

- (2) See "Influence of Echoes on TV Transmission", Pierre Mertz, Journal of SMPTE, Vol. 60, May 1953.
 - (3) For an excellent presentation see "Performance Testing of Television Channels", by Maurice E. Cookson pp. 28-34 TV and Communications, June 1964.
 - (4) See "Observer Reaction to Low Frequency Interference in Television Pictures," by A.D. Fowler, Proc. I.R.E. Vol. 39, pp. 1332-1336, Oct. 1951.
- Thank you for your time. (Applause)

MR. W. K. HEADLEY: Thank you, Ken. As we proceed in our long and varied journey ahead this morning, at top speed necessarily, we will whisk you into the second subject, which concerns itself with solid state system concepts, and on this subject you will hear from Mr. Donn Nelson, Staff Engineer at Ameco, Inc.

MR. DONN G. NELSON: There was a thought provoking article written by General David Sarnoff of RCA and NBC fame in the May issue of Fortune Magazine. In this article, General Sarnoff predicts the future of not only electronics, but many other aspects of communications in the United States and for the whole world. He is an advanced thinker and among the things he predicts are these: he predicts that some day news can be typed out in one country and by a verifax satellite TV link be simultaneously reproduced many thousands of miles away. The news can happen and we can instantly receive it. He predicts that some day a personal communications link will exist, which will allow the mass public to talk to each other and look at each other in full color reproduction at any time. Now he does not say how this is to be accomplished, but I think that we have in the CATV industry a means whereby this could be achieved.

Roughly 15 years ago, the first CATV system was formed and it was formed for altruistic purposes rather than the reasons we form a system today, but during that period of time the equipment we worked with was frequently handmade. We made it ourselves. We had to do our own engineering. We didn't have all the illustrious brains in the engineering world at our disposal, because they had never heard of our industry. Many of you sitting in this audience could probably be well called design engineers, because you are contributors to the modern stage of the art. Frequently when I am at the plant in Phoenix, Arizona, a customer will call up and say, Donn, why don't you manufacture such and such, and so I go talk to somebody, and he talks to somebody else and pretty soon Ameco has a new product on the market and it wasn't because of our superior thinking or because of our ingenuity, it was because of the fact that we are dealing with very able and very intelligent people who are our customers. The future is thrilling because we have only scratched the surface, we don't know where we will arrive ultimately. We now have CATV, CCTV, ETV and STV.

The three areas in which we will have substantial improvements soon are: 1. rural TV, including long distance transmission, 2. the interrogation and response system which is something that has been known for years and is something which we are going to be forced to adopt, and 3. reliability, something in which we are all interested.

One of the foremost allegations that the FCC has against CATV is the fact that we cannot, nor do we offer service to everybody. If a farmer happens to live four or five miles out of town, even if there are a few other farms out there, we, as system operators, just plain ignore them because we can't afford the amount of money it would cost to hook them up. It might be 27 years before we get our money back. I was talking to Dick Yarrick, one of our salesmen out of the Harrisburg office in Pennsylvania, and he says that he has wired or sold the equipment for wiring many small towns together. If a town is maybe four and a half miles from another town, he has been able to use transistorized line extenders and offer economical service from one of these communities to another. This is something many operators have missed for a long time.

Bill Rheinfelder, Ameco's chief scientist, turned out a report in which he rated all of the Ameco amplifiers. He determined what he called a figure of merit. This figure of merit was based upon the noise factor and the output capability of each amplifier. One of the striking things which was disclosed by this report was that Ameco's line extender series has exactly the same figure of merit found in the more deluxe and expensive mainline series of equipment. This means that an operator can cascade line extenders, which sell for \$69, less discount, again and again and again and deliver high quality pictures at the end of the transmission line.

Also, in our laboratory we have been working on an FM modulation system for long distance CATV transmission. It now appears that in the very near future, Ameco will have an even better means of propagating signals. There is no reason, based on scientific data, that Fm video could not be transmitted 50 or 60 miles without degradation of the video information or the sound. That would mean that we could economically replace many of the microwave hops which are so difficult to obtain with a cheaper reliable transmission system.

The second thing I would like to discuss is the interrogation and response requirement. In order that educational TV may really be effective, we must plan to have interrogation and response. The cripple, the shut-in, the person too feeble to leave home would be able to study a trade on educational television and, by means of the CATV system in his community, he could answer questions during tests from his bed. He could achieve diplomas, certificates or even degrees.

We have the equipment to accomplish the above conditions right now. In fact, at Ameco we had a requirement very recently to do this very thing. I found that many years ago, we used to build what we designated a CF 33. This was a small unit which bypassed an amplifier so that RF could go one way and audio or other lower frequency information the other way. The devices worked very well, but there was no need for them, so we hid them away with the old obsolete prototypes. I resurrected some CF-33's and used them with some of our new subchannel amplifiers to pass subchannel around one way and the regular VHF the other way. It worked beautifully. There is no reason why any one of the companies represented at this convention couldn't produce equipment to give interrogation and response. There is no reason why the CATV system of the future couldn't have additional sources of revenue resulting from this. Also, we could have a power company and water company meter reading service, whereby, we could punch a button and impulse devices would send out information over the CATV system. Every house could be required to be attached to the CATV system whether they use the TV signal or not. It could be a requirement of the power company. This coded information could be back fed around the amplifiers in the CATV lines to a central information hub; it could be decoded, fed into IBM machines from which utility bills, monitoring the individual homes in a community, could be processed in minutes.

Think of the revenue that would come to the CATV operator if he maintained a service like this. The CATV operator could also run public opinion polls interrogating consumers right from their homes. He could show a product on the TV screen and the customer could punch a yes or no button which would indicate approval or rejection of this product. There is no reason why in the CATV system of the future, we couldn't vote at election time, by having a keyed identification to be activated directly from our homes.

The third important area of system improvement which I foresee is that of reliability. Years ago many of our systems were "Jerry rigged"; many haphazardly thrown together. Some systems had Ameco equipment, Jerrold equipment, Entron equipment and SKL equipment, all operating in a given length of cable. These

These systems were inferior, incongruous and frequently a night-mare to keep operating. The engineering of modern CATV equipment has improved vastly. There is no major manufacturer of CATV equipment today who doesn't make pretty good equipment.

The cable connectors we use today are much better than the problematical ones we used to use. For example, we at Ameco have announced a new line of 75 ohm, matched, simple and durable cable connectors. Today we have cable coaxial which is far superior to any we have had in the past. The anticipated life of good aluminum cable is 20 years. Derrek Busby of Canada Wire Ltd. says, "Ours will last 35 years". I don't know if that was salesmanship talking, but I doubt it. But just think of that, 20 years! That's twice what we used to think of as the life of the entire CATV system. Our modern day systems are better, but they must be made even more reliable. If for instance, "Phonovision", which the telephone company is currently demonstrating, became popular and in demand, the CATV system would be an ideal medium for transmitting this video and audio. We have bands of unused RF frequencies between the FM spectrum and channel 7. We have all of the subchannels that could be filled with phase modulated video information. If AT&T would become interested in utilizing our industry for this purpose, they would insist upon one thing; that is system reliability. AT&T would probably not even consider renting or leasing services from a CATV system which had a low reliability index. Where amplifiers and component parts become very hot due to vacuum tubes and high voltages, the system can require frequent and extensive maintenance. The reliability of Transistors is dramatically superior to that of vacuum tubes. An anticipated life of 97 years makes these devices preferred amplifiers for now and the future.

The last thing I would like to say is that many of the things I have mentioned as "coming soon" are happening today. Ameco is now building a system in a relatively large Southern city in which we are including additional income for the CATV operator. We are adding a subchannel communication link to this productive CATV system. It will consist of a 10 mile closed link from the head end which will completely loop the activities centers of this Southern metropolis. It runs right through the center of town where it passes through the business and shopping areas. The loop unites the public schools, it goes by the public institutions, the parks and every place having something of interest for the citizens. This subchannel link will have 50 inputs. Each input will allow the origination of TV programming for community service and commercial purposes. The subchannel information will pass through the amplifier chain to the head end where it will be converted to a normal CATV channel. Local businessmen will advertise on this system. The CATV operator will be able to sell or give away time to display a grand opening of a new store, he can show sales promotions, he can show a library opening, he can show anything of civic importance to his CATV subscribers and his subscribers only.

Ameco is a manufacturer who is meeting future reliability requirements today. We feel that when we look to the future of CATV, we are looking to the future of CATV with Ameco. (Applause)

MR. W. K. HEADLEY: I'd like to make another short announcement here. I know that many of you have brought your children to the convention. It's been a pleasure having them and I hope they are having a wonderful time. I'm sure they are because I think you will all agree that the job George Barco and Bob Tarlton have done as co-chairmen of the committee has given you a convention that you will long remember. To prove the point that the planning is complete and detailed, some of you might be wondering what you will do with your children when you are attending the banquet tonight. Therefore, this is simply to announce that there will be a childrens' banquet in the Crystal Room at 7:00 P.M.