Appendix C

TELEPHONE PIONEERS AND PTTY

By: Lee Brody

The Telephone Pioneers are a service club of the Bell System consisting of members who have been employed by the Bell System for 21 years or more. Each chapter throughout the country undertakes several community service projects which are publicized throughout the Telephone Pioneers organization. Some of these projects are purchases of special equipment for donation to special groups, such as a braille typewriter to a service organization. Some of the projects are started up by Pioneer members as their "pet-project" such as working with children of minority groups.

When I asked the Telephone Pioneers of N.J. Bell Telephone for volunteers to teach us how to repair TTY's, little did I realize what a tremendous undertaking it would be.

In our request, we made clear that we did not ask for uncompensated services. We said to the Public Relations officer, give us your discarded machines that are headed for the junk yard, and give us volunteers to teach us how to rebuild and service teleprinters. We will create new phone subscribers that will bring additional revenue at no cost to the Bell System. At this time (Nov. 1971), with 2,000 PTTY stations in the country, I would venture to say that the Bell System has increased its gross revenue by almost one million dollars a year with no additional investment of capital. At a later time we hope to complete our phone bill survey in the N.Y.-N.J. metropolitan area with specific information.

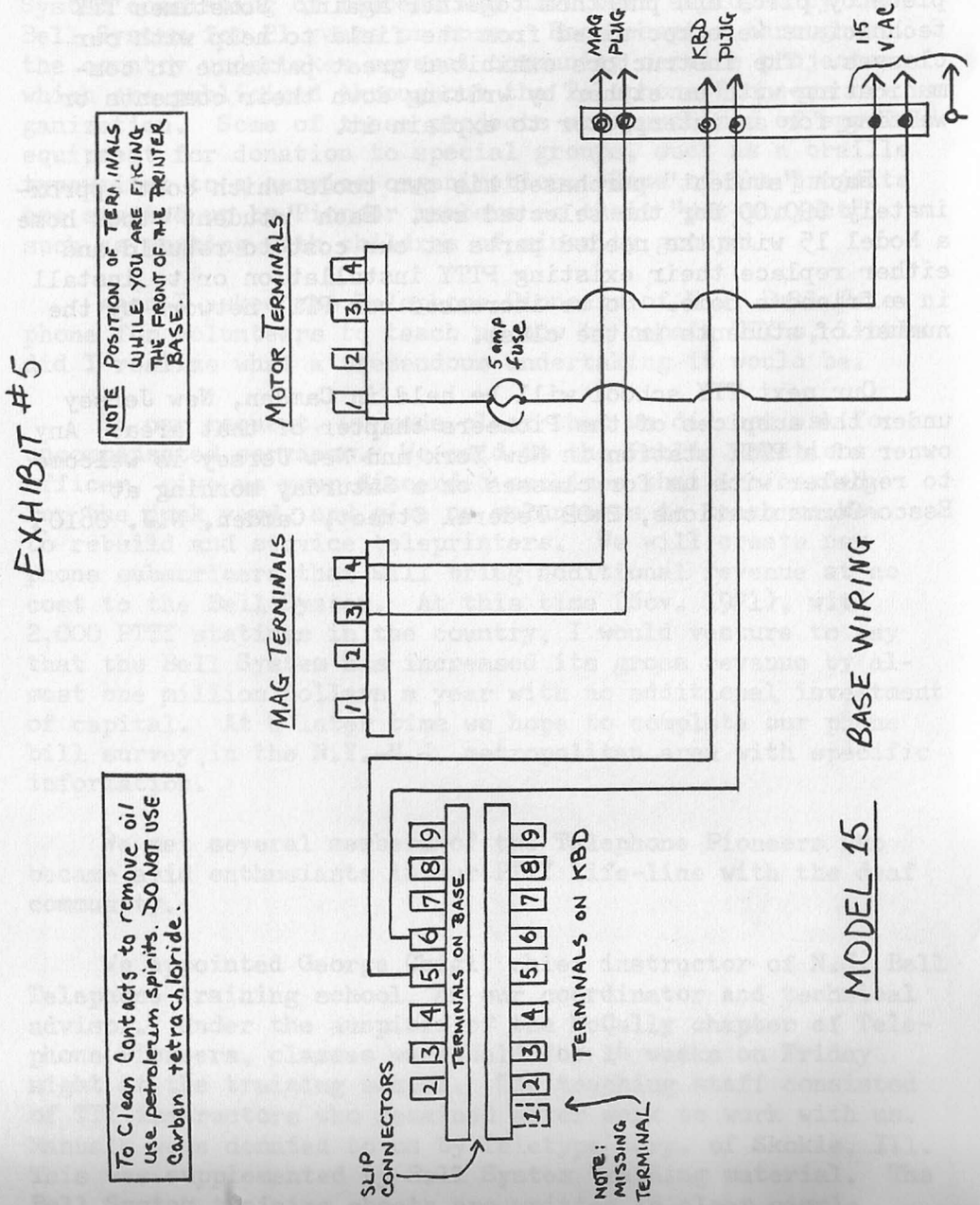
We met several members of the Telephone Pioneers who became avid enthusiasts in our PTTY life-line with the deaf community.

We appointed George Chigi, chief instructor of N.J. Bell Telephone training school, as our coordinator and technical advisor. Under the auspices of the McCully chapter of Telephone Pioneers, classes were held for 14 weeks on Friday night at the training school. The teaching staff consisted of TTY instructors who remained after work to work with us. Manuals were donated to us by Teletype Corp. of Skokie, Ill. This was supplemented by Bell System training material. The Bell System training sheets are written in clear simple language (Exhibit #5).

The first three classes consisted of lectures to discuss the teletypewriter code, different types of distortion, and mechanical functions of a TTY. Then the class of 22 students were divided among 5 to 10 instructors and we worked around 5 to 7 machines each week. We tore the machines apart piece by piece and put them together again. Sometimes TTY technicians were recruited from the field to help with our classes. The instructors exhibited great patience in communicating with us either by writing down their comments or waiting for an interpreter to explain it.

Each "student" purchased his own tools which cost approximately $90.00 for the selected set. Each "student" took home a Model 15 with the needed parts at our cost to rebuild and either replace their existing PTTY installation or to install in a friend's home. So we increased our PTTY network by the number of students in the class.

Our next TTY school will be held in Camden, New Jersey under the auspices of the Pioneers chapter of that area. Any owner of a PTTY station in New York and New Jersey is welcome to register with us for classes on a Saturday morning at Essco Communications, 2402 Federal Street, Camden, N.J. 08105.



Appendix D

RADIO-TELETYPEWRITERS FOR THE DEAF - PRESENT AND FUTURE

By: James C. Marsters

Questions have been raised as to the feasibility of using teletypewriters over the radio (RTTY) to receive important news and/or to by-pass expensive telephone bills. Here we will discuss what has occurred. A look into a crystal ball may show what the future holds in radio-teletypewriter use for the deaf people.

Approximately 20-years ago, Robert H. Weitbrecht approached the Federal Communications Commission (FCC) to permit radiohams to use the shortwave radio bands for radio-teletypewriter transmissions. RTTY Pioneer Weitbrecht met with much resistance to this proposal, but after long arduous work the proposal finally won. Now over 10,000 radiohams use the RTTY over the radio.

Deaf people willing to take up the challenge of RTTYing can make many friends around the world via the radio and learn a lot about electronics, as well as develop language, grammar, and knowledge of the world.

To operate a RTTY radioham station, a radio amateur license is necessary, requiring a good use of the Morse Code and a practical knowledge of radio-electronics. Morse Code identification is necessary at the beginning and end of each radioham RTTY transmission. A few deaf people possess radio amateur licenses.

Radio RTTY has its limitations: One cannot call another person on the radio like one calls on the telephone. Much has to be arranged beforehand. Neither can one always be certain that one's transmission will be received by the other party - due to the uncertainties of radio wave propagation... bouncing radio waves off the ionosphere to distant places, static, interference, etc.

After several months of negotiating with the U.S. Weather Bureau, Los Angeles members of Teletypewriters for the Deaf, Inc. were able to arrange a daily weather broadcast using the special TTY code for the deaf, starting March 30, 1971, over the regular voice weather station in Los Angeles, California - 162.55 MHz VHF-FM, 12:30 to 1:00 p.m., PST. (Fig. 1)

DEPT OF COMMERCE NATIONAL WEATHER SERVICE FORECAST OFFICE LOS ANGELES

NOON AGRICULTURAL FORECAST TUESDAY OCTOBER 5 1971.

THE STRONG GUSTY DRY EAST-TO-NORTHEAST WINDS MAINLY IN MOUNTAINS AND LOCALLY BELOW CANYONS IN THE COASTAL AREAS ARE EXPECTED TO GRADUALLY DECREASE LATE TODAY AND WEDNESDAY. THE WEATHER WILL CONTINUE SUNNY AND WARM TODAY AND WEDNESDAY, BUT WITH VARIABLE CLOUDINESS AND CHANCE OF ISOLATED AFTERNOON AND NIGHTTIME THUNDERSHOWERS IN THE MOUNTAINS AND DESERTS FROM ABOUT SAN BERNARDINO COUNTY SOUTHWARD. HIGH TEMPERATURES WILL GENERALLY BE 90 TO 100 IN COASTAL AREAS - THE UPPER 60S AND 70S IN MOUNTAINS. THE80S HIGHER DESERT VALLEYS AND 90S LOWER DESERT VALLEYS. THE OUTLOOK IS FOR MOSTLY SUNNY WEATHER THURSDAY EXCEPT FOR FEW SCATTERED THUNDERSHOWERS IN THE SOUTHERN MOUNTAINS AND SOUTHERN DESERTS AND SLIGHTLY LOWER TEMPERATURES IN MOST AREAS.

MIDDAY RELATIVE HUMIDITY WILL BE 10 TO 20 PERCENT IN UPPER COASTAL VALLEYS AND 8 TO 15 PERCENT INTERMEDIATE VALLEYS.

(Fig. 1)

The Weather Bureau simply takes a perforated TTY tape from a suitable incoming TTY weather report and runs it at 60 words-per-minute on a tape distributor transmitter (Fig. 2), into an acoustic coupler from which sounds are played into the radio transmitter's microphone. (Fig. 3) Or, it may be recorded on a continuous tape recorder and transmitted over the radio at suitable times.

The U. S. Weather Forecast Bureau in Los Angeles is located in the Federal Building in West Los Angeles; the weather transmission goes 30 miles over the telephone line to Mount Wilson, where it is transmitted from the broadcast tower for an up-to 75 mile line-of-sight range. VHF-FM radio waves cannot go through mountains or steel buildings very well, nor can they bounce off the inonosphere - hence the range is limited to local reception. (Fig. 4)

The U. S. Weather Bureau has agreed to broadcast the special TTY code for the deaf only as an experiment. It will not broadcast other types of news or emergency information other than weather. Regular broadcasting stations are not permitted by the FCC rules to broadcast TTY codes. Teletypewriters for the Deaf, Inc. has been working to make available more TTY broadcasting information for the benefit of deaf people through the FCC.

In the Los Angeles area only, a person wishing to receive this special weather broadcast secures an VHF-FM radio ($10 and up) capable of receiving the 162.55 MHz weather station. He places this radio on top of the acoustic coupler (Fig. 5), sets the volume control level so the monitor light flickers moderately, and the teletypewriter will type out the weather news between 12:30 and 1:00 p.m.

Now we will try to visualize the future of radio TTY for the deaf:

1) A Citizens-Band frequency for the use of the deaf people should be assigned.
2) This Citizens-Band frequency may have a segment of time set aside for daily broadcasts in TTY code of news of importance to deaf people.
3) Emergency news will take precedence over all other news. Deaf people can then call other deaf people on the telephone, if necessary, in orderly procedure to insure the distribution of this important news... tornadoes, hurricanes, earthquakes, floods, blizzards,

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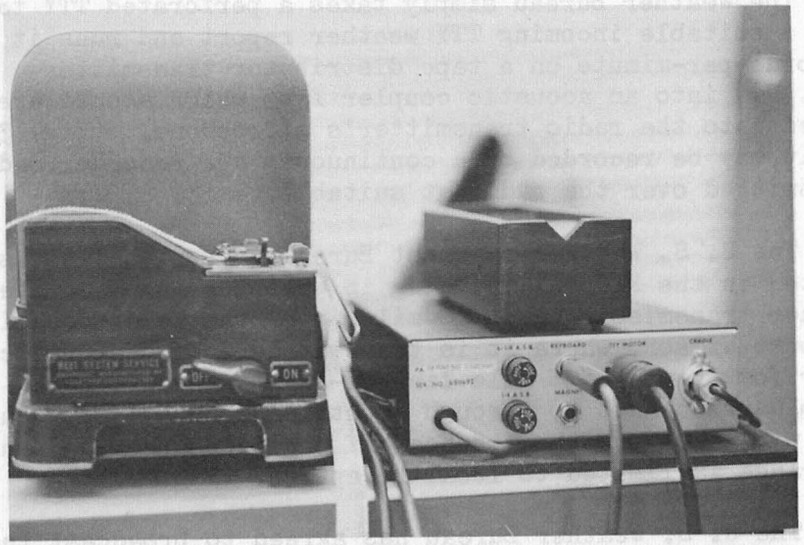
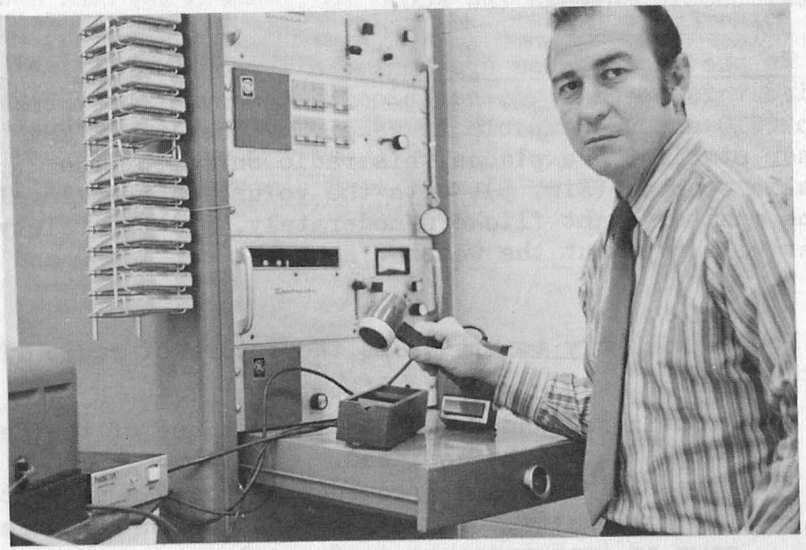
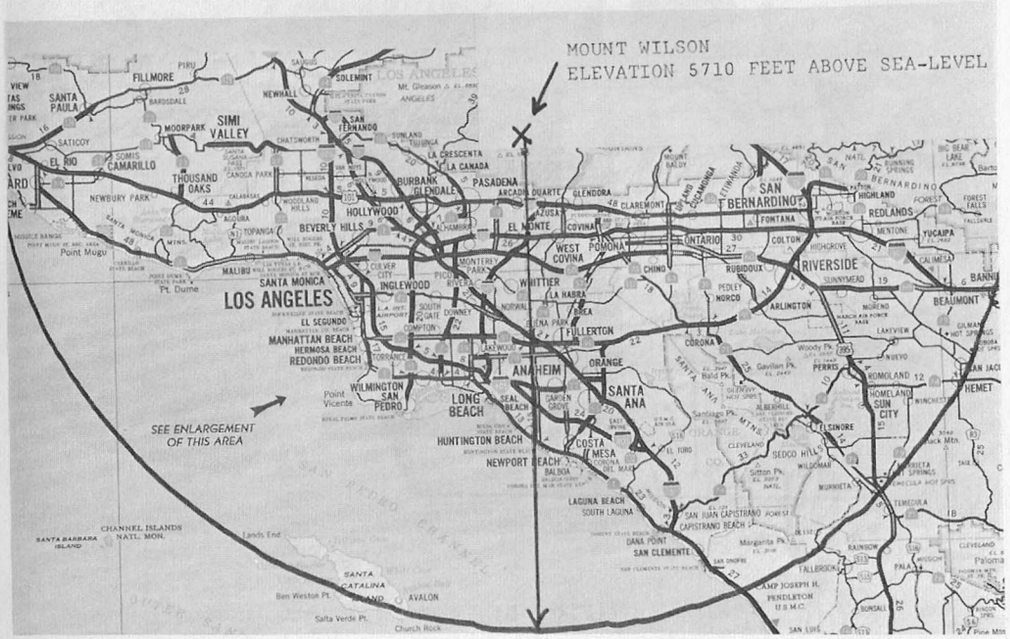


(Fig. 2)



(Fig. 3)



(Fig. 4)
Up to 75 miles line-of-sight range for weather news broadcasts for the deaf over the 162.55 MHz FM radio from Mount Wilson - above Los Angeles, California

(Fig. 5)

4) At set times, important television programs may be locally interpreted by a hearing person via the TTY as it is occurring on television and received by deaf persons over the radio and translated onto their TTYs.
5) The FCC may give television stations the alternative of broadcasting program interpretations in the TTY code for the deaf on a sub-carrier VHF frequency in lieu of using the more expensive television captioning methods.
6) The FCC may require that major FM radio stations in metropolitan areas devote a segment of time broadcasting news in the TTY code either on their regular station or on an FM sub-carrier station.

Issuance by the FCC of a single Citizens-Band frequency for the deaf people to use TTY code would be the simplest means of expediting radio and television information previously long denied an estimated 20-million hearing-impaired population in the U.S.A.

For the health, protection, and welfare of these hearing-impaired citizens, many of whom have families, the Teletypewriters for the Deaf, Inc. hopes that the Federal Communication Commission will assign a Citizens-Band frequency for the benefit of the deaf, and to expedite a change in the FCC regulations to permit VHF-FM radio and television stations to use the TTY code for the deaf.

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Appendix E

COMMERCIAL TELEPHONE ANSWERING SERVICE AND PROBLEMS IN SERVING DEAF SUBSCRIBERS

By: Andrew Saks

Now that we have devices to enable us to use the telephone without the need of hearing or hearing persons, there is a sizeable network throughout the United States that should not be limited to the deaf in scope. We must broaden it for the deaf by encouraging them to contact hearing persons not equipped with teletypewriters. One solution is the telephone answering service equipped with a teletypewriter. When I say answering service, I do not mean a hearing relative in the household, or a shut-in, or a friend willing to help the deaf. I am speaking about the commercial telephone answering service.

It has been my experience that in approaching commercial answering services to interest the enterprise in giving a telephone-teletypewriter answering service for the deaf, and to render themselves available to the deaf who desire such a service, that most of the firms shy away from such a proposal. The most common reason they have pointed out is the time factor, which would be above average in handling teletypewriter calls. You see, the answering service will have to be an intermediary between a hearing person having no teletypewriter and a deaf person so equipped. Thus you can see that more time is required to handle a call for the deaf person. This is a far cry from what the answering service provides for the hearing subscriber. All such a subscriber does is call his answering service for any messages or give instructions to the answering service for outgoing messages. The deaf subscriber, for outgoing or incoming calls, must depend on the answering service operator to make voice calls on an extra phone while the deaf subscriber is waiting on the line, and then to relay the message by typing to the deaf person. The time involved in handling such a call could go from three minutes to one-half hour or even longer, whereas the hearing subscriber's calls are not more than three minutes at the most.

I am going to give the current figures (approximate) on how an answering service charges a hearing subscriber. There is usually a flat rate of about $18 for a 44-hour business week, or $24 for a 24-hour service. Also, the hearing subscriber has a line connected to the answering service from his telephone, for which the telephone company makes a monthly charge. On the basis of 24-hour service the hearing subscriber is permitted to have 65 free incoming calls. Thereafter, all additional incoming calls are 20¢ each. For outgoing calls for that subscriber it is 20¢. Now you can see that is all the charges that are made against the hearing subscriber.

In the case of the deaf subscriber, who is also charged the same as above, there are a number of additional items he has to pay. One, the price for each telephone message is 20¢ for the first line, and 5¢ each additional line, or about 10¢ a minute if a time clock is used and hooked up to the power of the teletypewriter. Then there is a monthly rental of $24 for floor space occupied by a teletype machine which can be prorated among the deaf subscribers. Then there is an extra phone required for the teletypewriter, which is charged by the telephone company, and which is also prorated among the deaf subscribers. So you can see where the deaf subscriber, if he plans to make full use of the commercial answering service, can have a monthly bill of between $65 and $100.

Of course, the deaf subscriber could help to reduce the total by working out abbreviations, standardizing phrases, and shortening them to reduce the length of a teletypewriter call. Another plan would be to limit the number of calls per month at a reduced rate.

But it won't be enough to reduce the monthly bill to the level of that for the hearing subscriber, nor can we expect, out of sympathy, answering services will give us a concession and reduce their rates. Therefore, I suggest that perhaps we can, through Teletypewriters for the Deaf, Inc., approach an appropriate federal agency, such as the Department of Health, Education & Welfare, to see if arrangements can be made for a Government subsidy for the commercial telephone answering services interested and willing to give service to prospective deaf subscribers. This way a deaf person could be almost at par with the hearing in paying his bill.

I would like to add one more thing which might be of great importance to you. You know that there is no problem to deduct the charges of a telephone answering service if it is strictly for business, but when a person has to use an answering service in the home for his personal use, naturally, he cannot deduct the expenses from his income tax return.

Thus I wrote a letter to the Internal Revenue Service for a ruling on telephone answering service charges, with the result that a few months later I got word that it is permitted to deduct such charges as a medical expense, provided in Section 213 of the Internal Revenue Service Code. You must remember that since this ruling does not apply automatically to all who meet the requirements, every person desiring such a deduction must write individually to the IRS, and upon receiving a reply he is to attach a copy to his tax return.

Appreciation is expressed herein to Teletypewriters for the Deaf, Inc., for allowing the presentation of this paper at the TDI conference in Washington, D.C., on November 13-14, 1971.

Attachments: 1. My letter to the Commissioner of IRS, dated June 19, 1971.

2. A letter from the IRS, dated July 12, 1971.

June 9, 1971

Commissioner of Internal Revenue
Internal Revenue Service
Washington, DC 20224

Attention: T:PS:T

Re: Andrew Saks
2175 Pacific Avenue
San Francisco, CA 94115
S. S. No. 568-24-2669

Dear Mr. Commissioner:

A ruling is respectfully requested on behalf of the above-captioned taxpayer with respect to the deductibility, as a medical expense, of expenditures for telephone answering services.

The applicant herein is totally deaf and uses specialized equipment (an accoustic coupler) to connect a regular telephone with a teletype machine. The applicant's specialized equipment is that referred to in Internal Revenue Service Ruling 71-48, which ruling held that since the specialized equipment was purchased by the taxpayer primarily for the mitigation of his condition of deafness its cost is deductible as an expense paid for medical care. The accoustic coupler and teletype machine enable the applicant to communicate over the telephone with anyone who has identical equipment.

In order to communicate with persons and organizations who do not have identical equipment the applicant has had a teletype machine and accoustic coupler installed in the office of a telephone answering service. For a monthly fee the answering service provides teletype operators, 24-hour service, and space for the teletype machine and coupler. A copy of the fee schedule of Artson Answering Service, San Francisco, California, is attached. Fees paid by the applicant include (1) a basic monthly charge for 24-hour service, (2) a basic monthly charge for teletype machine space and teletype transmitting telephone and (3) additional charges for each call over 65 per month plus charges for each line of teletype transmissions. If more than one deaf subscriber employs the answering service its charge for item (2), teletype space, is divided among the subscribers.

When the applicant wishes, for example, to make an appointment with a doctor he dials the number of his answering service via telephone and accoustic coupler, and types his message on his teletype machine. The message is received on the teletype machine in the office of the answering service. The service contacts the applicant's physician by telephone and relays the physician's reply back to the applicant by teletype machine. If any "conversation" is required between applicant and physician it is handled by the answering service operator acting as an intermediary, alternately speaking with the physician on the telephone and with the applicant via teletype machine.

In addition to using the answering service for everyday contacts, the applicant is dependent on it to contact police, fire department, etc., in emergencies.

Whereas a hearing subscriber might employ an answering service primarily to receive incoming calls while his telephone was unattended, the applicant employs it primarily to communicate with those who do not have a teletype machine and accoustic coupler.

The Law

Section 213 of the Internal Revenue Code of 1954 allows as a deduction in computing taxable income the expenses paid during the taxable year, not compensated for by insurance or otherwise, for medical care of the taxpayer, his spouse, or a dependent, subject to certain limitations.

The term "medical care" is defined in Section 213 of the Code as meaning amounts paid for the diagnosis, care, mitigation, treatment, or prevention of disease, or for the purpose of affecting any structure or function of the body (including amounts paid for accident or health insurance), or for transportation primarily for and essential to medical care.

Ruling Request

In view of the foregoing, and on behalf of the applicant, it is requested that the following ruling be issued:

That the expenditures for telephone answering services by the applicant, Andrew Saks, will qualify as a deductible medical expense under the provisions of Section 213 and regulations thereunder.

Respectfully submitted,

Andrew Saks

Enclosure (1)

US Treasury Department

JUL 14 1971 REC'D

Internal Revenue Service
Washington, DC 20224

Date: JUL 12 1971 | In reply refer to: T:I:I:1:1

Mr. Andrew Saks
2175 Pacific Avenue
San Francisco, California 94115

Dear Mr. Saks:

This is in reply to your letter of June 9, 1971, with attachment, in which you request a ruling that the cost of installing and operating a Phonetype in the office of a telephone answering service is deductible for Federal income tax purposes.

You are totally deaf; therefore, you purchased a Phonetype for use in your home. A Phonetype is a device which enables a deaf person to communicate with other deaf persons or with anyone who has such a device by converting teletype signals into telephone signals and telephone signals into teletype signals.

In a letter dated January 28, 1971, we ruled that the cost of the Phonetype used in your home (to the extent it enables you to communicate effectively over the telephone) is considered to be for the purpose of mitigating your condition and is deductible as an expense paid for medical care subject to the limitations provided in section 213 of the Code.

In order to communicate with people who do not have a Phonetype, you also have had a Phonetype installed in the office of the Artson Answering Service. When you want to communicate with someone who does not have a Phonetype, you dial the telephone number of the answering service and type your message. The answering service receives the message on the Phonetype in its office and relays the message by regular telephone. If you want to carry on a "conversation," the answering service acts as an intermediary, alternatively communicating with you on the Phonetype and with the other party by regular telephone.

Section 213 of the Internal Revenue Code of 1954 allows as a deduction in computing taxable income the expenses paid during the taxable year, not compensated for by insurance or otherwise, for medical care of the taxpayer, his spouse, or a dependent, subject to certain limitations.

The term "medical care" is defined in section 213 of the Code as meaning amounts paid for the diagnosis, cure, mitigation, treatment, or prevention of disease, or for the purpose of affecting any structure or function of the body (including amounts paid for accident or health insurance), or for transportation primarily for and essential to medical care.

Revenue Ruling 71-48, I. R. B. 1971-5, 10, concerns specialized equipment that enables a taxpayer to communicate over a regular telephone with anyone who has identical equipment. The ruling holds that, since the specialized equipment was purchased by the taxpayer primarily for the mitigation of his condition of deafness, its cost is deductible by him as an expense paid for medical care subject to the limitations provided in section 213 of the Internal Revenue Code of 1954.

Accordingly, the cost of installing and operating the Phonetype in the office of the answering service (to the extent it enables you to communicate effectively over the telephone) is for the purpose of mitigating your condition of deafness and is deductible as a medical expense under section 213 of the Code.

It is important that a copy of this ruling be attached to your tax return for the taxable year in which the transaction covered by this ruling was consummated. Accordingly, a copy is enclosed for that purpose.

Sincerely yours,

Lester W. Utter

Chief, Individual Income Tax Branch

Appendix F

HOW THE DEVELOPMENT OF A MODEM FOR THE DEAF HAS AFFECTED THE COURSE OF THE DEAF PEOPLE'S LIVES

By: J. T. Rule, Jr.

This paper will attempt to describe how the average deaf person's life has been affected by the development of a modem, an instrument making it possible to acoustically couple the teletypewriter to the telephone, enabling deaf people to use the telephone for the first time in history since its invention.

Before 1964, the year the development of the first practical modem was announced, the deaf people depended upon awkward means of communication over distance, such as writing letters, driving to friends' homes, or asking relatives or friends to make phone calls. This method tended to discourage the high speed transmission of intelligence among deaf people, reducing their effectiveness as a political force. Several attempts were made to secure some legislative action affecting the deaf but these failed most of the time because of the time element necessary to communicate in order to utilize their force.

After the development of the modem, deaf people finally had the means to "talk" over the phone by the use of the teletypewriters, which had been donated to the deaf, as they become obsolete, by the telephone companies, Western Union, and other firms. With the passage of time, deaf people began to utilize the telephone more and more. At first they used it for social calls but as the novelty wore off, they began to use the telephone for serious purposes.

The author will illustrate an example of how deaf people used the teletypewriter to their advantage in the state of Massachusetts.

During early 1970, an organization was formed in Massachusetts, called the Massachusetts Council of Organizations serving the Deaf, henceforth to be called MASSCOSD. During one of it's meetings, an important subject was discussed, the lack of interpreters for deaf people who had been called to court for any reason. Whenever a deaf person was hauled before the court, he was at a very serious disadvantage in the proceedings which might have come out adversely. His inability to read lips or to understand anything in the fast moving events stripped away his protection. Thus, deaf people asked that a bill be filed with Massachusetts legislators to require that the courts furnish interpreters upon the request of the deaf defendants. MASSCOSD saw the importance of this bill and decided to back it. Now, the MASSCOSD is composed of several organizations for the deaf scattered all over the state, which would have put MASSCOSD to serious disadvantage if the modem had not been developed.

So, with this in mind, the President of MASSCOSD asked this author to be chairman of Tele-Communications Committee and to develop some sort of special TTY network so that everyone in the state would get necessary intelligence in a very short time, in a matter of hours, where formerly days were required.

There the situation stood, with the network in prototype development when the bill was snagged in the Committee. Under previous conditions, the bill would have died right there since there was little time to act. However, the MASSCOSD President made a call to this author. After explaining the situation, the author did some quick thinking and seeing that the special network had not been developed to the point that it could be efficiently utilized, he quickly planned a strategy. He told the MASSCOSD President to make a copy of an emergency letter on tape.

At this point, an explanation is necessary to clarify the use of the tape on the teletypewriters. There are several kinds of teletypewriters in use. They may be broken into two categories, ASR and KSR. ASR stands for Automatic Send-Receive. KSR stands for Keyboard Send-Receive. Here we will be concerned with ASR. There are two types of ASR, one that cuts the tape from the keyboard only while the other does the same but has a feature of cutting a tape from an incoming message also. It so happened that MASSCOSD President and this author had the latter type of machines. Hence when the author asked the President to cut a tape, of the letter, the author had in mind copying the letter on his own tape when the President ran off his tape at high speed. After hanging up, the President proceeded to cut a tape and upon finishing the letter, he called the author again to tell him the tape was ready. The author turned on his tape mechanism and told the President to fire away. Thus the entire letter was transmitted over the telephone line and cut the author's tape as well as printing on paper. Hence, the author did not have to type out a copy of this letter.

It was all stored on tape. As soon as the transmission ended, and author told the President to call several people south of Boston and tell them to call the Massachusetts Deaf Messenger and ask them to tell others do the same. The author would do likewise north of Boston. Having completed the call, the author pulled out the tape and made a loop by splicing the ends together, then he put the tape on the DM.

The DM is an array of equipment, consisting of Model 19 teletypewriter and tape distributor, modem and assorted automatic devices. Thus, when one calls the DM, the first ring of the telephone triggers the equipment and starts the tape loop running through, thus transmitting the intelligence to the caller on his machine.

As soon as each party received calls from the President and the author, they called the DM and received the President's urgent letter. Key deaf people in Massachusetts thus knew within a few hours, that the bill had snagged, and therefore quick action was necessary.

The letter urged everone to write letters to the legislators and to set up petitions. All TTY owners who received this message from the DM, then went by car or on foot to their non-TTY owner friends or they used the telephone with help of hearing relatives or friends. Thus, this intelligence spread across the state very rapidly and by midnight, practically all deaf people knew the time had come for action.

Within a day or two, the trickle of mail to the legislators became a flood. The legislators, awed by so much mail, realized that deaf people attached so much importance to the bill that they voted in favor for it and thus the bill was saved to pass on to the next committee. The bill was passed through the labyrinth of the State House and then it bogged down again in another state committee. The MASSCOSD President made another urgent call and the same thing was repeated, with the same results.

A hearing was called for and a message was put on the DM urging deaf people to attend the hearing. As a result, over 40 deaf people turned up, which, according to one of the legislators, was fascinatingly unusual even with hearing people. The bill eventually passed and was handed to Governor Sargent to be signed into a law.

According to the Honorable Robert Aronson, out of 7000 bills filed in the year of 1970, only 500 bills became law and our bill was the most impressive event that happened to the State House. Upward of 2000 letters had been mailed!

Thus, deaf people finally have a powerful tool at their disposal to accomplish many things they could not do when there were no means to talk over the telephone. In the future, the deaf people will be more vocal about affairs around them.

Postscript:

The author has used a computer through a member of MASSCOSD to list the names and telephone numbers of MASSCOSD members to build the MASSCOSD TTY network in a special configuration. Should an emergency arise again, all the President needs to do to activate the network is to call two people. These two people in turn will call two other people, thus multiplying the intelligence quickly. These people called, will then call the DM to get the necessary message. Each member of MASSCOSD has a list of two parties to call.

Appendix G

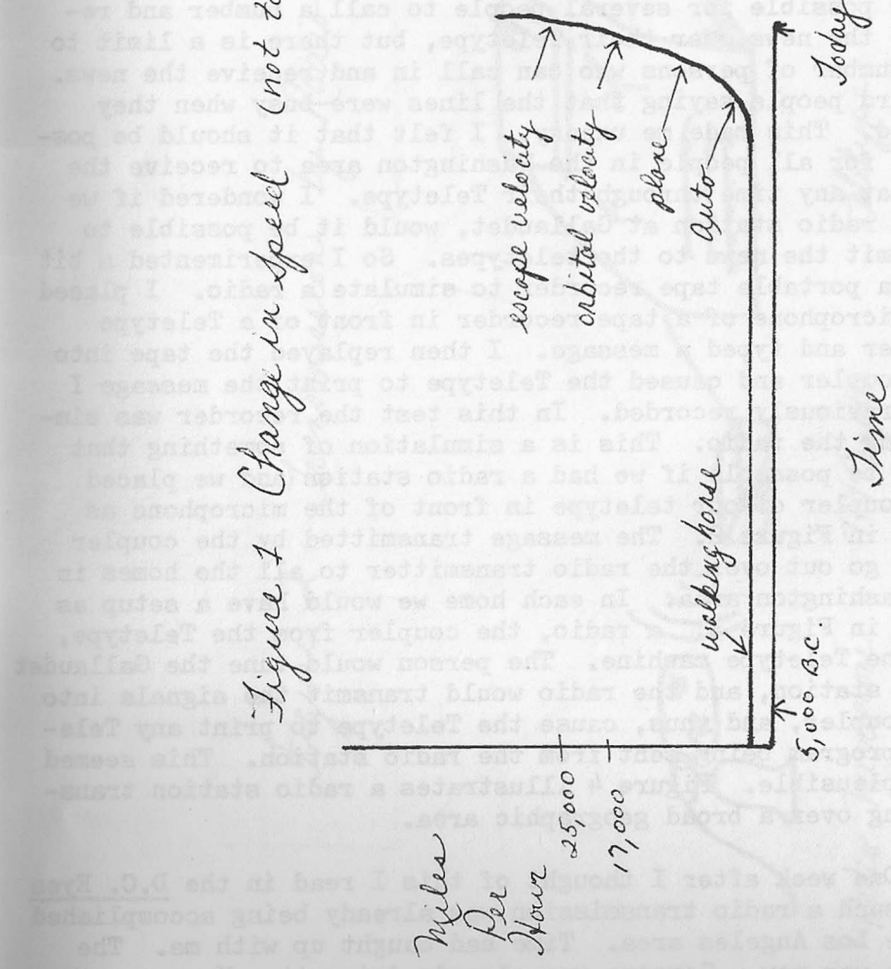
A LOOK INTO THE FUTURE

By: Dr. Donald Torr

If any of you are professional football fans you've probably heard of the Washington Redskins. For many years the Washington Redskins fan has followed a poor football team. But he has been told that in the future things would get better, but they never did. Recently we had a new coach come to Washington by the name of George Allen. Mr. Allen said, "The future is now." Surprisingly, he has made it happen: The Redskins are winning football games.

I think those of us concerned with the use of communication media for the deaf are in a similar situation. The future could be now. We could use technology to support improved communication for the deaf if we really attempted to exploit it.

To talk about the future is dangerous, but that is my topic. It's dangerous because the world is changing so rapidly. If you plot the change it is awesome. Everything seems to be accelerating. In Figure 1, I have suggested the speed with which man can move with relation to another object. I have shown on the vertical axis, miles per hour, and on the horozontal axis, time. Time going back to 5000 B.C. and bringing us up to today's date. It's clear in that picture that for the bulk of recorded history man has moved at about four miles an hour or less. Just moments ago on this chart man invented a car with which he could travel at a more rapid speed; comfortably at sixty miles an hour. Then came the plane which gave him speeds of 100, 200, 300, 1400, 2000 miles an hour in a very short time. Almost immediately, man orbited satellites which travelled at 17,000 miles an hour. Then in a wink of an eye he accelerated that satellite to an escape velocity so it could leave the earth at a speed of 25,000 miles an hour and thus no longer be a satellite of the earth. The change in speed has occurred in most recent history and the rate of change is changing. You find a similar thing if you plot the number of calculations which we can perform per second. For the bulk of recorded history we operated at a man's pace. And then, a short time ago, the pace began to pick up. I personally was very pleased in 1952 to be able to get my hands on a computer which would calculate 15 operations per second. Today, 1971, I have a Teletype in



my office through which I can communicate with the computer in our Hall Memorial Building, and that computer will do calculations for me at the rate of 100,000 calculations per second. The change in the calculation rate in a very short time is amazing.

This is true in other fields; it's true for population growth; it's true for nearly anything you may stop to think about. The world is changing very rapidly. Now, recognizing this rapid change it is difficult to forecast what will happen and when it will happen. I have had a personal experience with this. Recently I talked with Mr. Al Pimentel. We discussed his message service. By means of that service it is possible for several people to call a number and receive the news over their Teletype, but there is a limit to the number of persons who can call in and receive the news. I heard people saying that the lines were busy when they called. This made me uneasy. I felt that it should be possible for all people in the Washington area to receive the news at any time through their Teletype. I wondered if we had a radio station at Gallaudet, would it be possible to transmit the news to the teletypes. So I experimented a bit with a portable tape recorder to simulate a radio. I placed the microphone of a tape recorder in front of a Teletype coupler and typed a message. I then replayed the tape into the coupler and caused the Teletype to print the message I had previously recorded. In this test the recorder was simulating the radio. This is a simulation of something that would be possible if we had a radio station and we placed the coupler of our teletype in front of the microphone as shown in Figure 2. The message transmitted by the coupler would go out over the radio transmitter to all the homes in the Washington area. In each home we would have a setup as shown in Figure 3: a radio, the coupler from the Teletype, and the Teletype machine. The person would tune the Gallaudet radio station, and the radio would transmit the signals into the coupler, and thus, cause the Teletype to print any Teletype program being sent from the radio station. This seemed very plausible. Figure 4 illustrates a radio station transmitting over a broad geographic area.

One week after I thought of this I read in the D.C. Eyes that such a radio transmission was already being accomplished in the Los Angeles area. Time had caught up with me. The future was now. Someone was already doing it. However, the future doesn't happen automatically, and we do not have this capability in the Washington area now. Someone must push for it. We are contacting the Federal Communication Commission

Figure 2 Transmission by Radio

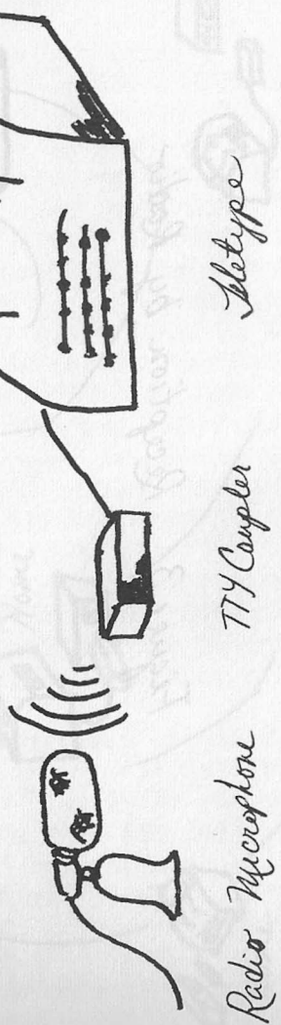


Figure 3 Reception by Radio

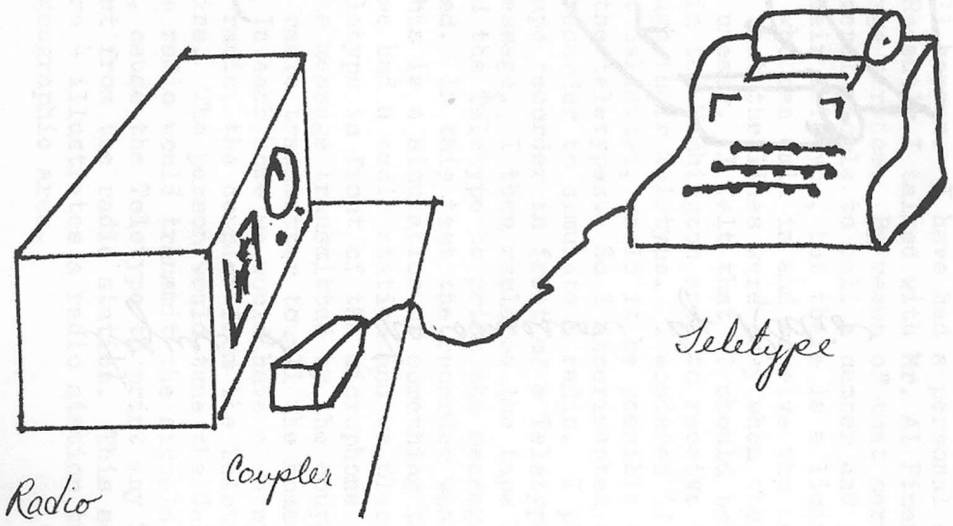
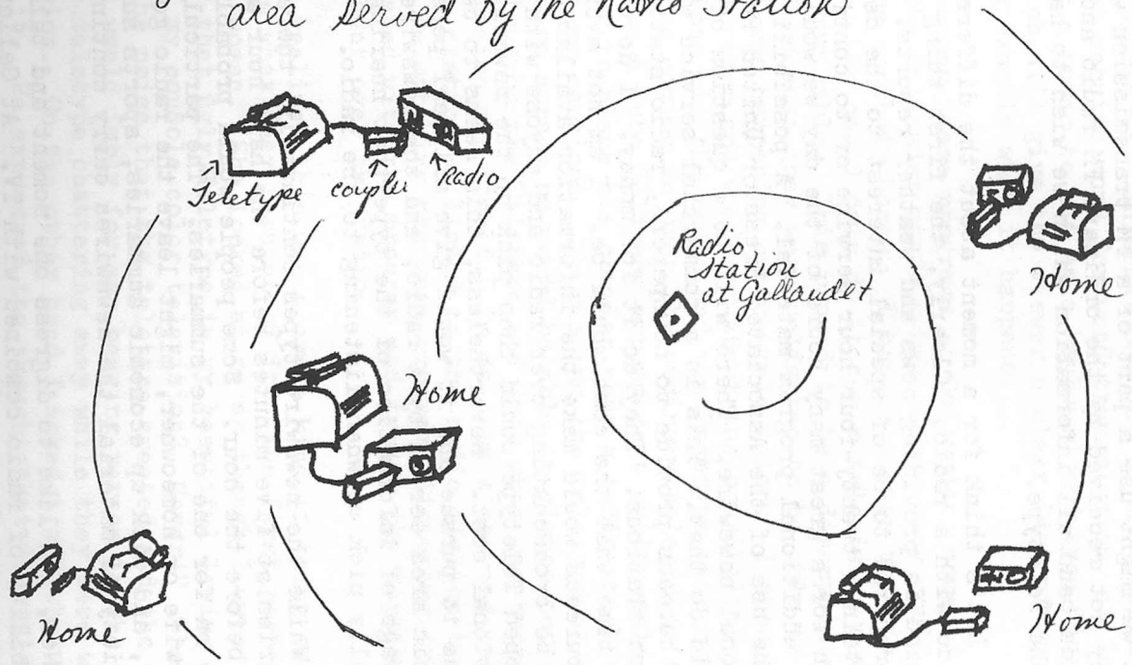


Figure 4 Simultaneous Reception in the area served by the Radio Station



to explore alternatives for us in Washington. There is at present a shortage of FM channels, but we intend to investigate further to determine whether or not a channel might be made available. Another possibility is that we can find time; or get an agreement from another station to transmit our signal some part of each day. A third alternative is that we might use a part of a FM transmission which is normally not received by the ordinary FM radio and transmit on a side band all information which we wish to have picked up by the Teletype.

Let's think for a moment about the different things we can do with a radio. Clearly, the first thing which comes to mind is providing news and weather reports. These could be prepared to be of special interest to the deaf, but to maintain a twenty-four hour service or to continue in operation for a great many hours of the day we would probably want additional program material. A possibility here would be the use of the Associated Press or United Press International newswire. There will be a question of cost if we should do that. This is a commercial service which these news bureaus provide to newspapers, radio stations, and television stations. They do it for money. I do not know at this time what the cost would be. I am not even certain that the bureaus would make the information available since we will be broadcasting over radio and anyone with a properly equipped Teletype could then pick up the newswire at no additional cost. Nevertheless, this seems to be a worthy avenue to pursue and it would give all deaf persons in a geographic area served by a radio, and the newswire, continuous coverage of information of the type that hearing persons normally pick up when listening to the radio.

While the newswire types continually, there are news summaries at five minutes before the half hour and five minutes before the hour. Some people would probably turn the radio on for one of the summaries. The particularly curious housewife or homeowner, might leave the radio going continually, and pick up economic summaries, sports summaries, and a variety of material the newswires carry continually.

Now, I'd like to digress one moment and talk about the possibility of radio combined with TV. At Gallaudet we have established a closed circuit television system. It is quite modest at the moment, but we do provide some live captioning of television programs. We receive a commercial television program and add to it electronic captions. The combined image is than sent over a cable throughout the Gallaudet campus and then can be seen over television sets which are connected to that cable. We used it with the last Apollo flight. We used it for the World Series. It can be used anytime we wish to add printed English to a television program. The person who generates the captions cannot possibly type at the rate with which the speaker will be providing the hearing public with information, but if the program itself does not require word for word transmission, it is possible for a human to sit at a keyboard and type live captions which will give the viewer a clear idea of what is happening exactly when it happens.

After seeing these programs at Gallaudet, some of the members of the Gallaudet staff asked me how they could get such programs in their homes. I had to answer that it was not possible. We could only do it for a television set that was tied to our cable. This proved to be a disappointment to the staff because they were delighted to be able to follow exactly what was happening on the television. I thought about this further and wondered about the possibility of combining captions via the radio and the Teletype with the television program coming in over the ordinary television set. Figure 5 shows a Rube Goldberg arrangement which would permit a home viewer to place his coupler near a radio which would be transmitting captions. By placing the teletype in front of a television screen he would be able to glance periodically at the printout on the Teletype and know what was happening on the television set itself. To do this a hearing person at the radio station or linked to the radio station by telephone would be watching the same program, listening to the sound generated with the program and typing the captions which were sent over the radio.

Now, I realized this was a crude kind of thing so I asked people what they thought of it. The first person I asked was a woman. She looked at me as though I were crazy. "What! Put that ugly Teletype in my beautiful living room in front of my console color television? Never!" She also mentioned the noise that the teletype created and the difficulty that would imply for any hearing person in the family; to have the teletype chattering away while they were watching the television. On the other hand I asked a man what he thought of it. He expressed the thought that it would be interesting. The possibility here then is that we could hide a small portable television in a closet with an ugly Teletype and at least someone in the family could see live captions which would help to explain what was happening on the television.

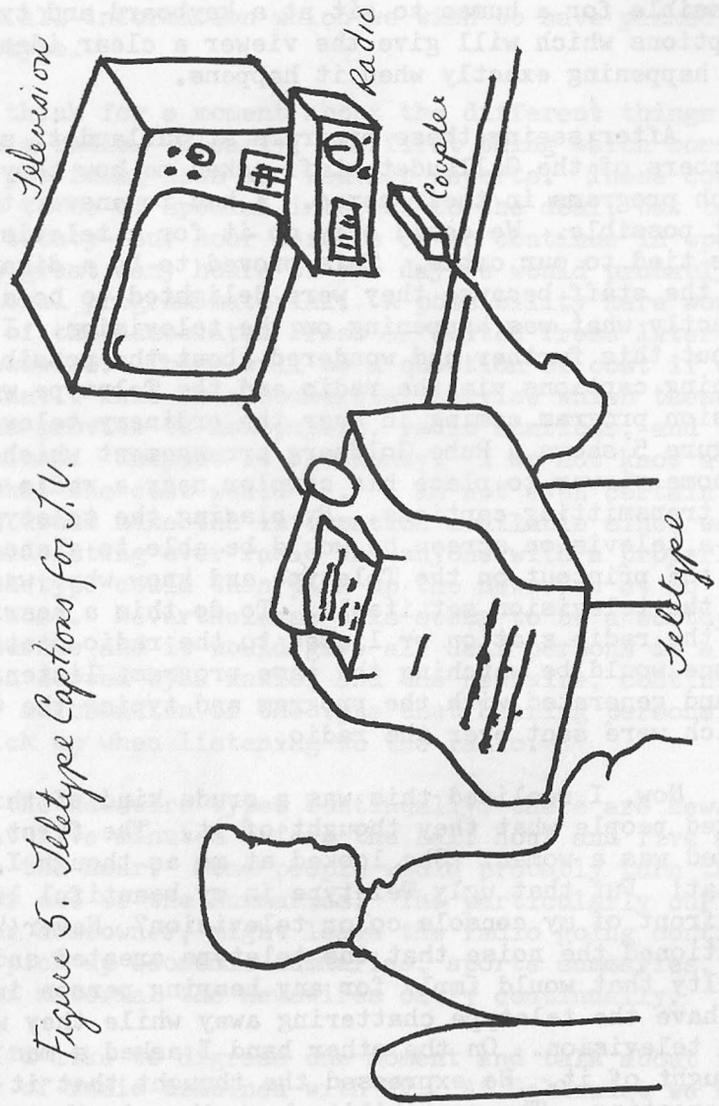


Figure 5. Teletype Captions for T.V.

But once again this a poor solution and technology today makes other solutions quite possible. There is no technological problem that prohibits our having captions on commercial television. If they wish to do so, all stations could transmit live captions. They could also fully caption entertainment programs.

Progress is delayed for several reasons. One is the money it takes to prepare the captions. At the very least it means manpower--someone must type the captions. In addition it means some additional equipment to permit the captioning to happen. There are different groups of people who have contacted the television studios asking for captioning. I've participated in that sort of thing, encouraging the stations to use captions. Still, there is no really serious pressure to make it happen. There may well be reservations on the part of a Station Manager who is concerned about possible public reaction to the use of captions. Studies funded by the Office of Education have shown that a small percentage of the public would resist such captions as being distracting.

Perhaps the answer to captioning for the deaf and hard of hearing will come about through a recent breakthrough on the use of cable television. It has been determined that cable companies will be permitted to pick up remote signals, that is, they will be permitted to take programs from another part of the country and put them on their cable. They can in that way sell time and make money through the advertising they are able to sell in support of those programs. This may make cable television profitable. It this is so, many channels become available to a community which are not available through the broadcast of television signals. An increase in the number of available channels in turn should mean that some channels should be available for special uses.

It would be most desirable that one channel be allocated for use by the deaf. That channel could simultaneously transmit programs shown on another channel at the same time and differ only by the inclusion of live captioning or by total captioning.

To support continual programing it might be possible to carry Associated Press or United Press International video news. The main question here again is the price these two services will charge for that capacity.

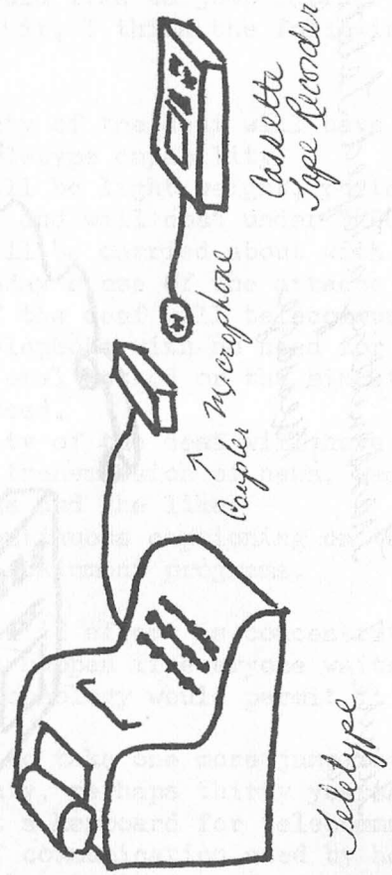
I'd like to return to the use of the radio again. It has occurred to me that we might make use of radio transmissions for emergency bulletins and that we could alert deaf individuals to the fact that an emergency had occurred by sending a telemetered signal which would trigger a visual alarm in the home of a deaf individual. As long as they kept their radio on, any time this particular unique tone or sequence of tones were transmitted from a radio station, the visual alarm in the home would be triggered. When that happened, the individual in the home would be alerted that some emergency had occurred and they could then turn to the Teletype to read the bulletin which followed.

Now, I'd like to talk a minute about the use of audio tape and the Teletype. As you know, many persons do not have Teletypes and couplers in their homes. It is possible that persons without such service might be able to contact people who had Teletypes if they were to use audio tape cassettes and a tape recorder. To do this it would be necessary to prepare specific messages on tape. Figure 6 demonstrates the recording setup. The coupler is placed near the microphone of the tape recorder. The tape recorder is started and the individual types the message which he wishes to record. When he has completed that message, the tape recorder is stopped and an identifying name is placed on the cassette which carries the message.

Each cassette could carry a different message. Perhaps "I am well" or "I need help" or "This is Mrs. so-and-so and I need help". The cassette would be placed in a recorder by the individual who wished to send the message, as shown in Figure 7. The recorder would be placed before the telephone after placing the call, then the tape recorder would be started and the message would be transmitted to whomever you had chosen.

In a place such as the Washington area where we now have the Hotline, an elderly person without a teletype could have such a tape recorder with perhaps several different messages on different tape cassetts for communication with the Hotline. For example, the person might be expected to call in each day to let the people manning the Hotline know that that person was alright. The absence of the message could be a signal that they should send help to that person. Or a person could contact the Hotline with an emergency message, giving their name, address and the nature of the emergency if that had been anticipated and typed previously. I think the extension of this is obvious. Persons traveling away from home could carry

Figure 6 Taping a Teletype Message



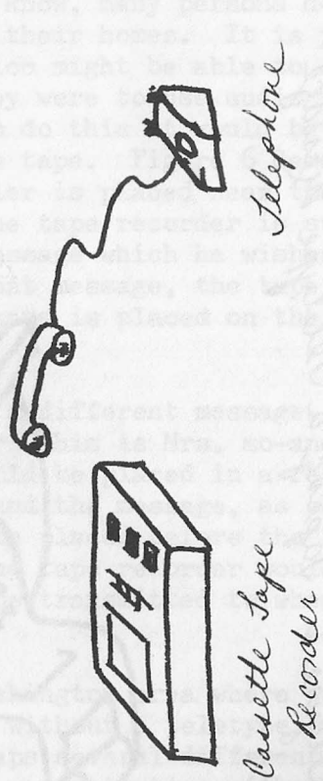


Figure 7 Transmitting a Taped Teletype Message

a tape recorder and send a message announcing their safe arrival. Hearing persons without Teletypes could warn their deaf friends of a visit. Another possibility with the use of taped messages would be for long distance communication where a message might be taped at one speed and then transmitted at a faster speed. The receiving party would record at the same fast speed and then terminate the telephone conversation and replay the message at the slower speed. In this way the total message cost conceivably could be cut. When the message had been replayed and the full import understood by the receiving party, the two parties could then reestablish telephone connection and discuss points of agreement and disagreement.

At this time I would like to jump farther into the future. If we work at it, I think the following is possible in the next ten years:

- The great majority of the deaf will have the equivalent of Teletype capability.
- The terminals will be light weight, portable, highly reliable, and will cost under $200.
- The terminals will be carried about with the casualness of today's use of the attache case.
- A fair number of the deaf will telecommunicate by television/telephone with no need for keyboard operation. The oral method or the simultaneous method will be used.
- The great majority of the deaf will have continual access to radio transmission of news, weather, special bulletins and the like.
- There will be continuous captioning on television of news and entertainment programs.

These things can happen if effort is concentrated in the right places. They will not happen if everyone waits for someone else to do it. The technology would permit it tomorrow.

And now I'd like to take one more jump into the future, this time perhaps twenty, perhaps thirty years. Now a deaf person does not sit at a keyboard for telecommunication. He uses the same means of communication used by hearing people. He wears a device which accepts incoming voice information, including his own voice, and converts it to digital signals. These signals are impressed upon his body and are correctly interpreted by his brain. The technology does not permit this now. The ability to convert voice signals to digital signals is very crude. There has been no adequate means

found to impose the digital signal on the body. We have no empirical data to show that the brain could learn to interpret these signals properly. Nevertheless, I think it could be a reality in twenty or thirty years if we decided to make it happen.