

Telephone Achievements

Telephone Service of Today the Creation of The Bell Co.

In no line of human endeavor has the inventive brain of the scientist contributed more to the world's progress than by the creation of the art of telephony, of which the Bell system is the embodiment.

When the telephone was born, nothing analogous to telephone service as we now know it existed. There was no tradition to guide, no experience to follow.

The system, the apparatus, the methods—an entire new art had to be created. The art of electrical engineering did not exist. The Bell pioneers, recognizing that success depended upon the highest engineering and technical skill at once organized an experimental and research department which is now directed by a staff of over 550 engineers and scientists, including former professors, post-graduate students, scientific investigators—the graduates of over seventy universities.

From its foundation the company has continuously developed the art. New improvements in telephones, switchboards, lines, cables, have followed one another with remarkable rapidity.

While each successive type of apparatus to the superficial observer suggested similarity each step in the evolution marked a decided improvement. These changes, this evolution, has not only been continuous, but is continuing. Substantially all of the plant now in use, including telephones, switchboards, cables and wires, has been constructed, renewed or reconstructed in the past ten years.

Particularly in switchboards have the changes been so radical that installations costing in the aggregate millions have frequently been discarded after only a few years of use.

Since 1877 there have been introduced fifty-three types and styles of receivers and seventy-three types and styles of transmitters. Of the 12,000,000 telephone receivers and transmitters owned by the Bell Company January 1, 1914, none were in use prior to 1902, while the average age is less than five years.

Within ten years we have expended for construction and reconstruction an amount more than equal to the present book value of our entire plant.

Long distance and underground transmission was the most formidable scientific problem confronting the telephone experts.

The retarding effect of the earth on the telephone current often impaired conversation through one mile underground as much as through one hundred miles overhead. Overhead conversation had its distinct limitations.

No possible improvement in the telephone transmitter could of itself solve these difficulties.

The solution was only found in the cumulative effect of improvements, great and small, in telephone, transmitter, line, cable, switchboard, and every other piece of apparatus or plant required in the transmission of speech.

While the limit of commercial overhead talking had increased from strictly local to over 1000

miles as early as 1893, it was not until 1905 that conversation could be had over long-distance circuits of which as much as twenty miles was in underground cables. By 1906 underground talking distance had increased to ninety miles. By 1912 it was possible to talk underground from New York to Washington.

It was then that the construction of underground conduits from Boston to Washington was determined upon, not that it was expected to get a through underground talk between those places, but in case of storm or blizzard, to utilize intermediate sections in connection with the overhead.

Our persistent study and incessant experimentation have produced results more remarkable still. We have perfected cables, apparatus and methods that have overcome obstacles heretofore regarded as insuperable both to long distance overhead and underground conversation.

Underground conversation is now possible between Boston and Washington, four times the length of the longest European underground line. This enabled the Bell System in the recent great storm, so destructive on land and sea, to maintain communication for the public between all the principal points on the Atlantic seaboard.

Telephone communication is established between New York and Denver, is potentially possible between all points in the United States, and by 1915 will be an accomplished fact between New York and San Francisco.

In our use of methods or apparatus, we are committed to no one system. We own, control or have the right to use inventions necessary to operate any system recognized or accepted as the most efficient. The Bell System must always recognize, and in its selection must always be governed by the necessities of a national service, with its complex requirements, which is infinitely more exacting than local or limited service.

These achievements represent vast expenditures of money and immense concentration of effort which have been justified by results of immeasurable benefit to the public. No local company unaided could bear the financial or scientific burden of this work. Such results are possible only through a centralized general staff, avoiding wasteful duplication of effort, working out problems common to all, for the benefit of all.

The pioneers of the Bell System recognized that telephone service as they saw it, was in the broadest sense a public utility; that upon them rested a public obligation to give the best possible service at the most reasonable rates consistent with risk, investment and the continued improvement and maintenance of its property.

Without this expenditure of millions and concentration of effort, the telephone art as it exists could not have been developed.

What we have done in working out these great problems in the past should be accepted as a guarantee of what we will do in the future.

THEO. N. VAIL, President.

Construction of Earth Roads

INTERESTING DETAILS OF GOVERNMENT EXPERIMENTS IN MAKING GOOD HIGHWAYS.

WASHINGTON, D. C., March 20.

As soils differ for agricultural purposes, so they differ for roads, says the road expert of the Department of Agriculture. Clay or soils of fine texture usually make poor roads, especially if they contain much vegetable matter. The coarser soils, however, which contain some sand or gravel, will often make very satisfactory roads for light traffic, provided they are kept in proper repair.

If the road is composed of fine clay or soil, it will sometimes pay to resurface it with top soil from an adjacent field which has sand or gravel mixed with it. This method, called the top-soil method, is now in successful use in Virginia, North Carolina and Georgia, and probably other states.

The earth road can best be crowned and ditched with a road machine, and not with picks and shovels, scoops and plows. One road machine, with a suitable power and operator, will do the work of many men with picks and shovels and do it better.

The road machine should be used when the soil is damp, so as to make the soil bake when it dries out. If it is worked dry it takes more power to draw the machine, and, besides, dry earth and dust retain moisture and quickly run after rains. The use of clods, sods, weeds or vegetable matter in building earth roads should be avoided because they also retain moisture.

It is a great mistake to put the working of the earth off until August or September. The surface is then baked dry and hard. And it is not only difficult to work but is unsatisfactory work when done. Earth which is loose and dry will remain dusty as long as the dry weather lasts and then turn to mud as soon as the rains begin. By using the road machine in the spring of the year while the soil is soft and damp, the surface is more easily shaped and soon packs down into a dry hard crust which is less liable to become dusty in summer or muddy in winter.

Storm water should be disposed of quickly before it has time to penetrate deeply into the surface. This can be done by giving the road a crown or slope from the center to the sides. For an earth road which is twenty-four feet wide the center should not be less than six inches or more than twelve inches higher than the outer edges of the shoulders. A narrow road which is too high in the middle will become rutted almost as quickly as one which is too flat, for the reason that on the narrow road all the traffic is forced to use only a narrow strip.

Shoulders are often formed on both sides of the road which prevent storm water from flowing into side ditches, retaining it in the ruts and softening the roadway. These ruts and shoulders can be entirely eliminated.

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ated with the road machine or split-log drag.

Ordinarily the only ditches needed are those made with the road machine, which are wide and shallow. Deep, narrow ditches wash rapidly especially on the steep slopes, which is another good reason for decreasing the steepness of the grades. It is difficult to maintain an earth road, or any kind of road for that matter, on a steep grade.

The width of the earth road will depend on the traffic. As a rule, 25 or 30 feet from ditch to ditch is sufficient, if the road is properly crowned. A road that is narrower than 25 feet is difficult to maintain for the above stated reason that teams are more apt to track on narrow roads than on a wide road, causing it to rut if subjected to heavy hauling. The road should not be loosened, dug, or plowed up any more than is absolutely necessary. The road should be gradually raised, not lowered; hardened, not softened.

On flat lands, where water moves slowly, grading material should be taken from the lower ditch and culverts supplied where waterways occur. A shallow ditch on the upper side makes it possible to give culverts a good fall. Two or more small pipes, instead of one large one of equal capacity, may be used for culverts, especially if the large pipe necessitates much grading or raising of the roadway. At least six inches should be left between each pipe and earth should be tamped around them thoroughly so as to prevent a wash-out.

To prevent washing on steep roads, the water should be carried under the surface at frequent intervals from the upper to the lower side, and from the lower side away from the road. Five 12-inch pipes in a mile of roadway is about as cheap and far better than one 20-inch pipe. The water must be disposed of before it gains force or headway, or has time to damage the road.

The maximum velocity for a 24-inch vitrified tile flowing full without head on a grade of two inches per hundred feet, is 3.6 feet per second, or about 2 1/2 miles per hour. When the grade is increased to thirty-six inches in 100 feet, the velocity becomes twenty feet per second or about 13 1/2 miles per hour. The discharge for the 24-inch pipe in the first instance will be 5086 gallons per minute and for the steeper grade 25,260 gallons per minute. It will therefore be seen that a 24-inch pipe laid on a grade of thirty-six inches to the 100 feet will have over five times the capacity of the same size pipe laid on a grade of one inch to the 100 feet.

Under the same conditions the maximum velocity for a 12-inch tile on a grade of one inch per 100 feet equals 1 1/2 feet per second or about 7-8 miles per hour and for the same tile on a grade of thirty-six inches to the 100 feet the velocity would be 7 1/2 feet per second or about 5 1-6 miles per hour. The discharge for the 12-inch tile in the first instance would be 442 gallons per minute, and for the steeper grade 2650 gallons per minute or about five times as much.

By increasing the fall, we increase the capacity of the pipe, decrease the size of the pipe necessary, and therefore decrease the cost of the culverts. Furthermore, culverts laid flat will soon fill up, but if given a good fall, they will keep themselves clear.

If much fall is obtained in a culvert pipe, the spillway should be paved. Earth should be tamped around and under the pipe in layers, and should be of sufficient depth to prevent the pipe from being broken by traffic; but under no circumstance should a ridge over the culvert be allowed, for it not only endangers the life of the culvert, but is a menace to traffic.

An attempt to drain mud holes with culvert pipe will fail in most cases. The water should be drained off by means of open ditches; the soft mud thrown out and replaced with just enough good firm earth to make it level (after consolidation) with the surrounding surface. If mud holes in earth roads are filled with brush or stone, it will usually

TO THE PEOPLE OF COOS BAY

We wish to again call your attention to the fact that we are sole agents in this city for Meritol Pile Remedy. Our success with this remedy has far exceeded our most sanguine expectations. Therefore, we are pleased to recommend and guarantee every package of Meritol Pile Remedy. Owl Prescription Pharmacy, Frank D. Cohan, Opposite Chandler Hotel, Phone 74. Central Avenue Drug Store, local agency. Price \$1.00.

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Result in two mud holes, one at each end.

Repairs to roads should be made when needed, and not once a year or ter crops are "laid by." One day's labor judiciously distributed throughout the year, will accomplish more and better work than the same amount of labor expended in one day, especially if the six days are in August, September, or October, when the ground is hard and dry.

Because of its simplicity, its efficiency and cheapness, the split-log drag or some similar device is best fitted to come into more and more general use. With the drag, proper maintenance of earth roads becomes a simple and inexpensive matter. Care should be taken to make a log so light that one man can lift with ease, as a light drag can be drawn by two medium sized horses and responds more readily to various methods of hitching and shifting positions of the operator than a heavier one.

ADVERTISED LETTERS.

List of unclaimed letters remaining in the Marshfield, Oregon, Postoffice for the week ending March 24, 1914. Persons calling for same will please say advertised and pay one cent for each letter called for:

Brown, C. E.; Barmore, A. C.; Cooley, Lloyd; Cotter, Mrs. Chas. Davis, Oliver; Davis, Harry; Peltcloth, F. (2); Gaston, G. B.; Hunt, M. J.; Johnson, J. B.; Johnson, L. C.; Kutner, J.; Laskey, L. V.; Lewis, M. Lindberg, Mrs. O. O.; Needham, Henry S.; Rosewarne, Mrs. J. V.; Robertson, S.; Russel, Mrs. Martha; Set, E.; Thompson, Tom; Thompson, Ben; Wilson, Miss Frances; Williams, Harry V.; Williams, W. E.

W. B. CURTIS, Postmaster.

Political Announcements

ANNOUNCEMENT.

I announce myself a candidate for State Representative subject to the will of the Democratic voters at the primaries May 15. Will vote for the people's choice for Senator, and work for better road laws to enable the people to get Oregon out of the mud.

A. T. MORRISON.

(Paid Adv.)

ANNOUNCEMENT.

As a progressive I hereby announce myself as a candidate for county Commissioner and if elected will endeavor to fill the office to the best of my ability.

E. B. CURTIS.

(Paid Adv.)

ANNOUNCEMENT.

I hereby announce myself as a Republican candidate for Joint Representative for Coos and Curry counties at the primary election May 15.

E. J. LONEY.

(Paid Adv.)

ANNOUNCEMENT.

I desire to announce to the Republican voters of Coos county that I am a candidate for the nomination at the primaries to be held May 15, for the office of county commissioner. I advocate lower taxation, good roads and a businesslike administration of county affairs.

I favor no particular locality, and if elected will work for the best interests of the whole county.

THOMAS B. JAMES.

(Paid Adv.)

FOR SHERIFF

I hereby announce myself as a candidate for the nomination of Sheriff, on the Democratic ticket at the primary election. If elected I promise to conduct the office in an economical manner, with the assurance that all interests and individuals will be accorded fair treatment.

TAYLOR SULLIVAN.

(Paid Adv.)

ANNOUNCEMENT.

I hereby announce myself as a candidate for County Commissioner on the Democratic ticket at the coming primary election.

O. J. SEELYE.

(Paid Adv.)

FOR COUNTY CLERK

As a Republican, I hereby announce myself as a candidate for the nomination at the primaries to be held May 15 for the office of County Clerk.

If I am nominated and elected, I will, during my term of office, perform all its requirements, without parties promptly, expeditiously and to the prejudice and as economically as possible, consistent with good service. Believing that I can save money for the tax payer and make some for myself, I want your vote.

F. E. ALLEN.

(Paid Adv.)

ANNOUNCEMENT.

I have filed by intention as a candidate for renomination for office of County Commissioner on Republican ticket.

GEO. J. ARMSTRONG.

(Paid Adv.)

Meritol Rheumatism Powder. The unusually large sale of this remedy is the best evidence that it could offer you to prove its merit. It is made of effective ingredients and is guaranteed to give permanent relief for rheumatism. We gladly show you the terms and explain its merits to you. Owl Prescription Pharmacy, Frank D. Cohan, Opposite Chandler Hotel, Phone 74. Central Avenue Drug Store, local agency. Price \$1.00.

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