INTRODUCTION OF AN ORGANIZED TRAINING PROGRAM

IN THE PLANT DEPARTMENT OF

THE SOUTHWESTERN BELL TELEPHONE COMPANY

A thesis submitted to the faculties of
The School of Engineering and the Graduate School
The University of Kansas

For

THE DEGREE OF ELECTRICAL ENGINEER

By

Eric S. Minet

1929
Training has always been a part of our lives either at home, in school or in business. Training is necessary in order to perform any kind of work in the most satisfactory manner. Telephone work is highly specialized, and the telephone business has experienced a rapid growth. The Southwestern Bell Telephone Company has doubled in size during the past thirteen years and the present rate of growth indicates that the company will again double in size during the next eighteen or twenty years. Consequently, the need for training satisfactory workers has long been recognized and the newer developments in our business; such as, the dial system of operation, tele-photograph, the telephone typewriter and other special services have brought about the need for proper training of telephone workers.

Although the training of the plant forces of the Southwestern Bell Telephone Company has not been on a uniform basis in the past, the results obtained such as the reduction in costs and improved service indicates that the job of training has been comparatively good.

However, due to the rapid growth of the business and the large number of improvements in the telephone art, it has become necessary to organize the plant training program. Plant work, which consists of engineering, construction and maintenance of the telephone property and equipment is highly technical and very exacting. A well trained plant personnel is necessary in order to provide the kind of telephone service
which the public expects and which the telephone company wants to provide.

Other features of the telephone business; its financial policy, its researches, its engineering, manufacturing, construction, operation and maintenance have been systematized in order to meet the demands of the public and the obligations of the industry. It is also necessary to organize a uniform plant training program.

By the end of this year, 36% of all the telephones in the Southwestern Company will be operated by dial offices. During the next five years, $45,000,000 will be invested in inter-city toll cables which will connect the principal cities in the Southwestern Company's territory as shown by Exhibit I. Carrier telephone circuits have been developed until now it is possible to send as many as 20 messages on one group (4) of wires. Telephone typewriter service is increasing and the telephone circuits are being used more and more for radio broadcasting.

Recognizing that all these jobs require trained men, the company has set out to train its plant forces according to a uniform program.

The training problem is to advance in skill and knowledge now employees as well as present forces so as to make these people more effective in performing definite particular things. Consideration of the training program discloses that training must be done on the job or at a place away from the job, that is, job training or centralized school training. Job training is ordinarily applied to suit individuals. Centralized school training is primarily designed to meet the needs of
a group of people who have the same training need simultaneously. Due
to the widely scattered forces and since plant training is so closely
tied up with production, it is evident that the training responsibility
lies with the supervisors and foremen who are responsible for the jobs
and since training is generally recognized as a definite responsibility
of the line organization, the first requirement of the organized train-
ing program is a large group of trained instructors.

The aim is to give all supervisors and foremen who have direct
training responsibilities a uniform training in the principles and
fundamental practices of the teaching art.

The plan is to conduct vocational instructors training courses
in which foremen, wire chiefs and other supervisors will study and
practice the methods of teaching. Thus, by special training, these
supervisors will add to their knowledge of the telephone business some
of the tricks of the trade of teaching and they will be able to impart
their expert telephone knowledge to the learners with a minimum of
effort and with more satisfactory results.

Just as in the case of changed engineering practices and new
methods, the need is for one who is thoroughly familiar with the changes;
so in training work, the need is for trainers who are familiar with the
proper teaching methods. It is not good business to attempt to substi-
tute enthusiasm and willingness for the ability as a trained trainer.
In vocational training, the first requirement of a trained trainer is
that he must know the job and have sufficient skill to properly demon-
strate same. The second requirement is that he should understand
teaching practices; he must know fundamental principals and have enough actual teaching experience to assure those being trained of a proper understanding of those things to be taught.

The author of this thesis has not attempted to enter into a discussion of the fundamentals and various methods and techniques of teaching industrial subjects. The author has endeavored to give, first, an appreciation of the need of an organized vocational training program in the Plant Department of the Southwestern Bell Telephone Company, second, a description of an accepted method of teaching vocational subjects in industry, third, the practical application of this method to the Plant Department of the Southwestern Bell Telephone Company, fourth, the actual introduction of the organized program in the company, and, fifth, the administration of the training program.

The author hopes that the thesis will be of help to anyone who is interested in the field of industrial education and who is particularly desirous of becoming familiar with the actual introduction, application and administration of an organized vocational training program in a large industry.
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<td>Photograph of First Vocational Instruction Training Conference Held in Dallas,</td>
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<td>Photograph of Vocational Instruction Training Conference Held at St. Louis,</td>
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CHAPTER I

General Information Regarding the Southwestern Bell Telephone Company

The Southwestern Bell Telephone Company serves the five States of Missouri, Arkansas, Kansas, Oklahoma and Texas and a small portion of Illinois adjacent to St. Louis. This region covers about one-sixth of the total area of the United States and has a population of approximately sixteen million. This service includes both exchange and toll. At the end of 1928, the Southwestern Company was serving 1,299,401 company owned telephones, and was connected with 845,028 telephones of rural lines and other telephone companies in the five States. The Southwestern Company maintains 783 central offices, 48411 miles of pole lines and 421843 miles of toll wire. During 1928, an average of 9,327,182 exchange messages were carried over the Southwestern wires per day. During the year, there were 63,797,146 outward toll messages.

The Southwestern Company is one of the associated companies of the Bell System. It is the policy of this company as it is of the Bell System to provide a continually improving service at the lowest cost consistent with financial safety; that is, to provide a satisfactory service for the area served free so far as humanly possible from
imperfections, errors, or delays and enabling, at all times, anyone anywhere to pick up a telephone and talk to anyone else anywhere else clearly, quickly and at a reasonable cost.

The number of employees in the company at the end of 1928 were as follows:

<p>| | |</p>
<table>
<thead>
<tr>
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<th></th>
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<tbody>
<tr>
<td>Men</td>
<td>9,640</td>
</tr>
<tr>
<td>Women</td>
<td>18,760</td>
</tr>
<tr>
<td>Total</td>
<td>28,400</td>
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The company with general offices at St. Louis, Missouri, is divided into four operating areas which are:

<table>
<thead>
<tr>
<th>Area</th>
<th>Headquarters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Missouri and Arkansas</td>
<td>St. Louis</td>
</tr>
<tr>
<td>Western Missouri and Kansas</td>
<td>Kansas City, Missouri</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>Oklahoma City</td>
</tr>
<tr>
<td>Texas</td>
<td>Dallas</td>
</tr>
</tbody>
</table>

A map giving the four area boundaries is shown on the following page.

The company organization is composed of the Plant, Commercial, Traffic, Engineering, Accounting, Statistical, Publicity and Legal Departments.

The responsibility of the Plant Department is to engineer and construct the outside plant (both exchange and toll) and to maintain all plant including buildings, central office equipment, outside exchange and toll plant.

The Commercial Department has charge of the Company's business affairs. This includes the responsibility for sales work, handling of
A Map of the Southwestern Bell Telephone Company's Territory

Showing the Boundaries of the Four Operating Areas
contracts for service, collections, rate matters, dealings with regulatory bodies, directory matters, special contracts of all kinds, business dealings with other telephone companies, as well as an active interest in all matters affecting the earnings of the Company.

The Traffic Department is the operating department. Its function is the satisfactory and economical establishment of local and long distance telephone connections. To do this involves a study and development of the methods of handling the service that are most acceptable to the public and are at the same time consistent with economic conditions of the company; the provision of the proper type and amount of switchboard and toll line equipment to satisfactorily handle the telephone users' service, and the provision, training, arranging, and supervising of the necessary operating forces for the handling of this service.

The Engineering Department is in general responsible for the technical standards and design of the plant. This includes the development of general plans for the extension of the plant, detail engineering of buildings and equipment, supervision of practices and design to insure proper transmission and protection standards, the standardization of outside plant materials, together with a broad technical supervision of the outside plant engineering, and plant inventories and valuations.

The names of the other departments are descriptive of their respective responsibilities.
CHAPTER II

THE PLANT DEPARTMENT

Since this thesis has to do with the introduction of a training program in the Plant Department, a more detailed description of the Plant Department follows:

An Organization Chart of the Plant Department is shown on the following page. The organization is of a non-functional type and has the same four operating areas as mentioned in Chapter I.

The Plant Department is headed by the General Plant Manager with the General Office located in St. Louis. The four Plant Superintendents who head up the area organizations report to the General Plant Manager. The General Plant Manager also has reporting to him his Staff, consisting of the General Plant Supervisor, the General Plant Personnel Supervisor and the Supervisor of Real Estate. Each Plant Superintendent has as his immediate subordinate the Division Plant Superintendents and the Construction Superintendent for that area. The Eastern Missouri and Arkansas area has three divisions; the Western Missouri and Kansas area has three divisions; the Oklahoma area has two divisions and the Texas area has four divisions.

The divisions are in turn divided into districts each headed by a District Plant Chief as shown by the Organization Chart.

The second page following gives some data relating to the names of the various divisions of each operating area, the names of the
Note: The figures shown in brackets represent the total number of regular employees as of January 1, 1929.
## Exchange and Station Data

### Year: 1929
### Jan 1
### Operating Areas

#### Headquarters

<table>
<thead>
<tr>
<th>East Missouri and Arkansas</th>
<th>West Missouri and Kansas</th>
<th>Oklahoma</th>
<th>Texas</th>
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<tbody>
<tr>
<td>St. Louis, Mo.</td>
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<td>Oklahoma City, Okla.</td>
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### Plant Statistical Report No. 33B

#### Plant Department

<table>
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<th>State</th>
<th>Plant</th>
<th>Station</th>
<th>Station</th>
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### Plant Department Sheet No. 1

#### State Plant Statistics

<table>
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<th>State</th>
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<th>Station</th>
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<tbody>
<tr>
<td>Missouri</td>
<td>Little Rock, Ark.</td>
<td>Kansas City, Mo.</td>
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### Exchange and Station Data

#### Summary

<table>
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<tr>
<th>Exchange</th>
<th>Defects</th>
<th>Repair</th>
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<td>22</td>
<td>12</td>
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<td>Little Rock, Ark.</td>
<td>Kansas City, Mo.</td>
<td>Kansas City, Mo.</td>
</tr>
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</table>
districts in each division, the names of exchanges in each district
and the number of telephones by exchanges or cities served.

Outside plant engineering is performed by the Division
Plant Engineers (and their forces) who report to their respective
Division Plant Superintendents. This work consists of making plans
for and estimating the cost of all exchange and toll plant and main-
taining records regarding the exchange and toll plant. Exchange plant
engineering consists of engineering pole lines, wire, aerial cable,
underground cable, conduit, house conduit and house cable; toll plant
engineering consists of engineering toll pole lines, toll wire, toll
cable and toll conduit.

The above plant, both exchange and toll, after being engineer-
ed is built by the Construction Department in accordance with the
engineering plans and in accordance with standard specifications. The
organization of the Construction Department is also shown by the organ-
ization chart.

The Maintenance Department, headed by the District Plant
Chiefs who report to the Division Plant Superintendents, performs all
routine substation installations, changes and removals, repair sub-
station equipment, maintain all buildings, switchboards and other
central office equipment and maintain the exchange and toll plant. These
forces also make minor equipment installations.

Each Plant Superintendent also has a Staff which is composed
of the Plant Supervisor and his forces, Personnel Supervisor, and the
Buildings and Supplies Superintendent. Each Division Plant Superintendent
has a few staff men who are experts in the maintenance of toll and exchange plant and in equipment matters.

The number of permanent plant employees by operating areas in the Southwestern Company are approximately as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of Plant Employees</th>
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</thead>
<tbody>
<tr>
<td>Eastern Missouri and Arkansas</td>
<td>2100</td>
</tr>
<tr>
<td>Western Missouri and Kansas</td>
<td>1600</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>1000</td>
</tr>
<tr>
<td>Staff and Miscellaneous</td>
<td>50</td>
</tr>
<tr>
<td>Texas</td>
<td>2550</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7300</strong></td>
</tr>
</tbody>
</table>
A vocation is a person's economic employment - occupation, trade, business or profession. This term includes all means whereby people earn a livelihood. So considering the various occupations in the Plant Department of the Southwestern Company, it is evident that a great many vocations are represented. The more important vocations are substation installer, substation repairman, linesman, groundman, cable splicer, cable splicer's helper, equipment installer, central office repairman, P.B.X. installer, P.B.X. repairman, toll line repairman, switchman (central office repairman for dial offices), toll testboardman, exchange testboardman, frameman, exchange engineer, toll engineer, draftsman, janitor, elevator operator, miscellaneous clerks, reporter attendant and right-of-way agent.

Vocational training has for its purpose, training of the individuals to do certain definite things as effectively as possible. The names of the large number of vocations in the above paragraph are descriptive of telephone training requirements.

Vocational training as applied to the Plant Department of the company at this time must not be confused with supervisory training; that is, the primary end of vocational training only has
to do with training the employees below the supervisory rank (however the supervisory organization will greatly benefit by the organized training program).
CHAPTER IV

APPRECIATION OF TRAINING NEEDS

Although, training of the plant forces of the Southwestern Bell Telephone Company has not been on a uniform basis in the past, the results obtained such as the reduction in costs shown by the rating plans and the improvements in service indicate that the job of training has been comparatively good.

However, due to the rapid growth of the business and the large number of improvements in the telephone art, it has become necessary to organize the plant training program. Plant work which consists of engineering, construction and maintenance of the telephone property and equipment is highly technical and very exacting.

By the end of 1929, 36 per cent of all telephones will be operated by dial offices. During the next five years, forty-five million dollars will be invested in inter-city toll cable which will connect the principal cities in the Southwestern territory. Much of this cable will be underground. Carrier telephone circuits have been developed until it is now possible to send as many as 20 messages on one group of wires. Telephone typewriter service is increasing and telephone circuits are being used more and more for radio broadcasting. Recognizing that all these jobs require well trained men, the company has set out to train its plant forces according to a
Another factor which enters into the necessity of organizing plant training is the increased demands being made by the public. The public is demanding higher speed in completing both exchange and toll calls, and also assurance against interruption. Subscribers are now demanding prompt installations and quicker repair service comparable with that furnished by other public utilities. The rural subscribers are expecting more dependable and improved service. Business firms want such wiring plans and switchboard arrangements that will actually meet their telephone needs. In addition to the above things, subscribers are expecting better looking equipment than has been provided in the past, such as, hand telephone sets in preference to the deskstands.

The company has a large plant labor turnover and it is believed that this can be improved by introducing an organized training program. The following table gives some comparative figures showing the plant labor turnover situation in the Bell System and in the Southwestern Company:

<table>
<thead>
<tr>
<th></th>
<th>1927</th>
<th>1935</th>
<th>Avg.</th>
<th>Annual</th>
<th>Net Gain</th>
<th>Deduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell System (Stations) a</td>
<td>14,000,000</td>
<td>17,000,000</td>
<td>3750</td>
<td>over 30,000 (excludes temporary employee)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Number of Plant Employees)</td>
<td>105,000</td>
<td>135,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwestern System (Stations) b</td>
<td>1,234,000</td>
<td>1,700,000</td>
<td>225</td>
<td>4,800 (all employees)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Number of Plant Employees)</td>
<td>7,200</td>
<td>9,000</td>
<td></td>
<td></td>
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</tbody>
</table>
The above comparison between stations and plant employees is given to show that the number of plant employees will probably remain almost proportional to the number of stations. The Southwestern Company during the past few years has averaged approximately 6.3 plant employees per 1000 stations.

It is noted by the above figures in columns (a) and (c) that the labor turnover of the Southwestern Company is large. Each year the Plant Department of the Southwestern Company hires and gives some training to and then lets go about forty-eight hundred employees per year for a net gain of two hundred twenty-five. The past experience indicates that the plant labor turnover during the next five years will be about sixty or sixty-five per cent per year. This percentage is calculated by dividing the probable annual deductions in forces by the total average number of employees.

The chief reasons for the large labor turnover are as follows:

a. Temporary employees
b. Improper supervision and training
c. Unforeseen conditions
d. Lack of a uniform program

The company hires a great many men for temporary jobs; these jobs consist principally of conduit work and ground work. In conduit work, temporary employees are hired to dig ditches for placing main underground conduit and lateral conduit. The ground work for which temporary employees are hired consists of work with either toll line or exchange construction gangs. These men dig holes, unload poles and perform such work requiring a low degree of skill. Approximately one-third of the total labor turnover is due to
temporary employees alone.

Many employees leave the service because of improper supervision, improper training and also due to poor selection. A new employee often gets in the wrong frame of mind before he has been with the company long enough to understand the company's policies, and work assigned him. Any business is a relationship between individuals and the success of the business depends upon the contentment of the individuals. The frame of mind of a person is nothing more or less than the result of the ideas he has gotten on the job or the ideas he is now getting. The principal features of the job which are apt to give him a right or wrong frame of mind are:

1. People on the job
2. Company's policies
3. Work assigned for him to do

Quite often, unforeseen conditions arise which result in the hiring of large groups of men. These conditions consist chiefly of elect storms, wind storms and tornadoes which make it necessary to do prompt reconstruction work to place the plant back in service.

The lack of a uniform program has, at times, resulted in the laying off of employees which might have been avoided had the program been made uniform. The Southwestern Company has had comparatively little loss because of this reason.

Regardless of the reasons for having employees leave the service, it is a costly proposition. Every employee who has
left the service was interviewed by someone when he entered the service, was given a physical examination, was assigned to a job and given training. These operations cost money.

The following figures give the actual 1928 plant labor turnover by operating areas excluding the temporary employees:

<table>
<thead>
<tr>
<th>Operating Area</th>
<th>Percentage Plant Labor Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Missouri and Arkansas</td>
<td>52%</td>
</tr>
<tr>
<td>Western Missouri and Kansas</td>
<td>26%</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>30%</td>
</tr>
<tr>
<td>Texas</td>
<td>34%</td>
</tr>
<tr>
<td>Company</td>
<td>39%</td>
</tr>
</tbody>
</table>

As stated above, an excessive labor turnover costs money, and if labor turnover can be reduced by proper training, better selection of employees, and improved supervision; some reductions should result in the plant payroll. In order to get some idea of the cost of labor, following are some average comparative figures:

- Total plant investment: $265,000,000
- Gross additions per year: $41,000,000
- Net additions per year: $19,000,000
- Total current maintenance per year: $20,000,000
- Plant payroll per year: $11,000,000

Another feature which shows the necessity of improved training is that the Plant Department in assuming some responsibilities, which the Traffic Department formerly had, due to the change from manual to dial operation. It was formerly the responsibility of the Traffic Department to complete calls at the switchboard by means of cords. Whether the subscriber received a prompt and correct connection or not depended upon this operation. Now with
the telephones being converted to dial operation, it is the responsibility of the Plant Department to make these connections as the Plant Department maintains the machine switching equipment which completes the calls.

Another feature which brings about the importance of proper training is that the increase in forces will probably be largely in the Substation Installation and Maintenance Departments rather than in the Construction Department. These substation installation and maintenance forces are continually meeting the public to install telephones or repair telephones. Consequently, since these new forces will be so closely connected with the public, it brings about a further necessity of improved training.

The above conditions help to portray the need for an organized training program in the Southwestern Company. The same conditions to some extent exist in all the associated companies of the Bell System.

The Bell System is a success because it has a service to sell which is well worth the cost. The Bell System has made uniforms or has standardized on most of the important features of the telephone business. The Bell System has a sound financial policy. The American Telephone and Telegraph stock is recognized as one of the premier investment securities in the world. The new stock issues to finance the increased growth of the telephone plant and improved
service to the public are readily bought by the existing stockholders.

The manufacturing methods by the Western Electric Company, which is the manufacturing company for the Bell System, have become standardized. The Western Electric Company now has two large manufacturing plants in operation, the Hawthorne Plant at Chicago, employing approximately forty thousand men and another large plant at Kearny, New Jersey. This company has recently purchased 120 acres of land at Baltimore, Maryland, for a third manufacturing plant. This third plant will cost thirty-three million dollars and is being built for the manufacture of toll cable.

The engineering, construction, operation and maintenance practices have likewise become standardized.

There remains one important feature of the industry, however, which has yet to receive its share of effort and that is the matter relating to the best utilization of the human factor. This feature is largely a matter of proper training and the Bell Companies are now taking steps to systematize the work.
CHAPTER V

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

VOCATIONAL TRAINING CONFERENCES

The American Telephone and Telegraph Company, parent company of the various associated companies of the Bell System, recognizing the need for improved training methods throughout the nation, requested that each of the companies send to New York City one or two representatives for the purpose of holding conferences on vocational training. During 1928, three such conferences, each composed of about twelve men were held.

Two representatives, the General Plant Personnel Supervisor and the General Plant Training Supervisor, from the Southwestern Company attended the third conference. This conference, lasting six weeks, was in session during October and November in 1928 and was the last conference held. The purpose of these conferences was to give the associated company representatives a proposed method of organizing the plant training. These representatives then returned to their respective companies to introduce the training work.

The methods proposed were found in a general way to be adaptable to the Southwestern Company. It is understood that most of the associated companies are progressing with the proposed plans, and consequently, the organized vocational training program has become a
nation wide activity.

The New York City Conferences were held on a discussional basis directed by a very capable and experienced conference leader. The Conferences held on a discussional basis promote group thinking and the action taken by the individual after leaving the group depends largely upon the extent of his participation in the group thinking.

The subject matter discussed during the six weeks conferences consisted of the following:

1. Appreciation of training needs
2. Introduction of the teaching methods
3. Lesson analysis and lesson preparation
4. Layout of course
5. Supervised practice in lesson analysis, the use of the teaching methods and preparation of course
6. Some technique in conference leadership

The conferences were furnished with a set of notes covering the first five of the above six features. Exhibit 6 of this thesis consists of a copy of the notes.

After the representatives of the Southwestern Company had returned from the New York City Conferences, it was necessary to adapt the training methods to fit the needs of the company and to formulate plans introducing an organized training program in the company.

The formulation of such plans, the actual introduction of the plans and means of administering the training program in the Southwestern Company forms the main body of this thesis.
CHAPTER VI
FIRST REQUIREMENT OF THE ORGANIZED
VOCATIONAL TRAINING PROGRAM

The purpose of the training program is to advance in skill and
knowledge the new employees as well as present employees so as to make
these people more effective in performing definite particular things.

Consideration of the training program discloses that train-
ing must be done on the job or at a place away from the job. These
two types of training are classified as job training and centralized
school training. Centralized school training may be of a permanent
nature or of a temporary nature. Job training is ordinarily applied
to suit individuals. Centralized school training is primarily design-
ed to meet the needs of a group of people who have the same training
need simultaneously. Due to the widely scattered forces in the South-
western Company, it appears that job training is better adapted to the
larger portion of the company. This being the case, the first require-
ment of organizing the training of the plant forces is a large group of
trained instructors to do the job training and sufficient trained in-
structors to carry on the centralized school training. Most of the
training will be done on the job and centralized schools will be estab-
lished, either temporary or permanent, where conditions make it desirable.
The instructors for job training will consist of the foremen, Wire Chiefs,
District Plant Chiefs, and Supervising Foremen who now have the training
responsibilities.
The instructors for the centralized school work will be men who have been picked because of special qualifications.

In order to introduce the organized training program into the company, it was first necessary to assure those assigned instruction work being given uniform training in the fundamental practices and principals of the teaching art. It seemed desirable to hold conferences for these Foremen, Wire Chiefs, District Plant Chiefs and Supervising Foremen referred to above. These men who are to receive this teacher training will be referred to later in this thesis as instructors or as vocational instructors.
CHAPTER VII

PLAN FOR INTRODUCING THE ORGANIZED TRAINING
PROGRAM IN THE SOUTHWESTERN BELL TELEPHONE
COMPANY

Having decided to equip those who have training respons-
sibilities, as trained trainers, there was considerable discussion as
to whether these vocational training conferences should be held for a
three weeks period or for a four weeks period.

The work of training trainers may be divided into two parts,
the same as any other kind of training. These two parts are "knowledge"
and "supervised practice." The proportion of knowledge and supervised
practice required varies, depending upon the nature of the training.
In the case of training instructors, errors have been made in the past.
The most common error is attempting to do the training work spasmodically
or in too short a time. Many attempts of the following nature have been
tried:

A group of foremen meet with a leader who often has only a
limited teaching background. For two or possibly three hours a week,
the conference method is attempted but there is no clear idea of its
fundamental use.

It has been demonstrated definitely for conference purposes,
that less than ninety hours of training for a foreman as teacher is
almost wasted. With only three hours a week of such training, it would
require thirty weeks to qualify the individual. A more practical way
is to use a more intensive full time period for training. This gives
the best results not only in the quantity of teaching but also by
equipping the foreman to apply the teaching ability during the time he
would otherwise be receiving three hours a week training.

The knowledge portion of training vocational instructors, in-
cluding an appreciation of the training needs, teaching methods, lesson
analysis and also how to lay out a course might be covered in a week's
time. The question then resolves itself into how much supervised teach-
ing practice should be given. The advantage of the four weeks conference
lies in the additional thoroughness of the knowledge portion and the
additional supervised teaching practice given the conferences.

However, the removal of the foremen and Wire Chiefs from the
job is not only a very expensive proposition but the practice tends to
temporarily weaken the organization while those supervisors are away
from the job. It is an expensive practice, and, consequently, it can
be seen that there is a point of diminishing returns; that is, there is
a point beyond which the good obtained in the conferences does not
compensate for the expense of continuing the conference.

The cost of keeping one man in such a conference amounts to
approximately one hundred ten dollars per week, therefore, the cost of
the conference of the twelve members amounts to about thirteen hundred
dollars per week. Considering this fact, it seemed desirable to limit
the conferences to three weeks, providing means could be introduced to
assure the foremen and Wire Chiefs leaving the three weeks conference
as well trained instructors. Consequently, much thought was given to

the matter with the adoption of the following means to assure a successful three weeks conference.

a. Form 1, shown on page 53, was developed for the purpose of analyzing job assignments. This form is used by the members of the three weeks conferences and facilitates the lesson analysis work. The operating points are listed on the left side of the sheet and opposite each operating point is listed in column two the ideas that must be in the possession of the one who is to successfully perform the job. A full description of the use of this form is given in Chapter X.

b. Form 2, Instructors' Lesson Plan Sheet, shown on page 55, was prepared for facilitating lesson planning work during the three weeks conferences. This form is also described in Chapter X.

c. Form 3, The Learners' Progress Record, shown on page 59, was developed for the purpose of use by the instructors after they leave the conference. This form provides a means by which the instructors may keep a record of the various jobs that each of his men can or cannot do satisfactorily. The real purpose and advantages of this form are described in Chapter X.

d. Form 4, The Instructors' Lesson Plan Sheet in Handbook Size, was developed for the use of instructors after they go back on the job; this form provides a handy means for the instructors to make up their lessons and keep their lessons on file in the handbooks described in (h) below. (See exhibit 5.)

e. Form 5, Learners' Progress Record in Handbook Size, was developed for the use of the instructors who would prefer this record
in small size rather than the large size described in (e) above. (See exhibit 5)

f. Another means of helping to assure that the subject matter would be covered in a three weeks period is for the conferences to be in session seven full hours a day instead of six one-half hours as has been the practice in some previous conferences.

g. In addition to the seven hours required in the conference room, each conferree is required to study at least one hour outside per day. It should be impressed upon the conferree at the start of each conference that this hour of outside work per day should be given regularly rather than let it accumulate for week ends.

h. In order to help the conferree to assimilate the information covered during the conference, the American Telephone and Telegraph Notes, the same as exhibit 6 of this thesis, is given each conferree. The conferrees of course, take notes during the day, and, no doubt, find that their own notes are sometimes more valuable than the printed notes.

i. The large size notes described immediately above serve very well as a text but are not so desirable as a reference book, consequently, the main features of the subject matter contained in the large size notes have been briefed and printed in handbook size as shown by exhibit 5. A brief discussion of the teaching methods, lines of approach, the teaching and learning process, planning lessons, the teaching contents and course preparation are included in this handbook. In addition, each conferree is furnished fifty Instructor Lesson Plan Sheets, Form 4, and copies of the Learners' Progress Record, Form 5. The course,
prepared by each conference, is typed on the Learners' Progress Record Sheets and returned to the instructors after they go back to the job.

J. It is necessary, in order to assure the program being carried out, to properly administer the work through the lines of organization after the instructors leave the three weeks conferences.

If the plans are not properly supervised after the instructors leave the conference, the organized training program will possibly not be more than fifteen per cent effective. Consequently, by having active follow-ups, it is hoped that the organized training program can be made at least 75 per cent effective. The follow-ups will, of course, be handled by the supervisors in the line organization as well as by the Plant Superintendents' and General Plant Manager's Staffs. The instructors during the three weeks conferences receive the knowledge of how to train and considerable supervised practice. It will take, however, possibly four or five months of active use of the teaching methods in the field for these men to become "seasoned instructors."

This feature is covered more in detail in Section "G" of the Statement of Policy in Chapter IX.

The three weeks conferences discussed above are for the purpose of making trained trainers out of those who have the responsibilities of trainers; this includes the first and second line supervisors; that is, foremen, wire chiefs and special instructors are the first line supervisors and the District Plant Chiefs and Supervising Construction Foremen, Supervising Installation Foremen, Supervising Repair Foremen and Supervising Splicing Foremen are the second line supervisors. In the administration of any such large program, in an organization like
the Plant Department of the Southwestern Bell Telephone Company, it is of course desirable that the higher supervisors be made familiar with the plans. Consequently, it seemed desirable to hold two day informational conferences for this purpose. It was realized that it would be impossible to give the higher supervisors a detailed knowledge of the matters which would be covered in the three weeks conferences. Yet, it was found that in the two days, it would be possible to give:

1. An appreciation of the training needs
2. A brief description of the teaching methods and other techniques of teaching
3. A description of the mechanics of job analysis and lesson preparation
4. A description of the mechanics of course preparation
5. A discussion of the Statement of Policy
6. Special explanation or suggested means for administering the organized training program after the vocational instructors leave the conference.

A study revealed that it would take one person; that is, the General Plant Training Supervisor, approximately six years to hold the three weeks conferences in all four areas of the Southwestern Company. This would, of course, take too long, consequently, it was decided to appoint a Plant Training Supervisor for each of the four operating areas, who would conduct the three weeks conferences. Those four appointments were made.

Three plans were considered for the actual introduction of the training program in the Southwestern Company. These plans embodied:

1. The holding of the two day informational conferences for the supervisors above the rank of the second line supervisors.
2. The training of the 4 area Plant Training Supervisors as conference leaders and giving them a full knowledge of the training program so that they could conduct the three weeks conferences in their respective areas.
3. The holding of the three weeks vocational training conferences.

The three plans considered were briefly as follows:

PLAN I

1. The General Plant Training Supervisor to first hold a three weeks Vocational Training Conference in St. Louis.

This was for the purpose of giving the General Plant Training Supervisor who had had no conference leading experience, some experience as a conference leader and to try out or test the teaching methods.

2. The General Plant Training Supervisor to hold a four or five weeks conference in St. Louis with the Plant Personnel Supervisors and Plant Training Supervisors from each of the four areas (total of eight attending). This conference would have been for the purpose of giving these men sufficient knowledge of the training program, sufficient training as conference leaders and suggestions for properly administering the program.

3. These area Plant Personnel Supervisors and Plant Training Supervisors to then return to their respective area to hold the two days informational conferences for the higher supervisors and the three weeks conferences for the Vocational Instructors.

PLAN II

1. The General Plant Training Supervisor to conduct a three weeks conference in St. Louis for the purpose described in paragraph 1 under Plan I.

2. The General Plant Training Supervisor to hold the two days conferences in St. Louis for the Eastern Missouri and Arkansas area.
3. The General Plant Training Supervisor to hold two three
weeks conferences in St. Louis with this area's Plant Personnel
Supervisor attending the first conference and the Plant Training
Supervisor attending both conferences.

4. The Eastern Missouri and Arkansas area Plant Training
Supervisor to continue the three weeks conferences.

5. The General Plant Training Supervisor to then go to each
of the other three operating areas to conduct conferences as described
in paragraphs 2, 3 and 4 immediately above.

PLAN III

1. The General Plant Training Supervisor to hold a three
weeks conference as described in paragraph 1 under Plan 1.

2. The General Plant Training Supervisor to conduct the two
days informational conferences in St. Louis.

3. The General Plant Training Supervisor to conduct two three
weeks conferences in St. Louis with eight foremen and the Plant Personnel
Supervisors and Plant Training Supervisors from the Eastern Missouri and
Arkansas and Western Missouri and Kansas areas attending the first, and
ten foremen and the two plant training supervisors attending the second.

4. The Plant Training Supervisors to then continue the three
weeks conferences for their respective areas until completed.

5. The General Plant Training Supervisor then to conduct the
two days conferences for the Western Missouri and Kansas area at Kansas
City and the Western Missouri and Kansas Plant Training Supervisor to
start and continue the three weeks conferences until completed.
6. The General Plant Training Supervisor to repeat items 2, 3, 4 and 5 at Dallas and Oklahoma City with the Texas and Oklahoma Plant Personnel Supervisors and Plant Training Supervisors taking part as described for the Eastern Missouri and Arkansas and the Western Missouri and Kansas areas respectively.

7. The General Plant Training Supervisor then to sit through one three weeks conference held by each of the four area Plant Training Supervisors in the following order:

Dallas, Oklahoma City, Kansas City and St. Louis.

Plan three is a combination of plans one and two and has an important advantage over plan two in that it permits an earlier starting of the three weeks conferences in all four areas. Plan three seemed to permit actual starting of the three weeks conferences in all areas practically as soon as plan one and has the distinct advantage of permitting the General Plant Training Supervisor becoming actually engaged in the introduction work in all four areas, thus assuring closer supervision of the introduction work by a General Office representative and also giving the General Plant Training Supervisor a closer contact with the field conditions, need for training and reactions from the line organization. A study of the economy of the plans along with the above considerations indicated that plan three should be adopted.

Consequently, the General Plant Personnel Supervisor submitted the three plans to the Plant Superintendents conference held at Oklahoma City. Plan three was adopted without change, with the approval by the four Plant Superintendents of the following schedule:
St. Louis -

December 17 - January 5.

Introductory conferences in St. Louis for supervisors above the
level of the first line supervisor in the Eastern Missouri
and Arkansas territory. Tentative plans provide for either
three or four such conferences, each probably lasting two
days and to be led by the General Plant Training Supervisor.

St. Louis -

January 7 - January 26.

First Vocational Training Conference in St. Louis to be led by
the General Plant Training Supervisor. This group to consist
of:

12 foremen instructors

St. Louis -

January 28 - February 16.

Vocational Training Conference in St. Louis to be led by the
General Plant Training Supervisor and consisting of:

8 foremen instructors - Eastern Missouri and Arkansas terri-

2 personal supervisors, one from Kansas City and one from
St. Louis

2 training supervisors, one from Kansas City and one from
St. Louis

12

St. Louis -

February 18 - March 9.

Conference in St. Louis to be led by the General Plant Training
Supervisor and consisting of:

10 foremen instructors - Eastern Missouri and Arkansas terri-

2 training supervisors, one from Kansas City and one from
St. Louis

12

Thus, each training supervisor will have attended two conferences
led by the General Plant Training Supervisor.
St. Louis -

March 18 - April 6,

First Vocational Training Conference in St. Louis led by the Eastern Missouri and Arkansas training supervisor. These conferences will then continue until the completion of the vocational training conference program.

Kansas City -

March 11 - March 23,

Introductory conferences at Kansas City similar to those held in St. Louis and to be led by the General Plant Training Supervisor.

Kansas City -

March 25 - April 13,

First Vocational Training Conference in Kansas City to be led by the Western Missouri and Kansas plant training supervisor. These conferences will then continue until the completion of the vocational training conference program.

Dallas -

March 25 - April 6,

Introductory conferences in Dallas to be led by the General Plant Training Supervisor.

Dallas -

April 8 - April 27,

Vocational Training Conference in Dallas to be led by the General Plant Training Supervisor and composed of:

3 foreman instructors
2 personnel supervisors, one from Dallas and one from Oklahoma City
2 training supervisors, one from Dallas and one from Oklahoma City
Dallas -

April 29 - May 19.

Vocational Training Conference in Dallas to be led by the General Plant Training Supervisor and composed of:

10 foremen instructors
2 training supervisors, one from Dallas and one from Oklahoma City

Thus, it is noted that each training supervisor from Dallas and Oklahoma City will have attended two conferences each led by the General Plant Training Supervisor.

Dallas -

May 27 - June 15.

First Vocational Training Conference at Dallas by the Texas training supervisor. These conferences to continue until the completion of the vocational training conference program.

Oklahoma City -

May 20 - June 1.

Introductory conferences to be held by the General Plant Training Supervisor similar to those held at Dallas, Kansas City and St. Louis.

Oklahoma City -

June 3 - June 22.

First Vocational Training Conference at Oklahoma City and led by the Oklahoma territory training supervisor. These conferences to continue until the completion of the vocational training conference program.

Then beginning with June 3rd, it seems desirable that the General Plant Training Supervisor should sit in on one conference at Oklahoma City, one at Dallas, one at Kansas City and one at St. Louis. This procedure seems advisable in order to give the Training Supervisor in each territory any possible assistance in holding the training conferences and in order to be of any assistance to the other forces in administering the training program in accordance with the suggested and standard plans.
CHAPTER VIII

APPOINTMENT OF A PLANT TRAINING SUPERVISOR
FOR EACH OF THE FOUR OPERATING AREAS OF THE
SOUTHEASTERN COMPANY

A Plant Training Supervisor was appointed for each of the
four areas in order that the three weeks vocational instructor
conferences could be completed within a two year period.

The chief duties of the Plant Training Supervisor are:
1. To conduct the three weeks vocational instructor train-
ing conferences.

2. To provide that enthusiasm and promotive quality which
spreads interest in training throughout the organization and creates
the desire and willingness on the part of every supervisor to take
part in the training program.

3. To help to prepare the courses to be used by supervisors
in the training of their workers. The supervisors should prepare their
courses largely by themselves as they are much more likely to take an
interest in the training program and to feel a definite responsibility
for making it actually effective.

4. To improve and constantly revise a procedure for carrying
out the training program.

The qualifications of such a Plant Training Supervisor may be
stated as follows:
1. Sufficient standing among his associates to enable him to effectively carry out the training program. (A fund of telephone experience)
2. A pleasing personality
3. Good executive ability
4. Interested in developing people
5. Resourceful and able to adopt himself to different conditions
6. Realize the effect of his example
7. Thoroughly familiar with the training plan and technique of conference leadership.

A more detailed description of the functions of the Plant Training Supervisor may be obtained from pages 8 and 9 of the March Issue of the Southwestern News (see exhibit 4). The names and photographs of the four plant training supervisors appointed are shown on page 9 of this issue. There is shown on page 17 of this issue the first vocational instructor training conference held in St. Louis incidentally the first held in the Southwestern Company.

This same group is also shown by exhibit 3, as it appeared in the "Broadcaster", an Eastern Missouri and Arkansas Plant Department Weekly Publication.
CHAPTER IX
ADMINISTRATION OF THE TRAINING PROGRAM AND
THE STATEMENT POLICY

The administration of the organized training program may be classified as follows:

1. Two day information conferences which have been previously described and will be covered more in detail in Chapter XI.

2. The three week vocational instructor training conferences which have been previously described and will be covered in detail in Chapter X.

3. Training conference leaders or rather training the four Plant Training Supervisors in the four operating areas on conference leadership. This feature will be covered in Chapter XII.

4. The administration of the Training Program after the instructors leave the conferences.

A copy of the "Statement of Policy" follows this page.

Particular attention is called to Section "C" which has for its purpose the proper and efficient administration of the training program after the instructors leave the three week conferences.
A STATEMENT OF POLICY TO BE USED AS A GUIDE FOR ADMINISTERING THE ORGANIZED VOCATIONAL TRAINING PROGRAM

This statement of policy has been prepared in order to assist in the introduction of the Organized Vocational Training Program in the Plant Department of the Southwestern Bell Telephone Company.

A. GENERAL.

1. The purpose of vocational training is to bring the workman in the shortest length of time to the point where he can do a safe and satisfactory job. There is no virtue in delaying the development of a man upon the job to which he has been assigned, for each day the worker is performing his tasks with handicaps resulting from lack of knowledge or skill, he is an expense to the Telephone Company and a source of dissatisfaction to himself. Any training program that does not take into account the conservation of human power is of doubtful commercial value and is certainly a detriment to society in general.

2. Our present training practices lack chiefly the following:
   a. Trained instructors.
   b. Well defined and properly built courses.
   c. Adequate organization and supervision of the training activities.

3. The most pressing needs for vocational training should be met first. If there are vocations which are from 40% to 75% manned with new or relatively new men, these vocations should be trained before those which have less than 40% new or relatively new men.

4. The training program should be introduced with as little disturbance to the line organization as possible. A large program which is too energetically promoted might react to a disadvantage in the operation of the plant organization. The training program should be introduced gradually as a fixed policy rather than as a campaign.
5. Job training is favored in most parts of the company. There are circumstances which require centralized school training, and where these circumstances exist centralized schools, either temporary or permanent, should be established.

6. Course building should be accomplished under the guidance of the supervisors in the line organization.

B. SELECTION OF MEN.

Any man with certain qualifications is a good prospect for training as an instructor. For the benefit of those who have the duty of selecting men to be trained as instructors the more important qualifications of the ideal instructor prospect are listed below.

1. Must know the job well and be in good standing among his fellow workmen.

2. Should be interested in the development of people.

3. Should be one who is not difficult to get along with.

4. Should be adaptable and resourceful.

5. Must realize the importance of his example, i.e., he must realize that bad habits are dangerous stimuli to the accidental learning of bad work habits.

6. Should have appreciation of learner's view and patience with his progress.

7. Should be able to express himself briefly and clearly.

8. Should be self confident.

9. Should be capable of developing a realization of the relative importance of the learning and teaching machinery.

10. Should possess some analytical ability.

All of the above qualifications cannot be readily determined prior to instructor training. However, those which can be determined are rather definite and are, in general, 1, 3, 7, 8 and 10.
C. FIELD RESPONSIBILITIES.

Training is definitely tied up with production, and for that reason the responsibility of training lies with the line organization. The field should -

1. Determine its training needs.
2. Select the training plan to meet the needs.
3. Set up its own courses.
4. Select the men to attend the vocational training conferences.
5. Supervise the training activities.

D. STAFF RESPONSIBILITIES.

It is the function of the Plant Personnel Supervisors and the Plant Training Supervisors to lead the Vocational Training conferences and to assist in organizing to meet the training problem.

E. A SEASONED INSTRUCTOR.

After a vocational instructor has completed the vocational training course he should have considerable successful practical experience as an instructor and be marked by certain characteristics as follows:

1. He must know his subject well and have sufficient skill to properly demonstrate it.

2. He must know the teaching process and be able to plan effective lessons. This includes job analysis, the teaching content, preparation of lessons, etc.

3. He must have the ability to make use of the teaching methods and policies best suited to the conditions.

4. He must be able to set up and follow a definite source or sequence of learning assignments.

5. He should be able to confer with the supervisory organization as to the training needs of the vocation which he represents.

F. FOREMEN INSTRUCTOR CONFERENCES.

1. Each foreman's conference should consist of not more than twelve men and preferably of not less than three vocations.
2. The conference room should be well lighted, well ventilated and as free from outside noises and interruptions as possible.

3. It is suggested that no smoking be permitted during conference periods because smoking is not only unhealthful when a large group is quartered together, but the act of lighting cigarettes, etc., is very distracting.

4. The conference room should be properly equipped with a good table, proper chairs, waste baskets, places to hang the coats and hats, a good rug, etc. which lend to the property dignity of a conference room.

G. MEANS TO ASSURE THAT THE TRAINING PROGRAM WILL BE CARRIED OUT.

1. The staff methods and results organization should include plant training as a part of their regular surveys. (This organization can be of great benefit in recognizing the results of the training program.)

2. In order to be able to carry out 1 above, it is desirable that the methods and results organization attend the three weeks training conference.

3. The Plant Training Supervisor and Plant Personnel Supervisor should make periodical checks or surveys in the field.

4. The training activities of the vocational instructors (foremen) should be closely supervised by the supervisory organization through the lines of the organization, i.e., the training program should be considered a regular function and treated the same as any other activity.

5. In order to carry out 4 above, it is desirable that the maintenance supervisors, toll supervisors, district plant chiefs and supervising foremen attend the three weeks training conference.

6. The vocational instructors will leave the conference with a sample course for their particular vocation. The training supervisor will collect these courses at the end of each conference and have them typed on the Learners' Progress Record and returned to the
instructors. These instructors should then keep these records properly posted and the supervising organization should occasionally check to assure actual carrying out of the plan.

7. Each vocational instructor on leaving the conference will be furnished a pocket sized notebook with brief notes and about 50 small sized lesson plan sheets. It is the intention that each instructor will completely analyze and fill out these lesson plan sheets for at least four job assignments per month writing the lesson aims on each card until the course is completed. The supervising organization should closely supervise this work to assure it being carried out.

8. It is the intention to have standard courses for each vocation. Each supervising foreman should work toward obtaining a standard course for his vocation and later the methods and results organization will be requested to pass on proposed standard courses.

9. The vocational instructors will be furnished a set of notes which serve as a textbook regarding the training work.

10. Care should be exercised by the line organization to give proper recognition to anyone doing a good training job.

H. RECORDS AND REPORTS.

1. It is the intention that records and reports relating to training activities be kept to a minimum.

Plant Department
Southwestern Bell Telephone Company
March 1, 1929
CHAPTER X

THE THREE WEEK VOCATIONAL INSTRUCTOR TRAINING

CONFERENCES

The three weeks vocational instructor training conferences which are for the purpose of training trained trainers are composed of an average of twelve men. At least three different vocations should be represented at each conference so as to increase the interest of the group and to provide nearer ideal subjects for the practice teaching portion of the conference. The conferences are held on a directed discussion basis which is covered in Chapter XII. Exhibit 2 is a photograph of the first conference held in Texas, April 1929.

The three week conferences may be divided as follows:

1. An appreciation of the training needs
2. The teaching-learning process
3. The teaching methods
4. Job Analysis and preparation of lessons
5. Lay-out of courses (or job outline)
6. Supervised practice in the use of 2, 3, 4 and 5 above

A detailed discussion of this subject matter is contained in exhibit 6. There is given below, in brief form, a discussion of the six items mentioned above.

I. Appreciation of Training Needs

The first question discussed is, "Why do we train?" The answer being, we train to remove handicaps which may be classified as the lack of
knowledge, skill and some mental characteristics. A discussion follows as to who needs training; that is, who have handicaps? Some thought reveals that new men need training, transferred men need training, and, also, all others due to:

a. Improvement in the art (new inventions)
b. Changes in routine
c. Changes in specifications
d. Changed methods

The above is presented just merely to give some idea how the conferences start. The first two days of each conference are spent on this appreciation portion of the subject matter.

2. The Teaching-Learning Process

The teaching learning process is based upon the recognized learning process which is that we learn by the "association of ideas." This teaching-learning process which may be truly called an intentional teaching-learning process is recommended for teaching vocational subjects and consists of the four steps which are:

THE TEACHING AND LEARNING PROCESS

Step I  -  Preparation
Step II -  Presentation
Step III -  Application
Step IV -  Test

Step I - Preparation

The purpose of Step I is to select an idea which the learner already has to which the new ideas can best be tied.
Step II - Presentation

In this step all of the new ideas of the lesson must be given to the learner in the best order for their being assimilated by him. The size of a lesson should be limited to about eight new ideas.

Step III - Application

The third step is to let the learner try out the new ideas with the instructor observing closely so as to correct any errors or deficiencies. The principal concern is to see that the learner has properly grasped the ideas and has properly tied them up.

Step IV - Test

Step IV is to give the learner a job involving all the new ideas and let him carry it out unaided, however, under the supervision of the instructor.

The organised training program is really based upon this intentional teaching-learning process. The process is introduced during the third day of the conference as shown by outline in this Chapter.

3. The Teaching Methods

The completion of any job requires the use of certain methods. The effectiveness of the results obtained varies directly to the effectiveness of the methods which were used in carrying out the job. Also the effectiveness of our training work will vary directly as to the effectiveness of the methods used. In general, there are five teaching methods which are as follows:

1. The DEMONSTRATION Method

This method is characterized by the fact that actual tools, equipment and material are used by the instructor in giving the lesson.
The demonstration applies whether the instructor acts as the demonstrator or whether the learner takes the equipment and demonstrates.

2. The ILLUSTRATION Method

This method makes use of some substitute for the actual tools, materials, equipment or processes. These substitutes may consist of drawings, diagrams, models, pictures, etc.

3. The LEXICER Method

This method consists of giving out information. It is purely a one-sided proposition and affords the learner no opportunity for come-back. The lecture may be oral or written.

4. The DIRECTED DISCUSSION Method

This method differs from the lecture method in that the learner is expected to take part and express his points of view. It is a two-sided proposition with the learner making a come-back.

5. The EXPERIMENTAL Method

The true experimental method is one of trial and error with no evidence of direction by one familiar with the ideas being learned. It is usually called a "cut and try" method. This method is not endorsed for vocational training.

Just as an instructor may use different methods in teaching, likewise he may use a different policy. The success of an instructor depends considerably upon this selection. The policy of an instructor is called the line of approach and may be an informational one or a developmental one.
The Informational Line of Approach

With this line of approach the instructor gives facts to the learner which are necessary and which must be accepted by the learner. The learner is not required to do any reasoning and for this reason, this line of approach has been called a "pouring in" process.

The Developmental Line of Approach

This line of approach requires thinking on the part of the learner and is used to develop judgment on the part of the learner. This line of approach is often called a "drawing out" process.

The following is a summarization of what has been found to be usually the best methods and lines of approach to use in each of the four steps:

<table>
<thead>
<tr>
<th>Steps</th>
<th>Method</th>
<th>Line of Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step I</td>
<td>Directed Discussion</td>
<td>Informational</td>
</tr>
<tr>
<td>Step II</td>
<td>Demonstration - Lecture</td>
<td>Informational</td>
</tr>
<tr>
<td>Step III</td>
<td>Demonstration - Discussion</td>
<td>Developmental</td>
</tr>
<tr>
<td>Step IV</td>
<td>Demonstration</td>
<td>Informational</td>
</tr>
</tbody>
</table>

These teaching methods and lines of approach are introduced on the fourth day of the conference.

4. Job Analysis and Lesson Preparation

The difference between the teaching order of a lesson and the planning order of a lesson should be understood.

Teaching Order

The teaching order of a lesson is, of course, Step I, Step II,
Step III and then Step IV.

Planning Order

The planning order of a lesson should be Step II, Step I, Step IV and then Step III.

In laying out Step II, it is essential that all the new ideas to be presented in the lesson are definitely set up. The best way to assure that all the new ideas are being considered in their proper sequence is to make a written analysis. This may best be done by taking a sheet of paper and marking a line through the center from the top of the sheet to the bottom of the sheet. On the left hand side write at the top of the sheet "What must be Done (Operating Points)", then on the right hand side of the sheet write "What must be Known (Ideas)". This is illustrated as follows:

<table>
<thead>
<tr>
<th>What must be Done (Operating Points)</th>
<th>What must be Known (Ideas)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Then the ideas make a step II for a lesson or sufficient step II's for a series of lessons.

In order to get a clear idea of this job analysis, the job assignment of "making up a 104 copper above" (splicing toll wire) is shown on Form I. This form was designed to be used by the conference, (See following page) during the three weeks conferences in order to facilitate their job analysis work. After making the job analysis on Form I, the next step is to determine the teaching content.
# VOCATIONAL INSTRUCTOR TRAINING COURSE

## Determination of the "Teaching Content"

Take a job assignment and list the OPERATING POINTS in column one of this sheet.

Opposite each OPERATING POINT list in column two the IDEAS that must be in the possession of one who is to successfully perform the job.

### Name of Job Assignment  Making up 

<table>
<thead>
<tr>
<th>1. What must be done. (OPERATING POINTS)</th>
<th>2. What must be known. (IDEAS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Get tools and material</td>
<td>1. Identify 104 copper wire</td>
</tr>
<tr>
<td></td>
<td>2. Identify 104 copper sleeve</td>
</tr>
<tr>
<td></td>
<td>3. Identify sleeve twistors</td>
</tr>
<tr>
<td></td>
<td>4. Identify 8&quot; pliers</td>
</tr>
<tr>
<td></td>
<td>5. Identify &quot;0&quot; emery cloth</td>
</tr>
<tr>
<td>2. Straighten wire ends</td>
<td>6. Wire must be straight to slip in</td>
</tr>
<tr>
<td></td>
<td>sleeve</td>
</tr>
<tr>
<td></td>
<td>7. To make good contact</td>
</tr>
<tr>
<td></td>
<td>8. Always use &quot;0&quot; emery cloth</td>
</tr>
<tr>
<td></td>
<td>9. Clean wire far enough for sleeve</td>
</tr>
<tr>
<td></td>
<td>10. Watch sharp ends of wire</td>
</tr>
<tr>
<td></td>
<td>11. Always clean both old and new wire</td>
</tr>
<tr>
<td>3. Clean wires</td>
<td>12. Sleeve must be clean, dry and</td>
</tr>
<tr>
<td></td>
<td>straight</td>
</tr>
<tr>
<td></td>
<td>13. Junk all bad sleeves</td>
</tr>
<tr>
<td>4. Inspect sleeve</td>
<td>14. Place wires in sleeve from opposite</td>
</tr>
<tr>
<td></td>
<td>ends (ends stick out 1&quot;)</td>
</tr>
<tr>
<td></td>
<td>15. Don't puncture hand</td>
</tr>
<tr>
<td>5. Place wire in sleeve</td>
<td>16. Bend ends up with pliers</td>
</tr>
<tr>
<td></td>
<td>17. Don't injure line wire</td>
</tr>
<tr>
<td>6. Bend wire ends</td>
<td>18. Always use twistors and not pliers</td>
</tr>
<tr>
<td>7. Place sleeve twistors</td>
<td>19. Place in proper slot 1/8&quot; from end</td>
</tr>
<tr>
<td>8. Twist sleeve</td>
<td>20. Make six half turns</td>
</tr>
<tr>
<td>9. Cut off ends</td>
<td>21. Twist from both ends</td>
</tr>
<tr>
<td></td>
<td>22. Bend ends back and cut off</td>
</tr>
<tr>
<td></td>
<td>23. Don't injure wire</td>
</tr>
</tbody>
</table>
The question is often asked as to whether all the ideas involved must be included in a lesson. There is a well recognized formula for determining what must be included in a lesson which is as follows:

Let A represent what must be known or done to accomplish a given job.

Let B represent that which a particular learner now knows or already can do.

Let C represent what must be taught.

Then, A-B=C or what must be taught.

A lesson should, as a general rule, not contain more than eight new ideas. It is much better to have too few ideas in one lesson rather than too many ideas in one lesson.

Those new ideas to be taught are copied on the instructor’s lesson plan sheets. The job assignment of “making up 104 copper sleeves” is shown broken down into two lessons on the following two sheets. Ideas 1, 2, 3 and 4 have been crossed out on Form I, page 53 as already being in the possession of the learner for this particular case.

Instructors’ Lesson Plan Sheets in Large Size, Form 2, are designed for the use of the conference during the conference. A large quantity of the Lesson Plan Sheets in Handbook Size, Form 4, are furnished the instructors on leaving the conferences for use of job analysis and the lesson preparation on the job. A sample of this form is included in exhibit 5.

Job analysis, lesson preparation and practice teaching start
Course: Toll Lineman

Job Assignment: Making up 104 copper sleeve

Lesson No.: I  Lesson Aim: Preparing wire for sleeve

Step I.  Preparation

1st Idea: You remember seeing Bill splice that wire yesterday

Step II.  Presentation

1st Idea: Identify "O" emery cloth

2nd Idea: Wire must be straight to slip in sleeve

3rd Idea: To make good contact

4th Idea: Always use "O" emery cloth

5th Idea: Clean wire far enough for sleeve

6th Idea: Watch sharp ends of wire

7th Idea: Always clean both old and new wire

8th Idea: Sleeve must be clean, dry and straight

9th Idea: Junk all bad sleeves

Step III.  Application

*How: Demonstration by learner with direct discussion

Step IV.  Tests

*How: Demonstration by learner

*Note - Check key ideas in Step II.
INSTRUCTORS LESSON PLAN

Course: Toll Lineman

Job Assignment: Making up 104 copper sleeve

Lesson No.: II Lesson Aim: Placing and twisting sleeve

Step I. Preparation

1st Idea: We will now place the wire in the sleeve and twist the sleeve

Step II. Presentation

1st Idea: Place wire in sleeve from opposite ends (ends stick out 1"

2nd Idea: Don’t puncture hand

3rd Idea: Bond ends up with pliers

4th Idea: Don’t injure line wire

5th Idea: Always use twistors and not pliers

6th Idea: Place in proper slot 1/8" from end

7th Idea: Make six half turns

8th Idea: Twist from both ends

9th Idea: Bend ends back and cut off

10th Idea: Don’t injure wire

Step III. Application

*How: Demonstration by learner with direct discussion

Step IV. Tests

*How: Demonstration by learner

*Note - Check key ideas in Step II.
about the middle of the first week and continue during the remaining two and one-half weeks of the conference. At least twenty lessons are prepared and taught by each conference.

5. Layout of a Course (or Job Outlining)

The making of a course is the arrangement of the job assignments in successive steps making for the progress of the individual who is being trained. The progression factor table will help to overcome some of the difficulties met with in setting up a successful training course. A progression factor table is a list of those features of a job which we try to avoid in giving a new man work. The principal features are knowledge, skill, judgment, speed and accuracy. The job assignments may be conveniently written on library cards, one job assignment to a card, then the cards arranged in proper order. One job assignment will consist of one lesson or group of lessons.

The job assignments may then be divided into blocks, each block being a main sub-division of the entire course. A lineman's course consisting of about eighty job assignments may be divided into blocks as follows:

- Block A = Pole work
- Block B = Wire work
- Block C = Strand and guy work
- Block D = Cable work
- Block E = Miscellaneous

The job assignments in block "E" will include job assignments relating to the employees' representation plan, the employees' benefit plan, the insurance plan, the savings plan, the stock buying plan, first aid, accident prevention, care of motor vehicles and other matters of which a knowledge must be possessed by the one who is to become a
thoroughly trained linemen.

A sample course for "Toll Repairman" is shown on the Learners' Progress Record, Form 3, following this sheet.

Each conference prepares a complete course for his particular vocation (or the one of his vocations having the most urgent need for training in the case of the District Plant Chief or Supervising Foreman having more than one vocation under his supervision) on library cards arranged by blocks, each block being separated by means of an index card. At the completion of each conference, each instructor leaves his course with the Plant Training Supervisor who has it typed on the Learner's Progress Record Sheets in two copies. The original copy with the cards are returned to the instructor for his use on the job and the duplicate copy is retained by the Plant Training Supervisor to be used later in helping to standardize courses. It is hoped that within two years, standard courses will be provided for each of the vocations in the Plant Department of the Southwestern Company.

Some of the advantages of the course of study and Learner's Progress Record as given by the First three week conference group at Dallas are:

1. Gives a complete plan for teaching in the proper learning order.
2. Helps to assure a completely trained employee.
3. A benefit in transferring men.
4. Will help to avoid expensive corrective training.
5. A record of the qualifications of a man for promotion, job assignment or salary increase.
6. Shortens the training period and lowers the training cost.
7. Better measure of job requirements.
8. Improved selection of employees.
9. Reduced labor turnover.
10. Should help to reduce accidents.
### List-Job Assignments in proper order for learning.

<table>
<thead>
<tr>
<th>1</th>
<th>Inspecting pins and crossarms.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Straightening crossarms.</td>
</tr>
<tr>
<td>3</td>
<td>Replacing &amp; Equipping crossarms.</td>
</tr>
<tr>
<td>4</td>
<td>Replacing double arms.</td>
</tr>
<tr>
<td>5</td>
<td>Transferring crossarms.</td>
</tr>
<tr>
<td>6</td>
<td>Use and placing of steel pins.</td>
</tr>
<tr>
<td>7</td>
<td>Making transposition bracket braces.</td>
</tr>
<tr>
<td>8</td>
<td>Placing transposition brackets and straightening brackets.</td>
</tr>
<tr>
<td>9</td>
<td>Replacing transposition brackets.</td>
</tr>
<tr>
<td>10</td>
<td>Inspecting poles.</td>
</tr>
<tr>
<td>11</td>
<td>Stenciling poles.</td>
</tr>
<tr>
<td>12</td>
<td>Framing poles.</td>
</tr>
<tr>
<td>13</td>
<td>Facing poles.</td>
</tr>
<tr>
<td>14</td>
<td>Stepping poles.</td>
</tr>
<tr>
<td>15</td>
<td>Straightening poles.</td>
</tr>
<tr>
<td>16</td>
<td>Raking poles &amp; checking rake.</td>
</tr>
<tr>
<td>17</td>
<td>Resetting poles.</td>
</tr>
<tr>
<td>18</td>
<td>Moving poles by trenching.</td>
</tr>
<tr>
<td>19</td>
<td>Removing poles.</td>
</tr>
<tr>
<td>20</td>
<td>Ground bracing of poles.</td>
</tr>
<tr>
<td>21</td>
<td>Setting poles with gin pole.</td>
</tr>
<tr>
<td>22</td>
<td>Digging pole holes.</td>
</tr>
<tr>
<td>23</td>
<td>Setting poles with pike poles.</td>
</tr>
<tr>
<td>24</td>
<td>Placing push braces.</td>
</tr>
<tr>
<td>25</td>
<td>Placing push &amp; pull braces.</td>
</tr>
<tr>
<td>26</td>
<td>Unloading poles.</td>
</tr>
<tr>
<td>27</td>
<td>Transporting poles.</td>
</tr>
<tr>
<td>28</td>
<td>Contracting hole &amp; pole work.</td>
</tr>
</tbody>
</table>
**LEARNER'S PROGRESS RECORD**

**VOCATIONAL INSTRUCTOR TRAINING COURSE FOR**

**TOLL PATROLMAN**

**BLOCK A - Toll Pole Work**  (Sheet #2)

List Job Assignments in proper order for learning.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>Selecting location of poles.</td>
</tr>
</tbody>
</table>
### Learner's Progress Record

**Vocational Instructor Training Course for Toll Patrolman**

**Block B - Toll Wire Work**

List Job Assignments in proper order for learning.

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Inspection &amp; Replacement of insulators.</td>
</tr>
<tr>
<td>2</td>
<td>Inspection of old ties.</td>
</tr>
<tr>
<td>3</td>
<td>Tying in line wire.</td>
</tr>
<tr>
<td>4</td>
<td>Dead-ending line wire.</td>
</tr>
<tr>
<td>5</td>
<td>Inspection of line wire.</td>
</tr>
<tr>
<td>6</td>
<td>Replacing line wire.</td>
</tr>
<tr>
<td>7</td>
<td>Transferring line wire.</td>
</tr>
<tr>
<td>8</td>
<td>Checking sag in line wire.</td>
</tr>
<tr>
<td>9</td>
<td>Re-sagging line wire.</td>
</tr>
<tr>
<td>10</td>
<td>Inspecting &amp; making sleeve joints.</td>
</tr>
<tr>
<td>11</td>
<td>Soldering copper sleeves &amp; wire joints.</td>
</tr>
<tr>
<td>12</td>
<td>Inspecting &amp; placing cross-connections in cable box.</td>
</tr>
<tr>
<td>13</td>
<td>Inspecting &amp; running jumpers on poles.</td>
</tr>
<tr>
<td>14</td>
<td>Inspecting &amp; placing #14-#18 drop wire.</td>
</tr>
<tr>
<td>15</td>
<td>Checking transpositions.</td>
</tr>
<tr>
<td>16</td>
<td>Cutting physical transpositions.</td>
</tr>
<tr>
<td>17</td>
<td>Cutting Type #1 transpositions.</td>
</tr>
<tr>
<td>18</td>
<td>Cutting Type #2 transpositions.</td>
</tr>
<tr>
<td>19</td>
<td>Cutting Type #3 transpositions.</td>
</tr>
<tr>
<td>20</td>
<td>Cutting Type #4 transpositions.</td>
</tr>
</tbody>
</table>

Check if job can be performed satisfactorily.
List Job Assignments in proper order for learning:

1. Digging anchor holes.
2. Inspecting & placing anchors.
4. Inspecting & placing down guys.
5. Inspecting & placing guy guards.
6. Checking pull on poles.
7. Proper location of anchors.
9. Inspecting & pulling guys.
11. Placing arm guys.
LEARNER'S PROGRESS RECORD

VOCATIONAL INSTRUCTOR TRAINING COURSE FOR

TOLL PATROLMAN

BLOCK D - Toll Line Clearances

List Job Assignments in proper order for learning.

<table>
<thead>
<tr>
<th></th>
<th>Job Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Removing wire &amp; debris.</td>
</tr>
<tr>
<td>2</td>
<td>Cutting underbrush.</td>
</tr>
<tr>
<td>3</td>
<td>Checking tree clearances.</td>
</tr>
<tr>
<td>4</td>
<td>Handling tree trimming permits.</td>
</tr>
<tr>
<td>5</td>
<td>Trimming trees.</td>
</tr>
<tr>
<td>6</td>
<td>Checking highway &amp; R.R. clearances.</td>
</tr>
<tr>
<td>7</td>
<td>Checking foreign wire clearances.</td>
</tr>
<tr>
<td>8</td>
<td>Joint construction clearances.</td>
</tr>
<tr>
<td>9</td>
<td>Noting potential accidental interference.</td>
</tr>
<tr>
<td>10</td>
<td>Noting fire hazards.</td>
</tr>
<tr>
<td>11</td>
<td>Noting high tension power line building activity.</td>
</tr>
<tr>
<td></td>
<td>Description</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>General Safety Practices</td>
</tr>
<tr>
<td>2</td>
<td>Safety inspection of tools.</td>
</tr>
<tr>
<td>3</td>
<td>First Aid Kit &amp; use.</td>
</tr>
<tr>
<td>4</td>
<td>Employees' Benefit Plan.</td>
</tr>
<tr>
<td>5</td>
<td>Employees' Insurance Plan.</td>
</tr>
<tr>
<td>6</td>
<td>Employees' Stock Plan.</td>
</tr>
<tr>
<td>7</td>
<td>Employees' Saving Plan.</td>
</tr>
<tr>
<td>8</td>
<td>Personalization of Service.</td>
</tr>
<tr>
<td>9</td>
<td>Sale of service.</td>
</tr>
<tr>
<td>10</td>
<td>Choice of proper living quarters.</td>
</tr>
<tr>
<td>11</td>
<td>Exercising care in preventing trouble while at work.</td>
</tr>
<tr>
<td>12</td>
<td>Use of the §17-3 test set.</td>
</tr>
<tr>
<td>13</td>
<td>Reporting to &amp; working with toll testboard.</td>
</tr>
<tr>
<td>14</td>
<td>Accounting.</td>
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<td>15</td>
<td>Handling of Working Fund.</td>
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<tr>
<td>16</td>
<td>Making daily work reports.</td>
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<td>17</td>
<td>Making toll line patrol report.</td>
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<tr>
<td>18</td>
<td>Making miscellaneous reports.</td>
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<tr>
<td>19</td>
<td>Material routine.</td>
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<td>20</td>
<td>Storage of materials.</td>
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<td>21</td>
<td>Disposing of junk material.</td>
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<td>22</td>
<td>Care of truck.</td>
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<td>23</td>
<td>Driving truck.</td>
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<td>24</td>
<td>Placing material on truck.</td>
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<td>25</td>
<td>Clearing toll trouble.</td>
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<tr>
<td>26</td>
<td>Inspecting toll stations.</td>
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<td>27</td>
<td>Making toll station inspection report, Form S-6438pl</td>
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<tr>
<td>28</td>
<td>Reading pole &amp; wire prints.</td>
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<tr>
<td>29</td>
<td>Drawing routine order sketches.</td>
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</tbody>
</table>
11. Benefit to the men.
12. Increases personal knowledge of trainer.
13. Helps to assure better service.
14. Will help to prevent keeping mediocre men in the organization.

6. Supervised practice in the use of the teaching-learning process, teaching methods, job analysis, lesson preparation and layout of course.

Each conference is required to analyze a sufficient number of job assignments so as to prepare at least twenty lessons and to teach at least twenty lessons to some other individual of the class during the two and one-half weeks of practice teaching, and to prepare a complete course. Actual tools and materials are used in teaching lessons in the classroom. Some of the materials provided for the classroom work are a thirty line switchboard, crossarms, wire of various kinds, telephones, sub-station protectors, knobs, brackets, bolts of all kinds, sleeves, et cetera.

After each member has taught a lesson, or series of lessons, the individuals of the group take their places about the conference table for a discussion of the methods used, effectiveness of methods used and to offer suggestive criticisms.

The supervised practice teaching and course preparation are the most important parts of the three weeks conference and should not be neglected to the slightest degree. It has been found to be advantageous to have a new employee act as a learner during part of the conference. This gives a better test of the teaching methods and is well worth the effort.

The detailed outline of the three weeks vocational instructor
training conference follows this page. It will be noted that the
schedule is shown in the righthand margin of this outline. Much
knowledge of the subjects discussed and conclusions reached can
be gained by glancing over these pages.
OUTLINE OF COURSE FOR VOCATIONAL
TRAINING CONFERENCES (DETAIL)

A. Opening Conference.

1. Leader should be in conference room first.
   a. Informal introductions.
   b. Know names, titles and locations of all members.

2. Pass books out and being seated.
   a. Have names of members on books.
   b. Avoid disclosing any prearranged seating arrangements.
   c. Have paper, pencils and erasers.

3. Members writing names, titles and mailing address.

4. Introduction by leader and brief biographies.
   (Leader gives own biography first)

5. Rules and Regulations.
   a. Starting time (Be prompt and 1 hr. outside)
   b. Recess periods
   c. Noon Hour
   d. Closing time
   e. Smoking
   f. Use of phone
   g. Hotel accommodations
   h. Cashing checks.

6. Appointment of Time Keeper. (To prevent running over recess periods, noon or closing period).

7. Statement of purpose.
   a. The purpose of this conference is to give you, who do instructing work, a uniform training in the principles and fundamental practices of the teaching art, etc.
b. We have been doing training a long time.
c. We know more about training than we think we do.
d. This training program is not revolutionary.
e. Training is an easy, natural process.

B. Appreciation of Training Needs. (List on board reasons given)

1. Why do we train?

a. Starting Telephone Company in Mexico.
b. Could man from University of Missouri install a telephone?
c. Could a high school graduate install a telephone?
d. Could a man after completing a correspondence course install a telephone?
e. Each of the above three lack something: c more than b and d more than c.
f. How about man who is a good installer (12 years experience) but constantly quits and is rehired at different cities. He also lacks something.
g. Could I make a good "basket ball player"?
h. We train to reduce or to overcome.

HANDICAPS

i. Handicaps are usually classified as the lack of—
   (1) Knowledge – (give example)
   (2) Skill – (b,c,d, and g above)
   (5) Psychological – (mental) (if above, or man installing telephone in fashionable home affects both knowledge and skill)

   (mental attitude)

2. Who needs training, i.e., who have handicaps?

a. If everyone could meet the standard or objective; we could say that there are no handicaps and there would be no need of training.
b. Why did they pick Mr. Elias for Vice-President or Mr. Ficklin for General Plant Manager?
   (They lacked fewer "handicaps" than others)
c. Who have handicaps?

   (1) New men.
   (2) Transferred people.
   (5) Also all others due to:

   Improvement in the art.
   Changed standards.
   New specifications.
   New routines.
B. Appreciation of Training Needs (Continued)

d. 100% of our people have "Handicaps".
e. When should training start? (Story of starting training of two year old child)
f. Proper frame of mind very important.

(1) Seemingly small handicaps are sometimes large and vice versa. (Any business is a mere relationship between humans—the success depends upon the contentment of the workers.)

(1) People
(2) Co. Policies
(3) Work

g. Three stages for a "Beginner":

(1) Adjustment.
(2) Appreciation (Waking up)
(3) Application (Getting down to business)

h. Transferred people also go through three stages.
i. Large labor turnover (Labor turnover in our Co.) due to:

(1) Poor selection (Pre-employment tests)
(2) Poor training (or poor teaching)
(3) Bell System - 15% remain at end of four years. (Is this the best 15%)

j. Much room for improvement in the adjustment and appreciation stages which are the heavy cost periods. A systematic training program seems advisable.

3. Who does the training now? (four general ways)

a. Supervisor.
b. Fellow workmen.
c. Individual trains himself.
d. Regular instruction at centralized schools.
e. Who does the most training? (A large part under b and c)
f. Our procedure should be to reduce b and c to increase a and d.
4. Disadvantages of present practice.

a. Too many agencies.
b. Anybody's business but definitely nobody's.
c. Foreman is rated on production; does he have time for training? Also, fellow workers are rated on production.
d. Corrective training vs. preventive training practices.

e. Disadvantages of worker training himself.

(1) Form incorrect habits.
(2) Slow progress.
(3) Feels neglected.
(4) Wrong picture of organization.
(5) Increased accident hazard.
(6) Spotty training - No one knows progress.
(7) Effects public relations unfavorably.
   (There are some advantages as development of self reliance and character.)

f. Disadvantages of fellow worker training.

(1) Fellow worker may not be good instructor.
(2) Other disadvantages about the same as e above.

g. Possible discussion on accidents - Can they be eliminated?

5. Need for Organized Training.

a. Evidence of present disadvantages. (Mr. Taylor's case in K. C. - checking transpositions.)

(1) Square hole.
(2) Wiping plumber's joint.
(3) Workmen watched foreman place three Everstick anchors.
(4) Burying anchor three feet deep and driving rod in ground.
(5) Burying rod and no anchor on end.
(6) Ground to a sewing machine leg.
B. Appreciation of Training Needs. (Continued)

(7) Zoning - Receiver on right hand side of desk stand - Belleville.
(8) Crossarms on - upside down.

b. Proper procedure to have intentional training, i.e. increase training by Supervisor and regular Instructors.
c. Review three stages of a "Beginner" or "Transferred Man".
d. The first two stages - Adjustment and Appreciation are the true cost periods in training.
e. Disadvantages sufficient to "Outlaw" our present training methods.
f. A systematized or organized plan of anything is conducive of lower costs and more effective results.
g. General disadvantages of disorganized training.

(1) Good workers are pressed into instruction work whether they are capable or willing.
(2) Retardation of the effectiveness of these workers.
(3) Labor turnover - loss of much promising material due to poor instruction.
(4) Weak people, or undesirable prospects, keep in organization.
(5) Little credit to supervisor who now does good instructional work.
(6) Hardship on good trainers.
(7) Development of wrong working habits.

h. List on board advantages of organized training.
i. Bell System has standardized on:

(1) Financial policy.
(2) Research (140 West St.)
(3) Engineering.
(4) Manufacturing. (Hawthorne, Kearny, Baltimore, to be built)
(5) Construction.
(6) Maintenance.
(7) Operation.

j. How about the "Human Factor".
k. Training is a feature of the proper utilization of the human factor.
l. 10 years hence, "our worst worker may be better than our best today."
C. What constitutes Organized Training?  

End of 1st Day

1. Responsibility of training line organization.
   a. The line organization is accountable for the performance of the job.
   b. Is training part of supervision?
   c. Training can be organized.
   d. Actual conditions (job training) are ideal.
   e. Organized training necessitates good instructors.
      (Training forces for A. E. F.)

2. What is training? (Training football team or prize fighter)
   a. Getting an individual to actually be able to do a particular thing. (How did you learn to drive an automobile.)
   b. What training should do.
      (1) Have workers available.
      (2) Obtain improved performance.
   c. Marks to distinguish good training.
      (1) Perfection of performance.
      (2) Minimum of time for perfection.
      (3) Low production and training costs.
   d. Ideas - Practice = Training
      Ideas - Drill = Training (In reduction of "Handicaps").
      Teaching - Supervised Practice = Training (In reduction of "Handicaps").
   e. Drill work and practice build habits. (P. 28)
   f. Variation of amount of teaching and supervised practice in different work.

   a. On the job or away from the job.
   b. Job training is best suited to individuals.
   c. Central training is more adaptable for groups of people to be trained simultaneously.
   d. Examples of Centralized Plant Schools in New York, Philadelphia and Newark.
C. What Constitutes Organized Training. (Continued)

e. Centralized School.

<table>
<thead>
<tr>
<th>Disadvantages</th>
<th>Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Ordinarily limited to use in concentrated area.</td>
<td>(1) Uniform teaching practices.</td>
</tr>
<tr>
<td>(2) Requires careful coordinations (Two agencies to reconcile)</td>
<td>(2) Fewer instructors.</td>
</tr>
<tr>
<td>(3) Large initial cost and annual carrying charges.</td>
<td>(3) Better records of training program.</td>
</tr>
<tr>
<td>(4) Does not completely finish the training job.</td>
<td>(4) Facilities for setting up conditions are centralized.</td>
</tr>
<tr>
<td>(5) Necessitates worker from actual production</td>
<td>(5) Does not interfere with working conditions.</td>
</tr>
<tr>
<td>(6) Makes two adjustment periods.</td>
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</tbody>
</table>

f. Do not let Centralized School operating become more important than the purpose for which it was organized.

4. Agreement on standard training methods.

a. Large corps of trained instructors required. (Just as training is necessary for those who are going to perform other operations.)

b. Qualifications of an instructor.

c. These instructors can be developed.

   (1) Appreciation of training needs.
   (2) Appreciation and understanding of teaching methods.
   (3) Assistance and drill in planning lessons.
   (4) Supervised practice in teaching lessons.

5. Summarization of "Organized Training Plan".


a. What is a vocation? (A regular occupation)

b. Make people effective in performing some definite, particular things, just as soon as possible.

D. Teaching Process – Easy and Natural Process.

1. Learning process – How do we learn a new thing?

a. Reading, hearing, seeing, studying, etc. (list on board)
D. Teaching Process - Easy and Natural Process. (Continued)

   (How do you know)

c. "ASSOCIATION OF IDEAS".

d. Learning ability in proportion to ability to 
   memorize and reasoning power.

2. How would you teach?

   a. Obtain proposed subject from each member.
   b. Make sure subject is specific, i.e. not too 
      general.
   ***c. Let each member demonstrate teaching.
   d. Discuss mistakes (very briefly)

3. What is the Teaching Process. (Some processes have 
   more than four steps. Four steps found to be 
   sufficient)

   a. Step I - Preparation: Selection of the idea which 
      is already possessed and nearest the new idea.
   Step II - Presentation: Putting all the new ideas 
      before the learner in the best order for their 
      being assimilated by him.
   Step III - Application: Learner trying out new ideas 
      so as to correct any errors or deficiencies.
   Step IV - Test: Learner applies new ideas without 
      aid.
   
   b. The above steps are used for a good teaching job - 
      easy, simple and natural process. (Often used by 
      children, naturally - telling about new tricycle)
   c. How much of our training did we receive by the use 
      of the four steps?
   d. Analogy of -
      Teaching - Learning process.
      Selling - Buying process.

   e. How the process operates (classes of mental activity)
      
      (1) Subconscious activity.
      (2) Conscious Activity.

   f. Principle of intentional teaching - Learning process 
      as basis of organized training. See P. 45)

4. Intentional teaching vs. Accidental teaching. 
   (Boy fixing trousers - cleaning terminals with blow 
   torch)
D. Teaching Process – Easy and Natural Process. (Continued)

a. Two conditions for learning.

(1) By accident having a new set of random ideas put before us to be tied up by it.
(2) By intention having a definite idea put before us and through some process, making certain we have tied it up properly.

b. Amount of and disadvantages of learning by "Accident".

(1) Example – Synthetic Indigo Dye.
(2) Example – Learning to eat pork.
(3) School of experience is largely accidental learning.

c. Danger of accidental learning in an intentional program.

d. Advantage or need for intentional teaching.
   (List on board)

e. Utilization of ideas build habits.

f. Corrective practice vs Preventive practice.

g. Need for trained instructors. (Who should learn teaching methods.)

(1) Trained instructors can be developed.
(2) History of imparting knowledge.
(3) Certain teaching principles properly applied bring results.
(4) Proper teaching methods in schools and need for use in industry.

5. What constitutes a good instructor or trained instructors?

a. Trained nurse vs experienced nurse.

b. Trained instructor vs experienced instructor.

c. Requirements of a trained instructor. (List on board at least Nos. 1, 2, 3, 4 and 6.)

(1) Job performance ability.
(2) Know teaching methods.
(3) Application of teaching methods.
(4) Ability to plan lessons.
(5) Ability to make course, considering progression factors.
(6) Proper habits and practices as an instructor.
(7) A wealth of personnel features.
D. Teaching Process – Easy and Natural Process (Continued)

d. Which of the above do we lack now?

6. Five accepted methods for teaching. (Known by everybody but not always used to best advantage)

   a. Demonstration method. (Actual materials)
   b. Illustration method. (Substitute for actual materials)
   c. Lecture method. (One way – no comeback)
   d. Experimental method. (Trial and error – no direction)
   e. Directed discussion method. (Give and take)
   f. Which methods are poor for our use? – c and d.
   g. Which methods are best for our use? – a and b.

7. Lines of Approach (Policy of Instructor)

   a. Informational line of approach. (Pouring in)
      Used for building up facts – Example of boy building theatre.
   b. Developmental line of approach. (Drawing out)
      Used for building judgment.


   a. 8 coins – 4 of each kind.
   b. 6 coins – 3 of each kind.
   c. 15 coins – any kind.

9. First flight of teaching (Steps I and II only)

10. Weakness of Step I.

   a. Too long.
   b. Wrong picture produced.
   c. A let down to Step II – Make ideas merge.
   d. No response from learner.
   e. Resentment on part of learner of developmental approach.
   f. Step I must be easy, natural and simple.

11. Weakness of Step II.

   a. Too large a unit.
   b. Wrong selection of related information.
   c. Faulty analysis.
   d. Lack of sequence.
   e. Confusing learner.
D. Teaching Process — Easy and Natural Process (Continued)

*** 12. Round of teaching. (Step 1, 2, 3 and 4 of same lesson)

13. Summarization of what has been found to be usually the best methods and lines of approach to use.

<table>
<thead>
<tr>
<th>Steps</th>
<th>Method</th>
<th>Line of Approach</th>
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<tbody>
<tr>
<td>Step I</td>
<td>Directed Discussion</td>
<td>Informational</td>
</tr>
<tr>
<td>Step II</td>
<td>Demonstration - Lecture</td>
<td>Informational</td>
</tr>
<tr>
<td>Step III</td>
<td>Demonstration - Discussion</td>
<td>Developmental</td>
</tr>
<tr>
<td>Step IV</td>
<td>Demonstration</td>
<td>Informational</td>
</tr>
</tbody>
</table>

14. Always follow the four steps — an easy, natural, process.

a. Do not make lessons too long.
b. Do not assume learner can go ahead correctly.
c. Check key ideas in Step III.

E. Analysis of Teaching Content. End of 4th Day.

1. How do we know what to teach?

a. Any piece of work is the total result of distinctly different small details.
b. Successful performance and good quality job vs mediocre performance and questionable quality.
c. Improved performance in any field only through improved details.
d. A job has a fixed number of ideas.
e. "Write on board what must be done for some job."
f. Characteristics of an "Operating Point". (Fine enough for standard performance)

(1) Applied human effort to a particular assignment.
(2) Failure to do, causes assignment to fail.
(3) A motion study detail.

g. Study of operating points make the job easier and more satisfactory to learner. (Same thing with less effort.)
E. Analysis of Teaching Content (Continued)

h. Why can't other batters do as well as Babe Ruth?
i. The better the analysis, the better Step II.

2. What must be done. (On left of sheet for a particular job)

a. Extent of an analysis - 1 step finer than 1st.
   intention.
b. Brings out all ideas if properly made.
c. Real purposes of training. (Elimination of
   waste movements, etc. - List on board)

3. What must be known. (On right of sheet)

a. All ideas to be written out on board.
b. Ideas directly applying to particular operating
   points. (Wheatstone bridge)
c. Related ideas (Wheatstone bridge)
d. General ideas (Wheatstone bridge)
e. Too much related information will confuse
   learner.
f. Classification of related ideas.
   (1) Safety factors.
   (2) Identification of materials.
   (3) Properties of materials.
   (4) Terms as, tools, operations, apparatus.
   (5) Symbols.

g. Beware of terms, peculiar to telephone industry
   for the "beginner."

4. Teaching content.

a. Must all ideas be taught every one.
b. A = What must be known to do the job.
   B = What is already known.
   C = What must be taught.

   "A - B = C"

c. Importance of assimilating formula.
d. 8 new ideas per lesson should be the limit.

5. The above analysis develops Step II or a series of
   Step II.

a. Limit ideas in one lesson to assure assimilation.
   (Eating an apple in three bites.)
b. Each lesson to have a definite aim.
E. Analysis of Teaching Content. (Cont'd.)

6. Lesson planning not in same order as lesson teaching. Noon
   a. Step II
   b. Step I
   c. Step IV
   d. Step III (Most important step and usually omitted) (Place to bury the dead - life saver)

7. Each member plan one lesson in class. (By complete analysis)

8. Primary lessons vs Secondary lessons. Recess
   a. Primary lesson - no background.
   b. Secondary lesson - Learner has background.
   c. Determining when to use. (Very few Primary lessons.)

F. Detailed Lesson Planning. End of 5th Day.

1. Request twenty lessons.

2. Lesson planning preferable first hour in morning and don't leave group.

3. Leader should plan lessons at same time.

4. Greatest value from written analysis - reluctance to make analysis.

5. Success formula.

6. Analysis is a means to an end. (Key for G. E. Turbines)

G. Supervised Practice Teaching. End of 1st week

1. Practice teaching.
   b. Continue lesson planning and teaching for remainder of week.

2. Weakness of lessons. Look for definite things for each lesson as:
   1. Relationship to learner. (Learner is most important.)
   2. Continuity of steps.
   3. Relation of lesson to lesson. (Be natural)
4. Methods used.
5. Line of approach.
6. Check of key ideas in Step III.
7. Beware of use of unfamiliar terms and symbols.
8. Do not show superiority - which gives learner a feeling of inferiority such as "I will teach" you a lesson".
9. Only include desirable ideas.
10. Analogy of four steps - (4 legs to a chair)

11. Are all ideas included or too many ideas.
12. Are all safety features included.
13. Does teacher have a mastery of subject.
*14. Short lessons keep learner more active.
*15. The ultimate gauge of a lesson is its effectiveness. How does it work.
16. Lesson must be made fit for level of group.
*17. All lessons should be planned to allow the learner to easily and in short stages, make rapid progress.
18. Avoid parallel ideas in Step I. (Comparison of repeating shotgun with razor with repeating blades.
19. Difference between 1 sitting and 1 lesson.
20. Was time too long? Is time saved in teaching worth the chance of wrong notions or incomplete information.
21. Were proper practices taught?
22. Some lessons are a challenge to the ingenuity of the instructor to have a good Step III - Step IV.
23. Service production features.
24. Consider in telephone business:

   a. Safety and practical habits
   b. Permanency
   c. Contact
   d. Ground
   e. Continuity
   f. Insulation

25. Give learner reasons, where necessary.
26. Correct learner at first mistakes to prevent wrong habit formation.
27. Don’t take apparatus from learner’s hand.
28. Always follow four steps.
29. Detailed written analysis must precede lesson plan.
G. Supervised Practice Teaching. (Cont’d.)

3. Correlated features.

a. Technical lessons. (Deal with principles and makes direct easier)

b. Manipulative lessons.

(1) Direct production (that for which the gang is organized to do)

(2) Service production (that necessary for preparation for work) (Proper preparation and planning) (Chevrolet Company)

c. Many service production features are omitted. (Installer - dull bit - Measuring space for nails.)

d. Any kind of vocational training has both kinds of lessons.

e. Should service production features be included in courses?

f. A product is to increase the value or utility of materials by changing the shape, form and arrangement.

g. Is purpose of Step I for checking? Page 83.

H. Layout of Course. (Do not introduce too fast.

1. Review lesson planning thoroughly.

a. Teaching process (easy and natural)

b. Analysis of teaching content.

c. Lesson planning.

d. Job assignments. (Ask each member to prepare a list of job assignments for practice and put number on board of each) (Be sure to do this)

2. Progression factors.

a. List job assignments in production order.

b. List job assignments in learning order.

c. Production order is fixed.

d. What do we try to avoid in picking work for new man?

e. What is it that experienced man has that new man lacks? (Give examples of each)

(1) Knowledge.

(2) Judgment.

(3) Speed.

(4) Accuracy.

(5) Skill.
H. Layout of Course. (Do not introduce too fast) (Cont'd)

<table>
<thead>
<tr>
<th>High</th>
<th>Much</th>
<th>Fast</th>
<th>Much</th>
<th>Much</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill</td>
<td>Knowledge</td>
<td>Speed</td>
<td>Accuracy</td>
<td>Judgment</td>
</tr>
<tr>
<td>Low</td>
<td>Little</td>
<td>Slow</td>
<td>Little</td>
<td>Small Amount</td>
</tr>
</tbody>
</table>

f. Device for setting assignments in learning order.
g. Use of Library Cards.

(1) List name of job assignments. (1 to a card)
(2) Arrange in proper teaching order.
(3) List lesson aims on all cards.

3. Each member lay out fifteen or twenty assignments of course for one vocation.
   a. Write some assignments on board.
   b. Have others give theirs.

4. Production order vs Learning order.
   a. Again list job assignments on board in production order.
   b. Again list job assignments on board in learning order of some vocation.
   c. Production order is fixed.
   d. Factor table is a guide or tool and not an accurate measure.

5. Advantages of course of study. (On board)
   a. Brings all subject matter to be taught out.
   b. Permits arrangement of assignments in proper sequence.

6. Layout complete course for one vocation. End of 2nd week.
   a. List names of job assignments on each card and arrange.
   b. List "Lesson Aims" on thirty cards. (A complete set of lessons should be based upon experience in teaching.)
II. Layout of Course. (Do not introduce too fast) (Cont'd)

7. How will you use this course on the job.

8. Organization chart.

9. Ask class for the most important things to observe in teaching lessons.

I. Records and Reports.

1. Difference between records and reports. (Determined by use)

2. Purpose of records.
   a. Administration of a training program.
   b. Justification of a training program. (Quality and quantity)

3. Probable extent of records.

4. Pass out small books and write in on Page 6:
   a. Do not sacrifice safety and quality for speed.
   b. Haste makes waste.
   c. Work performed correctly and in an orderly manner lends itself to speed.
   d. Units will take care of themselves.

5. Use of Learner's Progress Sheets.

6. Analysis of four cards per month.

7. Blocks of job assignments within a course.
   a. Purpose.
   b. Name blocks.
   c. By parallel or series.
   d. Series teaching method preferred.

J. Closing Conference.

1. Have training program endorsed by official.

2. Review in detail the course.
   a. Appreciation of training needs.
      (1) At least 80% have handicaps.
      (2) Is this a loss now, yesterday, tomorrow, forever?
J. Closing Conference. (Cont'd)

b. Organized training.
c. Teaching process.
d. Analysis of teaching content.
e. Lesson planning.
f. Practice teaching.
g. Records and Reports.
h. Not revolutionary.

5. What is the most significant thing you have been impressed with?

a. Breadth of training field.
b. Importance of analysis.
c. Easy process of teaching.
d. Need of planned lessons.
e. Beneficial effect on the organization.
f. Benefits to individuals.
g. The contrast of present training methods with organized training.
h. Whole organization behind training.

4. These are the important things that have been named.

5. That is what you tell me, which doesn't mean anything. You tell your men these things.

6. Step III has been completed. Step IV will come. We will have to wait and see the results.

7. If you fail, I fail. Personally, I don't think you will fail me. And you won't if you go to the field and make these things that you have just mentioned effective.

8. Review.

a. "Who's behind the training".
   (1) Officials of the Southwestern Bell Telephone Co.
   (2) Officials of the A. T. & T. Company.
   (3) Officials of all the Associated Companies.

b. "Personal Feelings" and success formula.
c. "Organized training is another step in the progress of our business, to be with us always".
CHAPTER XI

TWO DAY INFORMATIONAL CONFERENCES FOR
THE HIGHER SUPERVISORS

The two day informational conferences are held for the purpose of informing the higher supervisors of the organized training program. Only the main features of the three weeks conference are covered, emphasizing particularly the mechanics of the program and the administration of the program. The Statement of Policy in Chapter IX is discussed in detail, especially section "G" relative to "Means Which Should be Taken to Assure That the Training Program Will Be Carried Out After the Instructors Leave the Conference."

The outline of the two day informational conference follows this page and it will be noted that the schedule is shown in the righthand margin of the sheets. A knowledge of the subjects discussed and conclusions reached may be gained by studying these pages.
OUTLINE OF INFORMATIONAL COURSE FOR SUPERVISORS.

A. Opening Conference.

1. Leader first in conference room.
2. Pass books out and being seated.
3. Members writing names, titles and address. (Remarks concerning V.I.T.A.)
4. Brief outline of plan.
   a. New York school 6 weeks - 3rd school.
   b. Ultimate aim.
   c. Outline of our plan.
5. Rules and Regulations. (Rules and Regulations of foremen's conferences - No Smoking)
6. Appointment of time keeper.
7. Introductions and brief biographies.
8. Statement of purpose and introductory talk.
   a. Uniform training in the principles, etc.
   b. Only skeleton outline, etc.
   c. Trained a long time - easy and natural - not mysterious - easier way.

B. Appreciation of Training Needs.

1. Why do we train?
   a. Starting telephone company in Mexico.
   b. Could a man from a high school or from a correspondence school install a telephone?
   c. Each man lacks something. We train to reduce or to overcome
   "HANDICAPS"
   d. Handicaps are usually classified as to lack of
      1. Knowledge
      2. Skill
      3. Psychological (mental) (Installing phone in $100,000 home)
B. Appreciation of Training Needs. (Cont.)

2. Who needs training, i.e., who have handicaps?

a. Those not meeting standards or objectives.
b. Why would they pick Mr. Elias for Vice President.
   (Less handicaps)
c. Who have handicaps.

   1. New men
   2. Transferred men
   3. Also all others due to improvements, new specifications, new routines, increased demands from public.
   4. 100% of our people have "HANDICAPS"

d. Frame of mind (Purpose of industry)

   1. People.
   2. Company policies.
   3. Work.

e. Three stages for a beginner.

   2. Appreciation - Waking up - feels easy in own mind as to success.
   3. Application - Getting down to business.

f. Transferred people also go through three stages.
g. Why large labor turnover. Give example.
h. Much room for improvement in first two stages which are heavy cost periods. A systematic training program seems advisable.

3. Who does the training now? (4 general ways)

a. Who does the most training?
b. What should be our procedure

4. Disadvantages of present practice.

a. Too many agencies
b. Anybody's business but definitely nobody's.
c. Foremen and workmen rated on production.
d. Corrective training versus preventive training practices.
B. Appreciation of Training Needs. (Cont.)

5. Need for organized training.

a. Evidence of present disadvantages. (Mr. Taylor's experience or own experience in checking transpositions.)
b. Proper procedure to have intentional training. (Now training is a combination of circumstances.)
c. Disadvantages sufficient to "outlaw" our present training methods.
d. A systematized or organized plan of anything is conducive of lower costs and more effective results.
e. Proper margin between operating costs and total income.
f. Our wages continue raising.

1. Training is a factor of the proper utilization of the human factor. (Our Company will not pay 25% - must go to betterment of service or wages)

2. Ten years hence our worst worker may be better than our best worker today.

C. What constitutes organized training.

1. Line organization has responsibility of training. (A definite job - just as important as setting a pole line - product equal trained individual.)

2. What is training.

3. Ideas - Practice = Training

   Ideas - Drill = (Reduction of "HANDICAPS")

   Teaching - Supervised Practice = Training (Reduction of "HANDICAPS")

4. Variation of amount of teaching and supervised practice in different vocations.

5. Job training versus centralized school training. (Schools in N. Y. & Philadelphia).

   a. Job training is best suited to individuals.
   b. Central training is more adaptable for groups of people to be trained simultaneously.
   c. Training gangs and teaching instructors.
C. What constitutes organized training. (Cont.)

6. Agreement on standard training methods.
   a. Large corps of training instructors required.  
      (Trained Nurses) (Where will we get the instructors)
   b. Qualifications of an instructor.
   c. These instructors can be developed (five features)

   1. Know job.
   2. Know teaching methods.
   3. Know how to prepare lessons.
   4. Know how to prepare course.
   5. Supervise practice of each.

7. Danger of centralized school operation becoming more important than the purpose for which it was organized.

8. Summarization of organized training plan.

9. Bell System a success - Why - Seven features - Mr. Watterson and common denominator.

D. Teaching process - An easy and natural process.

1. Learning process - How do we learn a new thing.

   a. Association of ideas.
   b. Native of Central Africa.
   c. "T.N.T".
   d. Seeing and hearing is not learning - foreign language.

2. Teaching process - (4 steps) - party at my house - writing in Chinese.

   a. The four steps are always used for good teaching.
   b. How much of our training did we receive by the four steps.

3. Intentional teaching versus accidental teaching.  
   (Boy cut hole in pants - cleaning terminals)

   a. Two conditions for learning are by accident and by intention.
   b. Danger of accidental learning in an intentional program.
   c. Need for trained instructors.
   d. Certain teaching principles properly applied bring results.
D. Teaching process - An easy and natural process. (Cont.)

4. What constitutes a good instructor or trained instructor (7 features)

5. Five accepted methods for teaching.
   a. Analogy of completion of any job necessitating use of effective methods.
   b. Advantages and disadvantages of each.

6. Lines of approach. (Policy of instructor)
   a. Informational.
   b. Developmental.

7. Summarization of what has been found to be usually the best methods and lines of approach to use for each step.

8. Necessity of always following the four steps.

E. "Analysis" of Teaching Content.

1. How do we know what to teach. (Operating point analysis) (Attention to details and success).
2. Lesson planning not in same order as lesson teaching.
3. Teaching Content (A-B=C)
4. What must be done.
5. What must be known
6. Eight new ideas per lesson should be the limit. (Should we always give a man all he will take)
7. Classification of related ideas (6 classifications)

F. Detailed lesson planning.

G. Supervised Practice Teaching.

1. Practice teaching.
2. Weakness of lessons (Look for definite things for each lesson - 29 such features)
3. Types of lessons.
G. Supervised Practice Teaching. (Cont.)
   b. Manipulative lessons.
      1. Direct production.
      2. Service production.

H. Correlated subjects.

I. Layout of Course.
   1. Review lesson planning thoroughly. [4 features]
   2. Progression factor table.
      a. What is it that experienced man has that new man lacks.
      b. What do we try to avoid in picking work for new man.
   3. Use of Library Cards.
   4. Blocks of Job Assignments, within a course (parallel teaching versus series teaching)
   5. Production order versus learning order (Production order is fixed)
   6. Advantages of laying out course. [4 advantages]
   7. Knowledge to be included in course.
         not essential nor economical. (If safety or practical habits are included, or if features regarding insulation, contact, ground or continuity of the circuit are present)
   8. Supervisory organization must endorse the course.

J. Records and Reports.
   1. Differences between records and reports (determined by use)
   2. Purpose of records.
      a. Administration of a training program.
      b. Justification of a training program.
   3. Proper extent of records.
K. Questions.

L. Pass out small handbooks writing in the following four features.

1. 
2. 
3. 
4. 

M. All other means or ways to assure that the organized training program will be carried out. (Total obtained features).

N. Closing conference.

1. Endorsement of training program by Mr. Lawrence.

2. Review in detail the course.
   a. Vocation of work classification.
   b. Job assignment.
   c. Lessons.
   d. Ideas
   e. Operating points.

3. Most significant thing you have been impressed with.

4. You have named the important things.

5. The success of the program will depend upon the degree to which we are able to train our instructors to properly train our employees to do certain definite things effectively and as soon as possible.

6. Step 3 has been completed. Step 4 will come.

7. Review
   a. Who's behind the training.
      1. Officials of our company.
      3. Officials of all companies - General Plant Manager's conference.

   b. Personal feelings (Success formula)
   c. Training to be with us always.
CHAPTER XVII

TECHNIQUE OF CONFERENCE LEADERSHIP AND TRAINING

THE FOUR PLANT TRAINING SUPERVISORS AS
CONFERENCE LEADERS

The four Plant Training Supervisors appointed obtained the
to attend three weeks
knowledge of the subject matter to be included in the three weeks
Vocational Instructor Training Conferences by attending three weeks
conferences conducted by the General Plant Training Supervisor at
St. Louis and at Dallas as shown by the schedule on pages 26-28.

It remained to give these conference leaders some fundamentals
and some of the techniques at conference leadership. This chapter deals
principally with such matters as presented to the men after regular
conference hours while they were attending the three weeks conferences.

Quite often there is a difficulty in obtaining the desired
frankness and confidence in discussion in a conference group because the
chairman of the group or conference leader is unfamiliar with the different
methods by which a conclusion may be reached.

The Conference Process may be illustrated as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Disturbed Situation</td>
<td>Redirected Situation</td>
<td></td>
</tr>
<tr>
<td>The Area Of Unadjusted Conditions</td>
<td>The Area Of Discussion And Conclusion</td>
<td>The Area Of Action</td>
</tr>
</tbody>
</table>
The conference process is illustrated by the three different areas above and are:

1. The area of unadjusted conditions before the conference. It is this disturbed situation which brings about the necessity of the meeting of the conference group.

2. The area of discussion and conclusions in the conference. The conference group is represented by the Chairman and conference gathered about a rectangular table. The discussion in a conference is the spoken sharing of the individual thoughts so that each member may know of that the others are thinking, and also share with one another the progress of their thinking. Groups are not always cooperative in their discussions and unless some conditions are observed, group discussion sometimes does not get very far.

3. The area of action after the conference may be called the redirected situation. The enthusiasm in the carrying out of those conclusions and the strength behind the redirected situation depends upon the extent of actual group thinking and the extent of actual participation by the individuals on the conclusions reached. These matters are greatly affected by the methods used by the group chairman in arriving at conclusions. Five most common methods used and which a chairman of a Conference Group should understand something about are illustrated below:

<table>
<thead>
<tr>
<th>Acquiescence</th>
<th>Assent</th>
<th>Compromise</th>
<th>Consent</th>
<th>Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ordering</td>
<td>Telling</td>
<td>Debate</td>
<td>Development</td>
<td>Group Thinking</td>
</tr>
<tr>
<td>and Directing</td>
<td>and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Selling</td>
<td></td>
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</tr>
</tbody>
</table>
At the bottom of the above illustration are shown five methods by which an issue may be handled: Ordering and Directing, Telling and Selling, Debate, Development, Group Thinking. At the top of the illustration is the kind of a conclusion, or agreement usually obtained by the use of the five methods. Following are some ideas of each method and the appropriate use of each method to bring about an effective redirected situation after the conference.

Conclusions Arrived at by "Ordering and Directing"

The thinking has taken place outside the group and the group experience here is nothing more than responding to an authoritative act of somebody's will. The group participation in thinking has been zero.

We must realize, however, that ordering and giving directions is a very necessary method used for a large part of the directions and control which is applied to industrial group activities.

Conclusions Arrived at by "Telling and Selling Method"

This is settling an issue by giving people information, either with our without persuasion. The group experience is mostly listening. A conclusion presented by the telling and selling method seems to receive assent of the group. That is, they can see the different points presented and can see the final conclusion. They may have a reservation which may have been cleared up by the answering of a question. On the other hand, the group did not do any real thinking in working out the conclusions and so are not very strongly committed in carrying it out. The group reaction is however stronger than the first method.

Conclusions Arrived at by "Debate"

Debate has no place in industrial leadership for directing group activities or group thinking. It does not tend to bring the leader and group together. A compromise is unsatisfactory and rarely permanent. Conclusions of this kind do not bring very enthusiastic redirected situations.

Conclusions Arrived at by the "Development" Method

The development method is tremendously effective for bringing people to grasp the reasons which are shaping a conclusion. It stirs people to use their own minds. In the development method, the Chairman gets from the group certain information and experience on which to generalize in terms of fundamental principles governing the conclusion and they begin to see the use of the information and experience which they have supplied.
Thus, when a conclusion is arrived at, the group consents heartily because they have worked out the information and reasons on which it is based. The area of action should be strong and enthusiastic.

**Conclusion Arrived at by Group Thinking**

In group thinking, where certain individuals start with interests or wishes the conferrees find that as the process progresses, these interests become modified or strengthened in the light of thinking and discussion that goes on in the group. The final conclusion is a conclusion that fits what each has come essentially to want or think. The group thinking is high and conclusions should have a strong area of action.

It should not be taken for granted that one method should be used on all occasions. The appropriate time to use a method or a combination of methods has got to be up to the Chairman of the group who must base his decision on a number of factors including: subject to be covered, personnel of group and length of time for covering situation.

The Development Method is recommended for large portions of the Vocational Instructor Training Conferences.

Some of the responsibilities and functions of a Chairman of a discussion group are:

1. He is responsible for helping the group have an opportunity for clear thinking which involves preparation on his part in both content and method.

2. He must see that the issues are clearly before the group.

3. He must see that solution material is introduced at the proper time.

4. He must see that the process progresses from step to step.

5. He must keep the discussion to the point.

6. He must see that the discussion proceeds from point to point.

7. He should get everybody into the discussion and have all points of view represented.
8. He should summarize the discussion from time to time.

The hints on conference leadership, hints on public speaking applied to conference leading and hints on the preparation of quarters following this page were presented to the Four Plant Training Supervisors and are self-explanatory.

It was recommended and followed out that each of the four Plant Training Supervisors should have in their first two conferences one or two prospective conference leaders. The prospect was not to be told that he was being considered; but would attend one three weeks conference and then if an emergency arose where a conference leader was needed, this prospect would attend a second three weeks conference and would also be given the material discussed in this chapter before starting his first conference.
LEADERSHIP

1. It is not desirable to have more than 12 in a group because of
   a. time limitation.
   b. proper amount of practice teaching for each member of class.

2. Group should not be less than 10 as value comes from conference or direct discussion. (Never more than 14)

3. The personnel of each conference should be from at least three vocations.

4. The conference leader should be quite natural and be one of the gang.

5. Leader must sell himself from the start by being sincere, logical and knowing the subject.

6. The conference leader in giving rules and regulations should follow a "restriction" by a "benefit".

7. Stories may very often be used to an advantage in order to win a point. However, they are not necessary.

8. It is desirable to minimize swearing and vulgarity. Although the purpose of the conference is to train instructors and not to reform the members, experience indicates that swearing should be kept to a minimum.

9. Leaders may save voice by pitching the voice a half tone lower.

10. Modulate voice in practice statements before presentation.

11. Nervousness will be present but will be less apparent after some experience. A remedy is, of course, poise, and may be helped by abdominal breathing; that is, two or three deep breaths with one letout suddenly will give some relief.

12. Group discussions will, at times, get too far away. An outline of the course will help to keep conference within bounds. Another help is to walk to board and make squares or lines or, perhaps, arrows which tend to relieve tension and calms discussion.
13. Keep group active. The members of the group may be classified as follows:

   a. Prolific contributors
   b. Sound contributors
   c. Unsound contributors
   d. Reluctant contributors

14. The leader, knowing the response desired, may distribute questions accordingly.

15. Following are two methods of distribution:

   a. Poor distribution by direct questions, to and from one man, for example, No. 7.

   b. Better distribution by asking No. 7; then asking No. 9 to come in, then No. 3. That is, jump across the table with the discussion. (See illustration.)

16. A non-directed question may be asked to whole group so as to get whole group thinking. Then follow this general question. If pause becomes tense, the question may be directed to some particular individual. Leader should know before asking question to whom question will finally be directed.

17. A non-direct question may be used as a device for breaking up conversation.

18. Do not expose a man or have him expose himself for not paying attention.

19. It is usually better to state questions first, then add the name. Some exceptions are:

   a. when it is desired to have some particular response from a particular lesson; that is, as an effect on other.
b. Give selection so as to quiet the quick talker

20. No one man or no two men should dominate a group as quieter men having sounder opinions will not contribute. This may be handled by
   a. Direct questioning with name first
   b. To get whole group to expose this man, that is, to attack him asking others if they agree with the quick talker's opinion
   c. Group may kid quicker talker about talking too much

21. A slow talker may be a sound thinker and should be brought out.

22. Be very careful to avoid any direct method of asking questions before group is acquainted with one another.

23. Some discussion may cease without a final conclusion.

24. Never ridicule any member of the group in any way.

25. Much of the course is informational and must be given to the group by prepared lessons; that is, as facts which may be checked later.

26. During the first day the leader should determine the type of men in the conference.

27. Concerning talking, the members may be divided into the ready talker and the reluctant talker.
   a. Ready talker
      1. Windjammer
      2. Sound Thinker (worth while ideas)
      3. Biased reasoner (which will not admit of controversial facts)
      4. Poser
      5. Humorous

The group will take care of Numbers 1 and 4. No. 2 is desirable. No. 3 is harder to handle. The salvation of No. 3 is to bring the group back to the course by asking the man, (if on another subject) what that has to do with training instructors. Much use may be made of No. 2
by using him to crystallize ideas. No. 2 may be matched against reluctant man by first getting the idea from him; that is, get the two men to discussing or debating the subject. There may be a few insistent or conversational talkers. This may be helped by the example of the conference leader. That is, build up conference dignity. Do not make too short statements or too long winded statements.

b. Reluctant talker

1. Sound thinker
2. Biased reasoner
3. Poser
4. Slow thinker
5. Dumb
6. Diffident or bashful

These types will have to be determined by getting men to talk some. Start questions to the reluctant man by the use of questions which he knows well; then encourage him by having group pass favorably on his answer. Keep No. 5 in group if possible; that is, if he is not particularly objectionable. The leader must do justice to man and the group. No. 5, if objectionable, may be taken out of the group. No. 5, must be sheltered and not humiliated. Type 6 must be sheltered. There should be given this man a motive for overcoming his handicap, such as saying "This kind of work overcomes self consciousness", or, "Confidence will come with practice teaching", the motive being self-advancement and self-development. Some of these features or philosophy will be helpful for the ready talkers.

28. Beware of saying anything or doing anything that would be an injustice to any member. Be sure to have reserves. That is, say "In my opinion it appears that unless this man changes, he will never make a success", rather than saying bluntly, "This man will never amount to anything."

29. Too much seriousness may not be very effective. Naturalness is the key to success in conference work.

30. Convince yourself first. Be sure of the subject matter and believe in it.

31. Be broad and not serious as to detail.

32. Do not always exclude strange ideas.

33. Do not be more important than the group. The group's reaction is the most important.
34. The success of the conference leader's job is hard to measure. The real measure is the appreciation of the subject made by students which is in turn measured by the way it is put over on the job.

35. Many students will expect to be measured and the leader must completely sell himself to the members so that they will think he is fair and will always give a fair report. The answer regarding an individual should be, "If you want my opinion of this man", et cetera, rather than saying "This man is so and so." Opinions should be verbal and not written. Always hesitate upon written statements. Do not say one man is best or worst if there is an element of uncertainty. Comparisons between groups are hard to make.

36. Things which may be measured of an individual in conference are:
   a. Probability of future growth
   b. Analytical ability
   c. Rapidity of mental process
   d. Reasoning ability
   e. Soundness of conclusions

   (a. above may include the character and personality)

37. The conference leader, during the first week, should look for some of "d" and "e" as well as some of "c". At the end of second week of conference check again and toward the end of the work check the third time. These three checks give a rather clear picture upon which to pass an opinion.

38. If there is any doubt, err toward the benefit of a man. Check as to member being "average", "good" or "below average." Conclusions should not be harsh.

39. Avoid positive statements. Better make statements as "I think", or "It is reported", or "I have heard."

40. The conference leader should make absolutely sure that he has his line of talk prepared and ability to build up diagrams, if used, as he goes.

41. Cautions to follow in sitting in with a group being led by a new conference leader:
   a. Never take group out of man's hand as there cannot be two leaders.
   b. Sit in with the group in the circle.
   c. Watch for little features of technique.
   d. Check mannerisms.
43. The following mannerisms should be carefully watched:
   a. Bad technique to dispute statements.
   b. Do not say "I don't think so."
   c. Do not be negative to everything. It is better to say
      "That sounds alright," or "How does it sound to you?"
      putting the question to someone else.

44. Watch for common responses as "Now or "Well". The term "I don't
   know", may be used, but should not be used to everything. It is
   better to often say "Does that check with your ideas?" or "That
   does not seem exactly like we said before", et cetera. It is
   bad practice for the conference leader to walk to side of room or
   to leave the end of the table as it leaves the group without a
   leader; that is, don't leave the focal point of the group. It
   is better to sit down when you want to leave the group.

45. A conferree's mannerisms may be checked by the use of the four
   steps at recess or out of class time.

46. Watch distribution carefully. The following is a way to get four
   men into a discussion.
   
   a. First ask a question of Mr. James.
   b. Then say, "Is that your view, Mr. Wheeler?"
   c. Then say, "Mr. Reed, do you check with him?"
   d. "Is that your conclusion, too, Mr. Thorm?"

47. Always know who to pick out to stop discussion.

48. A person may form the habit of being able to say what he thinks if
   he will learn to.
   
   "THINK IN TERMS OF WORDS"

   That is, if you see a telephone, think to yourself, there is a
   black telephone, rather than just seeing the telephone without
   thinking of the words to give the picture.

49. The words, "Obedience to law is Liberty", may be written on the
   board in case someone starts to smoke.

50. Work from one point to another easy and naturally without too
    direct a question or remark.

51. Leader should sit down for much of the purely information portion
    of course.

52. Group will lead you from one subject to another.

53. Good thought to mention a subject briefly prior to time of actual
    introduction.
54. Each morning try to review, for ten minutes, what happened the day before.

55. Tie in new conclusions with previous conclusions.

56. Proper reception for visitors.
1. If the speaking can but interest himself in the welfare of his audience and feel that he has something to give them that is worth while and that they really need, he will forget himself and experience less embarrassment.

2. A speaker will have to be in earnest and show that he means business to get the audience to listen and to respect him.

3. Know the subject and be prepared.

4. Say a few things definitely and well on each point and the total will make a first class speech.

5. Do not disgress from outline any more than is absolutely necessary.

6. A successful speech depends largely upon the adaptation of the treatment on the subject to the audience. (Study needs of audience).

7. Talk "to" people and not "at" them.

8. Use a forceful, energetic and convincing style of delivery.

9. Think with vigor and energy. Do not be sluggish.

10. Physical powers should be trained to attain the harmonious cooperation of the mind and body.

11. Be forceful and not loud.

12. Make speech simple, definite and practical.

13. Be simple yet "clear" — Be direct.

14. Enthusiasm backed up by brains and common sense is a great power for good.

15. Enthusiasm should not get away with the brains.

16. An earnest and well controlled enthusiasm is the kind which obtains results.
17. A speaker should study audience as well as self in order to arouse appreciation in audience.

18. See that audience get something out of it.


20. Pause occasionally to see that audience is getting the thoughts.

21. Throw out voice with vigor and strength; articulate distinctly; enunciate clearly and make every word understood — slowly and plainly.

22. Make hearers see the point.

23. Plan speech and stick to plan. — Have "Unity" and "Proportion".

24. Every subordinate thought or proposition should go to enforce and support the main or central thought.

25. Strong thoughts should be uttered at a slower rate of movement than less important thoughts.

26. Learn how to pause frequently and not talk too rapidly.

27. Have unity of speech and variety of delivery.

28. The highest type of oratory is enlarged conversation.

29. Concrete illustrations have a very practical value.

30. Plan one good illustration and one good fact under each head of your speech.

31. Often desirable to open speech with a good story and skillfully turn to real subject.
HINTS ON THE PREPARATION OF QUARTERS FOR VOCATIONAL TRAINING CONFERENCES

1. A room 18 feet by 20 feet is desirable.

2. Material used for teaching lessons should be stored in another room if possible.

3. The lighting facilities are quite important. Watch for glare from lights. Artificial lights sometimes are the best.

4. Too good quarters cannot be obtained.

5. A conference table may be made by fastening four tables together, or a couple of tables might be made from ordinary soft wood with a linoleum top. If four tables are used, they should be fastened together.

6. The chairs should be good armchairs and comfortable. The type El776 chair made by the Haywood Brothers and Hayfield Company has been recommended. It is understood these chairs cost about $5.00 a piece. A rug should be provided to reduce the hazard of the chairs slipping and to minimize noise caused by the scraping of chairs.

7. A paper pad 48 inches by 60 inches is preferred to a blackboard. This must be specially ordered. Black builder's crayon should be used to write with.

8. Coat racks and hangers should be provided.

9. The room should be thoroughly janitoried every day.

10. It is well to provide a bookcase or stationery file.

11. Stationery should be provided.

12. A notebook with red press board binders should be used in class.

13. It is not desirable to furnish the tobacco for smoking.

14. Ash trays, matches and waste paper baskets should be provided. Water should be available, also sanitary cups and a basket for disposing of the cups.

15. An uncontrolled telephone in the room is not desirable. That is, if a telephone is provided have someone to pick up the calls.
16. The temperature of the room should be kept at about 68 degrees which keeps the group most active.

17. The ventilation in the conference rooms should be carefully watched.
CHAPTER XIII

PRESENT RESULTS AND OUTLOOK

The introduction of the organized training program has been carried out to date (May 10, 1929) in almost exact accordance with the original schedule contained in Chapter VII.

Since January 1st, 1929, eight informational conferences have been conducted by the General Plant Training Supervisor as follows: two at St. Louis, two at Kansas City, and four in Texas. During the two weeks of May 20 to June 3 the two remaining informational conferences will be held at Oklahoma City.

The General Plant Training Supervisor has completed two three week conferences at St. Louis and two three week conferences at Dallas. The Eastern Missouri and Arkansas and the Western Missouri and Kansas Plant Training Supervisors have completed two additional conferences at St. Louis and two at Kansas City, respectively. The Texas Plant Training Supervisor will start his first conference May 27, while the Oklahoma Plant Training Supervisor will start June 3.

The training program has been enthusiastically received by the field organization. The higher supervisors who attended two day conference pronounce the plans as sound and expect very favorable results. Many of these higher supervisors have expressed their
desire of attending the three weeks conference. The first and
second line supervisors who have attended the three weeks conferences
have also expressed themselves as seeing much good in the program.
Some of the older men have stated that under the new training plans,
the newer employees will be able to progress as fast in five years
as the older employees did in ten years. It has been found that the
older employees, who it was thought might tend to belittle the efforts
of making "trained trainers" are the ones who are most enthusiastic
about the work. Those men are the ones who most keenly see the
mistakes of unorganized training. They are the ones who have suffered
most and see the increasing opportunities for the coming employees.

Considerable publicity has been given the plant training
program in the various company publications. These publications in-
clude the Southwestern Telephone News which is published in the interest
of the employees of all departments and the four plant publications,
one in each of the four operating areas.

Departments other than the Plant Department are becoming
much interested in the plant training program. Two members of the
Engineering Department attended one of the two day conferences at
Kansas City. At St. Louis, a member of the General Accounting Office
attended one of the conferences. The General Plant Training Supervisor
will conduct a three hour meeting for the Area Engineer and eighteen
of his higher supervisors at Dallas, Texas, May 20. A few representa-
tives from the Engineering, Accounting and Commercial Departments will
be invited to attend the two day conference at Oklahoma City.
One very important feature, which has been brought out, is that every feature of the training work, the mechanics of the program and subject matter discussed at the conferences must be made practical and useful.

Another important feature, which has been brought out, is the necessity of actively administering the plan. Each Instructor leaving the conference should be closely observed and encouraged so that he will make full use of the training.

Every effort should be made by the line organization and assisted by the staff organizations to build standard courses for each of the vocations of the Plant Department.

It can truly be said that plant training is a common denominator of all features of plant work. Because of this, plant training is, without a doubt, the most important item on which plant effort should be focused.

The carrying out of the organized vocational program should:

1. Assist in carrying out the Bell System’s policy.
2. Assist in meeting the demand and trends of the telephone industry.
3. Insure a high quality of maintenance and operation for the protection of telephone property and telephone service.
4. Assist in maintaining the economic status of the telephone employees as compared to other workers.
5. Assist in making better citizens and better employees.
E. S. Miner
A. G. Westerhoff

S. W. Godbold
A. W. Mount
R. B. Ross
C. C. Rough
John Davis
E. N. Hall

Vocational Training Conference
Dallas, Texas
April 8th to April 27th, 1929.
Here are the foremen and supervisors attending the second class of the Vocational Instructors' Training School being conducted in the Kinloch building, under E. S. Miner, general training supervisor. W. C. Harris, supervisor of training, will succeed Miner as instructor starting with the next class.

The following three sheets make up Exhibit 4 of this thesis and consists of pages 8, 9 and 17 of the March Issue of the Southwestern Telephone News. This Exhibit is referred to on page 40, Chapter 8.
TRAINING has always been a part of our lives, either at home, in school, or in business. Training to some extent is necessary in order to perform any kind of work in the most satisfactory manner. Telephone work is highly specialized, and the telephone business has experienced a rapid growth. Consequently, the need for training telephone workers has long been recognized, and the newer developments in our business, such as the dial system of operation, telephotograph, the telephone typewriter, and other special services, have brought about the real need for proper training of telephone workers.

Although the training of the plant forces has not been on a uniform basis in the past, the results obtained, such as the reduction in costs, shown by the rating plans, the decreased number of accidents, and the improvements in the personalization of the service, indicate that the job of training has been comparatively good.

However, due to the rapid growth of our business and the large number of improvements in the telephone art, it has become necessary to organize the plant training program. Plant work, which consists of engineering, construction and maintenance of the telephone property and equipment, is highly technical and very exacting. A well-trained plant personnel is necessary in order to provide the kind of telephone service which the public expects and which we want to provide.

Other features of the telephone business; its financial policy, its researches, its engineering, manufacturing, construction, operation and maintenance, have been systematized in order to meet the demands of the public and the obligations of the industry. It is also necessary to organize a uniform plant training program.

By the end of this year, thirty-six per cent of all our telephones will be operated by dial offices. During the next five years, $45,000,000 will be invested in inter-city toll cables which will connect the principal cities in the Southwestern Company's territory. Our carrier telephone circuits have been developed until it is now possible to send as many as twenty messages on one group of wires. Telephone typewriter service is increasing and the telephone circuits in our territory are being used more and more for radio broadcasting.

Recognizing that all of these jobs require trained men, the Company has set out to train its plant forces according to a uniform program.

Foremen and Supervisors Will Be Instructors

New persons coming with the Company need training. Employees already trained require additional and special training as the new developments and changes in our industry occur.

Plant training is so closely tied up with production that it is evident the training responsibility lies with the supervisors and foremen who are responsible for the jobs, and since training is generally recognized as a definite responsibility of the line organization, the first requirement of the organized training program is a large group of trained instructors.
The aim is to give all supervisors and foremen who have direct training responsibilities a uniform training in the principles and practices of the teaching art.

The plan is to conduct vocational instructors' training courses, in which foremen, wire chiefs, and other supervisors will study and practice the methods of teaching. Thus, by special training, these instructors will add to their knowledge of the telephone business some of the "tricks of the trade" of teaching, and they will be able to impart their expert telephone knowledge to the learners with a minimum of effort and with more satisfactory results.

**Plant Training Supervisors**

In order to introduce the plant training program, the position of plant training supervisor has been created in each of the four operating areas in the Company's territory. These plant training supervisors are:

- W. C. Harris, Eastern Missouri and Arkansas;
- E. F. Mulvihill, Western Missouri and Kansas;
- J. W. Rodgers, Oklahoma;
- A. G. Westerhoff, Texas.

These plant training supervisors, on the plant superintendents' staff, will lead the vocational instructors' training courses and, with the plant personnel supervisors, will assist in organizing to meet all training problems.

Twelve men will attend each vocational instructors' training conference for a period of three weeks. Two of these conferences have already been held in the Eastern Missouri and Arkansas area, in St. Louis, and the present plans provide for the conferences to start in the other three areas as follows:

- Western Missouri and Kansas area, March 25th, in Kansas City.
- Texas area, April 8th, in Dallas.
- Oklahoma area, June 3rd, in Oklahoma City.

**What Plant Training Should Achieve**

The plan of organizing the plant training has been enthusiastically received where it has been introduced, and properly carried out the organized training program should assist in carrying out the Bell System's policy, that telephone service shall be made better and shall be provided to the users at a cost as low as is consistent with financial safety. It should assist in meeting the ever-increasing demands and trends of the telephone industry; and it should insure a high quality of maintenance and operation for the protection of the telephone property and the telephone service. The training program should also assist in maintaining the economic status of the telephone employee, as compared to that of other workers in a community, and at the same time develop telephone people so that they may become better citizens and better employees.

The policy and plans of the organized plant training program take into consideration all of these things.

**These Men Will Supervise Plant Training**

- **Above**, E. F. Mulvihill, plant training supervisor, Western Mo. and Kans.
- **Bottom, left**, A. G. Westerhoff, plant training supervisor, Texas.

- **Above**, W. C. Harris, plant training supervisor, Eastern Mo. and Ark.
From Arkansas to England

On December 24, 1928, Obera Dodson, chief operator at Hope, Ark., received a call order from one of her subscribers who wished to talk to his parents in Bristol, England. He told Miss Dodson that his call home was a Christmas present, and he would like to talk as soon as possible. His call was completed in thirty-five minutes. After the conversation was finished, the Hope customer called to thank the chief operator for the splendid service he had received, and also for the speed with which the call was handled.

Ft. Smith First Aid Class

The First Aid class at Fort Smith has started training for the First Aid contest. Having lost the State contest last year by only two points, the boys say they are going to bring home the bacon this time.

St. Louis Operator Interprets a Distress Call

A Colfax subscriber, in St. Louis, came in on the line crying and called an Evergreen subscriber who answered but could not understand the child who was calling.

I told the called party that I was sure that the child was trying to tell him to come home.

I called my party and asked if I could be of any further help and the child said that her mother had gone out, leaving her to look after the baby. The baby had taken a spasm and the child asked me to call a doctor, which I did.

I called the child's father but he had gone home. I called my party again to see if I could be of further help and she said the doctor had just come. I told her that her father was on his way home.

Mrs. Mildred Duffy, St. Louis-Colfax.

VOCATIONAL INSTRUCTOR
TRAINING NOTES

SOUTHWESTERN BELL TELEPHONE CO.
PLANT DEPARTMENT
THE TEACHING METHODS

The completion of any job requires the use of certain methods. The effectiveness of the results obtained varies directly to the effectiveness of the methods which were used in carrying out the job. Also the effectiveness of our training work will vary directly as to the effectiveness of the methods used. In general, there are five teaching methods which are as follows:

1. The DEMONSTRATION Method

This method is characterized by the fact that actual tools, equipment, and material are used by the instructor in giving the lesson. The demonstration applies whether the instructor acts as the demonstrator or whether the learner takes the equipment and demonstrates.

2. The ILLUSTRATION Method

This method makes use of some substitute for the actual tools, materials, equipment or processes. These substitutes may consist of drawings, diagrams, models, pictures, etc.

3. The LECTURE Method

This method consists of giving out information. It is purely a one-sided proposition and affords the learner no opportunity for comeback. The lecture may be oral or written.
4. The DIRECTED DISCUSSION Method

This method differs from the Lecture method in that the learner is expected to take part and express his points of view. It is a two-sided proposition with the learner making a comeback.

5. The EXPERIMENTAL Method

The true experimental method is one of trial and error with no evidence of direction by one familiar with the ideas being learned. It is usually called a "cut and try" method. This method is not endorsed for vocational training.

LINES OF APPROACH FOR TEACHING

The "policy" of an instructor is called the line of approach and may be either an informational one or a developmental one. The success of teaching depends considerably upon this selection.

1. The Informational Line of Approach.

With this line of approach the instructor gives facts to the learner which are necessary and which must be accepted by the learner. The learner is not required to do any reasoning and for this reason this line of approach has been called a "pouring in" process.

2. The Development Line of Approach.

This line of approach requires thinking on the
part of the learner and is used to develop judgment on the part of the learner. This line of approach is often called a "drawing out" process.

THE TEACHING AND LEARNING PROCESS

The teaching process recommended for our business consists of four steps, which are:

Step I  - Preparation  
Step II - Presentation  
Step III - Application  
Step IV - Test

Step I. - Preparation.

The purpose of Step I is to select an idea which the learner already has to which the new ideas can best be tied.

Step II. - Presentation.

In this step all of the new ideas of the lesson must be given to the learner in the best order for their being assimilated by him. The size of a lesson should be limited to about eight new ideas.

Step III. - Application.

The third step is to let the learner try out the new ideas with the instructor observing closely so as to correct any errors or deficiencies. The principal concern is to see that
the learner has properly grasped the ideas and has properly tied them up.

Step IV. - Test.

Step IV is to give the learner a job involving all the new ideas and let him carry it out unaided, however, under the supervision of the instructor.

PLANNING LESSONS

The difference between the teaching order of a lesson and the planning order of a lesson should be understood.

Teaching Order.

The teaching order of a lesson is, of course, Step I, Step II, Step III and then Step IV.

Planning Order.

The planning order of a lesson should be Step II, Step I, Step IV and then Step III.

In laying out Step II, it is essential that all the new ideas to be presented in the lesson are definitely set up. The best way to assure that all the new ideas are being considered in their proper sequence is to make a written analysis. This may best be done by taking a sheet of paper and marking a line through the center from the top of the sheet to the bottom of the
sheet. On the lefthand side write at the top of the sheet "What must be Done (Operating Points)", then on the righthand side of the sheet write "What must be Known (Ideas)". This is illustrated as follows:

<table>
<thead>
<tr>
<th>What must be Done (Operating Points)</th>
<th>What must be Known (Ideas)</th>
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</table>

Then the ideas make a step II for a lesson or sufficient step II's for a series of lessons.

THE TEACHING CONTENT

The question is often asked as to whether all the ideas involved must be included in a lesson. There is a well recognized formula for determining what must be included in a lesson which is as follows:

Let A represent what must be known or done to accomplish a given job.

Let B represent that which a particular learner now knows or already can do.

Let C represent what must be taught.

Then, A-B=C or what must be taught.
INSTRUCTORS LESSON PLAN

Course_____________________________________________________
Job Assign.No. ___Job Assign.______________________________
__________________________________________________________
Lesson No. calcium Lesson Aim__________________________
Step I. Preparation
1st Idea_________________________________________________
Step II. Presentation
1st Idea_________________________________________________
2nd Idea________________________________________________
3rd Idea________________________________________________
4th Idea________________________________________________
5th Idea________________________________________________
6th Idea________________________________________________
7th Idea________________________________________________
8th Idea_________________________________________________
Step III. Application
*How____________________________________________________
Step IV. Tests
*How____________________________________________________
*Note - Check key ideas in Step II.
INSTRUCTORS LESSON PLAN

Course _______________________
Job Assign. No. _______ Job Assign. _______________________

Lesson No. _______ Lesson Aim _______________________

Step I. Preparation
1st Idea _______________________

Step II. Presentation
1st Idea _______________________
2nd Idea _______________________
3rd Idea _______________________
4th Idea _______________________
5th Idea _______________________
6th Idea _______________________
7th Idea _______________________
8th Idea _______________________

Step III. Application
*How _______________________

Step IV. Tests
How _______________________

*Note - Check key ideas in Step II.
INSTRUCTORS LESSON PLAN

Course __________________________________________________________

Job Assign. No. __________ Job Assign. ______________________________

Lesson No. __________ Lesson Aim _________________________________

Step I. Preparation
1st Idea

Step II. Presentation
1st Idea

2nd Idea

3rd Idea

4th Idea

5th Idea

6th Idea

7th Idea

8th Idea

Step III. Application
*How

Step IV. Tests
How

*Note - Check key ideas in Step II.
INSTRUCTORS LESSON PLAN

Course __________________________________________
Job Assign. No. ___________Job Assign.______________________

Lesson No. ___________Lesson Aim __________________________

Step I. Preparation
1st Idea __________________________________________

Step II. Presentation
1st Idea __________________________________________
2nd Idea __________________________________________
3rd Idea __________________________________________
4th Idea __________________________________________
5th Idea __________________________________________
6th Idea __________________________________________
7th Idea __________________________________________
8th Idea __________________________________________

Step III. Application
*How __________________________________________

Step IV. Tests
How __________________________________________

*Note - Check key ideas in Step II.
<table>
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<th>Check if job can be performed satisfactorily</th>
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List job assignments in proper order for learning

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List job assignments in proper order for learning

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EXHIBIT 6

The following pages, comprising Exhibit 6 of this Thesis, consists of the Notes furnished by the American Telephone and Telegraph Company relating to "Vocational Instructor Training."
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Foreword

One of the first requirements in organizing the training of plant forces is a corps of suitably trained instructors.

The bulk of the training which must be carried on in breaking in new people and in continuously advancing in skill and knowledge those who are already in plant forces, will rest on these instructors.

To assure having the best practices and methods effectively used in this activity it is desirable to have all people assigned to instructing work given a uniform training in the principles and fundamental practices of the teaching art.

These fundamental principles underlying the teaching art are the same for the plant department as for the more formal teaching institutions. There is some difference in the application in view of the emphasis of certain teaching technique which best suits the conditions of plant training.

To the end of presenting sound fundamentals and particular teaching practices for training instructors the following text has been developed.

If and as the conditions meet with warrant the need of changing this text it will be modified and adapted to definitely meet the needs of the Associated Companies who care to use it.

The ultimate aim is to have an acceptable standard course for training instructors who carry on all the training activities of plant work.
The "New Comer" Has Hope - and a Handicap.

Whenever green people are taken into an industry, they have one asset which can be used to advantage. Almost without exception these people are eager to learn how to do certain things well enough to keep the job. They know that the only purpose in taking them on is to have them do their share or part in securing the particular product for which the whole group is organized. They hope to succeed well enough to hold the job. The newcomer realizes that he or she is not proficient in performing certain movements, that is, that they lack skill. He or she realizes a handicap also in the lack of those basic ideas which help in developing skill. This desire to possess the ideas and the hope to develop that skill performance is the prime mover causing the new individual to want to learn.

The Handicap must be reduced.

When new people come into manufacturing or commercial pursuits, somebody in the organization must offset the new comers handicap.

Some one must make these people effective in performing some definite, particular things, just as soon as possible. This is what can be called the training problem of any organization, and it is absolutely inescapable. It does not matter whether the training requirement is recognized or not, the necessity for doing it is there just the same.
The training problem is made up of two very different parts. These parts are clearly evident to the green worker, though often lost sight of by experienced people. One of these can be called a mental part having to do with ideas which somehow are connected with and have a bearing on the effective performance. This idea development being a mental process is most commonly and properly thought of as an instruction or a teaching feature. The other part of the training has to do with manual dexterity or such automatic mental procedure as comes from drill in perfect performance. This is called not so commonly but just as correctly the supervised practice or drill feature in applying the ideas to the definite things to be done.

Who Needs Instruction?

There is little difficulty in realizing that one who goes into an organization for the first time and has had no experience in a particular line does require training. This is so evident that it often is felt to be the whole of the problem. However, a little more thought makes it evident that because of changes both in methods and procedures, as well as the transfer of people to different work, all people at some stage or other, regardless of their length of service and experience, could with profit be given some training.

In the primary organization objective of rendering people effective in certain performances, it is quite obvious that there is always one best way in which to carry out this performance. This does not mean that there is one standard way, but under varying conditions there must always be, where there is choice of methods or ways, one which is better than the others. The problem, then, is to attempt to bring all the people in an organization to a point of most
effectively performing their part, having each make use of the best possible way. To get them to this stage in the shortest possible time, must be the aim of training.

Frame of Mind is Important.

The whole purpose of industry is to have individuals do very definite things effectively. The time required to build up this particular ability must be kept down to the minimum. Most of us know that production is affected very definitely by the frame of mind of the individual doing the work. The frame of mind is nothing but the effect of the sort of ideas which have been growing or which are beginning to grow in the mind of the individual. A worker's frame of mind is bound to be affected by and connected with individual personal relations or contacts, and general policies of the organization, quite as much as it is with the work assigned and the particular skill which has been or is to be acquired. Training, then, must consider the developing of ideas in connection with the work and the general frame of mind of a particular individual quite as much, if not more, than it considers the manipulative performance. In view of this, training can be divided into two general phases: the development of ideas, which is a mental process, and the development of skill, which is a directed drill process.

The Three "Stages" of People on New Work.

It is interesting to go back over our own experience and review for ourselves the rather different frames of mind, which could almost be called definite stages, through which we went when we took on new work. We are very little different in this respect
from any one else. During the first stage or frame of mind, the individual is trying to adjust himself mentally to the conditions which must be faced.

1. Adjustment Stage. In this stage there is a feeling of bewilderment and helplessness which is most baffling. This is strikingly illustrated when the individual is brought in to such work as will be involved in connection with a telephone central office. The almost endless array of apparatus, the severely mathematical layout, the almost overwhelming mass of detail in connection with the wiring and setting of apparatus causes the newcomer to really wonder if ever he will be able to master such an enormous concentration of important detail. During this stage and while he is quite bewildered by material things, he is also bewildered by meeting a considerable number of people who do not know him and, in turn, whom he does not know. Some of these people he likes instinctively, others he instinctively wants to avoid, while still others are not classified in his own mind at all. Depending on the sort of work he was doing prior to coming to the central office, he is debating more or less seriously the advisability of staying on the new work with the prospect of not being able to perform satisfactorily and of being told that he will not do as a worker. It is quite easy to discern the brand new man because of his bewilderment and uncertainty. During this stage he asks many times for directions which afterward will appear perfectly simple even to his own mind. He does not know where materials are located, whom to ask for advice, where to get information relative to practices other than those on which he is
placed and, in general, is more or less of a handicap to himself and everybody else in the organization.

2. Appreciation Stage. The stage which follows the first one might be called that of waking up or Appreciation. Gradually the individual begins to find that he need not bother with a great deal of the detail which he sees and that after all the practices which are assigned to him have a regularity which he begins to master and it can be said, in general, that he begins to take hold and through his own reasoning make enough allowances to feel at least more easy in his own mind as to his probable success.

3. Application or Realization. The third stage may be called Realization or Application and is that of getting down to business. After having gone through the first two stages the individual begins to make some sort of a contribution of which he is conscious. He does know and has appraised nearly all the individuals with whom he comes in contact. He has a definite picture of the things that he is expected to do and the quality and amount of work expected from him. He should feel during this period a growing ability in performing that work which is assigned him.

The Adjustment and Appreciation Stages are the heavy cost periods.

It is quite evident that from the point of view of effective group work the third stage is the only profitable one. During the first two stages it is costing more to keep the individual than the individual's contribution is worth. The first two stages must be looked upon as a cost or investment period. An interesting fact in connection with these stages is that there is no standard time
limit for each stage. With one individual it is quite conceivable that the first two stages might be overcome in a few days. With another individual it is very likely that each of these first two stages might involve weeks of time. A great deal depends upon the individual and the particular kind of work which is assigned as well as the care used in handling the individual during the first stages.

There may be many or there may be only a few new people taken on at any given time. Regardless of the number, each must be brought through these three stages as effectively as it is possible for them to be brought through and this requires some sort of training program.

Transfered People must go thru these Stages.

It is not only in the case of the new man that the need for development and training is found, the same condition exists, and with almost the same intensity, whenever an experienced worker is transferred, either to a new assignment, new location, or both in which case we have to deal with, though in varying degrees, the same three stages through which the new worker must pass.

It is however, unfortunately true that this situation has not been given much thought or consideration. Too much has been taken for granted in the case of the "transferred" worker. The fact that this person has had several year's of experience in the organization, though this experience may have been in another class of work, does not seem to qualify him for training in the new assignment, and, that this worker is just as eager to make a showing now, as he was the day he became employed, that the same need for
basic ideas and manipulative skill is still present seems to have been entirely overlooked when actually there is just as definite a need for training the worker who has been transferred as there is need for training the new man.

Why this is so.

Let us see why this is true, first take the worker who has been transferred to new work at a new location and compare his situation with the situation of the new man. Only in one or two particulars do they differ and these differences lay in the fact, that the transferred worker is familiar with general Company policies and routines and has some, though it may be limited knowledge of the telephone industry. Remove these and we find our "transferred" worker again bewildered by material things, and again bewildered by having to meet and become acquainted with new people and select those he will like and to avoid those he does not like. Again he is faced with the necessity for asking advice, locating materials and seeking information relative to the new practices; and strange as it may seem, in the case of some men, because of past experiences, they are even more reluctant to do so than the new man, and so we find our "transferred" man going through the first or Adjustment Stage.

Is there any need for comparing the situation in the next two stages, is it not true, if our comparison of the first stage is correct, that the next two stages will show the same need for guidance? Will not the "transferred" man have to pass through the "Appreciation Stage" and on to the "Application" stage before he has a definite picture of the things he is expected to do and the quality and amount of work expected of him under the new assignment?
Finally it would seem, that there is even more need for instructing so that the proper frame of mind can be achieved, making it more certain that the one transferred will be even more satisfactory as a worker and feel in his own mind satisfied with the transfer.
Part A.
Section 1.
Chapter B.

Training other than new or transferred employees.

There is another need for training, even with people who remain on the same work, where routines or practices change even in a slight degree. With every change there comes an effect on the frame of mind to those involved. There are ideas which make it easy or difficult for one to adapt himself to the change. The training need is to aid in developing those ideas which will help the individual adjust himself to suit the changed factors and feel happy about it.

This changing of routines or specifications is one that is fairly constant. We are so accustomed to those changes that they have become a part of our daily life and apparently offer no problem at all. It is only after a series of changes have been made in some particular routine that we begin to discover that something is radically wrong; the men are not turning out a standard product. Different groups of men or forces, begin to turn out a product radically different from that of some other group or force.

When workers are criticized for wrong practices which they honestly thought were right, there is a certain amount of just resentment.

Changes in routine and practices are therefore apt to result in three undesirable conditions:

1. Workmanship not up to standard.
2. Performance of varying nature in different forces or groups.
3. Lowered morale or discontent.
This phase of the training problem is perhaps a little more difficult than that of training to make use of a new or radically different routine or even the breaking in of new men. While these last two are almost immediately recognized as conditions that definitely call for training, the first condition is very often passed unnoticed from a training standpoint.

This situation may be dealt with in general, by:

1. Having the foremen and their men given such training as may be necessary to gain a mutual and uniform interpretation of the changes involved.
2. Having the foremen instructed in such changes so that they in turn, may instruct their men.
3. Issuing the changed specifications or bulletins to all foremen and workmen with the hope that they will be able to properly interpret them and put them into practice.

Obviously, the third way is most inefficient for reasons discussed elsewhere in these notes.

The first way would be effective in that both foremen and workmen would receive the same knowledge or interpretation.

The second way, provided the foremen can and will teach, would probably be the most effective of all as the foremen would be enabled to discharge their own training responsibilities including the actual teaching and the "follow up" under regular working conditions to see that such training was properly put into practice and adhered to.

A very healthy condition is manifested when workmen will go to their own foremen for information and advice rather than being compelled to go elsewhere or to find all things out for themselves.
Summary

It is a safe statement to make that all people in an organization at one time or another feel a need for someone's helping them to develop the right ideas in connection with parts of the work. Each individual feels that his performance can possibly be improved by improving the manipulations which have to be carried out. Thus the need for training is evident wherever there is apt to be any trace of the three stages of, first, adjustment; second, waking up; and third, getting down to business.

The methods used in dealing with people should be different for the various stages.

The first stage - Adjustment - is very important and requires careful handling to save for the organization good prospective workers who might not survive this stage if care is not used. State of mind is always important, and may be favorably affected by more intelligent treatment. The first two stages - Adjustment and Appreciation are the true cost periods in training.

The purpose of training is to get the one being trained into the third stage of Application as soon as possible. In this connection it is first necessary to bring them thru the first two. There is no avoiding the cost period by assuming that an individual is in the third stage before he has arrived there.
Who Should Be Given Training

It has been said that 100 per cent. of the people in industry could be given some training with profit. It is not too strong a statement to go farther and say that this 100 per cent. must be given some training. There is no possibility of avoiding the training in one form or other. From the first day that one enters the employment of an organization up to the day that he leaves, providing any growth at all, is made; the progress is possible only by virtue of the fact that training has been received. There is a wide diversity in the means through which individuals are trained. Taking the numbers of people in our organization by and large, a relatively small number of them would claim to have been trained in a formal way. It is the practice to do the bulk of the training by actual practical application on the job.

Where Training is most often carried on.

Barring a comparatively slight activity, which gives vestibule school instruction, the instruction job for the most part is done under actual working conditions on productive work. This means that an almost perfect training laboratory is available and used. The work assigned new people comprise actual work problems the solutions being themselves part of the organization product.

A quite striking weakness is found in the fact that the activity of instruction in this perfect training laboratory is either lacking entirely or is almost entirely disorganized so far as
good instructional conditions are concerned. This in itself is not strange because the main purpose is to have people do these particular things because they have to be done, and instructing must of necessity take a secondary place. The side of training which involves drill is thereby weakened, but is of necessity still carried on though with much difficulty both to the organization and to the one being trained.

Schools Serve Only a Small Number

Wherever schools as such are utilized, not only do they serve a small number of people, but this small number has a very limited time allowance in school training. For the purpose of this consideration let us consider those people who are trained in other than school activities. The question must arise in many minds which might be formulated this way: Who does the training which is given to the greater number of people in our industry? Depending upon the individual questioned there might be three answers; one of these would be that the supervisor does the training, the other would be that the men with whom the individual works do the training, a third would be the individual trains himself.

Who Does The Training Now.

In actual practice, all three of the answers given above are correct; the supervisor does some, the men with whom the individual works do some and the individual himself does some. Under this condition it does not seem far-fetched to say that there are too many agencies who are expected to be doing training to have it well done. This training work seems to be anybody's business and is definitely nobody's. It needs but the smallest consideration of our own experience to bear out the statement that if some one agency was
charged with this activity we would have made better progress during our own training period.

Some of the disadvantages of this disorganized instruction and drill may be stated as follows:

(a) Good workers are pressed into the service of instruction whether or not they are able or willing to give good instruction.

(b) The actual effective production of these good workers and the people being instructed is retarded to a greater degree than is necessary.

(c) There is a labor turnover due to poor instruction which makes itself apparent through the loss of good, promising material who may or may not immediately leave, but who ultimately separate themselves from the organization.

(d) Those people who are weak and to that extent undesirable prospects are often successful in keeping their place in the organization by manifesting considerable energy and willingness while doing mediocre work.

(e) There is very little credit given to the supervisors who do good instructional work. The pressure and the measurement of results, being centered on effective production, fail to take into consideration that training as it is now done takes away somewhat from effective production, and on that basis should be credited.
(f) There is a hardship worked on foremen or supervisors who do a good instructional job. The men trained by such individuals usually are transferred to other supervisors who either cannot or will not do good instructional work, thus leaving the supervisor who tries the perpetual problem of training people.

(g) Improper or incorrect practices as well as wasteful methods are developed as individuals try to work out their own solutions. These eventually must be corrected entailing much closer supervision and the effort necessary to overcome wrong working habits.

Results Indicate Need for Improvement.

The effects of this rather wide distribution of responsibility are manifested in a great many ways because in haphazard methods of training we find haphazard performance. Because of lack of standardization in training we find a great variety of standards being applied. Because of little or no credit being received for training we find little or no earnest effort made to do good training. There is no question as to the responsibility for the training of workers. Without any argument it finds itself definitely delegated to the supervisor in charge of the group. Then, the effects of the means used in discharging this responsibility is just as clearly delegated to that same supervisor. There may be many extenuating considerations which possibly will absolve him from blame, but there can be no avoidance of the definite responsibility that is his.
Illusions About Training.

Many times it is felt by the supervisor that if he personally spends three hours in starting a new man he has given nearly all the time that he can to training. Three hours will be granted by most people as only a small fraction of the time necessary to acquire the skill and knowledge that nearly any work demands. Infrequent short visits by supervisors may be called training by them, but falls far short of being training as an effective medium for bringing the new individual through the stages above mentioned.

Sometimes the actual work of "breaking in" or training is delegated by the supervisor to some proficient worker. This is the commonest medium through which a supervisor attempts to care for his training responsibility. The drawbacks of this assignment are very evident with a little consideration. The workman was not and is not employed for the purpose of teaching or training. His sole purpose in the organization is to produce very definite and tangible results personally. His whole effort in this direction is the measure of his success. Why then should he penalize himself as a good worker by devoting time to perfecting some other worker? Long after it has been forgotten that a workman "broke in" another, his production record stands, and it is against this that he is measured. If this were alone not enough of a handicap in training, there is another which is more striking. It is the fact, that even with the best intentions a good workman may oftentimes hinder rather than help a new man to acquire skill and knowledge. There is always an impatience and hurry to get the new man off the producers hands. Often before he is ready he is tagged as fully trained.
It would seem from both the above statements that actually after all the newcomer is left pretty much to his own device and abilities in perfecting the skill and the knowledge required of him in performing the tasks assigned him. There must be a better way than this. If there is any advantage in schools it must lay on the side of an effective teaching process. If there is an advantage in having good teaching in schools, which takes only a small portion of the people, it is surely within reason to assume that some of this teaching technique applied on the job where most of the training is done, would materially improve conditions.

At times the fact of having a central school misleads our thinking. It is easy to assume that because a central school is in almost continuous operation and classes are held regularly that all men are being trained.

A more clear picture is that of following a given individual. How much time does he put in at the central school? Out of a years activity how many hours of school instruction has he had? What happens when he leaves the school? Is he looked upon as fully trained and in no further need of instruction? A rough check of hours applied to definite training shows that there must be some supplemental work carried on if the man being trained is to be justly treated in the field.
Training Is The Supervisors' Responsibility

In the preceding chapters the thought was intended to show the conditions under which training is now done. The outstanding feature was that it is not definitely taken care of by anybody, excepting in the formal schools. There is no question of the responsibility for training being definitely the supervisors. The underlying thought, however, is that although not definitely set up or recognized, it is being done in a disorganized, ineffectual way. When it is remembered that the training conditions are almost ideal, it does seem too bad that such conditions are not put to better use. There is nothing pseudo about the problems or the testing conditions of job training. Every piece of work that is done as a training medium is an actual part of the production of the organization. Hence, the situation from that angle is ideal. It is unfortunate that this is not so true in most of the school training; substitutions for actual problems must often be made and pseudo conditions established.

Training Can Be Organized

This being the case, thought may well be directed toward making a much better use of these ideal training conditions than is now the case. This is more apparent in view of the fact that whether better use be made of these conditions or not, the training must go on there just the same. The problem resolves itself into considering just what advantage can be obtained by conscious effort.
in utilizing this almost perfect set of laboratory conditions in training. It would seem only good sense to make the job of doing this training in its entirety the responsibility of some particular individual. The actual responsibility is the supervisor's but under some conditions he, as an individual, cannot devote his time as it should be devoted to training the new or transferred people or equipping present forces to meet new processes and changed routines of practices. If the supervisor under these conditions delegates the carrying on of training to another, he should see that that other or those others have the full scope of the training in their hands and will be accountable to him for the training results that they secure. Thus the first requirement would be to have some individuals definitely assigned to do training and properly equipped as instructors to carry out this training.

Organized Training Necessitates Good Instructors.

If the first line supervisor is going to care for the training needs he needs training as an instructor. If some one other than the first line supervisor is going to carry out the actual training he needs training as an instructor.

It may develop in practice that both the first line supervisor and some particular people in the working force may have to combine their efforts in the training. Thus both supervisor and workman assigned to training work need and should get the same training as instructors.
Part A.
Section III
Chapter b.

Job Demands Include both Mental and Physical Requirements

Training reduced to its simplest terms simply means getting an individual to be actually able to do a particular thing. There is a good deal of elaboration in connection with training programs but the aim must be specific in that it carries with it a job performance expectancy of some kind. In order to prevent some misunderstanding, there is a difference between what can be called mental job training expectancy and manual job performance training expectancy. Mental training may be set up to establish habits of thinking and reasoning which will become almost automatic with no connection whatever to physical performance. Certain vocations require just this sort of training. Job performance training while embracing ideas and mental habits is primarily expected to manifest itself in some form of manual dexterity. In later chapters a clear distinction between training as a pure discipline of the mind and training which has for its object specific physical attainments will be gone into. By far the greatest portion of our training must be on job performance.

What Training Should Do.

In our organization much has been said and is being said about training. It might be interesting to ask - why should we train at all? Answering this question emphasizes the problem of the need for constantly improving job performance. The only reason in the world that we do any training is to have competent workers available when we need them, or to bring our present workers to a stage of improved performance which they now lack.
The marks which distinguish good training are:-

1. Perfection of performance
2. Minimum of time used in achieving the required perfection.
3. Economy of Facilities - Production cost - training effort.

Training is Part of Supervision

In the preceding chapters it was indicated that our present status, so far as training work is concerned, is not as effective as it must eventually be. The question left in our mind concerned itself with how immediate improvement could be made.

In the final analysis the need, quality and effect of training with its control is primarily a problem of supervision. Consider then in what direction and to what extent training is a part of supervision. Taking the word in itself, there is in the minds of most people little doubt of its meaning. It means looking after certain things with the aim and object of making sure that the whole project is successfully carried out. While it is our tendency to group many features under the heading of supervision, ultimately it comes down to a consideration of a number of distinct details, all of which must be properly attended to. It is almost a truism to state that nearly all the big difficulties in supervising have their source in some minor detail which was overlooked or improperly cared for. Reversing the thought would allow the condition to be stated this way: If every small detail is properly cared for through some form of supervision, the whole project must be successful. Supervision divides itself into three phases:
(a) Order

(b) Certainty

(c) Dispatch

a. First, one of analysis and planning. Briefly, it means to determine what is to be done and to set up a program which will insure the completion of a project.

b. The second phase can be called instructing or training, or any term which involves the building up of the idea possessed by the supervisor to a point where the same aim and result is in the mind of those people reporting to the supervisor.

c. This phase involves what can be called inspecting or checking. It is a precautionary measure taken to assure the supervisor that there has been no misconception or that if the conception was uniformly accepted through any of the failings of the human being no error or omission of practice is creeping into the process.

There is no intention in these notes of trying to emphasize one of these phases over another. It is the intention, however, to point out that the way in which each of these phases is attended to is of vast importance in the success of a supervisor's work. Analysis and planning call for special abilities which are definitely recognized by an organization. This is equally true of the checking or inspecting phase of supervisory work. It is the second phase, that of instructing, that the clear-cut picture of requirements and responsibilities fails to make its appearance. Nearly all of us consider ourselves to be perfectly competent to do any instructing or teaching which falls within our own scope of activity. It is probably due to this inherent trait that the training or instructing phase of the supervisory work shows such a wide ramification in viewpoints and methods.
Definite Organization of Training Facilities.

In considering the importance of training as a part of supervision it was shown that two phases enter. One is the teaching of ideas. The other, that of practice or drill. In making an application of these phases consideration must be given to determine where they can be best carried out. It is quite plain that there are only two places where it may be done. It must be done on the job itself or at a place away from the job. It is quite likely that in considering the whole training project some combination of both places will prove to be the most workable plan. Determination to make use of either or both places is nothing more than an attempt to utilize such facilities for training as are now available or can be made available as time passes. It may be that these facilities are not being used to the best advantage. Nearly everyone will agree that the job itself is the best place for testing the effectiveness of individual performance and for giving the most effective habit formation practice. It is not to be assumed, however, that because of this fact alone the job is always the best teaching laboratory from an economic point of view. There are features which govern the choice of the place where training is to be done that must be considered. These features might be put up in question form somewhat as follows:

1. What determines the conditions where job training is the best choice.

2. What determines the conditions where central training or training away from the job is the best choice.

In answering these questions there is a general situation which almost automatically limits the choice. Job training by itself from the very nature must be applied to suit individuals and is
apt to cover a wide range of subjects or practices. Central training on the other hand is usually applied to groups of people in about the same status as regards job performance and is more or less standardized in its application to these groups.

**Job Training**

Under certain conditions, even with groups of individuals in the same status, it may be necessary to carry on job training. One instance of a situation of this sort might come in an isolated area where there are small groups of people to be trained but the cost of sending these people to a place where central training is available would be prohibitive. There are also some concentrated areas where no central school is in operation and because of this situation training must be done on the job. It is quite possible that working conditions even for a group of people cannot be economically reproduced at a central place. Certain phases of line construction work beyond the preliminary "climbing" and tying in stage would be virtually impossible to reproduce for central training. There are many features of this sort which make training on the job obligatory. Many times there are new methods or changes in practices of a relatively minor nature which must be introduced to experienced workers. These particular features may apply to safety practice, public relations or a number of small changes in operating practice. There are times when people are transferred to new work, making a modification of an individual that probably could be trained in a center but under the production requirements it is not expedient or practical to send one individual in. Many times the subsequent development of skill which follows the preliminary stage that might have been given in a central school must be carried on by means of
job training. All forms of corrective training where individuals are tending to form poor work practice habits are obviously job training problems.

**Central Training.**

Training in a central place or school, as indicated, is primarily designed to meet the need of a group of people who have the same training need simultaneously. It may be well to consider that the central school does not have to be set up as such and completely isolated from the job. A central school idea is being carried on even though the plan embraces taking only a corner of a central office with some spare equipment and utilizing that space for group training. This form is just as much central training as that carried on in a special building called a plant school. The conditions which warrant central training would be indicated by the following:

Where a number of new people are put on at the same time doing similar work. For example, if 12 or 15 cable splicer's helpers are hired the same day it is more economical to have these 12 as a group be given preliminary training by one man instead of having 12 different people on 12 different jobs cover the same group. It is equally true that when a group of the present working force reporting to a number of different supervisors lack the same ability in performance, it is more economical to train this group at a central point. There is a feature in connection with central schools that should be given considerable thought. It is the question of the degree to with which actual working practices can be fairly duplicated for training purposes.
The Teaching Part of Training

This means building up in the mind of another a sequence of ideas or mental pictures which properly underlie working practices. The process of building up of these ideas is subject to definite principles and is effective in proportion to the degree the methods used conform to such principles. The use of such methods and devices that most effectively employ sound principles of mental processes is the art or science of teaching. There is a fund of knowledge and experience supporting good teaching practices which is definite enough to be set up and presented in an organized fashion to one who is expected to teach. Always in the picture there is the "complimentary" process of learning. The whole process is the "Teaching-Learning process." This may be compared in some aspects to a "Selling-Buying" process. It would be somewhat illogical to say "I sold a farm but nobody bought it." Likewise it would be just as illogical to say "I bought a sewing machine but nobody sold it." There are two parties concerned in the buying or selling process. Similarly there are two parties concerned in the teaching-learning process. Most people will agree that the following statement is illogical. "I taught something but nobody learned it." Just as in Selling, an attempt may be made, but as the actual test of selling is having some one buy, so the actual test of teaching is having some one who has learned. Not so many will agree that the statement which follows is illogical - "I learned something but nobody taught it." Even in this debatable situation the conditions which permitted learning must follow the same general principle as in the case of a deliberate attempt to teach. Some one has aided in presenting the new idea even though unwittingly and caused some learning to be acquired.
How Do We Learn A New Thing.

Many answers are advanced such as, by seeing, by hearing, by experience, by study, by reading, or by original thinking. These are however only mediums through which the actual process is carried out. For example, how much study, reading, hearing, seeing etc. would be required for you to learn what this means \( \frac{1}{\sqrt{\pi}} \) or if you do not already know, - R.G.M.? or T.N.T.? - or \( \sqrt{\left(\frac{2}{L}\right)^3} \)

Probably of these symbols everyone who reads will know what T.N.T. means even if they can not say "Trinitrotoluol," or have any notion of the actual appearance of the substance. How did you learn this? If you had never seen or heard an explosion of any kind could you have had any picture of what T.N.T. might do? Probably few know what \( \frac{1}{\sqrt{\pi}} \) means. And very probably no reader knows \( \sqrt{\left(\frac{2}{L}\right)^3} \) means. Why? Just because one cannot learn a new thing without having already in his possession an idea or mental picture to which the new idea can be tied. That is we can only learn by associating the new idea with some one or more ideas we already possess and making it part of the complete picture. It is just this principle which underlies the whole learning part of the process and of necessity must underlie and affect the teaching part of it. Then we learn through two general conditions

(a) By accident having a new set of random ideas put before us to be tied up by it.

(b) By intention having a definite idea put before us and through some process making certain we have tied it up properly.

Learning by Accident Is Not Safe.

It is very possible and quite likely under the first condition to learn things which are not true. In fact through the
medium of accidental learning we very often get most distorted pictures and actually must unlearn these under subsequent conditions. The process of learning goes on quite constantly as long as consciousness remains with us and by far the greatest volume of our learning comes through the first or accidental condition. Even in the second condition while being definitely taught and checked we may learn through accidental teaching of a way to "beat the teacher." We may be "tying up" new ideas about relationships, ethics, behavior etc., that prove to be quite untrue and have to be unlearned later.

Obviously the danger of the accidental learning makes it a poor one to use when a necessity for particular and specific sound ideas is seen. Also quite obviously in an intentional program there is need for considering many features which must be guarded against lest through accident such a set of ideas develop that the real effect of the intentional teaching is destroyed.

**Drill Work and Practice Build Habits**

It is not enough to give attention to the development of ideas alone. The results which are looked for call for the application or utilization of these ideas. Under actual conditions, the performance of any individual being trained depends on something in addition to the ideas developed. The feature on which results actually depend is the degree of skill one individual has in applying some particular ideas to the work which must be performed. Then, there is a phase of the training through which, by direction and by assignment of work, skill is promoted. The aim of this direction is to build up an approved performance which becomes second nature and almost automatic for the individual. It attempts to set up sound habits in connection with detailed methods which are as near as
being instinctive as is desirable. Such habits of performance can only be secured through repeated practice. This repeated practice requires careful supervision and some understanding of the complete aim so that there will be no habit to undo or correct at later stages. In carrying on the practice feature of training, it is well to consider that there are two kinds of situations. One could be called corrective practice, which indicates that there has been a break in the supervision which allowed unapproved habits to develop. The other would be preventive practice, which has for its aim to so impress the correct practice at each stage that there is no room for error or wrong practice to creep in. Generally speaking, the correct or best way to do work is the easiest way and the most satisfactory to the individual. Drill or practice work should aim to meet this slogan: "Learn to do it right the first time and by subsequent practice set the habit."

Ideas Govern Practices

In considering the two phases in a training program and calling them, as we have, the idea phase and the practice phase, would indicate that they are two separate features independent of each other. This is not actually true. Practice cannot be carried on without some ideas being developed and ideas themselves without practice are virtually useless. The parallel feature in connection with these two phases might be clearly seen through this illustration. The steam locomotive runs on two rails. If we consider the idea phase as one rail, the practice phase as the other, and the locomotive as the person trained it may be a fair comparison. We know that the locomotive if placed on two rails that are correctly spaced and graded on a well-balanced bed will go fairly smoothly.
If one rail is not in place or has spread the going is rough. Both
rails are necessary if the locomotive is to run rapidly, safely and
with the least wear and tear on the whole equipment. So, with the
training. If the ideas are too far off from the practice, or if they
are lacking, or if after ideas are developed, there is no chance to
practice, the man being trained has a rough trip. Going back again
to the locomotive, we know that there may be flat wheels, tight
brakes, loose connections on the engine, but the better condition the
track is in makes it easier to locate these defects. On a rough,
poorly graded or trackless road, the deficiencies of the locomotive
might not be noticed. It could be assumed that the locomotive is all
right but the road-bed makes it rattle and perform poorly. Through
the same sort of illustration the more effective and perfected the
paralleling of ideas and practices become, the easier it is to locate
actual deficiencies in the men being trained. The poorer the condi-
tion of idea and practice, the easier it is for a deficient individ-
ual to get by.

What can be done to improve training.

The experience of most individuals in industry, emphasizes
one fact which is outstanding. We all find that contact with certain
individuals helped us to learn fast and make a great deal of progress
toward perfect performance; while with other individuals there seems
to be an almost impossible barrier between us that made it difficult
for us to make progress. More simply expressed, the people whom we
have met and under whom we hoped to learn varied from each other and
affected our progress. It is not a question of the willingness of
each of these individuals to help us, this difference is in ability—
one individual can help us easily, and another individual cannot help us to any great extent no matter how hard he or she tries. It is fairly evident to most of us that not everyone possesses the ability to effectively instruct others. It would seem, then, that an advantage is to be gained in using the industrial laboratory for instruction if those people who have the faculty of passing on their knowledge to others are selected and used in the training program. Such people would more effectively develop the ideas which are back of all the performances which must be carried out. They are better suited for teaching which is the one factor that helps more than any other in shortening the period necessary in acquiring proficiency in performance.

Use of Trained Instructors is Imperative.

As the refinements of operating the telephone business make themselves evident, the need for more complete and economic training and instruction becomes evident. This need has always existed, and has been met up to now with more or less makeshift remedies.

There has been an enormous effort expended in training workers in particular, and it seems that every step has been projected excepting the most vital one. Inasmuch as the art or practice of training which really is teaching ideas and then supervising the practice of the idea, is subject to fundamental principles, it is not unreasonable to suppose that an understanding of such principles is most essential. Just as training is necessary for those who are going to perform operations in the conduct of the business, in like manner it is necessary to train those people who are going to impart the ideas and supervise the practice.
Trained Instructors can be developed.

While instructing can be done by untrained people, as up to the present has been very largely the practice, the cost of having instruction given by untrained people makes it prohibitive to continue. Thus, in view of a constantly closing margin on operating costs, and in view of the fact that training costs, must be absorbed in operating, there can be no escape from the logic of the need for an organized program which will include trained instructors. Teaching is a very old art. Through all the generations of mankind, somebody has been imparting ideas and developing the younger generations. Because this is the oldest art, most of us feel perfectly competent to teach. We have taught quite a number of things to quite a number of people. However, those who have made an investigation of teaching as an art, and this investigation has been going on for hundreds of years, have found out that there are certain principles which when properly applied, yield better results than could be secured without them. There is nothing cumbersome or mysterious about the principles of teaching, and any individual who does good teaching must give consideration to the principles either consciously or unconsciously. The advantage of conscious use is great enough for us to desire it in formal education, hence it is just as desirable in industry. This conscious use can be developed and those people who are going to instruct others can themselves be trained in the use of teaching principles. The first feature which must be met is that of selecting individuals to be trained as teachers. They can then be helped in organizing the content or subject matter that they propose to impart to others. They can be given an appreciation and a full understanding...
of teaching methods and the varying conditions under which each method is most effective. They can be given assistance and drill in planning teaching lessons following the principles which have been known for centuries, but following them deliberately and with a full knowledge of the effectiveness of the proper selections. They will need to be given supervised practice in carrying out such lesson plans long enough so that the drill or perfected performance gives them the training that they need in order to effectively carry on an instructing program.

Whether it be the supervisor who trains or some one delegated by him, there is a need for mastering some of the principles and teaching practices which constitute the equipment of a good instructor. The mastering of such principles and practices would result in having available trained instructors. It is well to consider what is meant by the term "trained instructor."

What constitutes Trained Instructors.

Most people find little difficulty in distinguishing between what is meant by trained nurses as against what is meant by experienced nurses because there are characteristics which distinguish the trained nurse almost at once. It is a little more difficult for many to distinguish between a trained instructor and an experienced instructor, probably because not enough of us have taught about the value of definite training in connection with instructors. It is true that people may train themselves either as nurses or instructors. There is, however, always a limitation to self-training which is evidenced by the individual not knowing exactly how best to
train himself. There never is any certainty in his mind that any phase of the training is completed.

**Definite Training Program Is Necessary.**

If the process through which one is to become a trained nurse be considered, it may serve as an illustration of the features desirable in training instructors. There are certain individual traits which make themselves evident and by means of which probable success as a nurse is indicated. After careful selection the prospective nurse is admitted to a training center. At this center specialists who know nursing thoroughly put the student nurse through a regularly established course of procedure and carefully check individual performance. At definite intervals test situations covering the entire field of nursing are presented for the sole purpose of perfecting student technique. On completing the training the graduate knows that he or she will be able to meet any situation which is encountered by reason of having acquired the fundamentals of nursing and a certain experience factor which covers a much wider range than is apt to be encountered in practice. The same sort of procedure is required for training instructors.

**Trainee Should Have Job Performance Ability.**

In selecting the individual it is first necessary to make sure that complete possession of knowledge, which is to be transmitted to others and ability to perform such practices as may be involved, be not overlooked. This is the first requirement and can be called training content.

**Instructor Trainer Should Know Teaching Art**

The one selected must then be guided and shaped in performance as an instructor by some agency which does know the art and principles of imparting knowledge to others. This agency must set
up the requirements of instruction, determine what is to constitute the instructor training program and be able to say when any individual has finished the training. As a result of training as an instructor the individual who has been selected and trained, will possess in addition to his content the following:

(a) A knowledge and command of teaching methods with the ability to choose the particular method which will be most effective in any given situation. There is always one best method or combination of methods to be used and the trained instructor will do his work more effectively and in a shorter time by having a conscious knowledge of the best methods to use.

(b) The trained instructor will have a definite course of progressive steps which will advance the learner from the green stage to the seasoned stage easily and naturally. In addition to the general plan or course, he will have ability to plan on paper and execute effectively definite teaching lessons which will cause the learner to be conscious of his progress and interested at all times.

(c) As part of the training, he will have developed proper habits and practices as an instructor through having been supervised in the use of teaching methods. Just as
a man on delicate adjustment work must be given careful attention when he first starts to learn to adjust, the instructor who first starts out must be given the same sort of careful attention because the adjustments that he makes being mental ones are extremely delicate.

(d) He will be better able to work into the regular vocational program a wealth of personnel features. As a result of this a much more uniform and sounder interpretation of company policies will be established.

It is the lack of these features that is most keenly felt by the so-called self-trained instructors who seldom, if ever, are given any corrective criticism and as a result are not certain that the practice they follow is correct.

Status and Responsibility of Job Instructors.

Granting that trained instructors are available, the question of the extent of their responsibility and activities could profitably be considered. When there is no individual in a given group who definitely needs training, the instructor can and should act as a producer by virtue of not having impaired his productive ability by adding that of teaching. There might be little chance for confusion of thought on what the instructor would busy himself with in the event of there being nobody at a particular time needing instruction. This is not a problem; when not applying his efforts as an instructor he is a producer. Whenever an individual is in need
of training, it is the responsibility of the trained instructor to advance this individual from his present status whatever it may be to some pre-determined level of skill and knowledge set up by the 
supervisory force and the instructor. During this time the instructor is responsible for the kind and quality of work done, for the time required by the individual in making the growth expected, and for the state of mind of that individual so far as the work is concerned throughout the process. He is responsible for making use of the best teaching practices, for so arranging the training work that it is pleasant and profitable for the one learning, in addition to the development of such mental reactions as are affected by company policies and routine practices. Thus in brief it might well be said that the chief product of the trained instructor is the well rounded and properly developed worker. As an instructor, his prime purpose is to develop men and the material production which comes as a result of training is only a by-product temporarily.

**Line Supervisor must Check and Direct the Instructor.**

Whenever such a wide responsibility is assigned any individual, it is not safe to assume that all the conditions imposed by the responsibility will be met. It is not unlikely to assume that any instructor will require checking and supervision just as any supervisor requires the same check. The question of determining who shall check the instructor is already set up in the organization distribution of responsibility. The supervisor for whom this individual is training men must, in the final analysis, check and direct the instructor. It is just as much a part of the supervisor's job to aid and strengthen those doing the instruction he requires, as it
is for him to aid and strengthen those who do actual productive work. For the first part, our present supervisors are not equipped to properly check and supervise trained instructors. They are rapidly approaching a condition of mind, however, where very little additional appreciation on their part will enable them to do this checking work effectively.
Formal Teaching-Learning Process.

As previously stated, there is a fundamental basis for learning. The only way anyone can learn is by tying up the new idea or mental picture to some idea or ideas already possessed. Several sets of symbols were used to illustrate this. As a more concrete illustration, consider your chance of having the idea of radio broadcasting properly developed by you in the mind of a native of Central Africa, if you were in Central Africa and had no apparatus or equipment excepting that which is usual for that section. Even if you had a receiving radio set and let the native listen to it, how nearly correct would be his mental picture? On the other hand, how could the native build up in your mind the mental pictures he has when he hears the drum beats of the Medicine Man? In either of these situations before any idea can be gained some translation must be made on a basic idea which carries over and takes in the new one.

Hearing and Seeing Is Not Learning

A very striking example of the condition of the mind trying to get the proper picture is that of trying to "make out" what is meant by listening to people talking in a tongue of which one knows nothing. Every expression of the face and every gesture and every tone is keenly observed but for all the attention very little is gained. Oftentimes the most violent harangue which to the foreign listener can only end in blows turns out to be an expression of good will. Long speeches are translated into short statements and brief grunts often require lengthy interpretations. Why is this?
Because in such instances the person unable to understand or speak the language has no learning base or idea which lets him properly take in the new ideas. While there actually is much mental activity and a strained effort to get the ideas, until some medium translates these on a common ground there is nothing gained.

**How the Process Operates.**

Without going into the field of brain function and the processes by which happenings are registered and sensed in the mind, we know that every person, at least during hours of consciousness, carries on some sort of mental activity. That there are two general classes of mental activity is commonly accepted. The first classification is that of the automatic, instinctive or subconscious activity best illustrated by its control of body functions. This activity requires no volition on the part of the individual and no effort on his part seems to have any effect in controlling it. The mind is not definitely conscious of such things as the assimilation and chemical changes in foods eaten or changes in the rate of blood circulation and the renewal of physical parts of the body.

When there is a volition and a chance to modify the activity the process is then in the other division which is most commonly called the conscious mind. A further good illustration of the crossing over into the conscious mind from the subconscious is that of such a body function as faulty digestion of food eaten. When the digestion is faulty enough the individual becomes conscious of a headache and a feeling of distress in the stomach. This consciousness is acute and is of such a nature that something can be done about it. While it is extremely difficult, if not impossible, to
set up the probable picture the mind forms or what particular shape the idea takes, for our purpose this is not necessary. It is well to realize, however, that within this division the mental activity can be controlled to some extent. Temporarily the individual can wipe out the mental picture and substitute another which will engage the conscious mind. One may have a headache and feel distress and by virtue of necessity push this idea into the background and forget it temporarily while concentrating on some other idea or ideas. This series of ideas which push the headache out might be the solution of a pressing business problem or the necessity of catching a particular train with a limited time at one's disposal. Undoubtedly the idea of distress is still in the conscious mind and with it are many others. It is this faculty of the mind to carry several ideas simultaneously that is of interest in the study of the learning process. There seems to be a gradation of ideas or mental pictures and a division of attention to each, which ranges from one on which most of the attention is centered down to some which are quite close to the non-volitional or subconscious border. There is an ability which enables the individual to pick out of these ideas the one or ones on which mental activity is to be centered. Inasmuch as all new ideas are taken in with this division of the mind and that the activity can be centered on particular ideas makes the process of formal presenting or teaching effective in proportion to the degree to which attention is focused on some particular ideas.
Part B
Section I
Chapter A.

In a previous chapter mention was made of two general ways in which new ideas may be assimilated by individuals. From this division it follows that as a teaching feature there are also two:

(a) Teaching by accidental combination of circumstance which is aimless and uncertain as well as uncontrolled.

(b) Teaching by intentional effort which is directed and in a measure controlled.

What we may Learn by accident.

Most of the important ideas of our industrial development are claimed to have been presented through accidental combination of circumstance. At least there are enough shining examples to indicate that in such cases the learning process was most effective. As a result of these examples many claim that if an individual is any good the experience of meeting circumstances will teach him effectively. It may seem at first glance to be a sound conclusion and when accepted would endorse the use of accidental circumstance as a teaching plan.

This thought will be modified somewhat on considering how few cases are mentioned where the wrong ideas and conclusions were gained through this same medium. Most references are made to successful ventures and little attention focused on failures. For every sound idea which is presented through accidental circumstance, it is not unreasonable to claim that several unsound ones are presented. Unfortunately as much action is taken on many of these unsound ones
as is taken on the one sound one. The sifting out of the sound conclusion or idea from the others presented is usually a process of trial and error. Depending on the capacity of the individual who makes the trial the chances of final success vary greatly.

It is unfortunate from the teaching-learning viewpoint that the same circumstance or combination of circumstances can and does give radically different ideas to different people. It is not unusual to find ideas and conclusions which are diametrically opposed to each other accepted and adopted by individuals under the same situation. As a probable example, consider the conditions under which most weavers of cloth on hand operated looms saw the first power loom. To nearly all of them the circumstance was accidental - out of a clear sky. While all of these people saw exactly the same physical and mechanical apparatus, it is fairly safe to assume that the individual conclusions varied. It is not improbable that one saw an opportunity to improve the mechanical features while another saw the possibility of complete failure of the machine. If industrial history tells the story correctly most of those who saw the machine reached the conclusion that it should be suppressed and destroyed. Which it was. It did prove a costly matter to get the soundness of machine production accepted by the majority.

Learning Correctly thru Accident is Not Usual

Our whole industrial evolution proves that it is the exceptional individual that gets the right idea or conclusion through an accidental combination of circumstances. For some unknown cause we find that erroneous ideas are more readily accepted and acted upon by most people. Many times beliefs and conclusions in connection with certain matters are accepted by individuals who are authorities in
that particular field, only to have them found to be unsound by someone who gets the true or sound idea from the same conditions which confirmed the others in their original belief.

From the foregoing it seems fair to claim that we may get new ideas or learn anything through accident. Sometimes what we learn is sound but usually it is not. At best it is a chance. There are many phases in our industrial and social life on which only chance will focus attention and probably it is fair to match chance with chance. Often there is no other way to uncover new ideas and undoubtedly as long as we live as a race there will be conclusions and ideas formed by circumstance.

There is no need for making use of the accidental circumstance in connection with industrial training for most people. The fact to keep in mind is that even in making use of the other way this chance conclusion is a factor. There is always the hope of new ideas coming out of its application and the danger of false ones growing while certain specific idea matter is being presented. It has a bearing and an important one on the methods used in intentional teaching.

Intentional teaching.

Any individual under new or changing conditions is forming conclusions and accepting new ideas. There is a difference between just letting these ideas grow and form of themselves and having the mental process directed to make sure that particular conclusions and ideas are formed. The attempt to direct the formation of definite conclusions in the mind of others is intentional teaching. It may be well or poorly done but when certain conclusions or ideas are definitely put before another there is an intention to teach.
Inasmuch as this intentional Teaching-Learning Process is the basis of organized training, some consideration may well be given it.

Briefly it rests on a few principles which follow -

(a) In any branch teaching begins with the simplest elements and gradually takes in the more complex in accordance with the development of the one learning.

(b) Sufficient time is devoted to each point of teaching to make sure the learner has mastered it.

(c) Whatever is taught is taught in the simplest manner possible. Make it easy to learn by avoiding undue complexities.

(d) Whenever possible actual conditions and objects will be used as learning mediums. True nature and causes of specific effects will be presented, and substitution avoided.

(e) General or underlying principles must be presented and details considered as a part of the principle.

(f) The requirements of practical every day use and the present demands will govern the content of what is to be learned. Storing away information to be drawn on at some later day will be avoided.

(g) The aim is to develop individual knowledge and talent and not a dogmatic exposition.

(h) Skill in performance or the actual application of knowledge will be a definite part of the program.

There must be:–

1. A complete concept or general picture of the purpose.
2. A series of specific aims or attainments.
3. A definite progressing plan.
4. Readily assimilated small units leading to the specific aim.
The Formal Teaching Process is Natural and Easy.

As a means for setting up the teaching process under a formal plan let consideration be given to an actual problem. Assume that you are desirous of teaching your best friend the way to your new home. Just what procedure would you follow to make absolutely certain that the friend would be able to come to a party in your home at a predetermined hour? You surely would not start describing the appearance of your front entrance. You would probably set up some common ground when you both agree that his own knowledge limits the journey. From that point then through a very definite series of checking points you would trace the path of direction, making sure that places where the chance of going wrong are indicated and correctly interpreted. So far two distinct steps have been covered.

1st You have established the point to which his present knowledge takes him that is nearest to the end of his journey which is your house.

2nd You have presented to him the various features of the new road he must travel to reach your house.

Would you feel that after you had done this and he listened to you that he could be certain of the directions? No — you probably would check up on him before he started and try to make doubly sure that he would not be misled or follow the wrong turning at such places or points in the journey that you know might be confusing. You would want him to tell you exactly what he understood from your directions so that if he had any wrong notions you could correct these before he tried to work his own way out of them.

This is a 3rd definite step, to make sure that he has really "got" what you intended him to "get." Actually, however, you are not sure that he can find his way to your house until he has done so
without undue trouble on his part or assistance from you. You would want him to find your house, solely from the directions given by you to feel that you had actually developed these ideas or this new knowledge.

This is the 4th step which is the final check. If the first three steps are properly covered and the directions you give are correct ones there would be very little chance of his failing to arrive on time and feeling quite sure of his way all the time, which is the mark of a successful 4th step.

Now while these steps are not always well done so far as teaching goes, and while we often do not think of such things as teaching at all, still the steps in the process are so logical that almost instinctively we use them.

Teaching Process

Teaching in the telephone business or any industry is a definite job. As must so as building a pole line or installing a private branch exchange. In the case of the teaching job the product is an individual, whose knowledge has been increased. The effectiveness of the teaching job is measured by the ability of the men trained to put into effect on the job what they were taught.

In general the aim of vocational training in industry is to increase the trade skill and trade knowledge of particular workers in that industry. Broadly speaking skill is something that cannot be taught. It requires a minimum of physical dexterity or deftness, which applied to any particular craft improves with practice. Supervised practice ordinarily will enable a worker to attain high skill in a shorter length of time than if he is left to work alone.
Teaching or instruction in the exact sense is concerned with imparting of ideas. A little reflection will bring out the fact that teaching is not such a very difficult task. Everybody learns, and the things learned may be taught deliberately and consciously or they may be taught by chance or accident. Fundamentally we learn by associating ideas. The new idea is linked up with some idea or ideas which we have in our background of experience.

The ease with which we learn a new idea depends to a considerable extent on the readiness with which we are able to associate it with our present fund of knowledge. And the value that the new idea will be to us depends to a considerable extent on the particular idea or ideas to which it is tied.

This faculty of the human mind for association of ideas has long been recognized and on it is based what may be called the Teaching Process.

Teaching Process In Industry.

Briefly stated the Teaching Process is to develop and fix a new idea in the mind of the learner, by deliberately selecting an idea which he already has, linking the new idea to it and taking the necessary steps to be assured that the new idea is properly associated and fixed. Many authorities have studied the problem and have established various systems. These authorities agree on the fundamental process, but differ on the number of steps necessary to accomplish and check the result.

For our vocational schools and our teaching on the job a system has been developed which recognizes four steps. These four steps are natural and logical and everybody goes thru more or less
the same process in teaching. The real problem is to get each person in our business who has occasion to instruct to consciously recognize the Teaching Process. The technique of teaching which is employed need not be elaborate. The Teaching Process recommended for our business recognizes four steps.

   Step I. Preparation
   Step II. Presentation
   Step III. Application
   Step IV. Test

Preparation:

As pointed out the Teaching Process depends on the faculty of the human mind for association of new ideas with ideas which the learner already has. If there are no ideas which can be used for association it may be necessary to develop them.

The purpose of Step I, therefore is to select an idea which the learner already has to which the new idea can best be tied. It may require some questioning, but usually something in the learners background of experience will be brought to light which can be readily associated with the new idea which is to be taught.

Presentation

Having selected an idea to which the new ideas can be best tied, the next phase of the teaching process is to present the new idea to the learner for his adoption. The new ideas must be presented in the best learning sequence. The ease and effectiveness with which Step II can be accomplished will depend to a large extent on the vividness of the idea developed in Step I.

A case of the use of Step I and Step II would be the following. Suppose that it was desired to teach a learner how to write from one to ten in Chinese characters. We know in this
particular case that the learner is familiar with the Roman numerical system. After having the learner demonstrate that he can read the numbers I, II, III, IV, V, VI, VII, the instructor checks the learners understanding of the principle that four is represented as five minus one or the figure I at the left of V as IV, and that 6 is represented as five plus one or the figure I at the right of V as VI. His Step I would then be completed.

For his Step II he would then present the learner with the new ideas: One is represented as 1, two as 11, three as 111 in the Chinese characters. Five is represented as _____. Attention is then called to the principle of developing other numbers with five as a base somewhat similar to the Roman system. i.e. $\frac{1}{5} = 6$, $\frac{1}{-4} = 4$, and finally that ____ = 10.

**Application**

The third step of the teaching process is to let the learner try out the new ideas. The instructor observes this step closely and corrects any errors. His principal concern will be to see that the learner has properly grasped the key ideas and tied them up. To continue the case cited above, the key ideas would be that the Chinese character five is represented as ____ and that other numbers are built up by adding and subtracting from five i.e. $\frac{1}{5} = 6$, $\frac{1}{-4} = 4$.

**Test**

Step IV of the teaching process is to give the learner an assignment involving all the new ideas and let him carry it out unaided. This gives the instructor information as to whether the learner can properly use the new knowledge. In other words Step IV
is really a check on the teaching job. If the first three steps are properly done, the chances are good that Step IV will work out satisfactorily.

Summary

In our plant departments there is a lot of teaching to be done. This fact is recognized. The easy natural way to learn is by association of ideas. Intentional teaching recognizes this fact and attempts to definitely select ideas which the learner already has and then link up the new ideas to them. The complete teaching process is to select the old idea, present the new idea and then make sure that the learner has properly associated the new knowledge and can use it.

We would accomplish more in our big teaching job if everyone who has occasion to instruct was familiar with and made use of a systematic method rather than depend on our present more or less haphazard system of training. The Teaching Process recommended for our business recognizes four steps.

Step I - **Preparation** - Out of all the ideas a learner has focus attention on one idea which offers the best tie-up for the new ones.

Step II- **Presentation** - Put the new idea before the learner in the best learning sequence. These ideas should tie up naturally with Step I.

Step III- **Application** - Make certain that learner has key ideas correctly tied-up.

Step IV- **Test** - Have learner run thru the whole sequence of ideas without any aid to make sure that he can use them properly.
The Teaching Methods.

The completion of any job necessitates the use of certain methods or ways. The effectiveness of the results obtained varies directly to the effectiveness of the methods which were used in carrying out the job. The same conditions also apply to teaching a learner which is, in itself, a job although not always recognized as such.

Here too, the effectiveness, from a teaching standpoint, will vary directly to the effectiveness of the method used. Consequently any formal teaching program necessitates a determination of the methods which can be used. In general there are five teaching methods which are as follows.

1. The DEMONSTRATION method.
2. The ILLUSTRATION method.
3. The LECTURE method.
4. The EXPERIMENTAL method.
5. The DIRECTED DISCUSSION method.

The Demonstration Method.

The fundamental characteristic of this method is that actual tools, materials and processes are used. This consists of actually showing the learner how the thing is done or what it is. When this method is used a definite result has been predetermined and the sequence of all operations are directed. The demonstration itself can be either on the part of the instructor or the learner. When the learner does the job under the guidance of an instructor or under the guidance of any direction he becomes the demonstrator and is literally demonstrating to himself. This practice is perhaps more commonly referred to as "doing" or "experience" but is nevertheless making use of the Demonstration Method. As an example, in
teaching a learner to climb a pole with the use of climbers, actual climbers must be used on a telephone pole if the Demonstration Method is to be followed.

The Illustration Method

The Illustration Method differs from the Demonstration Method in that some substitute is used for the actual tools, materials or processes. These substitutes may consist of drawings, diagrams, models, pictures, sketches and many other devices. Like the Demonstration the Illustration may be made either by the teacher or the learner. In either case however, there is direction to a predetermined result. Many times this method can be used more advantageously than the Demonstration Method. For an example, in teaching bridge construction, drawings, models and other substitutes can be effectively used. In addition the operation of the internal parts of engines, motors or mechanical devices can be depicted alone by the Illustration Method.

The Lecture Method.

This method consists of essentially passing out information. It is purely a one sided proposition and affords the learner no opportunity for comeback. There are many forms of the lecture method, of which the oral deliberation is probably best known. Literature of all kinds, correspondence courses and the like, however, fall under this classification. As has been stated its fundamental characteristic is its one sidedness.

The Experimental Method.

The true Experimental Method is one of trial and error with no vestige of direction. In the method the learner is
permitted to cut and try, picking up any new ideas which he can as
the result of his efforts. The result is never predetermined. While
many things have been learned by experimentation, from a formal
teaching standpoint it is extremely poor inasmuch as it is carried
on without direction and there is no guarantee that the learner will
acquire any new ideas whatever. In some cases it may result in
erroneous ideas being formed much to the detriment of the learner.

The Directed Discussion Method.

As its name implied this method is based on discussion
directed within predetermined limits. In effect it is an exchange
of ideas, a give and take proposition affording the learner the
greatest opportunities for comeback. Unanimity of opinions cannot
always be attained by this method but fundamentally it aims to ac-
complish this. This part of the method demands a willingness on the
part of the participants to see the other fellows point of view. The
attitude of those involved is generally quite different from that
embodied in an argument.

Lines of Approach.

In setting up any teaching program not only must the
lessons be planned and the methods determined but in addition the
"policy" of the instructor must be decided upon. This "policy" or
line of approach, may be either an information one or a developmental
one. The success of the teaching depends considerably upon this
selection.

The Informational Line of Approach.

When this line of approach is used the instructor gives
facts or data to the learner which are necessary and which must be
accepted by the learner. Likewise the informational approach can be used by the learner in giving such facts to the instructor. In either case the recipient of the facts is not required to do any reasoning.

The Developmental Line of Approach.

This line of approach requires thinking on the part of the learner. He is not merely supplied with a series of facts but is put thru a sequence of mental gymnastics by virtue of which reasoning takes place and conclusions are reached. Consequently this line of approach is highly desirable when it is intended to develop the judgment of the learner; judgment in this case being defined as the use to which facts or evidence is put.

Methods and Line of Approach for Step I.

We will recall that Step I aims to focus the attention of the learner on an idea. Such a purpose consequently limits us in our selection of a method. The method used should be of such a nature that the teacher can feel assured beyond a reasonable doubt that the learners attention has been focused on a usable idea. This means that we must actually determine where the attention of the learner is centered. In general the only method which gives the instructor such assurance is the Directed Discussion. This permits the instructor to force the learner to focus his attention on a usable idea. The Discussion Method may in some cases be advantageously supplemented with Demonstration or Illustration.

Also because of the purpose of this step the developmental line of approach will undoubtedly prove most effective.

Methods and Line of Approach for Step II.

This step has for its purpose the presentation of the new
ideas to the learner. In general the best method to be used in this step is the lecture plus Demonstration or Illustration or both.

In some cases the Discussion Method can be used advantageously. These cases however should involve the development of judgment. Extreme care should be exercised in choosing the Discussion Method for this step. Many times it will prove decidedly uneconomical and may have a tendency to confuse the learner. In addition a lengthy discussion for the purpose of presenting new ideas which could have been presented effectively and speedily by the lecture method may place the training work in bad repute in the minds of the production organization.

In general again, the Informational line of approach seems to be best suited for this step.

Methods and Line of Approach for Step III.

Inasmuch as this step purposes to check key ideas the method selected should provide for doing this effectively.

In this step the instructor must definitely satisfy himself that the learner has acquired the key ideas of the lesson presented. The Demonstration plus Directed Discussion Methods will in all probability be best suited to this step. In this case the Demonstration will be on the part of the learner. For obvious reasons the Developmental line of approach will prove most effective.

Methods and Lines of Approach for Step IV.

This step provides that the learner should be checked on the entire sequence of ideas presented. In this step we are interested in the ability of the learner to use the new ideas. Consequently our choice of a method should assure such a use. The
Demonstration method will in general best fulfill these requirements. Inasmuch as it is desired that the learner use the new ideas without aid the informational line of approach seems best. In this step the Demonstration and the Informational approach will be on the part of the learner.

**Summarization of Methods and Lines of Approach**

**Best Suited for Steps I - II - III - IV**

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<td>Demonstration - Lecture</td>
<td>Informational</td>
</tr>
<tr>
<td>Step III</td>
<td>Demonstration - Discussion</td>
<td>Developmental</td>
</tr>
<tr>
<td>Step IV</td>
<td>Demonstration</td>
<td>Informational</td>
</tr>
</tbody>
</table>
Operating Point Analysis a Necessity in Planning Lessons.

In performing any piece of work the total result is always the sum of a number of distinctly different small details. It is the attention paid to these details which cause the differences in individual performance results. One worker may lose time and cost himself more in effort by the way he has his materials placed or his tools arranged. The apparently trivial matter of placing the hand or even the choice of fingers to use in making adjustments spells the difference between successful performance and a good quality job and mediocre performance and questionable quality. There is always a best sequence and selection of these details to fit a given situation. The best selection always results in assuring good quality of workmanship in the least time with a minimum of effort or danger on the part of the person performing the work. These details are clearly in evidence at all times. It is only thru improvement on them that job performance can be improved. Hence in instructing work they become of the utmost importance because they are to be set up as practices which will be followed by those who have been instructed.

For the purpose of helping in the analysis necessary for planning lessons these details have been called "Operating Points." They are defined as follows:

A. Any point in a minor operation where human effort is required.

B. If not covered the Operation will fail

C. A small group of individual movements.
In Teaching a Lesson - Steps 1 - 2 - 3 - 4.

Some thinking has been directed toward the steps or progressive stages of a lesson as required in any formal teaching. It was set up as following the order of,

I. Preparation
II. Presentation
III. Application
IV. Test

A careful distinction should be made between the order of steps when the lesson is being taught and the order in which these steps are planned by the one who is going to teach the lesson.

In Planning a Lesson to be Taught - Steps - 2 - 1 - 4 - 3.

Because the teaching order is Step I, Step II, Step III and IV it does not follow that the lesson will be planned or laid out in the same order. A very little thought shows the impossibility of this. Until the new ideas are determined upon and arranged in the best order for being absorbed by the learner those ideas to which the new ones are to be tied cannot be determined. It follows then that the first step in the lesson as it is taught is not the first step which is laid out when the lesson is being planned by the teacher. Instead the order for planning the lesson is:

1. Step II
2. " I
3. " IV
4. " III

There is very little chance for misunderstanding the need for reversing the order of Step I or II for planning purposes.
Common sense dictates that before any part of Step I is laid out - Step II must be clearly set forth with the ideas arranged in the best order for rapid adoption.

**Laying out Step II.**

Again there is a common sense guide in setting up the new ideas. It is that they be new ones, to the learner. To definitely include ideas which are already in the possession of the learner is not good planning. These may have to be used in the method of handling the presentation or may have to be specifically checked in Step III. They have no place in Step II.

How then can Step II be laid out or planned? There is a well recognized formula for this.

Let $A$ - represent what must be known or done to accomplish a given task.

Let $B$ - represent that which a particular learner now knows or already can do.

Let $C$ - what must be taught.

Then $A-B = C$.

Taking a simple illustration of filling a cable splicer's furnace when the furnace and kerosene supply are at the manhole. Any detailed analysis of operating points indicated that to successfully fill a furnace the following is essential.

**The Assignment Aim - To fill Kerosene Furnace**

<table>
<thead>
<tr>
<th>What Must Be Done</th>
<th>What Must Be Known</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Put R. hand into R. hip pocket</td>
<td>Identify long nose pliers</td>
</tr>
<tr>
<td>2. Close fingers and thumb on pliers</td>
<td>Which way hand should be turned</td>
</tr>
<tr>
<td>3. Withdraw hand and pliers</td>
<td>Use to be made of pliers</td>
</tr>
<tr>
<td>4. Bring pliers into position above plug</td>
<td>How to hold pliers for this use.</td>
</tr>
<tr>
<td>5. Open pliers with fingers and thumb - R. hand</td>
<td>How to open pliers with one hand</td>
</tr>
</tbody>
</table>
### What Must Be Done

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Slip open pliers on to head of plug.</td>
</tr>
<tr>
<td>7.</td>
<td>Compress plier jaws R.hand</td>
</tr>
<tr>
<td>8.</td>
<td>Place L.hand on furnace top</td>
</tr>
<tr>
<td>5.</td>
<td>Hold top of furnace firmly</td>
</tr>
<tr>
<td>10.</td>
<td>Push R.hand toward left</td>
</tr>
<tr>
<td>11.</td>
<td>&quot; L.hand toward right</td>
</tr>
<tr>
<td>12.</td>
<td>Release L.hand</td>
</tr>
<tr>
<td>13.</td>
<td>Release R.hand pressure on pliers</td>
</tr>
<tr>
<td>14.</td>
<td>Remove pliers from plug</td>
</tr>
<tr>
<td>15.</td>
<td>Pass pliers to L.H.</td>
</tr>
<tr>
<td>16.</td>
<td>Turn plug with fingers of R.H.</td>
</tr>
<tr>
<td>17.</td>
<td>Remove plug R.H.</td>
</tr>
<tr>
<td>18.</td>
<td>Lay plug down</td>
</tr>
<tr>
<td>19.</td>
<td>Pick up funnel</td>
</tr>
<tr>
<td>20.</td>
<td>Place funnel in filler hole</td>
</tr>
<tr>
<td>21.</td>
<td>Pick up kerosene can R.H.</td>
</tr>
<tr>
<td>22.</td>
<td>Support with Left hand</td>
</tr>
<tr>
<td>23.</td>
<td>Open safety cover with R.hand</td>
</tr>
<tr>
<td>24.</td>
<td>Place nozzle in funnel</td>
</tr>
<tr>
<td>25.</td>
<td>Tilt can to pour</td>
</tr>
<tr>
<td>26.</td>
<td>Hold in pouring position until tank is filled enough</td>
</tr>
<tr>
<td>27.</td>
<td>Tilt can back.</td>
</tr>
<tr>
<td>28.</td>
<td>Release safety cover</td>
</tr>
<tr>
<td>29.</td>
<td>Set can down</td>
</tr>
<tr>
<td>30.</td>
<td>Take funnel out R. hand</td>
</tr>
<tr>
<td>31.</td>
<td>Check fill by sighting</td>
</tr>
<tr>
<td>32.</td>
<td>Lay funnel down</td>
</tr>
<tr>
<td>33.</td>
<td>Pick up filler plug R.H.</td>
</tr>
<tr>
<td>34.</td>
<td>Place plug in hole</td>
</tr>
<tr>
<td>35.</td>
<td>Turn to right finger tight</td>
</tr>
<tr>
<td>36.</td>
<td>Take pliers from L.hand</td>
</tr>
<tr>
<td>37.</td>
<td>Place pliers over plug</td>
</tr>
<tr>
<td>38.</td>
<td>Open pliers thumb and fingers</td>
</tr>
<tr>
<td>39.</td>
<td>Place open pliers on head of plug</td>
</tr>
<tr>
<td>40.</td>
<td>Compress jaws of pliers R.hand</td>
</tr>
<tr>
<td>41.</td>
<td>Turn pliers to Left</td>
</tr>
<tr>
<td>42.</td>
<td>Hold furnace top L.hand</td>
</tr>
</tbody>
</table>

### What Must Be Known

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Best position to place pliers to turn properly.</td>
</tr>
<tr>
<td>62</td>
<td>Amount of pressure</td>
</tr>
<tr>
<td>63</td>
<td>Need for steadying furnace</td>
</tr>
<tr>
<td>64</td>
<td>When to place hand with thumb locked on street.</td>
</tr>
<tr>
<td>65</td>
<td>How to avoid skinning knuckles.</td>
</tr>
<tr>
<td>66</td>
<td>Amount of pressure to apply.</td>
</tr>
<tr>
<td>67</td>
<td>Need for pliers only to start the plug.</td>
</tr>
<tr>
<td>68</td>
<td>Half turn generally enough</td>
</tr>
<tr>
<td>69</td>
<td>Will need pliers again to tighten.</td>
</tr>
<tr>
<td>70</td>
<td>Saves time and is easier to remove loose plug with fingers</td>
</tr>
<tr>
<td>71</td>
<td>Keep plug away from dirt</td>
</tr>
<tr>
<td>72</td>
<td>Keep dirt away from hole</td>
</tr>
<tr>
<td>73</td>
<td>Keep threads of plug free from dirt</td>
</tr>
<tr>
<td>74</td>
<td>Identify funnel</td>
</tr>
<tr>
<td>75</td>
<td>Must have strainer in funnel</td>
</tr>
<tr>
<td>76</td>
<td>Why dirt must be kept out of tank</td>
</tr>
<tr>
<td>77</td>
<td>Identify kerosene as against gasoline</td>
</tr>
<tr>
<td>78</td>
<td>Need for care of kerosene</td>
</tr>
<tr>
<td>79</td>
<td>Should not spill kerosene around</td>
</tr>
<tr>
<td>80</td>
<td>Pour only as funnel takes oil away</td>
</tr>
<tr>
<td>81</td>
<td>Never fill tank brim full leave 1&quot; air space</td>
</tr>
<tr>
<td>82</td>
<td>Always close safety cover</td>
</tr>
<tr>
<td>83</td>
<td>Put supplies back in place this saves time in the long run.</td>
</tr>
<tr>
<td>84</td>
<td>Avoid dripping kerosene - fire hazard.</td>
</tr>
<tr>
<td>85</td>
<td>Air is going to be pumped in and space is required inside tank for expansion of heating</td>
</tr>
<tr>
<td>86</td>
<td>Make sure threads are free of dirt.</td>
</tr>
<tr>
<td>87</td>
<td>How to determine threads are not crossed.</td>
</tr>
<tr>
<td>88</td>
<td>Run up by spinning</td>
</tr>
<tr>
<td>89</td>
<td>Use pliers to give last 1/2 turn</td>
</tr>
</tbody>
</table>

**Determining Lesson Content.**

The features listed above are illustrative only. It is not to be assumed that some deviation from the list is not possible or at
times desirable. Using the list then only as a case illustration it is perfectly obvious that there is no need for including any of this in a lesson for one who has successfully carried out the process. Even with a green man there are bound to be some of these features which are not new.

Let us assume a young man who undoubtedly has seen kerosene both in its raw state and burning in some form; who has handled a funnel for pouring liquids. He would have to go through the same series of 1 to 42 in the left column just the same as the experienced man. But in the right hand column there would be some feature which would not be new. Probably up to item 7 these are new ideas. Some of 8-9-10 may not be new. From 11 to 18 probably is new and from 19 to 24 probably is not new. The remainder is likely to be new. Thus out of 42 items - 8 of these may be excluded in planning Step II. As was said before good instruction would call for checking or making sure of even these at a later point in the plan.

Small Units Make Best Lessons

At this point it may be worth while to consider if the number of ideas which are new is not too great for one lesson. Probably there is an advantage to be gained in grouping these operating points in smaller number and listing these under smaller operations. Then instead of calling the operation lighting the furnace, let us say it breaks up into:

(a) Remove filler plug
(b) Insert funnel
(c) Pour kerosene in
(d) Remove funnel
(e) Replace filler cap.
This arrangement gives the instructor a chance to take smaller units for planning lessons and consequently gives the learner a chance to assimilate these more effectively. A rough comparison shows that if there are 34 items to be presented the chances of some of them not being properly absorbed are higher than if these same 34 were presented 6 or 7 at a time with the successive steps III and IV to make sure of their being assimilated. Then the actual lessons which might well be planned and taught would each have a definite aim and enough content to warrant separate teaching lessons. In any of these there would be not more than 12 items or separate ideas. It is better to have too few items in Step II than too many. There is no standard which may be set up or definite limits to be set for the actual number. The governing feature is always whether or not the normal person at the stage indicated by the lesson itself can easily follow and evaluate each one presented.

Small units properly set up will go a long way toward effective teaching and will also eliminate the necessary elaborate checking.

In lesson planning, Step 2 is the first to be laid out. This step is a presentation of new ideas or new application of elder ones. These ideas might be classified as:

A. Ideas directly applying to particular operating points.

B. Ideas related to the whole project.

In the case of teaching a man to use a Wheatstone bridge the application of A would be his learning the keys punched and which levers to more, etc. The application of B might be his learning the laws of electricity involved in the bridge. It is necessary to know a certain amount of underlying theory to successfully carry out most
of our tasks. On the other hand there is some danger of confusing a learner if we include too many principles at one time.

**Related Ideas Must be Included**

In some cases, related ideas may be important enough to warrant being set up in separate lessons. Some of the principal classifications of related ideas are:

1. Dangers.
5. Terms Designating (a) Tools.
   (b) Operations.
   (c) Apparatus.
   (d) Location.
Definite Training Courses Must be Set Up.

Under the second result for training instructors, the project of having definitely planned steps in progressive sequence was indicated. These were called, and properly so, courses for training. There is such a divergence of thought on what constitutes a course, that it may be well to define what will be included in a training course under given conditions. Depending on the particular skill required to perform definite parts of the work, the content of courses is definitely prescribed. Those manipulations, together with the related knowledge governing successful manipulations which must be accomplished in carrying out certain operations, in themselves constitute the course. Thus there is no standard course which must be followed under all conditions. It is necessary to make the course, using the working jobs and operations which actually have to be performed. The making of a course simply is the rearrangement of that work which is available in such a manner that it offers successive steps, making for the progress of the individual who is being trained. It would be folly to attempt to wait until just exactly the standard work became available on the job before training, because in industry such ideal conditions seldom, if ever, occur. Thus it is not poor practice or a technical error to find differences in the work assignments given to two individuals being trained for the same goal where each is assigned to a different set of local conditions. The work available must, in all cases, govern the course which is set up and followed. This does not mean that a
complete course covering all possible conditions cannot or should not be set up as a mark to shoot at. It is well to have the ideal course, and to adapt the actual working conditions to meet the ideal as nearly as those conditions will permit.

Any Course is only a Series of Work Assignments.

A training course which aims at improving job performance must of necessity deal with those assignments which are an actual part of the particular work. The work itself is nothing more than a series of assignments which some one must cover as they arise. When-ever an individual can successfully cover each assignment as it comes up we say that he is thoroughly competent on that work. Any lesser degree of competence calls for some additional training.

The only difference between a complete list of all the assignments a man might be called on to cover and a training course for that work is that the course will have these assignments set up in the order in which they are most readily learned or mastered. This is not always the same order in which production demands that they be done. Quite often the first assignment which must be done is much more difficult to learn and harder to accomplish than others which come later. The course is not determined by the need of individuals. It is fixed by the work itself. The selection of parts of this course to suit individuals may vary but the course as such would take a perfectly green man all the way thru. The course then is a graded series of assignments arranged so that the first assignment given is the easiest to do and the easiest to learn. Each successive assignment will make more and more of a demand for increased ability and knowledge until the abilities and knowledge of the individual meet the job requirements in all particulars.
It is evident that from a training point of view that the order in which successive assignments are given makes a great deal of difference. This is very apparent when we consider the following.

1. We want some production. We must give the new man something to do.
2. Some of these assignments are easier to learn and do than the others.
3. Some of these have, as a prerequisite, the ability to cover others.
4. These seem to naturally support each other in the order of performance.

Progression Factors.

1. The difficulties both of producing and learning for any given small unit assignment (teaching job) are fixed.
2. The only progress made is made by individuals.
3. With individual growth comes the ability to master assignments which are increasingly difficult to learn or do in their relation to each other.
4. The progression factors are selected from the point of view of individuals.
5. The separate assignments are arranged relative to each other as they call for some particular ability on the part of the individual.
Progression Factor Table will Help.

A progression factor table should help to overcome some of the handicaps met with in setting up a successful training course. The setting up of this table, therefore, and its subsequent use, should help to avoid many undesirable conditions, some of which are:

1. Calling on a man for more skill than he possesses.
2. Calling on a man for estimating powers or judgment which can come only with experience.
3. Putting a man in such a location that his safety is unduly threatened — perfectly obvious to all.
4. Putting a man in such a location that his safety is unduly threatened — not obvious to him.
5. Calling on a man to think of too many things simultaneously.
6. Calling on a man for more knowledge than he possesses.
7. Putting a man in a position which calls for more speed and accuracy than he has attained.

Some of the factors on which the individual will grow or make progress are:

1. Skill.
2. Knowledge.
4. Speed.
5. Accuracy.
6. Complexity. That is the ability to handle a number of operations.
7. The ability to work in different locations.
8. Poise.
Skill running from low degree to high degree; knowledge from little to much; speed from slow to fast; accuracy from small degree to great degree and judgment from very little to much, etc. Considering these various factors, it is evident that there can be no time ratios in these factors nor are they equal in amount. These lines, in the progression factor table, would not necessarily be of equal length. Accuracy may be obtained much more readily than knowledge; speed might be more readily attained than judgment.

Looking at this from a teaching angle, we know we cannot teach speed. Speed can be looked at from two viewpoints.

Manual operation may be done slowly at first and will develop as the skill of the learner increases but the operations themselves, do not depend on speed. They do not include any time element. The tacking up of a pair of wires along a baseboard might consume an hour or two hours and still be a perfectly good job as far as the production is concerned. This is also true of the changing of a receiver cap which might be done so slowly that it would take 30 minutes to complete the operation. This might still
be a perfectly good job from a production standpoint if we disregard
the economic feature of the job. On the other hand some operations
call for a particular speed - that is, speed is an inherent factor
in the operation itself. There are some things which must be done in
a certain time limit. Wiping a joint calls for a definite speed. If
too much time is taken, the solder may set and cannot be molded or
wiped. In soldering a wire on a lug which itself is mounted in some
apparatus that may be easily melted, speed is an important factor.
If the soldering iron is kept on the lug for too great a time, it
will loosen the lug in its mounting; therefore, this operation must
be done within a definite time limit or the work performed and the
piece of apparatus itself, will be a total loss.

Looking again at these progression factors, it develops
that knowledge can be taught. Speed is largely a matter of develop-
ment as also are accuracy, judgment and skill.

JUDGMENT. Some teaching may be done in the way of
judgment but this, in turn, seems to go back to
knowledge; that we really are adding something
to a man's knowledge, the careful and intelligent
application of which will help him to develop his
judgment.

ACCURACY. Accuracy may be considered in two ways.
1. Approximate.
2. Scientific.
There may be accuracy as applied to a man and as
applied to the job. It is much easier to learn
how to adjust a piece of apparatus within one inch,
one way or the other, but it may be much harder
for the learner to master an adjustment that must
be made within one-thousandth of an inch one way or the other.

Planning Assignments Against a Progression Factor Table.

Take any fifty jobs, how would you lay them out as against this table? Suppose one job was high on knowledge, but low on speed, etc., so that this job, plotted out on the progression factor table, instead of being a straight line right across the table might give us a very erratic line.

Suppose we represent fifty jobs by fifty sheets of paper punched with tie holes along the edge to be hung on a five prong rack, these five prongs representing progression factors.

It is quite apparent that any one sheet cannot be high on any one prong and low on another prong but must be placed in one position, either above or below some other sheet.

When making use of a progression factor table, we must place an assignment at one place on the scale. Some jobs may make a great demand on only one factor than some other jobs. This is sufficient reason, however, to put this assignment requiring the greater demand on one factor, in a position higher on the scale than the other assignment.

When we have set up the assignment in the best order for progression in learning and doing, we have as a result a definite training course.

Instructional Progression.

Training has been carried on before any one gave much thought to such things as progression factors. It was always more or less a simple thing to pick out the first two, three or four little jobs which were easiest for a man to learn and perhaps that
thing which was the hardest to learn, this latter job being of the type whereof it might be said, "Well, if he can do that job, he can do anything", but where the great majority of jobs belong, those jobs between the few easiest to learn and the few hardest to learn, was largely a matter of conjecture or pure guess, mostly the latter. A few operations on an installation job in their doing order, are:

1. Survey the basement.
2. Bore hole in the floor.
3. Select tools.
4. Select material.
5. Take tools to basement.
7. Place tube.
8. Run inside wire through floor.
9. Run ground wire.

If an experienced installer took a new man with him on an installation job, he would very likely have the new man bore hole or run wires or carry tools on the very first job and would not teach item No. 1 the first day or so. Why? Because he instinctively knows that it is easier for the new man to learn how to tack wires, etc., than it would be for him to learn how to survey the basement.

If, therefore, we have always recognized that some things are easier to learn than others and some things are harder to learn than others, can we not do a much more efficient training job if our work is laid out in a progressional order based on some definitely determined factors.

There may be slight Differences in Course Layouts.

There is, obviously, a possibility or even a probability that two instructors, in setting up a progressional order, will not agree in every detail. There will be some minor differences of opinion due to the individual instructor's judgment. But in the
main, these differences of opinion will be very minor in their relations to the general set-up of the entire course of instruction.

In the final analysis, while we are considering the progress of the learner, the actual jobs themselves, determine their own relative position in the lay-out of progression.

The easiest thing to learn in any phase remains the easiest to learn, whether the learner is a college professor or a longshoreman.

Knowledge to be Included in Course

Knowledge has been divided for convenience into three classifications:

1. Required.
2. Related.

1. Required knowledge is that which is absolutely necessary to proper performance of the work being taught.

2. Related knowledge is that knowledge which is quite desirable for the doing of a good job.

3. General knowledge is knowledge that is related in a way to the work at hand but is not essential for the performance of the work. From an economical standpoint, it is very doubtful that this general knowledge would have a place in the regular training program.

As an example of these three divisions of knowledge, we might consider the operation of a Wheatstone bridge. Under required knowledge we would have:

1. Levers to use.
2. Scales to read.
3. Connections to make.
4. Arithmetic.
Under related knowledge, we might have:

1. Theory of the bridge.
2. Theory of the Marley loop.
3. Theory of the Murray loop.
4. Effect of temperature on wire.
5. Capacity.

Under general knowledge we might have:

1. Transmission measurements.
2. Chemical and physics courses.
3. Economics.

The Supervisory Organization must endorse the Course.

Certain of these knowledge requirements are necessary for effective production. The line supervisors are the ones who determine what effective production is.

The determination of requirements should be made by supervisors collectively and for the general run of men bearing in mind that there are always differences between individuals.

Instructors, planning a course, must therefore work with the supervisors to determine the necessary requirements, taking into consideration not only the individual characteristics of such supervisors but also those items of knowledge which they, themselves believe to be absolutely necessary, desirable and that small amount of general knowledge that might be considered desirable.

A Course must be set up as a guide.

As one result of this particular conference we should have ultimately:

Some particular class (a work classification) set up in complete detail so far as a training course is concerned. This involves:
1. Arranging the various assignments in the order you would choose to help the learner make most rapid progress.

2. For each assignment, the series of hand lessons necessary to successfully teach the learner.

A logical procedure for laying out such a course of instructions is:

1. A list of assignments in their production order. (Small assignments such as filling a torch, mounting a bell box, etc.).

2. Set up the factors to be considered in progression. Note: It is not desirable to consider too many factors, possibly three, four or five. A great number of factors is apt to grow unwieldy and confusing to the point of uselessness.

3. Arrange the assignment in the sequence which the progression factor table indicates is the best.

4. Plan the lessons for each assignment.

For the mechanics of this procedure, it might be desirable

1. List assignments on 3 x 5 L.B. cards, one assignment to a card.

2. Place the cards in the learning progression order and number them 1, 2, 3, 4, etc.

3. It would be helpful to indicate on these assignment cards, the lesson aims that go to make up the assignment.
Lesson planning.

In planning a lesson it is necessary that a clear picture of the new ideas be fixed in the mind of the teacher. Such new ideas or new applications of old ideas clearly fall in Step 2 of the lesson. It is therefore, logical to assume that Step 2 should be planned first. In laying out Step 2 it is essential that all the new ideas to be presented in the lesson are definitely set up. The sequence or arrangement of these ideas is of less importance than the inclusion of all the new ideas. However, by modifying and rearranging these ideas in various sequence, it will be found that some arrangements are decidedly more logical and effective than others. We might start teaching at any point where we are sure that the ideas can be most naturally and easily assimilated by the learner. There is a danger of including too many ideas in a Step 2 if too large a unit is selected. While this step must include what you want to teach, if too many ideas are presented, the learner is apt to be confused. The purpose is to include only those ideas for one lesson which will be assimilated easily. It is only by limiting the size of the lesson that we can be reasonably assured that no new ideas will be overlooked.

Assignment aim workers' unit lesson plan.

We have an assignment aim which is a series of unit lesson plans and they must not be confused in the mind of the instructor. An assignment aim might well be to fan out and prepare for soldering, a piece of 20 pair switchboard cable on a terminal block. This
assignment can be broken down into seven lessons which follow:

1. How to fan first five pairs.
2. How to fan next five pairs.
3. How to fan next ten pairs.
4. How to care for spare pairs.
5. How to separate a pair.
6. How to locate point at which to skin.
7. How to skin insulation.

Another might be:— Mounting a 534A subset.

The lessons in the assignment might be as follows:

1. Difference in mounting depending upon the type of wall construction.
2. A technical lesson on the size and name of screws used in mounting such sets on wood walls.
3. A technical lesson on some of the common faults found in wood screws.
4. A lesson treating with some of the safety features which should be observed when handling screws and also when using a screw-driver.
5. A lesson on the number of screws to be used and the manner in which such sets should be held while mounting.
6. How to place the screws in the upper hole.
7. How to place the screws in the bottom hole.

It will be in connection with such lessons as are indicated above that the steps in the formal plan will set up.

Step II must be preceded by an analysis.

In setting up a Step 2 the standard practice for doing a job should be the basis for lesson plans.

A careful analysis of all operating points will disclose the best method and tools to use on any assignment.

In view of the magnitude of the task involved to break down a job from a teaching viewpoint, in order to determine the ideas which should be included in a lesson, sometimes the question arises as to whether this should not be done from an analysis which would only go down to operation instead of the operating point.
A little consideration brings out the fact that the operating points as such, have nothing to do with instructing but that they are a vital part of all job performance and cannot be avoided by either the learner or the experts. On the basis of determining the ideas necessary to impart in any lesson, they are essential because they positively control the operation itself, and hence determine the ideas which should go into a lesson.

It may not always be necessary to place the minor details or minor ideas in the plan if the major idea contains the minor ideas and will cover them, but it is necessary to consider all the ideas. Sometimes some of the ideas look too simple or too silly to be included in a lesson plan. Although the idea might seem simple in Step 2, and if one lesson were the only end in view, probably the real test will come in a cumulative Step 4; where such ideas that were simple or appeared to be too. When ideas are not included in Step II, often in Step 4 the learner will bring out the fact that something is lacking which should have been included in the second step.

Make Use of Same Terms Throughout an Assignment.

In teaching a lesson or a series of lessons, it is desirable to use the same terminology throughout the entire series of lessons in order that the learner may not be confused with several terms for the same thing or the same operation. An example of this would be where the instructor has first asked the learner to separate the pairs in a terminal block and when he wants the learner to repeat this operation, he asks him to separate the wires. The learner is then confused. He does not readily comprehend the
difference between pairs and wires when in reality the instructor meant the same thing.

Company Policies as related Knowledge.

Often there are definite chances for presenting the ideas connected with such things as Regulations - Benefit Plan Employee Representation, Thrift etc. A planned lesson is just as effective in this field as in regular production. Where such features can be successfully given in connection with vocational training they should be worked in.

Inasmuch as this knowledge should be given the man at some time early in service, instructors or immediate supervisors should definitely plan to give it to him. It may be advisable to plan to give such lessons in an informal manner - during lunch time, in out of hour period, or between regular assignments.

Accident Prevention Related Knowledge.

There are danger features in some jobs which have to be incorporated in lesson plans. In every lesson where there is a danger point it should be brought out as safety has a definite bearing on production. Wherever there is a chance to work safety in it is sound practice to do so. There is a tendency for foremen to stress production and not safety. However, the emphasis should not necessarily be on danger but should show ways and means to avoid it.

In calling attention to the point that scratches on the hand might develop into blood-poison, we are rather waving a red flag on this danger proposition, particularly if this blood-poison feature is brought into almost every lesson where there is a danger of a scratch or a cut. Perhaps the more desirable way would be to
definitely plan a lesson which would develop the fact that small scratches might often develop blood-poisoning and then in the lessons which followed, simply point out the fact that scratches or cuts may result from improper use of tools without again bringing in the blood-poisoning features. The best way to eliminate accidents is to teach safe practices rather than to talk about dangers. When teaching, it is not desirable for the instructor to assume a superior or formal attitude, creating a feeling that he is somewhat above the learner and knows a great deal more than the learner does. While this may be perfectly true, the reaction on the learner is not at all a favorable one.

Related Knowledge to be Emphasized.

Related ideas must be definitely in the possession of the instructor for real effective teaching. The questions an instructor might ask himself when laying out Step 2 are:-

1. Are all the ideas in where they belong?
2. Are there too many of them?
3. Are they in logical sequence?

A lesson on securing a ground clamp to a pipe, offers quite an illustration of emphasis of related knowledge. The reasons for having a good, clean connection on the pipe are far reaching in telephone work. The need for a good ground connection is related knowledge because the question might often arise in the worker's mind and bother him if he did not have this particular information well understood. A definite answer to many questions of related information and its effect on the state of mind of the learner, cannot always be given. The following points may help in determining what to include:-
1. Any lesson must include the ideas required to successfully cover the operating point.

2. There may be some related ideas which are desirable to have included.

3. Where there is doubt as to the inclusion of ideas related, the following can help and be used as a guide.

   A. If the safety or practical habits (behavior) are affected, these ideas should be included.

   B. Where the features of insulation, contact, ground, or continuity of circuit are present, these should be included.
The Preparation Step.

There are times when a teacher is supposed to surmise the particular ideas that a learner may possess. Lessons for such learner are called primary lessons. At any other time the teacher may know that a series of ideas has been presented and lessons based on this knowledge are secondary lessons. For any individual, the number of primary lessons will be very few. Therefore, we must arrange to plan a series of secondary lessons connected up with each other in logical sequence. The fact that it is a primary or secondary lesson is relatively immaterial as far as planning Step 2 is concerned but it is of greater importance in planning Step 1. Step 1 should be planned from Step 2 and so arranged that the last idea in Step 1 will tie in naturally with the first idea presented in Step 2. From this it can be readily observed that we must plan Step 1 in a reverse order; that is from the last idea to the first one. This should be brief, simple, evenly obvious and not too far-fetched. It should be a natural almost indiscernable step which leads the learner thru a logical train of thought, focusing his attention on an idea which he already possesses and from which the transition to the new idea can be easily made.

Dangers in Setting Up Step 1.

There is no virtue in a prolonged Step 1, even though it approaches the new idea in a logical manner. In such cases, the learner frequently feels that all his time has been wasted leading him up to the new idea. The possibility of the learner's mind
wandering off on the wrong path is also increased if Step 1 is excessively long. A long drawn out and elaborate Step 1 is not desirable. A short snappy Step 1 is much more to the point.

However, there is a tendency to make this Step 1 too short to the extent that the instructor will have no proof whatever, that the learner is following him or has the same line of thought. As brief as Step 1 may be, we should have some response or some assurance which will indicate that the learner is focusing on the ideas. An example of this might be where an instructor with a rather prominent Adam's apple is conducting Step 1 by the lecture method and has carefully covered some points which he believes the learner has followed. At the conclusion of Step 1, however, it is possible that in the learner's mind, instead of the ideas that the instructor had planned we may find this idea, "What a remarkable Adam's apple that man has."

The instructor must make sure that the attention of the learner is on the ideas he is going to use to tie Step II in the lesson. He cannot take this for granted even when the learner is apparently giving him whole hearted attention. One can appear to be following a train of thought and still be miles away.

**Purpose of Step I is Not That of Checking.**

A general question may be asked "Can we check some of the knowledge which we feel should be common but on which we have some doubt in the case of a particular individual".

This also runs into another: - "Can we assume that a new man has a lot of information to start with?" It is easy to see that it might be necessary to check some of the learner's knowledge before proceeding with the teaching lesson but that this is a separate and
distinct function from that of Step I. Checking in advance may reveal apparent ignorance or discrepancies of knowledge. The learner however, may tie these up in later steps or later lessons. Logically, it may be wrong to assume that a learner has a lot of knowledge. Psychologically, it is very consoling to the learner. The purpose of Step I is not to check knowledge.

There is an opportunity for some checking in Step I but the best place to check is in Step III. There is danger in checking during Step I as the learner easily gets the idea he is being tried out and often feels that he is pestered needlessly. The purpose of Step I is to get to the focal point and tie up to Step 2. The prime purpose of Step 3 is to definitely check the learner. Step III not Step I is the legitimate checking step. The best policy to follow is to use good judgment in selecting the focal idea and remembering that this is already possessed by the learner to go after that idea. An illustration of the effect of a poor Step I can be seen from the following. The idea the instructor wished to focus attention upon was a flexible cover which would be cut to fit in place. His choice of basic idea was the dough covering on a pie. He asked the learner if he had ever seen pie crust put on apple pies. Learners mind immediately went back to Mothers' kitchen - clean white table - curtains at window - row of fresh made pies - aroma of these when taken out of oven, etc. He did not get out of the kitchen mentally until the lesson was well into Step II.

Step I Need Not be a set of Parallel ideas to Step II.

A tendency often found when instructors are first trying to lay out Step I is that of building up a series of ideas which
closely resemble those in Step II. For example:— In planning a lesson on removing the insulation from #14 rubber covered wire, often the process of sharpening a new lead pencil is used. Because there is a resemblance between the processes it does not follow that this is a better Step I than one which focused attention directly on the wire itself.

A good Step I is not obvious to any marked degree and often the observers do not recognize the dividing line between Steps I and II.

Where Step I is very obvious there usually is something wrong with the choice of ideas.

The J. O. P.

There is always an idea in Step I which is the actual point of departure from the learner's fund of knowledge. It is the focusing point from which the mind goes out or jumps for the new ideas. A term commonly applied to this idea is very aptly named "The Jumping Off Point."

This J. O. P. (as it is usually abbreviated) is the main objective of the entire step. It represents the actual idea which is most near the first new idea in Step II of the lesson. Obviously being the chief aim of Step I it should be the purpose of the instructor to get to it just as soon as possible always remembering that the learner's mind is the one which must reach the J. O. P.

Illustrations of Step I.

As a means of showing the relationship of ideas in Step I with those in Step II the following examples are given. These are not set up as perfect samples but may give a general picture.
1. Lesson Aim: **Removing Insulation from Switch Bd. Wire.**
   
   Step I 1st Idea: Different wire on underside of M.D.F. block.
   
   2nd " Cross connecting wire insulation removed with side cutting pliers.
   
   J. O. P. What tool to use on switchboard wire.
   
   Step II 1st Idea: Remove insulation with Long Nose Fliers
   
   2nd " Etc.

2. Lesson Aim: **Tie In Bare Copper Wire – (Pole Line).**
   
   Step I 1st Idea: Wires rest in insulators not on arm.
   
   2nd " Are tied in place.
   
   J. O. P. Must make tie after wires are strung.
   
   Step II 1st Idea: Short tie wire placed on insulator.
   
   2nd " Line wire is placed in tie.
   
   3rd " Make twist with under wire.
   
   4th " " " " over wire.
   
   Etc.

   Actually as has been stated before the planning or layout of Step I is done in reverse order when compared to the above examples. In planning the set up for tieing in wire the following order would be followed: – 1st J. O. P.

   2 - 2nd Idea.
Part D
Section III

Purpose of Step III is to make sure.

As has been stated the fundamental purpose of this step is to check the key as basic ideas presented in Step II. It is a general corrective test being applied. Normally the learner can be expected to have some difficulty in getting the exact meaning and appreciation of the ideas involved. It is to assure him as well as the instructor that the 3rd step is used.

Key Ideas may be indicated

After setting up Step II it is not usually difficult to pick out of the ideas set up there, some which are basic ones or the key ideas. These are the ideas which if properly absorbed will almost of necessity involve the absorption of the others.

Any Idea which has a bearing may be checked.

There is a tendency to feel that only such ideas as have actually been presented in Step II should be checked in Step III. This is not strictly true. Many times the previous concept of ideas held prior to a particular lesson are in error. One purpose in running the Step III is to clear up the haze which may result from a conflict of the new ideas with some which may be erroneous but are already possessed by the learner. Obviously there is nothing gained by having a puzzled learner. It is the intention in carrying out this Step III to reduce such puzzling features to a minimum.

Avoid Negative Instruction.

Any learner can cultivate bad or incorrect practices in the early stages of his learning. This can be avoided in two ways,
either in building up or stressing a positive idea as to the correct methods, or by the use of negative ideas. On the two ways, the positive method is the most desirable. In any event, the proper method should be so cultivated that it becomes a habit. The instructor, whose product is a trained employee, should never permit the learner to patch up inferior workmanship. Insist on doing it right the first time. After the correct process is presented and fixed in the learner's mind it may be well to warn him of the incorrect practices. The reason being, that association together with observation, may cause him to feel at a later date that incorrect practices by co-workers are just as efficient as those he learned.

Interest is Important.

The degree to which interest is maintained and attention focussed on right performance forms a very definite phase of the teaching job. It affects the learners "frame of mind" and on that score is vital. It is possible to arouse the desire and cultivate the habit of always doing a thing the right way. One of the important results of good teaching is the habit formation in performing work that is sound, correct and effective.

Group Instruction.

Step III is more difficult to plan and check where a group of learners is being taught than it is in the case of a single individual. This is rather evident when the purpose of the step itself is considered. To be certain that every one in the group has "tied up" the ideas properly and has no haze to overcome calls for a little more planning than will be required for making sure of one individual's tie up. Therefore in setting up this step for group instruction the choice of method the way in which key ideas are to be checked and the
distribution of this checking enter into the plan. For example: Where the lesson aim with a group is "To recognize the effect of Electrolysis on underground cable" Step III would probably make use of Lecture, Illustration and Directed Discussion. Pictures of the field conditions found in cables might be used to illustrate different types of damage. By discussion the group can be checked to make sure that hazy ideas regarding differences between short circuit burns, punctures due to mechanical accident and electrolytic action are cleared up. It is evident that the size of the group will make considerable difference in the proper carrying out of the step.

When is Step III Completed.

There is no set procedure which can be used to state with exactness when this step is completed. Only a general guide can be given. The purpose of the step is to make sure the key ideas in particular and any idea in general are clearly held by the learner. This being so the instructor must be the sole judge who decides when he is satisfied that the condition has been met. The step may be long or short, simple or complex but until the instructor is certain that the ideas which affect the proper performance are absolutely clear it is not completed.

1. The transition from Step 2 to Step 3 should be an easy, natural one. This step is often a delicate one and cannot be carefully defined. A condition in which there is doubt in an observer's mind as to when the transition was made, is a healthy one.

2. The effective teaching may be judged by the ease with which the learner acquires knowledge.

3. Demonstration in Step 3 by the learner usually produces the best training results.
Step IV

As has been indicated no one knows until after an actual test whether or not an individual has learned. Obviously a fair test does not allow for aid or assistance being given the individual being tested. Either the learner can do or does know a particular thing or cannot do or does not know that thing. The purpose of Step IV is to find out. This actually means that the real purpose in organized training is that it determines how effective the three preceding steps were carried out.

Granting that a fair selection of individuals to be taught has been made, failure in Step IV may be traced to some one or a combination of the following courses.

(a) Poor learning conditions.
(b) Improper handling of the lesson planned.
(c) Poorly planned lesson.
(d) Improper selection of content.

Each instructor who has been trained should be able to determine for himself which of these must be remedied for ultimate success. It is more important for the new instructor to find out the causes of failure in Step IV than it is for him to remedy the situation by corrective measures.

It may be safely said that if all three steps preceding IV have been correctly covered Step IV itself will be successful.
There has been a misconception of the application of planned lessons for the new instructor when he attempts to carry out a course of training. Up to now our whole aim has been to stress the planning of small units to be taught. Obviously in the complete training course each of these units becomes insignificant when measured against the total aim. There is a logical concept of the program which can be plainly seen if the following order is observed:

1. An individual learner is expected to master the knowledge and skill necessary to cover a job assignment. Obviously until the learner has mastered this job assignment he has not been trained effectively. Therefore, there must be a final step 4 which may include a final step 3, which is a check-up on all the teaching units which have preceded this assignment test. It is in this job assignment step 4 that the instructor determines the effectiveness of his teaching in all that preceded the assignment.

2. If we call this job assignment the major aim of the training it will be made up of a number of minor aims which have been planned as separate lessons. There may be a considerable number of these individual lessons each relatively small in content but nevertheless for each lesson the four steps must have been carried out.

Thus the probable solution to actual job checking comes about somewhat after this fashion:
(a) Small unit lessons are "put over" by an instructor who covers all four steps while with the man being trained.

(b) These unit lessons are successively taught until they have covered the activity of the job assignment.

(c) The instructor then assigns the job to be done which is the sum of the previous lessons, particularly watching and emphasizing step 3 to definitely check the amount of information retained by the learner. All through a, b and c there has been no separation between the instructor and the learner. The entire series are carried out under the personal observation of the instructor.

(d) The job assignment is definitely made to be covered by the learner alone, which constitutes a combination step 4 for all the prior unit lessons.

The necessity for this feature indicated under "d" is plain when we consider that the principle of effective learner rests on the proper connection of a series of stimuli and responses which manifest a certain ability.

The skill which is expected to come more slowly and to be built up by the learner will be developed by allowing the learner to carry through this job assignment often enough and with occasional checks to insure the instructor that the entire performance is correctly carried on.

If this concept is kept in mind by the instructor new to the work of training it will solve in a great measure the trying
problem of the distribution of his own personal time over a group of people being trained. It will also center thinking on the larger aim or assignment learning which is the sum of the various unit lesson plans.
"On the Job Training."

This form of training has been defined as that which is done under actual working conditions and on direct production. Wherever the result achieved by the learner remains as part of the permanent product there can be no question about it being "on the job training." For this form of training as for any other there are two general conditions to be met. For some particular features it is often desirable to work with a group of learners, all of whom are ready at the same time to acquire the same new knowledge or ability. This constitutes one set of conditions. Usually, however, the conditions met with on the job call for training several individuals who have not reached the same stage of development. Even when work is started with several individuals as a group the differences in learning ability between these individuals will cause some to go ahead faster than others. These differences between the individuals are not under any one's control and hence a greater portion of the time of an instructor doing "on the job training" will have to be applied to the individual rather than to groups.

For the purpose of aiding such an instructor, these two general conditions are best considered in the order in which they make the most probable demand on the instructor's time.

1. Individual instruction.

2. Group instruction.
Individual Instruction:

Consider a situation where four men come on to the job on the same day. It is not unlikely to find that they have had varying job experiences prior to coming on to the job which cover a range of no prior experience up to the classifications of C or D in a particular assignment. Obviously the lessons which should be taught to these individuals during the first day will differ from each other considerably. One probably has to begin on very elementary stages while another with the greatest job experience will be ready for and will expect to get assignments which are considerably in advance of those given to the others in the group. Such a situation definitely outlines the conditions which call for individual instruction. The problem which the instructor must deal with is that of effectively distributing his own effort as an instructor over these four men. In order to do this he must have some sort of plan which takes into consideration the following:

1. He must know the first series of assignments that are available.

2. The distribution of the learners on these assignments.

3. The question of maintaining interest on the part of all his learning group.

4. The actual use of planned lessons suitable to each of these assignments.

5. The frequency with which each should be given attention and the duration of time between visits.

Group Instruction

There may be times in "on the job training" where it is profitable to take a group all in the same stage and bring them
simultaneously to a higher level of attainment. It does not matter to much of any degree whether this group is made up of entirely new men or if they be men with considerable experience. The conditions the instructor faces are the same. He has an entirely different problem than that which he encountered on dealing with this same number as individuals. Such a project can be considered under the following headings:

1. The question of the teaching conditions and the particular assignments for training purposes.

2. The number that can be effectively handled.

3. The maintenance of group interest.

4. The modification of the lesson plan to fit a group.

5. The technical distribution of the lesson content to assure uniform interpretation. (This distribution should not be confused with the distribution mentioned in the preceding chapter.)

6. The amount of individual checking required before actual assignments to individuals.
Unit lessons may follow the productional order.

In setting up our training program we have two things to do.

1. Make the progression layout.
2. Plan lessons for assignments in the progression layout.

In general, the production order could be safely followed with respect to the lessons in any given assignment, to keep to that particular assignment. However, that is a definite progression for the various assignments or teaching jobs which would qualify an individual for any particular craft. As an example, it may be that five lessons are necessary to teach a man to prepare and light a Splicer's Furnace. In so far as these five lessons are concerned, there probably is no difference in the learning difficulty. Therefore, we may follow the order of production requirements with them. However, there is a definite order for the many assignments which this particular individual will be expected to fulfill on his first job. It is on the arranging of these assignments that the progression factor table will be used. Then if the table has been properly applied the progression of assignments is cared for.

The planning of lessons to properly teach these can be carried out without much further consideration of progression factors. The regular production order in which the assignment must be done will answer in most cases.
One of the most discouraging effects of haphazard training methods is the lack of definite knowledge of progress made by an individual. Progress can be measured only from some fixed point and with some time factor definitely used. Our haphazard training practices do not permit us to set up the present status of any individual before training is attempted. Neither is there any checking levels in point of time or performance against which individuals can be checked and their personal progress measured. It should not be inferred from the above that nobody has any notion of the progress made, because that is not true, but certainly no one has a complete record or any tangible facts on which to base statements of progress.

The effects of this lack of knowledge of the individuals are most pronounced. They manifest themselves in many ways which cause difficulties to pyramid for a supervisor dealing with individuals. Lack of concrete evidence to substantiate an impression of remarkable progress often interferes with a supervisor's rewarding such an individual as his merits warrant. The same lack often causes the supervisor to be unable to convince an individual who has not made progress that such is the case. There is very little data available which would show the slowing effect of taking on green people or the cost which is involved in using people who are not fully trained. Lack of definite facts is probably the greatest drawback that a supervisor faces in dealing justly and impartially with the individuals reporting to him.
A brief consideration of the drawbacks of this lack of definite knowledge emphasizes the advantages which would come if the definite facts were available. There is in the minds of most supervisors little difficulty in naming the best performer that he has. There is also little difficulty in his naming the poorest performer that he has. It is in the gradation between the poorest and the best that difficulties are encountered. It is seldom found that a group of ten men or more are equal in all respects. There undoubtedly is in every case individual difference enough to warrant their being placed in a somewhat graded manner from minimum to maximum effectiveness. Definite knowledge of the progress that each makes would help tremendously in making such a setup, and in justifying the claim that such a setup is a true one.

In a previous chapter one of the responsibilities of a trained instructor was that he take the individual assigned to him from his present status to some predetermined point effectively. Included in this responsibility would be the activity of actually recording on some acceptable standard scale the progress which he has been able to measure with that individual. Thus the trained instructor would begin to contribute at once some of the needed data to enable a supervisor to more effectively grade those for whose activities he is responsible.
This thesis is rather complete in itself especially since the American Telephone and Telegraph Notes are included as Exhibit 6. Since there are no particular references to be mentioned, the Bibliography has been omitted from this thesis.
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THE TEACHING METHODS

The completion of any job requires the use of certain methods. The effectiveness of the results obtained varies directly to the effectiveness of the methods which were used in carrying out the job. Also the effectiveness of our training work will vary directly as to the effectiveness of the methods used. In general, there are five teaching methods which are as follows:

1. The DEMONSTRATION Method

This method is characterized by the fact that actual tools, equipment, and material are used by the instructor in giving the lesson. The demonstration applies whether the instructor acts as the demonstrator or whether the learner takes the equipment and demonstrates.

2. The ILLUSTRATION Method

This method makes use of some substitute for the actual tools, materials, equipment or processes. These substitutes may consist of drawings, diagrams, models, pictures, etc.

3. The LECTURE Method

This method consists of giving out information. It is purely a one-sided proposition and affords the learner no opportunity for comeback. The lecture may be oral or written.
4. The DIRECTED DISCUSSION Method

This method differs from the Lecture method in that the learner is expected to take part and express his points of view. It is a two-sided proposition with the learner making a comeback.

5. The EXPERIMENTAL Method

The true experimental method is one of trial and error with no evidence of direction by one familiar with the ideas being learned. It is usually called a "cut and try" method. This method is not endorsed for vocational training.

LINES OF APPROACH FOR TEACHING

The "policy" of an instructor is called the line of approach and may be either an informational one or a developmental one. The success of teaching depends considerably upon this selection.

1. The Informational Line of Approach.

With this line of approach the instructor gives facts to the learner which are necessary and which must be accepted by the learner. The learner is not required to do any reasoning and for this reason this line of approach has been called a "pouring in" process.

2. The Development Line of Approach.

This line of approach requires thinking on the