

Special Group Is Busy Writing and Revising "Bell System Practices," Operating Handbooks of which the Associated Companies Acquired a Million Copies Last Year

The Bell System's Best Sellers

A. B. Covey

THERE IS a small office building in lower New York City whose entrance is so inconspicuous that a chance observer might pass by without even noticing it. Should he enter the building, however, and proceed to the third and fourth floors, he would find himself in a beehive of telephone activity. For the two floors house a group of men from the Engineering and Plant Departments of the Bell System's Associated Companies who have accepted temporary assignment with the Operation and Engineering Department of the A. T. and T. Company. These men are engaged in the preparation and revision of urgently needed Bell System PRACTICES.

Bell System PRACTICES are the instructions which describe the best methods of engineering, installing, constructing, and maintaining the telephone plant. The engineers use the PRACTICES as guides in the design of

cables, open wire lines, radio systems, carrier systems, and the many types of central office equipment. The installers use them as instructions for installing telephones, private branch exchanges, and Teletypewriter equipment. The construction forces use them in the construction of cables and open wire lines. The maintenance forces use them in the maintenance of all forms of central office and private branch exchange equipment, subscribers' station equipment, cables, and open wire lines. PRACTICES are also used for training purposes both on the job and in training schools. They are used not only in every Operating Company but also in the Western Electric Company and the Bell Telephone Laboratories.

During 1951 these Companies acquired over one million copies of the PRACTICES.

Bell System PRACTICES are, obviously, an integral part of telephone

operations. They are as important working tools as any the operating forces use. Thus, they play an important part in providing the public with the best and the most telephone service at the lowest possible cost.

The preparation of such information* has been one of the major functions of the Bell System headquarters organization for almost three-quarters of a century. During that time, these instructions have grown from a few circular letters to a library of over 9,000 separate pamphlets or sections. Many times it has been necessary to call on the Operating Companies for assistance

* While the discussion here is limited to Bell System PRACTICES, information of many other types is issued by the General Departments of the A. T. & T. Company as part of the constant process of furnishing advice and assistance to the Operating Companies.



The book-case contains about a third of the present active sections of Bell System Practices. They are kept in binders for convenient use

in their preparation, and now the situation has arisen again. The Companies have responded with the largest group of PRACTICE writers in history, organized since the middle of last year in the separate establishment already referred to.

In preparing PRACTICES, those writers are following a plan established over 20 years ago. Let's take a look at some of the developments which resulted in the creation of the Bell System PRACTICES Plan, the events leading up to the organization of the present special writing group, and also a brief look at a typical writer's job.

Early Forms of "Practices"

IN 1879, The National Bell Telephone Company was already established, with headquarters at 95 Milk Street in Boston. W. H. Forbes was president, Alexander Graham Bell was electrician, Theodore N. Vail, general manager, and Thomas A. Watson, general superintendent.

There were approximately 16,000 telephones in the country at that period, and Mr. Watson was spending most of his time trying to make them work. The subscribers of that day were not very critical of the failures of the telephone apparatus; they were amazed that it worked at all. But the difficulties experienced by the licensees, or agents, as they were called, resulted in a continual stream of questions to the National Bell in Boston on the design and maintenance of the telephone apparatus.

Answers to such questions were provided by means of circular letters, and a number of these are still preserved. It is interesting to note the

general similarity between those early letters and the drawings, descriptions, and data incorporated in the present-day Bell System PRACTICES.

Many years later, Mr. Watson was consulted on the historical facts about the information furnished the "Operating Companies" in those early days of the telephone. The need for this kind of information could best be explained, he responded, by a trip he made through the West in 1878 to inspect the telephones that were then in use.

"My route took in Chicago, Milwaukee, Pittsburgh, Washington, and all of the larger cities on route," he said. "I found our telephones giving fairly good satisfaction to the users, although to me, when I tested them, they seemed to work badly. I was especially dissatisfied with my call bells. Both telephones and bells had evidently been neglected since they had been put into use; apparently nothing had been done to them in the way of cleaning or adjustment since they left the shop. My time on this trip was largely spent in showing our men how to adjust the instruments and impressing them with the need of constant inspection to keep them working at their best." Thus, from the start there was a real need to get into the field people's hands the necessary information on the proper maintenance of the equipment.

While not a matter of record, stories handed down from the "good old days" make it appear that stand-

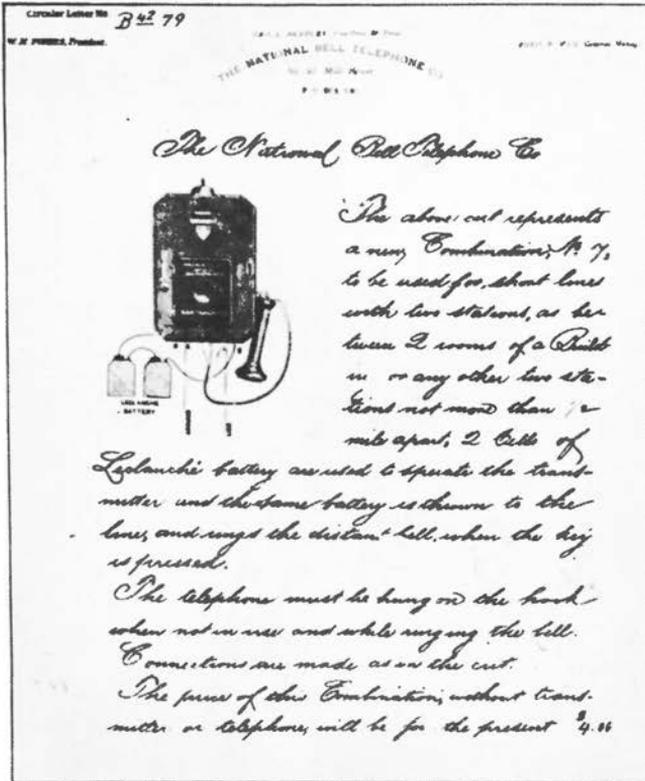


A group of "Practice" writers at work in their special quarters

ard procedures were not always followed. One tale relates to an operator who undertook to clean the switchboard plugs with steel wool. It seemed like a good idea—especially as the plugs were thoroughly cleaned. The "out" was that fine steel slivers adhered to the plugs, so that when they were inserted in the switchboard jacks they "shorted out" the jack contacts. The plug cleaning was necessarily followed by a thorough job of jack cleaning.

Another "off the record" yarn tells of an equipment attendant who was having trouble with a bay of equipment which contained a good many relays. Each morning, when he came to work, he found an accumulation of trouble reports which past experience told him were caused by "sticky" relays in the bay. Finally, he resolved to take drastic action; and each morning thereafter he hit the bay a wallop with a short length of two-by-four. The method was temporarily effective, but ultimately it was recognized as not a standard method of clearing the trouble.

Such incidents, however apocryphal they may be, do emphasize the



An early "Practice," covering the No. 7 subscriber's set

place of PRACTICES in Bell System operations.

Two important PRACTICE developments stand out in the period up to the end of World War I.

1. The inauguration of standard drawings as a means of furnishing information to the Operating Companies on new circuits and equipment. This method is still in use.
2. The introduction of the numbered specifications, covering principally outside plant construction items such as cables and open wire lines.

Copies of some of the early drawings, dating back to the 1880s, are

still preserved on microfilm at the Bell Telephone Laboratories.

The numbered specifications made possible the construction of the early open wire and cable lines. Viewed in the light of present-day standards, the methods were crude, but they filled the needs well, as is evidenced by the long periods of satisfactory service the lines rendered.

Developments after World War I

IN THE DECADE following World War I, there were more developments in the PRACTICE situation than in any other similar period in Bell System history. In

practically all of these, the Operating Companies played an important part. The developments were a direct result of concerted efforts to provide information in pamphlet form for use in the field. Those of particular interest were:

1. *Numbered Bulletins*
2. *Transmission Maintenance Practices*
3. *Handbooks of Outside Plant Engineering Practices*
4. *Transmission Practices*
5. *Bell System Maintenance Practices*
6. *Building Practices*

By 1930, PRACTICES were being issued to the Operating Companies

covering a major part of the operations carried on by the Plant and Engineering Departments. The transmission people had their method of distribution, the outside plant another method, the maintenance people still another. There was a real and obvious need for a coördinated plan of distribution. Again the Bell System team went into action: a new Bell System PRACTICES Plan was evolved. This provided for the inclusion, in one comprehensive scheme, of all instructions used by the Plant and Engineering people.

The Beginning of "Bell System Practices"

THE PLAN involved the establishment of a number of series of PRACTICES, each carrying the common title BELL SYSTEM PRACTICES. In addition, a supplementary title was assigned to each series to describe the particular type of plant and character of work involved. These titles are listed in the adjoining column.

To simplify distribution of the PRACTICES, a method was devised whereby the Western Electric Company made bulk shipments to the Operating Companies in accordance with established routines, while at the same time A. T. & T. forwarded advance copies to Company Headquarters. This general scheme is still in effect today.

The addition of PRACTICES on *plant assignment, Teletypewriter, foreign wire relations, equipment engineering, transmission engineering, and radio systems* followed during the next few years. The *buildings and grounds maintenance* series was changed and enlarged. By 1940, the

BELL SYSTEM PRACTICES

1. *Central office maintenance*, covering methods and procedures for maintaining central office equipment.

2. *Private branch exchange installation and maintenance*.

3. *Station installation and maintenance*, which covered both telephone and telegraph stations.

4. *Toll test room operation*, describing the operation of toll test boards and the service maintenance of all types of toll telephone and telegraph circuits and systems.

5. *Transmission testing*, relating to transmission tests generally made by traveling testing crews.

6. *Recovery and repair*, describing methods of handling and reconditioning used apparatus, equipment, and material which has been removed from the plant.

7. *Exchange test room*, covering the work associated with the local test desk, the duties of the repair service clerk, and associated routines.

8. *Building and grounds maintenance*.

9. *Motor vehicle maintenance*, covering the care of both motor vehicles and garages.

10. *Outside plant construction and maintenance*, covering both aerial and underground outside plant.

11. *Outside plant engineering*, dealing with the structural design of pole lines, cables, and underground conduit.

(*Supplies*, planned but finally omitted.)



An example of terminal pole construction in the 1890s

Bell System PRACTICES Plan was in full swing, with instructions being issued on practically every operation carried on in the Plant and Engineering Departments.

The PRACTICE activity was much reduced during World War II and in the early post-war period because of the demands on manpower occasioned by the war effort.

Present "Practice" Activity

THE year 1949 saw Bell System PRACTICES little changed from their original form of 1930. There were many indications that they had contributed largely to improved engineering, construction, and maintenance procedures and to reduced costs. A good many more, however, were urgently needed. This was brought about by two factors:

Shortage of manpower for this work during and immediately following World War II.

Large number of important developments in the period prior to and following World War II.

System operations had undergone many changes in the years since 1930. The changes, plus the need for other instructions, raised the question as to whether the current arrangements of Bell System PRACTICES were meeting the requirements of the Operating Companies in the best possible way. To find the answer to this question, a Joint Committee, consisting of representatives of the Bell Telephone Laboratories and the Operating and Engineering Department of the A. T. and T. Company, was formed early in 1950 to review the entire matter of the preparation and distribution of Bell System PRACTICES.

The Joint Committee established a full time "working group" to assemble the facts about the situation. The group consisted of two men from the A. T. & T. Co., one man from the Bell Telephone Laboratories, and eight men borrowed from the Operating Companies. Each of the field men was selected from a different Company: four from the Plant Departments and four from the Engineering Departments. One of the important requirements was that each man should have several years' experience in some phase of System operations which is covered by one or more of the various series of PRACTICES.

The "working group" circulated a questionnaire designed to bring out the present uses and the extent of distribution of Bell System PRACTICES in each of the Operating Companies. Members of the group also made

RECOMMENDATIONS OF THE
JOINT COMMITTEE

1. *Organization of the PRACTICE-writing work*, to bring the PRACTICES reasonably up to date and to keep pace with the developmental effort.

2. *Reduction in the number of series*, to increase effectiveness, avoid duplication, and reduce preparation effort.

3. *Changes in the style of presentation*, to make increased use of charts and other condensed and simplified methods of covering the necessary information.

4. *Inclusion in practice form initially* of much of the material now covered in general letters.

5. *Changes in organization, numbering plan, and indexing* of the PRACTICES.

mittee recommended certain steps as a means of making the PRACTICES more useful to the Companies. These are given in the adjacent box.

Organization of "Practice" Writing Groups

ACTIVE WORK to carry out the Joint Committee's recommendations began in the middle of 1951. The PRACTICE-writing activity at the Bell Telephone Laboratories was substantially increased. To expedite the work, 15 people from the Operating Companies and a considerable number of technical assistants were added to the development force.

A force of 65 men was borrowed from the Operating Companies to assist the Operation and Engineering Department of the A. T. & T. Co. to

visits to all Companies, to get first-hand information on the adequacy of these instructions, and suggestions for improvement.

Based on the facts assembled by the "working group," the Joint Com-



An "improved method" of pole raising, for which there probably was no "Practice"

bring the PRACTICES up to date. The men were selected as specially qualified from the standpoint of field experience.

The present PRACTICE writers have had experience in almost every operation of the Plant and Engineering Departments. The average Bell System service of the group is over 22 years. Practically every one of the Operating Companies is represented. History repeats itself—two of the men who were on loan to the A. T. & T. Co. as practice writers about 20 years ago are back on loan again, serving in a supervisory capacity in the group.

“Practice” Preparation: Hard Work, Perseverance, Patience

THE WRITER'S JOB starts with the need for a PRACTICE: a new development, perhaps, an improvement or change in an existing circuit, or an unusual operating condition arising in one of the Companies.

Upon receipt of his assignment, the writer proceeds to gather his basic material for the particular PRACTICE. He consults drawings, old issues of PRACTICES, general letters, posted comments from the Operating Companies in the form of engineering complaints, letters, and locally issued practices; Bell Telephone Laboratories notes; members of the A. T. & T. Headquarters staff, the Bell Telephone Laboratories, and in some cases one or more of the Operating Companies. He may also go out on a field trial of a new development, to secure first hand information.

Once the information is available,

preparation of the first draft begins. At this time the writer lays plans for any illustrations required. He may decide to use only pencil sketches in the early stages, or he may feel that it is advantageous to have the Drafting Department prepare the drawings in final form.

When the writer finishes the draft of his text, copies are sent out for comments to members of the A. T. & T. Headquarters staff, the Bell Telephone Laboratories, and, in some cases, a few of the Operating Companies.

Comments are generally received from most of the people to whom copies of the PRACTICE have been sent. If the comments are minor, the writer can proceed at once to incorporate them in his draft. If major comments are involved, he must hold up the revision pending the results of a conference among the persons concerned. In the revision process, the writer usually finds that a pair of scissors and a tube of rubber cement are important tools. Coincident with the incorporation of comments, any changes required in the illustrations are made.

In reviewing the comments, the writer sometimes finds that one comment may be diametrically opposite another in its apparent intent. He must reconcile these, keeping constantly in mind that when the PRACTICE is issued, it must represent the best views of the A. T. and T. Company, the Bell Telephone Laboratories, and the Operating Companies.

Accuracy also the writer must always have before him. He realizes that a transposition of digits in the code number of a piece part may mean the difference between a very



This is the group of writers borrowed from the Associated Companies—less four who were unable to be present

small motor and a large motor-generator set. A misplaced decimal point in a Transmission PRACTICE may result in the design of a circuit which is inoperative. The writer knows that with the wide distribution of this material, the impact of an error will be great.

After all comments have been incorporated and the copy retyped, the writer may feel that he is ready to submit the revised copy for approval. However, if some of the comments were major, he may decide to submit the copy for further check by the interested persons. In such cases, further revisions may be necessary.

Once approval is obtained, the remaining work of the writer is largely that of making sure that no errors creep in during the reproduction process.

As may be surmised, the writers have had to overcome many difficulties. But their efforts have resulted in an appreciable increase in the production of PRACTICES; a real dent has been made in the "urgent" back-

log. Furthermore, many new ideas and improvements, in line with the Joint Committee recommendations, have been introduced. Already many of the instructions prepared by the present groups of writers are in use in the Operating Companies, and the comments concerning them demonstrate that the authors are equipped with the "know-how" of PRACTICE writing. The writers themselves are of the unanimous belief that the experience they have obtained will be of great help to them upon return to their home Companies.

The value of PRACTICES to the Bell System, and indirectly to telephone users, has been demonstrated time and again: in normal day-to-day operations and during emergencies. Bell System PRACTICES have played an important part in holding costs down and in helping to meet the System's objective of constant improvement in service. They are a direct result of the efforts of the entire Bell System team: design, manufacture, and operation.