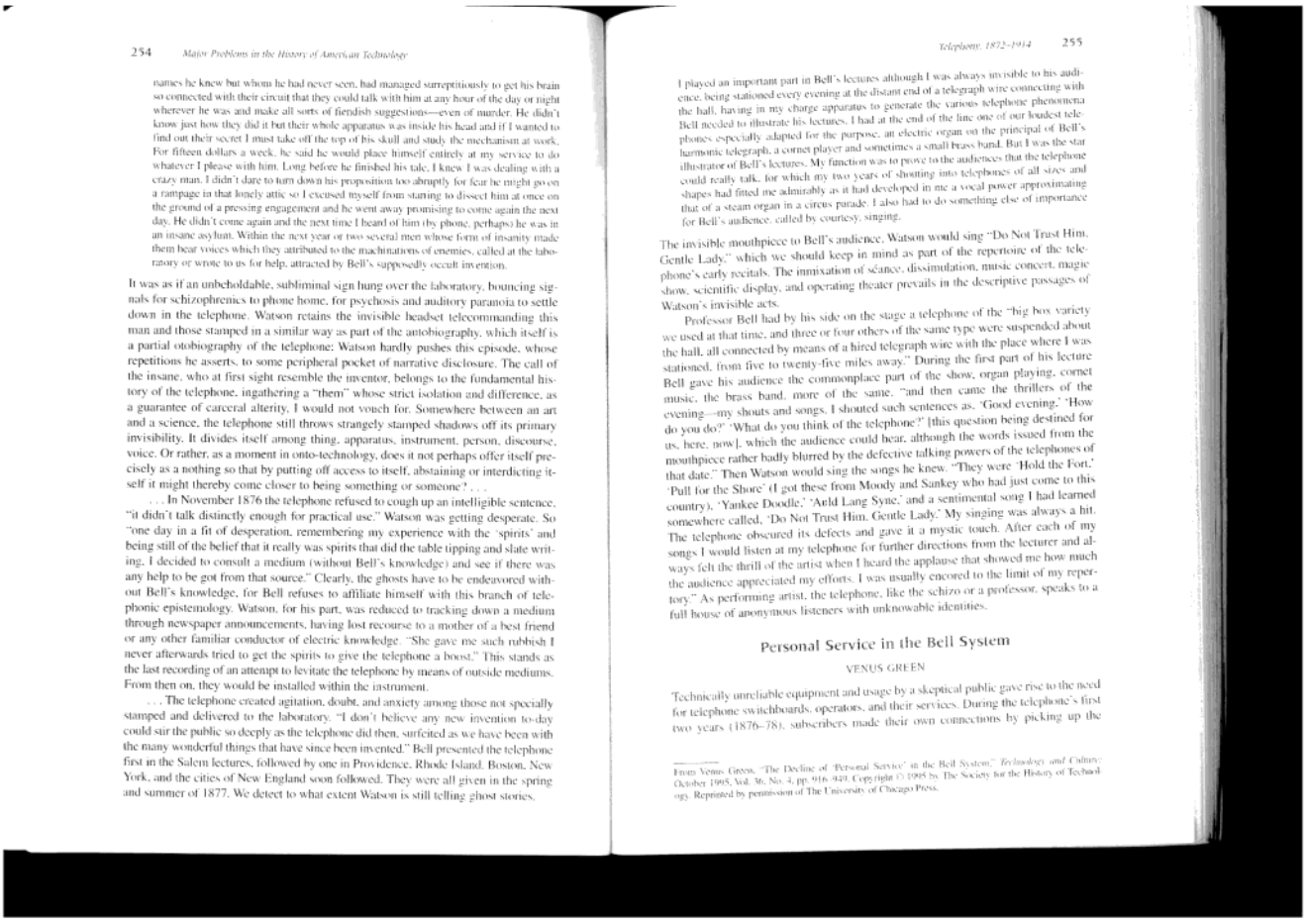
Day 13: Smith & Clancy 2

Sunday, October 18, 2020 1:28 PM



names he knew but whom he had never seen, had managed surreptitiously to get his brain so connected with their circuit that they could talk with him at any hour of the day or night wherever he was and make all sorts of fiendish suggestions—even of murder. He didn't know just how they did it but their whole apparatus was inside his head and if I wanted to find out their secret I must take off the top of his skull and study the mechanism at work. For fifteen dollars a week, he said he would place himself entirely at my service to do whatever I please with him. Long before he finished his tale, I knew I was dealing with a crazy man. I didn't dare to turn down his proposition too abruptly for fear he might go on a rampage in that lonely attic so I excused myself from starting to dissect him at once on the ground of a pressing engagement and he went away promising to come again the next day. He didn't come again and the next time I heard of him (by phone, perhaps) he was in an insane asylum. Within the next year or two several men whose form of insanity made them hear voices which they attributed to the machinations of enemies, called at the laboratory or wrote to us for help, attracted by Bell's supposedly occult invention.

It was as if an unbeholdable, subliminal sign hung over the laboratory, bouncing signals for schizophrenics to phone home, for psychosis and auditory paranoia to settle down in the telephone. Watson retains the invisible headset telecommanding this man and those stamped in a similar way as part of the autobiography, which itself is a partial otobiography of the telephone; Watson hardly pushes this episode, whose repetitions he asserts, to some peripheral pocket of narrative disclosure. The call of the insane, who at first sight resemble the inventor, belongs to the fundamental history of the telephone, ingathering a "them" whose strict isolation and difference, as a guarantee of carceral alterity, I would not vouch for. Somewhere between an art and a science, the telephone still throws strangely stamped shadows off its primary invisibility. It divides itself among thing, apparatus, instrument, person, discourse, voice. Or rather, as a moment in onto-technology, does it not perhaps offer itself precisely as a nothing so that by putting off access to itself, abstaining or interdicting itself it might thereby come closer to being something or someone? . . .

. . . In November 1876 the telephone refused to cough up an intelligible sentence, "it didn't talk distinctly enough for practical use." Watson was getting desperate. So "one day in a fit of desperation, remembering my experience with the 'spirits' and being still of the belief that it really was spirits that did the table tipping and slate writing, I decided to consult a medium (without Bell's knowledge) and see if there was any help to be got from that source." Clearly, the ghosts have to be endeavored without Bell's knowledge, for Bell refuses to affiliate himself with this branch of telephonic epistemology. Watson, for his part, was reduced to tracking down a medium through newspaper announcements, having lost recourse to a mother of a best friend or any other familiar conductor of electric knowledge. "She gave me such rubbish I never afterwards tried to get the spirits to give the telephone a boost." This stands as the last recording of an attempt to levitate the telephone by means of outside mediums. From then on, they would be installed within the instrument.

. . . The telephone created agitation, doubt, and anxiety among those not specially stamped and delivered to the laboratory. "I don't believe any new invention to-day could stir the public so deeply as the telephone did then, surfeited as we have been with the many wonderful things that have since been invented." Bell presented the telephone first in the Salem lectures, followed by one in Providence, Rhode Island, Boston, New York, and the cities of New England soon followed. They were all given in the spring and summer of 1877. We detect to what extent Watson is still telling ghost stories.

I played an important part in Bell's lectures although I was always invisible to his audience, being stationed every evening at the distant end of a telegraph wire connecting with the hall, having in my charge apparatus to generate the various telephone phenomena Bell needed to illustrate his lectures. I had at the end of the line one of our loudest telephones especially adapted for the purpose, an electric organ on the principal of Bell's harmonic telegraph, a cornet player and sometimes a small brass band. But I was the star illustrator of Bell's lectures. My function was to prove to the audiences that the telephone could really talk, for which my two years of shouting into telephones of all sizes and shapes had fitted me admirably as it had developed in me a vocal power approximating that of a steam organ in a circus parade. I also had to do something else of importance for Bell's audience, called by courtesy, singing.

The invisible mouthpiece to Bell's audience, Watson would sing "Do Not Trust Him, Gentle Lady," which we should keep in mind as part of the repertoire of the telephone's early recitals. The immixation of séance, dissimulation, music concert, magic show, scientific display, and operating theater prevails in the descriptive passages of Watson's invisible acts.

Professor Bell had by his side on the stage a telephone of the "big box variety we used at that time, and three or four others of the same type were suspended about the hall, all connected by means of a hired telegraph wire with the place where I was stationed, from five to twenty-five miles away." During the first part of his lecture Bell gave his audience the commonplace part of the show, organ playing, cornet music, the brass band, more of the same, "and then came the thrillers of the evening—my shouts and songs. I shouted such sentences as, 'Good evening,' 'How do you do?' 'What do you think of the telephone?' [this question being destined for us, here, now], which the audience could hear, although the words issued from the mouthpiece rather badly blurred by the defective talking powers of the telephones of that date." Then Watson would sing the songs he knew. "They were 'Hold the Fort,' 'Pull for the Shore' (I got these from Moody and Sankey who had just come to this country), 'Yankee Doodle,' 'Auld Lang Syne,' and a sentimental song I had learned somewhere called, 'Do Not Trust Him, Gentle Lady.' My singing was always a hit. The telephone obscured its defects and gave it a mystic touch. After each of my songs I would listen at my telephone for further directions from the lecturer and always felt the thrill of the artist when I heard the applause that showed me how much the audience appreciated my efforts. I was usually encored to the limit of my repertory." As performing artist, the telephone, like the schizo or a professor, speaks to a full house of anonymous listeners with unknowable identities.

Personal Service in the Bell System

VENUS GREEN

Technically unreliable equipment and usage by a skeptical public gave rise to the need for telephone switchboards, operators, and their services. During the telephone's first two years (1876–78), subscribers made their own connections by picking up the

From Venus Green, "The Decline of 'Personal Service' in the Bell System," *Technology and Culture*, October 1995, Vol. 36, No. 4, pp. 916–949. Copyright © 1995 by The Society for the History of Technology. Reprinted by permission of The University of Chicago Press.

phone and talking directly to the person called (usually signified by the number of rings). One wire connected each subscriber to the other, so there were as many wires as each subscriber had access to other people. Technicians invented exchange systems and switchboards so that all lines would come into a central office where they could be connected to other lines through a switchboard, eliminating all except one wire (or later a pair of wires) to the subscriber. Subscribers simply cranked up their magneto generators (used until common battery power became available) and waited for the operator. At the switchboards, operators performed various physical motions to connect the calls. Alone, however, these switchboard operations hardly convinced an incredulous public of the telephone's usefulness.

In its infancy, telephony competed with the telegraph as a method of communication, and telephone companies competed among themselves for hegemony over the entire business. The telephone industry realized that it would have to expand the functions of a telephone exchange beyond a simple connection. Even before the preference for female operators had been completely determined, telephone managers catered to the special needs of businessmen. In 1880, for example, the Metropolitan Telephone and Telegraph Company of New York City devoted an exchange of 58 Broadway almost exclusively to the service of "bankers and brokers" and one at 38 Whitehall Street to "produce and commission merchants." Specialized attention quickly developed into a profitable means of attracting new customers. Within the context of industrial expansion and competition, the meaning of telephone service changed from the simple notion of connecting two lines to providing an assortment of conveniences.

At the National Telephone Exchange Association meeting in April 1881, C. C. Haskins of the American District Telephone Company of Chicago presented a paper to executives from Bell and the independent telephone companies in which he defined "anything which may demand the service of the exchange instruments . . . as an auxiliary system; or at least *an auxiliary service*." Auxiliary services provided by his company included "sending for a third party for the purpose of communication, the use of a messenger to convey a written message which has been transmitted by telephone, calling for police, the fire department, a carriage of physician" and the "summoning of a lawyer to attend a case in court." Exchange connections with a system of burglar alarms and a "*watch signal service*, by which a constant check (was) held over private watchmen in charge of property belonging to subscribers" could also be obtained. And, on a more individual level, "parties desiring to be called at an unusual hour in the day, either by telephone bell or by a messenger, have repeatedly availed themselves of this method for ensuring their engagements."

Other companies supplied "reserved seats for places of amusement" (i.e., theater tickets), notification of the precise time in Connecticut manufacturing communities, special lines for rural areas, and, for San Francisco's subscribers, an information bureau. Most Bell companies provided messenger service, news, racing results, time, weather, election results, football and baseball scores, and other auxiliary services at a minimum charge or none at all.

Some managers questioned the profitability of connecting fire alarm systems, but the majority agreed with W. H. Eckert of Cincinnati who drew attention to the long-range profits obtainable from the good public relations generated by auxiliary services. He stated: "We cannot afford to put ourselves in an awkward position as

against the fire department or the insurance people. I have found that by making love to them I am making love to our profits in about the same proportion. It increases our subscribers and puts everybody on the side of the telephone." Consequently, managers expected the first operators, regardless of gender, to possess the necessary skills both to manipulate the switchboard and to stimulate goodwill among the subscribers.

Faced with competition and severe equipment problems, Bell executives quickly transformed auxiliary services into "personal service" as a means to capture and dominate the industry. For the Bell manager, "the personalization of the service (meant) . . . a service that is not only as nearly perfect technically as possible, but that is as pleasing as possible to the telephone user." In the early years, however, the imperfect equipment impeded connection services and the "pleasing" aspect became an important method of attracting new customers and soothing old ones frustrated by the constant technical problems. The pleasing aspect would transcend superficial niceties to give the subscriber service of substance. Personal service meant that each subscriber could immediately reach an operator who would accommodate his demands. And, equally significant, the subscribers would not be required to exert themselves a great deal to receive the service. Bell companies aimed to distinguish their services by offering businessmen attention similar to that given by domestic servants in the 19th-century home—efficient, confidential, and above all courteous.

In this era, executives believed that girls, socialized to defer on the basis of class, gender, and age, best qualified to give the kind of service Bell envisioned. Managers created a social and cultural relationship with the customers by employing young, single, native-born white women to cater to bourgeois concepts about servitude. Usually denied access to technologies, women, Marvin postulates, could have been hired only on the basis of these notions about class. It was necessary, she posits, "to make clear" that the "accommodating" telephone girl "was only a servant, not truly a member of the class to whose secrets she had access." Philadelphia managers, struck with this image of servitude, required operators "to wear a black uniform throughout summer and winter, with small, short, white aprons." . . .

The operator's role as a servant whose responsibility was to "satisfy" the "peculiarities" of each subscriber is also indicated by the Bell System's commitment to requiring the subscriber to work as little as possible when using the telephone. . . .

At their earliest meetings and conferences and in every form of company literature (instruction manuals, pamphlets, company newspapers and magazines, and circulars), telephone managers emphasized the importance of courtesy. As New York Telephone Traffic Manager J. L. Turner explained: "The words used by the operator are almost entirely prescribed in her rules. It is the voice expression, therefore, that she must supply in order to convey to the subscriber . . . the idea of pleasing and intelligent service as well as the mere courtesy of the operator." The operator should be "able to answer in such a manner that her subscriber immediately responds with a feeling of pleasure, whether expressed in so many words or not, 'Aha! There's my obliging operator. *She'll* give me what I want.'" If the operator could not oblige the subscriber, another emotion had to be communicated. When she said "Cortlandt 5-9-8-0 is *busy*" it would be with a sympathetic tone to convey "I am *sorry*, Mr. Smith. But I cannot give you what you want."

Customers rewarded many operators with letters of appreciation and gifts, while they punished others with complaints according to their perception of competence.

Pioneer operator Jessie Mix remembered that businessmen "used to send us boxes of candy and flowers and drop in to see us from time to time, and on occasions some of the livery stables, like Barker and Ransom's, would put a horse and carriage or sleigh at our disposal, and take the girls on a picnic." Another pioneer operator recalled that "boxes of candy, bottles of perfume, flowers, gloves, handkerchiefs, groceries and even turkeys were among the more common gifts." Eventually the telephone companies officially stopped this practice, yet it continued well into the 20th century in small towns, isolated communities, and even parts of some large cities.

But it is subscribers' complaints, rather than their generosity, that demonstrate more fully what they expected from the telephone exchange. With regard to call connecting, subscribers vigorously complained about slow pickups and disconnects, cutoffs, wrong numbers, false busies, no answers, and discourteous or impertinent behavior. . . .

However, subscribers resisted attempts to appease their grievances against structural and organizational changes that required work on their part. For example, they objected to having to re-call the operator whenever they reached a busy line or received no answer. They wanted telephone operators to call them back on busies and no answers long after the growth of telephone service and technological development had made this impractical. Subscribers also opposed calling by number instead of names. They did not want the responsibility of looking for numbers in the directory. Even though operators in larger exchanges had been instructed by the late 1880s to make connections by numbers only, subscribers continued to resist.

In 1902, for example, a *Boston Post* article criticized New England Telephone and Telegraph Company's rule about connecting by number only. Insisting that operators knew the most frequently called numbers anyway, the *Post* concluded that "the rule will break down of its own weight. It is easier for an operator to make the connection than to waste time arguing with the subscriber." As late as 1911, D. Lewis Dorroh, a lawyer from Greenville, South Carolina, sued Southern Bell Telephone and Telegraph Company over this issue. . . .

Dorroh and other subscribers' sense of entitlement had not only been encouraged by the company, it also had been nurtured by the operators. Frances Oberbeck, who began her telephone career in 1883 at St. Louis, explained that the early central office operators had "a general understanding that everyone was to do her best. We were all intensely loyal to the company." The pioneer operators encouraged subscribers to depend on them for services that exceeded call processing. Operators knew each customer by name, business, and personal needs. Some knew their customers' morning telephone routines so well they sequentially called each person the subscribers spoke with daily without being told to do so.

When businessmen placed phones in their homes, their wives often demanded a variety of domestic chores from the telephone operator. Occasionally, "mothers who wished to go out for afternoon tea or a meeting of the 'Dorcas Society' would leave their babies near the telephone with the receiver off, optimistically hoping that if the infant awoke . . . , it would cry and the operator . . . would call up the mother at the scene of the festivities." More frequently, the housewife would ask to have herself awakened from an afternoon nap. And when the housewife expected visitors who would not leave unless the telephone rang, she simply "prearranged calls from obliging operators." Bell System literature often boasted about the many domestic favors

operators provided during the early days, and no evidence has been found to suggest that the operators objected to these menial tasks.

Indeed, operator's reminiscences record their willingness to go beyond the normal call of duty. Miss E. Newell of Stockton, California, recalled that operators adhered to the motto: "Give Service, no matter what happens!" There are accounts of heroism by operators who saved lives and property in situations which called for immediate, intelligent, and calm decision making. Operators halted robberies, attempted murders, and other crimes by quickly alerting the authorities. They saved hundreds of lives by calling doctors in acute medical situations and by alerting communities to impending dangers such as fires, floods, and hurricanes. Many operators lost their own lives by refusing to leave the switchboard before they warned everyone of an emergency. One famous story is that of Sarah J. Rooke of Folsom, New Mexico, who in August of 1908 remained at her switchboard notifying the village of an advancing flood until she was swept away. Neighbors found her body several miles below the village with "the headpiece, worn by telephone operators, still gripped [to] her ear." Operators sincerely felt the devotion and selflessness required to give personal service.

Women who put their "personal" in personal service thereby gave the Bell companies an edge against competitors. Bell managers used the idea of servitude as a marketing tool to expand their business. Bourgeois subscribers, accustomed to having servants, bought telephone service based on the expectation that operators would serve. And operators internalized these expectations and behaved accordingly. This cultural system resisted the change implicit in the dial system. As we shall see, the introduction of dial occurred when the most significant aspects of the subscribers' and the managers' cultural expectations regarding telephone service had nearly disintegrated.

Although imperfect in conception and implementation, the idea of automatic systems arose almost simultaneously with manual systems. M. D. Connolly, T. A. Connolly, and Thomas J. McTighe received the first patent for an automatic system in 1879, only a year after the first successful manual exchanges had been put into operation. This system never actually operated on a commercial scale, but it did establish a foundation for later work. Indeed, technicians patented and offered for sale more than eighty-six automatic systems, devices, and improvements between 1879 and 1898. Bell patent attorney Thomas D. Lockwood reviewed many of these new systems and approved the purchase of some as a safeguard against the future. Lockwood remained convinced, however, that automatic switching lacked any immediate value and that manual systems were inherently superior. Nonetheless, Bell executives, cognizant of the many claims made by inventors of automatic features, permitted their own engineers to work on various design projects for such features.

At first, Bell System engineers invented various types of automatics in an attempt to solve the high cost of providing service to small towns where there were not enough customers to justify the salary of an operator or even twenty-four-hour service. . . . At this time, Bell managers viewed automatic switching systems as temporary measures to provide service for thirty to forty-five subscribers. Such systems would inevitably be replaced by full manual systems when the number of subscribers exceeded these limits.

. . . Bell managers resisted automation because they were convinced that manual switching was technically superior and that an operator was needed to deliver high-quality personal service.

Not everyone, however, viewed depersonalization in negative terms. On the expiration of the Bell patents in 1894, independent companies hastily installed automatic exchanges to provide more formidable opposition to the Bell monopoly. In 1889 Almon B. Strowger (1839–1902), a schoolteacher turned undertaker who was reputedly angered by what he felt was too much personal contact, invented an automatic exchange for the elimination of operators. One version of the story claims that "he heard that one of his friends had died, and was very put out by the family's failure to turn to him to make the funeral arrangements. He conceived a strong animosity to telephone operators, suspecting them of having diverted the call of the bereaved family to one of his competitors, and he decided on a drastic remedy, to do away with telephone operators altogether." . . .

Since the first Strowger systems did not include dials, subscribers had to perform a number of operations to complete a call, pushing ones, tens, or hundreds buttons a specified number of times to register the number of the subscriber they wanted to call. Once the correct buttons had been pushed, the subscriber operated another button to ring the recipient. At the conclusion of the conversations, the subscriber pushed a button and hung up the receiver. Independents introduced dials in 1896, but the Bell System regarded the operation of dials as a considerable amount of work for the subscriber.

. . . Snubbed by the Bell System, Strowger allied with two other inventors to form what became the largest and most successful automatic telephone company and telephone equipment manufacturer in the United States, the Strowger Automatic Telephone Exchange. On November 3, 1892, the first commercial Strowger automatic exchange was installed at La Porte, Indiana. This system and its numerous improvements established the foundation for all automatic equipment of the step-by-step type.

Summarizing a report on the Romaine-Callender Automatic Exchange, Lockwood suggested to President Hudson that Bell "decline to identify . . . with the invention" because

> . . . the mechanism must be more costly than ordinary mechanism.
>
> . . . the said machine is inherently complex in the extreme.
>
> The increased complexity involves increased liability to get out of order, and this in turn makes the practically constant attendance of a skilled artisan a necessity.
>
> The strongest assertion made in behalf of the economy of such apparatus is that by its use, the operator may be dispensed with.
>
> But the operator is not a very costly appliance, considering that she brings to her work (theoretically at least) a modicum of human intelligence, and introduces elements conspicuous only by their absence in the automatic apparatus, to wit, elasticity of operation, the power of meeting irregular and chance contingencies, and the power of dealing with the public.

Most Bell System managers agreed with Lockwood that in exchange for the elimination of low-paid operators the first automatics entailed higher installation and maintenance costs due to the wages paid to skilled craftsmen, unreliable equipment, and limited types of services. Of course, "the power of dealing with the public" still concerned managers in 1893. While AT&T's long-distance, toll, and other services continued to require operators, independents could and did achieve savings because they operated few toll lines and provided no long-distance service. Economically, according to Lockwood, automatics were "no saving." . . .

Even without automatic switching, new machinery eroded many aspects of personal service. Aside from speeding up the operators' work pace and therefore increasing productivity, the introduction of various technical innovations significantly changed everything about operating, including the workday, training, discipline, and working conditions. One of the first noticeable changes was the gradual shift in operators' responsibilities. A typical operator in 1885 reported to work, made her morning tests by checking each subscriber's line, placed calls by name (even in New York City), called back on busy and no-answer calls, listened in on conversations to ensure that people were talking (disconnecting them if they were not), and performed innumerable personal services. Depending on the type of manual board used, each operator handled calls for fifty to 100 subscribers.

The major changes in operators' work resulted from breakthroughs in switchboard development. The introduction of the "multiple" switchboard during the latter 1880s and early 1890s led to growth in the number of subscribers but partially removed the possibility of operators knowing each subscriber by name. Multiple switchboards could place as many as 10,000 subscribers within the reach of each operator. The operator could connect each of 100 subscribers (whose names she did know and for whom she was directly responsible) to any of the 9,900 others. On the multiples, operators connected calls by number. Using numbers instead of names distanced the operator from the subscriber and signified one of the earliest retreats from personalized service. When common battery power displaced magnetic generators in the mid-1890s, it also lessened contact between the operator and the subscriber by eliminating the need for the morning tests.

. . . Despite the impact of these changes on personal service, however, an important distinction in managerial motives requires clarification.

In the 19th century, management's aims in switchboard development were more complex than simply increasing the operators' productivity. Depersonalization occurred as a by-product of Bell's efforts to use new technologies to defeat competition. New switchboards required different operating techniques that sometimes distanced the operator from the subscriber. In this sense, managers sought control over the workplace more for service stability than for higher operator productivity. With better switchboards, operators provided better service. In the 20th century, however, managers deliberately used scientific management techniques and technology to depersonalize operators' work and thereby increase their productivity. As before, depersonalization was economically motivated, but the impact on the subscribers and the operators was different. Ultimately, depersonalization led to the collapse of any cultural link between the subscribers and the operators.

. . . In 1902, the Bell System opened its first formal training school, where it indoctrinated operators with the expectations of a rationalized/scientifically managed work environment. Aside from instruction in the physical operation of the switchboard, operators learned a specific group of verbal phrases to be used with subscribers. Although courtesy remained a requirement, there could be no deviation from these phrases.

The degree to which the Bell System sought to establish preset terminology had been demonstrated in 1899 when New York Telephone's Western Division superintendent called the Yonkers manager's attention "to the rule prohibiting the use of the word 'hello!' for any purpose or at any time." The word was "not only meaningless," according to the superintendent, "it [was] confusing to subscribers" and also "cause[d] delay in the service. Operators were instructed to respond to subscribers by saying "number, please." This helped to diminish the friendly and spontaneous exchanges that had been so important in the first years of telephony.

Even if operators had been allowed to speak freely, they would not have said much because they were also placed under strict time limitations. AT&T expected operators to answer calls with 5 seconds, but they accepted 10 seconds as "a reasonable standard of service." New York Telephone and other associated companies, faced with an immensely higher traffic than the long-distance company, had established a more strict standard by 1911. New York Telephone required operators to answer or disconnect calls within an average of 3.5 seconds. . . .

Codification of methods for enforcing new procedures and the technologies for detecting deviations from the code developed rapidly after 1900. For example, AT&T's rigidly specific "Traffic Department Operating Instructions" dated November 1, 1910, were five times larger than the broad guidelines of the 1897 "Rules for the Government and Information of the Employees." And the No. 1 Relay switchboard, the main distributing frame, automatic call distribution, and service observing procedures enabled managers to supervise operators technically as well as physically. Kathering M. Schmitt, manager of the first telephone operating school, stated that the uniformity of equipment completed in New York by 1901 led to a "uniformity of operating practices" which in turn made possible uniform training of operators.

Depersonalization, however, did not occur in a uniform pattern. Even among managers of the largest exchanges, the concept of personal service declined slowly. In 1904, for example, Philadelphia operators still re-called subscribers on all "busy" and "no answer" responses. William R. Driver, a local manager, explained: "If a subscriber makes a call and we receive it and acknowledge it, we are then his agent or servant to see that it is completed. The idea of his having to give us his order two or three times before we complete it for him, is treating the public and the subscriber in a very discourteous and unkind way." As late as 1907, the president of the entire Bell System, F. P. Fish, reiterated AT&T's position on automatic switching: "It is clear to us that the Automatic System is not desirable. It simply throws upon the subscriber the work which should be done and which can be better done at the central office. It is no more 'secret' than the Manual System. . . . There are many objections to the Automatic System, which I am satisfied are conclusive against it as compared with the Manual System. Yet despite these objections to automatic systems the era of the friendly operator giving individualized attention and assorted information to subscribers was ending. . . .

. . . During the competitive era (1894–1914), the Bell System managers had many opportunities to voice their objections to total automation. In this period aggressive advertisements by independent telephone companies made extraordinary promises. The Automatic Telephone and Electric Company of Illinois, for example, claimed the following advantages: "Immediate connection with the number desired. . . . Entire absence of the frequent tedious delays occasioned by indifference of operators or inability to handle business as promptly as desired, and the equally frequent and unsatisfactory response to calls, 'They're busy.' . . . Absolute secrecy of conversation. . . . Continuous service, both day and night. . . . lower rental. . . . Perfect adaptability to the smallest towns and villages, as well as cities. . . . Impossibility of interruption or disconnection during conversation. . . . [The independent phone companies' ads all] emphasized the elimination of operators, reduced costs, and better transmission. . . .

Southern New England Telephone Company prepared a detailed brief against the Automatic Electric Company's campaign to win Connecticut over to automatic telephone service in 1904. . . .

As they attacked the independents . . . Southern New England managers clung to the necessity of having operators in the central office:

> The history of the manually operated switchboard abounds in instances where, in case of fire, assault and robbery, the manual operator has been able to summon assistance at all hours, day and night, and to bring to the aid of the subscriber, in such cases, the help of neighbors, of the police or of the fire department or of all of them together. . . .
>
> If there were no operator, and the automatic machinery at the subscriber's station and at the central office were employed, the would-be telephone user, who is oftentimes a mother or daughter or child, alone in the threatened household, would, in the excitement or danger of the moment, be unable to manipulate the automatic machinery and to do correctly all of the other things required before a call for help can be sent. This automatic system cannot be operated by the subscriber in the dark.

It is ironic that this argument was based on asserting the helplessness of females as it simultaneously affirmed the woman operator as the protector of the community at large.

Ma Bell's Road Trip

BRUNO LATOUR

As in Machiavelli's *Prince*, the progressive building up of an empire is a series of decisions about alliances: With whom can I collaborate? Whom should I write off? How can I make this one faithful? Is this other one reliable? Is this one a credible spokesperson? But what did not occur to Machiavelli is that these alliances can cut across the boundaries between human beings and "things." Every time an ally is abandoned, replacements need to be recruited; every time a sturdy link disrupts an alliance that would be useful, new elements should be brought in to break it apart and make use of the dismantled elements. These "machiavellian" strategies are made more visible when we follow scientists and engineers. Rather, we call "scientists" and "engineers" those subtle enough to include in the same repertoire of ploys human and non-human resources, thus increasing their margin for negotiation.

Take for instance the Bell Company. Telephone lines in the early days were able to carry a voice only a few kilometres. Beyond this limit the voice became garbled, full of static, inaudible. The message was corrupted and not transmitted. By "boosting" the

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From Bruno Latour, *Science in Action* (Cambridge, MA: Harvard University Press, 1987), pp. 124–127, 130–121, 140, 142, 143.