

The marriage that almost was

Western Union has always been ridiculed for rejecting the telephone. But what actually happened wasn't so ridiculous after all

The birth of the telephone—one hundred years ago this month—is a fascinating story of the genius and persistence of one man. In addition, it is an instructive demonstration of how an industrial giant, in this case the Western Union Telegraph Co., can miss its chance to foster an industry-creating breakthrough—something that has happened again and again in electronics and other fields.

Between 1875 and 1879, Western Union's chiefs engaged in an intricate minuet with Alexander Graham Bell and his associates. On more than one occasion, the telegraph colossus came excruciatingly close to absorbing the small group of entrepreneurs. That the absorption was finally avoided was probably the result of a technological gamble

that simply didn't pay off, as well as a clash of personalities that may have been the reason the gamble was taken in the first place.

The clash occurred between William Orton, the president of Western Union, and Gardiner Hubbard, Bell's father-in-law and principal backer. The roots of the clash

go back to before either man had even heard of Bell. They go back to at least 1868 when the first of several bills designed to break Western Union's telegraph monopoly was introduced in the U.S. Congress on behalf of Hubbard, a Boston patent lawyer-turned-promoter, who was among the many then fearful of Western Union's growing power. In those years, the telegraph was the nation's great growth industry and Western Union its largest and most powerful corporation. Formed in 1866 by consolidating the leading telegraph companies, it would, by 1873, transmit 90 percent of the telegraph business over more than 150 000 miles of wire. As one U.S. Senator warned, the power of the telegraph could scarcely be overestimated, for all urgent business and social correspondence was carried out via telegraph and "it is the means of influencing public opinion through the press, of acting upon the markets of the country, and of seriously affecting the interests of the people."

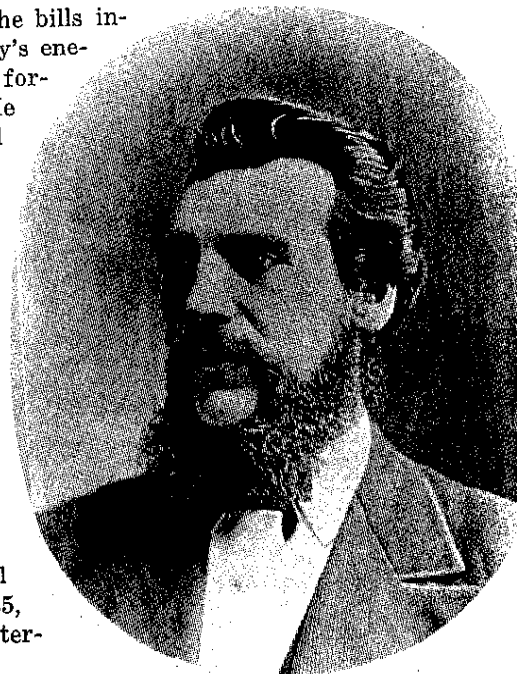
Attacking the telegraph monopoly

Hubbard had achieved considerable financial success from such ventures as bringing the street

railway and illuminating gas to Cambridge, Mass. Long intrigued by telegraphy, he decided to do something about what he called "this monopoly with its inflated capital which serves its stockholders better than the public and whose rates are exorbitant and prohibiting of many kinds of business." Between 1868 and 1874, he lobbied unceasingly, shuttling back and forth between homes in Boston and Washington, for a private "postal telegraph company" to be chartered by Congress but with Hubbard and some of his friends among the incorporators. As Hubbard envisioned it, the company would build telegraph lines along the nation's rail and post roads and contract with the Post Office Department to send telegrams on its wires at rates roughly half those being charged by Western Union. Hubbard claimed that such a system was the only way rates could ever be brought down "since the statistics prove that telegraphic management in private hands *does not* result in either economy or efficiency of service to the public." He also attacked Western Union as resisting technological innovation, remarking prophetically, in 1874, that "the day for new inventions has not passed . . . the potentialities of the telegraph are boundless; no man dare say what the future will bring forth."

It was William Orton who led Western Union's campaign to defeat the bills induced by the company's enemies. Orton was a formidable adversary. He originally had studied to be a teacher, writing his college thesis on the magnetic telegraph and building a model to illustrate it. After teaching for a few years, he went into the printing and publishing business, which led, in 1862, to an appointment as New York City Collector of Internal Revenue and, in 1865, Commissioner of Inter-

♦♦♦ The place: the attic of Charles Williams' "shop," 109 Court Street, Boston, Mass. The time: shortly after dawn, June 2, 1875. As Thomas Watson later put it: "The speaking telephone was born at that moment."



Alexander Graham Bell, 1876

nal Revenue. In the fall of 1865, he accepted the presidency of a leading private telegraph company, only to discover that its financial condition was so desperate that it required a merger with Western Union to save it. But the whole industry was in chaos then and Western Union was apparently not much better off. When Orton moved up to the Western Union presidency in 1867, he found himself in what his obituary, writer later called "an onerous position which might well have appalled a less resolute and courageous man." Orton had to suspend dividends for several years, pouring the money thus saved into reconstructing and extending lines and building new offices. He also established "the previously unknown office of electrician" and pushed for technological innovations such

as the duplex and quadruplex telegraph, which would greatly extend the existing information-carrying capability. On the political front, he fought hard and skillfully against Hubbard and his other rivals, objecting to having Government compete with private enterprise, casting doubts on the ability of the Post Office to run the system, and so on. There were acrimonious exchanges between him and Hubbard brought on by such charges as Hubbard's suggestion that Western Union's unique opportunity to get news of world commodity prices before anyone else presented a "temptation so strong few would have the strength to resist."

Orton's feelings were probably summed up very well when he

wrote his chief Washington lobbyist in 1870 that Hubbard "vibrates from one end of the capitol to the other and between one committee and another so regularly that he may by and by be looked upon as a part of the Congressional clock-work. . . . I am inclined to believe that a little of Sheridan's Indian policy would be good for him, and if not scalped he should doubt-

PHONE A SUCCESS

Inventor Tells Fascinating Story of Its Birth—Emperor of Brazil Aided Him—Noted Japanese Among the First Users



Cover page of a published reminiscence by Bell.

less have his head shaved at the earliest opportunity."

In the end, Orton managed to enlist enough Congressional support to defeat Hubbard's bill as well as those of others who were attacking Western Union. Hubbard lost because of weaknesses in his quite complex bill, but also because the proposed scheme aroused considerable suspicion in Congress as it called for the Government to assume all the financial risks while Hubbard and his friends would enjoy substantial profits if his postal corporation succeeded. Thus, in the spring of 1874, the promoter of what one Congressman called "a swindling scheme" gave up his efforts and returned to Boston ready for new ventures. As it turned out, he didn't have long to wait, for in October Alexander Graham Bell came to tea.

Hubbard had met Bell two years earlier at a Boston school for deaf children. The 25-year-old Bell was then pioneering in the teaching of speech to the deaf and Hubbard, whose 15-year-old daughter Mabel had been deaf since the age of five, was the school's president. Bell had been on the trail of what would turn out to be the telephone since 1866. In that year, he discovered that in his speech experiments with tuning forks he had unknowingly repeated Helmholtz's experiments for determining the musical tones of vowels. This led to one of the great "mistakes" of modern technology. Bell got hold of Helmholtz's book and, being unable to read the German text, concluded wrongly, from the diagrams, that Helmholtz had transmitted vowel sounds by electricity. Obviously, if vowel sounds could be sent, then so could consonants, and hence ordinary speech. Years later, long after he had learned of his error, Bell would admit that if he had been able to read German he might never have commenced his experiments.

When he first met Gardiner Hubbard at the deaf children's school in 1872 Bell had been in the U.S. only one year and was just getting introduced to the stimulation of the nation's intellectual and scientific center. Caught up in the excitement over telegraphy, he began working on a scheme he called the harmonic telegraph for transmitting several messages simultaneously over a single wire. The following year, he began teaching speech at Boston University and conducting some of the experiments that, by the summer of 1874, would lead to his basic conception of the telephone. He also took on Mabel Hubbard as a private pupil. Although she didn't like him at first, their relationship deepened until the fall of 1874, when he first paid a social call at the elegant Hubbard home on Brattle Street in Cambridge.



Gardiner Greene Hubbard

Gardiner Hubbard later recalled what happened on that visit: "He [Bell] had been playing upon the piano, and, I think, stopped, and . . . asked if we knew that if he sung to the piano a corresponding note would reply. He said that was not only true but that if a telegraph wire was connected with the note of a piano and a sounding board or musical instrument at a distance and a current of electricity carried over it, the sound could be transmitted by telegraph, and that it could be adapted by using the different notes to represent a dot and a dash for a telegraph. When I asked him what would be the value of it, he replied that he thought it would be of great value, as all the different notes could be sent over the same wire, so that one wire could do the work of thirty or forty. I told him I had been interested many years in the postal telegraph and telegraphy in general, and that if he had an invention of that kind I should have no objection to furnishing the funds to take out a patent, as one of my oldest friends in Washington had great skill in that matter and considerable experience in telegraph patents."

Soon afterwards, the seeds of the Bell Telephone Company were planted when Hubbard and Thomas Sanders agreed to support Bell's harmonic telegraph experiments in return for a share in the patent rights. Sanders was a well-to-do businessman who had furnished money for some of Bell's previous experiments in return for Bell's help in caring for his deaf-mute son George.

A meeting with President Orton

Around the same time, in 1874, Bell learned that, during the summer, a Chicago electrician named Elisha Gray had transmitted musical tones "that were distinctly audible at the receiving point over an unbroken circuit of 2400 miles." In its report on the gadget, which Gray called a telephone, *The New York Times* for July 10 quoted a Western Union official as saying "that in time the operators will transmit their own voices over the wires and talk with one another instead of telegraphing."

News of Gray's invention naturally disturbed Bell and, spurred on by Hubbard and Sanders, he put aside his telephone ideas and concentrated on his harmonic telegraph. With the help of a young machinist named Thomas A. Watson, Bell pursued his work in the grimy three-story electrical shop of Charles Williams, where, only six years earlier, a country boy named Thomas Edison had been tinkering with his own scheme for a multiple telegraph.

By February 1875, Bell and Watson had been able to make their device work, and, on February 19, Bell and Sanders entrained for Washington to show it to their patent attorneys. They no sooner had set up their equipment at Hubbard's Washington home when Bell was startled to learn that he would be meeting shortly with none other than President Orton of Western Union.

Bell described what transpired to his parents in a letter of March 5.

One of the first things I did on reaching Washington was to set up my apparatus so as to make four stations, A, B, C, D. My wish was to illustrate

that a message could be sent from B to C at the same time that a message passed from A to D.

I had four cells of a battery, but no acids. In order to have plenty of battery power, that the thing might work well enough, I wished [sic] six cells and a mixture of bi-chromate of potash with some acid (I forget what).

There was only one electrician in town, and I went to him for everything, unfortunately giving my name.

He sent me down two cells of Lockwood's battery, and I was surprised that the young man who brought them came right into the parlor and stared about, to see what kind of instruments I had got.

Still further was I surprised to find that the two cells he brought would not work.

The young man came back with the bi-chromate solution for the other cells, but I had my suspicions aroused and did not use the solution.

To add to my distress Mr. Hubbard informed me that Mr. Orton (the president of the Western Union Telegraph Company) would be round in half an hour to see my instruments.

"The Western Union" is probably the largest corporate body that has ever existed.

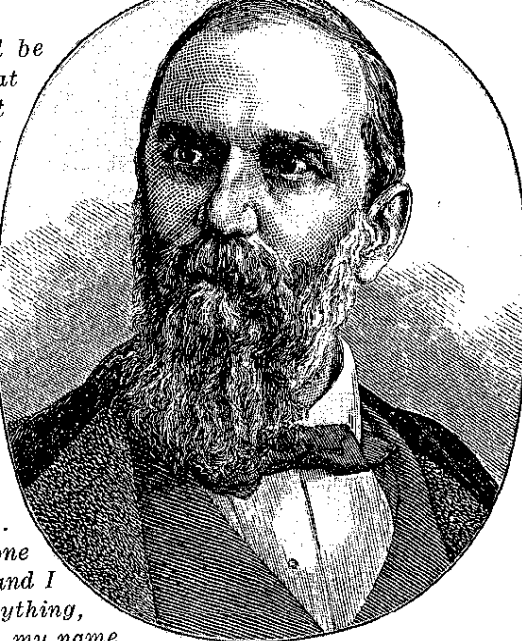
It controls more miles of telegraph wire than there are in the whole of Europe! It was, therefore, important to have my instruments in good shape. I did my best by getting nitric acid and sulphuric acid to get the cells I had in working order. I sawed a large carbon in two, borrowed a couple of slop-basins and had the whole in working order just half a minute before Mr. Orton made his appearance. The instruments, by good luck, never worked better. Mr. Orton was very much interested, and said he would like to see me again, but had to go to New York that night.

Two days afterwards I was in the Capitol seeing the Senate, when a gentleman came up and tapped me on the shoulder. It was Mr. Orton. He told me that the Western Union would be glad to give me every facility in perfecting my instruments, and he gave me a hearty invitation to take my apparatus to New York, and I should have the assistance of their best electricians.

They have a special experimental room, and have at instant command thousands of cells of battery, and thousands of miles of real line wire to test with.

Mr. Orton said further, that he wished me distinctly to understand that Western Union had no interest in Mr. Gray or his invention.

Orton might have been telling the truth. That fall, Hubbard had had more than one conversation



William Orton

with Orton about Gray's invention and later testified that Orton considered it "a very curious invention . . . but that he did not see that it could be of any practical value, though of great theoretical interest." Only a few months earlier, Orton had announced to the world "a discovery that may be called the solution of all difficulties in the future of telegraphic service." This was the quaduplex telegraph, which had been developed by Thomas Edison under patents controlled by Western Union. The benefits of the invention were, coincidentally, reported in *The New York Times* of July 10, 1874, directly above the news of Gray's invention. "In one instant it will quadruple the usefulness of the 175 000 miles of wire owned by the Western Union Telegraph Company. It is a new process of multiple transmission by which two messages can be sent simultaneously in the same direction over the same wire and either message can be dropped at any way station on the circuit."

But so far as Bell's invention went, why Orton should have been interested in it was explained in that same letter:

There are two rival telegraph companies . . . The Western Union and the "Pacific Line."

The Western Union have hitherto enjoyed a monopoly. But last year a man invented a method of sending four messages simultaneously along the same wire, and the Pacific Telegraph Company bought his patent for seven hundred and fifty thousand dollars (\$750 000).

The result has been that the Pacific Company has been able to reduce their prices so as to compete successfully with the Western Union.

Now my invention comes out as a means by which thirty or forty messages may be sent simultaneously, and by which intermediate stations may communicate with one another. If the Western Union take it up it would enable them to recover lost ground. At all events it is evidently a good time to bring out the invention. I visited the Western Union telegraph headquarters in New York on my way here. I have made arrangements to spend Saturday and Sunday every week in New York at the West. Un. Building.

I am to have the assistance of Mr. Prescott . . . , so now I feel that all is plain sailing if I can prove priority.

On February 27, Bell, Hubbard, and Sanders formalized their earlier agreement to share equally in Bell's telegraphic inventions, including "any further improvements he may make in perfecting said inventions of improvements." This simple agreement, notes Robert Bruce, author of the recent biography *Alexander Graham Bell and the Conquest of Solitude*, marked the beginning of what eventually became the largest single business enterprise in history.

Orton drops his mask

In mid-March, Bell visited the Western Union headquarters offices in New York City where, as

The birth of the telephone

In 1913, Alexander Graham Bell's assistant, Thomas Watson, addressed the newly organized Telephone Pioneers of America at its annual meeting in Chicago on the "birth and babyhood" of the telephone. When he came to speak of that spring evening in 1875 (see text), Watson related how Bell said, "Watson, I want to tell you of another idea I have, which I think will surprise you." I listened, I suspect, somewhat languidly, for I must have been working that day about sixteen hours with only a short nutritive interval, and Bell had already given me during the weeks we had worked together, more new ideas on a great variety of subjects, including visible speech, elocution and flying machines, than my brain could assimilate, but when he went on to say that he had an idea by which he believed it would be possible to talk by telegraph, my nervous system got such a shock that the tired feeling vanished. I have never forgotten his exact words; they have run in my mind ever since like a mathematical formula. 'If,' he said, 'I could make a current of electricity vary in intensity precisely as the air varies in density during the production of a sound, I should be able to transmit speech telegraphically.' He then sketched for me an instrument that he thought would do this, and we discussed the possibility of constructing one. I did not make it; it was altogether too costly and the chances of its working too uncertain, to impress his financial backers—Mr. Gardiner G. Hubbard and Mr. Thomas Sanders—who were insisting that the wisest thing

for Bell to do was to perfect the harmonic telegraph; then he would have money and leisure enough to build air castles like the telephone.

"During the winter and spring of 1875, . . . when I was not working for Bell I was thinking of his ideas. All through my recollection of that period runs that nightmare—the harmonic telegraph, the ill working of which got on my conscience, for I blamed my lack of mechanical skill for the poor operation of an invention apparently so simple. Try our best, we could not make that thing work right, and Bell came as near to being discouraged as I ever knew him to be.

But this spring of 1875 was the dark hour just before the dawn."

On June 2, 1875, the two young men were sweating over a modification of the harmonic telegraph in the attic of Williams' shop. In Watson's words: "I had charge of the transmitters as usual, setting them squealing one after the other, while Bell was retuning the receiver springs one by one, pressing them against his ear . . . One of the transmitter springs I was attending to stopped vibrating and I plucked it to start it again. It didn't start and I kept on plucking it, when suddenly I heard a shout from Bell in the next room, and then out he came with a rush, demanding, 'What did you do then? Don't change anything! Let me see?' I showed him. It was very simple. The make-and-break points of the transmitter spring I was trying to start had become welded together, so that when I snapped

he related it, "Mr. Orton and Mr. Prescott both devoted a large portion of their time in discussing with me the whole plan from its theoretical point of view." Then came a series of tests which, as Bell put it, "went like clock work. The signals," he later wrote, "though feeble, came sharply and concisely through the 200 miles of line wire."

Despite the successful tests, the mood changed dramatically when Bell returned the same afternoon. This is revealed by Bruce, who quotes a subsequent letter to Bell's parents informing them that Orton casually pumped him further on his work and then announced that "that ingenious workman," Elisha Gray, had just visited Orton with apparatus next to which Bell's was "crude." Orton, reports Bruce, then proceeded to point out what a great power Western Union was, and reminded Bell that inventors were apt to overestimate the value of their work. The interview was capped by Orton asking whether Gardiner Hubbard was involved with Bell "in this matter." When the presumably shaken young inventor replied in the affirmative, he was told, "The Western Union will never take up a scheme which will benefit Mr. Hubbard." After that, a "perfectly gentlemanly and polite" William Orton drove Bell to his hotel, promising him all the help Western Union could give but stressing once more that Hubbard could not be involved as he had done too much to injure the company.

According to Bruce, Hubbard (who was in New York that day) immediately offered to withdraw, but Bell would not hear of it. Then, at Hubbard's suggestion, Bell threatened to take his instruments to the rival Atlantic and Pacific Telegraph Company. This seems to have caused Orton to back down to the extent of saying that while Western Union would not help develop something that would benefit Hubbard, neither would personal feelings keep the company from buying a desirable invention. Orton also emphasized that while he would back Gray if Bell went to his rivals, no such arrangement existed at the moment, nor was any contemplated.

This attempted "squeeze" seems to have been the last direct contact between Orton and the tiny Bell group until the famous offer—which I shall discuss shortly—of the telephone patents to Western Union two years later.

From New York, Bell returned to Boston "thoroughly worn out . . . beginning to realize the cares and anxieties of being an inventor." He postponed his classes and returned to telegraphy, but his heart does not seem to have been in it. Technical difficulties were encountered, but perhaps, too, his traumatic encounter with Orton in New York unconsciously held him back, making him a trifle less interested in building a multiple telegraph and perhaps more ready to concentrate on his long-simmering ideas for transmitting speech. He had discussed these ideas with Joseph Henry at the Smithsonian Institution while in Washington, D.C., and the world-renowned scientist had advised him that he had "the germ of a great invention" and that he should work at it himself rather than permit others to perfect it.

A few months after his Washington trip, there came an evening that may well have marked the psychological turning point for Bell. As described in the editorial box (left), Bell, that evening, turned to Watson saying, "I want to tell you of another idea I have, which I think will surprise you." The other idea was, of course, "to transmit speech telegraphically," and the realization of that goal took place shortly afterward, on June 2, 1875, a date Watson always remembered as marking the birth of "the speaking telephone."

The months following the exhilarating discovery of June 2 were turbulent ones for Bell. He became engaged to Mabel Hubbard, for one thing. And for another, he kept at his telephone research despite the skepticism of his father-in-law, who would have preferred that he devote his efforts to the multiple telegraph. Finally, on February 14, 1876, his application for the telephone patent was filed in Washington. By an amazing coincidence—one that was to cause Bell no end of grief in the years to come—the filing was followed within only a few hours by the filing of a caveat (a warning only of intent to invent) by none other than Elisha Gray, covering "the art of transmitting vocal sounds or conversations telegraphically through an electric circuit."

the spring the circuit had remained unbroken while that strip of magnetized steel by its vibration over the pole of its magnet, was generating that marvelous conception of Bell's—a current of electricity that varied in intensity precisely as the air was varying in density within hearing distance of that spring. That undulatory current had passed through the connecting wire to the distant receiver which, fortunately, was a mechanism that could transform that current back into an extremely faint echo of the sound of the vibrating spring that had generated it, but what was still more fortunate, the right man had that mechanism at his ear during that fleeting moment, and instantly recognized the transcendent importance of that faint sound . . . The shout I heard and his excited rush into my room were the result of that recognition. The speaking telephone was born at that moment."



Thomas A. Watson, 1874

The proprietors of the Telephone, the invention of Alexander Graham Bell, for which patents have been issued by the United States and Great Britain, are now prepared to furnish Telephones for the transmission of articulated speech through instruments not more than twenty miles apart. Conversation can be easily carried on after slight practice and with the occasional repetition of a word or sentence. On first listening to the Telephone, though the sound is perfectly audible, the articulation seems to be indistinct; but after a few trials the ear becomes accustomed to the peculiar sound and finds little difficulty in understanding the words.

The Telephone should be set in a quiet place, where there is no noise which would interrupt ordinary conversation.

The advantages of the Telephone over the Telegraph for local business are:

1st. That no skilled operator is required, but direct communication may be had by speech without the intervention of a third person.

2d. That the communication is much more rapid, the average number of words transmitted a minute by Morse Sounder being from fifteen to twenty by Telephone from one to two hundred.

3d. That no expense is required either for its operation, maintenance, or repair. It needs no battery, and has no complicated machinery. It is unsurpassed for economy and simplicity.

The Terms for leasing two Telephones for social purposes connecting a dwelling-house with any other building will be \$20 a year for business purposes \$40 a year, payable semiannually in advance, with the cost of expressage from Boston, New York, Cincinnati, Chicago, St. Louis, or San Francisco. The instruments will be kept in good working order by the lessors, free of expense, except from injuries resulting from great carelessness.

Several Telephones can be placed on the same line at an additional rental of \$10 for each instrument, but the use of more than two on the same line where privacy is required is not advised. Any person within ordinary hearing distance can hear the voice calling through the Telephone. If a louder call is required one can be furnished for \$5.

Telegraph lines will be constructed by the proprietors if desired. The price will vary from \$100 to \$150 a mile; any good mechanic can construct a line; No. 9 wire costs 8½ cents a pound, 320 pounds to the mile, 34 insulators at 25 cents each; the price of poles and setting varies in every locality; stringing wire \$5 per mile; sundries \$10 per mile.

Parties leasing the Telephones incur no expense beyond the annual rental and the repair of the line wire. On the following pages are extracts from the Press and other sources relating to the Telephone.

GARDINER G. HUBBARD.

CAMBRIDGE, MASS., MAY, 1877.

For further information and orders address

THOS. A. WATSON, 109 COURT ST., BOSTON.

The first telephone advertisement.

Nevertheless, on March 7 (a remarkably short time since his application, which attests to the originality and importance of his invention), Bell's patent was granted. Mabel Hubbard would write her fiancé that he had triumphed over "the colossal power" of Western Union and of William Orton whom she described as "almost the most powerful man in this country and willing to spare no expense, honest or dishonest, to conquer you."

After this, "matters began to move more rapidly," recalled Watson, "and during the summer of 1876 the telephone was talking so well that one didn't have to ask the other man to say it over again more than three or four times before one could understand quite well, if the sentences were simple." In June, the whole world learned of the invention through its successful demonstration at the Centennial Exhibition in Philadelphia; in the fall, Bell and Watson laid the multiple telegraph aside forever; in January 1877, Bell received a second telephone patent (for an "Improvement in Electric Telegraphy"); in April, a line was connected between Williams' shop and home, and Bell could write Mabel, proudly, "The first telephone line has now been erected and the telephone is in practical use."

Western Union says no

Despite his successes during these months, Bell's financial affairs were precarious. Desperately anxious to get married, he went on the lecture circuit with his telephone. Although the profits were disappointing, they were apparently sufficient

to forestall the remedy Mrs. Hubbard seems to have been pushing—the outright sale of the telephones rather than the leasing of them, which her husband preferred. As Watson circumspectly explained: "Some of the ladies deeply interested in the immediate outcome were strenuously advocating at this critical juncture making and selling the telephones at once in the largest possible quantities—imperfect as they were. Fortunately for the future of the business the returns from the lectures that began at this very time alleviated this danger."

Mrs. Hubbard's concern was understandable. She was anxious for Mabel to be married, and she also enjoyed a standard of luxury that earlier correspondence suggests was quite important to her. During the 1872 debate over his telegraph bill, Gardiner Hubbard had written his wife, "The thought of one day giving you an abundance of the good things of this world keeps up my courage." Consequently, there must have been considerable anxiety over Hubbard's affairs, for by July 1877 he was describing them as "entirely deranged by the adverse circumstances of the past few years." Most of the money for the fledgling Bell enterprise was coming from the merchant Thomas Sanders, who, by March 1878, would have sunk almost his whole fortune of \$110,000 into the venture.

Nevertheless, somewhere along the way, Hubbard conceived a solution to his financial difficulties that would have been far more drastic than the selling of individual telephones. His solution was the now legendary offer of the Bell patents to Western Union for \$100,000.

Strangely enough, although this offer is mentioned in almost every book on Bell and the industry, there seems to be almost no evidence of it. We don't know when the offer was made, or precisely why it was rejected. Bell biographer Robert Bruce places it during the late fall or winter of 1876-77, but adds that there is no mention of it in Bell's private correspondence, which is surprising when one considers Bell's volubility concerning so many other events. Two scholars who examined the Western Union Company's "President's Letter Books" for that period found no mention of it, nor has any mention of it been found in Hubbard's surviving letters to Bell. (In 1928, Bell's secretary, Catherine MacKenzie, wrote in her biography of Bell that he used to say *he* had made the patent offer in person but had been shown out when it was learned Hubbard was a backer. However, continues her account skeptically, "No evidence to support or to disprove this has been available to the writer.") Indeed, the only evidence that it even occurred is the following gleeful recollection, in 1913, by Watson:

"At about this time Professor Bell's financial problems had begun to press hard for solution. We were very much disappointed because the president of the Western Union Telegraph Company had refused, somewhat contemptuously, Mr. Hubbard's offer to sell him all the Bell patents for the exorbitant sum of \$100,000. It was an especially hard blow to me, for while the negotiations were pending I had had visions of a sumptuous office in the Western Union Building in New York which

I was expecting to occupy as Superintendent of the Telephone Department of the great telegraph company. However, we recovered even from that fiasco. Two years later the Western Union would gladly have bought those patents for \$25 000 000."

Despite the lack of documentation, this incident is invariably used as a prime example of technological myopia, cropping up frequently in surveys of forecasting boners. This may well be due to the existence of a "report" that has appeared in the engineering literature on several occasions during the past two decades at least. This document—always good for laughs and, consequently, adorning the walls of many an office—reads as follows:

For further reading

For readers who wish to probe beneath a surface this article could only skim, the writer recommends starting with two excellent, heavily documented books on which he relied considerably: Robert V. Bruce's *Bell: Alexander Graham Bell and the Conquest of Solitude* (Little, Brown and Co., 1973) and Matthew Josephson's *Edison* (McGraw-Hill, 1959). Then, for the early years of the telegraph industry, including the Hubbard-Orton controversy, the reader might consult Lester G. Lindley's doctoral dissertation (Rice University, 1971) *The Constitution Faces Technology: The Relationship of the National Government to the Telegraph, 1866-1884*. Another relevant dissertation is Rosario J. Tosiello's *The Birth and Early Years of the Bell Telephone System, 1876-1880* (Boston University, 1971). Five earlier books particularly worth reviewing, although hard to find, are: *Edison—His Life and Inventions* (F. Dyer, T. Martin, and W. Meadowcroft, Harper & Bros., 1929); *Menlo Park Reminiscences* (F. Jehl, Edison Institute, Dearborn, Mich., 1937); *Alexander Graham Bell*, by his long-time secretary Catherine MacKenzie (Houghton-Mifflin, 1928); *Beginnings of Telephony* (F. Rhodes, Harper & Bros., 1929); and Thomas Watson's autobiography *Exploring Life* (D. Appleton and Co., 1926). As for actual source material, the thousands of pages of testimony from the 20-odd years of telephone litigation that relate directly to Bell were edited and published in two works available in the Bell Collection at the Library of Congress, and the AT&T Historical Collection. These are *The Bell Telephone*, published by the company in 1908, and *Proofs by and about Alexander Graham Bell*, by the company's chief counsel James Storrow. Much of Bell's correspondence cited in this article is here, along with his detailed deposition explaining the conception of the telephone. *The Narrative History of the Litigation on the Bell Patents, 1878-1896* by Charles Swan (Storrow's assistant) is a must for anyone who would explore that legal thicket, while the *Journal of the Telegraph*, *Scientific American*, and *Frank Leslie's Illustrated Weekly* from that period provide informative as well as colorful accounts of the technical progress as it occurred. Finally, a comprehensive chapter on Theodore Vail and the growth of AT&T under his leadership is provided in Robert Sobel's *The Entrepreneurs* (Weybright and Talley, 1974).

November 15, 1876

Chauncey M. Depew, Esq.
President, Western Union Telegraph Co.
New York City

Dear Mr. Depew:

This committee was formed at your request to consider the purchase of U.S. Patent 174,465 by the Western Union Company. Mr. Gardiner G. Hubbard and Mr. A. G. Bell, the inventor, have demonstrated their device, which they call the "Telephone," for us, and discussed their plans for its use.

The "Telephone" purports to transmit the speaking voice over telegraph wires. We found that the voice is very weak and indistinct, and grows even weaker when long wires are used between the sender and receiver. Technically, we do not see that this device will ever be capable of sending recognizable speech over a distance of several miles.

Messrs. Hubbard and Bell want to install one of their "Telephone" devices in virtually every home and business establishment in the city. This idea is idiotic on the face of it. Furthermore, why would any person want to use this ungainly and impractical device when he can send a messenger to the local telegraph office and have a clear written message sent to any large city in the United States?

The electricians of our own company have developed all the significant improvements in the telegraph art to date, and we see no reason why a group of outsiders, with extravagant and impractical ideas, should be entertained, when they have not the slightest idea of the true practical problems involved. Mr. G. G. Hubbard's fanciful predictions, while they sound very rosy, are based upon wild-eyed imagination and a lack of understanding of the technical and economic facts of the situation, and a posture of ignoring the obvious technical limitations of his device, which is hardly more than a toy, or a laboratory curiosity. Mr. A. G. Bell, the inventor, is a teacher of the hard-of-hearing, and this "Telephone" may be of some value for his work, but it has too many shortcomings to be seriously considered as a means of communication.

In view of these facts, we feel that Mr. G. G. Hubbard's request for \$100,000 for the sale of this patent is utterly unreasonable, since the device is inherently of no value to us. We do not recommend the purchase.

Yours truly,

(Name Deleted)
for the committee

Unfortunately, this report is suspect on several counts. First, it is misaddressed. Chauncey Depew was never president of Western Union Telegraph (he became a member of the board of directors in 1881). Second, it is unsigned and the original was apparently not on corporate stationery. Finally, its tone seems far too shrill and exaggerated for a report to top management. For various reasons, Bell's invention may well have been considered a toy in the commercial sense, but it is hard to believe an examining committee would have considered it

"wild-eyed" and "idiotic on the face of it."

How did such a document originate? One can speculate along three lines: It could have been a joke. Or it could have been an honest attempt to recreate years later what such a committee might have reported. Or it might have grown out of a confused reminiscence by someone who was aware that Chauncey Depew was offered—and refused, to his everlasting regret—a share in the Bell patents.

Depew's \$200 million chat

The Depew story is fascinating not only in itself but for the additional light it sheds on the Orton-Hubbard relationship. In his autobiography and in a subsequent interview with *The New York Herald Tribune* of August 1, 1926, which appeared under the headline "Chauncey Depew confesses three big mistakes in long career," Depew called the telephone his third mistake, and "the greatest money error I ever made."

In 1876, Depew was attorney for the New York Central Railroad (he subsequently became president and board chairman) and in this capacity was in almost daily contact with Hubbard, who was then an officer of the Congressional Commission for the Improvement of the Mails and the Telegraph. Depew related that Hubbard came to him one day:

He thought he could put a promising investment in my path. He explained that his son-in-law, Bell, while a curious person in many respects was nevertheless a great inventor and that he had at last perfected what he was pleased to call the "talking telegraph."

Money was needed. If I would invest \$10 000 in the company they were forming they would give me a paid-up one-sixth of the whole enterprise, and Hubbard was sure I would make money by it. I asked him to let me think it over awhile, and when he had left I put on my hat and posted right down to see my friend, William Orton, then president of the Western Union Telegraph Company.

On hearing my story, friend Orton laid his hand on my shoulder to make his words the more emphatic, I suppose, and told me in all good faith and complete sincerity to drop the matter at once. He said in the first place the invention was a toy, that Bell could not perfect anything so that it might have commercial possibilities, and that above all, if there was any merit to the thing, the Western Union owned the Gray patents and would simply step in, superseding Bell, and take the whole thing away from him. That cooled me off to an amazing extent. I felt I was out of the deal when I left Orton's office.

However, that same afternoon Hubbard dropped in again to find out if I had made a decision. I told

him what Orton had said, and that I had better drop out of the matter. Hubbard was most vehement then in his deprecation of any chances the Western Union might have to win a patent suit with the so-called Gray patents, which, he said, he knew all about. He told me more of Bell's work and his prospects, and by the time he got through I seemed to be weaned away from Orton and back to Hubbard's side again. So I asked Hubbard to come in and see me the next day, and went home that night actually resolved to risk the \$10 000 in Bell's device on the strength of Hubbard's arguments.

Scarcely had we arisen from the evening meal that day when my friend Orton, of the Western Union, dropped in. He said: "After you left my office I began to worry for fear you would be foolish enough to let Bell have that \$10 000. I know you will lose it if you risk it in that invention, and I do not believe you can afford such a loss. I want to explain further to you

why Bell could not succeed with his device, even if it worked. We would come along and take it away from him, and you would be out of pocket the \$10 000." And so on these lines I chatted it out with Orton—that's the most expensive chat I have had yet!

Next day I told Hubbard I had decided after all not to invest any money with Bell, and, although we argued some more, I stuck to this last decision, and Hubbard went away.

A few months after the above interview appeared, William Langdon, the historical librarian for the American Telephone and Telegraph Co., interviewed Depew, and elicited the fact that he did not know about Hubbard's offer of the Bell patents to Orton.

This led Langdon to speculate that Orton had already declined to buy the telephone when the Depew offer was made, and that this was the basis for Hubbard's antagonism.

"On the other hand," wrote Langdon, "I wonder if by the time Mr. Depew came to him Mr. Orton was not already finding reason to suspect that the Bell Telephone had a value and that he might have made a mistake in not buying it. At the same time I have no doubt that his judgment was still that the Gray patent was superior and would prevail if it came to a contest in our courts. It might well be that the simplest way for Mr. Orton to look out for his Company's interest was to prevent the Bell people from getting any money rather than to let the matter get into the courts."

This begins to suggest why there was very likely much more behind Orton's rejection of Hubbard's offer than the naive myopia many people have perceived. After all, Orton was nobody's fool. Depew considered him "the best informed and most accomplished electrical expert in the country."



Thomas Alva Edison

Scientific American credited him with "a ready appreciation of inventors' work" and with being "quick to advocate the adoption and use of new and improved devices calculated to add to the extension and efficiency of the telegraph system or the convenience of the public."

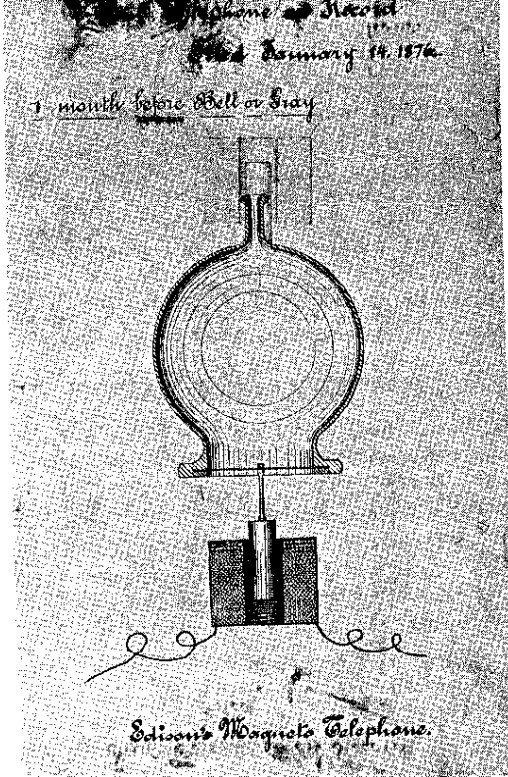
Edison enters the race

Perhaps the best example of Orton's understanding—and the one that makes the Depew "report" so incredible—is that he had been far-sighted enough to put young Thomas Edison on Bell's heels early in 1875, soon after he had learned what Bell and Gray were doing with the multiple telegraph. In fact, this writer strongly suspects that Orton's whole attitude toward the telephone can be understood as resulting from a subtle combination of his dislike for Hubbard and his great confidence in Edison and the other inventors in Western Union's "stable." Ironically, this confidence came tantalizingly close to being totally justified.

Edison had left Williams' shop in Boston early in 1869 and arrived in New York City that summer. He was broke and in debt, but full of ambition. Within two years, his reputation as an "ingenious" inventor had been established and he had landed a contract to build stock tickers for Western Union.

During the next four years, Edison enjoyed a turbulent and sometimes bitter relationship with Western Union and its president that space limitations unfortunately prevent describing here. But two inventions came out of the relationship that are directly relevant to this story. The first of these was the quadruplex, hailed by Orton as "the solution of all difficulties in the future of telegraphic science." This established Edison as an inventor who "never fails in anything he seriously undertakes."

As a result of this success, some months after visiting Bell in Washington in February 1875, Orton engaged Edison to look into the "acoustical telegraph" that Bell and Gray were pursuing. However, Orton may have been after bigger game, for in July he furnished Edison with a German report on a primitive "telephone" that had been made with sausage skin and wood in 1860 by one Philipp Reis. Edison's researches led him to file a caveat on January 14, 1876, which included an apparatus for analyzing sound waves. The apparatus, shown in the accompanying drawing, employed a solenoid connected via a plunger to the base of a resonating metal chamber that acted as a diaphragm. According to Edison's



This drawing from among Edison's laboratory papers claims to show the first telephone on record because it illustrates one of the devices included in a telegraphy caveat Edison filed one month before Bell filed his telephone patent application. Although Edison considered himself to be the first person to use the "magnetotelephone" in acoustic telegraphy, he readily admitted that it had never occurred to him to cause a human voice to vibrate the diaphragm. For this he always gave full credit to Bell.

biographers, he did not try the effect of sound waves produced by the human voice on this apparatus until a few months later when he learned of Bell's telephone demonstration. He went back to his device and found, incredibly, that it was capable of transmitting speech, although apparently crudely. Although Edison always admitted having been after a harmonic telegraph and not a telephone, and that he was "as much astonished as anyone" when he heard of Bell's discovery, we will never know if it was, in fact, Edison's deafness that caused him to put aside his device and not try the effect of sound produced by a human voice, thereby missing the opportunity to become the inventor of the telephone!

It could not have been long after March 1876 that Orton put Edison on a retainer of \$500 a month, in Edison's words, to "take hold of Bell's telephone and make it commercial." According to Edison, attempts to introduce the telephone commercially "failed on account of its faintness and the extraneous

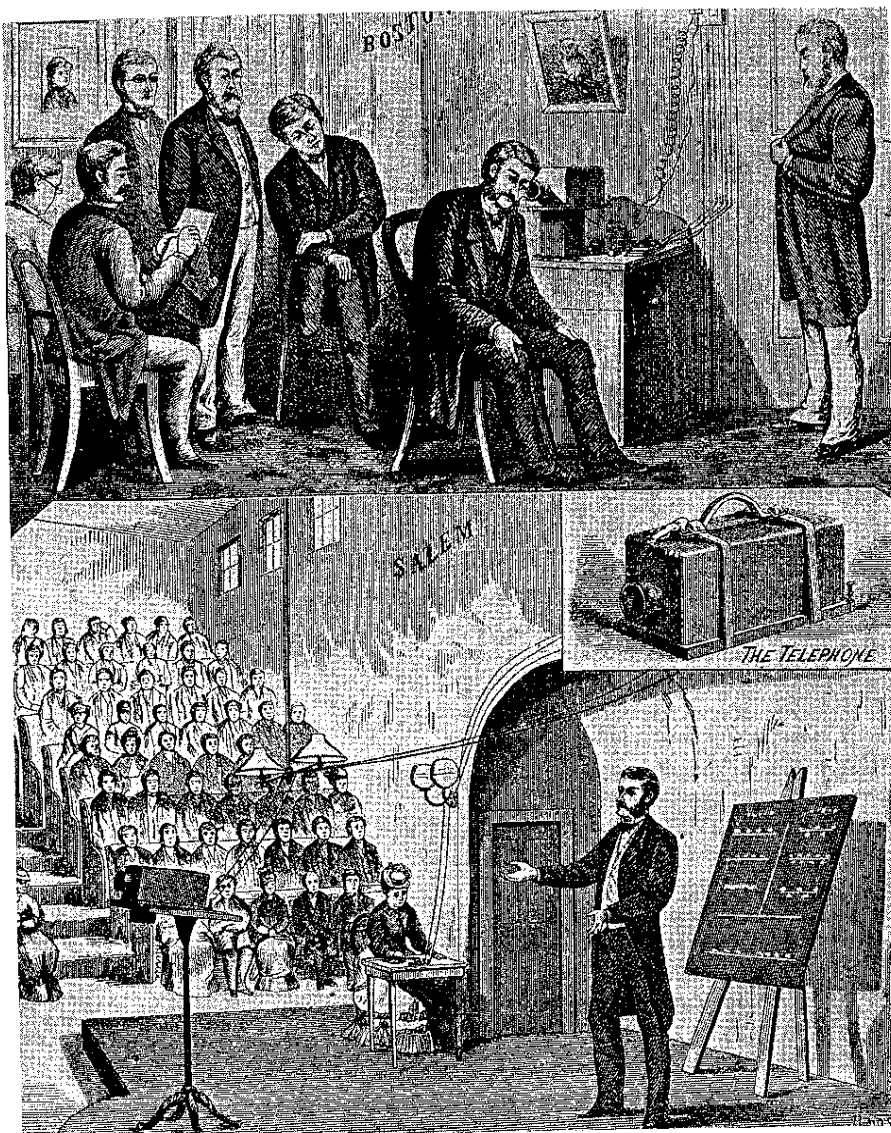
sounds which came in on its wires. . . ."

Orton's confidence in Edison was not misplaced. During the next year he worked with his well-known intensity to raise the telephone volume. One of the weaknesses of Bell's first telephone was that it was actually two receivers, one at each end of the line, and only one person could talk at a time. Edison apparently recognized the need for a separate transmitter, and, by April 1877, had filed a patent for a transmitter he called "more perfect than Bell's." Edison's transmitter embodied two important innovations. Whereas Bell used a vibrating diaphragm to energize a magnet coil and diaphragm at the receiving end, Edison introduced a variable-resistance circuit using graphite-impregnated electrodes and an induction coil. This greatly extended the transmission range and the volume.

A few months later, Edison discovered that a button of pure carbon attached to a metal disk caused an even greater increase in the volume. In short, he had built a microphone, and the carbon transmitter patent he filed in February 1878 proved an enormous asset to Western Union in the furious telephone war in which it was by then engaged with the newly formed Bell Telephone Company.

The great telephone war

The Bell Company had been formally organized in July 1877 (two days before the long-awaited



This woodcut, reproduced from the *Scientific American* of March 31, 1877, shows Bell lecturing to an audience at Salem, Mass. At the same time, Bell's telephone, shown placed before his audience, is connected up to his laboratory, 14 miles away in Boston.

wedding of Alex and Mabel), and by fall it had placed nearly 1000 telephones in operation. By then, whatever doubts Orton may have actually had about the commercial value of the new invention were clearly gone. In August, he ordered Western Union's top expert and Edison's first partner, Franklin Pope, to make "a full and careful investigation of the subject of telephony with a view to acquiring such patents as would enable the Western Union to use the telephone in connection with its business."

Pope reportedly was given all possible assistance, including every publication that could be found from the past 50 years on electricity and acoustics and the services of a scientific translator familiar with eight languages. After a few months of investigation, Pope concluded that Elisha Gray's patents would control the use of the telephone, and he recommended their acquisition.

Emboldened by Edison's progress with his transmitter, Orton apparently heeded Pope's advice. In December 1877, he organized the American Speak-

ing Telephone Company, which picked up the important patents and claims of Edison, Gray, and others, and entered direct and bitter competition with the tiny Bell interests. The giant corporation (it was capitalized at the then-astronomical sum of \$40 million) opened its own telephone exchanges, cut rates (and, it was alleged, Bell wires), and rented its own telephones, which it claimed used Gray's receiver and Edison's transmitter. Edison summarized the battle with wry brevity: "... the fight was on, the Western Union pirating the Bell receiver and the Boston company pirating the Western Union transmitter."

The beleaguered Bell Company fought back on two fronts — technological and legal. Tom Watson (by now superintending all telephone manufacturing and development work) hired the immigrant Emile Berliner, who had filed a caveat for a variable-pressure transmitter just 13 days before Edison's first transmitter application. This enabled the Bell Co. to file an interference against Edison's transmitter, thereby tying his patent application up in litigation that was not settled in his favor until 1892!

Meanwhile, in March 1878 Western Union had filed a block of interferences against Bell's patents on behalf of Gray and several other inventors. These were the first of more than 600 suits to be fought in courts high and low over the next 18 years—and were to cause Bell considerable anguish, even though his claim was always upheld.

The most important of these suits came in September 1878, when the Bell Company retaliated by seeking an injunction against a Western Union agent, Peter Dowd, who was renting Western Union telephones in Massachusetts. Western Union based its defense on the work of Gray, whom the company claimed as the principal inventor. When the case was settled by consent, in the fall of 1879, it would establish the fact that the Bell Company's most powerful opponent no longer disputed the Bell patents.

Western Union hangs up

Since this consent agreement marks the end of the conflict, I will turn now to a brief summary of

the rocky path that led to it.

During 1877 and 1878, both parties realized competition would benefit no one and that some sort of settlement should be reached if at all possible. Feelers were put out, and on February 8, 1878, one of Edison's associates wrote him from Chicago that "it seems quite well understood here that the Bell party will come into the Western Union camp and I think it is the sensible thing for them to do. The way to make money in the telephone field is to join forces and present a solid front. There will be enough of the spoils to satisfy all if the basis of agreement is equitable."

For some reason, quite possibly the old personal antagonism between Hubbard and Orton, this particular merger fell apart within the next two weeks. But in April, the personal factor was eliminated forever. On a Sunday evening, after a ride in New York's Central Park, 52-year-old William Orton suffered a fatal stroke. In a special memorial edition, the *Journal of the Telegraph* reported that he had been about to go on a three-month vacation and that at times he "appeared to suffer from excessive weariness and occasionally complained of severe headaches." Adding that the company had never been stronger or with such an apparently brilliant future before it, the editors also claimed that Orton "was much interested in the telephone and believed that while as yet crude and imperfect it would ultimately be perfected so as to be of much greater practical value commercially than had as yet been demonstrated."

Some indication of the strain Orton must have been under is provided by a letter his Washington lobbyist sent Edison on April 22: "Orton was a giant among pigmies on Broadway and Dey St. . . . when he was Orton he was a kind hearted man and if he had not been worn down by the hungry stockholders he would have been a different man."

With Orton gone, a settlement would undoubtedly be easier. Testimony on the Dowd case began in January 1879 and negotiations looking toward a possible settlement were begun as early as April. Western Union's chief counsel, George Gifford, was apparently convinced of the validity of Bell's patent and his strategy was to try and convince the Bell Company that although it controlled the principle of telephony, Western Union controlled the instruments by which it was commercially feasible; hence, he reasoned, the patents should be combined and a company formed in which each side would own 50 percent. A clue to Western Union's interest in settling is provided in a letter from Orton's successor, Norvin Green, to Edison on December 26, 1878: "I am quite satisfied there never has been a dollar of profit to any proprietor operating the telephone; and unless the competition is speedily reconciled and better prices obtained, there never will be."

The Bell Company refused Gifford's proposal, but the principals continued negotiating directly. This resulted in the famous agreement of November 10, 1879, by which Western Union admitted the validity of the Bell patents, agreed to retire from the telephone field, and assigned all its telephone patents to the Bell Company. In return, the Bell

Company agreed to pay Western Union 20 percent of all royalties received from telephone rentals over the next 17 years and to keep out of the public telegraph message business.

Why such a drastic settlement, particularly when Western Union might well have hung on for years while it looked for ways to buy out the Bell Company or otherwise throttle it? The answer does not lie in a failure to recognize the importance of the telephone. Rather, it seems to lie in a fear of the predatory actions of Jay Gould, a figure who loomed much larger in the events of the period than this article has had space to explain. Gould was a man of whom Edison said, "His conscience seemed to be atrophied, but that may be due to the fact that he was contending with men who never had any to be atrophied." In May 1879, Gould had launched one of his periodic attacks on Western Union. This time, he organized a competing telegraph company and, at the same time, began buying telephone exchanges and making motions in support of the Bell Company in its fight against Western Union. Western Union's stock plummeted, and the decision to settle with Bell was probably based on a desire to ensure the security of its telegraph monopoly. Moreover, Western Union did receive a very handsome price. As the annual report for 1880 said: "The effect of the settlement was the termination of expensive and hazardous litigation, securing to this Company protection from competition and a valuable franchise, and establishing the value of assets held by the Gold and Stock Telegraph Company [Western Union's telephone subsidiary] at least one and one half millions greater than they were before the settlement was made." Indeed, over the next 17 years Western Union received nearly \$7 million in royalties from the Bell Company. But ironically, while Western Union's settlement was probably sound business strategy at the time, within a year Gould gained control of the company anyway.

There is a further irony to the story. The old instinct for eliminating competition never died completely, and the year 1908 saw the consummation, if only briefly and incompletely, of the marriage that almost was. One of Gardiner Hubbard's master strokes, before he lost the helm of a near-bankrupt Bell Company early in 1879, was to hire the brilliant Theodore Vail as general manager. Vail played a key role in the Western Union fight and, later, in laying the foundations for the AT&T we know today. In 1908, aiming to make AT&T the only significant force in communications in the U.S., he engineered the purchase of enough Western Union shares to gain working control of the company. But five years later, antitrust pressure forced him to unload, thus ending forever his dream of a single company. ♦

This writer wishes to acknowledge particularly the valuable assistance of Lewis S. Gum, of AT&T, and Arthur R. Abel, of the Edison National Historic Site, in making accessible to him a wealth of archival material. In particular, all illustrations with the exception of those showing Edison and his telephone device were supplied by the AT&T Photo Center. The two involving Edison were supplied by: U.S. Department of the Interior, National Park Service, Edison National Historic Site.