Thesis Program

Regional Broadcasting Network

For The Southwest

Fall 1970

John D. Rowland

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REGIONAL BROADCASTING NETWORK

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HISTORY

Scientific definition of television: An electronic method of transmitting visual and aural images over a considerable distance; reproducing these in an unlimited number of places so rapid it is instantaneous.

The possibility of sending pictures through the air from one place to another is not a new idea. As early as 1884, Paul Nipkow patented a mechanical scanning disc. This was the first practical method of breaking pictures up into small particles that could be sent from the originating point and reassembled at a receiving point some distance away. It was a form of mechanical television. Variations of the Nipkow disc were used in further research and development until the invention of the iconoscope tube in 1923, which achievement began the era of electronic television. As is the case with most major discoveries and inventions, these developments were not isolated "finds," but rather were the inevitable results of years of study and research in physics, optics, electricity, photosensitive materials, vacuum tubes, and many other areas.

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modern television system.

Because of its less complicated nature, sound broadcasting developed earlier than did the transmission of pictures. As early as 1920, radio station KDKA, in Pittsburgh, was broadcasting regularly. It was during that year that KDKA broadcast election returns of the Harding-Cox presidential race, and the phenomenal growth of the radio broadcasting industry was under way.

In 1923, Dr. Vladimir K. Zworykin obtained a patent for an all-electronic television camera tube which he called the "iconoscope." The iconoscope was the standard camera tube for a number of years, and is still in use at many stations for the broadcasting of films and slides. In 1929, Dr. Zworykin brought out an electronic picture tube called the "kinescope." This type of receiver tube is still in use today. Despite this major progress, it was not until 1933 to 1934 that the iconoscope was sufficiently perfected to permit the building of a practical television camera. Between 1923 and 1934, many experiments were conducted using different television systems. Experimental stations were licensed and began to broadcast. The first was operated by WGY, the General Electric radio station in Schenectady, N. Y. It went on the air in 1928. R.C.A. - N.B.C. followed in 1930, and C.B.S. in

1931. By 1939 it was clear that the all-electronic system, employing Zworykin's iconoscope and kinescope, was the method by which practical television broadcasting would be possible.

In 1940, the infant television industry thought it was ready to begin regular commercial telecasting. However, it was not until July 1, 1941, that the Federal Communications Commission licensed the first commercial television station. The first commercial license went to station WNBT, the N.B.C. station in New York City. This beginning was, for all practical purposes, short-lived. The Second World War drastically arrested the development of television as a nationwide means of communication. There was continued experimentation and limited broadcasting during the war period, but it was the immediate post-war period that saw the industry grow to significant proportions. By 1947, the number of sets in use clearly showed that television was really on its way.

In the late 1930's and early 1940's television was sonsidered something of a problem child. One of the problems that continued to plague the growth of television was precisely where, in the radio spectrum, it should be located. Under present United States standards a television broadcasting channel requires a band width of 6 megacycles. Since 1 megacycle is equal to 1000 kilocycles,

it can readily be seen that television requires some room! This is graphically brought to mind when we realize that the total AM broadcasting band runs from 550 to 1600 kilocycles, or just 50 kilocycles over 1 megacycle!

At an early date television was moved upstairs to that portion of the radio spectrum called the "very high frequency" (VHF) range. Shortly after the earliest telecasting began, the frequencies were reshuffled to make room for FM. After this move there remained channels 1 through 13, all in the VHF range. Later channel 1 was deleted as a usable television channel. There then remained 12 VHF channels, 2-13. Channels 2-6 fell in the range of 54-88 megacycles, and channels 7-13 in the range of 174-216 megacycles. In between channels 6 and 7 space was left in which to place the FM frequencies.

With these 12 channels available the Federal Communications Commission proceeded to issue licenses. Such licensing continued until September 30, 1948. At this point the F.C.C. issued what has come to be known as the "Freeze Order." Licensing of television stations was suspended pending a complete study of all the problems involved. Of first concern was the question of how a truly national television system could be established within the existing available frequencies. There were also numerous technical questions to be answered. When

the freeze occurred there were 107 stations in operation.

One additional applicant held a construction permit and proceeded to complete the building of a station. So, from the issuing of the freeze order until three and a half years later, there were but 108 television stations on the air.

The F.C.C. thawed the freeze on April 14, 1952, when it released its Sixth Report and Order. This voluminous document did several important things. It set forth a nationwide allocation plan for all available TV channels. It reserved 242 channels exclusively for use as noncommercial, educational stations. It settled the many claims and counterclaims that had been presented to the commission. And most important of all, it made available a total of 82 TV channels. The VHF channels, 2-13, remained as they were. What was added was a further shift upstairs in the radio spectrum, into the "ultra high frequency" (UHF) range. That part of the UHF range assigned to TV use runs from 470 to 890 megacycles. This permitted the assignment of channels 14-83. Early in 1956 there were 454 television stations in operation, 347 using VHF channels, and 107 using UHF.

Present TV stations operate on one of the 12 VHF or one of the 70 UHF channels. In the nationwide allocation plan, VHF and UHF channels were intermixed. That is,

both kinds of channels were assigned to areas and to specific communities. For example, Chicago has assigned to it five VHF channels and five UHF. A smaller community might have only one UHF channel, but the community next to it might have a VHF. The main point is that they were not separated geographically. As we shall see, this was an important, if not entirely foreseen, aspect of the Sixth Report and Order.

REGIONAL NETWORK

There are several reasons for the creation of a regional network suggesting financial success. Some of these are: population growth, continuous rise of the gross national product, our labor force striving for a shorter work week (creating more leisure time.)

UHF channels have often been called the sleeping giant of American television. Congressional legislation is 1964 made it mandatory to include a UHF converter on all TV sets. With the passing of this law, it definitely opened up expansion in the fields of TV stations and networks. There are three national networks at the present time; ABC, CBS, NBC. The FCC is in hopes that with the frontier of UHF that it will create two more networks. This could be possible by the creation of many more local stations, and their need to have a source of air material. Our regional network could also extend its services to the present ABC, CBS, AND NBC networks. The FCC is making this possible by making the existing national network cut back 3½ hours of national broadcasting time to local stations by January 1, 1971.

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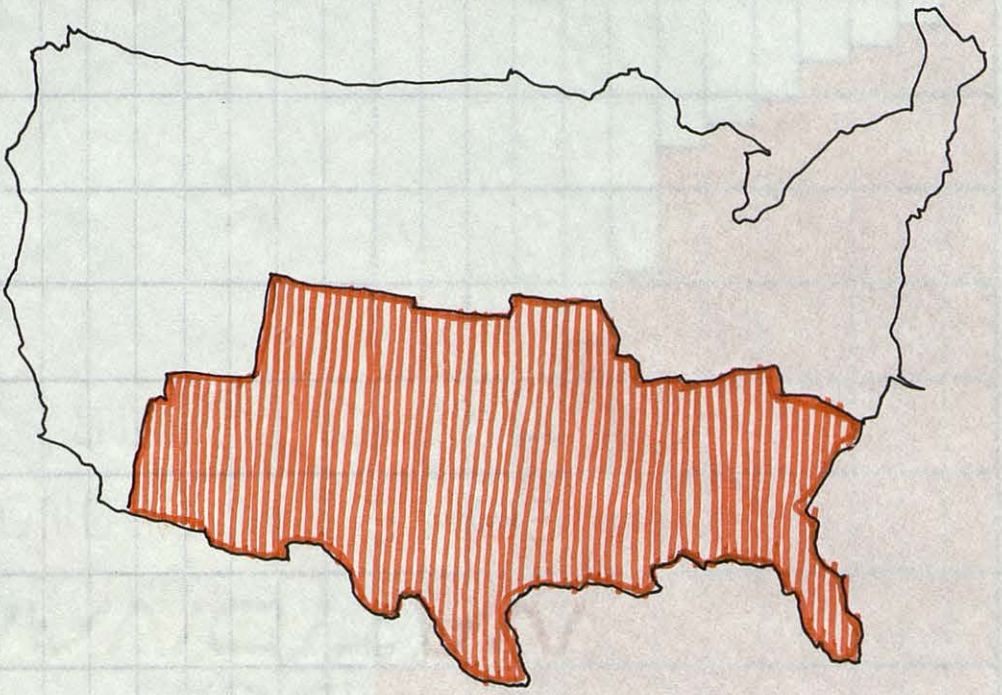
Extensive capital expenditure would suggest that it is best to start regionally and expand later to a national network. Regional networks can concentrate on regional tastes, preferences, and listeners' habits. Regional networks can register great listener popularity, and both national and regional advertisers can employ them to a good advantage. The fourteen state region, shown in figure 1, contains more than 33% of the television set ownership in the United States, and includes some of the fastest growing areas in the U. S., such as Dallas, Atlanta, and Houston.

Figure I, page , shows the 14 state area that the regional network would cover in its initial operation.

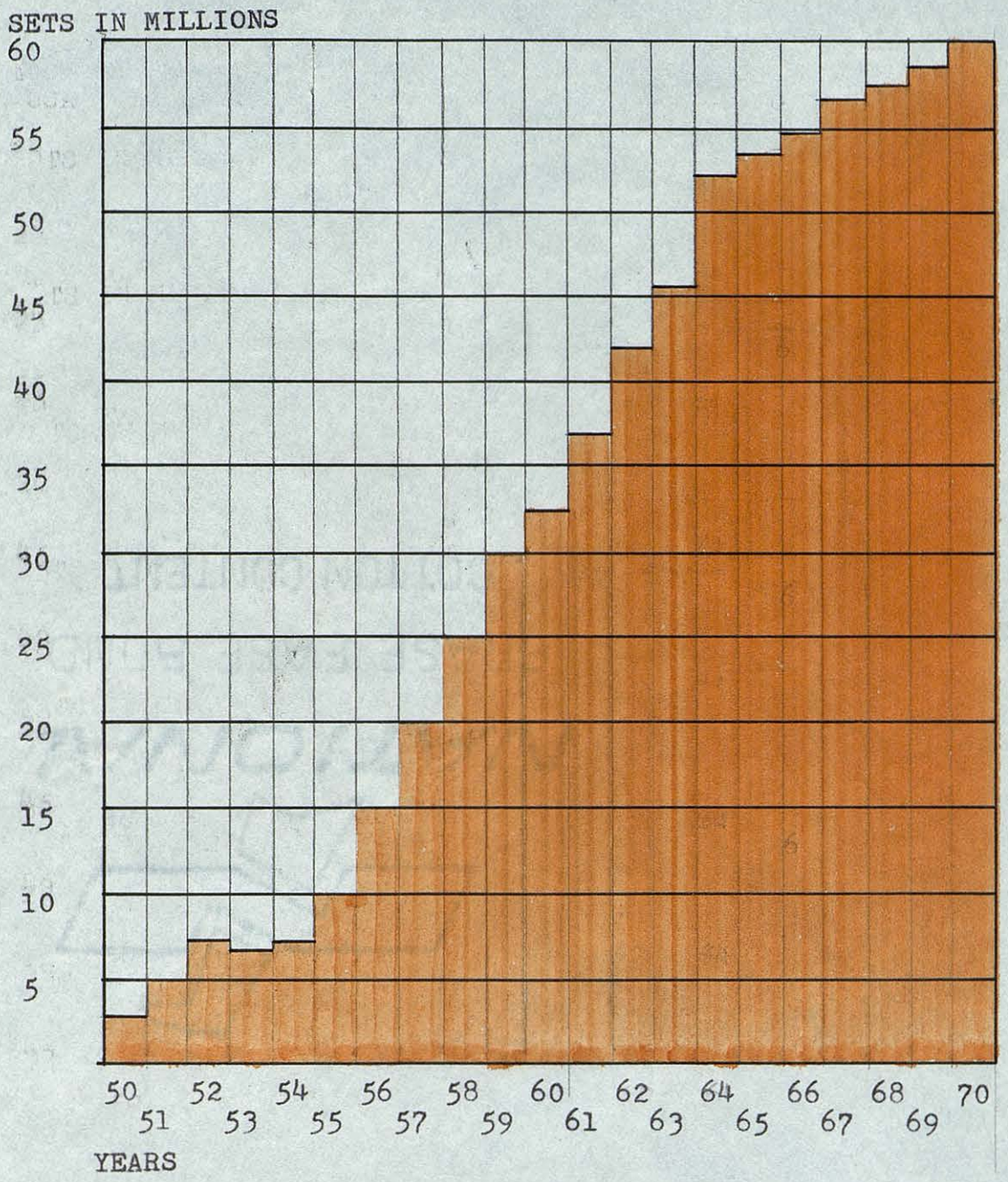
Figure I



Initial States In
Regional Network:

1) Texas- (Dallas, Regional Base)		10) Georgia
2) New Mexico	6) Colorado	11) Alabama
3) Arizona	7) Missouri	12) Mississippi
4) Oklahoma	8) Arkansas	13) Florida
5) Kansas	9) Louisiana	14) Tennessee

Number of Television Sets
In USA (In Millions)



SITE SELECTION

Many things must be taken into consideration in the choosing of a site, especially when it is expected that this network will eventually increase from a regional to a national network. Of the fourteen state region included in the initial broadcasting phase, Texas is the most centrally located. This becomes important because of several reasons.

(1) broadcasting time changes

(2) travel time and location of talent - many professional people are located in the Texas area.

(3) Texas would be in a central location if and when the network goes to a national level.

The major sources of talent are located in the New York, Los Angeles, Chicago area. The Texas area would serve as a mid point between the east and west coasts as a source of employment for professional talent.

Dallas is the home of the initial investors in Airways Inc., and besides being centrally located, it is one of the fastest growing areas in the United States as pointed out by the 1970 census. This growth has assurred the continuous growth of advertising firms in the southwest region. Dallas has proved itself a popular

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place for celebrities and professional people alike.

Transportation, as a site consideration, is important on national, regional, state, and local levels, not only to the professional talent but also the advertising sales team. The regional airport between Dallas and Ft. Worth will serve any national and regional needs. Red Bird airport in southwest Dallas will service intrastate needs. This airport will be used more and more as it becomes necessary for Airways Inc. to operate their own aircraft. Dallas also has a comprehensive net of freeway systems which could quickly connect employees to any point in the city. This can be easily seen by the following maps.

Utilitities are easily accessable from the following sources:

Dallas Power and Light

Lone Star Gas

Sewage and Water from the city of Dallas

The specific location is in southwest Dallas near the Mountain Creek Lake region. The relatively hilly terrain provides an opportunity for multi-level designs and growth, while providing excellant accessability and service. As the enclosed map shows, it is in close proximity to several important areas:

Red Bird Airport

CBD

Dallas - Ft. Worth Airport

At present time, this location is void of residential areas. The relatively low cost of land in this region makes it a practical location. This particular location is beneficial not only for the industry, but could provide the needed incentive for growth in this region. At the present time, Dallas Baptist College along with several farms and ranches are the only types of development in the area. The proposed growth of the Mountain Creek lakes will probably increase land values in this area in the near future.

FROM STUDIO TO RECEIVER

In broadcasting, engineers refer to a camera chain. The camera by itself is not an independent unit. Three basic pieces of equipment form the camera chain: the camera proper, a power supply, and a camera control unit. Somewhere in the system there is also included a picture monitor, and a monitor with a cathode-ray oscilloscope. Different manufacturers package these units differently, but in all makes of cameras these various functions must be supplied.

When a camera chain is operating, the necessary voltages are fed to the camera from the power supply, which is usually located in the control room or some other convenient centralized point. The camera goes through the scanning process, amplifies the resulting electrical impulses, and returns them to the camera control unit in the control room. Here the video engineer is able to make all the necessary adjustments in picture quality. He has both a picture monitor and a wave form monitor to tell him about the character and quality of the picture. He does what an audio engineer does when he is ridding gain on sound, except, of course, he has many more adjustments to make. From the camera control unit the picture , or "signal" as it is now known, goes to the switcher.

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While our signal is momentarily held up in the switcher, let us add the last necessary piece of equipment in the process of producing the transmittable television signal. To insure the scanning process is executed in time and under proper control, and that the recanning done in the receiver at home is in time with the scanning in the camera, certain electrical impulses known as "sync pulses" are needed. These are supplied to the camera, the camera control unit, and the switcher by the synchronizing generator, or more familiarly, "syn generator." If you have ever watched a television receiver and had the picture roll in a vertical direction you will appreciate vertical sync. When you see a weird conglomeration of lines that resemble a picture being violently pulled from the side, you can appreciate horizontal sync. If all sync is lost you get nothing but a mad scramble of lines and patterns. To be sure, sync is a very important part of the television signal.

Now we are ready to pick up our signal at the switcher. From the switcher, the signal is sent to the transmitter. There the video signal, combined with the audio, is superimposed over the carrier wave and broadcast in the same way that a radio signal is transmitted.

The television receiver must do several things. It must provide for tuning, or selection of the desired fre-

quency or channel. It needs amplifying circuits to strengthen the incoming signal. It must provide the means for converting the audio signal back into recognizable sound, and for converting the audio signal back into a recognizable picture. The audio is handled the same as in radio. More accurately, it is handled as in FM radio, because sound in television is broadcast by means of frequency modulation. The audio signal is converted into usable sound by means of the speaker.

The video signal is changed back into a picture in the receiving tube, called a "kinescope." The inner surface of the face of the kinescope is covered with a phosphorescent material. In the neck of the tube is an electron gun. Around the neck of the picture tube are deflecting coils which cause the gun to scan the inner face of the tube. The pattern scanned is identical to the pattern scanned in the pickup tube of the camera, because of the action of the sync pulses which were transmitted with the picture signal. As the stream of electrons hits the phosphorescent material it causes it to glow. This electron beam is modulated with the electric (video) currents established by the camera tube in the studio. This causes the glow of the phosphorescent material to be light or dark in a pattern similar to that in the original scene.

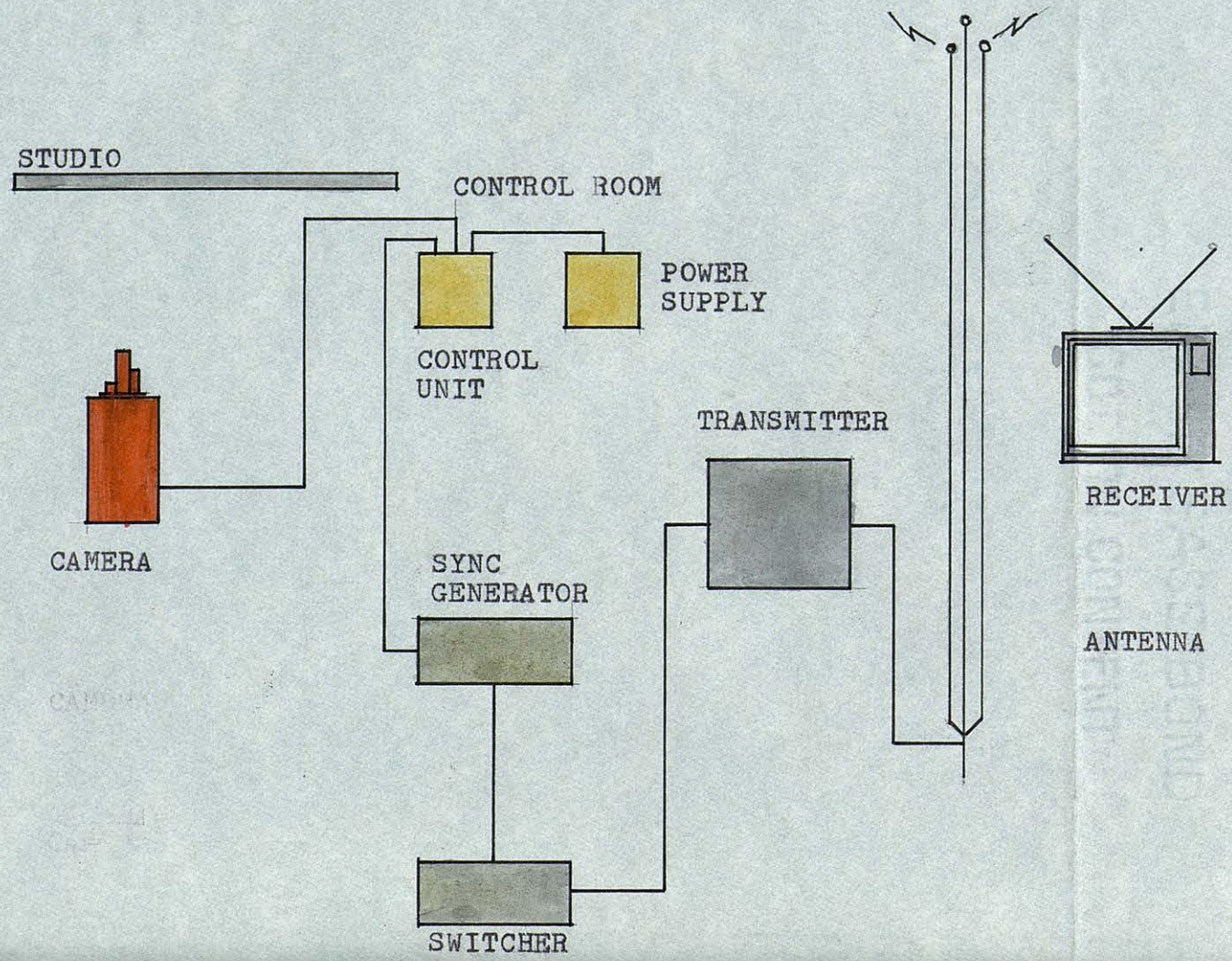
We have transferred a picture, through the air, from one place to another--from studio to home receiver.

Television signals are fed to multiple stations in one of two ways. They are carried by coaxial cable which is laid underground between two points, or they are transmitted from point to point by microwave relay stations. Coaxial cable was the first system used, and in the early days it was considered the most workable. Later experience proved that microwave systems could afford just as good service, better according to many engineers, and they were much cheaper to install than coaxial cable.

In the microwave system, the TV signals are sent by narrow-beam transmitters operating on specially assigned frequencies, are picked up by receivers, amplified, and sent on to the next station. The receiving and transmitting equipment is located on towers which are built approximately 30 to 40 miles apart. The majority of our present network television is carried by microwave relays.

It is probable that coaxial cable will continue to be installed since it serves many purposes, other than television, connected with usual telephone and telegraph service.

In television networking, as in radio, the distribution facilities are, for the most part, owned and operated by the American Telephone and Telegraph Company.


STUDIO
CONTROL ROOM
POWER SUPPLY
CONTROL UNIT
CAMERA
TRANSMITTER
RECEIVER
SYNC GENERATOR
ANTENNA
SWITCHER

PERSONNEL

Personnel will vary between broadcasting campaings and television stations according to programming and program schedule. Programming will be covered in a later section. According to initail programming set up on a regional basis, 182 employees will be necessary. The following is a list and number of employees that will be required.

2 technical writers	1 transmission
6 clerk typists	4 costume design/make up
13 actors	1 lawyers
1 stage superintendent	1 sales director
1 carpenter	1 station relations man
3 electricians	6 accountants
12 cameramen	4 sports team
12 riggers and microphone	4 master control operators
2 for messenger and delivery	4 film processing
4 film and video tape auditing	2 engineers
6 maintenance	4 scriptwriters
6 secretaries	4 script film library
2 receptionists	20 account salesmen
3 executives	6 stagistislans
4 lighting directors	4 press relations
4 audio control	2 pilots

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2 receptionists	20 account salesmen
3 executives	6 statisticians
4 lighting directors	4 press relations
4 audio control	2 pilots

4 budget managers	3 program directors
1 assistant budget manager	3 technical directors
1 script censor	4 film projectionists
2 clearance men	4 announcers

The functions of several of the important jobs are listed below:

Program Director or Chief Producer - He reports directly to the executive personnel and in some cases to the sponsor. He is responsible for the entire production including live, film, remote; and he directs the production going on the air. His duties are manifold. He chooses the script and directs the visualization of the program. A Program Director or Chief Producer must be able to prepare his own cue sheets to achieve precision timing of the show. He also must be able to direct the technical crew and must know their jobs thoroughly. It needs a man who has extensive background in the dramatic art with knowledge in the technical and organization phases of television.

Budget Manager of Comptroller - He is directly responsible to the executive personnel, but works closely with the Program Director. It is his task to determine the exact estimates for each production and prepare daily

and weekly budget forecasts for the network. He also should have a statistical assistant who will supply him with exact figures of past program expenditures to help him to keep his figures as close to reality as possible. His job is one of the most important in the network.

Script Censor and Clearance Man: He is responsible for the clearance of all scripts, and his department should also handle all clearance problems in connection with music, recordings, films, and other copyrighted material. He reports directly to the Program Director.

Public Relations Manager: He can constructively contribute to good relations between the network, the sponsors, and the general public inside the telecasting area.

Office Manager: The Office Manager reports to the Network Manager and is in charge of all the staff for administrative offices and very often acts as Personnel Manager. He directs and controls the typing pool, the transportation and communication staff, and the messenger services.

Video Technical Director: He is directly responsible to the Program Director. He is actually the liaison officer between the Producer and the technical crew and is responsible for all that goes on in the live talent studio and in the studio control room. The Technical Director narmally is a well trained technical man who knows all

video and audio operations and can interpret the Producer's view. He is directly responsible for keeping the show on the air in case of an emergency and for improvising if anything goes wrong. He manipulates the switching of the cameras.

Audio Director: He is in charge of all audio operations and is directly responsible to the Program Director or Chief Producer. He is a technical man with experience in the sound part of show business. He controls all sound pickup operations and is in charge of transcriptions and sound effects.

Film Director: Often called the Film Editor, he is responsible for the buying, and often the production, of film programs. He must be well versed in the film business, both in the sales field and in the production field. He is responsible directly to the Program Director and is in charge of transcriptions and sound effects.

Lighting Director: There is a constant question under whose authority, program or operations, he falls. A wise move is to make him responsible for all lighting arrangements and put him directly under the Program Director or Chief Producer. He will have responsibility for basic and dramatic lighting in the studio as well as for remote pickups. He will have under him a production lighting crew and the operational personnel in charge of

all switchboard operations.

Art Director: He is responsible to the Program Director and has under him all employees executing any form of art work for the station. He must, himself, be able to execute art work and must be able to determine exact costs. He works in close cooperation with the Budget Manager and the Construction Supervisor.

Continuity Editor: He is responsible to the Program Director, but for practical purposes he reports to one of the program director assistants. He checks scripts, times dialogue, and is responsible for the over-all timing of the production. He has an important job and must have had previous experience in this field.

Costume and Property Supervisor: The Costume and Property Supervisor is responsible to the Program Director but for the sake of convenience often reports to the Assistant Producer. He secures costumes and properties and is responsible for their storage and repair.

Stage Manager: He is responsible to the Program Director and manages and supervises the handling and securing of all properties, scenery, draperies, and calls during production. This is an important job which demands stage experience.

Chief Librarian: He should be in charge of all three libraries: music, film and scripts. He must be able to

organize his three units efficiently to meet the constant demand for material and to adapt to changes which are a daily occurrence. He reports directly to the Program Director.

Chief Engineer or Technical Manager: His is the top technical job in the station. As the technical executive, he is responsible for all technical operations as well as the planning of technical services. He must have a sound knowledge of both video and audio broadcasting and must work closely with the Chief Producer or Program Director. He is also in close contact with the Budget Manager.

Video Supervisor: He reports directly to the Chief Engineer and is responsible for all video operations and and personnel in the studio area. He supervises cameramen and video control operators.

Master Control Room Supervisor: He reports to the Chief Engineer and is in charge of all control operators in the master control room area.

Film Projection Supervisor: He is responsible to the Chief Engineer for the technical quality of the film and slide output. He also supervises background projection.

Remote Supervisor: He reports to the Chief Engineer. He is in charge of remote location pickups and special productions. His crew is comprised of cameramen, video and audio control operators, and micro-wave equipment

operators.

Transmitter Supervisor: He reports directly to the Chief Engineer. He is responsible for the final outgoing signal, the performance of the video and audio transmitter, and all equipment linking up the studio with the transmitter.

Maintenance Supervisor: He is directly responsible to the Chief Engineer and his job is to take care of the maintenance of the station electronic equipment. This demands a man with a versatile engineering background.

Technical Research Director: He is responsible for keeping up with the latest technological developments in the electronic field and their application in the TV network. He reports to the Chief Engineer and also presents the Chief Engineer's view to management in conferences. He must have had experience with one of the top-grade electronic equipment manufacturers.

SPACES

"With a very few exceptions, the existing networks originating centers have shown through their years of operation a lack of imagination and original planning and design."

"Network originating costs are large because there is no doubt that at present the waste in production costs is staggering."

The above comments were taken from T. V. Stations, by Walter J. Duschinsky. They show a dissatisfaction with past network design and planning. If the following design criteria are observed, it will be possible to correct past faults and inadequacies.

There are seven basic criteria for good network planning:

1. Space must be sufficiently large (room for expansion).
2. Areas must be functionally arranged.
3. Traffic flow must be undisturbed.
4. Space must be utilized both horizontally and vertically.
5. Areas and volumes must be in proper relationship to each other.
6. Space must be flexible.
7. Space must be efficient.

All these requirements are, of course, reflected on the three main areas of the network--the Operational, Production, and Administrative.

The Operational Area

Traffic is the main consideration in this area, and the technical traffic must be separated from all others and confined to its own area in order to eliminate bottlenecks and cross traffic between operation and production. The technical traffic space should be arranged with care to provide direct access to all technical areas and be large enough to permit personnel and material movement. Space must be designed for every piece of equipment.

As operational traffic will be on a vertical as well as horizontal plane, use will be made of stairs, elevators and other vertical means of transportation. A technical core should be provided, and the technical control area, such as studio control rooms, master control room, etc., should be directly accessible from the traffic core at various levels. This arrangement would provide, in addition to easy accessibility, the proper interconnection and quick interchange of personnel. Intercommunication between technical areas will, therefore, be greatly facilitated.

A horizontal trench and vertical duct system should

be located in the center core of the space. This system should be laid out to permit short runs radiating out from the vertical vertebra system. This core will provide efficient and convenient maintenance and operation.

The Production Area

"Efficiency" is the keyword for production areas. These must be planned to give perfect servides to all operations and must be well-coordinated, with each part of the equipment used efficiently.

The functional separation of studios from other production areas must be realized for successful operation. The present practice of using the high-dollar-value studio area as scenery, prop and equipment storage space should be abandoned. To this end, space devoted to storage, shops and dressing rooms must be large enough to function without overflow into the actual production area.

Ideally planned and adequate studio space is important because it is here that money is made and spent. Studio space should adjoin its control areas in such a way that sight lines and access are easy and efficient. At present, practically every studio building has a more or less rectangular form--not because such is needed for live talent production, but because it is a conventionally accepted form conceived by some architect who has been as

far removed from the operation of television as heaven. The use of a lightbridge or of other technical features will determine the ceiling form and configuration and may demand special forms.

Use of different floor levels should be considered in this planning stage, and is of such importance that it is of such importance that it must be classified as a basic question.

Adjoining the studio area will be the other production areas, some of the property and scenery storage and, especially, the equipment storage. Dressing rooms, make-up rooms and other secondary areas need not, however, be in the immediate vicinity.

The Administrative Area

The administration level should occupy, in a vertical development, the highest level, well-separated from operation and production, and may be located in the structural truss spanning the studio area below. Sales and public relations offices should be easily accessible to the public.

Because of the limited number of original productions to be programmed, initially, the operational and production areas will require less space than other networks with a higher percentage of originating production

hours. However, with the anticipation of growth to the national level, these areas should be left flexible. In order to familiarize you with the functions of the spaces, the following rundown is included.

Projection Room: This space is used for telecasting of film and slides. For televising, films are projected directly into a television camera. Also associated with this area should be a preview and editing area. Once the film is on the air, correction is out of the question.

Processing facilities: This will include space for splicing, editing and storage.

The television equipment for processing 16mm film and slides of all sizes should include the following items: film splicers, rewinders and viewers for editing already processed film, processing equipment, an editing bench, and slide files for all sizes of slides. Storage racks of 16mm films for small, medium and large film reels, able to hold from 100 to 2,000 feet, a screening projector and associated screen, and a dark room with developing equipment for still photographs and 16mm film are also required.

Generally, film processing facilities should be as near as possible to the film projection area, but if film production facilities are restricted, only the editing, splicing and storage spaces need adjoin the film

projection.

The term "kinescope" (which is sometimes referred to as teletranscription recordings) is applied to the recording on film of a picture produced by the television camera on a TV receiver tube, and the simultaneous recording of its accompanying sound. Once the kine has been produced, it easily lends itself to editing and copying.

Up to now the use of kine has been restricted because the quality of kinescope has not been up to the standard of films. Another reason for the restricted use of kine is the rules imposed by trade unions regulating re-use of television programs. This term refers to a live talent show which is telecast and at the same time put on film by the regular kinescope process. It is processed at high speed and the program may be retelecast shortly afterwards. It is a suitable vehicle for overcoming time differentials. For example, hot-kine is used when network origination is done in New York, but the program is to be telecast in Los Angeles. The hot-kine is an important development and will increase in importance as the number of programs originating in different global time zones increases.

Control Room: The control room will include all necessary video and audio control equipment and provide

space for operating and directive personnel. It should be as compact as possible. It should be in direct relationship to the studio, and should be elevated to permit an uninterrupted line of sight between the two areas.

Master Control: This area takes care of out-going picture control. Master Control should be in a direct physical relationship with the control room. The basic equipment required for the master control room are as follows:

1. master control console for video and audio equipment, with an out-going and line monitor, and a single switching panel and monitors for TV and film cameras.
2. video and audio master equipment (such as sychronizing generators, distribution equipment, phasing equipment and switching units.

It is important that the control console for the master operator be set at the right position and location so that he can view not only the studio, but also can see all of his equipment. The lighting in all control room areas should studied carefully to prevent glare and reflection from the observation sindows.

Studio: All types of complex live or videotape production take place in this area. It should be flexible enough to handle short simple production or long complex ones. If live audiences are contemplated, areas

have to be provided to seat them.

The possibilities of shapes for the studio other than the presently popular rectangle should be seriously considered. Limitations of the rectangle are:

1. Distance from the studio control booth to the scene of the production is too great and close supervision, therefore, is difficult.

2. Because the producer is far away from the sets, he has to be in an elevated position so that his sightline is not obstructed. This will automatically place other obstructions such as lightbridge, flys, and other ceiling obstructions within his view.

3. Distances in large studios are so great that cable runs from cameras, microphones, and other auxiliary equipment are very long and the costs of maintenance and use is tremendous; in addition, floor confusion always results.

4. Rectangular spaces and large spans require the use of deep trusses which automatically either reduce the free studio height or waste cubic area in unused space overhead.

5. Corners are either unused or, more often than not, used as madeshift prop and scenery storage areas and are, therefore, nonproductive, wasted areas.

Most of the leading producers in the major networks have recognized that an ideal live talent studio should be composed of the following:

1. A central studio control position--possibly two of them--to observe studio production from a convenient distance.

2. The employment of four or more studio cameras to be used in a circular movement, switching from set to set and back, with a minimum of movement by the camera crew and its assisting production personnel.

3. Unobstructed sightlines from the central control position without obstruction by trusses, light-bridges, flies, air-conditioning ducts, and other auxilliary ceiling-hung equipment.

The centrally-located studio control positions in the form of a tower, with a circular studio floor area surrounding it, may be the most functional approach. The distance from the tower to the studio wall will thus be equal at any given spot and this distance can be calculated by adding camera movement area, staging area and background area. No space will be wasted and every area will be fully utilized. The television planner should create for the producer an ideal staging and camera pickup area. Creative planning and design of the live talent studio by architects is one of the most neglected

points in the present studio plant. The large live talent studio is a factory responsible for the creation of highly complex productions.

The staging area should include the area used for the setting up of scenery--some of it permanent, some of it of an incidental nature--and the space needed for acting which must be in front of the scenery. It must also include appropriate side and rear aisles, large enough for the unhindered passage of production personnel.

To facilitate camera movement and expedite production, certain staging arrangements have been accepted as basic. These are generally classified as clockwise, counter clockwise and nesting systems.

Floor plans for sets should be well-planned in advance; not only for simplicity of camera movement and sequence of shooting, but also for total utilization of the studio floor space.

Sets may be either put together on the studio floor or prepared in outside shops or in the station studio workshop. Set size and character will determine the procedire. Television production should emphasize the simplicity of sets, not only in a material way but also in line, form and color. Sets are backgrounds only and should not distract from the actual acting, the main

attraction of live talent productuions.

As mentioned previously, studios may include provision for the flying of scenery, but this practice should be used only if it accelerates the process of fast, efficient production.

For the planner and the planning group, it is important to realize that large live talent studios should only be used when they will produce revenues. The depreciation of the large live talent studio and its operation both demand full use of the area. The employment of multiple crews, not only from the technical and operational point of view but also from the programming standpoint, is expensive. A complex live talent production requires the necessity for a team of writers, producers, visualizers, and artists before actual production is undertaken.

Rehearsal times for large-scale productions and multiple-set productions are staggering. The ratio of 20 hours of rehearsal to one hour of actual air time is quite common.

<u>The Studio Floor Area</u>: The camera movement area in front of the set is that space. The electronic camera is employed to pick up the set, actors, and action. In this process the camera men will move back and forth and sideways. The camera follows the actions of the cast;

therefore, its manipulation may be complex. In large productions camera cranes are employed which are used in the same way film camera cranes are used in large film studios. The boom microphone man also follows the action and must move the microphone to follow the sound source.

At present camera movement around the floor is not a free one because the heavy coaxial camera cable does not permit complete maneuverability. For large studios the use of overhead-supported coaxial camera cables (supported by "V" shaped rubber cords) is one way to free the floor. In the giant studios of the networks, the use of a cable-free camera--operated by batteries sending its signals by wave to the control equipment-- is being considered. Boom microphones can be fed from ceiling fixtures.

If the circular studio, with its central control tower, is used, camera cables will have short runs and the central column supporting the control tower will act as a main duct and plug-in point for all equipment.

Another area which is coming to the forefront is the computer room, which in the future will assist or completely replace some of the switching and production areas now required.

Several other auxiliary spaces to production and

operations are self explanatory:

Dressing Rooms

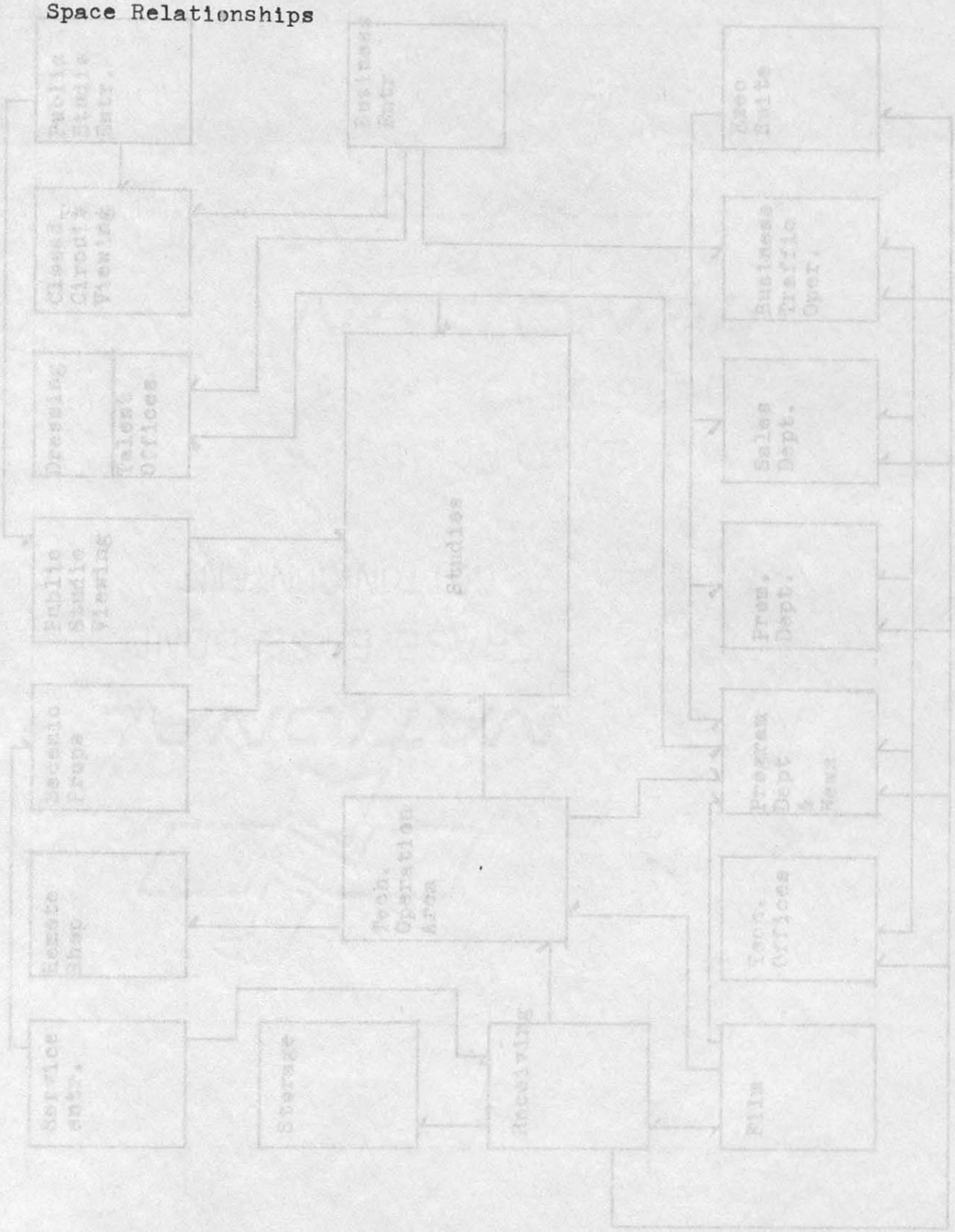
Rehearsal Rooms

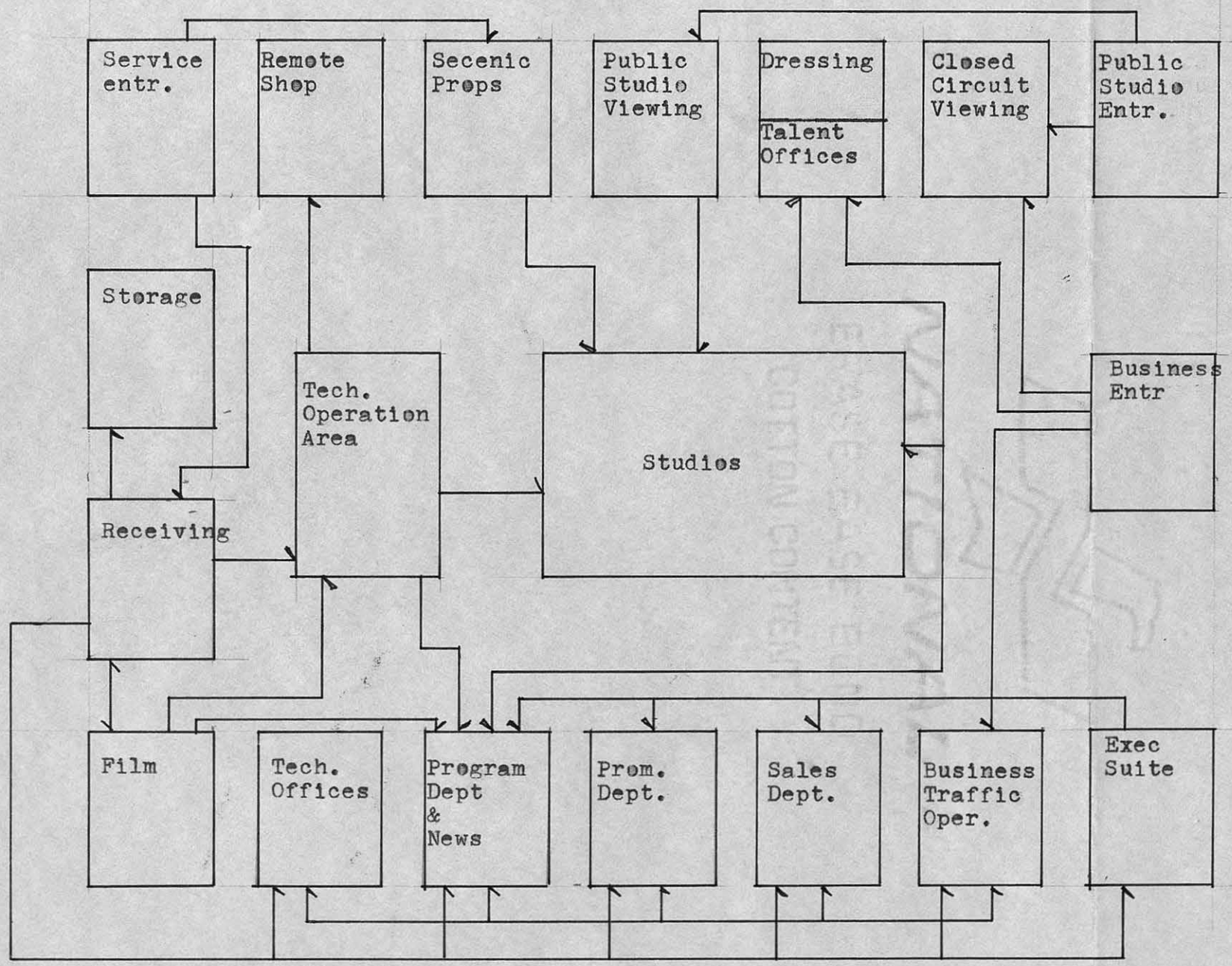
Scenery Storage

Scenery Shop

Offices

Space Relationships




Service entr.
Remote Shop
Secenic Props
Public Studio Viewing
Dressing
Talent Offices
Closed Circuit Viewing
Public Studio Entr.
Storage
Tech. Operation Area
Studios
Business Entr
Receiving
Film
Tech. Offices
Program Dept & News
Prom. Dept.
Sales Dept.
Business Traffic Oper.
Exec Suite

PROGRAMMING

Television programming is the make or break point for many television networks and stations. The following is a breakdown of network programming and air time.

TOTAL NETWORK PROGRAMS

77.5 hours weekly 61.7% air time

	FILM	VIDEO	LIVE
ABC	19	63	5.3
CBS	20	27.35	39.5
NBC	20.35	58.35	19.24

It will be the policy of the regional broadcasting facility to present a balanced program structure, both with respect to the type of program offered and to the interests of the viewers throughout the area to be served.

Initially, production would only be for 14½ hours through the week and 16 hours on Saturday and Sunday. Three hours of this programming would be available by video tape to the VHF networks ABC, CBS, and NBC. This air time production would continue until the administration considers an increase advantageous. The following percentage of program types are considered to be the best by the major networks.

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Entertainment	59%	News	12%
Religion	3%	Discussion	7%
Agriculture	3%	Talks	5%
Education	10%	Miscellanious	1%

Although this is thebasic breakdown for the major networks, it will be necessary to begin with alimited program and add on as it becomes financially advisable. The new network will begin with a strong emphasis on news, weather, and sports. Because of high production costs and number of employees required, most shows will not be original network productions. Most programs will be package deals purchased from private production firms. The following is a schedule of programming for a typical production week.

Programming, Typical Production Week

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8 am	NEWS	WEATHER		SPORTS			
		KIDS SHOW				CARTOONS	
9 am	QUIZ	SHOW					
			SOAP OPERA				
10 am							
11 am		MOVIE				MOVIE	NEWS
12 noon	NEWS	WEATHER		SPORTS			
					PACK SOAPIE		
1 pm						SPORTS	SPORTS
2 pm		MOVIE					
3 pm							
4 pm		TALK SHOW					
5 pm	NEWS	WEATHER		SPORTS		NEWS	MOVIE
					CARTOONS		
6 pm	LOCAL	TIME SLOT				MUSIC	
	VAR.			DRAMA			
7 pm	PACK	MOVIE	MOVIE	COMEDY	MOVIE	VARIETY	
8 pm	MOVIE	PACK				MOVIE	MOVIE
		SHOW DRAMA		MOVIE	MOVIE		
9 pm			MOVIE				
10 pm	NEWS	WEATHER		SPORTS			
11 pm							
12 mid							

LIGHTING

Lighting for color television is a very important consideration, but no different from that required for black-white except that a consistent color temperature of approximately 3100° Kelvin-plus or minus 250° Kelvin should be used and, of course, a higher volume of light is required for the color camera. The volume of this light will depend upon the type of camera being used.

Hard shadows--that is, shadows into which you look and see no detail--should be avoided as they represent a hole in the picture and may be subject to a deposit of spurious color as may take on the complementary color of the surrounding area. All shadows should be transparent--that is shadows into which you look and see some detail. Converting a hard shadow into a transparent shadow is very easily done, as it involves only the addition of a small amount of fill light.

ACOUSTICS

The following considerations should be taken into account when dealing acoustics:

1. Select, if possible, quiet surroundings.

2. See that noise is to take place as it can be controlled.

3. Analyze the arrangement of facilities within

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ACOUSTICS

The following considerations should be taken into account when considering acoustics:

1. Select, if possible, quiet surroundings.
2. See how much noise is to take place so it can be planned for.
3. Consider the arrangement of facilities within

the building

4. Take into account noise control inside the building.

5. Plan and construct for sound insulation.

6. Consider the shape and size of the studio.

7. Study the requirements of sound-absorbing materials.

The acceptable noise level within a television building is 25 to 30 decibels.

INTERVIEWS

The following interviews proved very helpful in obtaining information and resource material throughout the semester.

Mr. Kinghorn

Texas Tech University (Telecommunications) Oct. 2, 1970.

Mr. Gibson

Texas Tech University (Telecommunications) Nov. 18, 1970.

Mr. B. S. Hunteycutt

Chief Engineer (KDFW-TV, formerly KRLD-TV) Dallas, Texas, Nov. 27, 1970.

Mr. Chris Irby

Chief Engineer (WFAA-TV), Dallas, Texas, Nov. 27, 1970.

Mr. Jack Hauser

Vice President in charge of TV facilities (WFAA-TV) Dallas, Texas, Nov. 27, 1970.

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John D. Rowland
2009 9th
Lubbock, Texas

Richard C. Welsch
Production and Business Affairs (NBC-TV)
Burbank, California

Dear Mr. Welsch,

I'am a fifth year architectural student at Texas Tech. University. I have chosen to design a regional broadcasting network for the southwest as my terminal problem. My research is at the point that I need specific information from the major networks. Through information acquired from Broadcasting Yearbook, I learned that the three major networks supply, on the average, 61.7% of local station air time. I need to know:

1. Size and number of studios required to produce roughly 75 hours a week

2. Personnel: number & type

3. Equipment, RCA TK-42 color camera, etc.

Also any information you might have as to the name of the architectural firm that might have assisted you in the design or planning of your facilities would be helpful. Any information or assistance you can give me would be greatly appreciated.

Yours truly,

John D. Rowland

NATIONAL BROADCASTING COMPANY, INC.
3000 WEST ALAMEDA AVENUE, BURBANK, CALIFORNIA 91503
(213) 845-7000, 849-3911

CHARD C. WELSCH
e President
duction and Business Affairs

December 7, 1970

Mr. John D. Rowland
2009 - 9th
Lubbock, Texas

Dear Rowland:

I am sending you this information in reply to your request. Although it won't serve to answer all your questions, I hope it will help you along your way.

Some of the information you have requested is not readily available, however, you will find:

1. A map of the United States showing the NBC Television Network. The red line denotes a leased microwave service to Burbank on which we feed the on-the-air network picture from New York. The Pacific Network is on a delayed broadcast basis.

2. A KNBC Program Schedule showing its broadcast schedule. You will note network service is indicated by a dark shaded area and KNBC air by a light shaded area.

3. A location layout for the entire Burbank plant which houses:

   a. The Television Network.

   b. KNBC personnel.

   c. The News Department which services the Network, KNBC and the Radio Network.

You will note there are five studios used for

network production, Studios 1, 2, 3, 4, and 9. KNBC has its own studio, Studio 5, but shares video tape and telecine facilities with the network.

4. A schedule showing the allocation of shows to the studios for a four-week period.

The Austin Company, 1660 Wilshire Boulevard, Los Angeles, California 90017, has been the prime architect and builder.

Hope this information will help you.

Sincerely,

Richard C. Welsch

enclosures

John D. Rowland
2009 9th
Lubbock, Texas

I.W. Baker Jr.
Assistant General Manager, (KRLD-TV)
Dallas, Texas

Dear Mr. Baker

I'am a fifth year architectural student at Texas Tech. University. I have choosen to design a regional broadcasting network for the southwest as my terminal p problem. I will be in Dallas over the Thanksgiving holid days and would appreciate an interview with you. This would be very beneficial to my research. If this is possible, would Friday the 27 of November be acceptable. If this date is unsatisfactory, I could possibly hold over until Monday the 30th. Your assistance would be greatly appreciated.

Yours truly,

John D. Rowland

KDFW-TV (FORMERLY KRLD-TV)
400 NORTH GRIFFIN • DALLAS, TEXAS 75202 • 214-742-5711
A CBS AFFILIATE

Vice President and
sistant General Manager

November 23, 1970

Mr. John D. Rowland
2009 9th Street
Lubbock, Texas 79401

Dear Mr. Rowland:

I will be unable to meet with you on Friday, November 27 but would be available on Monday, November 30 in the afternoon around 2:30 p.m. However, I suspect that the type of information you are seeking can be better provided from Mr. B. B. (Bill) Honeycutt, our Chief Engineer. Mr. Honeycutt had the responsibility of working with all phases of the design construction and equipping of our broadcast facility.

It would be well for you to give Mr. Honeycutt a call for an appointment.

Sincerely,

I. W. Baker, Jr.

IWB:mc

John D. Rowland
2009 9th
Lubbock, Texas

Mike Shapiro
General Manager, (WFAA-TV)
Dallas, Texas

Dear Mr. Shapiro

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Yours truly,

John D. Rowland

WFAA
AM-FM-TV
Broadcast Services of The Dallas Morning News
Communications Center, (214) 748-9631, Dallas, Texas 75202

Mike Shapiro
ce-President & General Manager

November 23, 1970

Mr. John D. Rowland
2009 Ninth Street
Lubbock, Texas

Dear Mr. Rowland:

Thank you for your letter. Regretfully, I shall be out of the city the latter part of this week so the dates you have selected would be most inconvenient.

Quite honestly, I am a little in the dark as to your objective. Are you talking about designing a regional broadcast network from the technical angle - such as ordering lines, availability, etc? If so, the person you should speak to at our Station is Mr. Don Easterwood.

If your approach is something else please drop me a line and I'll try to be as much help to you as I can.

Sincerely yours,

MIKE SHAPIRO

Air Mail

John D. Rowland
2009 9th
Lubbock, Texas

George Milne
Director of Production Planning & Control(ABC-TV)
New York City, New York

Dear Mr. Milne,

I'am a fifth year architectural student at Texas Tech. University. I have choosen to design a regional broadcasting network for the southwest as my terminal problem. My research is at the point that I need specific information from the major networks. Through information acquired from Broadcasting Yearbook, I learned that the three major networks supply, on the average, 61.7% of local station air time. I need to know:

1. Size and number of studios required to produce roughly 75 hours a week

2. Personnel: number & type

3. Equipment, RCA TK-42 color camera, etc.

Also any information you might have as to the name of the architectural firm that might have assisted you in the design or planning of your facilities would be helpful Any information or assistance you can give me would be greatly appreciated.

Yours truly,

John D. Rowland

John D. Rowland
2009 9th
Lubbock, Texas

Leonard Chaimoiortz
Informatio Services CBS-TV
New York City, New York

Dear Mr. Chaimoiortz,

I'am a fifth year architectural student at Texas Tech. University. I have choosen to design a regional broadcasting network for the southwest as my terminal problem. My research is at the point that I need specific information from the major networks. Through information acquired from Broadcasting Yearbook, I learned that the three major networks supply, on the average, 61.7% of local station air time. I need to know:

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Yours truly,

John D. Rowland

John D. Rowland
2009 9th
Lubbock, Texas

Martin Meany
Manager Allocation Engineering
Burbank, California

Dear Mr. Meany,

I'am a fifth year architectural student at Texas Tech University. I have chosen the design of a regional broadcasting network as my terminal thesis problem. My research has now reached the point where I need specific information fron the three major networks. I need to know:

1. The facilities necessary for: 1 hour variety show (live & video tape)
2. The facilities necessary for a 1 hour drama (film,video tape,live)
3. Number and size of studios required to produce 75 hours weekly to local stations

Your help would be greatly appreciated.

Yours truly,

John D. Rowland

John D. Rowland
2009 9th
Lubbock, Texas

Robert Gould
Program Director, WBAP-TV
Fort Worth, Texas

Dear Mr. Gould,

I'am a fifth year architectural student at Texas Tech University. I have chosen the design of a regional broadcasting network as my terminal thesis problem. Because of the vastness of my problem any information you could send me in regards to the transmission or production of hour and ½ hour shows: (live or video tape), would be greatly appreciated.

Example: 1 hour (variety show)
video tape
personnel
equipment
studio size (with live audience)

If you aren't able to supply me with this information, any futher sources or references would be greatly appreciated.

Yours truly,

John D. Rowland

John D. Rowland
2009 9th
Lubbock, Texas

R.L. Pointer
Director of Broadcast Engineering
New York City, New York

Dear Mr. Pointer,

I'am a fifth year architectural student at Texas Tech. University. I have choosen the design of a regional broadcasting network as my terminal thesis problem. My research has reached the point where I need specific information from the three major networks. I need to know:

1. The facilities necessary for: 1 hour variety show (live & video tape)

2. The facilities necessary for a 1 hour drama (film,video tape,live)

3. Number and size of studios required to produce 75 hours weekly to local stations

Your help in these general fields would be greatly appreciated.

Yours truly,

John D. Rowland

John D. Rowland
2009 9th
Lubbock, Texas

J.D. Parker
Director Transmission Engineering
New York City, New York

Dear Mr. Parker,

I'am a fifth year architectural student at Texas Tech University. I have chosen the design of a regional broadcasting network as my terminal thesis problem. My research has reached the point where I need specific information from the three major networks. I need to know:

1. Equipment necessary to produce & transmit on a national level.

2. Any catalogs or trade magazines which may have useful information.

Any help in these fields would be greatly appreciated.

Yours truly,

John D. Rowland

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