Bell Laboratories Record

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Our New Building

A Description of the New Section H

OUR new addition on the corner of Washington and Bethune Streets, in spite of a strike put on by plasterers and bricklayers, is rapidly approaching completion. Barring fire, flood, or other act of Providence, Warren B. Sanford, Plant Manager, and his assistant, James G. Motley, will have our new quarters ready for us by the end of December —which is about two months ahead of schedule. Rearrangement of space in the present sections and expansion into the new section will take something like six months.

The new section H is a steel structure resting on concrete piles. This structure supports and is enclosed on the exterior with brick walls, the roof being formed by reinforced cinder-concrete weather-proofed with red Spanish tile. The floor arches are constructed of hollow tile laid between and around the girders and beams forming flat arches. All structural steel is completely fire-proofed either by the above means or in some few cases with concrete.

A rapid trip through the new building will give some idea of its construction. To start at the entrance on Bethune Street—this will be something rather special, although its present appearance is unpromising enough. It will have a terrazzo floor and Botticino marble walls. On the right of the entrance hall are the stair well and shafts for three elevators. These elevators, to be designated K, L, and M, will be slightly larger than A and B; to be exact, five feet six inches by six feet eleven inches. They are to be of the Otis "unit multi-voltage control" type. The features are smooth riding and easy control. Those technically inclined will be interested in the fact that this system of control requires a separate direct current generator for each elevator motor. The generator armature leads are permanently connected to the motor and control of the car is obtained by reversing and varying the strength of the generator field.

As the new elevators are not yet installed, the visitor must get to the eleventh-floor auditorium (our next stop) by walking or going through the old building. Plans for the auditorium are still nebulous. It will not be com-

The old liquor warehouse partly demolished

pleted with the rest of the building. All that can be promised now is that it will seat about eight hundred and forty people.

The tenth floor is to be an acoustical laboratory; or rather, a number of such laboratories. There are no columns on this floor, which made it necessary to use especially large, heavy girders to support the auditorium. Probably everybody remembers watching those huge 14-ton pieces of steel swinging high up over Washington Street.

Below the tenth, all the other floors are much alike, so a description of the ninth will suffice. The floor is of cement over which, in due time, there will be linoleum. Sprinkler pipes are in evidence, but no electric light or telephone conduits are visible. They are hidden in the walls and floors. The telephone wires will be strung, when the desks are located, through an Orangeburg duct system in the cinder fill under the cement floor. All the walls and the flat ceilings are plastered. The doors are hollow metal, and the windows have metal frames and sashes. An especially pleasing feature is that the radiators, one of which is located in each bay along the outside walls, can be controlled individually.

There are two ways (exclusive of the elevator shafts and the old building) to get down from the ninth floor to the basement, which is the next point to be inspected. One is by the main stairway; the other is by the stairway in the fire tower in the southwest corner of the section. This fire tower is available for exit but not for entrance, as the door to each floor is locked to the outside. There is access to the open air at every floor, as is required by the new building code.

In some respects the basement will be the most comfortable part of the building in which to work, for it will be ventilated by air that has been washed, and heated when the season requires. This will make the passing of some of the larger steamships merely an incident, instead of a curse.

Heat, light and power will come from the basement of the present building. And right here we are

The steel framework as it appeared last April

going to start getting technical again.

Last winter a new heating plant was installed for Sections A and D, which will also heat Section H. Steam from the turbines which drive the pumps circulating hot water through the system is used in heating the water, with additional steam from the boilers when necessary. A new refrigerating system has been installed to cool the drinking water for both present and new sections.

Power for laboratory use in Section H will be supplied from a central power room located in the old engine room space. The vertical distribution of power and other laboratory services—steam, compressed air, and so forth—is located in a shaft in front of the elevators.

The local public service company will be the main source of electric power. This power will be delivered to us at 13200 volts with the ordinary commercial regulation. To provide for the transformation of this voltage to 110-220 volts and to regulate for our requirements, seven transformers and three high voltage regulators with the switching equipment have been installed in a fire-proof building built in the space under the old engine room skylight. One transformer with one regulator is spare. The transformers primary and secondary are connected in delta, two banks in parallel. Either bank of transformers may be disconnected from the high and low side by the use of truck switches and circuit breakers which have been provided. The roof of the building housing this equipment supports the switchboard which will distribute single phase and three phase current for light and power in the new section. As soon as Section H is completed, alternating current will be drawn from this source to light the present building also. Space in Section H will be allotted as follows:

In August the outside brick work was completed

Basement—Research Department.
First Floor—Medical and Personnel Departments.
Second Floor—Classrooms for the Educational Department.
Third Floor—Offices for Educational, Methods, and Chemical Research Departments.
Fourth Floor—Inspection Engineering Department.
Fifth Floor—Drafting room for Systems Development Department.
Sixth Floor—Physical Laboratory, apparatus draughtsmen, files.
Seventh Floor—Systems Development Department.
Eighth Floor—Research Department.
Ninth Floor—Research Department.
Tenth Floor—Research Department.
Eleventh Floor—Auditorium.

History of the Telephone Pioneers of America

The Twelfth Annual Meeting recently held in Washington, D. C., recalls the growth of this organization throughout the fifteen years of its existence

THE association known as the "Telephone Pioneers of America" was formed in 1910-11 by men and women who were active in the early days of the telephone. The purpose of this association was the recording and perpetuating of the facts, traditions and memories attached to the early history of the telephone and the telephone system, and for the promotion, renewal and continuance of the friendships and fellowships made during the progress of the telephone history.

The first annual meeting was held in Boston, Mass., November 1 and 2, 1911. There at the Hotel Somerset 246 pioneers met and organized the association. A constitution and by-laws were adopted and Theodore N. Vail was elected president, an office to which he was reelected at the five following annual meetings.

Annual meetings were held in New York 1912, Chicago 1913, Richmond 1914, San Francisco 1915, Atlanta 1916, Montreal 1920. No meetings were held in 1917, 1918 or 1919 because of the war. At the St. Louis meeting in 1921 it was found advisable in order to take care of the rapidly increasing membership to make arrangements dividing the members into groups or local chapters. The executive headquarters in New York were continued and local chapters were organized so that local interests could be better served. Each of these chapters is entitled to one delegate to the General Assembly for each fifty members. It is in the General Assembly that the executive action of the Pioneers takes place. Meetings were held in Cleveland in 1922, Atlantic City in 1923, Chicago in 1924 and in Washington in 1925.

At these conventions the Pioneers are the recipients of much attention from the local telephone company, who act as hosts and do everything in their power to make the convention a success. Entertainments and sightseeing trips are provided and good fellowship is registered everywhere. Old acquaintances are renewed and new friends made, and from the time the Pioneer leaves his home until he returns he is having the time of his life. The large number of Pioneers traveling to the convention makes it possible for special trains and special rates of fare to be obtained.

At present the organization is composed of over 10,000 members affiliated with 35 local chapters. Our local chapters are Empire No. 5 of New York, H. G. McCully No. 12 of Newark and the Edward J. Hall No. 25, which was organized in 1922 to provide a pioneer home for those who were in the New York Departments of the A. T. & T. Company and the Western Electric Company.

In the Bell Telephone Laboratories at the present time there are 77 Pioneers and 66 employees whose service record of 21 years or more makes them eligible to be pioneers

who have not yet united with the organization.

Any employee of the Bell System who has had 21 years of service or more is entitled to apply for membership in the Pioneers. B. F. Merritt of the Historical Museum, Room 1201, is a member of the Executive Committee of the Edward J. Hall Chapter No. 25 and he would be glad to give any information about the pioneers to those who are eligible to unite with them.

1925 Convention

Th 1925 annual convention was held in Washington, D. C., on October 16 and 17. About 2,500 Pioneers and guests were present.

Harvey Fletcher was one of the speakers at the convention. Dr. Fletcher described the Bell System's new developments for aiding the deaf. With the assistance of Joseph B. Kelly, several demonstrations were given during the course of the lecture.

For the year 1926 Harry B. Thayer, Chairman of the American Telephone & Telegraph Company was elected President. James L. Kilpatrick, Vice-President of the Western Electric Company and one of our Directors, was elected a member of the Executive Committee.

Five Pioneers from Bell Telephone Laboratories, members of the Edward J. Hall Chapter, attended with their families. These were Samuel F. Butler, Pearson M. Neave, Robert H. Phillips, Warren B. Sanford, and Conrad Schaul. Mr. Butler was the official delegate from our Laboratories.

The Power of Insight Acquired by Study

The great inventions of the sixteenth, seventeenth, and eighteenth centuries were made without special scientific knowledge, and frequently by persons who possessed skill rather than learning. They greatly influenced science and promoted knowledge, but they were brought about more by accident or by the practical requirements of the age than by the power of unusual insight acquired by study. But in the course of the last hundred years the scientific investigation of chemical and electrical phenomena has taught us to disentangle the intricate web of the elementary forces of nature, to lay bare the many interwoven threads, to break up the equilibrium of actual existence, and to bring within our power and under our control forces of undreamed-of magnitude. The great inventions of former ages were made in countries where practical life, industry and commerce were most advanced; but the great inventions of the last fifty years in chemistry and electricity and the science of heat have been made in the scientific laboratory; the former were stimulated by practical wants; the latter themselves produced new practical requirements, and created new spheres of labor, industry, and commerce.

From "A History of European Thought in the Nineteenth Century" by J. T. Merz.

Modern Guilds of Craftsmen

Professional and trade associations are the modern counterpart of the guilds which flourished during the middle ages

WHEN or where the craft guild originated is today unknown. We do know, however, that by a thorough system of apprentice training, by an exchange of knowledge and experience, and by encouragement of individual genius, the guilds of the middle ages developed craftsmen who built things sincerely good and truly beautiful.

The modern counterpart of the medieval guild is the professional or trade association. Today each branch of science and of commerce has its association, some of which have attained the dignity of national institutions. They have grown in importance directly in proportion to the unselfish cooperation practiced by their members.

Bell Telephone Laboratories, believing in the good work of the modern craft guilds, maintains a company membership in those associations whose interests touch its own, such as the New York Electrical Society, Merchants Association of New York, American Management Association, and so on. Its members individually are also actively associated with many of the major technical societies.

The scientists and engineers of our laboratories are represented in the membership of the scientific societies in such fields as physics, chemistry, mathematics, electro-chemistry, optics, and astrophysics. There are also memberships in the American Medical Association, and the American Otological and Roentgenological Societies. Through individual memberships the Laboratories are in touch with the major engineering societies, electrical, mechanical, radio, civil, automotive, aeronautical, naval engineering and architecture, railway, mining, refrigerating, metallurgical, electric light, steel treating, wood preserving, paper and pulp making, concrete, heating and ventilating, iron and steel, to mention a few which will indicate the range of interest. We are also represented in the societies or institutions which deal with testing materials, weights and measures, technical photography and microscopy. There are memberships in purchasing agents' associations, boards of trade and commerce, the American Actuarial Society, the Institute of Graphic Arts, and similar organizations which are not concerned with the physical sciences.

Other memberships are in societies and associations broadly concerned with scientific advances such as the National Research Council, the United Engineering Society, the Franklin Institute, the Engineering Foundation, the American Philosophical Society, and the Society for the Promotion of Engineering Education. The individual memberships of our Laboratories also extend beyond the boundaries of our country and include Canadian, German, and French professional societies, and a long list of English societies including the famous Institution of Electrical Engineers.

Sound Recording and Reproducing

An epochal advance in theory and practice

TO make public announcement of the new Victor Orthophonic, a talking machine embodying certain developments of our Laboratories, a dinner was given on October 6 at the Waldorf by the Victor Talking Machine Company. The guests were representatives from our organization, the Western Electric, American Telephone and Telegraph Company, the musical press and the newspapers. Comparing the new with the old, an orchestral number recorded electrically was reproduced on the new machine. Then a similar number recorded by the old method was reproduced on one of the now obsolete types of talking machine. Recognition of the importance of the innovation was instantaneous; since a much longer range of tones was reproduced, and with a volume of sound much greater than before, the rendition sounded far more natural than that of any previous talking machine.

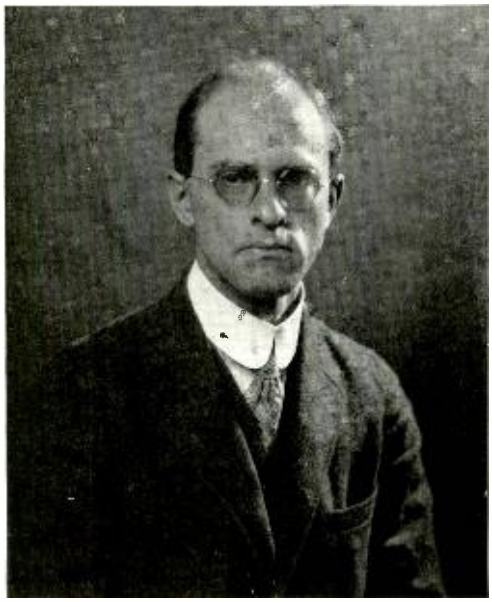
Among those who spoke after the demonstration were E. R Fenimore Johnson and E. E. Shumaker of Victor, George E. Cullinan of Western Electric, Edward B. Craft and S. S. A. Watkins of the Laboratories. We quote from Mr. Craft's remarks as follows:

"It has probably occurred to many of you to wonder how it has come about that an organization which is devoted to the development and operation of electrical communication service has interested itself in the phonograph art. In many respects the telephone and the phonograph have elements in common. The telephone deals with speech and hearing; the phonograph deals with speech, or music, and hearing. One involves the direct and immediate transmission of intelligence by electrical means from speaker to listener; the other involves the recording of intelligence in permanent form and reproducing it for many listeners, regardless of time or place. Both require that there shall be some mechanism which will catch the spoken word or musical note and another mechanism which will reproduce them for the listener. They are thus related arts and may well supplement each other.

One model of the new Victor Orthophonic. Note the great size of the horn mouth

"The telephone since its original conception has been the product

of the research laboratory. Continuously through the fifty years which have elapsed since Bell's invention, research



Joseph P. Maxfield, head of the department which developed the phonograph recording and reproducing systems

has served as the foundation on which has been built the ever-growing structure of our Nation's telephone System. Today there are in our Bell system over two thousand scientists and engineers engaged in creative work, in research and developments basic to telephony and the other branches of electrical communication.

"In the conduct of this work it has always been the aim to study broadly the problems of communication, paying attention not only to the electrical problems of telephony, but particularly to the physical problems of what speech is and the mechanism by which we hear speech or music. In the last twelve to fifteen years, the results of our investigations have pyramided and now we have a fund of scientific knowledge and a technique which is largely responsible for our present day telephony over wires and much that is fundamental to the present radio broadcasting art.

"The methods of scientific research have replaced the purely experimental methods of earlier days. Where it took centuries, for instance, to evolve the design of a violin, it is now possible in a comparatively short space of time by intelligent application of the results of scientific research to design to produce desired results. In these modern times one amazing development follows another so rapidly that we are beginning to view them as the

Henry C. Harrison, in direct charge of the development work and the inventor responsible for many of the basic ideas embodied in it

commonplace occurrences of our normal life. We generally accept them without a great deal of thought as to how they were brought about or as to why these results had not been obtained long before. But when we stop to think, we know that the results of scientific research accumu-

lated in many fields during the last twenty years or so are the basis and source of these recent marvelous advances.

"To refer more specifically to the subject in which we are this evening interested, we all know that speech or music travels as vibrations through the air or as electrical vibrations along wires, or through space as in radio communication. Some of our telephone problems, therefore, have been electrical and some mechanical, such as those dealing with the vibrations of moving parts of the telephone transmitter and receiver. Our developing knowledge of mechanical vibrations helped us to advance in our electrical researches; and vice versa, methods which we developed for studying and controlling electrical vibrations have most remarkably advanced our knowledge of all sorts of mechanically vibrating systems. We have learned in this way new truths about the diaphragms of telephone transmitters, or those of loud speakers and phonographs. By the application of scientific methods we have determined complex laws governing vibrations of columns of air such as you find in the horn of a loud speaker or phonograph, and have learned how to set up in horns vibrations which will carry to the ears of a listener all the notes and tones necessary for the faithful reproduction of any sound of music or speech.

"From fundamental studies in Bell Laboratories there has developed what I might call a new art and a new technique. And this technique through the Western Electric Company, which is one of the owners and supporters of the Bell Laboratories, has been placed at the disposal of the Victor Company. The Victor Company's own researches and investiga-

Theodore Osmer and Albert L. Thuras measure a mechanical impedance by a method developed by Mr. Harrison and Mr. Thuras

tions had carried them to the point where they were in a position immediately to appreciate the possibilities of this new technique, and I wish to compliment the executives and their scientific staff upon the alertness of this appreciation, and the rapidity and expertness with which they have adapted this technique to the needs of their own art. We of the Laboratories take a considerable pride in the part that we have played in this achievement, and we are filled with admiration at the manner in which the great Victor organization have applied the knowledge and principles of our communication to their own highly specialized and artistic field."

Norman H. Holland, one of the pioneers in this field

A Description of the New Machine

A comprehensive technical description of the researches and theoretical investigations which underlay these advances and led to the development of the Victor Orthophone, is to appear in the near future in a paper by Joseph P. Maxfield and Henry C. Harrison. For the guests at the dinner a popular account of this work was presented in a speech by Stanley S. A. Watkins. The RECORD prints from Mr. Watkins' remarks the following description of the new talking machine.

The talking machine which the Victor Company is now manufacturing represents the result of the application of new principles to the construction of what may be termed the acoustic system. The acoustic system of a talking machine includes a needle which is caused to vibrate by means of the groove on the phonogragh record, a sound box containing a diaphragm to which the vibrations are communicated from the needle through a lever system, and a horn which takes the vibrations from the diaphragm and conveys them to the open air in the form of sound waves.

Each of these elements is made up of parts which have various amounts of mass and various degrees of stiffness and resistance to motion.

The business of the acoustic system is to take the vibrations of the needle and lead them out into the air, at the same time converting mechanical motions of the needle to the air vibrations which constitute sound as we hear it, and in the process to retain the form of the vibrations so that the quality of the resulting sound is not distorted and unnatural.

Paul B. Flanders[1] completed the mathematical theory

In the past development of the talking machine, as is true in the earlier stages of most technical developments, the process of improvement of the acoustic system has been one of trying out a multitude of changes and combinations of the various elements. While this method leads to improvement, it is necessarily limited by the impossibility of trying enough com-

[1] *Preceding Mr. Flanders', valuable pioneering had been done by Donald A. Quarles.*

binations to always hit upon the best and ideal experiment.

The same method of "cut and try" was applied in its early years to another branch of technical art—the development of telephone transmission, an electrical problem which has a great deal in common with that of the phonograph.

Harry W. Ruh laying out the details of a folded horn

A telephone transmission line has to take electrical vibrations fed into it from the telephone and corresponding to the speech with which the telephone transmitter is actuated, and convey these electrical vibrations through a system of lines and instruments, finally converting them into sound vibrations in the air at the place where the listener is situated.

Now the electrical vibrations encounter in their journey conditions which are similar in their effects to those met with by the mechanical vibrations in their path through the acoustic system of the talking machine, the properties of the elements of the acoustic system—mass, stiffness and resistance—having their counterparts in the circuits through which the electrical vibrations have to pass and being subject to similar physical laws. It follows that what is learned of the behavior of one system may be applied to the other.

For a good many years now, the method of "cut and try" has been displaced in the field of telephone transmission through the development of a theoretical technique which has been arrived at through the work of various mathematicians and physicists, in consequence of which telephone lines and circuits are now designed for any desired conditions without the necessity of endless experiments, and moreover, it is known that the results obtained represent the best physically obtainable, or how near to the best results they approach when economic conditions prevent ideal conditions from being realized.

Recognizing then that the acoustic system of the talking machine is a mechanical transmission line with an analogy in a telephone line, it is a straightforward matter to apply the results of telephone line theory and build a talking machine which is capable of conveying the vibrations from the record to the air in the best manner.

But first let us say a few words about the conditions of the problem. Broadly speaking, the characteristics of the talking machine in the past which have made it fall short of ideal requirements may be put in two groups.

In the first place, it was not possible to deal with very low and very high tones. Speech and musical sounds are made up of air waves of various numbers of vibrations per second, middle C on the piano being about 250 vibrations per second, low pitched instruments going down to below 100 and the high overtones of speech and music extending up to about 5,000.

Arthur Bates measuring elasticity of a needle arm

1925 Service Honors

Twenty-five members of our organization celebrate this year service records of twenty-five, thirty, thirty-five or forty years and will receive new service badges

IN 1885 the telephone industry was in its infancy. The first granular carbon transmitter had been patented in England. The Western Electric Manufacturing Company started in that year manufacturing telephones for the American Bell Telephone Company under the terms of the 1882 contract. Its first work was the repairing of a shipment of five hundred telephones.

Edward Boland, who heads the roll of service honors for this year, came into the company in May, 1885, and has witnessed and participated in the developments in our industry since that time. Mr. Thayer, in an article on the early days of the company in New York, described Mr. Boland as the man who made everything. He has been living up to this description all of these years and may be found in the Engineering Shop turning out expert work.

William B. Wallace, Volney K. Coffill, Miss Addie E. Knoeller and John Kunze share the thirty-five year honors. They came into the company at different times during the year 1890, the year that the Western Electric Manufacturing Company held its last meeting of the Board of Directors

Standing: F. DeC. Thompson, C. F. Sauerbrey, John Kunze, Nelson Meats. Seated: W. B. Wallace, V. K. Coffill, Miss Addie Knoeller, Edward Boland, F. L. Cox

and thus passed from corporate existence, and the Western Electric Company, Incorporated, assumed its place in the Bell System. This was the year that witnessed the manufacture of the first dry-core cable and its first installation. Thus, the services of this group has been contemporaneous with the development of the huge telephone system as it exists today.

Mr. Wallace entered the Financial Department in New York in April. Mr. Coffill in June, Miss Knoeller in August and Mr. Kunze in October entered the Thames Street Shops. All of Mr. Wallace's service has been in the financial and commercial phases of the industry, chiefly as credit manager of the Atlanta Supply House from 1911 to 1924 and as assistant treasurer of the General Supply Department, until he came to Bell Telephone Laboratories, upon its organization, as our treasurer. Messrs. Coffill and Kunze and Miss Knoeller have been concerned with the manufacturing and shop activities. Mr. Kunze is now in the Engineering Shop, Mr. Coffill in the Inspection Department, and Miss Knoeller in the coil winding group of the Shop.

Among other events, the year 1895 brought to the Western Electric Company Frank L. Cox, Herbert E. Shreeve, Charles F. Sauerbrey, Nelson Meats and Ford DeC. Thompson, all of whom are now members of our organization. It was during this year that the ground was purchased for the erection of our building, so it might be fitting to include a parcel of real estate in the list of service honors.

Of this group, Mr. Cox and Mr. Sauerbrey are the veterans of West Street. Both joined the company before the building was constructed but they came here with the shops and have remained. Mr. Cox, who is engaged in wiring and maintenance work, is one of the representatives of

Back Row: A. W. Horne, E. J. Growney, Ralph Raymond; Second Row: William Carroll, C. R. Young, O. F. Forsberg, G. B. Hamm, S. F. Butler, H. C. Caverly; Front Row: W. Scharringhausen, H. L. Waters, John Goetz, W. J. Cuddy, C. E. Wenzel

the Systems Development Department in the thirty year group. Mr. Sauerbrey is in the Engineering Shop. Aside from his skill in his work, he is famous for his ever ready smile. Mr. Shreeve, who does not appear in the group unfortunately, is the assistant to our president. Mr. Meats is one of our many veterans who went to Hawthorne for a sojourn when the shops were moved. He returned during the war and has since held forth at West Street, where he may be found in the storeroom of the Systems Development Department. Ford DeC. Thompson is the head of the Operations Branch* of the Inspection Department, and as such he is domiciled at 395 Hudson Street.

Herbert E. Shreeve

The larger group is composed of twenty-five year veterans, people who came into the Company in 1900. That was the year in which occurred the final merger of the American Bell Telephone Company with the A. T. & T. Co.; the undertaking by the Western Electric Company of the purchase and distribution of supplies needed by operating companies; the first loaded line; and the first phantom circuit. These fourteen veterans (Miss Mary Lindner does not appear in the photograph) have witnessed the final phases of the development of the modern telephone system and our part in it.

**On Oct. 12, 1925 the operations branch of the Inspection Department was transferred to the Western Electric Company.*

All of the departments of the Laboratories are represented in this group. The Apparatus Development Department is represented by Oscar F. Forsberg, in charge of machine switching group No. 2; Charles R. Young, in charge of the group engaged in the development of loading coil cases and condensers; and William Scharringhausen, of the manual apparatus development group.

Samuel F. Butler, head of the current development and trials division; Harry C. Caverly, in charge of mechanical switching senders; and Ralph Raymond, special development studies, represent the Systems Development Department.

George B. Hamm and John Goetz are from the Research Department. Mr. Hamm is in charge of one of the laboratory service groups at West Street, and Mr. Goetz is in the experimental tube shop at Hudson Street.

All divisions of the Commercial Relations Department are represented in this group. The Plant Accounting Division enters William J. Cuddy. Building Service sends William Carroll, well-known as "Bill" to all who ride in Elevator B, and Edward J. Growney, just as well-known as "Ed" by passengers who journey up and down in Elevator C. The Engineering Shop claims Charles E. Wenzel who keeps the metal finishing shop up to the mark. Both divisions of the Inspection Department are represented. Inspection

Engineering presents Arthur W. Horne, head of the Eastern Zone group, and Inspection Operations, at Hudson Street, Henry L. Waters.

In the last issue was published a photograph of the new Service Badge which will replace on the first five year anniversary date of each veteran the Western Electric badges that they now have. In this issue are the photographs—with the exception noted—of the members of our company whose anniversary dates have occurred, or will occur during the year 1925. In addition, there are many twenty, fifteen and ten year veterans—too many to publish photographs—who will receive badges as soon as they are ready. The names of those who receive the twenty-year four-star button follow:

H. G. Bandfield	F. Berger
P. J. Campion	A. Chaiclin
J. J. Clark	J. Crouch
T. Donovan	C. A. Grant
J. J. Hinde	P. Schwerin
O. H. Kopp	A. Kronenfeld
V. W. Langborgh	H. A. Larlee
L. S. S. Lillis	J. J. Lyng
G. E. Mather	D. T. May
F. Meehan	C. D. Penn
Kathryn F. Poellman	A. Raynsford
J. N. Reynolds	W. B. Sanford
F. J. Scudder	G. W. Weaver
Ella A. Webster	E. B. Wheeler
C. H. Wheeler	S. B. Williams

Laboratory Notes

Abraham Chaiclin, Toll Development Department, installed the picture transmission apparatus used in some recent tests carried out by the United States Army at Fort Leavenworth. Photographs taken and developed in an airplane were dropped to the ground and telephoned to distant points.

Herbert E. Ives spoke before the Brooklyn Institute of Arts and Sciences on picture transmission by telephone. At the meeting of the Optical Society of America held at Ithaca, October 29 to 31, Mr. Ives delivered his address as retiring president of the Society.

G. A. Anderegg recently sailed for Europe, to be gone about a year. He will supervise the manufacture of the Fanning-Suva and Azores-Emden permalloy-loaded cables.

Harold W. Nichols and John C. Schelleng are co-authors of "How Earth Magnetism Affects Radio Waves," which appeared in the October issue of Popular Radio.

James L. McQuarrie, Chief Engineer of the International Standard Electric Corporation, formerly the International Western Electric Company, recently returned from Europe, where he has been arranging some of the details of the International's new relationship with the International Telephone and Telegraph Corporation.

John R. Townsend is a member of the Committees on Metallography and Magnetic Properties, American Society for Testing Materials.

William J. Shackleton is a member of the Committee on Magnetic Properties, American Society for Testing Materials.

Carl R. Englund is a member of the Committee on Methods of Measurements and Standards, International Union of Scientific Radiotelegraphy, American Section.

Six Thousand Letters a Day

A description of our unique mail service

In Bell Telephone Laboratories, with its numerous transactions between departments and with other units of the Bell System, the necessary correspondence and records involve the handling of a large volume of mail—larger, in fact, than that handled in the post offices of many towns of larger population than our day population.

View of interior of mail-car showing Margaret McNally, Supervisor

Our Mailing Department, in seeking a method of delivering mail as promptly as possible, has perfected a system which it believes is unique in industrial organizations. The backbone of this system is one of the freight elevators, originally installed to transfer material in the process of manufacture, which lost its usefulness when factory operations were moved to Hawthorne.

About two years ago Daniel R. McCormack, then responsible for our mail service, conceived the idea of using this elevator as a mail car. With the cooperation of Kenneth B. Doherty, who was head of the Office Service Department, it was assigned to the Mailing Department for the suggested use. Appropriate fittings were installed and a method which is a modification of the U. S. Railway mail service was inaugurated.

On each floor is stationed a boy at a table just outside the elevator door. All outgoing mail from each floor is collected at frequent intervals and delivered at this table. The elevator, which is constantly in motion, picks up the mail and leaves mail, if any, at each stop. All inter-department mail is assorted on the car, thus doing away with the former method of taking it to a central bureau for stamping and assorting. Mail from sources outside the building is received and assorted by the central receiving office.

The photograph shows the mail car's fixtures, which are complete to the electrical fan and the clock, which keeps correct time despite the constant stopping and starting of the car. Those who work in the car appreciate the fan while handling on summer days their per capita average of three thousand pieces of mail.

HEALTH

A Story of the recent Bell System Conference

By GRATIA L. PROUTY

HEALTH—how to keep it when you have it and build it up when you haven't much—was the subject of the first National Conference of Bell System Women, which was held under the auspices of the American Telephone and Telegraph Company at 195 Broadway, September 14 to 26, 1925. Forty-three delegates representing twenty different companies were present and took part in the discussions. Hazel B. Mayhew and Gratia L. Prouty were the delegates from our Laboratories.

The conference was opened by Vice-President E. K. Hall of the American Telephone and Telegraph Company and Dr. C. H. Watson, Medical Director of the American Telephone and Telegraph Company. Mr. Hall spoke on the personnel program of the Bell System and the relation of the health course to the policy of developing the best in each individual. Health, not as an end in itself, however desirable, but health as an aid to realizing more opportunities, to getting more enjoyment out of life, was the object of the work.

Our Delegates to the Convention: Miss Mayhew and Miss Prouty

Again and again during the following days this idea of a fuller and more abundant life as the result of better health was brought out and stressed as the different phases of the problem were taken up and the few simple essentials that lie behind bodily well-being were discussed. Throughout the whole course the practical application of it was always present. How can we approach the conditions of normal living in spite of the surroundings which our modern urban civilization imposes upon us? Cultivating the garden, for instance, is splendid exercise for those so fortunate as to possess one. But what of the girl whose back yard is a stone-paved court?

Miss McKinstry, Director of Physical Education at the Central Branch of the Young Women's Christian Association, gave one solution in her talk on corrective gymnastics. This was followed by an exhibition of the actual work that sent the whole conference group flocking to the measuring room to see how they stood

themselves. Another solution was presented by Miss Taylor of Dartmouth College, whose talk on nutrition and whose attractive posters on "Protective Foods" caused a run on milk that noon.

Still a third answer was given by Dr. Emerson of Columbia, who sketched the development of preventive medicine leading up to the movement for periodic physical examinations and showed the possibilities for longer, healthier life when regular examinations detected in the beginning the troubles that otherwise would go unperceived until the mischief was done and the individual's chances seriously impaired.

Other lectures on various angles of the main problem were given by Dr. Piersol of the Bell of Pennsylvania, Mr. K. W. Waterson, Assistant Chief Engineer of the American Telephone and Telegraph Company, Dr. Redden of the American Red Cross, Dr. Strayer of Columbia, Dr. Adele E. Streeseman, Assistant Medical Officer of the American Telephone and Telegraph Company, and Dr. Galston, Director of the New York Tuberculosis Bureau. The Round Table discussion on teaching methods was led by Miss Laura M. Smith, assistant to Vice-President Hall of the American Telephone and Telegraph Company.

Demonstrations in First Aid were given by Dr. Watson and Dr. Redden, the former dealing with the possibilities of roller bandages with which he proceeded to swathe Mr. D. H. Carter, and Dr. Redden making a triangular bandage do tricks, not all of which were down in the manual.

The care of the sick in the home was taught in an unforgettable way by Miss Ruth Blair of the Midwood Sanatorium, Brooklyn, with the aid of "Mrs. Chase," a life-sized and exceedingly docile patient who lay in any desired position. She never slid down off her pillows or objected to the hottest of mustard plasters as real patients have been known to do on occasion, and her patient submission to amateur baths was nothing short of marvelous!

One morning President Gifford spoke to the group for a few minutes, expressing his interest in the work and his faith that it would succeed and increase.

The conference was closed, as it was opened, by Dr. Watson and Vice-President Hall, following a brief talk by Assistant Vice-President H. J. Brandt of the American Telephone and Telegraph Company. Mr. Hall quoted a few lines that summed up the whole conference very neatly:

"Wisdom is knowing what to do;
Skill is knowing how to do it;
Doing it is Service."

A Binder for the Record

For those who wish to preserve a permanent file of the RECORD, arrangements have been made to supply a binder in which copies may be accumulated until enough are on hand to be bound in permanent form. These binders are of the same style as those used for the technical reprints. An order has already been placed with the maker, and when a supply has been received, the binders may be secured through the Personal Purchase Department.

Get All That's Coming to You

The Magazine of Wall Street says of the stock of the American Telephone and Telegraph Company: "Premier public utility issue. Business still growing. Sound investment."

WE ALL know what we think of the man who is always "on the make," who is out to get all that's coming to him. He is not a good co-operator and hinders team play. Sometimes a man of this sort gets away with it, but generally the one who progresses fastest is the man who can and will play the game with the team. The necessity of team work and its advantages to the individual are so well recognized in our Bell System and in the highly inter-related and coordinated work of our Laboratories, that they need no comment. They are part of the spirit of our Industry; they are the atmosphere into which each new employee comes.

As a rule one gets out of industry just what he puts in. Lack of energy, ability, loyalty, and cooperation will limit what one receives; but if one contributes these personal qualities to his work he receives the loyalty and cooperation of the others in his group, and his energy and ability are rewarded by increased responsibility and remuneration. To accept co-operation in return for cooperation, to welcome hard work and more pay—that is legitimately getting what is coming to one.

It would be absurd to leave part of one's pay on the cashier's window ledge. It would be absurd if one were sick not to accept the sickness benefits provided under our Employees' Benefit Fund Plan. None of us would make such mistakes as these.

A surprisingly large number of us, however, make a similar mistake. We take our full salaries but we miss an opportunity for something more. This additional amount is not part of our pay. It is one of our privileges as members of the Bell System. Our failure to accept it is not a matter of leaving it on the cashier's counter, because curiously enough it only exists in case we accept it. Our act of acceptance makes it real.

As employees of more than six months service in Bell Telephone Laboratories we are privileged to subscribe for American Telephone and Telegraph Company stock at a price less than its market price. We may buy one share for each $300.00 of our annual rate of pay, paying for it at the rate of $3.00 each month (or $.75 a week), and having credited towards the purchase price interest on our payments at seven per cent, compounded quarterly. When we figure out the financial advantages of buying this investment security on this plan and receiving seven per cent on our savings while purchasing, we can determine for ourselves whether or not we are getting all that's coming to us. The Plan further provides that any subscription may be cancelled at the option of the subscriber at any time and the amount paid returned to him with six percent compound interest—more than the usual rate for savings.

Keeping Time at West Street

We all see the clocks, but very few of us know why they are always on time

NOW it can be told, as Sir Philip Gibbs would put it. You have often seen the advice: don't watch the clock. The reason has at last been discovered: Roy N. Carr of the Model Shop watches it for you! It is not his method of avoiding work, however; on the contrary, it is part of his regular job.

All of which leads us to a consideration of our clocks and their upkeep and repair. There are several kinds of clocks in our building. There is the regular master clock and a second master clock for emergency use. There are the forty-two time-clocks located all over the building. There are ninety-two wall clocks, five mantel clocks, a grandfather's clock, various time stamps, a few desk clocks, and several clock movements in recording apparatus, all to be kept running regularly. Thus the clocks divide roughly into two classes; those electrically controlled from the master clock, and those which are "on their own."

The master clock is located in the telephone exchange on the tenth floor. It is checked for accuracy daily by means of the radio time-signals from Arlington, Virginia. So accurate is it that now and again a month will pass during which the maximum error will only reach one second. The care used in recording the accuracy of regulation is great enough to show every variation.

Regulation of so delicate and accurate a mechanism entails its own problems. The clock is spring driven, with a pendulum escapement. A weight at the end of the pendulum can be screwed up or down to regulate the time of swing; but in order to do this the clock has to be stopped. Experience has shown that stopping the clock throws it out of its normal gait for *three days;* therefore it is now customary to add or remove small weights which can be handled with tweezers while the pendulum is in motion, thus reducing the time required for acceleration or deceleration to one day. Of course, smooth and regular winding helps to keep a clock in the straight and narrow path; therefore in the case of the master clock the winding is done electrically.

The method of controlling the time clocks and stamps from the master clock is simple and reliable. The master clock has two cams, one which makes contact at the fifty-eighth second and the other which breaks contact at the sixtieth second of each minute. (Two cams are used in order to reduce the friction caused by the cam gradient and to make and break contact rapidly.) The making and breaking of this contact controls the master relay in the ninth-floor power-room, through a 24 volt battery circuit.

From the master relay impulses go out to the five auxiliary relays. One of these auxiliary relays controls all the time stamps in the building. The others control the forty-two time clocks in Sections A, B and G, C, and

D respectively. Soon a sixth auxiliary relay will be added to control the time clocks in Section H, the new building.

The auxiliary relays operate, in their turn, the relays in the various clocks. The motion of the armature of each clock relay is transmitted to an escapement on the same principle as the pendulum type (without the pendulum, of course) which advances the minute hand once a minute. If you note the motion of the hand you will see it jump forward half a minute, wait two seconds, and then jump the other half. The last jump occurs exactly on the minute and coincides with the breaking of the circuit of the master relay by the break cam of the master clock.

Roy N. Carr in his workshop

Of the clocks which go their way without heed to master clocks, relays, and the like, there is no need to speak in detail. They are just clocks, and that ought to be adequate as a description. The only time they need intrude on the story is when they require attention by Roy N. Carr, the man who watches the clock for you.

This brings us back to a consideration of the man who is paid (not fired) for watching the clocks. At 6:45 in the morning Mr. Carr is at his work. He begins by inspecting the hourly-rate time-clocks, making sure that each one is in working order. Then he goes to the other time-clocks and checks their operation. With the time-clocks off his mind he can attend to the rest of the clocks in the building, and that is a good task in itself. By the time the rounds are made it is 9:45, and three hours have passed. If he has noted anything wrong with the electrical part of any of the clocks he reports it to S. H. Willard, who thereupon issues the requisite order to have it repaired.

Mr. Carr is one of those people who can appreciate the meaning of daylight saving. When the clock went back to normal after its summer spree Mr. Carr went to work at 1:45 A.M. and at 6:45 A.M. he was just finishing the job of resetting all the clocks in the building. Twice a year he has to face that five-hour session.

Another thing that annoys Mr. Carr is earthquakes. Yes, earthquakes. You may not have been troubled by the tremor which occurred some months ago, but Mr. Carr was, for three clocks in our building stopped at exactly the same moment and had to be started, set, and regulated the next day.

In spite of earthquakes and other troubles, however, there is one advantage (or is it a disadvantage?) to Mr. Carr's job; he has plenty of time on his hands.

Bell Laboratories Club

Sunday, 1:	*Hike, Bear Mountain*
Monday, 2:	*Auction Bridge Party in Room 411, 6 p. m.* *Glee Club Rehearsal in Rest Room, 5.10 p.m.* *Dance Orchestra Rehearsal, Studio 1-G, 5.10 p. m.*
Tuesday, 3:	*Hike, White Plains to Kensico Reservoir*
Wednesday, 4:	*Women's Swimming Class, Houston House, 5.40 p. m.* *Rehearsal of Symphony Orchestra, Rest Room, 5.30 p. m.*
Thursday, 5:	*Physical Training Class for Women, Houston House, 5.30 p. m.*
Friday, 6:	*Bowling, Recreation Alleys, 5.45 p. m.* *Basketball, Men, 5.30 p.m.* *Chess, Restaurant Blue Room, 5.45 p.m.* *Rifle Club* *Basketball, Women, Washington Irving High School, 5.30 p.m.*
Saturday, 7:	*Hike, Heathcote to Yonkers* *Chess, Commercial Chess League Tournament Match* *Horseback Riding, Van Cortlandt Park, 2 p. m.*
Monday, 9:	*Entertainment and Dance at Hotel Pennsylvania, 8.30 p. m.*
Tuesday, 10:	*Basketball, Men, 5.30 p. m.* *Sewing, Rest Room, 5.30 p.m.*
Wednesday, 11:	*Women's Swimming Class, Houston House, 5.40 p. m.* *Rehearsal of Symphony Orchestra, Rest Room, 5.30 p. m.*
Thursday, 12:	*Physical Training Class for Women, Houston House, 5.30 p. m.*
Friday, 13:	*Bowling, Recreation Alleys, 5.45 p. m.* *Basketball, Men, 5.30 p. m.* *Chess, Restaurant Blue Room, 5.45 p. m.* *Rifle Club* *Basketball, Women, Washington Irving High School, 5.30 p.m.*
Saturday, 14:	*Horseback Riding, Van Cortlandt Park, 2 p. m.*
Sunday, 15:	*Hike to Sleepy Hollow*

Calendar for November, 1925

Monday, 16:	*Auction Bridge Party in Room 411, 6 p. m.* *Glee Club Rehearsal in Rest Room, 5.10 p. m.* *Dance Orchestra Rehearsal, Studio 1-G, 5.10 p.m.*
Tuesday, 17:	*Basketball, Men, 5.30 p. m.* *Sewing, Rest Room, 5.30 p. m.*
Wednesday, 18:	*Women's Swimming Class, Houston House, 5.40 p. m.* *Rehearsal of Symphony Orchestra, Rest Room, 5.30 p. m.*
Thursday, 19:	*Physical Training Class for Women, Houston House, 5.30 p.m.*
Friday, 20:	*Bowling, Recreation Alleys, 5.45 p. m.* *Basketball, Men, 5.30 p. m.* *Chess, Restaurant Blue Room, 5.45 p. m.* *Rifle Club* *Basketball, Women, Washington Irving High School, 5.30 p.m.*
Saturday, 21:	*Hike to Long Beach* *Chess, Commercial Chess League Tournament Match* *Horseback Riding, Van Cortlandt Park, 2 p. m.*
Monday, 23:	*Auction Bridge Party in Room 411, 6 p. m.* *Glee Club Rehearsal in Rest Room, 5.10 p. m.* *Dance Orchestra Rehearsal, Studio 1-G, 5.10 p.m.*
Tuesday, 24:	*Basketball, Men, 5.30 p. m.* *Sewing in Rest Room, 5.30 p. m.*
Wednesday, 25:	*Women's Swimming Class, Houston House, 5.40 p. m.* *Rehearsal of Symphony Orchestra, Rest Room, 5.30 p. m.*
Friday, 27:	*Bowling, Recreation Alleys, 5.45 p. m.* *Basketball, Men, 5.30 p. m.* *Chess, Restaurant Blue Room, 5.45 p. m.* *Rifle Club* *Basketball, Women, Washington Irving High School, 5.30 p.m.*
Saturday, 28:	*Horseback Riding, Van Cortlandt Park, 2 p. m.*
Sunday, 29:	*Hike, Suffern to Tuxedo*
Monday, 30:	*Auction Bridge Party in Room 411, 6 p. m.* *Glee Club Rehearsal in Rest Room, 5.10 p. m.* *Dance Orchestra Rehearsal, Studio 1-G, 5.10 p. m.*

The New York-Azores Cable

Permalloy was used for loading this new high-speed Western Union cable

In submarine cables of practical dimensions greater speed of signalling can be obtained if the signalling current can be caused to produce in the surrounding space a suitably greater magnetic flux. In the case of the New York-Azores cable an increase in speed of signalling from the ordinary limit of about 250 to over 1900 letters per minute was obtained by the design of the cable and its terminal apparatus to take advantage of increased inductance, obtained by loading the cable with permalloy. A brief note as to this work, as reported to the American Institute of Electrical Engineers by Oliver E. Buckley, was contained in the September issue of the RECORD. It was a year earlier, in 1924, that the cable ship started from New York, laying this cable for the Western Union Telegraph Company. At that time tests[1] made on the cable showed that it would do all that had been expected of it. Later when it was placed in regular service the newspapers carried long stories congratulating all concerned with this scientific advance.

But the memories of editors are short. London dispatches during September, 1925, claimed as a British achievement the process for the production of the alloys which had given this entirely new aspect to the economics of submarine signalling. This statement was published in the news columns of one New York paper and was used as a basis of an editorial by another. To place the facts on record Frank B. Jewett wrote the New York *Sun* from whose columns we excerpt his letter as follows:

"The new New York-Azores cable, although manufactured in England for the Western Union Telegraph Company, because of the absence of submarine cable manufacturing facilities in the United States, was designed by American engineers. The nickel-iron alloy used in the construction of the cable, and to which it owes its remarkable speed characteristics, was entirely the result of research work by American scientists. Not only is this so, but all of the loading material for the New York-Azores cable was made by the Western Electric Company in its factory at Hawthorne, Illinois, and shipped to England finally fabricated in form to be applied to the copper conductor of the submarine cable.

"Further, all of the machinery employed by the Telegraph Construction and Maintenance Company in the manufacture of the New York-Azores cable was built by the Western Electric Company at Hawthorne, and the operations of manufacture, except those having to do with the application of the ordinary gutta-percha insulation and the armor wires, were entirely under the supervision and control of engineers[2] from the Western Electric Company sent to London for that purpose.

"Preceding the manufacture of the

[1] *These tests were made by John J. Gilbert, Austin M. Curtis, and Arthur Melhose at the New York end and Allison A. Clokey, William A. Knoop and Jesse F. Wentz at the Azores end.*

[2] *These men were: from the Laboratories, Gustavus A. Anderegg, William S. Gorton, Jesse F. Wentz, Rogers H. Galt, Walter W. Hoke; from Hawthorne, James T. Griffin and Paul S. McCann.*

His First Job

The first work assignment in the Bell System of one of the men who is responsible for the present direction of our investigations and developments

UP in the hard coal fields around Carbondale, the introduction to a boy's life-work is a job in a breaker, picking slate out of the endlessly flowing stream of coal. When the boy's build doesn't fit the needs of the job, he sometimes gets a chance at what he really wants to do. In the case of John J. Lyng, the boy came to New York, where he entered the wholesale dry goods business. That was in the early nineties; Bell's fundamental patents having expired, dozens of small concerns were beginning to make and sell telephones. Into one of these, young Lyng's uncle put his machine shop, his experience, and his nephew.

John J. Lyng

Mr. Lyng's first job in the Bell System came a few years later when he entered the New York Telephone Company as an installer. The private branch exchange idea was just taking hold and these boards were being installed as fast as they could be made. With his manufacturing experience Mr. Lyng was a valuable man and soon was made a foreman. Then came a particularly good offer from a telephone manufacturing company of Boston. His resignation was accepted, his final pay received, when a fire occurred on a P B X job in one of New York's leading hotels. At three o'clock in the morning his former boss called on him to help them out. People didn't talk much about Bell System spirit in those days, but John Lyng telegraphed that he had to get back on his old job, then got his crew together. The fire had run up a cable shaft full of insulated wire. It put out of service the hotel's fire alarm and bell system and left what Mr. Lyng calls "the worst mess I ever saw." A week and a half of the hardest kind of work and Mr. Lyng was free to follow his fortunes to Boston.

Evidently the Bell System and Mr. Lyng liked each other pretty well, for in 1905 he entered the Engineering Department of the Western Electric Company. After a few months in order-editing under H. G. Eddy, he was shifted to designing and soon was in charge of a group. When develop-

New York-Azores cable were a number of years' intensive work by the scientists of the Bell System Laboratories. This work culminated finally in the development of metallurgical and manufacturing processes for the fabrication of these remarkable alloys, and in the manufacture, laying, and testing of more than 100 miles of cable similar to that now in place between New York and the Azores. This cable was manufactured for the Western Union Telegraph Company and was laid by them in the deep water off the coast of Bermuda.[3] The results obtained with this cable confirmed all of the results which had been anticipated from the previous research work, and satisfied the Western Union Telegraph Company that the very large expenditure involved in a transoceanic cable of the new type was justified.

"At the time the Bermuda and Azores cables were being manufactured there was great skepticism among submarine cable engineers as to the achievement of such revolutionary improvements on long submarine cables as have since been proved possible in the New York-Azores cable.

"That this improvement has in fact revolutionized the art of submarine cable telegraphy is evidenced by the fact that at the present time numerous other submarine cables are being manufactured along the lines of the New York-Azores cable. The alloy-loading material for a majority of these cables is being manufactured by the Western Electric Company and shipped to England or Germany, and other cables are being manufactured[4] under license."

[3] *Bell Laboratories members who went to Bermuda on this job were Oliver E. Buckley, John J. Gilbert, Austin M. Curtis, Arthur Melhose, William C. Redding and Eileen O'Donnell (now Mrs. J. J. Gilbert).*

[4] *These men are now in London in connection with this work: Messrs. Anderegg, Gorton, Wentz from the Laboratories; Messrs. Griffin, McCann and Henry M. Koll of Hawthorne.*

Officers and Committeemen

Herbert E. Ives was this year President of the American Optical Society and its representative on the United States Committee, International Committee on Illumination. He is also a member of the Committee on Meetings, Franklin Institute.

Harold W. Nichols is a manager of the Institute of Radio Engineers and a member of Committees on Radio Wave Transmission Phenomena and Measurement of Interfering Radiations, International Union of Scientific Radiotelegraphy, American Section.

Carl D. Hocker is a member of the Ways and Means and Insulating Oils and Varnishes Committees, American Electrochemical Society.

Philander Norton is a member of the Electrical Protection Committee, American Railway Association, Telegraph and Telephone Section.

Frank F. Farnsworth is a member of the Committee on Non-ferrous Metals and Alloys, American Society for Testing Materials.

Harvey A. Anderson is a member of the Committees on Non-ferrous Metals and Methods of Testing, American Society for Testing Materials.

Louis W. McKeehan is a member of the Committee on Metallography, American Society for Testing Materials, and the Committee on X-Rays and Radioactivity, Division of Physical Sciences, National Research Council.

ment work was concentrated at New York in 1907, Mr. Lyng continued to head apparatus design. His group at this time included half a dozen engineers, as many draftsmen, and less than a dozen men in the Model Shop. Great interest was being taken in small switchboards; the No. 8 and No. 9 central office boards were being developed, and the No. 4 P B X. Mr. Lyng recalls his troubles with a moulded-insulation panel for the latter board which gave trouble by "cold flow." His first patent is for an improvement on the No. 47 type fuse —a porcelain enclosed fuse for use on open wire lines.

Ability to design apparatus for easy manufacture was always one of his strong points, due to his early shop experience. But his greatest contribution to the Bell System has been his leadership of a group of engineers and his development of other leaders in that group as it has grown from a dozen to nearly seven hundred.

Research—The Key to Progress

THE first of the series of Fuller Lectures at Worcester Polytechnic Institute was given recently by Edward B. Craft. His subject was "Research," in its practical application to the field of technical endeavor. As an example of applied industrial research he described some of the work of Bell Telephone Laboratories, mentioning as specific instances of the results of cooperative technical effort, the vacuum tube telephone repeater, telephone transmission of pictures, and the Western Union permalloy-loaded cable. Coordination of personal initiatives into an organization whose purpose is collective accomplishment rather than individual glorification, he pointed out, is the tendency of the present. A few sentences of his talk may well be quoted:

". . . there is no mystery, and by the same token, no halo surrounding the word 'research.' Every one of your technical research problems is subject to solution by the same kind of brains that is required in any worthwhile task. To my mind, research is the magic key which will unlock the solution of any problem, whether it be industrial, political, or social; and a nation which fails to employ methods of research in the conduct of its affairs is jeopardizing its future existence."

On October 20 Mr. Craft addressed the Engineers' Club of Philadelphia on the same subject, stressing, however, the important part which management must play in the proper coordination of research with engineering, manufacturing, and sales.

* * *

Mr. Craft is Chairman of the Headquarters Committee of the A. I. E. E.; member of the Council, American Institute of Weights and Measures; and member of the Library Board, United Engineering Society.

He is also a trustee for the publication of critical tables of physical and chemical constants, and Vice-Chairman of the Division of Engineering and Industrial Research, National Research Council.

A History of the Colloquium

Some random notions of a Charter member on scientific curiosity, and the only thing that can be done about it, by I. B. C.

WHATEVER our special interests may be, industrial, practical, scientific or ideal, we all have one quality in common—and that is, curiosity. The Elephant's Child, you will remember, had "'satiable curtiosity"—the most dangerous kind—and though it got him into a tight place, it proved a blessing in the long run, for he came out a more extended and versatile animal at the end of the tale. This is not to argue that one should go nosing about promiscuously, but it is to say that properly directed curiosity is a valuable thing, particularly to the scientific worker, whose very craft depends not only on knowing what has gone before, but what is actually in process at the moment.

The great trouble with science is that we can never quite catch up with our insatiable curiosity and do our work at the same time; yet we have to do something like this if we are to accomplish anything. Benjamin Franklin found this out; and he lived in an unspecialized age, with little scientific literature to read: the good old times when Natural Philosophy held sway. But what with doing his own experiments, and corresponding with his scientific friends in England and France, (in addition to his political activities) it is a wonder that he had any time at all to read the Transactions which the Royal Society sent him gratis, after they had elected him to membership: what an easy time he might have had, if it had not been for his insatiable curiosity! (How Franklin would have gaped at Science Abstracts, Section A!) Luckily for our age, submerged by tons of literature, there are those who can and who will talk about things they understand; hence Colloquiums and other technical meetings—glorified parties for the purpose of talking shop—time-savers on balance, though sometimes we might doubt all this to listen to them. But until silent thought waves supersede the art of speech, human nature will not be satisfied without "special" or "regular" meetings, and organizations for holding them.

Delving back into some musty archives that were supplied for the purpose, we find that our Colloquium was organized in 1919 by a small group of Research men. They took the matter rather seriously (as befitted Fundamentalists), because several previous attempts at a scientific club or seminar in the Laboratories had failed to result in any permanent organization. One of the original rules, requiring that the membership be drawn from those who were affiliated with the national scientific societies* and were in actual touch with research work, is still in force; this as much as anything else has contributed to stability, and insured a certain standard in the papers which have been given. The Colloquium has

*Namely, *The American Chemical Society*, *The American Physical Society*, and *The American Mathematical Society*.

grown in membership proportionally with the growth of the Laboratories; this has tended to diversify its interests somewhat, but has not changed its purposes. The Colloquium does not plan to be all things to all men; its function is to follow and report competently on scientific progress, either through one of its own speakers, or, on special occasions, through an address given by some invited guest.* Hospitable members sometimes invite guests to listen to a talk in which they may be interested.

The actual procedure of the Colloquium is the standing joke among its membership—but like most Anglo-Saxon institutions, it manages to proceed, while amazing us all with the circumlocutions of its committee on procedure. During the past season the custom was abandoned of choosing speakers by rotation; there never has been any limitation as to subject matter discussed, except that it should be of current scientific interest. The present rules have been amply justified, judging by the interest of the members in the papers given. One of the pressing reforms for the coming season is that we abolish the ancient custom known as "Colloquium Steak" when we get together for dinner in the restaurant. If we can get rid of that, we may possibly enjoy the pleasure of having with us at dinner (at least when he is to speak) the well known member who habitually delivers the best paper of the season—and then has it printed in the Bell System Technical Journal, as a new installment of the series on Modern Physics.

Recently a coterie of our Electron Mechanics—arch-priests of the craft—got the idea that the Colloquium was not penetrating the holy mysteries of atomic structure with sufficient speed; these High Speed Particles organized a little "Colloquiette" or island-universe of their own. They are busily engaged in "unscrewing the inscrutable," that is, producing disintegration by impact. This nucleus is the fireworks of the Colloquium, and sets a rather rapid pace; but we fancy that its kinetic energy is not lost from the system and rejoice to have these gentlemen in the fold. The scattered radiation from some of their bombardments has already been translated into the vernacular of papers for the Colloquium itself.

The Colloquium will this fall enter upon its seventh season, during which will be held its one-hundredth meeting, and something will probably be done about it. The officers for the season will be: President, Burton W. Kendall; Vice-President, Karl K. Darrow; and Secretary, LeRoy A. MacColl. With reasonable co-operation on the part of the membership (now numbering over seventy) the Colloquium should have the best year in its history—and many more.

**The Colloquium has presented an appreciative audience to such scientists as R. A. Millikan, Max Mason, Henry Norris Russell, A. Summerfeld, F. W. Aston, and Ernest Rutherford.*

Before the New York Electrical Society, on November fourth, will be given the first public demonstration of the new electrically cut Victor records on the new Victor Orthophonic Phonograph. An introductory talk on the technique of sound recording and reproducing will be given by Joseph P. Maxfield of Bell Telephone Laboratories. The personnel of the Laboratories and their friends are invited to attend this demonstration. Notices on the bulletin boards will announce the exact time and place.

Telephone Dictation

By Clara S. Payor

In the south end of Section 3-A sits a group of twenty-five typists equipped with headsets, breast transmitters, and two typewriters each. These girls constitute the telephone dictation service of the Transcription Department. The headsets and breast transmitters enable them to use both hands freely when taking dictation. The two typewriters, one in the desk, the other on a swinging stand attached to the desk, serve as time savers. The former is used between calls for typing the routine work of the department, the latter is kept available for immediate use when taking dictation.

Have you seen a telephone dictation typist in action? Her telephone bell rings. She adjusts her receiver and transmitter, plugs in and answers "Telephone Typist." Now she is receiving instructions from the dictator and you observe her getting the required paper from the rack in front of her. With one expert turn the paper is in the typewriter and she is saying "all right" to the dictator at the other end of the wire. You next see her typing, not slowly and painstakingly, but with flying fingers, and an unconcerned air as if she were playing. If you look over her shoulder you may see a specification appearing word by word and line by line on the paper. Now she is taking down a list of names, now a series of numbers, and again a long descriptive paragraph filled with technical expressions. The specification is finished. Off come receiver and transmitter and the work is passed to the monitor's desk, where the dictator's messenger boy is already waiting to deliver it. How long did the whole operation take? Just sixteen minutes.

All of us are familiar with the various recording and reproducing instruments used for dictation. Each of them has contributed to the efficiency of modern office routine. However, in their present stages of development, they fall short of the efficacy and speed of telephone dictation. The telephone brings you into personal contact with the typist. You speak to her and instruct her as you would a stenographer. You hear her type as you dictate. When she does not understand she asks questions and you help her along as she works. Consequently the chances of making errors are minimized and when you are through dictating, your work is ready for your signature. This is a far cry from the days of agitation over delays caused by correcting errors in transcription and trying to keep up with the flood of accumulated records.

Telephone dictation in Bell Telephone Laboratories has grown with unexpected speed. From the humble beginning of two typists three and a half years ago, it now boasts of twenty-five operators, with all indications pointing to a possible thirty in the near future.

With two operators, the question of special switchboard arrangements did not enter into consideration. Each girl had her own telephone and received her calls as they came in. As the force grew, it became necessary to find a means for distributing evenly

the number of calls taken by the operators. Warren B. Sanford consequently suggested the installation of a thirty-position, cord-type P B X switchboard with ten trunks to the board, and all went well until the need for more than ten operators became felt. Then the switchboard with its capacity of only ten incoming calls became useless. Plans were made for designing a special board, with a special arrangement for as many incoming calls as there were operators. It seemed like a long process and an expensive one. Again Mr. Sanford came to the rescue, this time with a suggestion which permits of innumerable connections without special equipment other than a monitor.

Each of the operators is connected directly with the main switchboard. At the switchboard is a special operator assigned to "telephone dictation." In the Transcription Department is a monitor, also a telephone connected to the main switchboard. The special operator at the board gets all the telephone dictation calls by means of order wires which are available to operators at all positions on the switchboard. She consults the Transcription Department monitor, giving her the name and department of the person calling. The monitor assigns the call to the next telephone typist in line and gives that particular typist's number to the switchboard operator, who then makes the requested connection. The entire operation should require less than twenty seconds. In a large measure, the success of this new application of the telephone is due to Anna Menig, chief operator of our private branch exchange, and to Anna Kiernan, of the Transcription Department, who has charge of the group handling telephone dictation.

Dinner to Instructors

ON the evening of October eighth, Edward B. Craft entertained at dinner those who this year conduct our out-of-hour courses. This is the seventh year of these courses, conducted by members of the Laboratories, which make available the experience and training of our specialists. Following the dinner George B. Thomas acted as toastmaster.

Our new Educational Director, Maurice B. Long, who was introduced first, expressed pleasure in now being connected with this work. Thornton C. Fry talked from the instructor's viewpoint.

Dr. Jewett spoke words of praise and encouragement for this training program. He said interest in the courses indicated clearly that the Laboratories was not looked upon alone as a place in which to earn a living but also as a place where energetic men could develop indefinitely and could contribute to society as a whole.

Mr. Craft, as host of the evening, concluded the program with remarks on the co-ordinating influences of the courses. He expressed his feeling that if these courses had accomplished nothing more than the stimulation of interest in each other's work and a better understanding of each other's problems and viewpoint, that alone would have justified the entire effort.

each of the Associated Companies had been doing its own purchasing and warehousing of line material and supplies. This meant that each company had to maintain a separate purchasing department and to store a sufficient quantity of supplies not only to meet its regular requirements but also to take care of such emergencies as fires, sleet storms, floods, and other catastrophes. As some of the telephone companies maintained inspection forces and some did not, for each of the twenty or more Associated Companies there was a separate set of standards and requirements, with twenty or more purchasing agents bidding against each other and accepting material under inspections which varied as widely as the location of the companies themselves. In 1901 Western Electric entered into a contract with the Bell Telephone Company of Pennsylvania to perform for it the duties of purchasing and warehousing. This contract was soon followed by contracts with other Associated Companies. The advantages of such a relationship are obvious and proved as convincing in practice as in theory.

Frank A. Williams

Elbert L. McCormick

Feeling that the process of standardization should be carried into the field of inspection also, the A. T. & T. Co. undertook to coordinate insofar as it was able, the operations of the various inspection departments. Connected with this work were F. L. Rhodes, G. K. Thompson, and C. J. Davidson, all of whom are still active in A. T. & T.

It soon became apparent that the inspection of line materials could be better carried on by the Western Electric Company in connection with its warehousing and purchasing. In 1906, therefore, Mr. Thompson added this to his other duties.

Another factor which contributed largely to the formation of the present Contract Inspections Department was the organization of repair shops in the Western Electric distributing houses. In 1911 Mr. Thompson was relieved from his other work in the Engineering Inspection Department and for a year travelled about among the distributing houses, organizing repair shops and investigating methods of standardizing repair of transmitters. Regular inspection of distributing house shops then became a function of the Western Electric Company's Engineering Inspection Department; it is at present carried on by a group in the Contract Inspection Department, under the supervision of Ernest C. McDermott.

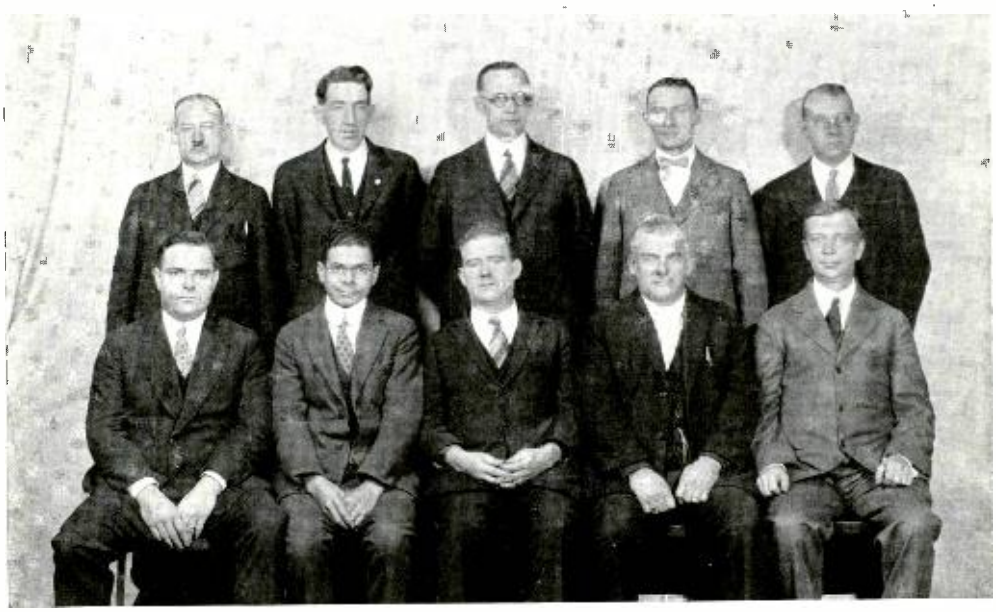
Ernest C. McDermott

During the war, Mr. Thompson had charge of the inspection of vacuum tubes manufactured at West Street for the use of the United States government. In 1919 he returned to

the Engineering Inspection Department as its head.

In 1924 R. L. Jones, previously Transmission Engineer, was made Inspection Manager. He divided the department into two groups, one of which under Mr. Thompson carried on the actual operation of inspecting materials manufactured for but not by the Western Electric Company. The other group, of which Mr. Jones himself took immediate charge, interested itself in inspection from a more purely engineering standpoint; that is, from the standpoint of making available the fundamental principles underlying inspection and of determining economical quality standards from studies of the performance of Western Electric products in service.

The work of the Contract Inspection Department is carried on by three main groups assisted by a Service Department in charge of Miss H. M. Kober and George M. Byl. The group headed by Frank A. Williams, officially known as the "Not Western Electric Material Department" inspects line material and similar supplies. There are seventy-eight men in the department, divided into eight distinct groups stationed in different parts of the United States. The inspection of telephone apparatus manufactured by concerns other than the Western Electric Company is headed by Elbert L. McCormick. Groups of men are stationed at the plants of the various companies from whom telephone supplies are purchased. The third division of the Contract Inspection Department is under Ernest C. McDermott. It carries on the supervision of distributing house repair shops which was started by Mr. Thompson in 1911.



Two hundred and fifty years of Bell System experience lie back of these men of the Contract Inspection Department:

Standing—J. J. Hinde, J. R. Stopford, F. DeC. Thompson, E. C. McDermott, L. R. Spengeman.
Seated—F. A. Williams, J. J. Clark, P. J. Campion, V. K. Coffill, H. L. Waters

An Earful is an Earful

Answering a question once asked by the "News"

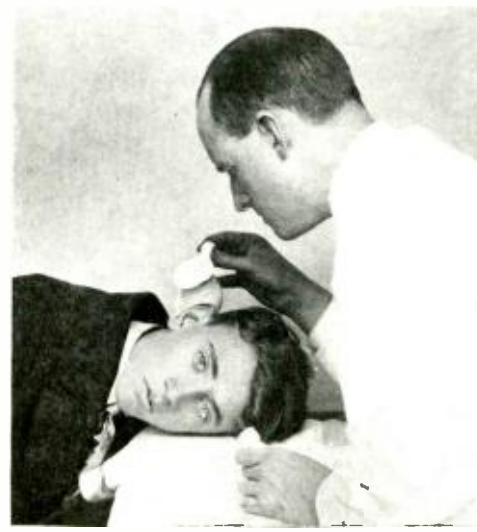
To render the Western Electric audiphone fully efficient in restoring hearing to those who have partially lost it, it became necessary to insure that each audiphone receiver fit and fill exactly the ear of the person who uses it. To accomplish this the receiver is mounted upon an ear-piece which is molded in conformation with the inner contour of the user's ear.

A section of the ear

The mold which gives the answer is obtained by a very ingenious albeit simple method. When the audiphone is delivered to a customer he will discover with it a quantity of white plaster together with the necessary instructions for its use. He then has only to call upon his physician, deliver the plaster, the instructions, and his person to the man of medicine, and await the results.

The mold partly removed

The physician, after reading the instructions, will insert two small balls of cotton into the inner passage of the ear, as indicated in the diagram. Then he will remove any hairs that may be present, coat the inner ear with almond oil to prevent the plaster from sticking, and incline the head of the patient to a horizontal position. Next he mixes a little water with the plaster and pours the resulting mixture into the ear, taking care to pour into the upper whorl so as to keep air-holes from forming. It runs from there into the ear slowly and without bubbling. It is allowed to set for twenty seconds and then built up into a rounded shape in order to provide a base on which the receiver is to be mounted. This is allowed to set for seven minutes, no more, no less, after which it is removed carefully. The one cotton ball which will be found sticking to the plaster is removed and the mold is ready to be sent to the Western Electric Company to be replaced by a hard-rubber earpiece.



Pouring the plaster for the ear-mold: Harry McAleer and Clarence D. Hanscom illustrate the method

Earpiece with receiver

When the patient receives the earpiece he will have not only an exact measure of his individual earful but in addition a mounting for his audiphone receiver which stops the leakage of speech sounds from the receiver and prevents the entrance of extraneous sounds. Also, as it is light, small and individually fitted, it will be physically comfortable when worn for a long period, and comparatively inconspicuous.

The plaster ear-mold

Bell Laboratories at the Air Meet

Spectators were kept constantly informed of events by means of a Public Address System

WE ARE all interested in what happens to equipment we design after it leaves our building, so "your correspondent" visited the National Air Races at Mitchell Field on October twelfth to watch the operation of the No. 1 Public Address System installed there by engineers of our public address group. The press stand, shown in one of the illustrations, partly collapsed in the middle of the afternoon; but, as the announcer assured the crowd, it only spilled a few typewriters and reporters. Unlike the press stand, the Public Address System did its duty. It operated smoothly; kept a crowd of 25,000 people informed about every incident; and provided amusement between events, thanks to a running fire of comments by Lieutenant "Looping Louie" Meister of the Army, who acted as announcer.

The Timers' Stand (in the center) and the shed housing the No. 1 Public Address System (at the left)

Part of the thousand-foot line of projectors at the National Air Races. The press stand is visible in the center

Bell System Researches

As Recorded in Articles Recently Published

Loudness vs. Sound Energy—Various experiments have shown that the human ear is far from perfect as a detector of sound waves, and that the relative loudness of a sound as judged by the ear is not a simple logarithmic function of the amplitude of the sound wave as has frequently been assumed in the past. That the various frequency components of the sound wave must also be taken into account is shown in a paper[1] by John Steinberg. A mathematical expression is given for this relationship, which may be used in calculating the relative loudness of complex sounds to a degree of accuracy which is not always obtainable by aural observation. Curves are given showing that as the intensity of a sound is increased the ear gives more weight to the lower frequencies, and illustrating the results obtained by application of the formulae given to the calculation of the volume efficiency at various power levels of telephone systems having known frequency characteristics. Since the present available data was obtained with other ends in view, the need of further experimentation is emphasized.

Electric Circuit Theory—Heaviside's operational calculus, due perhaps to an unfortunate obscurity of statement, is used by few investigators in spite of its value for solving the differential equations of electric circuit theory. John R. Carson (D. & R., A.T. & T.) has simplified the method and applied it to advanced problems. The present paper[2] is the embodiment of a course of fifteen lectures delivered last Spring at the University of Pennsylvania.

Metallic Crystals—When electroplated on polished brass, the crystals of copper and zinc lie at random, while most of the crystals of iron and nickel lie with one particular face parallel to the surface of the brass sheet. A paper by Richard M. Bozorth[3] describes experiments which lead to this conclusion.

Factory Planning—Where the product is widely diversified, as it is at Hawthorne, intensive planning is fruitful of great economies. How essential is farsightedness is also emphasized in a paper, "Engineering Planning for Manufacture," by G. A. Pennock,[4] (Technical Superintendent, Telephone Department, W. E. Co.), describing methods used at Hawthorne. To be sure that its facilities are adequate to supply without interruption the Bell System's need for a large quantity of apparatus at minimum cost, studies are based on a five year forecast made by the Associated Companies and the A. T. & T. Co. That ease of manufacture is important in piece parts design is illustrated by the savings from slight redesigning of certain items. Machines of the same kind are generally grouped together and the work moved from one department to another. The steps in putting a new item into manufacture are outlined. Personnel methods, including piecerate setting, are described. Cost reduction engineering has a definite

[1] *Physical Review, October 1925*
[2] *Bell System Technical Journal, October, 1925*
[3] *Physical Review, September 1925.*
[4] *Bell System Technical Journal, October, 1925.*

place in the work at Hawthorne.

TELEPHONE CIRCUITS—How irregularities affect loaded telephone lines is summarized in a paper[5] by George Crisson (D. & R., A. T. & T.). The information is drawn from original work by Campbell, Mills, Hoyt, and others. An irregularity may be either the failure to terminate a line by a circuit of the proper impedance or some discontinuity en route. The defects encourage reflection of the electrical waves, causing either "echoes" or singing of repeaters. Many formulae and illustrative examples are given.

CONTEMPORARY ADVANCES IN PHYSICS—In the second part of his article[5] on the Atom-Model, Karl K. Darrow gives a very brief recapitulation of the facts of experiment which the atom-model of Rutherford and Bohr is designed to interpret—facts which in the first part were described at length—and then proceeds to develop his account of the atom-model itself. This model consists of a positively charged nucleus and one or more electrons; yet it is certain that a system thus built up could not be permanent, if the electrified particles conformed to the laws of electricity as we know them. These laws must therefore be violated if the atom-model is to be maintained. Yet if these laws were violated at random, without system or principle, merely to attain a forced agreement between experiment and "theory"—then the theory would be worthless. Thus the essential question is this: Can we achieve an interpretation of the facts by assuming that the electrified particles within the atom move, not indeed according to the laws of electricity as we know them, but according to laws of their own? For the atom of hydrogen this is evidently possible. The laws which are required are stated in this article.

SPEECH-POWER AND ENERGY—Those who wonder why their radio sets give evidence of distortion from overloading when the estimated power output seems to be well within the rated capacity of the amplifier will find a possible explanation in a paper[5] by Charles F. Sacia, in which he describes measurements made on the relation of the instantaneous peak values of energy in human speech to the mean values. The results of these measurements indicate that in order to eliminate distortion in a speech amplifier, the mean effective voltage of the speech waves should not exceed one-fifth of the overload voltage of the system. A description of the method of measurement is given, with the results obtained in tabular and graphic form.

GENERAL ENGINEERING PROBLEMS OF THE BELL SYSTEM—Any intelligent plan for establishing and extending telephone service must necessarily begin with a thorough survey of the territory to be covered; of its physical aspects, its commercial and social character, and the nature of its probable future growth. Given this premise of a reliable commercial survey, the telephone service problem resolves itself into a question of adequately considering and interpreting the facts and from this interpretation designing the telephone system which will best meet the needs of the particular community. This telephone engineering in its broadest sense is discussed[5] by H. P. Charlesworth (Plant Engineer, A. T. & T.). It would be impossible, of course, in the scope of a single article, to consider even sketchily the details of providing telephones for a whole nation. Mr. Charlesworth merely outlines a few of the outstanding problems. As concrete exam-

[5] *Bell System Technical Journal, October, 1925.*

ples, he describes the engineering of the New York City telephone system and the New York-Chicago toll cable.

BINAURAL BEATS—The phenomen of "beats" arising from the interference of two tones of nearly the same pitch, is a familiar one. Clarence E. Lane[6] analyzes the results of investigations recently carried out in the Laboratories concerning the nature of binaural beats. By introducing tones of slightly different frequency into the two ears, two kinds of beats are obtained. Subjective beats are heard when the two tones have nearly the same intensity, and objective beats when the intensities differ widely. The former are the result of the sense of binaural localization of sound by phase, and are central in their origin, whereas in the latter case the stronger tone is conducted through the bones in the head to the opposite ear, where, due to its attenuation in transmission, it does not mask the weaker tone but causes beats.

THE SOUNDS OF SPEECH—From a large collection of data based on accurate records of speech sounds, which have been made and analyzed in the Laboratories during recent years, Irving B. Crandall has selected[7] the outstanding characteristics for discussion. An introduction is first given which traces the development of the theory of vocal production from the time of Helmholtz to the present day, and includes the recent contributions to speech studies by Harvey Fletcher, Donald MacKenzie, C. F. Sacia, and J. Q. Stewart. After a description of the recording apparatus, a classification of the speech sounds as vowels, semi-vowels and consonants is given; then follows a detailed statistical analysis of the duration, and the energy-frequency characteristics of the various sounds. The treatment of the data for the vowel sounds follows more or less conventional lines, but a new field is entered in the discussion of the semi-vowel and consonant sounds, on the basis of these records. Several representative records serve to illustrate the paper, and give an idea of the extent of the collection. The accuracy of the records is largely due to the technical skill of Mr. Sacia and C. J. Beck.

ADSORPTION OF GASES BY GRAPHITIC CARBON—This paper[8] by Homer H. Lowry and Stanley O. Morgan gives the results of a study of the adsorptive qualities of a number of samples of graphites prepared from "graphitic acid," oxidized to different degrees. The method of preparing the samples and measuring their adsorption of gases is described. The data obtained indicate that any treatment (such as oxidation) which will increase the ratio of surface to mass or the degree of unsaturation of the atomic forces of a solid adsorbent, or both, will increase its adsorptive capacity.

[6] *Physical Review, September, 1925.*

[7] *Bell System Technical Journal, October, 1925.*

[8] *Journal of Physical Chemistry, September, 1925.*

Club Notes

David D. Haggerty, Secretary

Saturday afternoon, September 26, at the Salisbury Country Club, near Garden City, Long Island, sixty-four of our golfers teed off in the qualifying round of the first Golf Tournament of the Bell Laboratories Club.

The players were handicapped for medal play, in accordance with standard rules, from their three best previous scores, which they turned in to the Golf Committee. These handicaps were called unusually just by the Salisbury "pro," in view of the scores made.

The qualifying round was won by Edward B. Craft with a gross score of 85, the best figure reached in the tournament. A prize of $15 in golf merchandise went to Mr. Craft for the achievement. The other prizes in this round were won by Jack Hillier and George Kellogg for low gross scores, and by Joe Dusheck and Larry Hampton for low net scores. The other twenty-two who qualified with their scores were:

	Gross	*Handicap*	*Net*
G. T. Lewis	89	10	79
E. H. Clark	90	10	80
J. G. Roberts	92	10	82
A. W. Lawrence	95	20	75
W. L. Kidde	95	14	81
H. B. Arnold	96	16	80
L. G. Hoyt	98	16	82
A. L. Thuras	100	24	76
T. C. Rice	102	21	81
H. L. Walters	102	27	75
A. J. Boesch	103	22	81
S. P. Grace	104	22	82
L. Keller	104	24	80
C. J. Corwin	105	27	78
H. D. Arnold	106	24	82
H. N. Bick	106	24	82
W. H. Harvey	106	25	81
J. Mills	108	27	81
J. W. Hoag	108	27	81
C. R. McConnell	114	35	79
H. E. Young	115	35	80
T. P. Ingram	117	35	82

H. D. Arnold, E. B. Craft, J. G. Roberts, S. P. Grace

The final round was played at Salisbury the following Saturday, October 3. Though the morning was rainy, the weather cleared for a good afternoon of golf. All who qualified, except Mr. Craft and Mr. Grace who were prevented by other reasons from

A. W. Lawrence, W. H. Harvey, H. N. Bick, Leon Hoyt

playing that day, were out for the final effort. H. D. Arnold and A. L. Thuras, finishing ahead of the other players, were tied with a gross score of 89, handicap 24, or net 65. Both claimed that they had played much better than their usual game. The winners of the other six prizes in this final round, with their scores were:

	Gross	*H'dicap*	*Net*
A. W. Lawrence	96	20	76
H. B. Arnold	92	16	76
G. Kellogg	87	10	77
E. H. Clark	87	10	77
A. L. Walter	105	27	78
J. Hillier	89	10	79

A cup was given by the Club for low net scores in the finals, in addition to graded prizes of orders for golf material for the eight leaders. So it was necessary for Messrs. Arnold and Thuras to play off their tie. The other ties in the final round were settled by dividing the prizes concerned.

The play-off for the cup and first and second prizes was held Friday, October 9, on the course of the Montclair Golf Club, in a pouring rain for part of the time. Mr. Arnold won, with a gross 96 net 72, over Mr. Thuras who had gross 104, net 80, thus obtaining the championship cup pictured on page 136.

This first tournament was a great success and the Golf Committee is to be congratulated on the excellent arrangements made. The interest aroused among our golfers was such that a tournament will become an annual event of the Club.

D. R. McCormack

Fall Dance

The Fall Dance is to be held Monday evening, November 9, in the Grand Ballroom of the Hotel Pennsylvania. Dan McCormack, Chairman of the Entertainment Committee, who has so successfully managed our dances for the past two years, has included the following musical program

George Kellogg, Al Thuras, Jack Hillier, Walter Kidde

by our Glee Club and our quartette:

Selections to be sung by Glee Club of thirty male voices:

The Winter Song
Lullaby and Good Night
Jolly Blacksmith's Lay

Selections to be sung by the quartette:

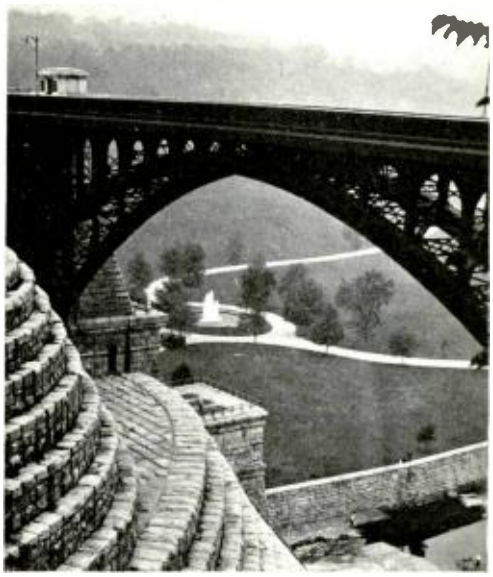
West of the Great Divide
Old Man Noah
Yes Sir She's My Baby

The Bell Laboratories Club Quartette is composed of F. Franklin Lee, first tenor; Russell P. Yeaton, second tenor; Francis M. Costello, baritone and Frederick von Schlichten, bass, who have been heard by the public over stations WOR, WEAF and WJZ.

Charlie Gittenberger
Basketball Manager

The Committee would like to have every Club member attend this party. We are sure that the program, including a short concert, bridge, and dancing, will interest all.

There are a limited number of boxes which may be obtained from members of the Committee, or by calling at room 108. Some Club members are arranging for box parties for the occasion, which insures seats together for the concert and a place to meet between dances.



View at Croton Reservoir taken during a hike

Hike, Saturday October 3

The ancient superstition which holds that thirteen is an unlucky number must be lacking sound foundation in fact, otherwise how could thirteen hikers successfully end a thirteen mile tramp which started under cloudy skies and with fast-falling rain drops? When the thirteen miles were completed the skies had cleared for a beautiful evening presided over by a mellow full moon.

The party nearly missed the train at Jersey City because the tube trains from Christopher Street were temporarily discontinued, a circumstance for which the number thirteen could not possibly be held accountable.

Some of the hikers at rest in front of a fountain

When the train arrived in Nyack the party immediately struck out down the road toward Alpine. At Piermont the trail left the main road and meandered uphill and down through the woods and over the rocks eventually reaching the Hudson shore a few miles north of Palisades Interstate Park. From there the route lay along the river, sometimes by paths high up the face of the Palisades, sometimes over rocks at the water's edge.

About dark a suitable camping spot was reached. In spite of the wet a roaring camp fire was soon built and each member of the party was assigned his share of getting supper ready. Phyllis Barton soon had the coffee pot boiling merrily, while others strung bits of steak, bacon, and sausages on a spit suspended over the coals.

The Golf Trophy

After supper had been eaten the thirteen gathered around the fire in the moonlight and while marshmallows were toasting they sang all the old favorites.

After a short walk to Alpine and a ferry trip to Yonkers the party dispersed, agreeing that this time, at least, thirteen had been no jinx.

This group holds weekly hikes, and each has been just as enjoyable as the one described. If you are interested why not join them on one or more of the November hikes?

Basketball—Men

The Bell Laboratories Club basketball league for men will open the 1925–1926 season in November with eight teams competing for the individual prizes and the silver trophy which has been donated by A. G. Spalding Bros.

This season the league will be managed by Charlie Gittenberger who is one of the Club's most valuable players and who has been associated with basketball in West Street for a number of years.

The departments in West Street which will be represented in the league for the coming season are as follows: Commercial, Research, Equipment, Toll Circuit, Tube Shop, Apparatus Development, Patent-Inspection, and Junior Assistants.

Chairmen or Managers of the Club Activities

Athletic Committee	H. E. Young	Golf	E. J. Johnson
Basketball, Men	C. Gittenberger	Entertainment	D. R. McCormack
Basketball, Women	Miss E. Hence	Glee Club	F. M. Costello
Track	H. M. Yates	Dance Orchestra	S. J. Zammataro
Bowling	H. L. Bostater	Symphony Orchestra	L. E. Melhuish
Swimming, Women	Miss J. Johnson	Chess	H. M. Stoller
Swimming, General	J. M. Wilson	Rifle Team	A. H. Leigh
Baseball	L. P. Bartheld	Hiking	Miss P. Barton
Horseback Riding	Miss M. G. Gilmartin		N. E. Sowers
	A. D. Soper	Sewing	Miss E. Hence
Physical Training, Women	Miss J. Johnson	Auction Bridge	A. Zitzmann
		Membership	K. B. Doherty