Duluth, Minn.; Brimberg, Isaac, Radio Engr., City of New York, Municipal Bldg., New York City; Brown, Willet H., Don Lee

Brdcstg. System, 7th and Bixel St., Los Angeles; Bryan, J. M., President, WBIG, Greensboro, N. C.; Buckwalter, Isaac Z., Mason-Dixon Radio Group, Inc., Lancaster, Pa.; Burke, J. F., Station KFVD, 645 S. Maraposa Ave., Los Angeles; Butcher, Harry C., Col. Brdcstg. System, Earle Bldg., Washington, D. C.; Butler, Burridge D., Pres., Sta. WLS, 1230 Wash. Blvd., Chicago, Ill.; Butman, Carl H., Radio Consultant, 704 Natl. Press Bldg., Wash., D. C.

C

Caldwell, Louis G., Lawyer representing Clear Channel Group, 914 Natl. Press Bldg., Wash., D. C.; Campbell, Martin, Gen. Mgr., WFAA, Dallas, Texas; Chambers, Joe A., McNary & Chambers, Nat'l Press Bldg., Washington, D. C.; Chatterton, C. O., "Portland Oregonian," Sta. KGW and KEX, Portland, Ore.; Chilton, A. L., Stations WGST-KLRA, Kirby Building, Dallas, Tex.; Clarke, A. S., Clarke Engineering Service, 1306 Sheridan St., N. W., Washington, D. C.; Cohen, Lester, Hogan, Donovan, Jones & Guider, Colo. Bldg., Washington, D. C.; Collins, Ray, Engineer, WFAA, Dallas, Tex.; Cosman, J. V., Federal Telg. Co., 200 Mt. Pleasant Ave., Newark, N. J.; Coulson, W. L., Station WHAS, Louisville, Ky.; Courtney, Rear Adm. C. E., Director of Naval Communications, Naval Operations, Navy Dept.; Cowles, Jr., Gardner, Iowa Brdcstg. Co., Des Moines, Ia.; Craig, Edwin W., Chairman, Clear Channel Group, Nat'l Life and Accident Ins. Co., Nashville, Tenn.; Crane, A. G., Nat'l Committee on Education by Radio, Laramie, Wyo.; Cummings, John, Tech. Director, WCAM, Camden, N. J.; Crosley, Jr., Powell, The Crosley Radio Corp., Station WLW, Cincinnati, O.; Cruise, Andrew W., Chief, Electrical Div., U. S. Bureau of Foreign and Domestic Commerce, Dept. of Commerce, Washington, D. C.; Culver, Ronald H., Jansky & Bailey, Nat'l Press Bldg., Washington, D. C.

D

Dakin, E. F., Col. Brdcstg. System, 485 Madison Ave., New York City; Daly, C. J., Attorney, St. Paul, Minn.; Damm, Walter J., Promotion Manager, Milwaukee Journal, Milwaukee, Wis.; Davis, Geo. C., F. C. C.; Dellar, Lincoln, Col. Brdcstg. System, 485 Madison Ave., New York City; DeWitt, Jr., J. H., Station WSM, Nashville, Tenn.; Dill, C. C., Attorney, 815 15th St. N. W., Washington, D. C.; Doolittle, Franklin M., Station WDRC, 750 Main St., Hartford, Conn.

E

Eaves, A. J., Graybar Elec. Co., 420 Lex. Ave., New York City; Evans, S. Howard, Nat'l Comm. on Edu. by Radio, 1 Madison Ave., New York City; Everson, C. M., Gen. Mgr., WHKC, Columbus, Ohio; Evans, Walter C., Westinghouse E. & M. Co., Chicopee Falls, Mass.

F

Falknor, Frank B., Station WBBM, 410 No. Mich. Ave., Chicago, Ill.; Fall, W., Harris & Ewing, Photographers, 1313 F St., N. W., Washington, D. C.; Fisher, Ben S., Attorney, Earle Bldg., Washington, D. C.; Flamm, Donald, Station WMCA, 1697 Broadway, New York City; Floegel, M. E., Station KFEL, Denver, Colo.; Foss, Wm. L., Consulting Engineer, 815 15th St., N. W., Washington, D. C.; Foster, A. S., Station WWL, New Orleans, La.; Foster, D. E., Radio Corp. of America, 711 Fifth Ave., New York City; Furth, Lt. F. R., U. S. Navy, Navy Dept., Washington, D. C.

G

Geddes, Bond, Ex. V. P. and Gen. Mgr., R. M. A., 1317 F St., N. W., Washington, D. C.; Gillespie, Wm. C., Station KTUL, Tulsa, Okla.; Gimbelle, Jr., Benedict, Pres., Station WIP, Philadelphia, Pa.; Girard, E. J., Mackay Radio & Telg. Co., 1420 New York Ave., N. W., Washington, D. C.; Glade, Earl J., Gen. Mgr., Sta. KSL, Salt Lake City, Utah; Gleason, W. J., Sec., Don Lee Brdcstg. System, 1076 W. 7th St., Los Angeles, Calif.; Gluck, E. J., Pres., Sta. WSOC, Charlotte, N. C.; Gregory, S. D., Asst. Mgr., Westinghouse Radio Stations, Chicopee Falls, Mass.; Grimes, David, Philco Radio & Television Corp., Philadelphia, Pa.; Grimwood, Fred O., Cons. Radio Engineer, Evansville, Ind.; Guider, John W., Lawyer, Colo. Bldg., Washington, D. C.; Gum, James W., Attorney, 815 15th St., N. W., Washington, D. C.

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Crosley and Others Testify on Third Day of Allocation Hearing

Powel Crosley, Jr., R. J. Rockwell, technical supervisor of WLW, Cincinnati, Ohio, and Joseph A. Chambers, technical advisor on behalf of the Clear Channel Group were the only witnesses heard today in connection with the allocation hearing before the Federal Communications Commission.

During the course of Mr. Crosley's testimony he was cross-examined by Commissioner Payne of the Telegraph Division in connection with time which his station gives to minority political parties and competitors in some lines of business.

"I believe that the high powered station located on a clear channel frequency performs a definite and necessary function," said Mr. Crosley "and as a meritorious institution should be preserved and encouraged. This belief is based upon experience."

During the course of his testimony Mr. Crosley also discussed the history of WLW, the economic effects of 500 kilowatt station operation and other topics relative to the latter question.

Paul Crosley

Mr. Crosley said:

Although some of the views which I will express here have been expressed by other members of the industry, I have taken the opportunity afforded me to appear and give to the Commission certain facts, which relate particularly to the operation of Station WLW.

Having been engaged in business as an independent broadcaster and manufacturer of receiving apparatus for more than fourteen years, I feel that some of my experiences and observations over this period may have a bearing upon the many and difficult questions which confront this Commission in determining its future allocation policies. Since these policies, as determined by you, will, to a large extent at least, determine the broadcasting future of this country, the importance of this meeting and the decisions to which it will ultimately lead can scarcely be exaggerated or over-emphasized.

On Experimental Basis

While I am not speaking as the advocate of any particular theory of allocation, our experience has largely been in the development of stations using power greater than that commonly and currently in use, and my remarks, since confined to that experience, will be largely so directed. Moreover, the fact that we have been permitted by the Commission to operate with power of 500 KW on an experimental basis has put in our possession certain information which we believe will be helpful to the Commission and to the industry at large.

It will, therefore, be my purpose to acquaint the Commission with such facts as I have relating to the operation of so-called "super-power" stations, as that term has been understood and applied from time to time; and more particularly and specifically to various stages in the development of WLW. I shall also take the liberty of reciting such of my own personal experiences as may or might have a bearing upon the solution of this issue, since they are related to the presentation and determination of similar issues in the past. I believe that the high powered station located on a clear channel frequency performs a definite and necessary function, and as a meritorious institution should be preserved and encouraged. This belief is based upon experience.

History of Station WLW

While the records of the Commission contain a full disclosure of the history of Station WLW from its inception down to date,

I believe that a brief recital of the following facts will make some of my statements and observations more understandable.

We first became interested in radio broadcasting in the early "twenties", at which time we were engaged in the manufacturing business, making phonograph cabinets and other articles of a similar nature. We were attracted at the outset by the various and what appeared to me to be the unlimited possibilities of radio from its social and educational, as well as its economic, aspects. I saw, or thought I saw, at the time, a new field for an entirely new article, namely, radio receiving sets. I realized that the public demand for such sets would be directly in proportion to the number of high quality programs which listeners could receive. We, therefore, became interested in the research end of radio broadcasting and made application for and were granted an experimental broadcasting license, and in April, 1921, began the operation of a station with a power of 20 watts under the call letters 8CR.

Originate in Workshop

The programs of this station were originated in a workshop in my home and consisted largely of the playing of phonograph records and conversation. We conducted this station until March, 1922, when we constructed a station to be operated with a power of 50 watts under the call letters WLW. This was the beginning of the station which has been continued under the same call letters and under various frequency and power assignments down to date. The changes in our operating power have been as follows: From March, 1922, to September, 1922, with a power of 50 watts; September, 1922, to January, 1925, with power of 500 watts; from January, 1925, to May, 1928, with power of 5000 watts; from May, 1928, to March, 1934, with power of 50,000 watts; and since March, 1934, down to date, we have been permitted to operate experimentally with power of 500,000 watts.

Super Power

The first time that I heard the term "super-power" was back in 1922 just after we had inaugurated our first 50-watt station with the call letters WLW. Another organization in Cincinnati, operating a 20-watt broadcasting station for some months, encouraged a radio club in Cincinnati composed of prominent radio listeners to get together and make a protest about our 50-watt "super-power" transmitter. A committee was appointed to investigate. I was invited to appear before this committee. I did so with a clothes basket full of letters, many of them from far away points such as Troy, Ohio.

The committee pondered the evidence weightily and a week later reported to the radio club its finding that even though we were using 50 watts we were evidently rendering a better service than we would be able to render with 20 watts as indicated by the favorable comments and congratulations upon our forward step as expressed in this mass of letters.

I well remember the deadlock on the question of power that existed at one of the early radio conferences called by Secretary Hoover. There again the question of "super-power" reared its head when the question came up as to whether 500 watts should be the limit of power or whether 5,000 watt stations should be permitted. I was one of those strongly advocating the proposal that broadcasting stations that wished to, might increase their power from 500 to 5,000 watts. The deadlock was finally broken down by a compromise that power of 5,000 watts might be tried experimentally.

We again presented a very grave question to the Radio Commission in 1928 when we asked to be allowed to increase from 5,000 watts to the "super-power" of 50,000 watts. I feel that the Radio Commission was wise in permitting us to build an experimental transmitter to use 50,000 watts. I feel that the Federal Communications Commission in 1934, having weighed most carefully and studied the matter from every angle, was wise when it permitted us to build experimentally our station of 500,000 watts.

Now why has my company continually advocated the use of greater and greater power? Why have we pioneered the advance from 500 to 5,000 watts; 5,000 to 50,000 watts; and from 50,000 to 500,000 watts? Perhaps it is because we have been manufacturing radio receiving sets during the same period; because very early in the game we appreciated that a radio signal is of identically the same nature as static and forms of man-made interference. We recognized the futility of any effort to separate the two signals in the receiving set, and realized that the answer to better radio reception was simply more power in the transmitter.

Our interest in greater power was manifest long before the present commercial possibilities of broadcasting became evident. Our policy has constantly been to improve our service; to plow back into better service a large portion of the profits that might accrue from the improvement of that service. I sincerely feel that the public has been served better by each and every step-up in power of our broadcasting station.

I shall attempt to be more specific in this matter and more particularly in the last stage of WLW's operation, by the recital of certain specific facts and conclusions which have been demonstrated by our experimental operation.

Benefits to the Public

From the very beginning it was our desire to increase the range of our station because we were selling large numbers of radio receiving sets into the small towns and rural districts and we felt a certain obligation to supply a broadcasting service to go along with the sale of the sets themselves. We were constantly striving to overcome the bugaboo of radio reception known as static. We had little interest in reaching out into the urban centers and obtaining much of an audience, because we knew that those areas were well taken care of by their local broadcasting stations. We were and still are interested in reaching the sections of the country remote from good broadcasting. We have endeavored to cover that "No Man's Land" lying between areas well served by local or regional broadcasting station, to deliver, winter or summer, in spite of atmospheric or other forms of interference, satisfactory reception for the radio listener who can not afford the more elaborate and costly receiving sets. That we have succeeded in doing this is evidenced by the recent engineering report of the Federal Communications Commission, indicating the popularity of our station in rural districts.

Commercial Angle

True it is we later became conscious of the fact that after many years of operating broadcasting stations at our own expense, there was a commercial angle to the venture, and perhaps we have profited because of our desire to serve better. I repeat that most of our profits have been plowed back into better and better programs, more and more costly presentation of programs, and better and better electrical, mechanical and technical equipment. The fact that we have been able to put our signal within the reach of more and more people is amply demonstrated by many measurements on file with the Commission which have either been supplied by us or made by the Commission's own technical staff.

Because of the fact that WLW has from the outset attempted to reach and serve the rural listener and the residents of the small town and countryside, it has perhaps engaged in less purely community enterprises than stations whose objects and purpose is to render an intensive service only to a particular metropolitan area. This is illustrated by the fact that WLW has some years carried no purely local advertising accounts; this type of business being taken care of by the other Cincinnati stations. It is further illustrated by the fact that our public service features are not designed and intended only for the residents of Cincinnati and the metropolitan area, but are planned to appeal to and to be used by an audience much more widely distributed.

Educational Programs

For example, for more than six years we have devoted one full hour each week day during the school year to Ohio State Univer-

sity at Columbus, Ohio, for its exclusive use in such a manner as the directing heads of that institution see fit to use the time. This feature is known as the "Ohio School of the Air," and the programs which have been broadcast during this period have been of wide appeal, having included scientific talks, lectures on literature and the classics, music appreciation programs and the giving of much useful information in such manner as it could be applied by the farmer or the housewife resident at points remote from either Cincinnati or the City of Columbus. We have always broadcast "The Farm and Home Hour" put on by the National Broadcasting Company, from its inception, and it is the policy of our station, observed throughout the years, that no fact or circumstance can interfere with the regular rendition of this program. Throughout the years we have regularly put on live-stock and weather reports, which we know are used and relied upon by the farmers, small merchants and producers throughout a vast area. As a matter of fact, all the important livestock markets throughout the Middle West, and as far East as Buffalo, are equipped with receiving sets centrally located and tuned at these periods to WLW, from which they obtain the most recent and up to date market quotations. This service is used and relied upon in much the same manner that traders upon the commodity and other exchanges utilize a ticker service.

Survey of Service

We mention these facts, not with a view of making an exhaustive survey of the public service features which we are now rendering and have rendered throughout the entire period of our operation. We refer to them only as illustrating the type of program which we broadcast and the variety of audience which we attempt to reach.

Although I realize that fan mail is not always the proper criterion of a station's regular listening audience, or a true measure of the extent of service which a station renders, due either to special appeals or the extreme or sensational character of the program broadcasts, nevertheless, it does offer some guide as to the number and extent of a station's potential listening audience. In this connection the following may be of interest.

Fan Mail

With the power of 500,000 watts during the first three months of 1935, we received almost 4 times as many fan letters as we had received during the same period the preceding year operating with a power of 50 KW. For the six-month period, October, 1935, to March, 1936, operating with 500,000 watts, we received almost 5 times as many pieces of fan mail as we received during the same six-months period, October, 1933, to March, 1934, when operating with a power of 50 KW.

When you consider that a great bulk of our fan mail comes from the small towns and rural districts, and the further fact that experience has shown that a relatively small number of listeners do actually write fan letters, it is clear that the power increase of WLW has resulted in furnishing a radio service not heretofore available to a vast number of such listeners.

By way of summary, I believe that the benefits to the public from our successive power increases have been threefold. First, many listeners received programs which, because of the type of receiving equipment used or because of distance, they never would have received otherwise; second, the reception for those who could hear the programs is vastly improved; and third, we have been able by increased revenues to improve the programs themselves.

No Interference

One of the first and most frequently expressed fears against the use of so-called "super-power" was that it would have a blanketing effect on the reception of other stations. I heard this fear first expressed in 1922, when we went from a power of 20 to 50 watts, and it has been repeated at various times by those who are not completely familiar with the facts ever since. Due to extensive experiments and tests which we have made, I again say definitely that such a fear it not borne out by the facts.

Certain of the experiments made at and near our station while in operation with power of 500 KW have already been explained and demonstrated. In the city of Cincinnati, 20 miles from our station, one of our standard tests of our receiving sets is to separate, without cross-talk, WGN from WLW in the daytime. WGN is only 20 kc removed from WLW. At night at our proving station, which is between 10 and 15 miles from WLW, we regularly bring in WOR, without cross-talk, which station is separated 10 kc from WLW, whenever static and atmospheric conditions will permit the

WOR signal to come through clearly. Our Mr. Rockwell will demonstrate to you with a sound moving picture a receiving set located only 2500 feet from WLW's antenna with ——— volts from WLW in the receiving antenna, bringing in stations almost all over the dial with a #40 7-tube set. Mr. Rockwell will give still further demonstrations, which in my opinion and in the opinion of competent technicians who participated in and observed these tests, definitely explode the early fears of blanketing as fallacious and unsound.

Cross Talk

I, of course, would be the last to assert that some radio listeners in close proximity to certain stations, and in fact any station, do not occasionally receive a form of cross-talk which is undesirable and frequently so objectionable as to destroy the usefulness of the desired program. I do assert that according to experiments conducted by us, both in and out of the laboratory, the prevalent cause for such a condition is neither defective receivers nor the proximity of high-powered transmitting equipment. That on the other hand, it is caused by the rectification of certain objects, resulting from corroded power line connections, unsoldered splices in antenna or ground leads, antenna leads loosely in contact with metal window screens or sills, and other conditions of a similar nature which are more or less common in metropolitan areas, and more particularly, in such areas where the power lines, and the radio and electrical appliances in use are not of recent installation. The presence of such conditions results in a demodulation of the desired signal or a separation of the audio frequency and radio frequency components in such a manner as to result in the signal of an undesired station appearing on the frequency of a desired station. Mr. Rockwell will demonstrate this type of cross-talk and the prevalent causes therefor.

Economic Effects of 500 KW. Operation

The economic results of the use of power of 500 kw. to a station using it or to other stations are not as susceptible of definite proof as are the technical benefits to the listening public or the absence of injury to the listening public from the technical operation of such a station. This is true because, among other reasons, each station and each locality presents an individual problem. Differences in location, in directing personnel, in program policies, in the prior experience and popularity of the station, and many other factors enter into the determination of these questions.

I am, however, able to give certain facts showing the relative cost of installation and operation of a 500 kw. and a 50 kw. plant based upon our experience, and since 50 kw. equipment is now standard, and a sufficient number of such units have been installed and in operation over a period of years, it should not be difficult to apply these ratios to any given case.

Operating Costs

In determining total operating costs, it is necessary to provide for a depreciation or amortization of the original cost of equipment for a period which approximates the life of the equipment. In the following comparison of figures we have used a depreciation of 10% based on ten year life, for both the 50 kw. equipment and its comparative 500 kw. equipment. Breaking down the purely technical items, we find that it costs us 371% more for electrical power; our water bill is 80% higher, tubes cost us 33% more in operating the 500 kw. transmitter over a 50 kw. unit. These figures do not take into account added program expenses, extensive building or construction, or additions to the administrative or executive staff which may be regarded desirable or even necessary. In our own case we did add 140% to administration and salaries; 9% to fixed charges and rent; 75% to program costs, and depreciation of 10%, so that in going from 50 kw. to 500 kw. our operating cost has increased 68%. As against this total operating increase of 68%, we increased our advertising card rate 20%, but have been able with the greater demand for our station to operate at a profit.

It is even more difficult to estimate the economic effects of 500 kw. operation upon stations of other classes located within the service area of the 500 kw. station. We have had no experience on this point and no opportunity to observe, other than that afforded by our ownership and operation of Station WSAI which is a regional station also located in Cincinnati. In that case the operation of the 500 kw. transmitter at WLW has had no adverse effect upon the network or other business of WSAI. As a matter of fact, the business of the regional station has increased steadily through this period.

Conclusions

In conclusion, I wish to thank the Commission for the opportunity of being permitted to state my views in a forum and for a purpose of this kind. I am strongly of the opinion that proceedings of this nature are not only useful but absolutely necessary to the industry for a proper understanding of its problems. Because of the very nature of the work in which we are engaged, we tend to become individualists and not members of a closely knit industrial organization. It is therefore well nigh impossible for all the members of the industry independently to keep closely in touch with the problems which confront us all. This type of proceeding performs this function.

I sincerely hope that the Commission will find that it has not suffered in vain, and that it will likewise derive some benefit from the views expressed here.

Following Mr. Crosley's statement he was cross-examined during the course of which he stated that WLW, his 500 kilowatt station, has been fully as good an investment for the Crosley Company as was the 50 kilowatt station. This means, he said, that the station is taking in more dollars than it was before because expenses of operating the 500 kilowatt station are much more than for the lower powered station.

The investment cost of the 500 kilowatt station Mr. Crosley told the Commission is about half a million dollars more than that for the 50 kilowatt one which preceded it including the erection of a new antenna and a new building.

History May Repeat

Mr. Crosley was asked if he thought that the granting of thirty 500 kilowatt stations would have any effect on the present broadcasting system of the country. He said that in his opinion history might repeat itself regarding the whole high powered question and he expressed himself as being in favor of a horizontal increase in power for small stations.

The small stations of the country, he contended, have a hard time competing against network programs because of their excellence but he expressed the opinion that there is a place in this country for all classes of stations, high power, regional and local.

Mr. Crosley told the Commission that he personally is not advocating any special policy on the high powered situation. He did say, however, that he did not believe that establishment of thirty 500 kilowatt stations would keep local stations from operating or take away their need in their own sphere of action.

Questioned on the European situation Mr. Crosley said that his understanding was that most of the European stations are government owned and contended that the broadcasting problem there differs materially from the problem in the United States. Just as the broadcasting problem is different in Europe and in this country so, he said, engineering problems are also different.

Can Station Pay?

Asked what he thought should be the controlling factors in the granting of a high power license by the Communications Commission, Mr. Crosley stated that the Commission would have to consider among other things whether the station was able to pay for the high power transmitter, the history of the station's ability to serve the public and how it has served the public in the past would also be a matter for the Commission to think about in granting such a license. The location of the proposed high powered station and its relation to other stations would also have to be considered. He definitely expressed himself against the Commission's putting any limit to high power.

Cross Examination

Commissioner Payne during the course of cross examining Mr. Crosley asked about the profits which the latter had stated in his testimony his company had plowed back into the business. Mr. Crosley could not give any definite figures but said that one of the ways in which this had been done was to establish better and better programs. He was questioned as to the dividends of the Crosley Company and stated that last year it had paid twenty-five cents a share and on further questioning testified that he owned about one-fourth of the stock of the Crosley Company.

Pharmaceutical Company

Commissioner Payne asked some questions relative to the General Pharmaceutical Company. Mr. Crosley testified that his company owns all of the stock of the Pharmaceutical Company which has

two products. The Commissioner insisted on knowing whether WLW made any charge for advertising this company's products on the air and Mr. Crosley stated that no charge was made either for that company or for the Crosley Company manufacturing radio sets or refrigerators.

Commissioner Payne was told in answer to one of his questions that Mr. Crosley had not refused to allow labor questions to be discussed on WLW. He stated that Townsend representatives had been refused time on WLW only because hearings were being held at that time by Congress on the Townsend question following which the Townsends had no desire for time on WLW. He denied that Lemke had been refused time on his station and insisted that it was the policy of WLW to give the same treatment to all political parties both major and minority.

Programs on WLW

Commissioner Payne further questioned Mr. Crosley relative to some of the programs used over WLW. He spoke particularly of one Alfred Gus Karger, a news commentator whom Commissioner Payne intimated talked for one political party. There was some discussion also of a feature of the Gruen Watch Company including talks by Drew Pearson and Robert Allen, also news commentators. It came out during the course of this part of the cross examination that the station was fearful of libel because of the personalities discussed in this program. This matter was later adjusted to the satisfaction of the watch company.

A letter from Senator Norris was read by Commissioner Payne in which the Senator spoke about complaints he had received against WLW in connection with political broadcasts. During the course of this cross examination Mr. Crosley pointed out to Commissioner Payne that he had to protect his station against possible libel and this was in answer to a question by the Commissioner relative to censorship in not allowing the Gruen Watch Company to go on with its Pearson and Allen comment.

R. J. Rockwell

R. J. Rockwell, the technical advisor of WLW and WSAI, showed sound pictures with the intent of demonstrating the fact that good reception can be obtained in close proximity of high powered stations taking WLW as a typical example.

He showed three separate exhibits to demonstrate the actual conditions in the operation of Station WLW. One of these included a recording of a WLW broadcast taken 300 miles from that station and using both 50 kilowatt and 500 kilowatt power. Mr. Rockwell also discussed complaints which had been received following the removal of WSAI to a new location which appeared to include external cross modulation. He said that WSAI is still continuing experiments to find out exactly what is happening. Mr. Rockwell contended during the course of his talk that no blanketing exists in connection with WLW using 500 kilowatt power.

Chambers Continues

Joseph A. Chambers, technical advisor for the Clear Channel Group, returned to the stand today to continue his testimony of yesterday. He was cross examined by T. A. M. Craven, chief engineer of the Commission, and then there was redirect examination by Louis Caldwell, counsel for the group.

Mr. Chambers told the Commission that about fifty million people in the United States depend upon clear channel stations at night for their reception and between thirty and forty million during the day time. He stated that the use of a number of clear channel stations could cover the whole country.

European Stations

He discussed at some length also the use of high powered clear channel stations in Europe and he stated that the Europeans think it necessary to use high power and further that it is necessary to retain clear channel stations.

Mr. Chambers also discussed the service radii of fifty and 500 kilowatt stations and went into the theoretical day time coverage area of a 50 kilowatt station. This latter he stated has a day time coverage of a hundred and sixty-six thousand two-hundred square miles with a night time coverage of approximately half a million square miles. He discussed further the trend of maximum and average power of United States licensed stations and said that not less than 50 kilowatts should be used by clear channel stations.

Under cross examination Mr. Chambers spoke of his qualifications as a radio engineer from 1922 on, stating that at one time

he had been connected with General Electric, later with Crosley, and is now Consulting Engineer.

Doctrine of Group

Questioned on the doctrine of the Clear Channel Group he was asked if each high powered station believes that it should serve the whole United States. He answered by stating that each station would try to cover remote areas but there are other factors going into the complete coverage of the country. He stated also in answer to a question that there has been no change in the doctrine in the high power group since the early radio conferences.

Mr. Chambers contended that even if all clear channel stations are operating they could probably not give a good signal all over the United States. Mr. Craven endeavored to get a correct answer from Mr. Chambers in connection with the number of clear channel stations to cover the whole country. Mr. Chambers said that in his opinion all of the rural inhabitants could get good service from fifteen clear channel stations. In this connection, however, he stated specifically that this would be night time reception and that day time reception would be definitely limited. In his opinion he said the Commission would be taking a chance in giving up any more clear channels.

Directional Antennas

Local stations Mr. Chambers believed might be taken care of on the frequency band from 1500 to 1600 kilocycles. He spoke of the possibilities of the use of directional antennas by regional stations and he stated definitely that he had no suggestions to make regarding the abandonment of either regional or local stations.

Mr. Chambers said that cross talk on adjacent channels is one of the limitations at present on the use of 500 kilowatt stations. External cross modulation he stated is really the basis of many of the complaints of blanketing.

Still under cross-examination Mr. Chambers said that a 500 kilowatt station on the West Coast and a 500 watt station located in Maine with a directional antenna would not give good results owing to interference, especially if the West Coast station wished to serve rural population. The West Coast station he stated undoubtedly would put out some signals that would reach into Maine.

Problems Similar

From an engineering point of view Mr. Chambers stated that European and United States problems are similar. The use of high power is a good insurance against interference in the United States from outside sources.

In connection with the cost of 50 kilowatt transmitters Mr. Chambers stated that the technical cost of such a station including depreciation, maintenance and operation would be about \$66,000 a year while for a 500 kilowatt station it would be about \$200,000.

On redirect examination Mr. Chambers said that there would be no chance of interference between a 500 kilowatt station in the United States and Europe. In his opinion he said the waves take a southern route going from this country to Europe thereby traveling a distance greater than that represented by air miles. If the Europeans increase their power and we do not and if there is interference then he said that we would be the sufferers.

Additional Registrations

The following additional registrations were made with the Commission yesterday:

A

Allen, Edward A., Lynchburg Brdcastg. Corp., Lynchburg, Va.

B

Berne, Louis W., Station WCNW, 846 Flatbush Ave., Brooklyn, N. Y.; Blackley, Chas. P., Station WSAV, Harrisonburg, Va.; Bennett, Edw., Univ. of Wis., Madison, Wis.; Blanton, Matthews, Attorney, KRBC, KBST, KPLT.

C

Campbell, Richard D., Engineer, Amer. Tel. and Telg. Co., 195 Broadway, New York City; Carpenter, H. K., United Brdcastg. Co., Terminal Tower, Cleveland, Ohio; Corkhill, C. W., Station KSCJ, Sioux City, Iowa.

F

Faske, Arthur, Station WCNW, 846 Flatbush Ave., Brooklyn, N. Y.; Fraser, Russell, Imperial Aerogram Corp., Hollywood, Calif.

G

Goulden, Stanley W., RCA Mfg. Co., Inc., Camden, N. J.

H

Hamilton, Ray V., Stas. KXOK-KFRU, St. Louis and Columbia, Mo.; Hill, C. A., Station WIBM, Jackson, Mich.

P

Ponsford, Walter W., Graybar Elec. Co., Philadelphia, Pa.

R

Richards, J. E., Gen. Mgr., Station WBNO, St. Charles Hotel,

New Orleans, La.; Rosenberg, E. J., Transamerican Brdcstg. & Television Corp., 521 Fifth Ave., New York City.

S

Staubitz, E. J., Blaw Knox Co., Pittsburgh, Pa.

T

Thomas, Norman A., Station WDOD, Hotel Patten, Chattanooga, Tenn.

W

Williamson, Jr., W. P., WKBN Brdcstg. Corp., Youngstown, Ohio; Wooten, Hoyt, Pres. and Owner, Station WREC, Memphis, Tenn.