

TAMING NOISY WOMEN:

Bell Telephone female switchboard operators as a noise source

Abstract

This paper focuses on women who worked at Bell Telephone Company in the U.S. during 1930s and 1940s as telephone operators, and the training programmes they went through. Transmission of information depended on their actions because they had to facilitate the switchboards, and therefore, held a crucial position *as part of the communication channel*. Thus, Bell felt they should tune their ‘bad’ behaviour which embodied noise in their systems. In order to maintain equilibrium, Bell enmeshed Michel Foucault’s disciplinary and biopower forms of governmentality and developed a hybrid form. This combination was seen in their flagship training programme, *A Design for Living*, where Bell penetrated operators’ bodies and minds, inside *and* outside work. When the operators revolted, Bell realised power should be exercised through automated dial machines. This would then become an inspiration for cybernetics who aimed to control communication systems that constructed information’s correct behaviour, and consequently users.

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Introduction

This paper explores transition of power relations in the case of the telephone and the struggle over its correct use and functioning. Focusing on Bell Telephone Company¹'s female switchboard operators and the training programmes they went through in the 1930s and 1940s, this article shows how standards of behavior were established in order to construct a norm. Most of the literature on telephone operators has limited the analysis to 1920s² and examined how telephone companies constructed a standardised norm of operators' bodies. This article focuses on the two following decades, stopping before the conversion to automatic switching technology that occurred at the end of the 1940s, when telephone users were able to 'dial' themselves, and operators became redundant.

The end of the 1940s also represents the emergence of cybernetics. The year 1948 saw Claude Shannon's monumental *A Mathematical theory of communication* and Norbert Wiener's book introducing this new approach. Cybernetics is a term taken from the Greek word 'steerman' meaning 'to govern', which was their main focus – Control and communication of animal and machine systems. Cybernetics' main figures came from Bell, who saw the human nervous system as a machine, and vice versa. Therefore, the transition to the telephone's dial automation, which delegated operators' work to machines, can be seen as an inspiration to the development of cybernetics.

As the abnormal form of information, noise has been associated with statistical irregularities or unwanted sounds which must be controlled or eliminated³. A closer examination shows that Bell attempted to control not only the noise of mechanic objects or sound frequencies but also that of their female telephone operators' bodies, minds and time. The equation of systemic-mechanic noise with operators' undisciplined bodies expresses a change in scale and operation of power relation.

These kinds of power relation transformations are the main focus of Michel Foucault's work on modes of governance. Foucault takes a genealogical approach to examine technologies of power and knowledge. According to him, there are three predominant modes of governmentality: sovereignty, discipline and biopower. They arrive one after the other, but they do not disappear, and residues of the previous forms of power persist. As Foucault argues regarding what would develop as biopower: 'This technology of power does not exclude the former, does not exclude disciplinary technology, but it does dovetail into it,

integrate it, modify it to some extent, and above all, use it by sort of infiltrating it, embedding itself in existing disciplinary techniques'⁴.

In disciplinary mode of governance people are controlled directly and individually through institutions such as the school, prison and hospital. With biopower, Foucault⁵ introduces a new framework where new models of ruling came to life, to control life, which he calls the *arts of government*. In the new form of governmentality the focus is on populations, and governing entails a continuous and active control over their bodies, preferences, and behaviors. Although Foucault concentrates on the role of the state, it is safe to say that Bell as part of American Telephone and Telegraph Company (AT&T) operated a strategy of governance.

Biopower, Foucault argues, is characterised by more intervention of scientific and biological management, policing of fertility, and subjectification of populations, all rationalised by its main tool - statistics. The population must be taught and understand specific daily conduct, which is then supervised, observed, and managed by *raison d'État*, but also by the citizens themselves in a process of self-regulation (deployed by and on themselves, and their close surrounding). The reason of the state is thus a practice that presents itself as a rationalised given and at the same time it is in a process of construction. Bell had its own reason, and the way that it was deployed upon female telephone operators will be elaborated below.

Feminising the telephone

In the first decades of the telephone, in order to make a connection between subscribers a manual mediator in the form of a telephone switchboard operator was needed. These positions were firstly given to boys, however, they were considered to be rude and pranksters. The first female telephone operator was Miss Emma Nutt, who was employed in 1878 by Alexander Graham Bell and opened the way to what would become by the 1880s a women's only domain. According to Venus Green, in those years the service that telephone operators offered helped to preserve social classes, because Bell 'presented telephone operators as a group of "compliant" girls who catered to the subscribers' needs just as a personal servant would'⁶. As valuable components in the economical growth of telephone companies, their fine tuning was essential, however, operators did not receive any recognition for their influence on the development of the telephone.

Bernhard Siegert argues that the voice characteristics of women were the reason they were employed to the switchboard operating position, '[b]ecause the frequency range of a woman's voice was more completely encompassed by the frequency band transmitted by the telephone'⁷. He observes that their discursive practices provided the definition of insanity, because they would not be able to talk for themselves, but had to repeat scripted sentences for many hours during their work shifts. Michèle Martin argues that the operators functioned as "mediating" elements in the making of telephone communication. However, she says that:

[T]elephone operators were placed in a paradoxical situation: they represented both a necessary element in and an obstacle to the production of instantaneous private interactive communication. Before the adoption of automatic switchboard, they were essential to making connections between subscribers, but, as "human mediators" whose activities could delay or intrude on the privacy of telephone calls, they were obstacles to the development of the telephone service sought by the companies. The telephone companies attempted to produce operators with particular habits, skills, and attitudes.⁸

Martin emphasises privacy as a factor that could be interrupted by the operators, however, every aspect of their behaviour could potentially become a noise factor, because they were *part of the communication channel*. Their correct etiquette was essential to the smooth and frictionless communication between subscribers, and therefore their bodies and minds were designed and managed like the rest of Bell's media apparatus. Their femininity, adds Martin, was used by the telephone companies to sell the telephone service in what she terms "labour of love". Similarly, in Italy's early telephone days operators 'became objects of sexual desire, but they were also considered women of easy virtue; they seemed to embody the figure of the new emancipated woman but also symbolised the inefficiency of *the manual* compared to the efficiency of *the automatic*'⁹. Operators were simultaneously the medium and the noise source.

According to Lana Rakow¹⁰, it was not only the fact that women were more polite and well mannered that made Bell and other telephone companies across the world hire them – they were cheap labour. Telephone operators were thus objects of desire, but at the same time, they were more efficient and desirable economically. Hence, Bell wanted to maximise these objects' usefulness by standardising, moulding, controlling and managing them according to their needs, just as they did with their inventions. Switchboard operators and the telephone

were mentioned and treated interchangeably from a very early stage. As Carolyn Marvin argues:

Much of the romantic poetry featured as light filler in electrical journals metaphorically identified women with technological objects, both of them properly under male control... Both the women and the telephone were 'inventions' second only to man himself. Sent down to please man, both woman and the telephone were mistaken for toys and turned out to be necessities¹¹.

These women were treated as a tool, an object which can be adjusted, modified, tailored and managed for the sake of a better communication and as a result, for profit. During the 1930s and the 1940s Bell developed training programmes for their female telephone operators which showed an attempt to exercise power and control over every aspect of their lives. These training programmes had been an ongoing project since 1902, however, the two decades discussed in this paper represent a deeper intrusion into female operators' bodies and minds, inside *and* outside the work place.

Designing the perfect (female) model

Training schools for telephone operators emerged in 1902, founded by the management of the Metropolitan Telephone and Telegraph Company and managed by one of the first telephone operators - Miss Katherine Schmitt¹². The realisation that such training needed to be standardised came after the increased use of the telephone and consequently the need for more skilled women who could handle the high traffic of calls with efficiency and uniformity. After going through physical check-ups that assured their bodies, eye sight, hearing and voice were suitable for the position; these women went through voice and pronunciation lessons. The "Voice with the Smile", Bell's famous slogan, was acquired through strict body adjustments, which included shaping 'the use of the tongue, lips, jaws, and posture that would result in proper pronunciation and a tone of eager friendliness'¹³. Designing the perfect voice was important because it was the mediating point between subscribers. Therefore, in order to ensure an efficient transmission it had to be clear, concise and embody the 'tone of service'.

After a short explanation on the functionality of the switchboard, operators were put to work 'learning by doing', familiarising them with the atmosphere of real-time work. Furthermore, there was a deportment card to report transgressions of operators, who were not allowed to

cross their legs, and had to ask permission to blow their nose or wipe their brow¹⁴. Managing operators' practices was not only a task made by their supervisors but also by themselves on their own behaviour. According to Kenneth Lipartito:

[T]elephone companies encouraged operators to fill "scrapbooks" with material bearing on accuracy in work and personal improvement, awarding prizes for the best efforts. The purpose of such policies was to create workers willing to perform their tasks hour in, hour out and to cooperate with their machines as well as their fellow workers. As Katherine Schmitt, Bell's first female supervisor, succinctly remarked, "the operator must be a paragon of perfection, a kind of human machine".¹⁵

Inspired by Frederick Taylor's scientific management approach, Bell broke down the operating service into distinct repetitive stages and aimed to standardise them, while putting strong emphasis on speed. According to Stephen Norwood, slow reactions, disconnections or unanswered calls were followed by punishments, such as lower salary, unattractive shifts or suspension from work. Norwood observes that:

Management believed scrutiny of the operator's performance to be "analogous to the inspection of the product of the factory, telephone service being the product in our case." Engineers responsible for methods and standards devised operating rules and techniques "to give the best possible service with maximum efficiency... under all conditions." To determine "proper standards" for operators' work load – that is, the number of calls an operator was to handle each hour – the engineers used stop watches to time each step of a call "to the exact second"¹⁶.

Bell engineers developed statistical measures to establish behavioural norms for operators to obey. Technological improvement to the switchboard meant that less effort had to be made in order to complete each call, however, it also increased the work pace that was expected from the operators¹⁷. Bell's operators were expected to answer or disconnect calls within a 3.5 seconds average¹⁸. Thus, statistics opened new opportunities to govern and manage operators in the name of efficiency and profit. Bell's earlier measurements of telephone operators' motions were designed to construct the most (cost) efficient norm, but it simultaneously produced what is the irregular, deviant and anomalous. As Ross Ashby argues '*noise is in no intrinsic way distinguishable from any other form of variety*. Only when some recipient is given, who will state which of the two is important to him, is a distinction between message

and noise possible'¹⁹. Noise in this sense took the form of physical malfunction: fatigue, injuries, or mental stability.

German telephone operators, who were employed by the Reichspostministerium (RPM) also experienced ailments and exhaustion from the fast tempo of their work. 'Medical and industrial experts, physiologists, and experimental psychologists weighed in on the subject of the so-called Fräulein von Amt, examining the effects of switchboard work on her body, senses, and psyche and exploring her sexual behavior, her attitudes toward marriage, and her leisure activities'²⁰. Like their American counterparts, German operators went through medical examinations where their bodies and performance were measured statistically. During the 1920s, scientific management, Taylorism and Fordism were imported from the U.S., along with strict surveillance and discipline methods on the operators' service, speed, and leisure time.

The connection between Bell and the RPM was the German psychologist Hugo Münsterberg, who developed tests inspired by Taylor for both companies. Münsterberg used operators to examine adaptation problems to the new rhythms of the work place in order to maximise their performance²¹. The psychotechnician Fritz Giese refined Taylor and Münsterberg's approaches by believing German work science 'should augment them with a concern for the "whole person," body and mind'²². In 1919 the RPM invited him to examine their employees, and Giese who was particularly interested in the operators' free time, analysed them and produced regularity curves. Seeing operators' bodies as thermodynamic systems, Giese designed fitness programmes, a "Taylorisation of the body", which strengthen operators body, and consequently optimised it. Although Andreas Killen argues that Giese designed special training programmes, these are not discussed and his operation did not last past the end of the 1920s. Nevertheless, it is instrumental to show how ideas in Germany about training operators and even cybernetic preceded Bell's venture.

Function follows crises

The financial crisis following the 1929 stock market crash had huge consequences to Bell. According to Jon Gertner, 'between 1930-1933, more than 2.5 million households, most of them Bell subscribers, disconnected from the phone grid'²³. One of the company's responses was to emphasise the service aspect of their business, attempting to make it as pleasing as possible. Only in mid-1930s the situation improved, with increasing subscribers and company revenues. But then when World War 2 (WW2) began in 1939, the opposite situation occurred

– there was high demand but the company could not support all the requests, which resulted in many angry customers. Therefore, Bell’s strategic moves were meant to expand its ability to make a profit from their staff and equipment, and shape their position as a necessary service for all ranks of society.

Bell’s belief in telephone operators as a vital element in their telephone system can be understood by their insistence in keeping them although automatic switching devices (also called ‘dial’) were invented as far back as 1891, by Almon Strowger. The invention was quickly adopted by small independent telephone companies, but only slowly adopted by Bell from the 1920s²⁴. By the end of 1940s three quarters of Bell’s subscribers were using automatic dial systems but telephone operators were still employed, mainly to have a competitive advantage over their rivals²⁵. Part of this approach was influenced by Bell’s disbelief that users can be trusted to use the dial telephone²⁶ correctly: ‘Corporate management had long believed that customers were bumbling amateurs; perhaps it was best after all to continue to rely on the expert skills of the trained technician, the operator’²⁷. Subscribers were harder to control, whereas training programmes could be deployed directly to discipline their operators, who were treated as their own possession to be re-designed and managed under rigid and intrusive measures.

New services

During the 1940s Bell started to offer a service called *Information Service* which was designed to help subscribers find telephone numbers of places or people they did not know. Information operators were expected to find answers to problems and questions people had, in less than half a minute, a predecessor of search engines. The main objective was clear – ‘giving and obtaining complete and accurate information over the telephone and taking advantage of sales opportunities [to] increase the value of the service - which in turn results in its more extended use’²⁸.

Another service was the *Intercepting Operator* who was responsible for monitoring misdirected calls, or calls to telephone numbers which were no longer in service. This operator would interrupt the call and ask the caller ‘What number are you calling, please?’. Then she asked ‘Will you make your call again, please?’ so that the customer will reach the destination. ‘She knows also the number of pieces of equipment in each channel which can be safely “busied out” for maintenance testing without affecting service, and when this number is reached, she takes action to have some of the normal “checking up” by the plant forces

postponed so that the highways of speech may be kept clear for all to use'²⁹. In other words, intercepting operators had to learn how the telephone apparatus and infrastructure worked, and act according to specific situations to reach equilibrium in the most efficient way, just like cybernetics saw automatic machines.

Bell's treatment of women as informational processors, part of their media technologies who facilitated the system *and* were assimilated into it, was a precursor of cybernetics' key concept – Feedback. According to Wiener, feedback is 'the property of being able to adjust future conduct by past performance'³⁰. Operators embodied the feedback loop because of their function as maintaining the equilibrium of the telephone system by providing technical support, and soothing mechanism. When the feedback did not operate properly, it increased undesirable uncertainty (entropy) in the system - they became a noise source.

John Pierce argues that 'cybernetics has laid claim to the whole field of automata or complex machines, including telephone switching systems, which have been in existence for many years, and electronic computers, which have been with us only since World War II'³¹. Operators' functions, which were hard to utilise efficiently and simultaneously by machines, were later delegated to automated systems: determining the calling number; answering calls in the tone of service; soothing angry subscribers; distinguishing, deciding and filtering between noise on the line and a signal; determining the connection wanted by the subscriber (translation between human and machine languages); writing a ticket for billing; remembering what to do in various situations; reporting and fixing malfunctions of the apparatus; and adjusting performance according to previous situations. Therefore, operators embodied several key features of cybernetics that Pierce outlines: detection, s(m)oothing, filtering, prediction of future signals in the presence of noise, storage, memory³². Bell's optimisation of the human nervous system, in the shape of training programmes for operators, then, served as an inspiration for cybernetics.

Bringing back the personal

Personalisation of the telephone service was a common practice since Bell's early years, in order to change the bad impression left from the boy operators. The re-introduction of this approach in the 1940s emphasised personal and friendly service. Telephone operators were expected to behave 'naturally' and spontaneously, and give answers to situations that one might not foresee. The voice's tones had to sound authentic as if conducted in a face-to-face conversation with a friend. The 'tone of the voice' became a programme for new operators to

become friendlier, attentive and pleasing. ‘When a girl speaks too fast or too slowly, speaks either indistinctly or with unusual accent or inflection, or has a voice with extremes in pitch, efforts are made to assist her to conform more closely to tone-of-service objectives and yet retain as many of the individual pleasing qualities of her voice as possible’³³. Overly polite speech that was highly emphasised before the Depression was no longer encouraged, and operators were told that excess use of words such as *please* and *thank you* gave the impression of a formulaic routine, and must be avoided. Specifically:

Simply having the desire to render a pleasing and personal service is not enough.

Activities directed specifically toward developing the right viewpoint include:

- Increased emphasis in training programs on the principles of pleasing tone, voice, and manner.
- Having groups of supervisory employees listen in simultaneously on operators' work, after which all members of the group discuss what has been heard, and reach a common understanding in regard to their individual appraisals of the service, tone, and manner.
- Encouraging all levels of management to use every opportunity to observe the service, tone and manner, followed by a discussion with the force of what was observed³⁴.

Women’s bodies, behaviours and voices were under scrutinised control and inspection. They were constantly monitored and observed by their supervisors and peers in order to achieve what Bell considered the perfect pleasing service. Bell merged Foucault’s discipline and biopower modes of governmentality by using elements of direct discipline as well as self-regulation and observation deployed on themselves and their fellow operators. An example of this hybrid bio-discipline was *Hear Yourself as Others Hear You*, a programme designed for operators to listen to other operators while they were working, and evaluate their service skills from a subscriber’s point of view³⁵. Power was exercised by establishing the norm of operators’ behavior, while punishing those who deviated from it.

A design for living

WW2 brought various governmental restrictions over telephone usage, interfering with Bell’s economical aspirations. The War Production Board orders meant that there were disruptions in the normal telephone service. Subscribers were irritated and annoyed by these limitations,

and Bell felt they had to do everything in their power to keep customers' faith, loyalty and trust. Since Bell operators were considered a pleasing (selling) machine, they were also expected to satisfy the country. Thus, they were also expected to work for free during the war, not only in Bell positions, but also for other governmental agencies³⁶. Operators were designed to increase Bell's sales and stabilise the brand's name and apparatus.

AT&T, the umbrella company of Bell, was extremely concerned with their worker's bodies, and was one of the first corporations to establish a medical department. This department was founded in 1913, and embodied, as Jill Cooper argues 'ambivalent if not conflicting goals, including a desire to mold a compliant and efficient labor force while simultaneously protecting workers' health and safety'³⁷. However, in biopower rationale - exercising power over a population by using techniques of intervening in, and managing bodies - these goals are complementary, not conflicting. According to Cooper, this department helped save AT&T money in providing preventive medical advices and showing they care for their female workers and thus justifying their position as a telecommunication monopoly.

Due to their stressful work conditions, telephone operators suffered from anxiety, fainting, fatigue, nervous exhaustion, headaches, backaches, and strains in their arms, ears and eyes. In order to correct some of these health defects, which Bell blamed on the operators, a training course called *The Health Talk* was invented during the 1920s and was standardised during the 1930s at all the company's training schools³⁸. As essential components of their communication apparatus, Bell could not afford to have damaged products. The politics of life, or biopolitics, went a step further when it came to the intrusion into female operators' bodies and leisure time. Bell women went through health activities invented by the company in 1925, then called *General Health Course for Women* and in 1943 transformed into *Health-Appearance-Personality*. This programme provided instructions on how to take care of themselves and others through nutrition, exercise, and hygiene. Operators' eating habits and diet were also a target for Bell to intrude and regulate. They had to go through another training course called *Food Makes a Difference* that taught them good nutrition and fitness appropriate for war-time³⁹.

This increased intrusion into operators' lives can be seen in one of the flagship training programmes developed by Dr. Theresa Boden, *A Design for Living*. According to Boden⁴⁰, 11,000 women had completed this programme between 1939-1941, which then stopped during 1942 to 1945 so that 'telephone women temporarily set aside their personal goals to

give their free time and effort to the many war activities of those years⁴¹. When the programme restarted in 1945, the name *A Design for Living* was selected, and by 1948 more than 400,000 women are reported to have completed the programme. The programme was described as follows:

Health is not merely the absence of illness. Body, mind, and spirit form the whole being, and to be healthy, a person must be happy. To be happy, an individual needs some variety of interests, and it is toward discovering these that the Design for Living program is directed. Through Design for Living may be developed a more nearly self-sufficient person, free from the frustrations and emotional imbalances which, we recognise today, contribute seriously to many illnesses. We in the medical field believe that personnel activities such as Miss Boden describes are an integral and important part of a program of preventive medicine which should be our greatest contribution to the business⁴².

The programme started in a meeting in 1939, where the Personal Relations Department of AT&T in New York wanted to provide an answer to what they described as requests from telephone women workers for a better use of their leisure time and their individual potential. The department, they argue, felt that the best thing would be to enable these women to reach ‘means for discovering for themselves their real needs and interests – a continuing plan for individual self-development’⁴³. The slogans that accompanied the programme were hung in Bell’s offices saying *What Do You Do with Your Time? And Do You Have A Design For Living?*. According to Bell, this programme gave ‘proof of the variety of interests and needs of the women who... have found through *A Design for Living* new meanings to life’⁴⁴. Thus, operators’ bodies were not the final destination of intervention; their minds, habits and preferences inside *and* outside work were also a source of knowledge that could be harnessed for the benefit of the company.

The programme consisted of ten weekly meetings of groups of ten to twelve women, who would sit around a table and talk about their individual potential, while the discussion was led by a group leader. The programme covered ten topics: conversation (‘the art of making others feel "at home" with you’), speech (‘how to say what you mean; the importance of choosing the right words’), reading, dress and grooming (‘how to look your loveliest’), etiquette (‘answers to your questions on the social rules’), entertaining (‘how to be the perfect hostess; planning parties’), home decoration, managing the family’s money (‘managing your money -

so you don't spend more than you earn'), travel and hobbies ('when to go and what to do with your holiday weeks and week-ends')⁴⁵.

The topic of 'entertaining' meant organising social events for soldiers, where the women were the main attraction. Similarly, in the early days of the telephone in Italy, since subscribers would be exposed to the opposite sex 'female telephone operator became a synonym for "prostitute" and the job considered a dishonourable occupation for a young woman'⁴⁶. A few decades later in United States, it seems that these notions were utilised as a competitive edge, and transformed into a strategy to promote Bell. Telephone operators had to function as hostesses and dance partners in parties Bell had sponsored and the women organised. In addition, operators organised picnics for soldiers, prepared the food and provided services of companionship and romantic partners:

A park was selected for the picnic, the day and the time were named, and the young women were on hand to meet the boys, each with an attractively packed box lunch for two. Each man drew for a box and with it went, as partner for the day, the girl who had packed it. The telephone woman who acted as chaperone said that she had no difficulty getting the party started, but she certainly had a hard time getting the boys headed back to the post on time - they were having such a good time⁴⁷.

Bell saw operators' branded selves as the *Spirit of Service*, which they argued was contagious⁴⁸. However, spirit seemed to have had a wide meaning, which included control over operators' bodies, minds, and time. Importantly, the goal was to bring 'happiness' and 'self-fulfilment' which would prevent frustration that leads to conflicts.

Circumventing dissent

These attempts to penetrate into operators private lives were a way for Bell to circumvent protest and 'militancy'⁴⁹, which were unwanted forms of behaviour that created disruption to their system, a noise source. Forms of organisation and protest of Bell telephone operators started as early as 1907 in San Francisco, whereas in 1919, New England Bell operators gathered a big walkout fighting for wage raise that signalled to the company that they should address what they considered to be dangerous activities⁵⁰. As personnel expert Ordway Tead argued 'it was in management's best interests to try to control informal organisation among employees and to reorient their thinking along more "constructive" lines'⁵¹. Therefore, Bell

developed training programmes for their operators as a noise reduction mechanism, a conversion to the correct behaviour.

One of the solutions Bell found to be useful against operators revolt was counselling. Popular workers were selected to be counsellors but did not require professional training, because their real purpose was not to solve mental or emotional problems. Rather, they were supposed to reduce disquiet and channel attitudes towards 'productive' directions. These counsellor-operators functioned as feedback-loops to stabilise noisy disturbances. Over half a million counselling meeting occurred at Bell between 1936 and 1955⁵². However, the shared experience made in *A Design for Life*, also contributed to a group identity which could turn towards organisation and unionisation, leading to the nationwide telephone strike in 1947 led by the National Federation of Telephone Workers (NFTW):

Women telephone workers and the organisations they built were the backbone of the 1947 nationwide telephone strike... With 350,000 employees on strike, 230,000 of them women, the 1947 telephone strike was the largest walkout of women in U.S history. Carrying signs that proclaimed "The Voice with a Smile Will be Gone for Awhile," around-the-clock pickets paraded throughout the South, the Midwest, and in rural towns across America⁵³.

These women demanded equal pay and other rights in the workplace they were deprived of during WW2, which they had expected to improve once the war ended. Dorothy Cobble observes that the NFTW failed to reach a national contract and regional settlements were made in regards to the operators' demands. Trying to control what Bell women do outside their working hours was a way for Bell to prevent any kind of activity or gathering that involved union organisation, and discussions around their rights and work conditions. As Bell Labs medical specialist argued '[p]eople with interests seldom have time to be frustrated'⁵⁴. Thus, the development of *A Design for Living* along with its counselling treatments contributed to surveillance and biopolitical management of unwanted forms of behaviour. At the same time, it could counter Bell's goals by helping to establish communication and collective action among the women. As Lipartito argues when talking about telephone strikes made in 1917:

The sudden expression of independence among the operators unsettled Bell management. As one member of the corporation observed, unions instilled in operators a "lack of respect for authority" and resulted in "independence of action by

the individual."... Both recognised that the same order and purpose that made for efficient switching could be turned against the company. Because manual switching required machine-like discipline, independence of mind endangered the entire telephone network.⁵⁵

Cybernetics' aim to achieve equilibrium was inspired by Bell's interpretation of the term, which meant efficient transmission of information in minimum time, expense and disturbance. Since this stabilisation was interrupted by the operators' constant rebellious actions, Bell realised that their position should be delegated to machines. Thus, control and power were to be exercised on the population through automatic technologies; the right way to behave with their apparatus was integrated, automated and delegated to their devices, while presented as the only way of usage. As Wiener, argues in 1950 '[a] recent innovation in the technique of telephonic switching provides an interesting mechanical analogy to man's adaptive faculty. Throughout the telephone industry, automatic switching is rapidly completing its victory over manual switching, and it may seem to us that the existing forms of automatic switching constitute a nearly perfect process'⁵⁶. This victory of male's adaptation ability shows how it was achieved by disciplining and managing women and then driving them out of the workforce. Their noise became silenced by automatic machines, where the technique of governing (cybernetics) was in-built, not supplemented.

Conclusion: Better, faster, stronger

The 1929 stock-market crash that led to the Depression along with WW2, made Bell realise the many uncertain conditions that can affect their business. This made them adjust their strategies to exert control and power on the things they owned. Since Bell thought their inventions were relatively perfect, it was necessary to reconfigure and manage the service they provided – the behaviour of their female telephone operators. Noise, was any unwanted form of behaviour in their systems which had to be controlled and managed in order to create a frictionless operation. The huge power they had in the communication market of North America, gave them the authority and ability to make such far reaching intrusions into their female telephone operators' bodies, minds and leisure time.

Bell enmeshed biopower with its disciplinary Taylorist approach, and created a hybrid. This mixed mode of governance was exercised to control telephone operators' behaviour and attitudes within *and* outside the workplace. It stretched the scope of discipline beyond specific institutions and penetrated new territories of life. Both the conceptualisation of 'bad'

human behaviour as noise, and the recognition of humans and machines as equal components of a communication system in Bell's treatment of its operators, would provide the basis for the replacement of human operators by dial switching. Instead of employing and managing noisy operators, they could swap them with automatic machines that could achieve equilibrium through self-governing feedback loops. Thus, Bell exercised its power through in-built black-boxed controlled design, and by doing so decreased both users' ability to disrupt their inventions and the uncertainty (entropy) of their systems.

This also sets the foundation for Shannon and Weaver's conceptualisation of noise, which they developed at Bell Labs in late 1940s. In information theory, they established and legitimised which forms of information should be categorised as statistical irregularities – noise, and which ones should be classified as a (normal) message. That in turn, would lead to the development of cybernetics, as control over systems of communications (animal or machine) would be delegated to automatic machines. These technologies were designed in a specific way to efficiently govern through statistical measures that constructed the right behaviour of information and consequently the users. This introduced the next phase in the evolution of biopolitics as a new form of governance, while integrating it to previous disciplinary techniques. Therefore, this fusion of governance can also be seen as the development of power relation scale and the way it is exercised; controlling, governing and managing people through new extensions and techniques afforded by automated, black-boxed media technologies.

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Notes

¹ For convenience it will be referred to as – Bell.

² Balbi, Killen, Martin, Green, Lipartito.

³ Shannon and Weaver, *A Mathematical*.

⁴ Foucault, “*Society*,” 242.

⁵ Foucault, *The Birth*.

⁶ Green, “Goodbye Central,” 914.

⁷ Siegert, “Switchboards and Sex,” 87.

⁸ Martin, ‘*Hello Central?*’, 50.

⁹ Balbi, “I will”, 71.

¹⁰ Rakow, “Women and the telephone”.

¹¹ Marvin, *When old technologies*, 30.

¹² Barrett, “The changing years,” 106.

¹³ Cooper, “Keeping the girls,” 492.

¹⁴ Collins, *The American*.

¹⁵ Lipartito, “When women,” 1088.

¹⁶ Norwood, *Labour’s Flaming*, 36.

¹⁷ Lipartito, “When women,” 1100.

¹⁸ Green, “Goodbye Central,” 933.

¹⁹ Ashby, *An introduction*, 186.

²⁰ Killen, *Electropolis*, 163.

²¹ Ibid, 194.

²² Ibid, 198.

²³ Gertner, *The Idea Factory*, 36.

²⁴ John, *Network Nation*, 383.

²⁵ Lipartito, “When women,” 1084.

²⁶ The automatic switching machine was considered to be a much more complicated system to operate and therefore was less reliable, especially in big cities. It also required high skill proficiencies from the users to operate them. See Green, “Goodbye Central,” 927.

²⁷ Lipartito, “When women,” 1105.

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- ²⁸ Hoy, "Helping customers," 75.
- ²⁹ Bauhan and Goudy, "What number," 130.
- ³⁰ Wiener, *The Human*, 33.
- ³¹ Pierce, *An Introduction*, 227.
- ³² Shannon, "Memory requirements."
- ³³ Clark, "How operators," 129.
- ³⁴ Prescott, "Towards," 90.
- ³⁵ Ibid.
- ³⁶ Fawcett, "Telephone Women's," 47.
- ³⁷ Cooper, "Keeping the girls," 490.
- ³⁸ Ibid, 492.
- ³⁹ Fawcett, "Telephone Women's," 40-41.
- ⁴⁰ Boden, "A design for life," 152.
- ⁴¹ Ibid.
- ⁴² Ibid, 148.
- ⁴³ Ibid, 151.
- ⁴⁴ Ibid, 158.
- ⁴⁵ Ibid, 151.
- ⁴⁶ Balbi, "I will answer," 67.
- ⁴⁷ Fawcett, "Telephone Women's," 49.
- ⁴⁸ Steelman, "Hiring a quarter," 139.
- ⁴⁹ Green, "Goodbye Central," 943.
- ⁵⁰ Cooper, "Keeping the girls," 496.
- ⁵¹ Ibid, 502.
- ⁵² Ibid, 503.
- ⁵³ Cobble, *The other women's*, 21.
- ⁵⁴ Boden, "A design for life," 161.
- ⁵⁵ Lipartito, "When women," 1108.
- ⁵⁶ Wiener, *The Human*, 59.