8:00 p.m., May 10, 1981. The big election night. With the riveted attention of all of France, television screens throughout the country went black in anticipation of the results. From the top of the screen, a seemingly abstract sequence of blue, white, and red lines began to appear—a drawing of the new president elect, rendered in the fuzzy aesthetic of Minitel. At 1,200 baud, the revelation was agonizingly slow. As the image unfurled line by line, viewers shouted out their guesses, filling the houses, apartments, city halls, and cafés of France with excitement. Finally, enough horizontal lines appeared to reveal with certainty that Socialist Party candidate François Mitterrand had won, defeating Valéry Giscard d'Estaing of the center-right Union for French Democracy.

The Minitel screen was a fitting medium for the announcement of France's new president. Profoundly French, from the design room to the users' fingertips, Minitel stood proudly as the pinnacle of centralized State power at work—the poster child of a coming telecommunications renaissance in France.[1]

For France, Minitel represented more than an innovation in data communications. From the start, State policy and national identity were woven deeply into the design and implementation of the system. This chapter discusses the relationship between specific features of the Minitel platform and the French political tradition of centralization. The Post, Telegraph and Telephone Ministry (PTT) at the center of all networked activity plays as a leitmotiv against a backdrop of economic and infrastructure development (the renovation of the phone network and the

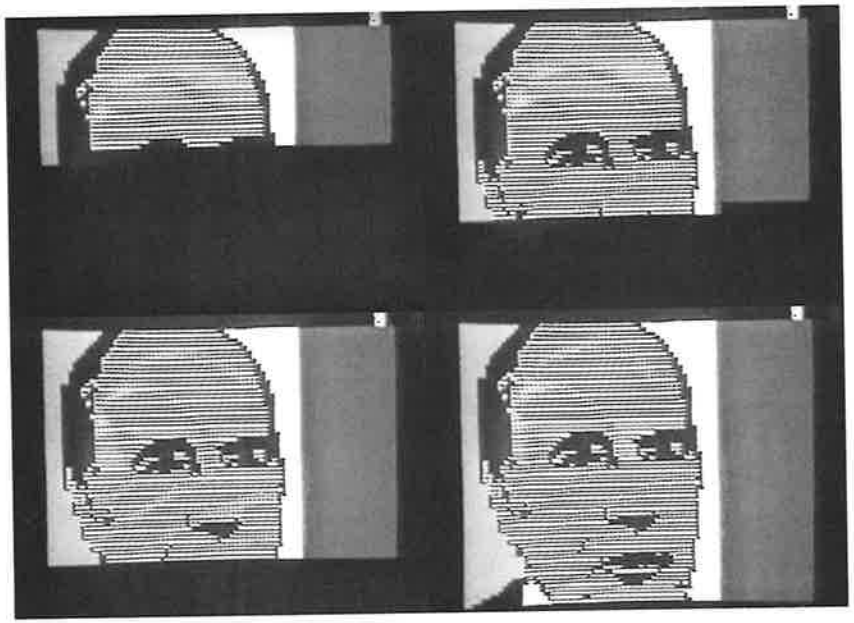

Figure 3.1 In 1981, the election of François Mitterrand was announced on television by way of a videotex portrait of the president's face. Antenne 2, "Election présidentielle 1981: Mitterrand élu," Paris, May 10, 1981, accessed September 18, 2016, http://www.ina.fr/video/I00002041. *Source*: Institut national de l'audiovisuel (INA).

jump-starting of a computer industry) as well as foreign policy antagonism, with IBM in the role of the US villain.

French Political Tradition of Centralization

In France, the State has historically played a central role in the organization of social and economic life. This tradition was reflected in the architecture of the Minitel system. From the start of the Capetian dynasty in 987 up to arguably the beginning of the twentieth century, France in many ways had been a fragmented country.[2] As historian Peter McPhee observed, while the 1789 French Revolution sought to overthrow a monarch seen as absolute, "the claim of the royal State to its territory [had been] contradicted by ethnic and linguistic diversity." It took hundreds of years for the State to embed centralized power through its institutions and finally be perceived "as the administrative arrangements of an older, deeper universal entity claiming an almost timeless reality."[3] The national myth of an inevitable French universalism implied that humans be identical in all places.[4]

The French State produced a sense of unified, universal nationhood through centralized control of language and enforcement of linguistic rules. Historians Hervé Le Bras and Emmanuel Todd describe France since the revolution as

> a unified administrative system, wonderfully centralized, obsessed with rationality. ... One follows with a manic precision uniform grammatical and orthographic rules recognized as sacred. Nowhere else in Western Europe, is the State more powerful, more dirigiste. Indeed, the State is strong in France because it must ensure the survival of a decentralized anthropological system.[5]

As French Marxist philosopher Etienne Balibar noted, the institution of language is rooted in "the process by which monarchical power became autonomous"—that is, in France, through progressive extreme centralization.[6] James C. Scott remarked that "the imposition of a single, official language" is a crucial element that supports the imposition of vertical State control, for "language represents a formidable obstacle to State knowledge, let alone colonization, control, manipulation, instruction, or propaganda."[7] Centralized control of the French language was enacted through a myriad of institutions. At the top of the pyramid sat Paris along with its ministries, schools, and academies, including the ultimate authority on the French language, l'Académie Française.[8] The centralization of language and culture, quipped Alexandre Sanguinetti in the late 1960s, "permitted the making of France despite the French."[9]

One of the key institutions in the production of modern France was a stratified public educational system topped by the *grandes écoles*—university and graduate-level schools where future civil servants were trained to serve the State and learned the virtues of centralization.[10] Prior to the revolution of 1789, centralization efforts culminated under the leadership of Jean-Baptiste Colbert, Louis XIV's finance minister, whose influence was such that the word *Colbertism* has come to symbolize the process of top-down state planning and mercantilism. Following the French Revolution, the graduates of the grandes écoles would go on to lead the State's infrastructure projects, further unifying the nation through the post, telegraph, telephone, and roadways.[11] It is no surprise, then, that the political tradition of centralization was embedded into the design and implementation of national communication networks.

During the nineteenth and twentieth centuries, several interlocking networks for communication and conveyance were laid atop the geography of France by the State. The tradition of centralization was clearly

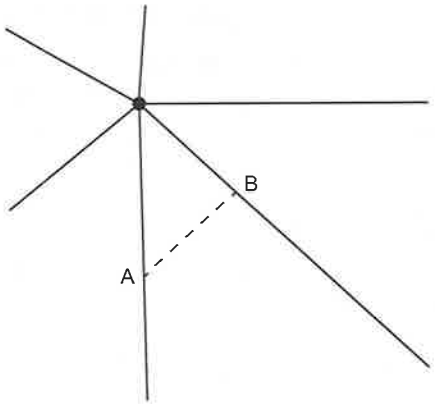

Figure 3.2 Diagram of a Colbertist road network in which Paris is the central traffic hub, and direct travel is impossible between points A and B. Adapted from James C. Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press, 1998), 75.

observable in the topology of the resulting road networks (see figure 3.2). Newly built pathways enabled convenient transit between the countryside and Paris while smaller, regional hubs remained largely isolated from one another.[12] Predigital communication networks were designed to facilitate communication to and from the capital city, where control over the entire system was exercised.[13] Scott argued that the "centralizing aesthetic" common to French infrastructure projects preserved strict hierarchical control at the cost of cultural and economic development.[14] Echoing Eugen Weber, Scott concluded that the centralized topologies of these systems were developed principally to serve the needs of government.[15] In Scott's words, the political tradition of centralization was "hardwired" into France's transit networks.[16]

The Plan to Digitize France

The Minitel adventure began as one of France's *grands projets*—ambitious blue-sky efforts designed by State engineers and carried out by domestic industry with little regard for the bottom line. At the start of the 1970s, France was faced with a pair of related problems. The first problem was a crumbling telephone infrastructure in desperate need of attention. The second was a sense of competition with the computer industries in the United States, particularly IBM.[17] Minitel emerged within a grander plan intended to address both problems.

The plan to improve the nation's telecommunications infrastructure was itself driven in part by an existing system on the verge of collapse. At the end of the 1960s, France had one of the worst telephone networks in the industrialized world.[18] The waiting list for a copper pair installation for 90 percent of clients was three years while at the same time in the United States, 99 percent of installs were completed within three days.[19] In 1971, the penetration rate in France was equivalent to that reached by Denmark in 1930, Sweden in 1935, the United Kingdom in 1956, and Italy in 1964.[20] By the mid-1970s, the forty-seven million people living in France were still served by fewer than seven million telephone lines—a penetration rate comparable to that of Czechoslovakia.[21] Rural networks continued to be switched by manual operators; the automation rate in 1971 was equivalent to that of West Germany in 1947, the United Kingdom in 1959, and Japan in 1962—a situation famously mocked in 1955 by comedian Fernand Raynaud.[22] In what remains a favorite skit in France, the comedian joked that the manual switching system was so inefficient that to place a call from inside Paris to the suburbs, the call had to be switched through New York (notice again the anxiety about the US role in controlling French telecommunications).[23] The average wait for urban customers to have a line installed in their homes in fact kept increasing, such as to sixteen months for Parisians in 1972.[24] The situation appeared to be worsening.

In 1975, the government decided to overhaul the country's patchwork telephone network and replace it with a completely automated system. Consistent with the ambition of previous grands projets, the new plan—dubbed "A Phone for Everyone" (*un Téléphone pour tous*) explicitly sought to provide universal service to both voice and data. For data, a high-speed public packet-switched network was necessary.[25] An upgrade of this magnitude was expensive, however, and the fees generated through telephone calls alone would not be sufficient to cover the added cost.[26] Instead, it was necessary to not only improve on the existing network but also develop novel revenue-generating services that could recoup the heavy investment.

Minitel provided one solution to the steep cost of upgrading the telephone network. As a user-friendly system, Minitel offered a satisfying demonstration of the value of digitization. In addition to this symbolic function, the consumer-oriented Minitel created new streams of revenue for the PTT. Just as the long-distance calling needs of business users generated significant revenue, the profit-seeking services running on Minitel paid fees for their use of the network.

But Minitel was not simply intended to increase traffic over the network or raise revenue. The story of Minitel plays against a backdrop of international relations—in particular, French–American relations in the fields of telephone equipment, computers, information networks, and content creation. The domination of US companies—chiefly IBM—in this set of interconnected fields was perceived as a threat to national sovereignty. President Giscard d'Estaing stated in 1974 that "for France, the American domination of telecommunications and computers is a threat to its independence in the crucially significant if not overriding area of technology and in the field of culture, where the American presence, through television and satellite, becomes an omnipresence."[27] The United Kingdom was also of concern in the teletext and videotex fields. As early as 1974, the State's joint television and telephony research center (the CCETT) began developing Antiope, its own standard for the display of information on video screens, to combat UK efforts to impose its Ceefax and Viewdata standards. In 1976, Giscard d'Estaing tasked Simon Nora and Alain Minc, two top French civil servants, with the production of a report that would address the concerns over the lack of digitization of France, the British threats, and the US threat embodied in IBM.

Nora and Minc's influential report, *The Computerization of Society*, recommended that the French State focus its resources on *telematics*, the meeting of telecommunication and computers. In a society defined by centralization—"publicly criticized and secretly craved"—the authors predicted that widespread telematics would significantly alter the economic, cultural, and political relationships within the nation. New circuits of communication, within and across the nation's borders, threatened to fragment the "social consensus" traditionally maintained by the State's central position in society.[28] In Nora and Minc's account, the development of telematics in France was inevitable. The only question that remained was the role that the State would play.

The conclusion reached by Nora and Minc was that France should enter into the field of telematics without hesitation. IBM, they argued, was undergoing a transition from manufacturing data processing machines to building mass-scale telecommunications networks. IBM posed a challenge that was not simply a matter of competition among national industries, as was previously thought, but rather concerned the administration of a global information infrastructure.[29] Whereas a mainframe computer might be adapted to any number of uses, they contended, IBM intended to maintain administrative control over the networks it was developing. In the absence of a strong national telematics policy, this sort of corporate oversight was likely to come into conflict with the State's interest in

maintaining central control over telecommunications. Furthermore, IBM was seen as an agent of US hegemony. Resisting Big Blue was crucial to preventing US influence from taking ahold of France and, by extension, the world.

The future envisioned by Nora and Minc in *The Computerization of Society* was as unsettling as it was exciting. Telematics, by necessity, drew public life into an uncertain space between private industry and the State. The implications that this ambiguity might have for the social life of the nation were yet unknown. "Care must be taken to prevent any portion of the computer industry from dominating any other part," asserted Nora and Minc," and to prevent the industry as a whole from dominating business and the citizenry." Faced with the encroaching forces of industry from abroad, the authors were unequivocal in their support for firm action on the State's part to preserve the nation: "to improve France's position in a contest with competitors not under her sovereignty, the authorities must make unrestrained use of their trump card, which is to decree."[30]

And decree, France did. In 1978, the executive branch of government approved an experimental videotex project.[31] Nora and Minc provided the political impulse. The Direction générale des télécommunications (DGT) was ready to build on several years of fundamental and applied research conducted through the CCETT (Antiope) as well as its own research center, the CNET, which had already developed functioning remote computing systems using the phone network for transmission ("Tic-Tac").[32] So started Minitel.

Centralization in the Architecture of Minitel

The system that became known as Minitel was comprised of multiple interlocking components developed in parallel during the 1970s and maintained throughout the following three decades. The first area of development was in planning and constructing a nationwide digital network; the second was in the design and mass production of terminal equipment for the French citizenry as well as mainframes and minicomputers to host the services; and the third was in the creation of a new administrative institution to regulate the system. Each of these aspects of the system was realized through cooperation between State agencies and private industry while keeping with the tradition of centralization.

The Télétel network featured a hybrid architecture involving both centralized and decentralized characteristics. Users accessed the network through gateways, the PAVIs, which were centrally controlled by the DGT, the telecommunications branch of the French PTT. The number of PAVIs

varied over time to alleviate the load on each gateway, but this number is irrelevant for purposes of our analysis: since all gateways were controlled by the monopoly operator, and followed the same access-control rules determined by the operator, access was logically centralized. On the other hand, the servers that hosted content were all privately owned as well as decentralized to the edges of the network.[33] This stood in contrast to the other European videotex experiments, particularly those in England, Germany, and Switzerland, where all content was hosted on centralized servers operated by the monopoly PTT operator. In those systems, potential content providers rented space on a shared central server.[34] In France, however, it was left to the content providers to purchase and administer their own servers. These privately operated machines were then added to the edges of the network through a digital data line leased from the State-controlled public data network, Transpac. In this sense, servers on Télétel were decentralized even as user access points were not.[35]

Data were routed through the Télétel network using the X.25 packet-switching protocol, a standard adopted by the ITU but developed largely in France by the CCETT, a standard that would end up competing with and losing to TCP/IP, the protocol that undergirds most of today's Internet.[36] Routing was handled on Télétel differently from both the X.25 and TCP/IP networks of the period.[37] While the standard X.25 protocol enables all hosts on the network to act as routers, or packet switches, the DGT implementation of X.25 did not.[38] In this nonstandard variant of X.25, therefore, the DGT deliberately prevented the decentralized, privately owned servers at the edges of the network from acting as routers.[39] Only the operator-controlled nodes were allowed to route packets. This meant that virtual circuits that would have been possible using a standard X.25 implementation were prohibited, thereby forcing all user traffic to pass through one of the State-run gateways (see figure 3.3).

The deliberate choice by the DGT to restrict routing to centrally run servers had major implications from the standpoint of economics and free speech. From a practical angle, the main implications are twofold. First, for a server to be accessible by the user, it had to establish a direct connection to one of the gateways. If the DGT decided not to allow a virtual circuit to be established from the gateway to the server, then the server remained inaccessible to end users, effectively "silenced" by the network administrators. This would not have been the case had the DGT allowed privately run servers to act as routers and create virtual circuits that did not pass through one of the PAVI. With regard to free speech, such a technical choice enabled the implementation of the censorship system discussed later in this chapter. By preventing direct, lateral connections

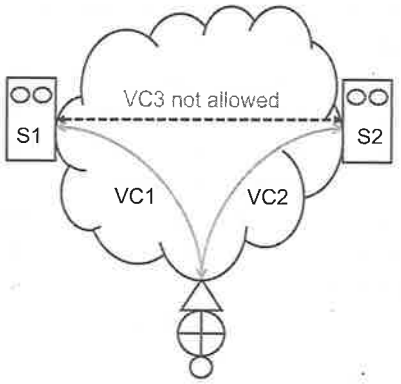

Figure 3.3 Télétel network architecture.

among privately run services, the DGT precisely controlled who was allowed to run a server, and by proxy, who could publish content and provide services.

The second implication of Télétel architecture on the culture of Minitel concerned the interaction of servers with each other. The nonstandard implementation of X.25 prevented a service hosted on one server from directly embedding content or accessing services hosted on another server without first requesting assistance from a PAVI. Thus, in the flow of data among different privately run servers, the PAVIs acted as intermediaries. France Telecom described this functionality as "rerouting," and the intermediary role of the PAVI was clearly documented in materials provided to the developers of new services. This feature placed the DGT at the center of the network's economic activity and enabled it to mediate what would otherwise have been uncontrolled lateral ties—in other words, the nonstandard implementation of X.25 on Télétel reproduced, in digital France, the star-shaped topology of the Colbertist road network (see figure 3.2).

Centralization and Economies of Scale

The Télétel network was just one component of the plan to place a newly digitized France at the forefront of the global telematics industries. Indeed, a crucial justification for building the high-speed data network was to create demand for French-made servers and terminal equipment. The antagonist in this high-tech drama went by three letters, IBM, and the battle played out against the backdrop of intense Franco–American rivalry across many strategic sectors.[40] By aggressively building Minitel, France

hoped to jump-start a domestic computing industry and become a leader in the rapidly growing videotex market.[41]

To enable the nascent French computing industry to compete with established players like IBM, the State actively primed the pump by creating programs that commissioned large number of terminals from domestic manufacturers.[42] For example, in 1985, 120,000 desktop computers made mainly by Bull, Goupil, and Thomson were installed into French schools, under an initiative known as *Le plan informatique pour tous*.[43] Such a strategy is particularly effective in an industry like computer hardware that benefits from what economists refer to as "economies of scale."[44] With State programs creating reliable, high-volume demand, French computer makers enjoyed lower average costs to manufacture their products.

As with all communication technologies, realizing the potential value of the Minitel network depended on mass-scale adoption by end users. Indeed, there is a strong feedback mechanism at work in most telecommunication systems. As more people log on, the existing participants benefit as well: chat rooms become livelier, content providers have larger audiences, games have more players, and on and on.

The central problem for attracting users to Minitel was a lack of suitable videotex equipment. At the start of the 1980s, few people in France owned a home computer, never mind a modem or specialized telecommunications device.[45] To overcome this barrier and stimulate use of the system on a mass scale, not only did the DGT forego any sort of basic subscription fee, but it also decided to subsidize the cost of providing a simple terminal to *every single citizen in France*. This highly unusual arrangement ensured mass participation and created an immediate demand for hundreds of thousands (and eventually millions) of durable home terminals.

The wisdom of giving away, rather than selling or leasing, Minitel equipment was not immediately obvious to everyone involved. To justify this massive expenditure, the DGT proposed discontinuing the traditional phone book and replacing it with the *réseau annuaire électronique* (digital phone book network), a telephone directory service running over the same infrastructure as Minitel. In fact, early versions of this plan made videotex use compulsory for all citizens wishing to use the phone book.[46] Although the notion that the DGT might altogether cease publishing a phone book on paper in the 1980s was premature, it suggested a grander future in which numerous State services might be provided electronically, easily recovering the sunk costs of building the network. The DGT proposal was a success, and the State began to place orders for vast numbers of terminal equipment to be distributed among the citizenry.

Although private firms were selected to carry out the manufacturing of Minitel equipment, engineers at the CCETT as well as the DGT itself remained intimately involved in the design and realization of the hardware.[47] According to Bernard Louvel, one of the original Minitel terminal engineers, the development of Minitel was a "very strong human and industrial adventure" characterized by mutual trust along with a "technical bond" between teams at the DGT and in industry. Louvel remembers the early days of Minitel as a uniquely productive partnership between public and private sectors, "inconceivable" today.[48] In the end, it was the centralization of the Minitel project management in the DGT that enabled the private industry to flourish.

Centralization and Billing/Accounting

One key feature of Minitel was its novel billing system, Kiosk (*le kiosque*), introduced in 1984. In the late 1970s, telematics was a niche activity, and the designers of new services struggled to find viable economic models. For terminal hardware, the DGT had already made the radical choice to distribute equipment free to users, thereby creating a critical mass on one side of the market to attract entrepreneurs to the network. It was less clear how network services would be financed, especially since by law, only traditional newspaper companies were permitted to distribute classified ads over Télétel.[49] For Minitel to succeed, it needed a means for service providers to generate revenue from their users.

Many contemporary online services opted to charge a baseline subscription fee for access. This model was adopted by both publicly run networks such as Prestel in Britain and privately operated for-profit services such as CompuServe in the United States. In these early days of telecomputing, however, subscription fees were a major barrier to adoption and contributed to the failure of numerous start-up systems. In 1980, even the geekiest of Parisians was not likely to have had direct, hands-on experience with a computer network. As such, it was extremely difficult to convince people to pay up-front for access. Computer-mediated communication was obscure, difficult to understand, and to some, downright strange.

In light of these conceptual and cultural barriers, the DGT adopted a pay-as-you-play model that did not require an up-front payment or recurring subscription fee to get started. In combination with the freely available terminal equipment, usage-based billing allowed curious new users to explore and experiment with Minitel at their leisure. In fact, users were not required to input any payment information at all. The DGT

instead would bill users directly by adding a simple "Télétel use" fee onto their monthly phone bills. Since everyone who had a phone line would get a free Minitel, and since both the Minitel ecosystem and public switched telephone network (PSTN) were managed by the DGT, all one would have to do to use the terminal would be to plug in the electric socket, connect the phone line, et voilà, you were online.

The simplicity of Minitel billing encouraged regular usage. Payment was delayed until the end of the phone billing cycle so the cost of today's use was not felt immediately. Furthermore, the various fees associated with the amount of time one spent online and the individual services that one accessed were combined into a single charge: Télétel use. One charge, one check. Both analog voice calls and digital data services were billed as one, despite the fact that each ran over separate backbone infrastructures.

The Kiosk billing system was, in many ways, the "killer app" underlying the runaway success of Minitel.[50] The Kiosk also reflected the French political tradition of centralization found in so many other aspects of the system.[51] Like the PAVI gateways in which it was implemented, Kiosk placed the DGT at the center of all online activity. It was also the reason why direct connections between privately run servers were prohibited on Télétel.[52] Indeed, the only way for the DGT to accurately bill users (and levy its toll to the service provider) was to monitor all the traffic passing through the DGT gateways, like the toll booths on a freeway or central hub in the Colbertist road network (see figure 3.2).[53]

While State-run gateways were necessary for Kiosk to function, the design and implementation of the Kiosk system itself was not an obvious choice. In fact, many would-be service providers opposed the centralization of all billing in a single State bureaucracy. As early as 1980, the service providers' association indicated that it did not want the DGT to be involved in the commercial side of Minitel: "Billing and collection shall be handled by the service providers only, the DGT must only intervene as an information carrier."[54] Billing, it reasoned, was a site of potential innovation and competition best managed by private enterprise.

Instead of Kiosk, early Minitel service providers requested that a chip card payment technology be implemented.[55] Payments through credit cards could have been accommodated in an architecture where content servers were allowed to act as switches, since all the payment information would have been included in the packets being switched. A chip card system, in other words, would have enabled the decentralization of payment on Minitel.[56] By rejecting the chip card proposal in favor of the

Kiosk system, the DGT established itself as the single administrative gatekeeper of all commercial activity on the network.[57]

The development of the Kiosk system reflected deeply rooted cultural beliefs about the role of the State in society. Minitel engineers had been trained in the grandes écoles—as noted earlier, prestigious schools where the State trained its best—just like Colbert's engineers, whose *esprit géométrique* was the "driving intellectual force behind" the road systems "devise[d] to facilitate central control."[58] It is no surprise, then, that late twentieth-century State engineers mapped the same architecture onto the online world. By implementing a centralized billing system, the designers ensured that the State maintained control over the content and services provided on Minitel.[59] As one of the young engineers who worked on the project later remarked, "The State was the boss. ... [I]t is therefore logical that [the network was] centralized."[60]

The Kiosk system positioned the State as organizer, controller, and taxer of all economic activity. As organizer, it summarily and autocratically decided on and imposed an economic model for an entire industry.[61] As controller and taxer, it built on the old adage "administrative highways ... made for troops to march on and for tax revenues to reach the treasury."[62] Kiosk enabled the State to tax all traffic, just like bridges over rivers once enabled local lords to enforce taxation over passing merchants. Where the passing goods used to be grain, a percentage of which would be taken by bridge toll, they were now bits, and a third of their value would be captured by the DGT as a tax to use the network.

Today, the notion that a single State intermediary could tax all data traffic seems anathema to the design of the Internet as a system with no central authority. And yet for the advocates of Minitel, a central billing system like Kiosk was deemed necessary to stimulate economic activity on the nascent platform. Indeed, Gérard Théry, head of the DGT at the time, would later go on to predict that the Internet would not successfully develop a mass market because of the lack of a centralized, Kiosk-like billing system.[63] How else could service providers accept payment from users? And how could the network infrastructure sustain itself without taxation? While Théry's prediction was not entirely correct—the public Internet worked out fine—his concerns were not unfounded. More than thirty years later, the lack of a trustworthy payment system continues to plague users and providers of Internet services.[64] None of the well-known payment technologies, such as PayPal or Bitcoin, offer quite the same balance of advantages and disadvantages as the Kiosk system. And, as we shall see, the payment structure of commercially successful platforms

such as the Apple App Store more closely resembles Minitel and Kiosk than the historically decentralized Internet.

Centralization and Speech

Throughout the life of the Télétel network, Minitel service providers were subject to State censorship. While the term *censorship* conjures images of banned books and jailed journalists, Minitel services were censored according to the strictest legal sense of the term—that is, government authorization was required prior to the launch of any new service. The specific implementation of Minitel censorship varied over time, but the principle of Minitel as a censored ecosystem itself remained constant.

From 1982 to 1986, Télétel publication was subject to a prior *authorization* regime. All proposals for services had to be filed with the prefect, the local representative of the executive branch who responds directly to the prime minister and oversees, among other things, the police force of the department at stake. If the prefect did not explicitly agree with the service coming into existence and grant it a seal of approval, the DGT would not connect the server in question to Télétel.[65] It was thereby excluded from Kiosk and inaccessible to Minitel users.

In 1986, the prior *authorization* regime formally switched to a prior *declaration* regime, in which would-be service providers needed only file a description of their new service with the DGT versus obtaining prior approval from the prefect. This change did not end censorship but rather shifted the gatekeeping role away from the local prefects to a different central administrative authority. After declaring its intent to create a new service, the would-be service provider was subject to a formal review by the DGT to assess whether or not it met the code of conduct embodied in the Télétel contract.[66] If the DGT determined that the service was not likely to meet the code of conduct, an opinion was sought from a second administrative authority, the Telematics Council (CST, *Conseil supérieur de la télématique*). If both organizations agreed, then the DGT could refuse to connect the new service to the network.[67] Although the new system resorted to a contractual mechanism, it was still censorship, since publication was still subject to receiving prior authorization from the administration—in this case, the DGT itself.[68]

The Tradition of Speech Control in France

Minitel censorship extended a particularly French understanding of free speech to data communications. Whereas the freedom of speech in the United States is guaranteed by a *negative* command in the First Amendment—"Congress shall pass no law … abridging the freedom of speech," the law in France grants the government a *positive* role in the regulation of speech. The practical implications of this role are elaborated in the Declaration of the Rights of Man and the Citizen: "Any citizen may … speak, write and publish freely, except what is tantamount to the abuse of this liberty in the cases determined by Law." Tasked with the protection of social welfare, Parliament is responsible for interfering with speech thought to be injurious to French society.[69]

The positive role of the French government in the regulation of speech is grounded in an assumption that freedom can be abused by some to hurt others and society as a whole, and that the people as a whole trust Parliament to guard against abuses of freedom by some—an assumption that contrasts sharply with the US tradition of popular sovereignty and mistrust in government.[70] In practice, French positive law offers many examples of broad content control. Explicit prohibitions range from broadcasting ideas in languages other than French, to insulting the president of the republic, to presenting narcotics in a positive light—an offense used to prosecute proponents of marijuana legalization.[71] Citizens accept these constraints with the faith that the State will maintain a standard of protection and mutual respect across society.

Given this tradition, the regulation of speech on Minitel was no surprise. The decision to require prior authorization, though, was a departure from tradition. Under the 1881 Press Act, speakers—including, later, the providers of Minitel services—were punished ex post facto for utterances that violated the law. Beginning in 1982 and reaffirmed in 1986, however, Minitel services were reviewed *before* they were connected to the network. Ironically, the push to this stricter standard was the result of lobbying by the print-press industry to stave off competition from the paradigm-shifting electronic press.

The Print Industry Appeals to Fear

As early as 1979, French newspaper and magazine publishers acutely anticipated the disruptive effect that a system like Minitel might have on their industry. But rather than extend their print businesses to include digital publishing, influential existing publishers endeavored to put regulatory hurdles in place to slow down potential competitors. At the forefront of this effort was the regional press, and especially François-Régis Hutin, the powerful editor in chief of *Ouest-France*, the country's largest-circulation daily. To curry public opinion, representatives of the press crafted an appeal to fear. An unregulated Minitel, they argued, was a platform for antisocial speech and State surveillance.

Coverage of early, small-scale Minitel experiments warned that the "lack of a rulebook" for online service providers would bring about "a certain State of anarchy" in which "everything was permitted and possible."[72] Such worrisome rhetoric rested on a belief that social stability depends on centralization. Remember Sanguinetti's argument that centralization enabled "the making of France despite the French."[73] And recall the "hardwiring" of the political tradition of centralization into France's transit networks.[74] In the realm of speech, this tradition of broad content control was similarly hardwired into the Minitel architecture through the combined action of the censorship system and centralization of technical power in the DGT. Proponents of the censorship system had their way because of the positive role of Parliament set forth in the Constitution: "Any citizen may ... speak, write and publish freely, except what is tantamount to the abuse of this liberty in the cases determined by Law," which implies that freedom can indeed be abused and needs to be curbed by Parliament.[75] According to this logic, tight control over the network was not only reasonable but also essential for the preservation of social harmony in France.

The press lobby, in a brilliantly schizophrenic move, split its public relations campaign in two. It at once called for greater State control of the system, arguing that an uncensored Minitel would lead to anarchy, and ran a parallel campaign warning that the little Minitel boxes represented an incursion of State surveillance into the home, a sortie by a telematic Big Brother. In short, the lobby demanded both that the project be killed and more regulated. And in 1981, Big Brother was not an abstract threat: the shadow of the USSR loomed large in the French imagination.

Hutin led the charge against Minitel in print. In an infamous series of editorials published from May 1979 to May 1981, Hutin warned of the risks that the online age would bring. He also argued that replacing the paper phone book with an electronic one could open France to totalitarianism. "There is no phone book in Moscow," he observed. "An authoritarian power or an invader could very well shut down the electronic phone book." Further, Hutin claimed, for the State to endanger the economic future of the printed press through the development of a State-controlled electronic publishing platform would call into question "the very existence of democracy in our country"—a move (again) reminiscent of "totalitarian States." Calling for regulation, Hutin stated, "Freedom oppresses, regulation frees."[76] Even though Hutin's argument was incoherent at best because it claimed that both anarchy and Big Brother would triumph lest Minitel be regulated, he successfully leveraged deeply rooted political beliefs

about the dangers of freedom and importance of regulation. The censorship system for Télétel was implemented as a direct result of the mounting political pressure and general sense of unease instilled by Hutin and others in the regional press.

Print publishing was not the only established media industry to exert political pressure on Minitel. In late 1970s' France, both television and radio broadcasting were overseen by a State-run monopoly. Under the umbrella of the Ministry of Information, *Télédiffusion de France* (TDF) remained a staid operation, with an organizational culture descended from the autocratic norms of colonial administration.[77] In parallel with the Minitel project, TDF was planning its own nationwide data network. Unlike Minitel, however, TDF conceived of electronic media as yet another medium for one-way, broadcast communication. Its project, based on the CCETT's Antiope technology, was a simple teletext system. In effect, the DGT and TDF—"hereditary enemies," in the words of one former administrator—were building two different futures for information networks in France.[78]

The regulation of speech was a key fault line in the conflict between the two agencies. While Minitel was designed for widespread participation by ordinary citizens, the broadcasting agency envisioned data communications as another tightly controlled channel for the centralized distribution of information. The conflict was embodied in the leadership of each agency. Théry, head of the DGT, remembers a visit from Jean Autin, head of TDF. During the meeting, the antagonism between the two agencies settled on the social effects of uncensored public speech. "They came to lecture me," Théry recalled in a recent interview. He believed that television specialists simply "could not conceive" of building a network to transmit anything other than "administered images," or preapproved material. The broadcasters seemed to believe that an unregulated network would be a race to the bottom. "If you open the Pandora's box," Théry recalled Autin stating, "it will be smut."[79] Rebuked by the DGT, TDF brought its concerns to Hutin, who in turn reiterated the broadcasters' agenda in the pages of *Ouest France*. In the memory of Théry, rising moral panic came to a head as Autin argued, "You will transform France into one giant porno theatre!"[80]

For Minitel advocates, there was more at stake in the regulation of online speech than an ideological commitment to free expression. In France, speech violations are a criminal matter. Well before Minitel reached mass adoption, administrators of the system worried that they would be held responsible for the speech acts of their users. Indeed, in recent interviews about his role as Minitel project lead, Jean-Paul Maury

affirmed a legitimate fear of being imprisoned if illegal content was found flowing across the circuits of a public data network.[81]

For the designers of Minitel, one figure appears to have had a surprising influence on the realization of a centralized censorship system: Jean-Jacques de Bresson, head of the Telematics Commission and one of the colonial "old guard."[82] De Bresson made a career as a lawyer in the colonies, in the Ministry of the Interior, Ministry of Information, and then as director of the Office de radiodiffusion-télévision française, TDF's precursor. According to Maury, de Bresson repeatedly threatened him outright with personal liability for the content found on Minitel. De Bresson was said to holler at the engineer, "Monsieur Maury, you will end up in jail!"[83] Michel Baujard, a former member of the Telematics Commission and former president of a Minitel service providers lobby, corroborates this analysis, and describes de Bresson's personality as a "key" to understanding the ways in which the DGT implemented Télétel. In Baujard's account of the period, de Bresson was adamant about the need for censorship. "He was a guy immersed in censorship," recalls Baujard. "He could not reason in any other way than through censorship."[84] These anecdotes underscore the many ways that the French tradition of central control drove the implementation of censorship into the Minitel project at both micro and macro scales.

Chilling Effects

The day-to-day effects of centralized control over Minitel could be hard to spot. By and large, the overwhelming majority of content found on Minitel fit neatly within the bounds of legality. The censorship regime was carried out along two levels: on the regulatory level, all new services were subject to prior administrative review, and on the technical level, all traffic passed through one of the centrally controlled gateway servers. These two prongs seemed to have been sufficient barriers to keep most potential lawbreakers at bay. Likewise, if it appeared that a preapproved service was overstepping the bounds for which it had been reviewed, France Telecom would simply "turn off the faucet," to borrow an expression from Minitel engineer Bernard Marti.[85] In other words, State administrators retained the power, through the design of the PAVI, to simply stop connecting virtual circuits to a remote, privately run server. There were many violations that might lead to disconnection—such as intellectual property violation and administrative technicalities—but the most commonly cited reason was the use of chat rooms by sex workers to pursue new off-line clients.[86] Solicitation of this sort was not only illegal but also caused embarrassment to the State, which was now accused of supporting prostitution. As a result, sexually explicit chat services were monitored and shut down by France Telecom with great zeal.

It may surprise readers from the US to learn that State censors did not otherwise curb the use of Minitel to transmit adult services and content over the network. Indeed, Minitel gained quite a reputation for its adult offerings, dubbed *Minitel rose* or *pink Minitel*. The lively circulation of text-based porn nicely illustrates the character of censorship in the newly computerized France. In practice, Minitel censorship meant only that services could not come online without prior administrative authorization. Typically, the types of services that were blocked were those likely to circulate content that could offend the political sensibilities of the government elite or upset social consensus. The fact that Minitel was the 1980s' kingdom of online pornography—the world's first mass adult market—simply indicates that pornography was not considered by the French executive branch as something that should receive priority attention.

Once approved, however, the providers of adult services needed to vigilantly monitor the activity on their systems lest they run afoul of local censors and find their "faucets" shut off. Pioneers of Minitel rose hired paid staff members to hang out in chat rooms around the clock, and steer conversation away from criminal or otherwise politically volatile topics. Sexually explicit conversation was tolerated—indeed, encouraged—but the boundary between sexy fun and subversive speech was not always clear. This ambiguity was especially difficult for services catering to kinky or queer communities. Daniel Hannaby, cofounder of the popular 3615 SM site, who also leased space on its server to other pink Minitel services, pointed out that censors paid particular attention to gay sadomasochist chat rooms such as the ones hosted on his servers.[87] Jean-Marc Manach, a man who, as a college job, posed as a female guest on multiple Minitel rose chat rooms, described his twin roles as a host tasked with "livening up" discussion while at the same time monitoring the chat rooms and disconnecting undesirable users.[88] These undesirables included prostitutes who used the Minitel rose chat rooms for solicitation—something that could and did at times create criminal liability for the site operators.

But adult services were not the only areas of Minitel affected by the ambiguities of the censorship system. Censorship also created barriers to entry that repelled entrepreneurs whose content was perfectly lawful—indeed, services were often stymied by the bureaucracy involved before they were ever connected to the network. Consider the story of three jobless yet enterprising individuals who in 1985 attempted to launch a Minitel site. Dubbed Amphitel, the proposed site consisted of an online

guide for the city of Grenoble and featured online travel services for tourists.[89] The site's founders partnered with the Sopra corporation, a major information technology services provider, and secured funding from Credit Agricole, one of the largest French banks. They were, however, puzzled by the process of getting approved to go online. They first wrote to their congressperson, one Bernard Montergnole, to request assistance in navigating the Minitel regulatory framework. The congressperson, not up to speed with that aspect of the law but eager to support digital innovation in his district, wrote to the minister of communications, M. Georges Fillioud, on February 4, 1985, requesting an opinion as to what authorization must be secured by the enterprising trio in order to roll out their service onto the Minitel network. The communications minister, though, was not up to speed either and had to request an opinion from his legal department. On March 26, 1985, almost two months from the congressperson's letter, the answer came from Jacques Vistel, a State Council justice delegated to the communications ministry, to explain to the minister that if the service is a mere e-mail system, then no authorization was required, but that if the service used electronics as a means of transmitting information to the public, then the entrepreneurs must retrieve official authorization forms from the local prefect and formally request an authorization to provide their service over the network.[90] The prime minister's legal service archives, where this exchange was recorded, do not indicate whether or not this politically correct service ever made it online. Yet the story is indicative of the very real chilling effects created by the centralized censorship system, even for mainstream speakers.

Conclusion

The design and implementation of Minitel reflected a commitment to the political tradition of centralization widely held across French society. Throughout the interplay between different State actors (the PTT, various ministries, administrations, and representatives of the judicial and legislative branches) and members of civil society, the State remained at the center as a micromanager of social relations. The prominent role of the State in jump-starting a telematics system was by no means unique to France—contemporary state-sponsored networks in the United States formed the basis of today's Internet—but Minitel took on an unusual symbolic position in French politics. Struggles between different ministries and their constituents, and high-level arbitrages, indicate that Minitel was used to promote certain industries over others, and fine-tune social equilibriums as France proactively engaged in the "computerization" of society. As such, Minitel was not just the result but also an instrument of centralized State planning, and its architecture reflected century-old traditions of State–society relations.

For many, Minitel was a natural extension of the existing French media industries. Stakeholders in the traditional publishing industries argued that Minitel should be subject to the same broad content restrictions as newspapers, radio, and television. The notion that information "published" via Minitel might be unregulated was not only a challenge to their economic position but also a threat to the stability of French society as a whole. In the French legal tradition, the State is responsible for protecting society from abuses of free speech. Why should Minitel be any different?

The print and broadcast publishers were not alone in their call for centralized State control of Minitel. Labor unions, which generally saw telematics as a driver of industrial growth and job creation, also insisted that telematics be driven by centralized forces. In 1982, the Confédération Force Ouvrière, a communist-leaning union, demanded that the Ministry of National Education provide training at all levels of telematics in order to raise the skill level and international competitiveness of the French industrial sector. The union's demands extended to the content of Minitel as well, warning that a neoliberal "laissez-faire" network would be dangerous to society. Instead, they argued that State regulators should grant authorization to provide services based on considerations of the common good.[91]

More important, the desire for centralized governance of Minitel was shared within civil society, even among groups traditionally separated by ideological differences. Early Minitel users agreed explicitly with the call for central oversight, albeit more tamely than some of the more inflammatory voices. An association of users of Télétel 3V, a small-scale Minitel experiment conducted in 1982, gave technical reasons for the State regulation of Minitel. Faced with the complexity of databases assembled from many different sources, the association reported that the organizational logic of databases and means of accessing them needed to be harmonized, "which is incompatible with total freedom left to service providers. A *central* organization stating minimum common rules seems to be required."[92] This radical statement went beyond the option eventually taken by the DGT, which chose to support Minitel service providers with educational materials concerning intuitive user experience design, but stopped short of mandating any particular structure or interface.

The deeply rooted perception that centralization and a paternalistic State were necessary for harmonious social order was also visible in the organizational relations between different institutions within the State. Ironically, this role is best exemplified by a 1983 report from the prime minister's office discussing the role that videotex should play in supporting decentralization—a move dear to newly elected President Mitterrand. "Telematics must become the instrument of a true regional, departmental, and local information politics, and serve decentralization," read the report. Further, local entities were themselves responsible to "conceive, implement, and manage their own information systems" on the new network. But in France, decentralization was imposed from the top and responsibilities moved downward by the grace of the centralized State. In doing so, the centralized State ensured that uniformity remained the rule, despite the move toward decentralization: "The State has initiated or supported experimental projects. It is now desirable, in the interest of all, that [the State] be present in the development phase. It is also necessary that each region harmonize the different initiatives that will come to light." Local representatives of the central State were therefore called on to coordinate these regional initiatives, and prevent "disorganized development," waste, and other inefficiencies.[93]

In retrospect, the virtues of centralized planning are clear. Minitel was fabulously successful domestically. By 1989, there were approximately five million Minitel terminals in use, leading James Gillies and Robert Cailliau of the European Organization for Nuclear Research (CERN, where the World Wide Web emerged) to describe France as "the world's most 'wired' country" in their published account of the period.[94] Efforts to prime the pump for local industries led to the creation of the iconic Minitel home terminal and created a platform for hundreds of small-scale entrepreneurs to experiment with online commerce. This nascent digital culture industry was further supported by Kiosk, a system that shifted the burden of billing and accounting from the start-up companies to the State, and supplied a reliable, trustworthy method of payment for curious users. In contemporary terms, Kiosk acted much like the Apple Store—offering a central repository of preapproved sites and services along with a convenient means to pay and be paid. Of course, unlike the Apple Store, which is run with the characteristic opacity of a profit-seeking enterprise, Kiosk was run by the State with the public interest as its top priority.

Centralization was not without its faults, of course. By routing all traffic through the State-run PAVI gateways—a prerequisite for the functioning of the Kiosk system—every bit of Minitel traffic was subject to State control. This technical feature facilitated a degree of gatekeeping

and proactive censorship on the part of State administrators that would not have been possible were the network run atop a more decentralized implementation of the X.25 internetworking protocol. Lastly, the limits of Minitel censorship and State oversight were rather poorly defined as the wild success of Minitel was largely unexpected and led to mostly ad hoc, pragmatic, behind-the-scenes arbitrages. Undoubtedly, the resulting ambiguity led some users to self-censor as well as refrain from speech that might have been perfectly permissible according to the letter of the law.