

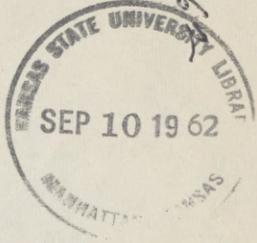
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# RURAL TELEPHONE SERVICE

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HEARING  
BEFORE A  
SUBCOMMITTEE OF THE  
COMMITTEE ON  
AGRICULTURE AND FORESTRY  
UNITED STATES SENATE  
EIGHTY-SEVENTH CONGRESS  
SECOND SESSION

ON  
**S. 3001 and H.R. 10708**

BILLS TO AMEND THE DEFINITION OF THE TERM "TELEPHONE SERVICE" AS USED IN TITLE II OF THE RURAL ELECTRIFICATION ACT OF 1936, AS AMENDED

JUNE 29, 1962

Printed for the use of the Committee on Agriculture and Forestry



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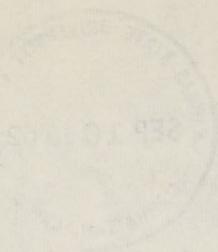
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## RURAL TELEPHONE SERVICE

FRIDAY, JUNE 29, 1962

U.S. SENATE,  
SUBCOMMITTEE ON AGRICULTURAL CREDIT AND  
RURAL ELECTRIFICATION OF THE  
COMMITTEE ON AGRICULTURE AND FORESTRY,  
Washington, D.C.

The subcommittee met, pursuant to call, at 10:07 a.m., in room 324, Senate Office Building, Senator Spessard L. Holland (chairman) presiding.

Present: Senators Holland, Talmadge, Young of Ohio, and Boggs. Senator HOLLAND. The subcommittee will please come to order.

This subcommittee meeting has been called for hearing on S. 3001, which is a bill to amend the definition of the term "telephone service" as used in title II of the Rural Electrification Act of 1936, as amended. (S. 3001 follows:)

[S. 3001, 87th Cong., 2d sess.]

A BILL To amend the definition of the term "telephone service" as used in title II of the Rural Electrification Act of 1936, as amended.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section 203(a) of the Rural Electrification Act of 1936, as amended (7 U.S.C. 924), is amended to read as follows:

"(a) As used in this title, the term 'telephone service' shall be deemed to mean any communication service for the transmission of voice, sounds, signals, pictures, writing, or signs of all kinds through the use of electricity between the transmitting and receiving apparatus, and shall include all telephone lines, facilities, or systems used in the rendition of such service; but shall not be deemed to mean telegraph services or facilities, or radio broadcasting services or facilities within the meaning of section 3(o) of the Communications Act of 1934, as amended (47 U.S.C. 153(o))."

Senator HOLLAND. In reply to a request from the chairman of the full committee, Secretary Freeman wrote a letter to Senator Ellender dated April 9, giving the recommendations of the Department of Agriculture on this bill. I ask that that letter be incorporated in the record.

(The letter referred to follows:)

DEPARTMENT OF AGRICULTURE,  
Washington, D.C., April 9, 1962.

HON. ALLEN J. ELLENDER,  
Chairman, Committee on Agriculture and Forestry,  
U.S. Senate.

DEAR SENATOR ELLENDER: This is in reply to your request of March 16, 1962, for a report on S. 3001, a bill to amend the definition of the term "telephone service" as used in title II of the Rural Electrification Act of 1936, as amended.

This Department recommends that the bill be passed.

The bill amends the definition of "telephone service" contained in section 203(a) of the Rural Electrification Act, as amended, so as to permit REA to finance a broader range of communication facilities than is presently authorized. Under

the existing definition of "telephone service," REA may finance those communication facilities in which "voice communication through the use of electricity between the transmitting and receiving apparatus, is the principal intended use thereof." This definition precludes REA financing of communication facilities where voice communication is not the principal element. The telephone industry has developed and is providing a growing variety of communication services in addition to conventional voice communication. These include facilities for such services as closed circuit television, teletypewriter, private line, telephotograph, and writing and data transmission. These are today generally recognized and are being increasingly utilized as normal services rendered by telephone companies in their service areas. A number of these services are also being provided by telegraph companies in addition to conventional telegraph service.

The proposed change in the definition of "telephone service" would allow REA to finance communication facilities for the transmission of sounds, signals, pictures, writing and signs, as well as voice. No change is made in any other provision of the act. Enactment of the bill would not open up a new field of REA financing but would enable REA to take care of its telephone borrowers' needs in providing services which telephone organizations are normally called upon to provide. There would continue to be excluded from permissible REA financing, as at present, conventional telegraph and public radio and television broadcasting facilities.

When the Congress was considering the legislation authorizing REA to make rural telephone loans, the possibility of future developments within the industry was recognized as was the possibility of Congress being called upon to make appropriate revisions in the authorizing statute to permit REA to meet financing needs associated with such developments. Rural telephone systems which have availed themselves of REA financing are faced with demands for communication services related to these developments. One such service, and a most important one, is the furnishing of facilities for the distribution of educational television over closed circuits to the schools in their service areas. They have a public and civic responsibility to furnish these facilities. Several borrowers have approached REA for financing of closed circuits for this purpose and have expressed the view that they should be able to render, in the rural areas they serve, the same service that other telephone companies offer. Enactment of S. 3001 would help them achieve this.

The Bureau of the Budget advises that there is no objection to the presentation of this report from the standpoint of the administration's program.

Sincerely yours,

ORVILLE L. FREEMAN, *Secretary.*

Senator HOLLAND. In order to expedite the conclusion of this matter, I want to give notice that the hearing is also held upon H.R. 10708, an act on this same subject, which in some respects is different from S. 3001. The witnesses may be heard on either or both of those acts.

(H.R. 10708 is as follows:)

[H.R. 10708, 87th Cong., 2d sess.]

AN ACT To amend section 203 of the Rural Electrification Act of 1936, as amended, with respect to communication service for the transmission of voice, sounds, signals, pictures, writing, or signs of all kinds through the use of electricity.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section 203 of the Rural Electrification Act of 1936, as amended (7 U.S.C. 924), is amended by striking out subsection (a) thereof, and inserting in lieu thereof the following:

"(a) As used in this title, the term 'telephone service' shall be deemed to mean any communication service for the transmission of voice, sounds, signals, pictures, writing, or signs of all kinds through the use of electricity between the transmitting and receiving apparatus, and shall include all telephone lines, facilities, or systems used in the rendition of such service; but shall not be deemed to mean telegraph services or facilities, or community antenna television system services or facilities such services and facilities shall be limited to closed circuit television operations other than those intended for educational purposes, or radio broadcasting services or facilities within the meaning of section 3(o) of the Communications Act of 1934, as amended."

Passed the House of Representatives May 17, 1962.

Attest:

RALPH R. ROBERTS, *Clerk.*

Senator HOLLAND. Under date of June 27 this subcommittee received a letter from Mr. Robert D. Partridge, legislative representative of the NRECA, supporting the purpose of these bills. I ask that that letter and the resolution attached thereto be made a part of the record.

(The letter is as follows:)

WASHINGTON, D.C., June 27, 1962.

HON. SPESSARD L. HOLLAND,  
Chairman, Subcommittee on Agriculture Credit and Rural Electrification, Committee on Agriculture and Forestry, U.S. Senate, Washington, D.C.

DEAR SENATOR HOLLAND: We understand that your committee will hold hearings on June 29, on S. 3001 and H.R. 10708. These bills amend the definition of telephone service contained in the Rural Electrification Act, so that REA financing may include telephone facilities required to provide rural areas with educational TV and data transmission facilities.

The National Rural Electric Cooperative Association supports the amendment to the Rural Electrification Act which these bills would accomplish. During this association's annual meeting last March, the membership adopted a resolution setting forth our position and the basis for it. A copy of the resolution is enclosed.

We respectfully request that this letter and the accompanying resolution be included in the printed hearings on S. 3001 and H.R. 10708.

Sincerely yours,

ROBERT D. PARTRIDGE,  
Legislative Representative,  
National Rural Electric Cooperative Association.

RESOLUTION NO. C-11 OF THE NATIONAL TELEPHONE COOPERATIVE ASSOCIATION

Whereas through the efforts of REA telephone borrowers, more than 6½ million inhabitants of rural America are receiving adequate and dependable telephone service, and many of the rural people receiving such service are also members of electric cooperatives; and

Whereas many new concepts of communication such as educational television and data transmission are being introduced and performed by telephone systems, and under present wording of the REA Act, telephone borrowers may not borrow funds for such purposes thus restricting their operations to the detriment of rural subscribers: Now, therefore, be it

*Resolved*, That NRECA endorse and support the amendment to the REA Act as proposed by the National Telephone Cooperative Association; which amendment, if passed, would allow REA to loan funds for new services such as educational television and data transmission.

Senator HOLLAND. The first witness is Mr. Richard A. Dell, Deputy Administrator, REA.

Mr. Dell.

STATEMENT OF RICHARD A. DELL, DEPUTY ADMINISTRATOR,  
RURAL ELECTRIFICATION ADMINISTRATION, U.S. DEPARTMENT  
OF AGRICULTURE

MR. DELL. Mr. Chairman and members of the committee, I am Richard A. Dell, Deputy Administrator, REA. With me are Raymond W. Lynn, Director of REA Telephone Engineering and Operations Division, and Ralph F. Koebel, Assistant General Counsel, USDA, who will be available to furnish any technical or legal information the committee may desire. The following telephone program data may be of interest to the committee. As of May 31, 1962, REA has made loans totaling approximately \$887 million to 777 telephone companies and cooperatives located in 45 States and the Virgin Islands. Of these, 565 are commercial companies with loans totaling about \$582 million, and 212 are cooperative type borrowers

with loans totaling about \$305 million. As a result of these loans, 898,000 rural subscribers will receive improved service and an additional 818,000 rural families will receive service for the first time.

Senator HOLLAND. Are these loans in current condition?

Mr. DELL. Yes, sir.

Senator HOLLAND. All of them?

Mr. DELL. We may have a little bit of delinquency, but not much. I can give it to you.

This is as of the end of May, Mr. Chairman. Overdue more than 30 days, the principal was \$210,590 from three borrowers. That is among the cooperatives. Commercial companies, one borrower more than 30 days overdue. And the amount overdue is \$250 in principal.

The interest more than 30 days overdue from cooperatives is \$9,077. From the one commercial borrower the interest overdue more than 30 days is \$467.

Senator HOLLAND. Do I understand, then, that of the 565 commercial borrowers only one was delinquent at the time?

Mr. DELL. As of the end of May; yes, sir.

Senator HOLLAND. And the 212 cooperative-type borrowers, how many were delinquent as of that time?

Mr. DELL. Three.

Senator HOLLAND. Senator Talmadge, any questions?

Senator TALMADGE. No.

Senator HOLLAND. Senator Boggs.

Senator BOGGS. No.

Senator HOLLAND. Proceed.

Mr. DELL. I appear today, at the committee's request, to discuss S. 3001 and H.R. 10708, which has passed the House and is now before your committee. These bills would amend the definition of "telephone service" as it appears in section 203 of the Rural Electrification Act.

In the summer of 1961, a number of REA telephone borrowers inquired as to the possibility of REA financing facilities to be used for delivery of educational television to school systems located in their service areas. These inquiries came primarily from systems in South Carolina although other States indicated interest. Inquiries have also been received from borrowers concerning REA financing of communication facilities to be used for data transmission, teletypewriting, and similar services.

When this problem was presented to us, we inquired of the General Counsel's Office as to REA's authority to finance such facilities. Our lawyers advised us that under the definition of telephone service in the present law, the only communication facilities which REA may finance are those in which "voice communication through the use of electricity \* \* \* is the principal intended use."

Senator HOLLAND. Is that from the law or the opinion of counsel?

Mr. DELL. That is from the act.

Senator HOLLAND. Thank you.

Mr. DELL. Consequently, communication facilities are excluded if they are intended solely for nonvoice communication, or for both voice and nonvoice communication where voice is not the principal element. Also expressly excluded by the definition are "telegraph services," and "radio broadcasting services," which as defined in the Communications Act of 1934, includes television broadcasting. S. 3001 and H.R.

10708 would extend the communication facilities which REA may finance to those furnishing any type of communication service through use of electricity, including transmission of sounds, pictures, writing, signs and other data, as well as of voice. There would continue to be expressly excluded from permissible financing, as at present, public radio or television broadcasting facilities, and conventional telegraph facilities which we understand are generally construed as facilities used in the transmission of written messages filed with the company by the general public.

Counsel's interpretation was communicated to the interested borrowers. They expressed the view that REA-financed telephone systems should be able to render, in the rural areas they serve, the same service that other telephone utilities offer. It is our understanding that enactment of the pending measure is sought to achieve this and thereby to place REA-financed systems on technical and competitive parity with other segments of the industry. As originally introduced, S. 3001 and H.R. 10708 would, we believe, resolve any question as to REA's authority to finance the local distribution facilities intended for use in educational television. The bills would permit also the financing of other types of service, such as data transmission, teletypewriting, facsimile reproduction, and other photographic transmissions, all of which are services commonly rendered by telephone companies. I would like to emphasize that S. 3001 and H.R. 10708 would not open up a new field of REA financing for a new industry but would be a matter of enabling REA to take care of its telephone borrowers' needs in providing services which telephone organizations are normally called upon to provide.

Between March 19, 1962, the date of the hearings on H.R. 10708, before the House Committee on Agriculture, and May 17, 1962, when the bill was taken up and passed by the House of Representatives, the National Community Television Association suggested an amendment of H.R. 10708. The objective of the association, which represents a substantial segment of the commercial community antenna television (CATV) industry was to eliminate from the definition of "telephone service" in the bill, commercial CATV services and facilities. REA had no objection to the proposal since the rendition of commercial CATV service is not ordinarily a function of telephone companies. As a matter of fact, REA had not even taken into consideration the financing of such service. In this connection, it should be understood that CATV service is found predominantly in cities and not in rural areas, due to the high cost of the cable system required for the service. This cost is reported to approximate \$5,000 per mile. This necessarily limits the commercial service to urban or built-up areas where the density per mile of subscribers is great enough to bring the charge for the service within a range which would be attractive to subscribers in terms of initial installation cost and monthly fee. Available data indicate that of the CATV systems now in operation above 85 percent are located in communities with population in excess of 1,500. Even if REA's statutory authority were broadened to encompass CATV facilities and service as such, it is doubtful that REA loans for such purpose could be made in view of the rural area requirements of the REA statute.

With such considerations in mind, and having determined that the borrower organizations which had initiated the drive for the amenda-

tory legislation, and the sponsor of the bill, had no objection to the amendment proposed by NCTA, REA acquiesced in the proposed amendment. It is important to note that the language of the CATV exclusion made an exception in the case of services and facilities "intended for educational purposes." This exception is important because of the fact that the facilities required for use by telephone companies in bringing educational TV programs into rural communities could be the same as those used for commercial CATV enterprises, that is, an antenna and cables to the receiving sets.

At the outset of the House debate on May 17, Congressman Poage, the sponsor of H.R. 10708, announced his purpose to offer the CATV amendment. Unfortunately, during the debate which ensued, there was evidenced considerable misunderstanding of the purpose and scope of the bill and of the CATV amendment.

Concern was expressed that the proposed definition of "telephone service" would allow REA-financed telephone systems to engage in the general broadcasting of television signals. This concern is without foundation. It is our hope that these hearings will serve to dispel any misunderstanding.

We wish to emphasize that the proposed legislation retains the original language of the 1949 amendment to the act which expressly and clearly excludes "radio broadcasting services and facilities within the meaning of section 3(o) of the Communications Act of 1934, as amended." Radio broadcasting under this section clearly includes television broadcasting. The Poage CATV amendment adds a further exclusion to the two already appearing in the 1949 amendment. This third exclusion deals with "community antenna television system services or facilities other than those intended for educational purposes." This amendment, as I have stated, was suggested and supported by representatives of the National Community Television Association and was offered by Congressman Poage, the House sponsor of H.R. 10708.

The following description of a community antenna system, taken from the April 13, 1959, report and order of the Federal Communications Commission in docket No. 12443, *Television Broadcasting Development Inquiry* (24 F.R. No. 76, April 18, 1959, pp. 3004 at 3006-3007), will serve to present the nature of CATV operations:

10. CATV's. A community antenna system (CATV) consists of a receiving antenna located on a high elevation so as to receive signals to best advantage, and wire lines whereby the signals received are transmitted to the receiving sets of the subscribers in the community, together with necessary amplifying equipment and sometimes equipment to "convert" the signal from the channel on which it is received to another channel at which it appears on the subscriber's set. Typically the CATV uses the lowest VHF channels on the subscriber's set; this necessitates conversion of the signals of any higher VHF or UHF stations which are carried on the system. The systems, which are generally business enterprises conducted for profit, obtain revenue by charging subscribers a monthly fee \* \* \* and generally in earlier years, and in many cases still, charge an initial installation fee \* \* \*. The systems range in number of channels from one to seven (and in a very few instances more than seven); many of them have expanded their facilities in recent years, and a substantial majority \* \* \* now have at least three channels. Typically, each station occupies one channel on the system. In some instances, however, it appears that some kind of switching arrangement is used whereby either the system or the microwave common-carrier facility supplying it presents a selection of programs from more than one station for each channel. However, a number of CATV's have additional channels on which no television stations' signals are presented; on these sometimes "closed-circuit" telecasts of programs or advertising are presented \* \* \*.

In other cases (e.g. Ithaca, N.Y.) CATV's have made a channel available to educational institutions, for use in closed-circuit programing for schools or for subscribers generally.

11. CATV's developed originally chiefly in places where satisfactory direct television reception was not possible, either because of distance from a station or (as in the rugged portions of the East) where terrain is an adverse factor.

12. The CATV's carry on their systems stations located both nearby and at a distance. The presentation of the programs of distant stations is in many cases made possible by use of microwave common-carrier facilities, which pick up the signals of the station at a point relatively near its location, and relay them to the distant CATV's receiving antenna. In some instances this kind of operation involves a relatively short distance (100 miles or less) between the city wherein the station is located and the CATV's community; the microwave facilities in these cases are used to improve the quality of the signal distributed and save line expense. However, in most cases where microwave transmission is involved the CATV's community is well over 100 miles from where the station is located.

This order (at pp. 3013-3014) and other decisions have established that the Federal Communications Commission has no jurisdiction over CATV's because they do not "broadcast."

CATV facilities are not open to the public and are intended and used primarily for the distribution to subscribers of TV programs which are obtained from off-the-air broadcasts by regulated TV stations. Such operation of CATV facilities are not considered "closed circuit operations" in the terminology of the industry.

Under the wording of the Poage CATV amendment, REA financing of CATV facilities would be limited to those CATV facilities intended for the distribution of educational programs. It is of great importance and in the public interest that CATV facilities financed by REA be available for educational television programs whether they originate in and are transmitted from regulated TV broadcasting stations, closed circuit systems, or a combination of the two. The recently enacted Federal legislation (Public Law 87-447) for matching grants-in-aid for educational television authorizes grants for the construction of new television broadcasting facilities. Restriction of REA-financing to CATV facilities which could be used solely for completely closed circuit educational television programs would deprive the intended rural beneficiaries of the REA telephone loan program of access to the important, growing, and federally assisted tool of broadcast educational TV programs.

Some confusion as to the techniques, methods, and facilities employed in the CATV operation appears to be manifested in the May 17 House debate of H.R. 10708. It is difficult to ascertain any clear intent other than that expressed by the language of the CATV amendment offered by Congressman Poage. The confusion appears to have been intensified by the adoption of an amendment to the CATV amendment which appears to add a limitation to the explicit exclusion from REA financing of CATV facilities other than for educational programs. The limitation added by the amendment referred to "closed circuit television operations" and is capable of various interpretations including the following:

1. The intent was to limit any CATV financing by REA to the facilities commonly regarded as CATV facilities, which might in themselves be considered "closed circuit," i.e.—

the receiving antenna. \* \* \* and wire lines whereby the signals received are transmitted to the receiving sets in the community, together with necessary amplifying equipment and sometimes equipment to "convert" the signal \* \* \*. (FCC report and order, supra, p. 3006).

If this was the intent, the amendment was superfluous.

2. The intent was to limit any CATV financing by REA to facilities which would be used solely and exclusively to receive educational programs originating and terminating on closed circuits without the use of "broadcasting." Although there are such telecasts, they are few and will probably continue to be sparse when the expansion in educational broadcast TV, fostered by the new Federal assistance program, gets underway. Carrying out this intent would defeat a chief purpose of the bill, to open the new and stimulating world of broadcast educational television to rural America.

3. The intent was to exclude from REA financing only CATV facilities for closed circuit noneducational (commercial) television programs and, therefore, to permit REA financing of CATV facilities for off-the-air and closed circuit educational programs as well as for off-the-air commercial programs. This would be entirely inconsistent with the probable intent of the sponsor of the limitation.

The most effective way, and perhaps the only way to achieve what most reasonably appears to be the intent of the language of the bill itself, the hearings before the House Committee on Agriculture, the committee report, and the House debate, and to dispel the confusion, is to eliminate the "closed circuit" amendment to the Poage CATV amendment. We ask this committee to eliminate the phrase added to the Poage CATV amendment which appears in the Senate committee print of H.R. 10708, at page 2, on lines 6-7 and reads, "such services and facilities shall be limited to closed circuit television operations." We accept the CATV amendment as offered by Congressman Poage and believe that if S. 3001 were so amended it would amply carry out the purpose of the bill with respect to educational television programs and would not intrude into the area of "radio broadcasting services or facilities."

Mr. Chairman, we appreciate the opportunity to appear. And if there are questions we would be glad to answer them.

Senator HOLLAND. I have a question or two, and I am sure other Senators will have some.

It is your intent to permit the REA, that is, the Federal Government, to make loans financing the putting in of such equipment as may be necessary to receive and transmit educational television programs, is it?

Mr. DELL. That is correct—to do that financing where we have a telephone borrower.

Senator HOLLAND. What is the difference between the system for such receiving and transmitting of educational program signals in educational stations and the transmitting of commercial stations?

Mr. DELL. I want to make one correction in the first question you asked me. We would not finance for the transmitting, we would only finance for the receiving of the educational programs, we would not finance for the transmitting.

Am I correct in that, Mr. Lynn?

STATEMENT OF RAYMOND W. LYNN, DIRECTOR, TELEPHONE  
ENGINEERING AND OPERATIONS DIVISION, RURAL ELECTRI-  
FICATION ADMINISTRATION, U.S. DEPARTMENT OF AGRI-  
CULTURE

Mr. LYNN. If you mean broadcast transmission.

Senator HOLLAND. My understanding is that you would finance the transmission but not the broadcasting facilities.

Mr. DELL. That is right.

Senator HOLLAND. My question is, what is the difference between the physical system required and the details thereof for the installation of a system that would receive and transmit the signals from an educational station and that which would receive and transmit the signals from a commercial station?

Mr. DELL. Mr. Lynn, the head of our engineering department will answer that.

Senator HOLLAND. Mr. Lynn.

Mr. LYNN. There would be no difference in the facilities used.

Senator HOLLAND. In other words, what you are asking for is permission to finance the facilities to receive and transmit to the subscribers to your system educational programs, but that same system, the same equipment could be used to transmit any program from any sort of station within range?

Mr. LYNN. That is true.

Senator HOLLAND. How do you expect to confine the use of it to the transmission and receipt and distribution of educational programs?

Mr. LYNN. The request for service would be from educational institutions, and they would be the subscribers that would be served. It would not be the general public subscribers of the company.

Senator HOLLAND. Suppose I were a person that had my home in the area covered by a rural telephone system, whether a cooperative or a private system that had been granted loans to extend and improve service, and suppose I coupled into the cable of the transmission system which had been procured through the loan from the REA. What would prevent me or the person that was receiving at the receiving portion of the system from receiving the signals from any station within range whether commercial or educational?

Mr. LYNN. The telephone company providing these facilities would have to receive and transmit that signal, the signals that you would be receiving would be those for educational purposes, and you would not be receiving the others and transmitting those.

Senator HOLLAND. What would prevent you from so doing it?

Mr. LYNN. Our financing would be limited to those for educational purposes.

Senator HOLLAND. My question is, isn't that equipment—aren't those transmission lines—isn't the whole system just as able to receive and transmit the signals from any commercial station any program that is within its range?

Mr. LYNN. It has the capability, if you put in the receiver to receive the proper channel and to transmit that channel, yes.

STATEMENT OF RALPH F. KOEBEL, ASSISTANT GENERAL  
COUNSEL, U.S. DEPARTMENT OF AGRICULTURE

Mr. KOEBEL. I think we would only finance the part that was educational.

Senator HOLLAND. By putting in a very small amount of additional equipment they could then receive from any station within range, couldn't they?

Mr. KOEBEL. We would require them to finance any commercial activity other than from our funds.

Senator HOLLAND. But the same cable would operate to serve both ends, would it not?

Mr. KOEBEL. I think that would have to be conceded. But I think in the financing that we would make sure that the proportions were proper.

Senator HOLLAND. Well, it is not clear to me. But it appears to me that the major part of the costs, that is, the furnishing of the cable, could be used just as well to transmit commercial programs as it could educational programs, and that with very little or maybe no added expense the system could be used for the receiving and transmission of any program from any station within range. Is that true or not true?

Mr. KOEBEL. What you have said is true, sir. I think, as Mr. Dell has pointed out, however, if we properly assess these costs, the costs would be rather prohibitive to the ordinary rural resident, whereas if we are financing it for educational purposes, presumably the costs are being borne by the school systems who might be using it.

Now, if any private subscriber wanted to use the educational portion, I assume he would have to bear his share. If commercial reception were on the same lines we would have to insist on the proportion being sound. And it appears to us that an ordinary rural resident would not be interested in the cost, if our costs are properly assigned.

Senator HOLLAND. Suppose you make the loan, and it follows that the cables are put in and the receiving facilities to receive from the educational station. Isn't the adding of additional facilities to receive from other stations that are within range, commercial stations, a very small added expense?

Mr. KOEBEL. Assuming that that is true—and Mr. Lynn could answer that better than I—I believe we would control that as in our other activities, telephone and electric, where our non-REA Act beneficiaries are involved, we insist that the costs be properly borne.

Senator HOLLAND. In other words, even after the cable were in, you would insist on such association, if it desired to receive other signals, other programs, commercial, to come back and repay you for that portion of the cable cost which is then attributable to other programs?

Mr. DELL. I think what we would do there—I depend on Mr. Koebel somewhat in this answer—but I think what we would do there, Mr. Chairman, is simply make this purpose very clear, and the requirement very clear in the loan contract when the loan is originally made, and they would be controlled in doing the sort of thing you described.

Am I correct?

Mr. KOEBEL. I think in effect that that is so. I didn't want to suggest that it is impossible also to provide commercial service.

Senator HOLLAND. You mean that you would try by all means available to you in the contract to restrict the operation to the receipt and transmission of educational systems?

Mr. DELL. Right. If we were loaning one of our borrowers in any State money for this purpose, the loan contract would specify the purpose for which this loan was being made and the uses to which the loan funds could be put, and then the facilities that those funds provide, the use to which they could be put.

Am I right?

Mr. KOEBEL. I think so. It may be theoretically possible to serve rural individuals but I think under the terms of the act as the amendment is proposed, it is highly improbable.

Senator HOLLAND. Now, your testimony has stated that the cost of the cable installation is about \$5,000 a mile, is that right?

Mr. DELL. Yes.

Senator HOLLAND. That is the principal cost of the entire system for the receipt and transmission of television programs, isn't it?

Mr. LYNN. That is a good portion of it, the antennas and amplifiers contribute considerable cost too.

Senator HOLLAND. What proportion of the cost is cable cost? My understanding has been that that was the large part of your cost in CATV systems.

Mr. LYNN. I couldn't give a percentage. I agree that it is the largest part.

Senator HOLLAND. Now, do ordinary telephone companies in rural areas install such cables for the purpose of allowing the receipt of educational programs solely?

Mr. LYNN. This new bill that was passed, that provides Federal grants, with State matching grants, will bring into the picture this need to a great extent. The present need is quite limited, I believe, as far as telephone companies are concerned.

Senator HOLLAND. Do you know of any case where a commercial telephone company has paid for the installation of cables and the other facilities for the receipt and transmission of an educational program?

Mr. LYNN. No, I don't believe I do at the moment other than in closed circuit ETV systems.

Senator HOLLAND. And yet you would propose to allow both private and public associations that were borrowers from REA for rural telephone service to install through loans from REA such cable and distribution and receiving systems?

Mr. LYNN. When they have a request from educational institutions for that service.

Senator HOLLAND. Is there anything in the act that limits this to service requested by educational television stations or systems? I didn't so find it.

Mr. KOEBEL. No, Mr. Chairman, there isn't. But what we are saying is that it would be such activities that would be likely. If you are thinking in terms of this CATV reception off the air, there are other forms, of course, that are typical closed circuit, I believe, such as exists in South Carolina. But as we visualize it, the principal type of users of an educational CATV system would be an institution. For the general public, the cost would be prohibitive.

And if I may comment a little further on your basic question, if we have financed the CATV system for educational use, that would be the only financing that we could make of this system, and then if the borrower wanted to attempt to apply commercial to it, we would insist that the full cost of commercial activity be financed otherwise by the borrower.

Senator HOLLAND. They would use the same cable system that you would have financed and already installed?

Mr. KOEBEL. I don't know what the costs would be, but it seems to me at the moment it would be prohibitive.

Senator HOLLAND. Suppose the loans from you had been secured for the purposes that you had in mind, and the cable system had been installed, now, what would prevent the borrower, whether a commercial borrower or an association, cooperative, from using its own money to install the additional facilities for receipt of the other programs, from using the same cable whose installation you financed for the distribution of those programs?

Mr. KOEBEL. I think at this sitting we would consider the cable to be there for educational purposes, that is all we can do under the act.

Senator HOLLAND. And then if it were used for these other purposes what could you do, practically, to insist upon the initial cost already put in being prorated among the various users?

Mr. KOEBEL. I think we haven't seen that through, Mr. Chairman, we know at the moment that all the installation is for this purpose. And it does seem to us that the cost of adding on residential commercial users would be prohibitive.

Senator HOLLAND. Do I understand, then, that what you are planning to do is to simply have this used at schools?

Mr. LYNN. That is the principal thinking; yes.

Senator HOLLAND. You understand, educational stations broadcast not just to schools, but to homes and all types of receiving sets.

Mr. LYNN. I think the thinking here was that the request for any distribution, antenna and distribution of the signal, would be from educational institutions wanted to get it into their places.

Senator HOLLAND. In other words, what you intend to do is to have this wording such that you confine this program to the receipt of educational programs from educational television stations and the transmission of those programs to schools only?

Mr. LYNN. Schools or hospitals, whatever the educational system would ask us to serve or to provide such service to.

Senator HOLLAND. If they asked you to provide it for individual homes would you think that you were so authorized?

Mr. LYNN. In the case of a cripple or a shut-in that they wanted this program for, I believe it would be proper.

Mr. DELL. The cost would be pretty high, though, Senator, I think it would be prohibitive to bring it to homes.

Mr. LYNN. I would like to add that such a cable distribution system to the schools would certainly not cover the total area, and would require more cable to get to individual homes. And that might be prohibitive as far as the individual subscriber is concerned.

Senator HOLLAND. Speaking only as one, I have no opposition at all to the proposal if it affects only the transmission of educational programs to schools. But if what you are proposing to do is to set up a general cable service which can be tapped in by others, and which

can be used just as well for the receipt and transmission of commercial programs as it can for educational, I would want to take a second look at it.

Mr. DELL. I would like to assure you, Mr. Chairman, that we in REA certainly have no intention of getting into the commercial field in this matter of transmitting programs. And we have no intention of doing it. And I don't think our borrowers do. I can't speak for 775 of them. But I don't believe they do.

Senator HOLLAND. Let's get back to a question I asked a while ago. Are any of the commercial companies financing the putting in of cables to the schools?

Mr. LYNN. They are on closed systems circuits; yes, sir.

Senator HOLLAND. The closed system circuits are excluded by the terms of this bill; are they not?

Mr. LYNN. That is one interpretation of it the way it reads.

Mr. KOEBEL. I think that is only true of the House bill.

Mr. DELL. The House bill as it finally passed.

Mr. KOEBEL. Assuming you put that interpretation on it.

Senator HOLLAND. Senator Boggs.

Senator BOGGS. The first thing that occurred to me—and I certainly want to give consideration to it—I would like to have the information as to the areas now served by the REA telephone service of the various States covered. I wonder if that could be made available, where we have that service.

Mr. DELL. Yes, sir. We have loans now in 45 States and the Virgin Islands. The States in which we have no loans now are, I believe, Connecticut, Rhode Island, Hawaii, and there would be two others. I will get them for you. But there are 5 States out of the 50.

I find I have them right here. We had no loans in Connecticut, Delaware, Hawaii, Idaho, and Maryland. In the other 45 States we have borrowers. It looks like the largest number of borrowers is in—did I not name Rhode Island?

Senator HOLLAND. No; you didn't.

Mr. DELL. That is the fifth State.

Senator HOLLAND. You have named six now.

Mr. DELL. Connecticut, Delaware, Hawaii, Maryland, and Rhode Island. And leave out Idaho.

They run anywhere from one borrower to—

Senator BOGGS. One borrower is a company?

Mr. DELL. Our borrowers are broken down this way: We have 777 telephone borrowers, 565 of them are commercial companies, and they have borrowed \$582 million. We have 212 cooperative-type borrowers, and they have borrowed \$305 million.

Now, the number of borrowers—and it gets to be a company or a cooperative—run from 1 in some States up to, it appears here, the highest number I see is 63 in Texas.

Senator BOGGS. And those companies or cooperatives would serve individual homes or institutions?

Mr. DELL. Yes, with telephone service.

Senator BOGGS. And the experience is satisfactory with those, and they are paying out on your present operation?

Mr. DELL. Yes, sir; the record is good. Out of the total of—I can give you those figures—out of the total of 212 cooperatives, \$305

million, there are 3 of them with payments overdue more than 30 days. The total in principal for those three is \$210,590. The interest is \$9,077.

Now, with 565 commercial companies, whose loans total \$582 million, there is only 1 with a payment overdue more than 30 days, and I think this must be for some technical reason, because the amount is so small. The principal is \$250, the interest is \$467.

Senator BOGGS. In all these areas, Mr. Dell, where this service is rendered, this is the only telephone service rendered?

Mr. DELL. The only telephone service rendered.

Senator BOGGS. And the enlarging of this service by this bill would be the only way these areas could be served with this transmission system?

Mr. DELL. That is right. When I say it is the only way, that brings up, Senator Boggs, a very interesting thing. On this educational television, where that service is being requested, if REA can't finance it for an REA borrower, it may be a company serving in an adjacent area, the Bell Co. or another independent company, or what have you, that will be called upon to provide the service.

Senator BOGGS. To put in a CATV in the area.

Mr. DELL. Right.

I would like to add this, Mr. Chairman, if I may, to follow a little bit on your line of questioning with respect to these systems going in and getting into the commercial field. I think in every State in which we have a borrower—there may be a few exceptions—but in nearly every one of those States they are subject to a State regulatory body, the public service commission or the utilities commission. And those commissions have jurisdiction as to rates, territories, the type of service to be furnished, and in some of them they have almost complete jurisdiction.

And we in REA do not finance them, Senator Boggs, until they have gotten all State regulatory approvals.

Senator BOGGS. The cooperatives have to get the same approvals?

Mr. DELL. The cooperatives and the commercials are practically the same; yes, sir.

Senator HOLLAND. That does not extend to CATV service, does it?

Mr. DELL. No, sir, it generally does not.

Senator BOGGS. But as I understand this bill, it would include CATV, that would be one of your primary services, wouldn't it?

Mr. DELL. It wouldn't be a primary one. It could include CATV, as I understand it, to the extent that it is used for educational purposes.

Mr. KOEBEL. That is right. Also it would be a question of whether our borrower had corporate power to go into CATV. That also would have to be the case.

Senator BOGGS. He could get that simply, couldn't he?

Mr. KOEBEL. Presumably he could get it, if the Commission had jurisdiction, or it might be a question of a charter authority.

Senator HOLLAND. Senator Boggs.

Senator BOGGS. The private telephone companies are setting up these CATV community services, aren't they?

Mr. DELL. No.

Senator BOGGS. To what extent are they in that field?

Mr. DELL. I don't know for sure, but I think to a very small extent—Ray, would you comment on that?

Mr. LYNN. I don't know that the telephone industry itself is in the CATV business at all.

Senator BOGGS. Well, as such—but commercial enterprises are in it substantially?

Mr. LYNN. Yes, very much so.

Mr. DELL. Senator Boggs, if I could make a comment, I know Mr. L'Heureux from the association, who represents the CATV people, is to testify on this bill, and I know he can clear up many of those questions, including the last one you asked there.

Senator BOGGS. But if you were granted this enlarged authority you would set up CATV services restricted to educational TV?

Mr. DELL. Right, sir.

Senator BOGGS. I would think that would be a very expensive item just restricted to educational TV, if you don't include the whole service on it, as desirable as having educational TV is concerned, I would think it would almost be prohibitive in itself unless you included the total service that that system could carry.

Mr. LYNN. I think an example of that might be if we looked at the State of South Carolina, which is putting in not a broadcast educational TV, but putting in a closed circuit educational TV system over the entire State. And the telephone companies are furnishing and installing the cables and microwave and other facilities required to distribute that over the State. It is of course rather costly, but it is being borne by the State educational group, and it is easily justified on their part, as I understand it, because it replaces teachers and provides—

Senator BOGGS. Supplements teachers, the teachers tell me.

Mr. LYNN. I am sorry, I didn't mean replace—it adds teaching ability of high quality over the State. Certainly if the telephone company were trying to foster that they would find a very small market, because subscribers themselves would not be able to afford it.

Senator BOGGS. But your main objective in this is primarily for educational TV?

Mr. LYNN. That is where the whole request stems from.

Senator BOGGS. And it would be your desire that the language and the intent would be limited to that?

Mr. LYNN. Yes.

Senator HOLLAND. You don't mean to exclude these other services like teletype and similar services which are furnished by normal telephone companies?

Mr. LYNN. No.

Senator HOLLAND. You do mean to include them?

Mr. LYNN. Yes.

Mr. KOEBEL. I think Senator Boggs' point was related to the narrow TV issue rather than the broad range.

Senator BOGGS. It was. And your question was right, then.

Senator HOLLAND. I confess I am puzzled. I notice that in your statement, Mr. Dell, on the paragraph at the bottom of page 2 you speak of the intent to render "the same service as other telephone utilities offer." Now, I understand that normal telephone utilities do offer some things not permitted by the present language of the Rural Telephone Act like telecommunications and things of that kind.

Mr. DELL. That is right.

Senator HOLLAND. But I don't understand that telephone utilities do offer this installation at their expense and the cable service required to transmit the educational TV. And I have asked two or three questions to ask that you indicate where any commercial companies have installed those cables for that purpose.

Mr. LYNN. They have installed cables for that purpose on a closed-circuit basis. They have installed them in Hagerstown, Md., serving the schools there. They are in the State of South Carolina, and there is a considerable amount of such facilities.

Senator HOLLAND. You mean at the expense of the telephone system?

Mr. LYNN. The telephone system is financing and putting them in, and it is receiving its compensation on a fee basis from the—I think there is a State educational commission—there are certain tariffs that the telephone companies have filed.

Senator HOLLAND. I ask that you prepare and file for this record a statement covering what the commercial telephone companies are doing in this field, because I understand from your statement that what you are trying to do is to leave the borrowers under your system in a position so that they will be able to render the same service that commercial telephone companies generally are offering.

Will you furnish for the record that information?

Mr. DELL. Yes, sir.

(The information is as follows:)

STATEMENT ON THE ACTIVITIES OF COMMERCIAL TELEPHONE COMPANIES IN THE DISTRIBUTION OF EDUCATIONAL TELEVISION TO EDUCATIONAL INSTITUTIONS

This report on the role of telephone companies in distributing ETV to school systems was obtained orally, chiefly from officials of major telephone companies which supply such services. It does not therefore purport to present a comprehensive picture of these rapidly growing activities. The following ETV systems utilize equipment furnished by telephone companies. This equipment includes coaxial cable, microwave facilities, or a combination of both, as well as amplifying and associated equipment:

*California.*—Anaheim school system: The ETV system now serves 20 schools with 2 channels, with coaxial cable and associated facilities furnished by a telephone company.

*San Jose* school system: The ETV system now serves 6 schools with 3 channels, with coaxial cable and associated facilities furnished by a telephone company.

*Indiana.*—Purdue University. The ETV system connects the campus at Bloomington with the extension campus at the Indianapolis downtown center, and plans are being made to connect all extension campuses in the State. This involves the furnishing by telephone companies of both microwave and coaxial cable.

*Maryland.*—Washington County school system: The ETV system serves 48 schools with 6 channels. This involves 113 miles of coaxial cable and associated equipment furnished by the telephone company. The telephone company has been informed that the State plans to extend this type of ETV to all schools in the State of Maryland.

*Michigan.*—Michigan State University: The on-campus system furnishes ETV to five buildings with four channels, with facilities furnished by a telephone company.

*New York.*—Cortland school system: The ETV system now serves eight schools with two channels. This involves 20 miles of coaxial cable and associated equipment furnished by two telephone companies.

*Ohio.*—Ohio State University: The on-campus system furnishes ETV to seven buildings with six channels, and includes distribution of two off-the-air channels. Distribution facilities are furnished by the telephone company.

*South Carolina.*—South Carolina State system: The ETV system now serves 68 schools; 46 with 1 channel and 22 with 3 channels. Plans have been made for

servicing most of the schools in the State with six channels. At present this system involves 630 miles of microwave and 120 miles of coaxial cable and associated equipment furnished by a number of telephone companies throughout the State. This system will eventually involve the furnishing by telephone companies of 4,900 miles of microwave channels and 3,779 miles of coaxial distribution cable to serve 1,613 schools in the State. A pertinent quotation from "The South Carolina ETV Story" issued by the South Carolina Educational Television Center: "Full responsibility for transmission of lessons from the center to classrooms lies with telephone companies."

Consideration is being given to the inauguration of ETV by many other city, county, and State educational groups. The types of systems being considered involve closed circuit operation, broadcast operation, or possibly a combination of broadcast and closed circuit. The State of Kentucky has been considering ETV by the primary method of broadcast but will undoubtedly require distribution of off-the-air ETV to some schools where direct reception is not possible because of terrain conditions or distance from the broadcast stations. Recognition of the need of an antenna and distribution system in receiving off-the-air ETV broadcasts appears in the legislative history of Public Law 87-447, providing for Federal grants for ETV broadcasting (S. Rept. No. 67 on S. 205). It was pointed out that while three educational TV broadcasting stations in Alabama covered 80 percent of the State, further coverage to a portion of northwestern Alabama is provided through a community antenna system serving that area.

The statewide ETV system in South Carolina is now connected to two hospitals which obtain ETV service directly from the telephone company providing that portion of the ETV facilities in the area. Information from officials of the South Carolina Educational Television Center indicates that most of the hospitals in South Carolina will eventually be connected to the ETV system.

Senator HOLLAND. My understanding is that the service rendered by these cables is so expensive that there has to be some responsible assurance of the receipt of very heavy cable charges before any such investment could be justified; is that your understanding?

Mr. DELL. Yes, sir. In the case of REA, Senator, before we could finance anything of this kind we would have to make—which we do on all loans—extensive feasibility studies, and be assured that the revenue coming from the recipients of these services would be sufficient to pay off the loan, the operating costs and so on, that would be involved.

Senator HOLLAND. And the recipients would be confined to the educational institutions?

Mr. DELL. Yes, sir. That is our intention.

Senator HOLLAND. And the revenue assured would have to be the revenue assured by the school system?

Mr. DELL. Right.

Senator HOLLAND. Whether it be the public school system authorities or the private school system authorities.

Mr. DELL. Right.

Senator BOGGS. Mr. Chairman, the recipients wouldn't be confined, would they, to educational institutions or hospitals, it would be available to any user of the REA telephone service, wouldn't it, actually?

Mr. DELL. Well, our purpose would be, any financing we did on it, Senator Boggs, would be for the purpose—for educational purposes. Now, if you had people who—

Senator BOGGS. And that is for the CATV?

Mr. DELL. In any of this financing, this service would be available just for educational purposes. Now, if you had invalids or people in homes, they could receive it if they could pay the tab, that would be the problem.

Am I correct on that? I will ask Mr. Lynn.

Mr. LYNN. Yes. But I think you would find it rather prohibitive for individual subscribers in the rural areas whom the borrowers serve to be able to afford the cost.

Senator HOLLAND. Whether they would be able to afford that cost or not, under this act you would not be intending to afford individual service, would you?

Mr. DELL. No, sir.

Senator HOLLAND. Your understanding is that the act would not permit you to finance the installation of cables for individual service—or would it?

Mr. KOEBEL. If I may answer that, Mr. Chairman, I don't think the act would exclude that. I think our testimony is that as a practical matter it is not contemplated. And as I understand one of these systems, South Carolina being a typical one, if you analyze the feasibility of a loan based on these cables leading to the school system, the idea of extending the cable to a lone or individual rural resident would make that cost quite prohibitive. For that reason we say it is not contemplated.

Now, it is not excluded.

Mr. DELL. It is not excluded. But I don't think we could establish feasibility for it.

Senator BOGGS. It is only a matter of a little spur line cut-in, isn't it?

Mr. DELL. I don't know, Senator. You might have the school sitting here and a fellow that wanted TV 3 miles away. Well, somebody is going to have to put up \$15,000 to get it down there. And you can't amortize that \$15,000 when you take all the charges into consideration that go into it for a few dollars a month, it can't be done.

Am I stating it correctly?

Mr. LYNN. I believe so.

Senator HOLLAND. I am not insisting on anything at all, but it seems to me that your case would be strengthened if you limited yourself, either by the wording or by the legislative record, to the supplying of these loans for the purpose of piping in the service to the educational institutions, because it is not inconceivable that there would be a private service that would be requested, coupled with the willingness of people well able to pay, to pay very high charges, so that they could be included in it. And it is not my understanding that rural telephone service is supposed to envisage that kind of service at that kind of prices.

Mr. DELL. I agree with you completely, sir.

Senator HOLLAND. We have asked for certain additional information from you gentlemen.

Mr. DELL. We will furnish it promptly.

Senator HOLLAND. Let me say only for myself in closing, so long as the loans are confined to furnishing facilities for the transmission of educational programs to the educational institutions on contracts which clearly show a commitment for the payment of funds sufficient to retire the loans, I have no objection. When you go to the possibility of furnishing other more general service, I think the question is much more debatable.

Mr. DELL. I assure you that we in REA, in our support of this bill, only want to do what the ordinary commercial telephone com-

panies and the independents and the Bell Co.'s are able to do in giving complete telephone service to their areas.

We do not want, and REA does not expect to get into television or radio broadcasting or that sort of thing at all, we can't, and we don't want to.

Senator HOLLAND. I remember that earlier in the hearing you spoke about supplying cable service for shut-ins, hospitals, and the like. So I am going to ask you to include in your statement that you prepare, any showing that you have of furnishing the service by commercial companies in that type of case.

Mr. DELL. We will be glad to do it, sir.

(For the information above, see p. 16.)

Senator HOLLAND. Senator Boggs?

Senator BOGGS. That is all.

Senator HOLLAND. Thank you, sir.

I am going to call next out of order Mr. Robert D. L'Heureux, counsel for the National Community Television Association, NCTA.

You may proceed.

#### STATEMENT OF ROBERT D. L'HEUREUX, COUNSEL, NATIONAL COMMUNITY TELEVISION ASSOCIATION

Mr. L'HEUREUX. Mr. Chairman and Senator Boggs, I will make a very brief statement. I do not have a prepared statement. My name is Robert D. L'Heureux. I am counsel for the National Community Television Association.

Several of you will remember me as former chief counsel of the Senate Banking and Currency Committee of the Joint Committee on Defense Production, and of the Senate Commerce Committee.

The National Community Television Association, which I will refer to as NCTA, is an association of private businessmen, of course. It is a nonprofit national trade or industry association with offices at 535 Transportation Building, Washington, D.C. Its membership consists of persons or organizations operating community antenna television, which I will henceforth call CATV systems, or engaged in manufacturing or supplying community antenna components or related equipment.

Its current membership includes approximately 500 system owners and 20 manufacturers and suppliers.

NCTA, which is the only national industry organization to represent the interests of the CATV industry and the public which it serves, is affiliated with 17 regional and State community television associations, each of which is represented on the board of directors of the national association. The combined membership serves an estimated 90 percent of the total owners of television receivers in the United States who are subscribers to CATV services. Industry statistics will indicate that TV systems serve approximately 790,000 homes, or 1 out of every 60 television homes in the country.

NCTA from time to time undertakes to represent the CATV industry and the television viewers dependent upon it in industry and government proceedings of significance to CATV. In this connection NCTA has appeared before the Federal Communications Commission on several occasions, and has presented testimony and other evidence to interested congressional committees.

Now, our purpose in being here is to assure you that we believe 100 percent in the Poage amendment as he introduced it. We believe in the prepared statement presented by REA here this morning 100 percent. I believe that the Saylor amendment which they recommend taking out of the Poage amendment has introduced a lot of ambiguity in what is intended. I think I can show you from the discussion on the floor that what Representative Saylor intended to do or had discussed on the floor is not accomplished by his amendment.

He had discussed that he was afraid that after hours, for instance, after the television programs of an educational nature were over, these REA borrowers might want to go ahead and serve, continue serving the public. Well, actually there is nothing in the Saylor amendment that prevents that. And actually I don't think you can find a way of preventing that.

I was very pleased at your questions, both of you, Senator Holland and Senator Boggs, because your purpose apparently is the same as ours, to protect private industry, to prevent the Government from subsidizing private industry, one segment of private industry as against another. And in that we heartily concur. That is why we asked Congressman Poage to introduce this amendment pertaining to CATV.

The way H.R. 10708 was originally presented without the Poage amendment and even approved by the committee before we even heard about it—because usually the Agriculture Committee has nothing to do with community antenna television systems—it caught us unawares, we saw that this had to do with something about television. So I quickly got hold of a copy of it, read the hearings in the House, and then I asked Congressman Poage to protect our industry. And he was sincere, and he said, "We don't want to subsidize one part of private industry as against another. And we think that you are being fair"—in fact, I have a quotation here, which I won't pull out, where he said on the floor of the House, "You people have been fair in protecting yourself and still make an allowance for educational television."

Now, what is this all about? What the REA asked for here and what the House asked for—and it was protected through this Poage amendment—was authority to use REA funds to help a borrower, presumably a telephone borrower. But under the definition it might be argued that it could be a CATV operation that would be starting there in that area to furnish reception of educational programs, primarily for the schools, but it could be for hospitals or for shut-ins if you could commercially make it feasible for them to receive it. I think the intent through the House debate and the debate in this committee is adequate to show that the REA is not entitled to just finance new commercial enterprises such as CATV systems, but that borrowers from REA be allowed to use the master antenna system in order to get educational programs into these schools.

Now, that is their intent.

Now, I will, before I finish my statement, give you the language that I suggested to Congressman Poage, that if it hadn't been too late, and it hadn't already been on the floor, they could have put in their committee report to show that intent very clearly. And I will suggest it here and give it to you before I close my statement. But actually even if it depended only on this discussion here, I think the

REA's intent is clear. And representatives of REA and I had discussions immediately thereafter, at the suggestion of Vice Chairman Poage, that we talk to Frank Renshaw, of the REA, who was in charge of the Telephone Division. We talked to a representative of the National Telephone Cooperative Association, also. We talked to their executive director about our amendment. And he was in wholehearted approval of it.

In other words, the private CATV industry, roughly 90 percent of which our association represents, is not afraid of this amendment. We think REA's intent and the Congressional intent are right.

Now, why do we want to allow educational television for the schools? Because we feel that REA loans are available in communities of 1,500 or less. Frankly, there is perhaps only about one-seventh of our whole membership that is in communities of 1,500 or less. Most CATV systems are in larger cities, 10,000 or more, or somewhat larger than that. They are not in smaller communities. We have found that from a profit viewpoint we must have perhaps about 20 subscribers per mile in order to even meet our expenses and make a modest profit.

REA furnishes service, I think, to one to five subscribers a mile in these small areas. Normally, these telephone borrowers will not provide competition for regular CATV systems. We are convinced that they won't be. On the other hand, we did want the Poage amendment in there, so that if ever there are broadened definitions of what communities REA should serve, these borrowers would not get into competition with Government money with private enterprise.

Now, why did I say that the Saylor amendment will not carry out the purpose intended by this amendment to the law (H.R. 10708)? Note that a master antenna system—and with your permission, at the conclusion of my remarks I would like to introduce in your record a speech made by Chairman Oren Harris, of the House Interstate and Foreign Commerce Committee, just last week, where he explains fully what CATV is, what they do, what they don't do, how they serve the public. This will make it clear in your hearings just what is meant by the community antenna television business. And if you will allow me to do that, I will insert it, in the record, because you will have there, for the first time, perhaps on the Hill in a congressional hearing, a complete definition and explanation of what the CATV business is.

Senator HOLLAND. Without objection that may be inserted.

(The document referred to follows:)

#### TELEVISION TO THE HINTERLAND

(Address by Hon. Oren Harris, Chairman, Interstate and Foreign Commerce Committee of the House of Representatives of the United States, at the Shoreham Hotel, Washington, D.C., on June 19, 1962, to the National Community Television Association, VIP Luncheon, 11th Annual Convention)

Mr. President, chairman of the board, distinguished guests, needless to say, it gives me great pleasure to welcome such an enterprising group to our National Capital. It is my understanding that almost every State in the Union is represented here, as well as some of your Canadian members. Although as an industry, you are but 12 years old, no one will deny that you have reached an imposing stature and, like another who reached his 12th year, you have grown in wisdom and in grace.

## GROWING RECOGNITION OF THE BENEFITS OF CATV

Twelve years ago, there were only a few community antenna systems in this country. Today, there are about 1,000 of them in 46 States and the Virgin Islands. You serve about 1½ million homes, or over 3½ million people. You are spreading into new areas from year to year. While most systems are small business enterprises in the true sense of the word, serving 1,000 subscribers or less, you are drawing the interest of large enterprises, such as the theatrical and broadcasting interests who are getting into the CATV business. The securities of some of your companies are listed on the stock exchange and bankers, investment houses, and brokers no longer look at you as an unknown quantity. CATV is a thriving business today and you present here were the pioneers who made it so.

Your contributions to educational television and other types of public service are well known. There are many grade schools and institutions of higher learning in many sections of the country which could not receive educational channels without your facilities. In many cases your channels are furnished gratuitously to the school systems of this Nation. I congratulate you.

Just about 1 month ago, on May 17, 1962, a bill, H.R. 10708, had been reported to the House by the Committee on Agriculture to amend a section of the Rural Electrification Act. Several Members of Congress were apprehensive that this bill might interfere with the development of community antenna cable systems. I was not surprised when the vice chairman of the committee, Mr. Poage, came up with an amendment which the NCTA had drafted. In answer to an inquiry whether this bill would injure CATV operators, Mr. Poage stated:

"We were requested by the association and not by the REA to use this language. It is the language of the people whom the gentleman fears are going to be injured—it is the language of the very people—and it is word for word and has not been changed, not even by a comma \* \* \*."

Then Congressman Poage paid your association a high tribute. He stated:

"I believe these gentlemen are not only fair to their opponents, but I believe they are fair to themselves. I believe they have come in and asked for a reasonable limitation. As long as it seems to be a reasonable limitation, I for one—and I believe the House Committee on Agriculture—is disposed to try to grant any reasonable limitation."

I believe that as an industry you have been fair to yourselves, fair to your opponents, and you have been reasonable in your demands. This, more than anything else, has won you an accolade from the Congress, the public, and the courts.

You will forgive me if I define a community antenna television system, otherwise called a master antenna cable system, for the benefit of guests or reporters who are sometimes confused by the great variety of technical terms in the television industry.

## DEFINITION OF CATV

According to the general understanding in the Congress, a community antenna is, as the term seems to imply, a master television receiving antenna erected and designed to serve a community, or such part thereof as is practical to serve, or as may have a requirement for service. It is technically and functionally analogous to the master antenna systems installed in apartment houses to permit service to part or all of the apartments, rooms, or suites by means of a single antenna system.

Generally, community antennas are found in areas where because of the interaction of topographic or geographic conditions, and technological and economic factors, reception of television signals by conventional antennas is either (1) non-existent, (2) of unsatisfactory quality, or (3) possible only with the aid of costly tall rooftop antennas placed on high elevations or other suitable locations.

Community antennas are capable of receiving the signals of more than one station simultaneously, they are designed and oriented, when installed, to receive the desired signals and to reject, as much as possible, the undesired channels. That is essentially the same function as is performed when a homeowner who erects a rooftop antenna purchases an antenna which has been designed and manufactured to give optimum reception on the channels he desires to receive and to reject signals of stations which might duplicate or interfere with those he prefers. Community antenna people do not alter, delete, or in any manner change the broadcast intelligence on the channels which they receive.

As the Federal Communications Commission and the courts have repeatedly decided, they do not broadcast, and they are not common carriers, such as telephone companies or telegraph companies. They are in the signal-receiving

business. But enough of these technicalities. Let us look at the origins of this CATV industry, as it is popularly called. That is where the real romance of your industry is to be found. It matches the wonderful tales of the first Curtiss-Wright flight and earlier planes bound together with bailing wire and glue.

#### EARLY BEGINNINGS

The history of the community antenna industry reveals the development of an entirely new industry in the best American tradition. In the very early days of television only very limited service was available in metropolitan areas and virtually no service in rural areas and small cities and towns more than 50 miles from the few major metropolitan areas. The Federal Communications Commission had imposed a so-called freeze on the licensing of television stations because of technical problems. This freeze lasted for several years and would have restricted the benefits of this dramatic new medium of mass communications to a few privileged urban areas were it not for the ingenuity of the small American businessman and the insistent demand by the public for the pleasure and educational benefits of television throughout the hinterland.

There were no precedents for this industry. However, since a single antenna could serve a hotel or an apartment house, then why could it not be made to serve an entire community?

The idea did not generate with the large and powerful electronics corporations such as the RCA's, the General Electrics, and the Philcos. It developed with local radio and television dealers in small towns who sought some way of providing television signals to the public clamoring to purchase receivers. The first system were indeed amateurish. They consisted of an antenna mounted on a pipe on the top of a hill; twin lead wire, such as connects any antenna to the television receiving set, extended from the antenna down the hillside and throughout the area services. It was supported by trees, fenceposts, corners of buildings and passed over alleys, backyards, etc. Inexpensive amplifiers, such as used in office intercommunications systems and available at most radio supply houses, were spaced at required intervals along the line. At times they worked surprisingly well, and at other times because of inexperienced operators and the fact that the equipment was not designed to meet the demands of an extensive antenna system, they were very poor.

The industry was born almost simultaneously on both coasts in 1949 and 1950. Recognizing the public need and demand in rural and fringe reception areas for television reception and for equipment designed to meet the rigors of outdoor operation, suppliers of electronic equipment began to experiment with a designed CATV amplifier and specialized equipment. The American public brought their demands to these people and insisted that they be met in the small cities and towns across the country. Many men and women with little or no training and with the limited advice available began to build and rebuild, making known their wants and frustrations to the equipment suppliers. The demands of this new industry resulted in the formation of new companies whose primary objective was to solve the problems of multichannel master-antenna reception for these small cities and towns. Established manufacturers were too busy with other problems to devote the time and resources necessary to start from scratch. As a result the dominating equipment suppliers in the CATV field today, 12 years from when the industry was first established, are still the companies which were organized to meet this demand. The industry has never been able to stand still. Development has been constant until today more than \$450 million has been invested in community antenna reception and the industry has caught the imagination of, and challenged some of the country's largest entertainment and financial organizations.

Essentially, however, the industry was born in smalltown America. It can take credit for its development and it still retains much of this original flavor. It is a real example of grassroots demand and development.

#### PROBLEMS OF CATV

As the CATV industry advanced in age, it encountered many problems. Cable operators found it difficult, at first, to obtain permission of telephone companies to string its cable along its poles. Power and other utilities cooperated, but telephone companies hesitated. Finally, they allowed CATV operators to use their poles, but many companies inserted all types of restrictive clauses in their contracts which tended to restrict the growth of the CATV industry. The con-

tracts were terminable upon 30 days' notice or 1 year, at most. I am informed that in the past year, most telephone companies have removed these restrictions and now grant contracts of 3 to 5 years' duration. Some have even made the term 15 years.

CATV operators incurred the wrath of a handful of local television broadcasters in a few single broadcast station communities. In fact, this led to demands from some of these small broadcasters for legislation to curb CATV systems or to place them within the control of the FCC. The Federal Government controls the whole field of radio and television as provided in the Communications Act of 1934. This exclusive Federal control was upheld by the Supreme Court in 1940 in the case of *Federal Communications Commission v. Pottsville Broadcasting Company*. However, while CATV is an adjunct of television, the Congress has granted jurisdiction to the FCC over CATV systems only with respect to the use of radiowaves. The FCC cannot regulate CATV as a common carrier.

The public interest issue in the controversy between a local television broadcast station and a CATV system in the same community has received much attention by the FCC and by the Congress.

As you know the issues were debated before a subcommittee of the Senate Interstate and Foreign Commerce Committee in 1959 and several bills to regulate CATV were introduced in the 86th Congress. No action was taken in the House and one bill got as far as the Senate but failed to pass and was recommitted to the Senate Commerce Committee. In this Congress, a bill (S. 1044) was introduced in the Senate, to control CATV, but no action has been taken on it thus far. I introduced a similar bill, H.R. 6840, at the request of the FCC, but no action has been taken by the House Commerce Committee or the subcommittee on it and none is contemplated at present.

In contrast to the unduly widespread scope of some of the earlier bills, the latest FCC proposal is designed to vest in the Commission authority to act only in those situations where local television stations are claimed to be in competition with community antenna television systems.

Of course, there has been a great improvement in CATV-broadcaster relations since these bills were introduced. I read in the trade press that at a recent meeting of your industry with FCC Commissioners and staff, it was pointed out that the communities where the CATV system did not carry the local television station could perhaps today be counted on the fingers of one hand. In view of the fact that there are well over 67 communities where a local station and a CATV system coexist, the problem can no longer be regarded as acute. By the same token, the old charge that the removal of rooftop or other antennas at the request of the subscriber, made it more difficult for the television station in the same community to be received, disappears as the cable carries this local station. The problem of attenuation of signals has almost disappeared as the improved state of the technology makes reception on the cable better than ever. Obviously, no community antenna operator would deliberately degrade a signal and make his service less attractive to his own subscriber. He would be working against his own pecuniary interests.

I am informed that an increasing number of CATV operators and broadcasters are working closely with each other to resolve their conflicts and establish a harmonious basis for each to render its respective service to their community in the public interests. Obviously, these agreements hold out some excellent promise that, the overall relationships between local broadcasters and CATV systems will improve still further.

Some cities or counties seem to be attempting to regulate television through insistence upon nonduplication agreements involving broad areas, such as grade A contours, etc. I thought this danger had been averted by a decision on June 4, 1959, by the U.S. district court, district of Minnesota, first division, enjoining a city in Minnesota from attempting to impose a nonduplication agreement upon a CATV system. I would expect that CATV operators will not permit a host of divergent and conflicting local regulations to spring up. The pertinent court decisions in these matters should be brought to the attention of the local authorities and their jurisdiction should be challenged in the courts, if necessary.

The temptation is great, of course, when vying with each other to obtain a local franchise, to accept such stipulation in order to win the coveted franchise. However, such restriction may plague you as an industry in the future.

Finally, there is one real threat which you presently face and this threat is that without the benefit of CATV legislation, the FCC may proceed to regulate CATV through their jurisdiction over microwave common carrier operations. The threat flows from the FCC's decision in the *Carler Mountain* case. That is the

case that denied a common carrier microwave company a license unless the CATV system which it intended to serve would agree to carry the local television programs and avoid duplication of its programs.

It is in this case that the FCC's Common Carrier Bureau filed a brief in which it characterized that decision of the FCC as "arbitrary and discriminatory."

The Common Carrier Bureau pointed out that while the Commission had ruled consistently that it did not have jurisdiction over CATV, the approach taken in the *Carter Mountain* case was a method of indirectly controlling the industry. The Common Carrier Bureau warned that the Commission's restrictions would have to "be applied to all common carriers, alike, across the board."

The brief then stated:

"Under the doctrine of this case, the FCC would be required to examine every telephone company application for extension of its facilities \* \* \* to determine whether a grant of such application might afford undesirable service to a CATV system vis-a-vis a TV broadcaster. An interesting and logical extension of this philosophy would give the Commission the power to affect control of broadcast networks by the expedient of refusing to authorize use of common carrier facilities for the networks until some 'desirable' conditions have first been satisfied."

If the Common Carrier Bureau is right in its warning and conclusion, then this decision contains frightful implications which should give concern not only to your industry but also to telephone companies, broadcasters, and other businesses, too.

Since this case has been appealed to the courts, I will not comment on the merits of the Commission's decision. However, if upheld, the decision in this case will change the FCC's and the courts' previous holdings on the duties and obligations of common carriers. If the Commission's new interpretation is sustained, the Congress is likely to be asked to hold hearings and reexamine what should be the scope of the Commission's powers over common carriers. In the meantime, I would think the Commission is likely to adhere to its previously announced policies, until clear determination of its authority in this field is obtained from the courts.

#### CONCLUSION

Except for some of the legal problems confronting your industry, I believe that the CATV industry is facing a rosy future of fresh opportunities to continue to serve the public. Neither local broadcasters nor CATV operators stand much to gain from discord or from appeals for greater regulation or legislation. Controls are two-edged swords. They cut both ways. Legislation or regulation is seldom obtained in the form sought. That is why I commend broadcasters and CATV operators who have resolved their differences through amicable agreements. In fact, these agreements are a fine demonstration of operation in the public interest and again I want to congratulate you for it.

Mr. L'HEUREUX. The Poage amendment introduced at our request was very clear. But then in the discussion on the floor it was shown that Members of the House did not understand too much what the community antenna television business was. And some of them apparently had the idea that they were strictly closed circuit. And actually they are not. A master antenna is a high antenna usually placed on a mountaintop with a cable running into the city and wires running into each home. You have a number of channels on there. Originally, they could receive only two or three channels. Now they can receive up to 9, and it looks like very soon they will be able to receive up to 12 channels on that master antenna.

Now, any of those channels can be used for a closed circuit television. In other words, a master antenna can use its channels for closed circuit television. But it is not itself a closed circuit television. So when Congressman Saylor said, "Well, I want to limit this further to closed circuit" he did this, in my opinion—and in this respect I am not testifying for our association, because our association was satisfied with the Poage amendment and adopted it—as far as the Saylor amendment goes our association has not taken a position. The Saylor amendment restricts still more what REA can do.

But let me tell you why I, as a private citizen, think that the Saylor amendment militates against what you are trying to do here in Congress to help educational television, because through a master antenna system you receive off-the-air programs, it is reception, it is not programing, it is reception, you receive off-the-air programs. And the intent of this legislation is to have them receive off-the-air educational television or even regular television programs that would be of an educational nature. That can be done with a CATV system.

Mind you, for the next few years at least most of these rural areas that you are trying to serve will not be able to afford educational programs via a closed circuit system. They could be receiving off-the-air television signals with a master antenna cable system, and that was the REA's intent in introducing this amendment to the law, and it was Congressman Poage's idea. It was to allow them to receive this off-the-air discussion, say, of arithmetic, or geometry or space programs, and so forth. Now with the Saylor amendment it says you can only use that part of a master antenna that is called closed circuit.

Now, I can't believe even Representative Saylor intended to do that. But that is a possible interpretation of his amendment, which would thus restrict the beneficial effects of the legislation. That would mean that when you get wealthy enough in a large State like New York, or you organize your educational department with funds so that they can run a closed circuit, then you can have educational television. The crying need for these rural areas now is to have the benefit of these educational signals which are received by a CATV system from VHF or UHF educational television stations or the commercial stations.

So I concur in what the REA recommended here in its prepared statement of taking the Poage amendment to H.R. 10708 as he introduced it. The community antenna television industry does not fear it. It discussed it fully with the REA and with Congressman Poage. And we are sure that the Poage cannot be misinterpreted to pit private enterprise against private enterprise. And the Saylor amendment, I think, is a miscarriage of the original intent of H.R. 10708, because it would keep these rural educational institutions, primary schools or high schools, from receiving off-the-air educational programs which, both on commercial stations and primarily educational stations, are about the best in educational television today.

And that concludes my statement.

Senator HOLLAND. I want to ask you one more question. Are you familiar with what the commercial telephone companies are doing with reference to the installation of cables and receiving sets at their expense for the receiving and transmitting to schools of educational programs?

Mr. L'HEUREUX. Yes. I will answer this question and the prior question you asked. No telephone company to our knowledge runs a community antenna television system. We know of one community antenna television system owner who has an interest in a telephone company, but no telephone company operates a community antenna system. On the other hand, however, the telephone companies do operate closed circuit systems. They do in North Carolina, or South Carolina, where they have connected most of the schools—grade schools and high schools—into a fine educational network.

Senator HOLLAND. Is this North Carolina or South Carolina?

Mr. L'HEUREUX. I think it is South Carolina. I always get these Carolinas mixed up.

Senator HOLLAND. There is a good bit of difference.

Mr. L'HEUREUX. Pardon me. Let's correct that to South Carolina.

Senator HOLLAND. Each one of them will say that it is quite different from the other.

Mr. L'HEUREUX. That is right.

But that is the only statewide system that we know of. Witnesses this morning have discussed a system in Cumberland, Md., where they would do that. But mind you, the telephone companies do operate closed circuit systems. And our master antenna systems do serve the schools on a large scale. In fact, for your record, I will send a copy of a letter that our president sent to Chairman Minow of the FCC on a poll we have taken recently. And I couldn't give you the numbers from the top of my hat here, but something like 90 percent of those who answered our poll, and it was a good segment of your industry, said, yes, they furnished the schools a channel or channels now to receive educational television signals.

(The letter referred to above is as follows:)

WASHINGTON, D.C., *January 30, 1962.*

HON. NEWTON N. MINOW,  
*Chairman, Federal Communications Commission,  
Washington, D.C.*

DEAR CHAIRMAN MINOW: When I first advised you several months ago that this association would vigorously expand its activities in educational television, you asked to be kept informed of our progress. I am happy to report that the community antenna television industry has made unusual and significant strides in furthering this vital teaching tool throughout America.

As you know, in June 1961, the NCTA board of directors unanimously approved an industrywide program through which CATV operators could substantially increase educational opportunities for students and adults in the communities they serve. To implement and coordinate this program, a high-level policy and action group was established. Among its members are Dr. John Guy Fowlkes, a pioneer in radio-television teaching techniques at the University of Wisconsin; Archer Taylor, technical director of television at Montana State University; Loren Stone, eminent broadcaster-educator, and general manager of KCTS, University of Washington, Seattle, is an adviser to this council.

Because of the tremendous interest of educators, educational associations and State education officials in CATV's role in advancing ETV, an objective survey was undertaken in cooperation with the technological development project of the National Education Association. The National Association of Educational Broadcasters, with which NCTA affiliated as a sustaining member, joined interest in this survey, so that all could determine the immediate and long-range capabilities of CATV for broadening the scope of ETV. Basic elements of this survey included evaluation of reception from existing ETV stations; analysis of community needs for equipment and technical assistance in expanding in-school instruction and adult education; requirements for interschool connections; student and classroom census; extent of teacher training in TV techniques; and other data pertinent to the NEA project needs.

A summary of the survey, completed January 22, 1962, reveals these significant statistics:

Of the 78 reporting CATV systems now able to receive an ETV station, 72 (90 percent) are providing one or more ETV signals. These signals come from 23 ETV stations and the midwest program for airborne television instruction (MPATI) to 131,793 homes, 231 elementary and high schools, and 11 institutions of higher learning in 17 States. Many of these schools and colleges have been connected to the cable at no cost to the institutions, their boards, or communities, and in many instances the ETV signal is being brought in via leased microwave facilities.

In the near future, ETV will be available to an additional 40,000 homes, 174 elementary and high schools and 9 colleges through the facilities of 27 NCTA member systems installing equipment and leasing microwave (where needed) in order to pick up an adequate ETV signal.

When this latter group is fully operative, one out of every six CATV households will be able to enjoy the advantages of educational television. Compared to the ETV reception ratios in all but major urban centers, this is an impressive figure.

It is particularly gratifying to note that these advances in adult education and in-school instruction have been made in the more remote communities, perhaps the least developed of ETV's potential. For example, in the relatively small communities of Aberdeen and Hoquaim, Wash., and Keene and Claremont, N.H., local CATV systems enable school children to receive classroom instruction from two ETV stations on a full-time basis. That is more ETV than is available in the Nation's Capital and all but two major cities. A complete list of ETV stations with programs on CATV systems is enclosed.

Although the CATV industry is justifiably proud of its measurable contribution to the advancement of ETV, it is not resting on its laurels. It is not even pausing. Comprehensive guidelines for the intensive and extensive activation of ETV at local levels are now being completed by our association's ETV policy council. We expect our membership will be able to considerably accelerate their own programs with this "how-to" guidance from educators and ETV experts.

This year, 1962, will be another dramatic year of real ETV achievement for the CATV industry, and for Americans who have to rely on this unique service to keep them informed. You may count on my keeping you informed.

Best wishes to you and your associates to whom I know you will wish to pass copies of this personal report.

Cordially,

WILLIAM DALTON,

*President, National Community Television Association, Inc.*

Mr. L'HEUREUX. Most of them furnished it to these school systems. And permitting reception of educational signals is what REA is trying to do here. And in many respects they would be receiving that service for either nothing or at a very reasonable cost from a regular community antenna system if one were available in the area. But our community antenna systems do not operate generally in those remote areas, and that is why REA wants this new lending power. But our systems do make possible reception of educational signals by schools through their cables, and usually at no fee at all.

But there is a great future for the regular telephone companies in furnishing closed-circuit television. I think the phone companies—I do know that the phone companies have planned on trying to get a network through the whole country of their own operations, I know that A.T. & T. or Bell companies have plans, have written a report on that, where they are going to try to connect all the schools in the country, if possible, through closed-circuit systems.

When they do that, of course, there will be less need for this type of legislation. But this may take years. This bill is intended to bring educational television to your rural areas now. That is the purpose of H.R. 10708.

Senator HOLLAND. The purpose isn't to allow the REA telephone borrowers to furnish this service free?

Mr. L'HEUREUX. Not necessarily. But I say, the community antenna systems have in many areas furnished it free. Why? Because they have, say, nine channels. REA borrowers couldn't do it now. That is why they are asking for this legislation and use of the funds to set up this type of a system.

Senator HOLLAND. We are interested in what CATV is doing, but that isn't the thing that we are exploring here. We are exploring what is proposed to be done under this act. You don't understand that they proposed to furnish free service to the schools?

Mr. L'HEUREUX. No, they do not. In fact, perhaps they could not. And I would like to answer another question you asked.

Senator HOLLAND. You don't understand that they proposed to make loans unless the loans are feasible from the financial standpoint?

Mr. L'HEUREUX. That is right.

Senator HOLLAND. And unless revenue adequate to finance the liquidation of the cost is guaranteed?

Mr. L'HEUREUX. That is a requirement of the REA Act, they could not do that.

And I would like to answer another question you asked. You asked whether they could not set up a cable system with this, and later it could develop into a regular private enterprise. That is true. But the fact that eventually a system so set up could develop into a full fledged private enterprise no longer assisted by REA in this small community doesn't mean that the contrary is true, that the community shouldn't receive educational programs now. This bill is the only feasible way. And our industry sees no danger to it from this legislation with the Poage amendment which he introduced on the floor of the House.

Senator HOLLAND. I understood you to say a while ago that under this act as proposed a loan could be made to a CATV system to furnish this service to a school.

Mr. L'HEUREUX. Yes.

Senator HOLLAND. Under what provision of that act is that possible?

Mr. L'HEUREUX. You will find that the definition in the law redefines a telephone borrower. Under that definition it could be argued that a borrower could be a CATV system. On the other hand, Mr. Renshaw has stated to us, and I think the statement was made here this morning, that they intend it for their telephone borrowers. But the way that was written, it could be argued that a loan could be made to a CATV in the area for educational purposes primarily. And the language that we had suggested that they put into the report, if the bill had not already been reported to the House, was the following—and Congressman Poage had agreed to this language:

H.R. 10708 would exclude from the various types of communications services which REA could finance, community antenna television system service whereby television signals are made available for receipt and distribution for subscribers in a community through a master antenna cable system. However, the amendment would not exclude REA financing of a master antenna cable system intended primarily for the reception and distribution of closed circuit and off-the-air educational signals.

Now, the Saylor amendment would knock that "off the air" portion, if you leave the Saylor amendment in the bill you could not use that language which refers to "off the air."

Senator HOLLAND. I didn't understand up until right now that it was proposed by this act to finance the educational programs for CATV systems, as I understand, CATV systems operate not in rural communities, but in communities much larger than those covered by the limitations of the Rural Telephone Act.

Mr. L'HEUREUX. That is generally true, except, as I pointed out, perhaps about one-seventh of our membership operates in that small a community. And point No. 2, I think that it was the intent of the REA to make it available to their telephone borrowers, and they so stated.

But as a technical man, having been counsel to the committees here on the Hill, I think your counsel will want to look into the question whether the way it is defined here a borrowers could be a CATV system.

Senator HOLLAND. That would help differentiate between CATV that could be borrowers and CATV that couldn't be borrowers, wouldn't it, and permit those that were so fortunate as to be within the included class to get Government loans at much smaller rates of interest than the other CATV's could get?

Mr. L'HEUREUX. Yes. I doubt, however, that in order to obtain that valuable privilege, if it is one, of getting 2-percent loans, that they would be willing to move to that small area to get them. Generally, by and large CATV systems would not come under the provisions of the bill.

Senator HOLLAND. Would you have any objection to excluding entirely CATV loans from the purview of this act?

Mr. L'HEUREUX. From my point of view, I would have no objection. But you may have some NCTA members who would say, "Well, then, you are allowing a telephone borrower to get into the CATV business, to get started that way, and you don't allow a CATV man." What if in that area your telephone company does not want—you have an independent telephone company which is an REA borrower, and it doesn't want to set up this kind of a service for the schools, but some other group gets together, a cooperative or otherwise, and says, "Listen, we will set up a small community antenna primarily for getting these educational programs, we are willing to do that at cost, we hope that in time we can get other people—and as this community develops—to join, and then we can finance it ourselves."

So I don't know if it would be in the public interest. But I would say for our members generally, while we haven't proposed it to them, I feel that they would not object strongly to excluding a CATV system as such from the provisions of this bill, as REA loans to telephone borrowers, anyway. In fact, we find that CATV operators can get loans under the Small Business Administration Act, and that is generally sufficient. The whole question is, What are you going to do to rural education if you do this? That is your whole concern here.

Senator HOLLAND. Is Mr. Dell still here?

Mr. KOEBEL. No; he has had to leave, Mr. Chairman.

Senator HOLLAND. Let me ask the other gentlemen who were with him, Mr. Koebel, is it the intention of REA to qualify CATV's for loans under this act?

Mr. KOEBEL. We would consider that a provision in the existing law might make some question as to whether we would finance an organization engaged only in CATV. Our present law requires that we have our borrowers provide general telephone service for the area. So that is part of our reason for taking the position that we would be making loans for educational CATV only to borrowers otherwise providing general telephone service.

Senator HOLLAND. You would have no objection to the law itself or the report making that clear?

Mr. KOEBEL. I don't think so, Mr. Chairman.

Senator HOLLAND. Thank you.

Mr. L'HEUREUX. And I don't believe our members would have much objection to it either.

Senator HOLLAND. Thank you, Mr. L'Heureux.

The next witness is Mr. Angus McDonald, assistant director of legislative services, National Farmers Union.

Mr. McDonald.

**STATEMENT OF ANGUS McDONALD, ASSISTANT DIRECTOR,  
LEGISLATIVE SERVICES, NATIONAL FARMERS UNION**

Mr. McDONALD. Mr. Chairman, due to an error in my office—we were under the impression the hearing was the first part of next week, and therefore I have no prepared statement for the committee. I would like to request, however, that a prepared statement be entered into the record and that the record be held open for a few days so that we can get a formal statement in.

Senator HOLLAND. Without objection that may be done.

Mr. McDONALD. Thank you, sir.

I am appearing here in complete support of this amendment which, as I understand it, broadens the definition of the areas that the Rural Electrification Administration can cover. As I understand it now, REA can participate in programing radio, but not by television. And while we would favor, of course, the strict adherence to the act and its original purposes to bring these services to farmers only, and those in small towns, we feel that this would carry forward that principle one step further, in bringing to these farm people the advantages of possibly television and the closed circuit system.

We feel that farm people, particularly those in remote areas, some of our farmers in the upper Missouri Basin, and upper Mississippi Valley, live many miles apart, and I happen to know that some of them now do not enjoy the benefits of television. Therefore we are appearing in complete support of this legislation; we think it is very timely, since the Senate has recently approved the bill, I believe the number is H.R. 8031, which increases the required number of channels in TV sets entering into interstate commerce. We were enthusiastic about that legislation, because we thought it would open up great possibilities for educational TV.

Mr. Chairman, thank you very much.

Senator HOLLAND. Let me understand clearly, are you supporting the extension of the educational TV service to your schools or to individuals?

Mr. McDONALD. We are supporting the educational TV to all of those which are now covered by the act.

Senator HOLLAND. If I understand the testimony of the officials of the REA, they have no such general purpose in supporting this act.

Mr. McDONALD. As I understand this legislation, it would not broaden the groups or individuals, schools and otherwise, to include those that are not now covered.

Senator HOLLAND. But the cost, as I understand it from them, is prohibitive, if you try to go into the matter of extending the cable service to individuals, because of the long distances and sparsity of customers, whereas there is no such difficulty when it comes to supplying the service to an institution like a school.

Mr. McDONALD. Well, I would feel we would be in principle in favor of such coverage, but my understanding was that this legislation did not broaden the number of groups or individuals that are now covered. I may be mistaken on that point.

Senator HOLLAND. You certainly are not mistaken in the fact that this doesn't broaden the group that can use it. But one of the purposes of this is to extend the educational service to educational institutions, as I understand the testimony of the representatives of the REA. And I don't understand that they have any intention of expecting loans to cover the putting in of cable service to individual subscribers because of the great cost that is involved, and because of the sparsity of the distribution of their customers in the rural areas which you mentioned.

Mr. McDONALD. Of course, I am not familiar with the technical aspects of what would be required to bring TV to rural people. My impression was that existing telephone systems could be utilized to pipe in these programs right into the home, where the wires were already there.

Senator HOLLAND. You mean your understanding was that you could use the same wires that were bringing in the telephone message to transmit the TV?

Mr. McDONALD. Yes, that was my thought.

Senator HOLLAND. Let's leave it this way. You are supporting this act insofar as it can go to meet the needs of the rural communities to get television, educational television service?

Mr. McDONALD. Yes, sir.

Senator HOLLAND. Thank you, sir.

Any questions, Senator Boggs?

Senator BOGGS. No, sir.

(Supplemental statement filed by Mr. McDonald is as follows:)

Mr. Chairman and members of the committee, I am submitting this statement in addition to the oral statement which was presented to the committee on June 29. Officials and members of the National Farmers Union feel that the expansion of the Rural Electrification Administration's authority which may help bring television service to those in rural areas is of great importance at the present time.

There is a possibility with the passage of H.R. 8031 that many educational programs will be broadcast throughout the United States. Therefore, we feel strongly that passage of this legislation is more timely and urgent than ever before.

The National Farmers Union not only supported the original legislation which authorized the Rural Telephone Act but worked closely with Senator Hill and others to bring about its passage. Passage of the act bringing telephone loans to rural cooperatives was a long up-hill fight and it came about after many years of pressure on members of Congress. It will be recalled that the REA Act was passed in the middle 1930's but the Rural Telephone Act did not become a law until 1949.

Farmers are in greater need of telephone, radio, and TV services than any other group because of their isolation and because the maintenance of an efficient farm unit and even life itself is in part dependent on rapid communication. Any legislation which expands or adds to present communication services is vitally important to farmers.

We, therefore, support this legislation without any qualifications whatsoever. We urge its speedy approval.

Senator HOLLAND. Mr. James L. Bass.

You may proceed, Mr. Bass.

**STATEMENT OF JAMES L. BASS, PRESIDENT, NATIONAL TELEPHONE COOPERATIVE ASSOCIATION, CARTHAGE, TENN.**

Mr. BASS. Mr. Chairman and members of the committee, my name is James L. Bass. I am president of the National Telephone Cooperative Association, the national service organization for telephone

cooperatives throughout the country. Membership is composed of nonprofit telephone cooperatives, providing modern dependable telephone service to rural America. With me is Mr. Robert E. Jamison, a member of the board of directors of the association. He is also the manager of the Horry Telephone Cooperative, Inc., Conway, S.C.

We support Senate bill No. 3001. Since the passage of the amendment to the REA Act in 1949, which made possible REA loans to finance modern telephone systems in rural America, more and wider demands have been added to telephone service. This is true in the urban as well as the rural areas. Some of these new demands include educational television, data transmission, telephotos, and others. Also, many new military and/or missile sites are being constructed in territory serviced by telephone cooperatives and commercial companies who obtain financing through the REA.

Language of the present REA Act limits the uses for which funds may be loaned by the REA to telephone borrowers. The proposed legislation amends the definition of "telephone service" and will permit borrowers to provide through REA financing many added services necessary to meet present day requirements of a rapidly expanding industry, so that such financing may extend to communication facilities for the transmission of sounds, signals, pictures and the like, as well as voice.

The proposed act does not change any other requirement respecting REA telephone loans, and retains without change the definition of rural areas, the requirement for full area coverage, and the prohibition of loans for telegraph facilities or radio broadcasting services or facilities, which also includes television broadcasting.

During House debate, a further exclusion was added to the two already appearing in the 1949 amendment. This deals with—

community antenna television system (CATV) services or facilities other than those intended for educational television purposes.

We believe this exclusion in no way detracts from the main purpose of the proposed legislation.

One immediate situation facing the industry is the expansion of educational television. It is becoming one of the more important tools in education, yet its real possibilities are still to be explored. So, in permitting REA borrowers to obtain funds for this purpose, you would be extending to them the opportunity to perform useful services already being provided by other segments of the telephone industry.

The proposed legislation will be of great benefit to all telephone borrowers obtaining financing through loans from the REA. These borrowers today represent a large and important segment of the telephone industry, and if they are to continue to furnish necessary services to their subscribers, they must be in a position to offer those services which a telephone utility normally offers, and which they are charged with the responsibility of providing in their certificated area of operation. Therefore, we feel this matter is of great importance, not only to our members, but to all REA borrowers and the people they serve.

Mr. Chairman and members of the committee, we of the National Telephone Cooperative Association appreciate very much the opportunity of being present, and being permitted to present these views on this matter.

Senator HOLLAND. Thank you, sir. Senator Boggs.  
 Senator BOGGS. I have no questions. I thought it was a very good statement, sir.  
 Senator HOLLAND. Mr. Bass, where are you from?  
 Mr. BASS. Carthage, Tenn.  
 Senator HOLLAND. That is a nice city. I know it. It is nice to see you, sir. Mr. Herbert Butler.  
 Mr. Butler, you may proceed.

**STATEMENT OF HERBERT H. BUTLER, DIRECTOR, GOVERNMENT RELATIONS, UNITED STATES INDEPENDENT TELEPHONE ASSOCIATION**

Mr. BUTLER. Mr. Chairman, my name is Herbert H. Butler. I am director, government relations, of the United States Independent Telephone Association, with headquarters in the Pennsylvania Building, 13th and Pennsylvania Avenue NW., Washington, D.C. Our association is the national trade organization of the independent segment of the telephone industry.

Our branch of the industry is made up of 3,035 companies serving 10,700 exchanges, with over 12 million telephones. It serves over half of the geographical area of the country and has more exchanges than the otherwise larger segment of the industry—the Bell System—which operates in the more densely populated areas. Of our 3,035 companies, only 1,010 serve more than a thousand, while the remaining 2,025 companies serve less than a thousand telephones. Included in the association's membership is a substantial number of REA borrowers, both commercial companies and cooperatives.

We are appearing here today in support of H.R. 10708 and S. 3001, essentially identical bills as introduced, the purpose of which is to amend section 203(a) of the Rural Electrification Act of 1936, as amended. Under the proposed legislation the term "telephone service" as used in the REA Act would be broadened to include educational television. At present under that act, telephone companies are restricted to loans for voice communication facilities. For this reason, telephone companies are unable to obtain REA loans with which to furnish the circuits and related equipment needed to help bring closed-circuit educational television to classrooms.

We are of the view that the objective of the legislation before you is a natural supplement to and logical extension of the normal communication function and public service responsibility of telephone common carriers.

The 36-man board of directors of our association by unanimous action on March 9, 1962, resolved that—

in the event an amendment to the REA Act is necessary to give the REA Administrator authority to make such (ETV) loans, the USITA supports such amendment for that purpose and that purpose only.

Educational TV is a rapidly expanding vehicle of public instruction. There exists today a deficiency of elementary and secondary classrooms and of public school teachers. It is generally acknowledged that this problem will become even more acute in the period 1965 to 1970. Congress recognized the gravity of the school problem and the inherent advantages of educational television when it passed

Public Law 87-447, which became effective May 1, 1962. This law authorized grants to States from \$32 million in Federal funds for educational television broadcasting facilities. None of those funds however, is available to telephone companies for the purposes contemplated by the Hill-Poage bill now before you.

As common carriers, telephone companies should and in some cases do provide transmission facilities for both interexchange and local distribution of closed-circuit educational television. The REA, however, under existing law does not have authority to make loans to bring such facilities into being. Use of telephone company facilities for educational TV purposes has definite advantages over other means of providing such service; namely:

(a) Closed-circuit educational TV conserves the frequency spectrum.

(b) In remote areas closed-circuit transmission is more reliable and satisfactory.

(c) Closed-circuit educational TV is more flexible.

(d) Short haul coaxial cable is more economical than microwave; that is, an estimated \$5,000 per mile for coaxial cable versus \$12,000 per mile for light route microwave. REA borrowers will be primarily involved in providing coaxial cable. Much of the cable supporting pole plant would be part of already constructed telephone plant.

Experiments in educational TV have proved highly satisfactory as a means of bringing instruction at a minimum of expense into the classroom. One of the pioneers in the educational TV movement is the State of South Carolina. This State-sponsored system visualizes ultimately 4,900 miles of microwave and 3,779 miles of coaxial cable. Some of our independent telephone companies and the local Bell company have been able to provide their portion of the network. But some small independents have not been able to provide such service because of unavailability of funds. It is desirable that telephone companies be permitted to borrow needed funds from the REA in order to participate in furnishing this very desirable public service, and in order thus to acquit their obligations as communication carriers.

We hope that your committee will recognize the gravity of the problem and give favorable consideration to the pending legislation.

Attached to this statement are two papers which may be of informational interest to you:

(1) "The Educational Television Field," by Thomas R. Warner, technical director, United States Independent Telephone Association, issued April 6, 1962.

(2) "Educational Television and the Independent Telephone Company," by Frank S. Barnes, Jr., vice president, Rock Hill Telephone Co., Rock Hill, S.C., an address delivered in Chicago on October 9, 1961, at the annual convention of the USITA.

I would invite attention to an apparent need for clarification in the language on page 2 of H.R. 10708. The language now reads:

\* \* \* but shall not be deemed to mean telegraph services or facilities, or community antenna television system services or facilities [sic] such services and facilities shall be limited to closed circuit television operations other than those intended for educational purposes, or \* \* \*.

The evolution of this language, which does not appear to exactly convey the intentions of the authors of the legislation, will be found

on page 7944 of the Congressional Record of May 17, covering the House debate. Congressman Poage, the author of the House bill, stated at that time:

This (amendment) leaves all of the limitations that are in existing law and specifically adds the further words that loans shall not include community antenna telephone (television) system services or facilities other than those intended for educational purposes.

We wish to express the hope that the needed clarification will be made and that the pending bill may be speeded to enactment.

Senator HOLLAND. What clarification is it that you suggest?

Mr. BUTLER. The clarification suggested by the REA would appear satisfactory. And that would be to strike out the words that Representative Saylor inserted and to continue with the words that Representative Poage—in other words, it would be the deletion on page 2, line 6, of the words “such services and facilities shall be limited to closed circuit television operations.”

Senator HOLLAND. Now, you represent what would be an important segment of borrowers under this new provision of the law in the event it were enacted, that is, the independent commercial operators, do you not?

Mr. BUTLER. We represent both, Senator; we represent roughly half of the borrowers, some 350 of the firms, of which roughly 300 are commercials, and 50 are cooperatives.

Senator HOLLAND. Now, is it your expectation that loans could only be made under this act, insofar as television transmission is concerned, for the furnishing of educational programs originating elsewhere to schools?

Mr. BUTLER. That is the current thinking. In other words, the Carolina system that we are talking about is limited strictly to schools.

Senator HOLLAND. Well, is it your understanding that this bill is limited to transmission of educational programs to schools?

Mr. BUTLER. Well, the wording, if it were left as recommended by the REA, and as you asked me just now, would be “community antenna television systems or services other than those intended for educational purposes.” So the words “educational purposes” would be controlling.

Senator HOLLAND. But that seems to include loans to community commercial CATV systems which would furnish educational services, they would seem to be included within the purview of the loans.

Mr. BUTLER. They could be under that wording, yes, sir.

Senator HOLLAND. Well, is that your understanding as to what is intended, or is it intended to limit the loans to firms that are furnishing general telephone communications, and that are borrowers under this act?

Mr. BUTLER. First, borrowers, under the act should be telephone companies as specified by the REA. Secondly, any service rendered under this amendment, I would think, would be for educational purposes. Now, if they could define educational purposes to “include institutions other than schools,” then conceivably it could so do.

Senator HOLLAND. That isn't my question. The question is whether the borrowers could be limited to those who would or should be limited, either would be under the act or should be under the act limited to firms that are in the telephone business, furnishing general

telephone communications service to the communities covered by this service.

Mr. BUTLER. I would hope so; yes, sir.

Senator HOLLAND. You don't want it to be extended to CATV systems that are not furnishing general telephone service?

Mr. BUTLER. I would answer I do not, sir.

Senator HOLLAND. Senator Boggs.

Senator BOGGS. No questions.

Mr. BUTLER. Could I conclude by reading two paragraphs out of the report of the President's Commission on National Education. I think it might give further light on the subject. In section 5 of "National Goals in Education," Dr. Garner makes this statement:

The educational use of television holds great promise, but this marvelous tool of communication is powerless in itself to improve education. It may be employed to good effect or foolishly. One of the challenges facing education by the 1960's is to learn to use it well. By 1970 every school in the Nation should be equipped for instruction by television. And the advantages and limitations of educational television should be universally understood. Properly used, television could bring superb lectures and other presentations to schoolchildren throughout the Nation. For example, demonstrations of scientific experiments of a quality that no single school in the Nation can now afford could be available to every school by 1970.

Senator HOLLAND. Thank you, sir.

(Attachments to statement of Mr. Butler follow:)

#### THE EDUCATIONAL TELEVISION FIELD

(By Thomas R. Warner, Technical Director, U.S. Independent Telephone Association)

(The purpose of this special report is to review developments in educational television and to provide independent telephone companies with a background for their possible future activity in this field.)

#### EDUCATIONAL TV IS NOT NEW

Educational television is not a new development just beginning to appear on the American scene. The present widespread interest in this field is an outgrowth of the increasing shortage in regular educational facilities as well as our long-time national objective of supplying the best possible education to the greatest number of people.

The use of television broadcasting for educational purposes (and of radio broadcasting before the perfection of TV) both locally and nationally has been with us for many years. The Nation's major commercial TV networks have allocated many hours of air time to the nationwide transmission of instructional programs. Many TV broadcast stations dedicated solely to the transmission of educational material have been licensed by the Federal Communications Commission and are in daily operation.

The use of closed circuit facilities to transmit the same instruction from a central location to several classrooms in the same building or to several buildings in the same community has been going on for sometime. At least one State, South Carolina, is progressing with a program which will make use of closed circuit facilities to supply the best possible instruction to all schools within the State. As a result other States are also investigating this approach to improvement in education.

#### SOME BASIC TERMS

ETV (educational television) is well understood in its broad connotation but much confusion arises when these letters are too loosely used to indicate how the task is accomplished. Before reviewing the ETV field more thoroughly, it would be wise to consider some basic distinctions and definitions for the purposes of this report.

Broadcast ETV (or ETV broadcasting) as used here means the distribution of educational material from a central source by transmission from a radio-TV

station through the air directly to any and all TV receivers capable of accepting the broadcast station's signals. Any wire circuits associated with this method would be similar to those used to supplement or augment regular radio and TV station operation—studio-to-transmitter lines, local pickup facilities, intercity network circuits, etc.

Closed circuit ETV means the distribution of educational material by transmission over a coaxial cable from a central originating location to only those receivers connected to the cable distribution system. For intercity transmission microwave radio facilities may be used in lieu of cable but there is no radio broadcast transmission directly to the receivers.

#### *Educational use*

Enrichment and training, as separate components of ETV, need to be understood. Enrichment refers to that part of the ETV output which would be beneficial to those receiving it while training refers to that part which is essential to or a requirement of those receiving it. As a further amplification, enrichment material would be of a type which might be degraded in quality of reception or from which portions might be skipped entirely without undue adverse effect upon the recipient. Training material, on the other hand, must be of the highest possible transmission quality and dependability so that no portion of the essential impact upon the recipient may be lost.

There are two broad areas of ETV contact also: Continuing education and basic formal instruction. These areas have different criteria in content, time, place, and purpose. Continuing education, for those who have completed their years of formal education and are embarked on their careers, calls for broad and mature program content touching upon many fields, available at times other than the normal daily work period and delivered to the individual at a place most convenient for him (generally in his home). In the majority of cases its purpose is one of enrichment. Basic formal instruction, primarily directed to those undergoing formal education, requires a program content which offers periods of required instruction or augments existing classroom teaching, available during regular school hours and delivered to the student's classroom. The usual purpose here is training first with enrichment second.

#### *Technical facilities*

The technical components of the ETV process can be divided into studio, distribution, and classroom facilities. Studio facilities embrace all the equipment required to transform the teaching process into a form suitable for electrical distribution. This would include studio classrooms, cameras, microphones, film scanners, video tape recorders, and all the properties and visual aids supporting the instruction.

Distribution facilities would include everything necessary to electrically transport programs from studio to receiver. In the broadcast ETV method this would be the regularly licensed transmitting equipment including antennas and, when more than one transmitter is being used the facilities connecting the studio to the transmitters. In the closed-circuit ETV method a distinction is made between the local circuits within a school district to which receiving equipment is connected directly and the intercity circuits connecting a central studio facility with two or more school district local circuits.

Classroom facilities covers the TV receivers needed to accept a broadcast ETV program, the receiving equipment associated with the local circuits of a closed-circuit ETV system and, in some plans under trial at present, a talk-back capability for individual classroom interrogation of a centrally located instructor.

#### PRESENT DEVELOPMENTS IN BROADCAST ETV

As individuals we can advance our knowledge and skill through reading, observation, practice, and contemplation. The best teaching, however, takes place when there is direct contact between a thoroughly prepared instructor and a receptive student. Some sources have estimated that there exists a shortage of over 130,000 teachers to meet today's needs. It has also been said that about half of all college graduates during the 1955-65 period would have to enter the teaching profession to fill the need. With an allowance for exaggeration in these figures and accepting some loss in direct contact between teacher and pupil, a great increase in the use of ETV seems evident.

There are more than 50 ETV broadcast stations on the air in 33 States at present. These stations fall into three categories: (1) Those which are State owned and operated, (2) those owned and operated as a part of an educational institution,

and (3) those owned and operated by nonprofit associations as community-sponsored projects. In addition, as previously pointed out, the commercial TV networks have provided time on their facilities for educational programs and in some cases educational institutions have worked directly with commercial TV stations.

The great advantage of broadcast ETV is its ability to directly disseminate its program to all TV receivers within its coverage area simultaneously and at no additional transmission expense other than the usual broadcast station costs of operation. It can reach every classroom in its area and make a classroom of every home equipped with a receiver. In the practical view it is superior to closed-circuit TV for continuing education and enrichment as it can place the program material in the home at the most desirable time and at the least cost to the supplier.

#### *Limitations affecting broadcast ETV*

However, there are also severe limitations acting upon broadcast ETV. Each ETV station can transmit only one TV program at a time. Each station requires a radio frequency allocation similar to those needed for commercial TV stations. Only a limited number of these channels are available for educational use and most of these are in the ultra-high-frequency (UHF) range. The geographical coverage of a UHF station is severely restricted particularly when compared to the coverage of a VHF station.

Since 1952 the FCC has reserved 92 VHF and 191 UHF TV channels for educational use. In the intervening 10 years, 41 VHF and 16 UHF educational TV stations have been established. Thus while some 45 percent of the VHF reservations are in service only 8 percent of the UHF have been used. Coverage is as important to broadcast ETV as it is to commercial TV. In an attempt to expand the service area a group of midwestern educational institutions have embarked on a program of airborne broadcast ETV. Using aircraft flying at some 23,000 feet they have expanded coverage to a 200-mile radius from the aircraft location.

To provide more than one subject per period scheduled, this airborne program operates two transmitters simultaneously giving the viewers a selection of two programs. The city of Pittsburgh, Pa., accomplishes this by operating on both a VHF and a UHF channel. However, multichannel broadcast operation can never be a complete solution due to the limited availability of channels.

Many of these limitations are or minor concern to the third category of stations mentioned earlier—the community supported nonprofit educational stations. The objective of placing excellent educational programming free of commercial influence into the homes of a community can be most economically achieved by broadcast techniques. The burden of good reception and technical excellence of receiver reproduction are responsibilities of the set owner and all the costs associated with reception are charged to the viewer.

Cost has an important bearing on the development of ETV. Broadcast ETV is attractive because there is no cost involved in the transmission medium itself—the atmosphere—although the cost for the transmitting facilities are not small. That part of the cost connected with reception is passed on to the ultimate viewer. As a means of lowering these station costs and thereby making the use of broadcast ETV more attractive the University of Utah conducted tests during the past year utilizing extremely low power (10 watt) UHF TV translator type transmitters to achieve local distribution. This project offers a potential for multichannel programming at a more reasonable cost although it would require some modification of existing FCC regulations and could ultimately encounter difficulties from the expansion of commercial UHF TV operations.

#### THE CLOSED-CIRCUIT ETV PICTURE

Closed-circuit facilities for ETV have also been used for the past several years. A primary limiting factor has been the cost of the coaxial distribution plant when compared with the cost of radio transmission facilities. There are a great many closed-circuit ETV systems in operation today although the greater part of these are restricted to within a single school or to oncampus systems at universities.

In the areas of basic formal instruction and training closed-circuit ETV offers features not readily or economically available through the broadcast method. Present-day coaxial cable development permits the simultaneous transmission of up to six separate instructional programs over the same cable. Every viewer connected to the system can receive the same quality of signal—the problems of fringe-area reception, shaded locations, ghosts, and external signal distortion

which confront the broadcast ETV method are not present. It is possible to incorporate high definition color TV with uniform quality of reception. It is also possible to provide a voice talkback or interrogation channel from the TV classrooms to the originating studio.

At Hagerstown, Md., for example, some 95 miles of cable were used to link 38 schools to a central location with 5 studios producing 25 lessons per day. In Cortland, N.Y., a two-way voice system was used which permitted instructors in the satellite classrooms to signal the TV teacher when a student had a question, broadcast the student's question in all classrooms for the benefit of the other students prior to the transmission of the answer by the teacher.

#### *The South Carolina program*

The most extensive development in the closed-circuit ETV field to date has taken place in South Carolina. There a preliminary survey indicated only 4 broadcast ETV stations were allocated to the State, each could generate only a single program channel, only 12 half-hour subject periods per schoolday could be provided, and these would not reach all the schools in the State. A further study indicated that even if 36 broadcast stations could be authorized, there would be only limited areas where 3-channel service could be made available to the schools.

In a preliminary survey of closed-circuit ETV, the State board of education found it could reach the 413 high schools in the State with 36 subjects at an annual cost of \$12.67 per pupil. This represented total cost and included teachers, technicians, studio equipment, receivers, and transmission facilities from the telephone companies. This was based on a three-channel system but could be expanded to four at little additional cost.

In a recent discussion of ETV on the floor of Congress, two Congressmen quoted a survey made by the Southern Regional Education Board which indicated the cost of conventional instruction in 300 colleges in 16 States ranged between \$12 and \$18 per student semester hour. This survey also estimated the cost of broadcast ETV at \$2.80 per student semester hour. If we assume two semesters per year and also consider three yearly subjects then this would reflect \$16.80 per pupil annually as compared to South Carolina's \$12.67. This might be an indication that, in meeting the teacher shortage in formal education and training, the closed-circuit approach may be the most economical to the taxpayer in the long run.

South Carolina is proceeding with its expansion plans for closed-circuit ETV. Both independent telephone companies and the Bell Associated Co. are cooperatively furnishing the distribution system. Studio equipment and classroom receivers are furnished by the State and local educational agencies. In the past year several other State agencies have taken a long look at the accomplishments in South Carolina.

#### CONGRESS LOOKS AT ETV

During several past sessions of Congress proposals for Government aid to educational TV (not to be confused with aid to education) have been advanced. Many of these passed the Senate but until this year always failed of passage in the House. Congressional preoccupation has been with broadcast ETV and at times these proposals, either deliberately or inadvertently, would have ruled out the application of Government funds to closed-circuit ETV.

In the 1st session of the 87th Congress the Senate passed and sent to the House S. 205. In the House, H.R. 132 was introduced in January 1961, reported out by the Committee on Interstate and Foreign Commerce August 21, 1961, and finally brought to the floor and passed, 337 to 68, on March 7, 1962. A conference committee must now consider these bills as they differ in several important aspects.

#### *House and Senate versions on aid to ETV*

The Senate bill provides for outright Federal construction grants limited to \$1 million per State for a possible total commitment of \$50 million. The House version limits the total to \$25 million on a 50-percent matching grant basis.

The House bill would provide some funds to assist States in making surveys and plans for State programs which would be eligible for these grants. No such provision is in the Senate bill.

Both bills limit the application of funds to the construction of facilities for broadcast ETV as opposed to costs of operation. The Senate version would permit the purchase of studio equipment for use with closed-circuit systems as well as broadcast. The original House version would have prohibited this but was amended through the efforts of Congressman Hemphill of South Carolina to read

"including apparatus which may be incidentally used for transmitting closed circuit television programs."

Both bills provide that the facilities will be used only for educational purposes. Administration of available funds including grants would be a responsibility of the Department of Health, Education, and Welfare. The licensing and regulation of broadcast operations would remain with the FCC.

#### AN INTERSTATE TARIFF IS FILED

Early developments in the closed circuit ETV were built upon special contracts as a tariff meeting the ETV situation completely did not exist. In November 1961 A.T. & T. filed tariff No. 253 with the FCC covering "channels for television transmission for use in educational television systems." The tariff became effective December 7, 1961. Some of the provisions in this tariff are worthy of note.

The tariff provides two classes of channel systems, (1) local distribution systems and (2) interexchange systems. A local distribution system consists of one to six channels within an exchange area between a signal source and receiving locations but may include facilities to provide service to a receiving area where the airline distance does not exceed 25 miles. An interexchange system consists of one to five channels between a signal source in one exchange area and a receiving location in another exchange area where the distance between the signal source and its receiving location exceeds 25 airline miles.

Channels are furnished in systems of one or more, each channel equipped for the transmission of the video and audio material of a single monochrome TV program, between the premises of the customer and authorized users, in one direction of transmission from signal source to receiving location and may not be used in any other direction of transmission. Special operation and supervision are not furnished. Systems are furnished on a 24-hour-per-day, 7-days-per-week for a minimum period of 1 month.

#### *Customer facilities and interconnection*

Station facilities are furnished by the customer and would include video cameras, microphones, consoles, monitors, and like studio equipment, the television viewers and antennas to pick up any broadcast material.

The tariff also provides for interconnection. The customer may interconnect at his premises channels secured under this tariff with, among others, TV channels operating on broadcast frequencies as well as local and interexchange educational television distribution systems provided by the customer. These connections may be made provided they are made at locations where program material is used for TV viewing or transmission over educational facilities and where the customer has adequate personnel and equipment for testing with the telephone company, provided that the customer's facilities work satisfactorily with the telephone company channels and provided that the telephone company's responsibility for transmission is limited to the channel facilities it furnishes.

#### *A rate example from the tariff*

Rates are based on local channels on the same premises, local channels to separate premises, interexchange channels, channel input and output equipment, outlets, and certain additional arrangements. As an example of the scale used the monthly rate for the first local distribution channel between separate premises is \$15 per one-fourth mile per month, the second channel is \$5, the third and fourth \$3 each, and the fifth and sixth \$2 each with a minimum charge of \$15.

#### HOW ETV SYSTEMS OPERATE

The studio facilities required for the originating of educational material are, for the most part, identical whether the broadcast or closed-circuit method is used. In fact a single studio could furnish the same material to both types simultaneously. There will be a need for facilities for "live" programming under practically all circumstances. However, the use of video tape will probably be the mainstay of this service. It permits the retention and repeated showing of essential basic instruction and is easily edited for maximum accuracy and effectiveness of program material. It can be readily transported between studio facilities so that original presentations by the Nation's outstanding experts in their fields can be made available to all at times most convenient to the local system's schedule. Finally, "living history" such as the orbital flight of Colonel Glenn can be repeated for succeeding classes and viewers.

Reception facilities vary somewhat between the broadcast and the closed-circuit ETV systems. In the broadcast ETV method a conventional VHF and/or UHF TV receiver is used. This receiver must have a receiving antenna system and the more marginal the received signal the more complex and efficient the antenna system required including height of the antenna structure. In the closed-circuit ETV method all viewers, while they are essentially the same as TV receivers, receive the same signal level from the distribution system. This, in part, accounts for the more uniformly dependable programing in a closed-circuit system.

The telephone company's prime interest and the extent of its participation in the ETV field are found in the method of distribution. The studio and viewing facilities will almost invariably be customer or privately owned.

#### *Distribution facilities in the broadcast system*

Consider first the distribution in the broadcast ETV method. A radio transmitter generating video and audio signals (TV as we popularly call it) sends the studio material through the atmosphere to the receiver. This equipment is customer owned. In a single station system telephone company service is likely to be limited to studio-to-transmitter and local program channel facilities when furnished by wire or cable. Provisions exist in the FCC rules which would permit the ETV broadcaster to own his own equipment for this purpose if it could be accomplished by the use of radio frequencies.

In multistation broadcast ETV operation there is an added requirement for the interconnection of stations which, in most instances, requires the use of intercity circuits of some type. These circuits can be furnished by the telephone industry by coaxial cable or by microwave facilities. Again, provisions in the FCC rules make it possible for the ETV agency itself to own and operate intercity microwave facilities. In the bills before Congress the funds proposed could be used for the microwave equipment necessary to interconnect the stations used for ETV broadcasting.

In summary, then, in the broadcast ETV system, the telephone industry might be called upon for studio-to-transmitter, local pickup and intercity circuits but it would also be possible for the potential customer, the ETV agency, to own and operate the entire system.

#### *Distribution facilities in the closed-circuit system*

In the closed-circuit ETV method local distribution is made by coaxial cable to which the viewers are connected. Where only one building or an on-campus situation exists the ETV agency may own the cable facility or it may obtain service from the telephone company. Where local distribution to scattered locations within a school district or city is considered the telephone company facility is the usual method.

The interconnection of several local systems with a central programing source normally calls for intercity facilities. These can be supplied by the telephone industry through the use of coaxial cable or microwaves. A word of caution is indicated here. In 1960 the FCC adopted an amendment to part 11 of its rules and regulations governing the industrial radio services and, under "Subpart L—Business Radio Service," makes the frequency band 6575–6875 megacycles available "for intercity closed-circuit television systems. Such authorizations will be granted on a case-by-case basis, and applicants must furnish complete and specific factual data showing wherein, apart from economic considerations, it is not feasible to utilize frequencies above 10,550 megacycles for such operations." The applicant in this instance, and any applicants for 10,550 megacycles, would be the potential customer, the ETV agency.

The language of both bills before Congress would appear to prohibit the authorization of any funds for the construction of microwave facilities if they were to be used in connection with closed-circuit ETV operations only.

#### THE REA AND ETV

With an increasing use of ETV to combat teacher shortages and to improve uniformly the quality of teaching more of the Nation's rural areas will be brought into the program. Thus telephone companies who have obtained financing through the Rural Electrification Administration will turn to that agency for such financial assistance as they may need in the furnishing of service to the ETV field.

Late in 1961 such a request was explored with the REA in connection with the proposed furnishing of closed-circuit facilities which would be a part of the South

Carolina program. A review and interpretation of the language used in the applicable sections of the Rural Electrification Act resulted in a determination by the REA that it did not possess authority to make loans covering facilities to be used for closed-circuit ETV purposes. Thus, section 203(a) of the act reads "the term 'telephone service' shall be deemed to mean any communications service whereby voice communication through the use of electricity between the transmitting and receiving apparatus is the principal intended use thereof," etc. [Italic supplied.]

To correct this situation Congressman Poage introduced H.R. 10708 in the House of Representatives, March 13, 1962. This bill would broaden the term "telephone service" to mean "any communication service for the transmission of voice, sounds, signals, pictures, writing or signs of all kinds through the use of electricity between the transmitting and receiving apparatus," etc. [Italic indicates changed language.] The restrictive phrase, "principal intended use thereof," would be omitted in this amended version.

This amendment, if adopted, will apparently clear the air regarding REA authority to make loans for closed-circuit ETV. It goes far beyond this. It seems likely that the broadened definition would cover any type of video transmission facility supplied for broadcast ETV, commercial television circuitry, and a number of other forms of communications service much more sophisticated than voice communication including facsimile and data transmission.

A similar bill, S. 3001, was introduced in the Senate by Senator Hill of Alabama. At the time of this writing the Senate bill was in committee. The House bill had been considered by the Agriculture Committee and, on March 22, 1962, reported to the House without amendment.

#### IN CONCLUSION—OUR PART IN THE PICTURE

It appears to me we are here considering two broad programs which occasionally overlap—adult or continuing education as one part of our national objective and improved formal classrooms training as another. As I have indicated, I believe the broadcast ETV method best meets the continuing education need and closed-circuit ETV the formal classroom training. Neither system, however, can be reserved to only its best use. Thus broadcast ETV can, within its limitations of service area and frequency allocation, furnish much service to the formal classroom program. In a like manner closed-circuit ETV facilities could be programed during evening hours to aid "night school" training and the worker retraining programs now under consideration by our Government.

#### *Service for both systems*

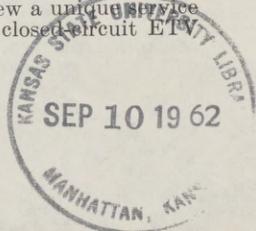
In the independent telephone industry we are apt to feel the impact of both approaches. We may be called upon to furnish the normal auxiliary services required by broadcasting—the studio-to-transmitter and interexchange network facilities. We may also be called upon to furnish the local and interexchange coaxial cable facilities for closed-circuit operation.

As has been pointed out, the congressional approach has been to foster the broadcast ETV method through Federal grants for this purpose. Right now we seem to be awaiting only to find out how much, when and to whom. It seems safe to assume there will be early activity in the progress of this method and many States will expand their programs and attempt to reach the greatest percentage of the rural area possible by broadcast systems.

However, the shortage of teachers and the deficiency in quality of teaching will be most acutely felt in the more rural areas for some time to come. To meet these critical deficiencies, many States may turn to closed-circuit ETV systems whether Federal grants are available or not. If we accept the figures presented in congressional debate and the survey figures of the State of South Carolina as indicators then multichannel closed-circuit facilities may be the most economical. Multichannel programing will certainly be needed to combat these shortages

#### *Investment—Rates—Territorial integrity*

The initial investment in closed-circuit facilities is not likely to be modest if maximum service to the schools in any school district is proposed. However, this type of service is one which the telephone company common carriers are best able to furnish and maintain at the levels of dependability needed for most effective instruction. It is, from the traditional telephone view a unique service for a telephone company to offer. Once installed, however, closed-circuit ETV systems should be long-term operations.



The rate structure developed by telephone companies for educational TV services should be carefully worked out. It appears they will have to be competitive to some degree. The customer has many avenues of approach to the problem. There exists the basic choice between broadcast and closed-circuit ETV. In addition he has wide latitude in the choice of facilities to be owned or leased. The present A.T. & T. tariff filing with the FCC permits the interconnection of customer channels with telephone company furnished educational TV channels.

Moreover, our companies should seriously consider furnishing this service, even if marginal, to protect the integrity of their operations as communications common carriers. It is quite obvious that our potential customers are in a position to meet many of their service needs through the installation of their own facilities (which could duplicate existing or planned telephone facilities). Not so obvious is a possible invasion of this area of service by specialized radio common carriers of private business enterprise. In the community antenna TV field (CATV) we have already witnessed the licensing by the FCC of specialized radio communications common carriers in the 6000 megacycle microwave region. Unbiased thinking should indicate that if ETV can help resolve the serious educational problem confronting our Nation, then ways will be found to use either or both methods to the maximum.

The greatest cost variables take place when considering the method of distribution. Here is where care should be taken to make sure the most accurate comparisons possible are made. A broadcast station can distribute only one program at a time. Present closed-circuit facilities can handle six simultaneous programs locally and five on intercity circuits. Whenever multichannel operation is being considered, multiple broadcast station installations should also be included for proper comparisons.

Experts in the field of radio transmission will be presenting facts and figures supporting the use of broadcast facilities. As an expert in the broad field of communications, the telephone company can provide much assistance to educators so they may be able to evaluate the community's needs in this specialized area of communications and secure as much service-per-dollar as possible for the taxpayer.

In summary we would suggest that independent telephone companies survey this field and its possible impact upon them in some depth. How extensive would be the service problem to schools in your area? What will be the minimum needs of these schools? What plans are under study by your local, county, or State educators? Will broadcast ETV meet these plans or will closed-circuit ETV be used?

U.S. INDEPENDENT TELEPHONE ASSOCIATION 64TH ANNUAL CONVENTION,  
CHICAGO, ILL.

ENGINEERING CONFERENCE, OCTOBER 9, 1961

EDUCATIONAL TELEVISION AND THE INDEPENDENT TELEPHONE COMPANY

(By Frank S. Barnes, Jr., vice president, Rock Hill Telephone Co.,  
Rock Hill, S.C.)

There is an article in the September 2 issue of the Saturday Evening Post entitled "Education Out of the Blue." This article praises in glowing terms the accomplishments and potentials of the educational television instruction being made available in the Midwest. It describes the detailed preparation of each lesson and its subsequent presentation using the very best teaching aids by a highly skilled teacher in front of television cameras. Instead of being transmitted live at the exact classroom hour desired however, it is recorded on video tape for subsequent transmission. These tapes are then held and used at the time the lesson is desired. The tapes may also be stored and used repeatedly year after year until new developments and techniques make new lessons desirable. With taped instead of live lessons, it is possible to reach near perfection with planning, rehearsing, checking for content and effectiveness, and taping and retaping until the teacher is entirely satisfied with the results. When the day arrives for transmission of the lesson to the schoolroom the tapes to be used that day are loaded aboard a four-engine airplane equipped with a television transmitter. The lessons are then broadcast from an altitude of 23,000 feet while the plane circles in a controlled pattern. The broadcast is in the ultrahigh frequency range which will not interfere with commercial ground stations. The schools participating in

the program are equipped with television sets modified to receive the ultrahigh frequency. A lesson for high school level is usually 30 minutes long and for elementary 20 minutes. After each TV lesson the classroom teacher, who is always present and in control of the class, follows up on the TV instruction.

There is no magic to television instruction. Actually, it is no more than another tool in the classroom teacher's kit. In this respect it is like a textbook or a wall chart or a classroom movie. In no sense will it replace the classroom teacher. It is not claimed to reduce the overall cost of public education though some supporters are convinced it has this potential. It is claimed, however, to increase the quality at about the same or slightly higher cost.

You probably are thinking, well, all this is fine, but what does it mean for the telephone industry and the independent telephone company in particular. Recently an industry group which has been extensively studying the ETV experiments pointed out that just as the telephone industry had a key role in helping the growth of commercial television, it is in a position to adapt its experience to the particular needs of educational television and foster the growth of this essential new public service. They further conclude that in order for the telephone industry to meet the broad requirements for ETV, it is important that independent telephone companies join in the ETV service offering whenever a demand for this service exists in their territories. At the present time there are 219 ETV systems in operation in this country. In only seven of these are the telephone companies at present furnishing any portion of the facilities.

Now one of the big jobs in any ETV program is the transmission of the picture and sound from the studio to that TV set in the classroom. There are two approaches to this job. One is referred to as "open circuit" transmission, and the other "closed circuit." In the "open circuit" method the ETV signal is broadcast from a television transmitter or transmitters operating primarily on frequencies in the ultrahigh frequency channels (above regular VHF channels 2-13). One of the difficulties of this method of transmission is coverage since the signal carries only a few miles from the transmitter. In the Midwest experiment this has been overcome by using the airplane. Coverage has increased, but other problems are present such as operation in bad weather, the limitation on the number of lessons which can be transmitted simultaneously, the difficulty of live telecasting when desirable, the inability to direct a particular program or transmission to selected sets, and the possibility of interference to the picture.

In contrast, the "closed circuit" method avoids these difficulties. The ETV signal is carried from the studio to the television set in the classroom by microwave radio relay, coaxial cable, or a combination of these mediums. The chart in figure 1 shows a typical arrangement using telephone company facilities. In this illustration the ETV signal is picked up at the studio and carried on coaxial cable to the telephone company building. At this point it is put on microwave and transmitted to other communities. In the receiving community the signal is converted back to VHF frequencies and transmitted over a single tube coaxial cable to the school. It is delivered to the classroom set at VHF frequencies (channels 2-13) without the use and licensing of a broadcast frequency. Using VHF frequencies permits the use of regular television receivers without the necessity of modification.

Both open and closed circuit ETV are being used and tried. The telephone industry has helped with a number of the closed circuit networks by providing the transmission channels between the central studio and the schools. The largest of these systems at present is the network operated by the ETV commission in South Carolina. This network is being furnished by the joint effort of Southern Bell and the independents.

ETV in South Carolina had its beginning in the fall of 1958. A study committee of the State legislature in March had recommended that a 2-year experiment be undertaken to determine the value of ETV to the public school system of the State. The legislature approved this report and appropriated \$65,000 for the first year. A studio was set up in Dreher High School in Columbia, the State capital, and lessons in plane geometry and French were transmitted to classrooms in this school over a closed circuit within the school.

In planning for the second year of the experiment the results of the first year were discussed with the legislative committee in January 1959. It was agreed that information was needed from the results in more than one school. A decision was made to investigate the cost of extending this experiment to other high schools in the city. Southern Bell, who operates in Columbia, was approached by the supervisory committee for assistance in furnishing the transmission facilities between the studio in Dreher High School and the other high schools. A plan

was worked out using coaxial cable and the legislature appropriated \$100,000 to proceed with the second year of operation which would add four high schools on a closed circuit network furnished by Southern Bell. Figure 2 shows the grouping of these schools in relation to the telephone office and the cable layout. During 1959 and 1960 first year algebra was added as a third course to the geometry and French taught the previous year.

Sufficient results were obtained from the experiment in the five high schools in Columbia for recommendation to the legislature that the experiment be extended to a larger area than Columbia and a structural authority on the State level be set up for direction of the experiment for 5 years.

Those in charge of the program began studying ways in which the experiment could be extended into a larger area. It was determined that if statewide coverage transmitting complete subject material was to be achieved in South Carolina, the three UHF and one VHF television broadcast channels allocated to educational use would not be sufficient. This was further borne out by the fact that coverage of these four stations was only partial over the State area and multi-channel operation through this medium would be virtually impossible. In figure 3 the map prepared by the ETV commission shows the coverage which would result from 36 broadcast stations strategically located throughout the State. You will note that there are only limited locations where three-channel operation would be possible. These stations would be very costly in investment and operation. In addition to the stations' cost there would be the cost of interconnecting facilities to tie all of them together. After carefully considering all of these facts it appeared that "closed circuit" transmission was the answer since the flexibility and capacity of such a system is virtually unlimited.

Faced with this information, the group approached Southern Bell about expanding the closed circuit system into other cities in the State. Southern Bell was able to work out a plan of providing the interexchange channels by microwave radio relay using spare channels, protection channels, and installing new channels on their recently developed microwave radio relay message system. The links between the microwave terminals and the schools would be provided by the installation of coaxial cable. This initial network to nine communities in widely separated sections of the State is shown on the map in figure 4. It included both Bell and independent areas.

In 1960 the legislature authorized the necessary appropriation for this network and in addition an ETV commission to direct the program. An order was received on June 30 from the new commission to extend the network to these nine communities. By extra special effort the network was placed into service in September 1960 in time for the start of school. With the inauguration of this service, the South Carolina educational television program became unique in at least two respects. It was the only "closed circuit" statewide network and it was the first such network to utilize 100 percent video taped operation.

At this point in the development of the network a representative of the South Carolina Independent Telephone Association began attending the weekly meetings of the industry group with the ETV commission staff to help coordinate, guide and develop the participation of the independents. In addition to this representative, the chairman of the Transmission and Communications Improvement Committee of the South Carolina Independent Telephone Association met with the group to assist with the technical problems involving the independents.

As the ETV program reached these other communities, a great deal of support and interest on the part of additional communities developed. Requests poured in to extend the network into these communities. In November of 1960 9 more schools were added and in January of this year 4 more bringing the total to 26 schools in 15 communities.

The final addition to the network for the school year 1960-61 was made with the connection of the new Cardinal Newman Catholic High School in Columbia on May 1, 1961. This is significant since part of the ETV commission policy is to make televised instruction available to private schools, groups, or individuals as well as to the public school system as long as no additional cost to the commission is involved.

The 1961 legislature confirming its confidence in the program appropriated additional funds to provide further extension of the State system for this school year. The extension as planned in May of this year for September 1 service date included 56 schools in 25 communities. These are shown on the map in figure 5. Since May the number has been increased to 65 schools in 21 of the 46 counties. This network now extends over 630 miles of microwave and 112 miles of coaxial cable.

At present three-channel operation is being used within the Columbia network to obtain experience for multichannel operation on the Statewide network. Here again one of the advantages of this closed-circuit method should be pointed out. It was possible to go to three-channel operation over the coaxial cable network in Columbia without adding additional equipment—the cable repeaters and the cable are a broadband facility with sufficient band width to easily carry the three channels and more. Open circuit, on the other hand, would have required two additional transmitters and frequency assignment from the FCC.

The ultimate aim of the South Carolina Department of Education is to reach all 1,249 elementary and high schools of the State with four channels. In order that the legislature would have the information on the cost of reaching these schools, all telephone companies in the State cooperatively prepared provisional estimates for the four-channel system. These estimates were completed in record time early this year and found to involve 4,900 miles of microwave channels and 3,779 miles of coaxial distribution cable. The layout on which the estimate was based is shown on the map in figure 6. It is expected that some changes in the routings may be found desirable as improvements in equipment designs and fuller use of the network make other arrangements desirable.

An intermediate step in the ultimate plan is to reach all high schools. The cost to the State of reaching the 413 high schools in South Carolina with three channels of regular daily subjects was found to amount to \$3,800,000 annually. This cost included the TV teachers, technicians, studio and equipment, receiving sets in the schools, and transmission by the telephone companies—everything. It would involve the finest teachers on 36 high school subjects taken by television to every classroom in the State at a per-pupil cost of only \$12.67 annually.

In January of this year the network made it possible for students to see addresses by two nationally prominent men to a gathering of legislators, educators, and business leaders of South Carolina. These men were space expert Dr. Werner von Braun and Dr. Alvin C. Eurich, vice president of the Ford Foundation. Dr. Eurich's commentary on the South Carolina ETV program included, "You have one of the most remarkable educational television programs in the country."

Let us now examine how this closed circuit approach to ETV will affect the independent company engineeringwise. The facilities selected to meet ETV requirements must be those that will be best fitted to it both technically and economically. The systems supplied by other sources are designed, community by community, to meet specific needs. To make a comparable service offering, the telephone industry ETV services must be stripped down to the essentials. This calls for systems to be specially constructed for ETV similar to the manner in which customers might construct the facilities for themselves. In some instances use may be made of portions of these ETV systems for other services. Where the economies are apparent, use may also be made of common plant for ETV. As was stated earlier and as shown on the typical layout in figure 1 there are two means of transmission in the closed circuit. These are microwave radio relay and repeated coaxial cable. The microwave facility involves a frequency assignment from the Federal Communications Commission for each microwave transmitter required. Only one transmitter and one receiver are required at each microwave repeater point as transmission is only in one direction; however, each additional channel requires another transmitter and receiver. Where the microwave facility terminates and only a receiver is used, FCC authority is not required. The picture in figure 7 shows a microwave repeater installation with the ETV transmitter and receiver alongside a message system repeater. The two bays on the right contain the ETV transmitter and receiver. The other two bays contain the repeater equipment for the toll message circuit. Transmission considerations of the present equipment limit the light route microwave systems to about seven or eight repeater sections.

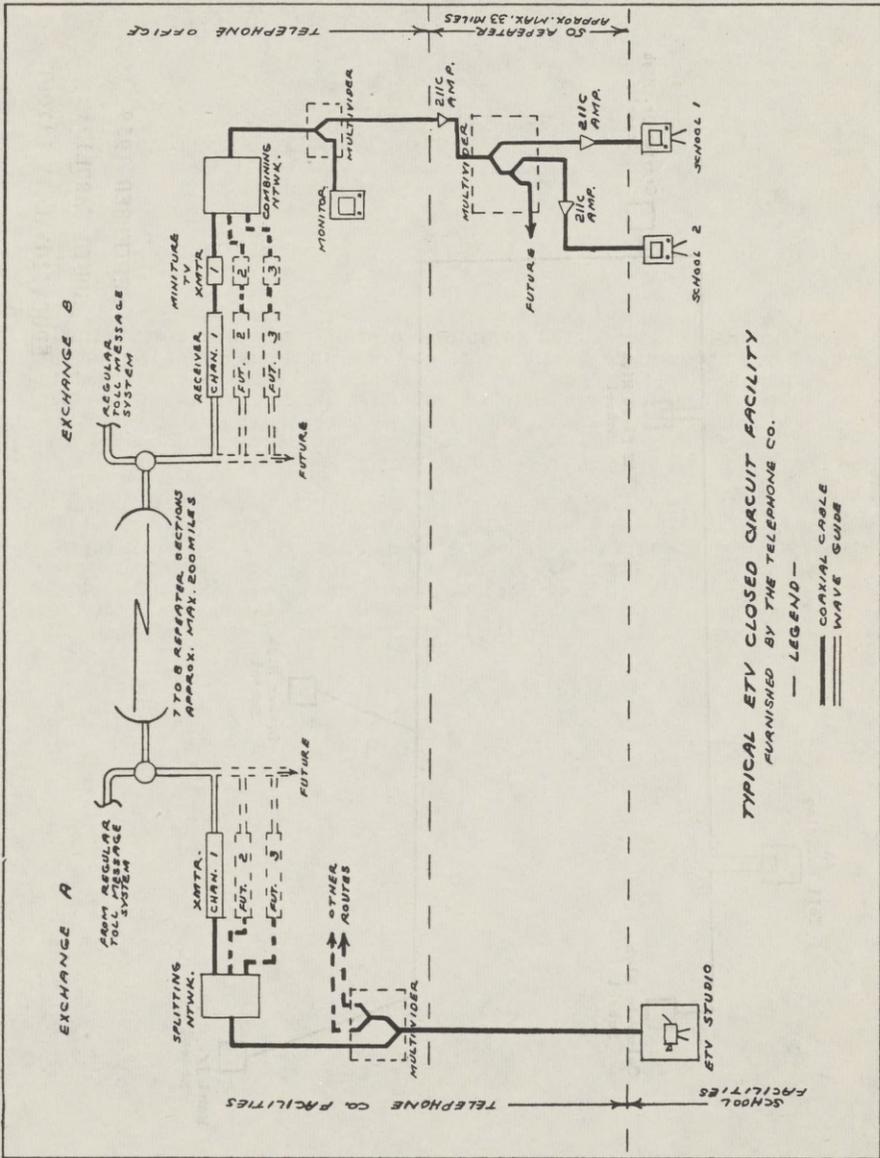
The other means of transmission is by coaxial cable. The cable used in the South Carolina network is the disk type which provides an air dielectric between the center conductor and the outer tube. The center wire is held in place by polyethylene disks at three-quarter-inch intervals. The center wire and reinforced tube is enclosed in a polyethylene plastic sheath. An exploded view of this cable is shown by the picture in figure 8. In addition to being installed aerially, the cable may be placed in underground conduit or buried. When it is installed aerially it should be placed on a separate strand in order to minimize the possibility of damage as any dents, kinks, or moisture in the cable will impair transmission. The TV signal must be amplified in the cable approximately every 3,500 feet. A repeater is located at these points and power is supplied by a commercial power tap. The picture in figure 9 shows the method of pole mounting

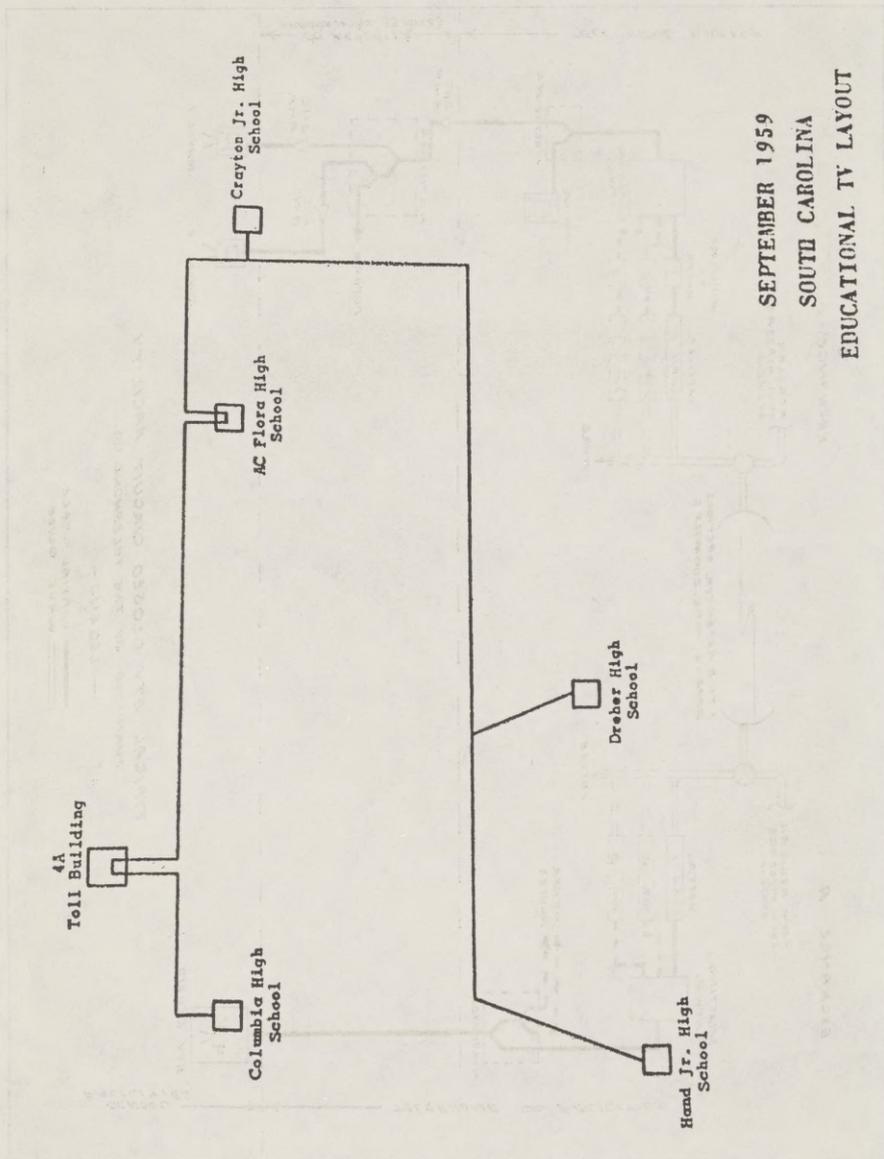
the repeater. This repeater, one at each location, will repeat all channels sent over the cable. Development is now underway on an amplifier which can be supplied with power from the central office. This will help reliability. A composite cable is also under development which can be buried or plowed in and will contain the coaxial tube and physical pairs suitable for carrier. This will make possible the provision of loops and trunk circuits between points connected by the ETV cable. There is some possibility that a trunk carrier can be developed to operate in the coaxial at frequencies that will not interfere with the ETV signal.

The average investment required for a light route microwave channel between towers on an existing microwave system is approximately \$12,000. For coaxial cable with pole line in place it is about \$5,000 per mile. The economy between microwave and cable varies with conditions; however, generally, the coaxial cable is more economical from 5 to 10 miles even on one-channel operations. For multichannel operation the distance increases since an additional repeater (transmitter and receiver) is required at each microwave repeater point for each separate channel on the network. In the cable only one repeater per repeater point is required for all channels. However, there are transmission considerations on the cable that limit its use to 50 repeaters or about 33 route miles. The cable system may be branched as long as none of the receiving points exceed about 33 route miles from the originating location.

In closing, the following should be emphasized. Transmission of ETV by closed circuit has very marked advantages over open circuit in cost, flexibility, reliability, and frequency spectrum conservation. In closed circuit transmission, the communication companies have the know-how and experience to furnish this facility reliably and economically. These facts are not recognized by many people in and out of the communication business; hence the efforts to provide other ways of meeting this need. This trend must not be encouraged by our failure to provide either the information or the facilities when there is the opportunity to do so.

ETV by closed circuit and the many other potentials this will open up for the use of closed circuit video transmission by our customers should be looked upon as a great opportunity and challenge. An opportunity to obtain the revenues to support better trained people and better plant to give better service—A challenge to show that our nationwide communication system furnished by private communication companies through constructive cooperation can continue to give to this great country of ours the best communication service in the world.

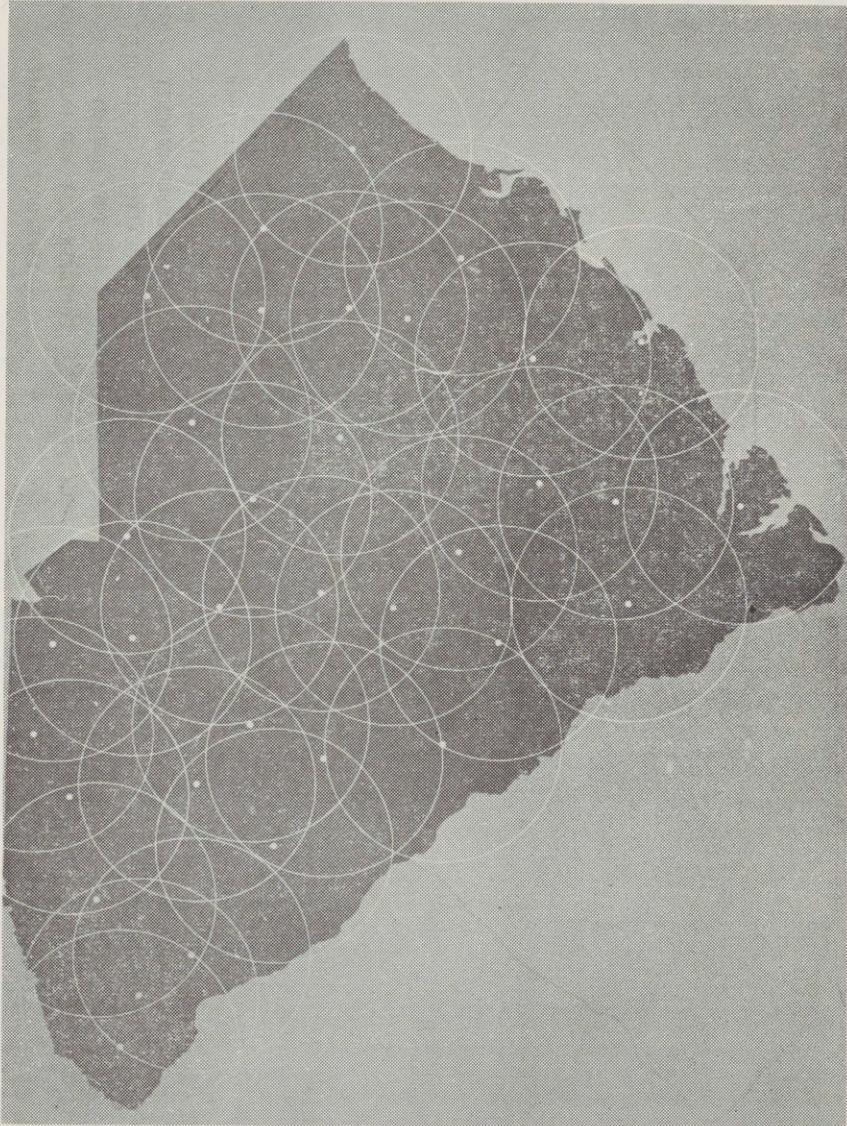


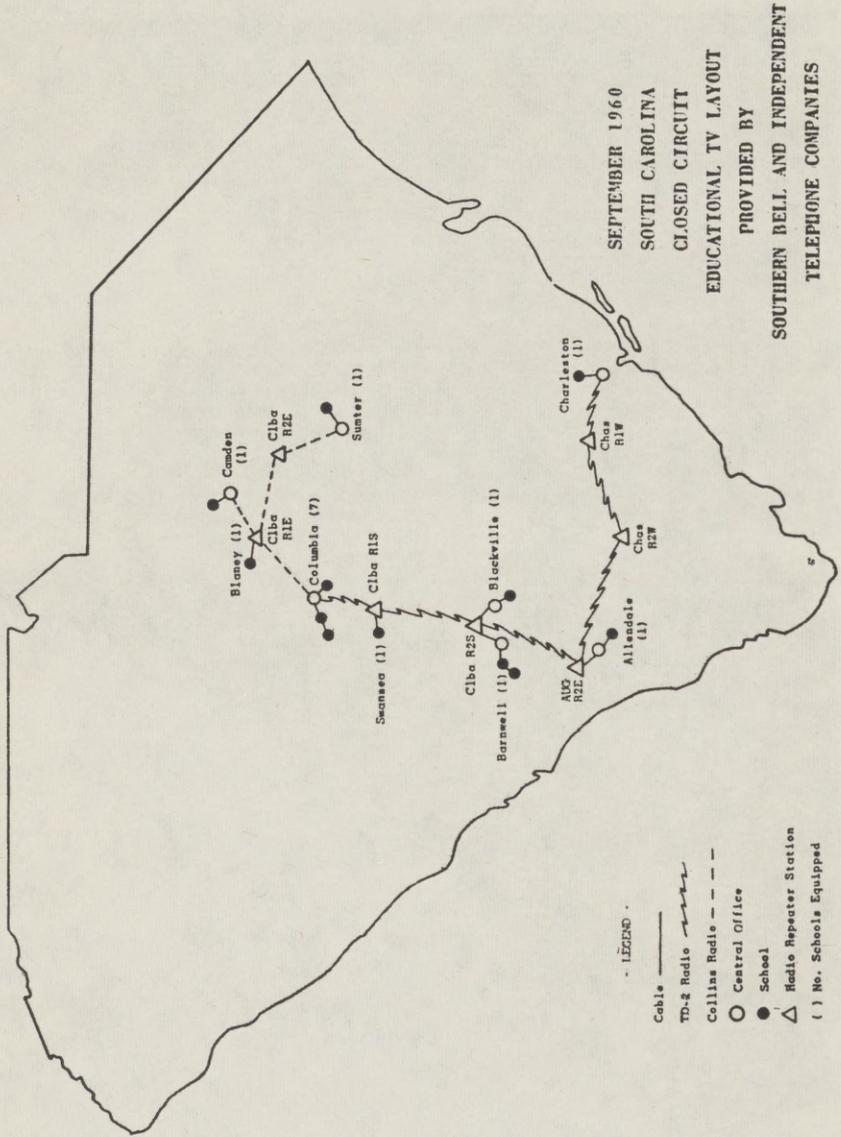


SEPTEMBER 1959

SOUTH CAROLINA

EDUCATIONAL TV LAYOUT





SEPTEMBER 1960

SOUTH CAROLINA

CLOSED CIRCUIT

EDUCATIONAL TV LAYOUT

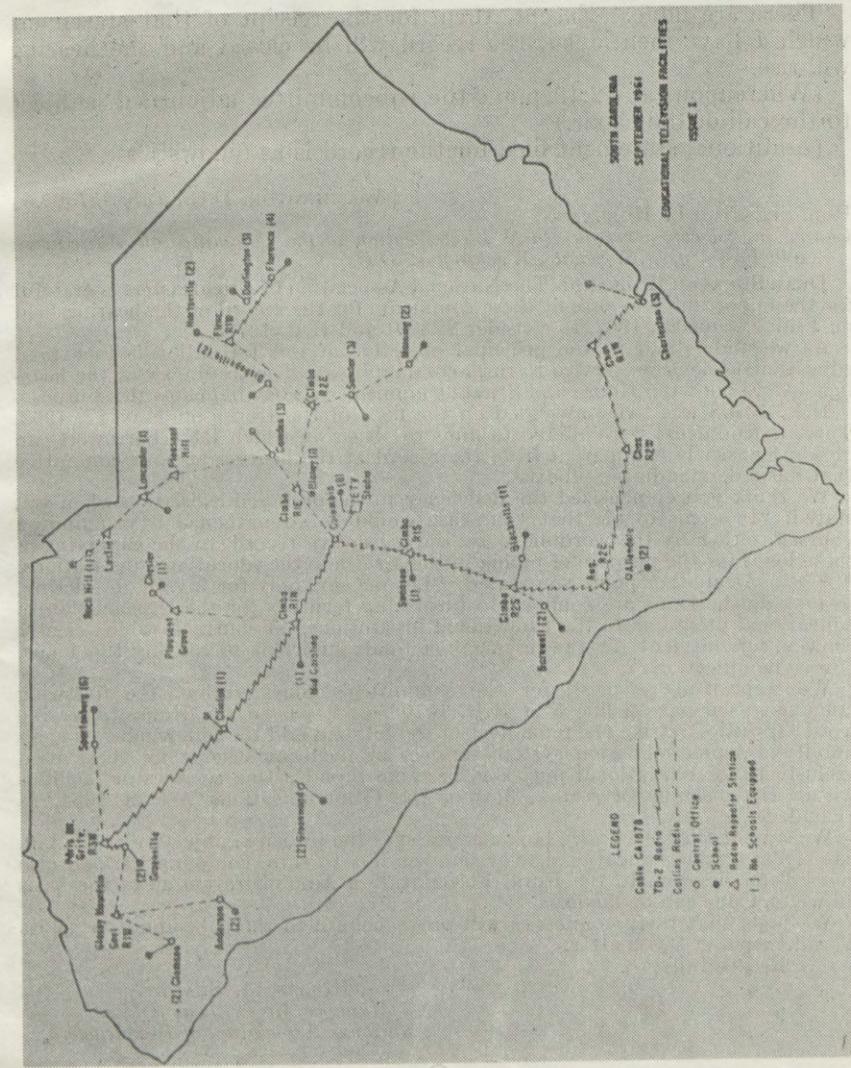
PROVIDED BY

SOUTHERN BELL AND INDEPENDENT

TELEPHONE COMPANIES

LEGEND

- Cable —————
- TD-2 Radio - - - - -
- Collins Radio ~ ~ ~ ~ ~
- Central Office ○
- School ●
- Radio Repeater Station □
- ( ) No. Schools Equipped



Senator HOLLAND. Does this conclude the testimony of the witnesses who wish to be heard this morning?

I understand that the witness for the National Farmers Union wanted to file a formal statement. We will keep the record open until Tuesday for that purpose.

Are there any questions from Senators or Representatives to be heard?

There are none. Except, then, for the receipt of that statement which I have mentioned, the record will be closed and the hearing will rise.

(Whereupon, at 12:10 p.m., the subcommittee adjourned, subject to the call of the Chair.)

(Additional statement filed for the record is as follows:)

WASHINGTON, D.C., July 3, 1962.

HON. SPESSARD L. HOLLAND,  
Chairman, Subcommittee on Rural Electrification of the Committee on Agriculture and Forestry, U.S. Senate, Washington, D.C.

DEAR SENATOR HOLLAND: The National Association of Broadcasters is grateful for the opportunity to submit these comments for the record of the hearing held on Friday, June 29, 1962, to consider S. 3001 and H.R. 10708.

As we understand it, the principal objective of this legislation is to extend educational television service to rural communities. The testimony at the hearings before both the House and Senate committees clearly indicates this purpose.

H.R. 10708 was twice amended on the floor of the House on May 17, 1962. These amendments were offered to limit the basis on which REA borrowers can obtain loans. It is apparent from the record at the hearing of your committee that misunderstandings still exist.

We think you emphasized the deficiency in the proposed legislation when you stated: "It seems to me that your case would be strengthened if you limited yourself, either by the wording or by the legislative record, to the supplying of these loans for the purpose of piping in the service to the educational institutions. \* \* \*" At another point you stated: "Let me say, only for myself, in closing, so long as the loans are confined to furnishing facilities for the transmission of educational programs to the educational institutions, on contracts which clearly show a commitment for the payment of funds sufficient to retiring the loans, I have no objections."

We respectfully suggest, for the committee's consideration, the following language. On page 2 line 5 of H.R. 10708, as it passed the House, after the word "facilities" strike the remainder of the bill and add the following: "or community antenna television system services or facilities other than those used exclusively for educational purposes, or radio broadcasting services or facilities within the meaning of section 3(o) of the Communications Act of 1934, as amended."

We submit that the above language satisfies the principal objective of the bill, namely to extend educational television services to rural communities, and also gives clear direction to the Rural Electrification Administration as to the basis on which loans can be made.

We hope that these comments will prove helpful to the subcommittee in its consideration of this matter.

Respectfully,

HOLLIS M. SEAVEY,  
Manager, Government Affairs,  
National Association of Broadcasters.

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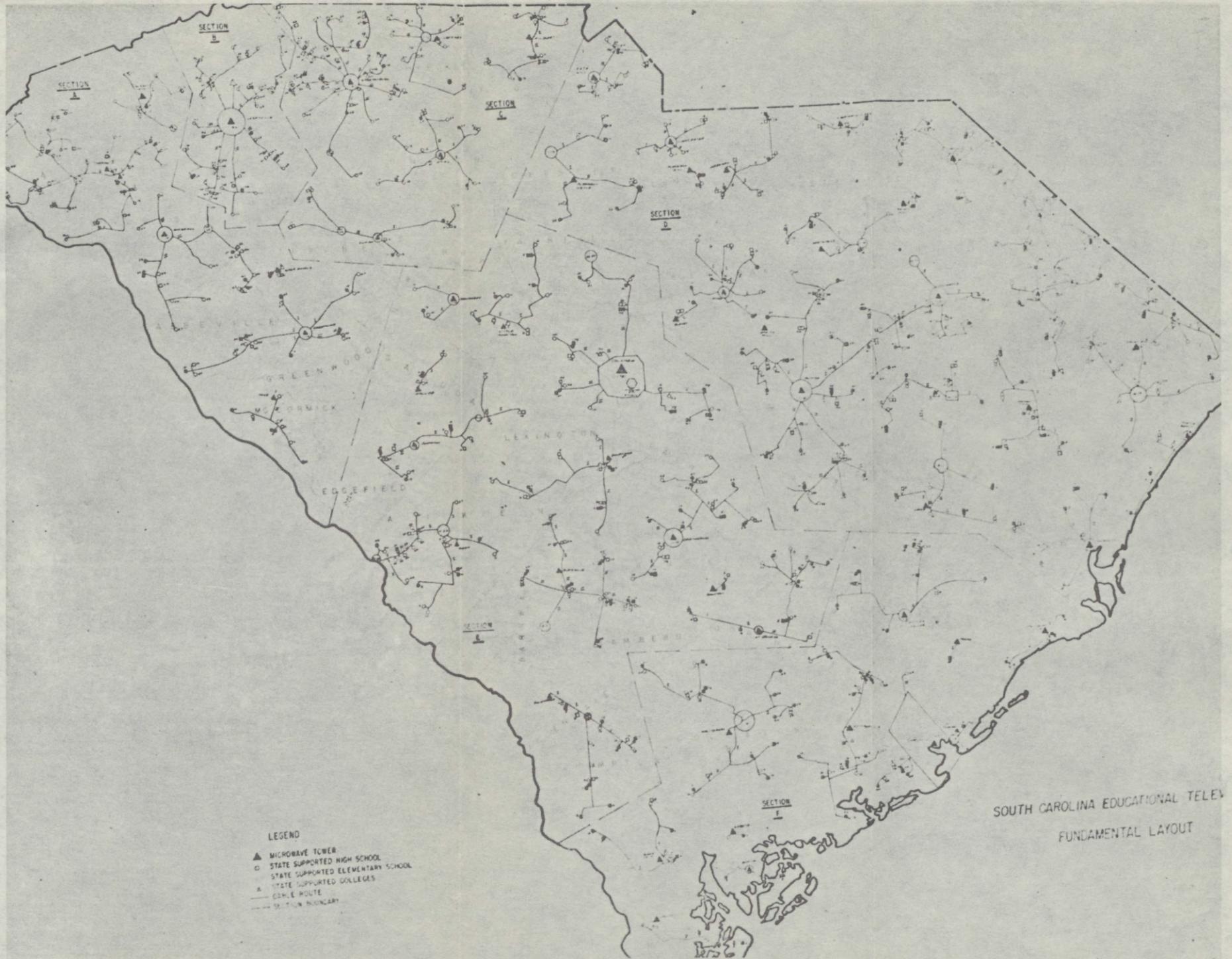


FIGURE 6

