THE INTERNET OF DEAD THINGS

THE INTERNET OF LIVING THINGS
ISBN 979-10-415-4978-8

THANKS TO TERESA & GARNET
DEDICATED TO MARTINE ZOE, DEZZIE, ILANA & NORA

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In retrospect, the history and development of the Minitel platform, the first mass-used telematics system, is highly symbolic of the transition from the so-called analog to the digital age. It took place in a very particular historical context, France in the 1980s, which can be considered quite uniquely futuristic compared to the rest of Europe during the same period, with various elements contributing to this. Among them: the start of operations of the fastest and most technologically advanced train line in Europe, the TGV, in 1981; the Parc de la Villette on the outskirts of the city with the Cité des Sciences et de l'Industrie, which enabled numerous aesthetic and cultural experiments with technology, and the Géode, a mirrored geodesic IMAX cinema, all of which opened in 1986. In Monte-Carlo, Monaco (technically a different state, but de facto still a protectorate of France and very closely related to it), the International Forum of New Images, then IMAGINA, an annual festival of computer graphics and communication technology, was held for the first time that same year. In 1983, the art and technology historian Frank Popper also curated the unprecedented exhibition "Electra. L'électricité et l'électronique dans l'art au XXe siècle" at the MAM, the Musée d'art moderne de la ville de Paris. Two years later, the philosopher Jean-François Lyotard curated the groundbreaking art exhibition Les Immatériaux, which took place in the equally futuristic Center national d'art et de culture Georges-Pompidou and conveyed different visionary ideas about the

development of art and media. Finally, one can add the materiality of the entire development of the Parisian business district of La Défense, with a high concentration of high-rise buildings and a huge pedestrian zone, together with the immateriality of the concept of 'rhizomatic thinking' in A Thousand Plateaus (Mille plateaux), the famous 1980 book by philosopher Gilles Deleuze and psychoanalyst Félix Guattari, which was quoted extensively by most theorists discussing the early Internet at the beginning of the following decade. Indeed, this particular period in France's history has recently inspired a science fiction sub-genre (a "dystopian uchrony") called "Giscardpunk"[1], whose starting point is the never-happened "re-election of President Valery Giscard d'Estaing in 1981" and which, in a similar spirit, explores the possible changes on a large scale.

The French government's master plan to introduce new digital remote access options for its citizens fits perfectly into this scenario. By stubbornly keeping the most important IT terms in French (ordinateur (computer), numérisation (digitalisation), données (data), etc.) until very late in the game, the French government was able to keep the French language in the technical terminology.) The Minitel systems enabled early mass technical literacy with an equally ambitious mass public investment that provided free terminals on demand to any French citizen with a fixed line, unparalleled in the rest of the world, considering that teletext as a more general medium has been introduced in 230 countries over time (from the early Cefax in the UK in 1974 to the KBC in Kenya in 2009).[2]

The Minitel embodied many features that we still use today, forty years later (the screen as the main interaction space, the connection to the network, the main use of centralised services, the online communities) and enabled abstract mechanisms that were then extended and expanded over the years by faster machines and exploding networks. The whole endeavour was aided by direct government support for private online service providers and free training, which allowed a new 'digital economy' to flourish and maintain control over the technical infrastructure. Impressively, the latter has proven reliable nationwide

over time (with the exception of a few weeks when it was offline in 1985, as Jérôme Saint-Clair states in one of the chapters), with state infrastructure kept open and neutral to ensure the public interest, but at the same time the entire ecosystem around it became "open and closed, public and private, centralised and decentralised" to enable commercial, social and cultural expansion.[3]

The Minitel became the medium for purposes that were pioneered in that environment while now we take them for granted, like the popular sexy chats ("Minitel Rose"), or home automation, all the way to organising street protests.[4]

And it was also the virtual place for early telematic art. An important example of this was above all Brazil, where Telebrás used the Minitel protocol[5] and called it Videotexto. Julio Plaza curated a major exhibition of Videotex art at the 17th Bienal de São Paulo in 1983, called "Arte Videotexto", while the work 'Reabracadabra' by Eduardo Kac was realized only a few years later[6], and while Teresa Dillon introduces in her contribution to the unique Art Accès telematic art magazine with artists' interventions.

This collection of texts traces the various paths of the history and meaning of the Minitel in a valuable way. It is not a nostalgic book, nor is it designed to investigate the purely media-archeological aspects. One of its core values lies in the compilation of contributions that are either first-hand or articulate the impact and dynamics of the medium technically and culturally. From the "technological sovereignty" (as Spideralex explains) to its characteristics that were quickly forgotten, despite being an avant-garde that in hindsight turns out to be a visionary plan, with a potential social impact similar, albeit on a different level, to that of the famous Cybersin system for planning economic development in Chile a decade earlier.

"Minitel was produced by a multitude"[7], and in this book it is also redefined by a small collective of authors through its crucial role in the "unleashing" of technology today. The different perspectives explored

and experienced here offer a specific selection of first-hand accounts, cultural impact, critical research and technical understanding of both the historical period in which the medium was increasingly adopted and a perspective from the current media landscape.

Among all the excellent contributors, there is one for whom the Minitel seems to have had a profound impact on his future life, as he has internalized both the open character and the complexity of the medium: Nicolas Nova. Through an unfathomable fate, he passed away suddenly just weeks before this book was completed, giving his text a deeper meaning. In particular, his contribution perfectly describes the emergence and development of the medium from a personal perspective that many who lived through the same years can easily identify with. He describes the various activities (innovative for the time) he was involved with and mentions his notes and media materials (news clips, various information) collected in school notebooks, which show his early attitude towards the anthropology of digital media. Some excerpts are then reported in context, and the technical rituals, the modalities of content navigation, the possibilities of search databases such as the phone book, the abbreviated writing conventions, the technical, social and cultural discoveries thanks to communities. The hours he spent as a teenager interacting remotely with content, people and communities also had real-world implications. He expanded his knowledge by visiting places and stores, exchanging photocopied material with strangers with whom he shared an interest in manga and role-playing games, for example. Overall, he emphasises the role of the medium in facilitating previously unattainable knowledge and communication, and then human networks capable of nurturing interests together. In his own tradition, he never fails to mention people who helped him, or precisely credit who did what, which he subsequently did in all his brilliant and heterogeneous projects afterwards. Somehow, his contribution perfectly complements these projects by consistently exploring various crucial techno-cultures, from a unique perspective that combines his personal experiences and design, historical, aesthetic, social and functional aspects. Known as a gentle man, Nova was a coherent polymath who could seamlessly

apply ethnographic methodologies, guided by critical thinking and executed with compelling design, while maintaining a nerdy technical knowledge and creating delightfully new meanings.

Somehow, his perspective reflects the most relevant aspects of Minitel that are still conceptually nurtured today. Inspired by his openness, knowledge and attitude, we can still learn a lot from this medium and reflect on its human and technical trajectories.

Benjamin Gaulon

Benjamin Gaulon is an artist, researcher, educator and cultural producer. He has previously released work under the name "Recyclism". His research focuses on the limits and failures of information and communication technologies; planned obsolescence, consumerism and disposable society; ownership and privacy; through the exploration of détournement, hacking and recycling.

Together with Dasha Ilina, he is a founding member of the collective NØ, a non-profit organisation whose mission is to support and promote emerging art and design research and practices that address the social and environmental impact of information and communication technologies in France and beyond, since its creation in 2018. They are both co-directors of NØ SCHOOL NEVERS since its first edition in 2019, and he is artistic director of Esapce USANII in Nevers since 2022.

recyclism.com
nowebsite.org

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In the quiet suburbs of Nancy, tucked away in a nondescript garage, two visionaries, Benjamin Gaulon and Jerome Saint Clair, embarked on a journey that would redefine the future of technology. It all began in the early 2000s when both Benjamin and Jerome, technology enthusiasts and environmental advocates, shared a common passion for repurposing obsolete technologies.

Their humble garage served as a haven for discarded devices and forgotten gadgets. They spent countless hours experimenting, tinkering, and breathing life back into old hardware. Their ambition was not just to revive these relics but to connect them to the web, giving them a new purpose in the digital age. The duo believed that the key to sustainable innovation lay in reimagining the past for the future.

With unwavering determination and a sprinkle of ingenuity, they founded the "Internet of Dead Things Institute" (IoDTI). Their mission was simple yet profound: to bridge the gap between the past and the present by integrating outdated technologies into the modern digital ecosystem. The IoDTI became a breeding ground for innovation, where old media, hardware, and devices found new life through creative re-engineering and connectivity solutions.

At first, their work attracted local attention. Enthusiasts and eco-conscious individuals alike were fascinated by their ability to breathe life into long-forgotten gadgets. As their projects gained traction, the duo's reputation began to spread like wildfire. Soon, they caught the eye of investors who saw the potential not only in their creations but also in their eco-friendly approach to technology.

With the newfound support, IoDTI expanded its operations. The garage transformed into a bustling hub of innovation, with engineers, designers, and environmentalists collaborating under one roof. The team worked tirelessly, salvaging vintage devices, retrofitting them with cutting-edge sensors, and connecting them to the internet. Their creations ranged from retro-inspired smart clocks made from old radios to art installations utilizing obsolete computer components.

The world took notice. Media outlets hailed IoDTI as pioneers of the circular economy, showcasing their innovative projects that blended nostalgia with modernity. Governments and corporations approached them for collaborations, seeking sustainable solutions for their technological waste. The institute's projects not only reduced electronic waste but also inspired a shift in the tech industry's mindset, emphasizing the value of repurposing over relentless consumption.

As IoDTI's influence grew, they expanded globally, establishing branches in tech hubs around the world. Their international team became a melting pot of diverse talents, all driven by the shared vision of a sustainable future. The institute's collaborations with renowned artists, scientists, and engineers pushed the boundaries of what was possible, leading to groundbreaking projects that captured the imagination of people worldwide.

In the years that followed, IoDTI became synonymous with innovation, sustainability, and creativity. Their work not only transformed outdated technologies but also transformed mindsets, paving the way for a new era of tech consciousness. Through their dedication, Benjamin Gaulon, Jerome Saint Clair, and the entire IoDTI team reshaped the

future of technology, proving that the key to progress lies in honoring the past while embracing the limitless possibilities of the digital age.

PIONEERING SUSTAINABLE SOLUTIONS THROUGH RESEARCH

At the core of the Internet of Dead Things Institute's mission is a steadfast commitment to pioneering sustainable solutions through cutting-edge research. Our dedicated research teams delve deep into the labyrinth of obsolete technology, tirelessly seeking out hidden gems within the vast landscape of electronic waste. Our focus is not merely on identifying these obsolete devices but on unraveling their untapped potential.

In a world where the tech industry generates an ever-growing mountain of discarded gadgets, our researchers embrace this challenge with enthusiasm and a unique perspective: "In trash, we trust." This mantra embodies our belief that within the seemingly endless expanse of electronic waste lies a wealth of opportunities. Every forgotten device, every discarded circuit board, and every obsolete component represents a canvas waiting to be transformed.

Our researchers are not merely scavengers; they are architects of change. Their work goes beyond salvage; it's about resurrection and renewal. With meticulous dedication, they explore the intricacies of these forgotten relics, dissecting their components, understanding their architecture, and envisioning innovative ways to breathe new life into them. Our laboratories buzz with creative energy as ideas take shape, transforming discarded technology into vibrant, functional, and sustainable open-source tools.

Moreover, our research isn't just an academic pursuit; it's a battle against the tide of electronic waste. By repurposing these devices, we mitigate the environmental impact of discarded technology. We reduce the strain on our planet's resources, one resurrected device

at a time. Each success story echoes our commitment to a circular economy, where the lifecycle of technology is extended, and waste is minimized.

In this journey of exploration and innovation, we collaborate with experts, engage with communities, and tap into the collective wisdom of the tech world. Together, we challenge the conventional narrative that deems old technology as irrelevant. Instead, we celebrate it as a source of inspiration, a foundation upon which sustainable futures are built.

Our research isn't just about gadgets; it's about redefining possibilities. It's about reimagining what technology can be and reshaping the way we perceive obsolescence. With each discovery, we move closer to a future where waste is transformed into wealth, where discarded devices find new purpose, and where innovation knows no bounds. In the realm of discarded technology, we find not just trash, but the raw materials for a brighter, more sustainable tomorrow.

REVIVING THE (UN)DEAD MINITEL: A STORY OF RENEWAL

In the annals of technological history, the Minitel, once a ubiquitous presence, faced an uncertain fate when it was decommissioned in 2012. To circumvent the looming specter of recycling, the French government embarked on an innovative initiative. Millions of these state-owned Minitels found a new lease on life as they were redistributed to their original users. What emerged from this decision was a resurrection, a chance for these devices to transcend their obsolete status and embrace a vibrant new purpose.

REDISCOVERING HIDDEN TREASURES

Incredibly, many of these Minitels, initially deemed relics of the past, remained not only intact but also fully functional and untouched.

Recognizing the untapped potential within these seemingly obsolete devices, the Internet of Dead Things Institute embarked on a mission. With a vision to breathe life back into these (UN)DEAD Minitels, the Institute set out to design an interface that would unlock their latent capabilities. This decision was not just about salvaging hardware; it was about honoring a technological heritage and embracing the spirit of sustainability.

SE: SYSTÈME D'EXPLOITATION MINITELSE UNLEASHED

The result of this endeavor was MinitelSE, a groundbreaking open-source operating system meticulously tailored for these reawakened Minitels. More than just a software upgrade, MinitelSE represented a paradigm shift, transforming these devices into powerful gateways to the digital world. Operating on dedicated hardware, MinitelSE became the bridge between nostalgia and innovation, offering users a multifaceted experience.

A WORLD OF POSSIBILITIES

MinitelSE empowered users to do more than just reminisce about the past; it allowed them to engage with the present and shape the future. With MinitelSE, users could effortlessly stream radio, browse the internet in text mode, relive classic gaming moments with Tetris and Worms, stay informed through news channels, connect with others through chat, and even exchange encrypted messages. This was not just a revival; it was a transformation, enabling these (UN) DEAD Minitels to seamlessly integrate into the digital age.

CONTINUOUS EVOLUTION

The story didn't end with MinitelSE; it was merely the beginning. The Internet of Dead Things Institute, fueled by an unyielding spirit

of innovation, continued to evolve. A dedicated engineering team tirelessly worked on developing new tools and specialized hardware, ensuring that MinitelSE remained at the forefront of technological advancements. With each new development, the (UN)DEAD Minitels became more than just relics; they became ambassadors of sustainable tech evolution.

BEYOND THE SCREEN

Moreover, MinitelSE's impact transcended the digital realm. The wealth of knowledge encapsulated in these devices was made accessible to a broader audience. A virtual encyclopedia, akin to an interactive book, was made available through the terminal, ensuring that the wisdom and insights cultivated by MinitelSE were shared far and wide. This democratization of information transformed these once-discarded devices into instruments of learning and enlightenment.

In this saga of renewal and reinvention, the (UN)DEAD Minitels found a second life, proving that with vision, ingenuity, and a commitment to sustainable innovation, even the relics of yesteryears can become pioneers of tomorrow. The (UN)DEAD Minitel story serves as a testament to the transformative power of repurposing, reminding the world that in the hands of visionaries, obsolete technology can become a beacon illuminating the path to a more sustainable, connected future.

EMPOWERING THROUGH EDUCATION

At the heart of our mission lies a profound commitment to education, a driving force that propels us toward a future where knowledge is accessible, and innovation knows no bounds. We believe that empowering individuals with the skills to navigate the intricate world of technology fosters a community of trailblazers, innovators, and problem solvers. Our aim is clear: to educate and empower a broad audience, guiding them on a transformative journey of hacking,

repurposing, and redesigning obsolete technologies.

In our vision, obsolescence is not a dead end; it's a gateway to creativity. Our dedicated education department stands as a beacon of enlightenment, conducting workshops that transcend the barriers of time. Since the early 2000s, we have been at the forefront, leading the charge in educating the masses about electronic waste, hacking, and recycling. These workshops are not mere gatherings; they are incubators of ideas, hubs of inspiration, and classrooms of endless possibilities.

UNLOCKING THE BLACK-BOX

A significant aspect of our educational mission revolves around demystifying the enigmatic world of black-box technologies. These closed systems, often deemed impenetrable, are the focal point of our educational initiatives. We equip individuals with the knowledge and tools to unravel these black boxes, transforming them from cryptic puzzles into canvases of innovation. By understanding the inner workings of these devices, our students learn to dismantle, modify, and repurpose them, effectively turning the tables on the very concept of technological limitation.

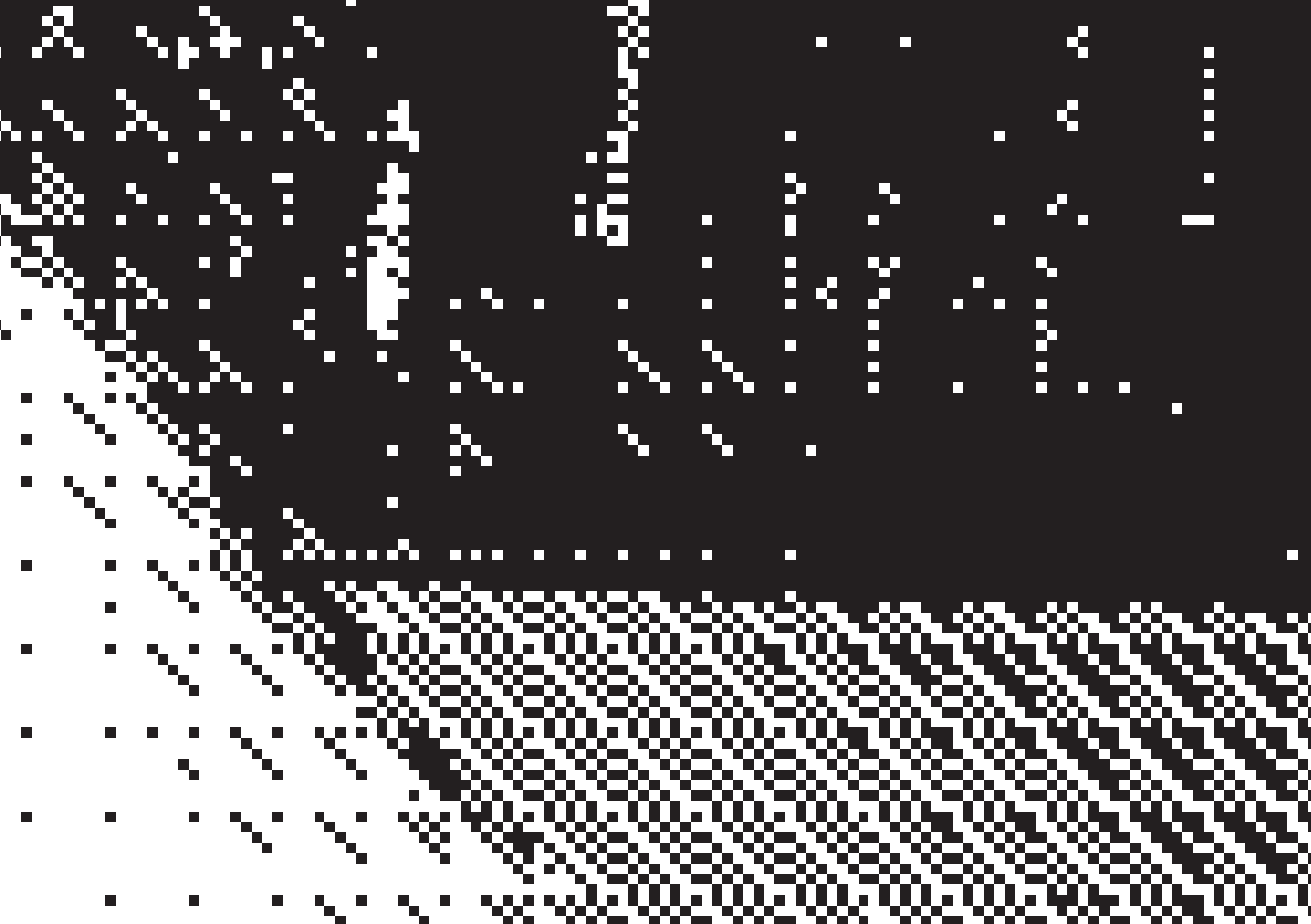
THE ART OF REPURPOSING

Central to our educational philosophy is the art of repurposing. We nurture a culture where obsolete devices are not discarded but cherished as stepping stones toward ingenuity. Through hands-on workshops, participants learn to dissect discarded technology, salvaging valuable components and repurposing them into new, imaginative tools. Our educators guide students through this process, encouraging them to envision innovative solutions to real-world challenges.

A COMMUNITY OF INNOVATORS

These workshops do more than impart technical skills; they foster a sense of community. Participants, ranging from novices to seasoned tech enthusiasts, come together to share ideas, collaborate on projects, and inspire one another. Through this collaborative spirit, we cultivate a community of innovators, where knowledge is freely exchanged, and creativity knows no bounds. Our educational initiatives serve as catalysts, sparking the flames of curiosity and ingenuity in the minds of all who participate.

In our classrooms, the obsolete transforms into the extraordinary, and black boxes yield their secrets to the curious. Through education, we dismantle barriers, not just in technology but in the way we perceive our world. We instill the confidence to question, explore, and innovate, fostering a generation of thinkers who see challenges as opportunities and obsolescence as a canvas for endless creativity. Together, we illuminate the path toward a future where every individual is not just a consumer of technology but a masterful creator, shaping a world where innovation thrives, and possibilities are limitless.



Jérôme Saint-Clair

Jerome Saint-Clair aka 01010101 is a French artist, engineer and researcher, who works in the fields of art and technology since 2001.

He evolves and experiments in multiple domains, such as, but not limited to: poetic computation, urban and software hacking, retail poisonning, experimental music, creative coding, media archeology,...

His work, primilarily based on programming and electronics, takes as many forms as net art, generative art, interactive installations, performances, experimental music and visuals, software and objects. He is a founding member of the Graffiti Research Lab France (2011), the DEad Minitel Orchestra (2013) and the CIO of Internet of Dead Things Institute (2018).

saint-clair.net

02

"Minitel" is a generic term designating pre World Wide Web terminals which appeared in French homes starting from June 4th 1982 and were widely used in France for three decades, until the Web took over and the Minitel services and its eponym network were shut down on June 30th 2012.

These cathode ray tube terminals[1], offering an 8 grayscale level display and embedding a modem, were lent for free by the French National Post and Telecommunication company to their customers. Users "only" had to pay for the per-call phone communication fees, billed every other month[2].

For many French people over 40, the Minitel has been their first form of online experience. It is quite an icon of an era. At the time, even if it did not sell internationally, the Minitel gained a worldwide aura and raised a lot of curiosity.

COMPUTERIZATION OF THE SOCIETY

The idea of what would become the Minitel (encompassing device, infrastructure and services) emerged at the beginning of the 70's. Everything speed up following a report on the computerization of the

French society, authored by Simon Nora[3] and Alain Minc[4] in 1977 at the request of the French President Valery Giscard d'Estaing[5].

Nora and Minc are said to have coined the term "telematique", a blend of computing and communication (compunication). This term is key when searching for documentation, not only about the Minitel, but also on the whole evolution of computer science and networks, societal changes, strategic choices, industry, ... it describes a shift that profoundly transformed both fields by opening a wider spectrum of possibilities in the 70's 80's.

At that time, the centralized strategy in terms of computing capabilities and technological sovereignty was elaborated at a national level, mostly by the Government by allocating funds to the public sector in charge of the requested technical developments . The industrial threat was I.B.M., large databases, satellite communication and, strategically speaking, being able to develop and produce electronic components locally was key. One must come to the conclusion that much hasn't changed since then.

The technology and the industry were also ready for the next step; producing electronic devices for the consumer market. But in the meantime, one could not foresee which services, devices, ergonomy,... would be widely adopted by a large audience. This led to what was described as "gadget development to mass production"[6] mechanisms. Gadgets were used to test the reactions, evangelize and measure the adoption of the public of novelties such as digital watches, calculators, 1st gen video-games, before moving to the next level of embedding them in proper electronic devices.

The onset of these new territories led, at the time, to some really interesting anticipation and fiction works, especially seen from today, more than 40 years later. They reflect the intensity of the conversation that was going on at the time in French society around computing and modernity. Some are so accurate that one might think that time travel was invented in the 70's.

One of these anticipation works is a two volume book released by François de Closets[7], a radio-journalist on France Inter who was running a program where he was inviting experts (scientists or company representatives) to discuss various topics. Each theme was the subject of two stories taking place in a near future (year 2000), one utopian, the other dystopian, followed by a discussion. This series, turned into a book, published in 1978 and 1979 is entitled "Scenarios du Futur"[8] (no translation needed, your French is now perfect). The computer networks issue goes, for instance, from a digitalized NHS system to surveillance state counter-attacked via a mass hacking and a DDOS[9].

Another visionary scenario is found in the prolog of the book entitled Mémoires Volées[10], which can be translated as Stolen memories. It pictures a Christmas shopping sequence involving a mother and her daughter and anticipates online shopping, software downloads, tablets, painting softwares, ...

A quite similar book in the way that it was created by a working group within the French national electricity company (E.D.F.) is titled Chroniques Muxiennes (Mux Chronicles). Using various technologies (telescreen, electronic calendar, smart/remote meters, etc) as a starting point, they imagined various work scenarios inside a "not so" fictional the national electricity company. The part about a remotely managed smart meters, considered as unrealistic and against privacy, is quite epic given how this technology evolved until nowadays, where it is a real thing installed in almost every home and that the attempt to make it compulsory was met with fierce opposition on privacy concerns.

In a more practical way, a lot of experiments and prototypes were developed to have a better grasp on what would work for everyone.

The Minitel made no exception and before its commercial launch, different setups and propositions were put on trial.

NETWORK INFRASTRUCTURE

What would become the Minitel evolved from a TV connected box using hertzian waves for data transmission to an all-in-one terminal using a wire network. The decision to use phone lines instead of hertzian waves was taken by Bernard Marti in 1976 following a meeting with the Soviet Union representatives in Moscow to promote the French communication system Antiope for the upcoming Olympics of 1980. Someone from Moscow asked if the system was using landlines. The right answer probably had to be "yes".

However, the French telephone network was archaic and unreliable. In 1974, only 12% of homes had a telephone. It was very common, back in the day, to have to wait for more than two years to get wired, especially if you were living in a remote location outside of town. A lot of efforts were made to deploy and modernize further the landlines, starting in 1975 with the Delta LP Plan[11], aiming at deploying 14 million telephone lines in 7 years. In 1984, 22 millions phone lines were in service, an equivalent of 88% of homes.

The Transpac[12] network (X.25 protocol, Internet concurrent), launched in 1978 and inaugurated in Paris then Rennes (headquarters of the CCETT[13]) on March 27th 1979, was used for the communication between heterogeneous computers and terminals. The connection from landlines to the Transpac network was made possible by P.A.V.I. devices (Point d'Accès Vidéotex). The network provided the high level of quality of service it was built for, apart from two main incidents, that occurred in 1982 and 1985. While the first incident's consequences were "only" random network interruptions, the latter deprived Minitel users from network access for two weeks. Overall, the network infrastructure sustaining the Minitel was robust and offered a good coverage.

EXPERIMENTS

During the last steps before the commercial launch of Minitel, several local scale experiments were conducted, each with a different aim, associated with a lot of media coverage to evangelize and to convince the future users (but also the politicians) of the benefits of this technology.

Users "simply" had to dial a number and perform a few manipulations and key presses on their terminal to connect to a Videotex access point, a network device in charge of interfacing the analog communications with the X.25 digital network mentioned earlier, and access the desired servers/services. This "simple" process needed to be assessed by real users, a trial for the new technology as well as communication material in order to make the interest in having it grow.

The very first experiment started in Saint-Malo (Brittany) in July 1980, among 55 users (20 companies and 35 individuals). They got access to a quite revolutionary yellow/white pages service (limited to 22 cities) with integrated maps to localize the search results. It was extended the next Autumn to 1500 users across France and ended in December 1982.

The yellow/white pages service was the main reason used to justify and promote the development of what would become the Minitel. At the end of the 70's, as the number of phone customers grew considerably, it became more and more difficult to have up-to-date paper phone directories which were printed and distributed once a year, only for the customer's administrative area (the French departments). An estimated 30% of the information was incorrect. This had a great impact on the call centers, the number of calls they received, and the staffing number needed to answer. The rather substantial savings induced by having an automated solution, with a high quality service and availability, covered the price of production of the Minitel equipment, therefore the customers had not to buy it. Not to mention

the ecological impact of printing a phonebook per customer : 30,000 tons of paper was used in 1982 with a forecasted 100,000 tons in 1985 according to customer growth.

The next year, in 1981, the experiment was extended to 4,000 users in the Ille-et-Vilaine department, still focusing on the phone directory services.

Another experimental service named GRETEL took place in an area of the city of Strasbourg, hosted by the D.N.A. (Dernières Nouvelles d'Alsace) newspaper. It started during the winter 1981 with 80 users and was later extended to a larger audience. The available services were news, TV and cinema schedules, weather forecasts, a few games and a mailbox system. It was at the origin of one of the most successful functionality of the Minitel: the instant chat system. First under-estimated by the developers, it is through some sort of hack found in 1982 by a user named "Big Panther" that the chat gained popularity. S/he used a functionality originally used by the support team to assist users to chat instead with other users. This turned out to be a really successful functionality and drove up to 85% of the traffic on the site. It was later normalized and became a profitable key feature of a lot of Minitel services.

The most important experiment in terms of users, duration and outcomes, took place in the cities of Versailles, Vélizy-Villacoublay, Jouy-en-Josas, Buc, Bièvres and Les Loges-en-Josas. It started in 1980 and was named Vélizy Télétel 3V. One hundred ninety service providers were initially involved to offer content to a 2500 users panel, extended in 1983 to 10,000 persons. They were equipped with Videotex boxes (nicknamed food warmers because of their shape) connected to a TV and the rudimentary keyboard (only caps keys) was integrated in a remote controller. The most successful services were the yellow/white pages, online press and shopping, train tickets reservation, remote banking and messaging systems.

This experiment was key in a sense that a group of passionate users

created a user group (A.A.T.E.L.[14]) and so did the service providers (A.F.T.E.L.[15]), both providing constructive feedback to the D.G.T.[16] - D.A.C.T.[17] which was driving the project: i.e. use AZERTY keyboards rather than alphabetical one, how to structure online newspapers (which sections should prevail and which ones should be dropped).

What remains known as the Vélizy experiment, led to the creation, in 1984, of the "kiosk system" (a reference to newspaper kiosks), a sort of portal where users were first redirected, once connected, and from which they were able to access different services through a codename. There were different kiosks, each with a specific pricing and dialing number: 3614, 3615, etc. This system, using the same principle of overtaxed communication used by the "speaking clock" was put in place to secure revenues for the local press industry which had expressed strong concerns about the Minitel and plausible loss of revenues in their sector. As a consequence, only companies having a press license were allowed to host Minitel services. Part of the communication paid by Minitel users were going to the Post and Telephone national company, while the rest was going to the services based on their audience.

This experiment also shed light on the need for users to be able to communicate through messaging systems. The mailbox-based M3V messaging system (nicknamed "Bidulette", which translates to "Little Thingy") was allowing private and thematic group discussions. While the D.A.C.T. and service providers, considering it as a simple gadget, thought about terminating the experiment, the A.A.T.E.L. fought nails and teeth to keep it running, arguing that it was a key feature for most users. While the Velizy experiment came to an end in Spring 1984, the massive development of such services later on proved them right.

DESIGN

In terms of device, people often tend to think that the beige Minitel (cubic / 25cm edge) with the fold-down keyboard (nicknamed the

garbage chute model) was the only model available. In fact, there were a lot of different models. Not only the similar in shape and color "cash drawer" model (with a retractable keyboard), but also a lot more, since several manufacturers had the license to produce Minitel set. However, all devices were compatible with (at least) the TELETEL standard (24 lines by 40 columns) display of videotex alpha-mosaïc characters[18].

A first set of T.A.E.[19] prototypes were introduced on August 9th 1979 at the C.I.T.A.T.[20] in Issy-les-Moulineaux. Some prototypes were not AZERTY, the most common keyboard for french, but ABCD keyboards, assuming that most people would not be familiar with keyboard typing. Some of these made their way to the public but didn't last long and the AZERTY keyboards took over. All keyboards were integrating extra navigation and connection keys. The companies who produced prototypes this year were Thomson-CSF, CIT-Alcatel, Matra Communication, TRT-Phillips.

The industrial designer Roger Tallon[21] invented the term and brand Minitel (Médium Interactif par Numérisation d'Informations Téléphoniques, which could be translated as Interactive Medium by Digitization of Telephonic Information), filed by the D.G.T. on April 9th 1981. Later the same year, he also filed a patent[22] for a terminal involving a C.R.T.[23] and a keyboard, mostly for domestic use.

A lot of different models were manufactured. Some with more functionalities were sold, as opposed to the ones lended for free, integrating phonebooks, card readers, and also password protections. A portable and compact one was also available: The Matra MO5, which was using a monochrome backlit LCD screen. One of the very last models launched, when the decision makers were still hoping for a merge between the Minitel and the Internet, is the Alcatel Web Touch, featuring a LCD color screen, a mouse and running a Java Virtual Machine allowing to either connect, via the integrated modem, to a now long gone Internet provider or to the now decommissioned Minitel network.

In terms of user interface and user experience, the previously mentioned experiments helped to forge the standards of a user-friendly interface and navigation, even if the page refresh rate was quite slow (several tens of seconds to refresh a whole page, even if optimizations were possible). Several papers and books analyzing this new medium, its possibilities and its limitations, were published, from the mid-eighties onward. For instance, the Rencontres Internationales de Lure which examines writing in all its forms (typography, literature, visual or digital) was among those who took these new aspects into consideration in their research and associated publications (see L'écriture télématique : Années zéro).

ANECDOTES: FURNITURES, ACCESSORIES, HACKS, POPULAR CULTURE

A whole new type of furniture needed to be designed in order to give the Minitel the place it deserves in its new home. The fact that the Minitel had to be located next to a landline plug and telephone led woodworkers to create Minitel dedicated furniture fitting in entrance halls or narrow locations (where the telephones used to stand). Some even had integrated sliding benches for more comfort during longer browsing sessions.

As the Minitel business model was a pay per use duration scheme, some people were using various techniques to circumvent the issue of having high phone bills. The most basic system was a digital chronometer, stuck to the Minitel, used to monitor how much time had been spent online. A more advanced trick was to use a wire taping system to record a quick navigation through pages which would later be read offline, once disconnected. The schematics for these systems (ie: PC to Minitel adapter) could be found in electronics magazines such as "Radio Plans" or "Generation Electronique" along with detailed tutorials. Some devices could be bought directly.

An easier and more basic way for saving screen time was, of course, the use of Minitel dedicated thermal printers, directly plugged and powered through the "peri-informatique" (DIN) plug at the rear of the Minitel.

In terms of services, some administrators, named SysOps (system operators), had put in place off-the-grid servers, mostly thematic forums, BBS-like, which were not referenced or accessible via the centralized kiosk system. The happy few aware of these free services (chat rooms, forums, files exchange, classified ads, ...), through computer magazines articles and word of mouth, had to dial a number to connect directly to their servers, allowing one or few simultaneous connections.

Some Minitel services providers were giving away stickers, which, stuck on the Minitel, were serving as bookmarks as there was no way to digitally store such information.

Apart from dedicated devices, the Minitel services could also be accessed via emulators running on PCs but also on devices such as Palm Pilots or Windows CE. One advantage of such solutions was that you could benefit from the color interface of the services (almost all Minitel devices were only offering a grayscale display).

In terms of remote communication (not Minitel specific then), at a time when modems were a quite expensive piece of equipment, some figured out that you could wire your computer to the Minitel and through a combination of keys, swap the default reception and transmission speeds to fit their needs.

The various hacks had probably been made easier thanks to a very detailed technical documentation provided by default by the manufacturers to every user. Something which is barely imaginable nowadays.

Minitel was a specific term in the sign language, made with both

hands, thumbs and indexes forming a square, moved forward and backward to mimic a blinking cursor.

A dedicated network (which lasted longer than the Minitel network) and service (3618 MIAMI[24]) was targeting this segment of the market.

There also was a specific model named Minitel Dialogue allowing to directly connect two Minitel through dialing and then chat.

GROWTH, PEAK, MISSED CONVERGENCE WITH THE INTERNET AND THE (POSTPONED) END

The number of Minitel services grew to reach a peak in 1997 with a total of 25,405[25], while the number of units was 6,473,000[26] in 1994, meaning that about 36% of the population had access to such devices (at home or at work).

The variety of services (banking and finance, booking, weather forecasts, online store, discussion forums, university admissions and exams results, etc.) contributed to its success, even if it did not sell internationally. In 1988, Bruno Lussato[27], a professor at the Conservatoire national des arts et métiers told his colleagues: "Some say that the whole world envies the Minitel technology. This, I'm not sure, but what is certain is that the whole world doesn't buy it".

The most successful services were gaming and messaging systems[28], and notably, what was called the "Pink Minitel". "Sexy"[29] and suggestive ads for those erotic online chat rooms were found everywhere, from magazines, to abandoned gas stations, bridge's pillars, while the service 3615 ALINE was introducing the weekly erotic movie. A whole generation of startupers made a lot of money with these lucrative services. Among them Xavier Niel[30], who became a millionaire in Euros at the age of 24 and is now best known as the founder and majority shareholder of the French Internet service provider and mobile operator Iliad trading under the Free brand (France's second-

largest ISP, and third mobile operator).

However, after 15 years of reign, the Minitel started to worry about the new kid in town. At the time, 6.7 million Minitel were in French homes, while only 420,000 persons were using the Internet on a regular basis. However, it was clear that the Internet was offering more perspectives in terms of economic growth and employment, and France was obviously late to the party. In 1997, Lionel Jospin, Prime Minister, finally decided that more room should be made for the Internet. The initiatives for a Minitel/Internet[31] merge were rapidly abandoned for a full World Wide Web orientation, and as a consequence a lot of Minitel services did migrate to the Web[32].

Initially planned for September 30th 2011, the Minitel services were unplugged on June 30th 2012 since a lot of connections were still registered (most of them to access services such as yellow pages or weather forecasts). Only the MIAMI services, mentioned earlier, running on a different network, did last a little longer.

Looking back, the missed convergence with the Internet, or at least the lack of evolutions of the Minitel (devices and network) have been attributed to a lack of innovation and vision, caused by political and internal struggles, mostly between scientists and the telecoms. Regarding this matter, the dismissal of the datagram[33] technology developed by Louis Pouzin[34] and implemented at the Cyclades[35] French research network level (one of the pioneering networks experimenting with the concept of packet switching) is often mentioned.

The Internet also probably took over because it was allowing more global/international access, through devices with more functionalities like being able to display colors, and pictures with a more realistic aspect, a "faster" (28k bauds or even lower before the ADSL) network and a single pricing (even though the Internet access was still tight to a modem connection to an Internet provider with a monthly plan and a pay per minute consumption owed to the national phone company).

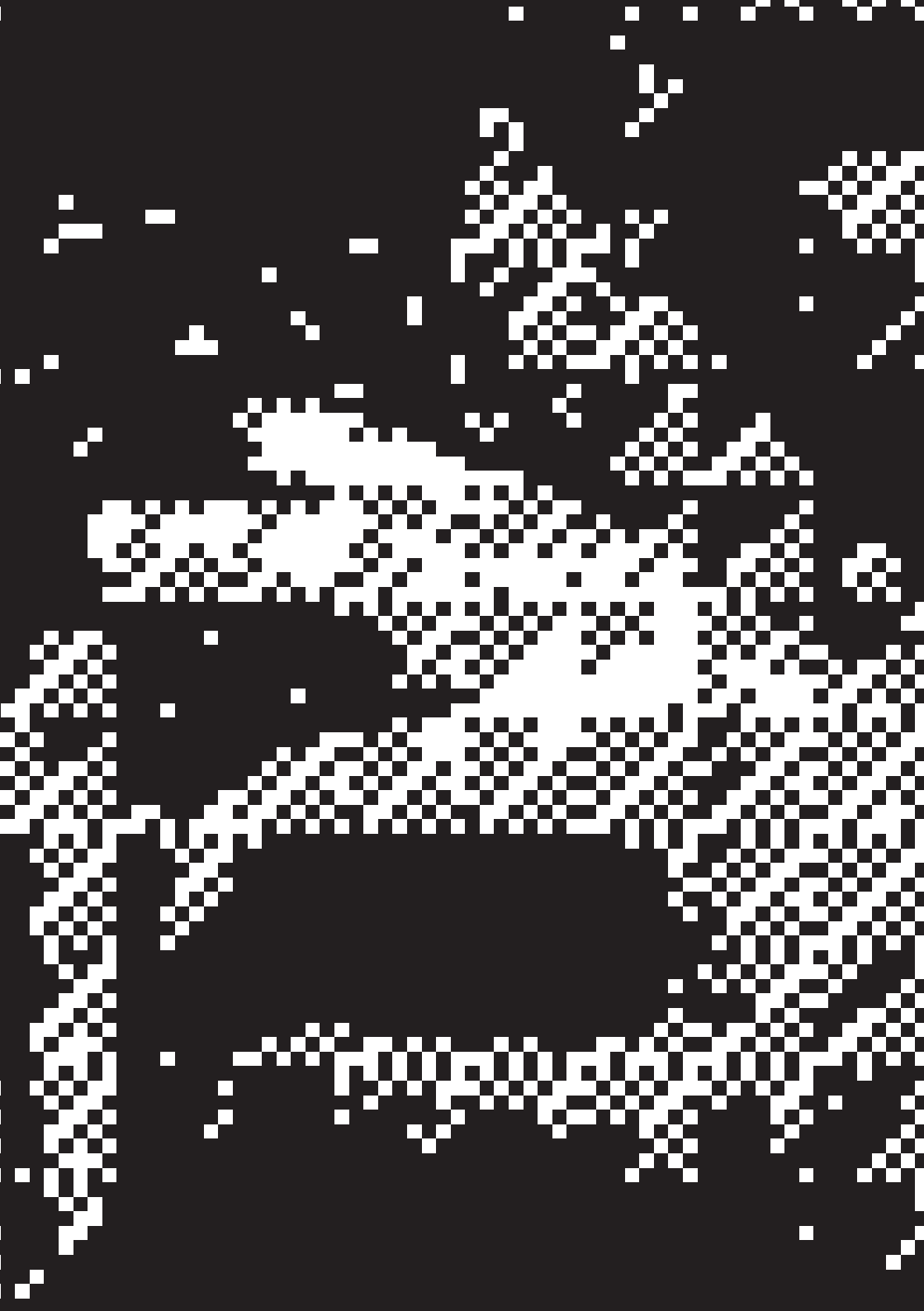
This, never initiated, evolution was the subject of an April's fool[36] on the TV news in 1985 when the presenter introduced a brand new and revolutionary service which correspond exactly to what we call "video on demand" today.

This leaves us with a lot of stories and memories from the 80's. The Minitel is often referenced in popular culture, ads, movies, songs, novels, etc and younger generations have a "rough" idea of what it used to be. Quite recently, in December 2020, the series "3615 Monique" (a typical name for a pink chatroom service) related to the Minitel "startups" era was released on OCS (Orange Cinema Series), property of Orange, formerly France Télécom S.A., formerly General Direction of Telecommunications. The loop is closed.

Many people kept their Minitel (and even the original packaging/ cardboard box) whose property was transferred[37] from the State to the National phone company's customers. This unilateral decision appeared in small characters on people's bills, ending in 2004, right before a European directive forcing electronic components manufacturers to recycle their devices became effective. Unions and ecologists raised their voice against this move and as a result, France Telecom let the customers bring their device back to their local agencies.

Most of the people who kept their Minitel were thinking that it would become a vintage rarity a few decades later. The fact is that only a few specific models did reach this status while the rest is, at the present time, not worth more than 10 euros for the most common ones. Most of them still sleep in French attics.

Parts of the recycled Minitel have been used to manufacture car bumpers and integrated into road surfaces, which is quite ironic for a device and network defeated by the information highways promoted by Al Gore.



Régine Debatty

Régine Debatty is a writer, curator, critic, and founder of we-make-money-not-art.com, a blog which received 2 Webby awards and recently received an honorary mention at the START Prize, a competition that acknowledges " innovative projects at the interface of science, technology and art". Régine is known for her writings that explore the connections between art, science, technology, and social issues.

She also created A.I.L. (Artists in Laboratories), a weekly radio program about the collaborations between art and science for Resonance104.4fm in London (2012–14), and is the co-author of the "sprint book" New Art/Science Affinities, published by Carnegie Mellon University.

we-make-money-not-art.com

03

The Dead Minitel Orchestra
By Régine Debatty
Published on April 18, 2017 on We Make Money Not Art
https://we-make-money-not-art.com/the-dead-minitel-orchestra/

In 1982, the French public telecommunications company launched a revolutionary system combining the telephone and information technology. It was a beige, plastic box and it was called the Minitel.
The screen-keyboard set was delivered for free to French homes. People could electronically check the weather or their horoscope, find local restaurants, apply to university, book a holiday, buy shoes, monitor their bank accounts, etc. They could even chat online and have some rudimentary forms of cybersex. It was the world wide web before the world wide web and actually it wasn't even worldwide because it was limited to the territory of France. I grew up in Belgium feeling left out, envious and cheated.

The Minitel was an avant-garde domestic technology and millions of people were still using it when France Telecom decided to pull the plug on the service in 2012.

In 2013, members of the Graffiti Research Lab France[1] decided to set up a DEad Minitel Orchestra (DeMO), a series of live performance

and artistic installations that explore the sonic and visual afterlife of the defunct Videotex online service. The result is experimental, joyful, often charming and sometimes absurd.

The Dead Minitel Orchestra is a project by Antoine Bonnet[2], Martin De Bie[3] and Jerome Saint-Clair[4]. I've been loving what the G.R.L.F.R. have been doing for years so the DeMO gave me the perfect excuse to contact them and ask for their opinions on quaint devices and extinct technologies:

Hi Jerome, Martin and Antoine! I grew up in French-speaking Belgium and was hyper envious of all these 36 15 services French people seemed to enjoy. Minitel seemed to be the acme of sophistication and modernity at the time. Is the Minitel still present in French contemporary culture? Has some kind of nostalgic cult developed around it?

Jerome: The Minitel was definitely a thing in France in the 80s. Imagine a pre-WWW area (in 1982) where suddenly every person with a phone landline can go get a revolutionary device for free from the national phone company (named PTT at the time) and connect to online services.

Some of those services were free to connect to (ie: white and yellow pages), some others were super expensive pay-per-minute (forums, adult and porn chat services among others). Looking back, it feels strange to realize, while watching archived national news[5] dealing with the Minitel, that there was a real nationalist pride accompanying it. There was a real struggle to stay competitive against other countries in terms of technology and industry, to remain autonomous. Remember, every country had its own computer company (Olivetti, Sinclair, etc.)

As a consequence of this mass adoption and national exception feeling (you know how French people are), everyone above 20 yo in France has a story with the Minitel. For the youngest ones, it's the weird computer sitting near the telephone at their grand-parents' place. For the others

it's the first connected terminal they have ever used. And it's true.

> ***Each time we perform or exhibit Minitels for a show, we notice a real nostalgia in the eyes of the audience. So much nostalgia that we are sometimes thinking of doing a "People staring at Minitels" project. We would end up with totally different portraits than Kyle McDonald's People staring at computers[6].***

Jerome: It also sometimes becomes an intergenerational transmission thing. Kids (who are too young to be aware about it) are usually super curious about it and their parents are always proud to tell them what it is and the relation they had with the Minitel. Maybe some sort of "finally a technological item my kids don't know about and that I can explain" effect.

Despite all this, we wouldn't say there is now a cult developed around it. But it was definitely part of people's everyday life. Not only as a device they used, but also through TV and billboard ads and also many wild ads for the "pink minitel" services showing nude women, along the roads, in abandoned gas stations ... The Minitel was also present during turning points of people's life: you were able to check online if you passed the "baccalaureat", or register for University. And that's the kind of story we hear each time. The Minitel is our digital Madeleine de Proust.

Internationally speaking, views are quite divergent. Envy for some like you, Régine, and sometimes curiosity. But also jokes. Golan Levin[7] told me he knows some. I'd be curious to hear them.

Antoine: When I was kid (I was around 8, I guess) , there were huge ads for "minitel rose" on the roads. They were everywhere and particularly on the roads leading to highways (Paris Peripherique). I really enjoyed seeing these ads because when I was seeing them, it meant HOLIDAYS!! I never got curious about these ULLA, CUM, etc. services but I really liked the way these ads were placed under dark spots (under bridges, in corners, etc.), how they were aging, losing

colors, ungluing or scratched. The girls in the pictures were almost naked but it never shocked me... I think I didn't notice until I became a teenager.

Martin: I remember my parents using it to access information when I was a kid. It was some kind of mysterious device I hadn't really accessed, except when I was using it by mimicry, more as a toy, without even connecting to any service (hopefully for my parents' phone bill). It's only later when I was 15 and that I did connect under my mother's supervision to check school grades that I started to realize how it could be used for. I really understood how revolutionary it was when I first experienced the Internet, a few years later. Being able to use it now, in my own artistic practice, is way more satisfying than typing pointlessly on a bizarre device.

Jerome: I personally remember going to the post office (the phone company and post office were the same national company at the time) with the paper my parents received in the mail to go get a Minitel. And also some years later take it back to get a newer version, probably the Minitel 1B. I remember my father checking the National lottery results and my mother placing orders on La Redoute (a mail order company).

Does the Minitel have some specific, technological or other, features that make it particularly interesting to use to generate sound and images? Or is it producing the same kind of audio and images as any other type of old bits of electronics?

It is worse than what you can imagine. What's funny is that people's memories tend to be biased and blurred with later computers or game consoles they used.

In fact, the Minitel does a single and monotone beep. It's not even 8 bit music capable. On a graphical point of view, it has 2 display modes (text and graphics), using grayscale colors (late models, difficult to find allow color though). In addition to that, the graphical mode is not even pixel based but rather character based, with, for each block of

character, a 2×3 stack of rectangles whose color can be either the foreground or background color of the character.

This explains why it has its own aesthetic in terms of graphics and that's what makes it so interesting.

Why is it the Dead Minitel Orchestra instead of just the Minitel Orchestra? Does the 'Dead" word refer to the fact that you've completely re-purposed and modified the functioning of the device? Or is it there to highlight that it's one of those dead tech that came to be supplanted by another one?

We picked "dead" for two reasons. The first one because we wanted to use the DeMO acronym, which is also a reference to the demo scene. The second one because the Minitel, in its original form, is actually dead. It is just a passive terminal, by design, and all the services (remote servers) have been unplugged on June 30th 2012.

It has not been totally supplanted by another technology. It kept living along with the Internet until Orange decided to cut the services. Lots of people were still using it, back in 2012. Mostly because those people were used to it and they had a single use case: car mechanics checking parts availability, farmers having a look at the weather forecasts, individuals checking the stock market, etc.

We used "Dead" because we started working with Minitel a few weeks before Orange shut down the service on June 30th 2012. Our first Minitel exhibition was a tribute, a death notice of the service. We remake some emblematic "3615" pages and create some visuals and animation to say goodbye. Since this exhibition we worked to "get the hell out of it" to get some kind of DemoScene practice with it, we even tried to modify the electronics to generate some generative visuals.

The idea of making music came later, and the name came naturally, from a dead technology we make experimental music as an orchestra, and using visuals and interfaces to get control over sound as a DeMO.

Is the DeMo a comment or reflection on planned obsolescence and on our throwaway culture?

We wouldn't say it was planned obsolescence. It doesn't fit the "give it for free and make money on the services" business model of the Minitel. It was built to last. Hopefully for us, the Minitels we own are still working, more than 25 years after they were manufactured. It's not too bad when you know that CRT (cathode ray tube) screens have a life expectancy of 20 years. Of course, some of them are a bit tired. The almost-dead-CRT effect is not bad though. However, sooner or later, all of our Minitels' screen will be dead. We'll have to figure out something else to workaround that.

What are the challenges of working with a dead technology like this one?

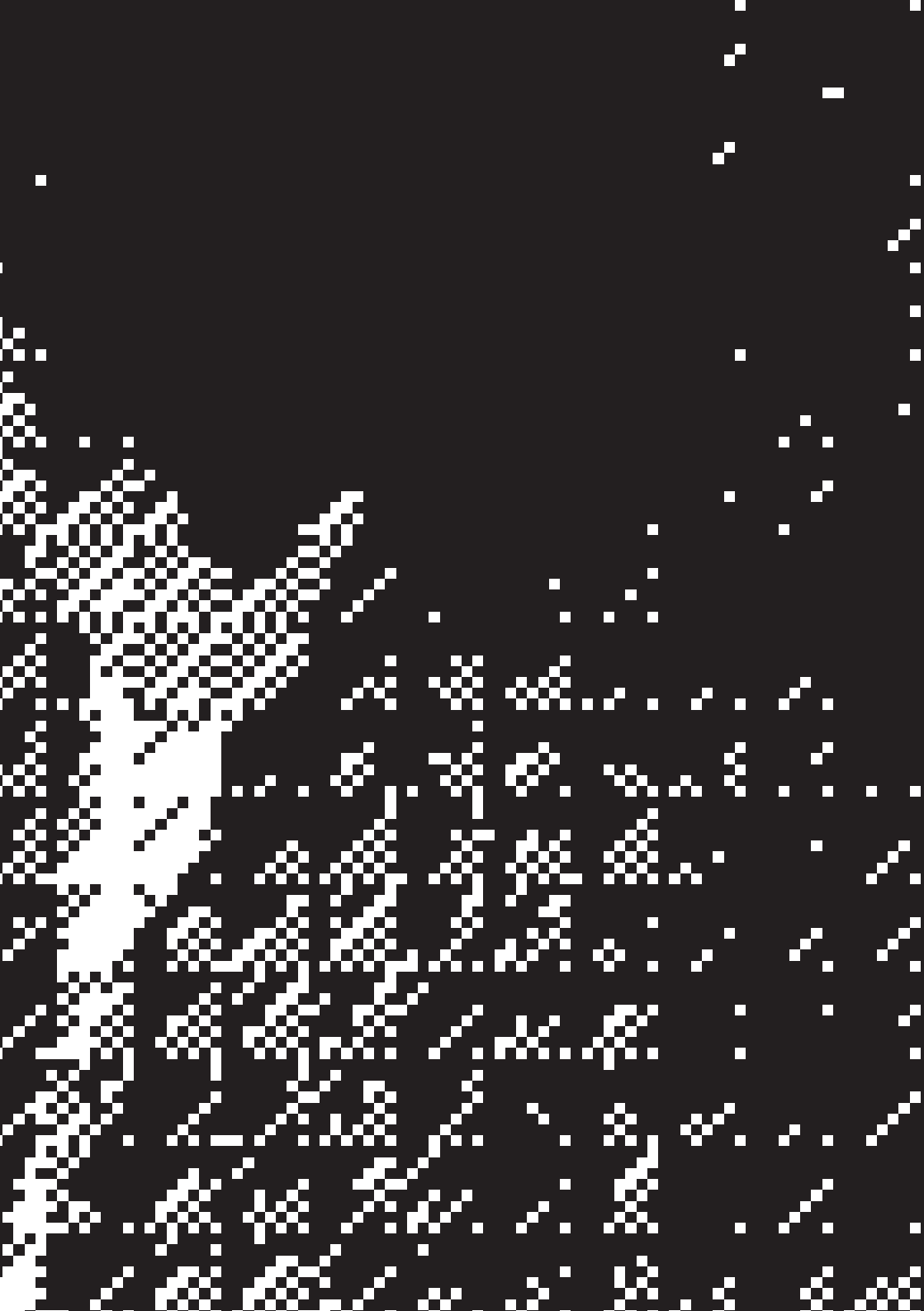
There are indeed various challenges. The first one was to find a starting point. Florent Deloison[8] pointed us to Fabrice, Renaud, PG and Phil (from the Toulouse Tetalab[9]) Webcam to the Minitel project. That's how it all began. We also found some good technical documentation.

We made Tetalab's original code evolve to work offline and we ended up creating a dedicated Minitel library for Arduino. Mostly because we wanted to be able to easily recreate classical Minitel screens: 36-15 ULLA, the yellow pages landing screen. And, moving forward, a Minitel-like Nyan Cat, a non playable Pong and an intermittently flattening electrocardiogram (using the single beep of the Minitel). Our goal at that time was to repurpose the Minitel as a low-tech photo frame. Either to host the screens mentioned above or for our 36-15 Selfie project.

Later came the idea to use it in a totally different way and make music/sound with it. At the very beginning we were using screen luminosity variations (either by circuit bending the graphical chip or by displaying random characters) to generate or modulate sound. We later used

a homemade MIDI clock to sync the Minitels. In our last setup, we only use the Minitel and its keyboard as an interface and everything is sent to Raspberry Pis handling both MIDI and audio output. We're also using one Minitel to display graphics and use it as a source for realtime VJ effects through another Raspberry equipped with a camera. The project is shifting to include more of the Minitel culture, using sound samples of Minitel TV ads or news saying how great the Minitel technology was. That's really a work in progress.

Each time we have a performance planned is an opportunity to move forward on this project.



Teresa Dillon

Teresa Dillon is an artist and researcher. For over, two decades her work has focused on the critical examination of techno-civic relations in various settings. This has led to a number of artistic works, curatorial projects, academic research and design-led programmes that focus on how everyday life, is enmeshed with digital artefacts and how the history, design and distribution of such artefacts, influence notions of survival, relationality, creativity, and connectivity. She currently holds the post of Professor of City Futures at the School of Art, UWE, Bristol.

polarproduce.org
repairacts.net
urbanhosts.org

04

WORKING THE BREAK POINT V.3: MAINTENANCE, REPAIR AND FAILURE IN ART: #RIPMINITEL 1980-2012

Working the Break Point, version three (v.3), is the latest release in a series of publications focusing on artistic practices that address questions of maintenance, repair, and failure in art.

This third version focuses on the work of Benjamin Gaulon and Jérôme Saint-Clair, French artists who, for the last twenty years, have been exploring and repurposing defunct technologies. Specifically, v.3 focuses on their ongoing work under the banner of the "Internet of Dead Things Institute" (IoDTI), which the duo co-founded with others in 2018. The Institute's humble garage beginnings are underpinned by an ambitious and bold declaration to become a leading global centre through which people are guided on "a transformative journey of hacking, repurposing, and redesigning obsolete technologies" (quote drawn from Gaulon's chapter in this publication). With obsolescence seen not as a "dead end" but as a creative, learning journey, it is driven by the desire to demystify the inner workings of our digital devices and a philosophy that focuses on the art of repurposing.

I have known Gaulon since 2012 and met Saint-Clair in 2019 when we came together for NØ SCHOOL, a summer residential programme

that takes place in Nevers, France. Gaulon co-directs the school with Dasha Illina, which focuses on addressing critical research around the social and environmental impacts of information and communication technologies. No School's approach and that of the IoDTI connect deeply with the work that I make under the umbrella of Repair Acts. Repair Acts aims to foster restorative cultures by connecting past stories with what we do today and how we imagine the future. IoDTI, NØ SCHOOL, and Repair Acts are all rooted in contemporary critical media art practice and transdisciplinary perspectives that draw on fields of design, education, activism, scholarship, and community and civic tech. In accepting the invitation to contribute to IoDTI's first publication, I draw a line from existing articles (Working the Break Point v.1 and v.2), which explore a shared interest in artistic and applied practices that work not just with obsolete technologies but also engage with processes of material abundance, redundancy, decay, waste, obfuscation, and elimination.

For those who are not familiar with v.1 and v.2, I open this chapter by providing a short summary of each version, highlighting elements that speak to Gaulon's work (v.1) and the co-director of NØ SCHOOL, Dasha Illina (v.2). Working the Break Point v.3 builds on this narrative by focusing on Saint-Clair and Gaulon's work on Minitel. This connects to colleagues who have also contributed to this book (The Internet of Dead Things), namely artists, designers, and scholars Nicola Nova, Garnet Hertz, and Lori Emerson, whose work addresses material matters related to so-called obsolete technologies, specifically through the lens of media archaeology. I close the chapter with thoughts that connect such media archaeology practices, with what its means to create circular media art practice.

VERSION 3 (V.3)

Working the Break Point v.3 continues to place attention on artistic practices that intentionally highlight an object's malfunctions—its cracks, glitches, broken, or failed states—in the reception and aesthetics of the works. Such works operate at the coalface of software and

hardware errors, amplifying malfunctions, and/or exposing semi-DIY (Do-It-Yourself) repairs through patches and hacks. These practices bring technical artifacts and systems, as vital contributions, to the fore (Barad, 2007; Bennet, 2010; de La Bellacasa, 2017; Jackson & Houston, 2021; Graham and Thrift, 2007; Star, 1999; Schuman, 2011) Furthermore, such works can expose planned obsolescence or the strategic decisions that render a format or device no longer viable, as well as highlight the labour, toil, humour, habits, and rituals surrounding everyday technological matters of care and maintenance. While my writing on this subject focuses on digital artworks, it is not limited to such art forms. Working the Break Point, v.1, was the first conceptual sketch that outlined how contemporary art practices sensorially articulate instances of the 'break point' and engage with and speak alongside scholarship in fields related to, but not exclusive to, repair, infrastructure, discard and degrowth studies, critical spatial practices, and applied research on circular economic transitions and policies. It also addresses just transformations, responsible consumption and production, ecological reparations, and environmental and post-human legal theory.

This work forms part of my ongoing practice under the banner of the pluralistic and arts-led research program Repair Acts. Repair Acts (established in 2016) is currently housed in Bristol at the School of Art, at the University of the West of England/UWE, with a sibling fork, studio repair acts (2022-), in Ireland. Both programs endeavour, as noted, to focus on repair, care, maintenance, and healing cultures by connecting past stories with what we do today and how we imagine the future.

Defining storytelling as a multidisciplinary, interactive art form that draws on visual and creative methodologies from the fields of art, architecture, design, performance, and media cultures, we combine these elements with traditional social science and humanities desk-based research, data visualization, and media archaeology. With the intention of creating technological narratives that not only spur listeners' imagination but also seek to create divergent alternatives to

current technology-making norms. We do this by exploring analogue, heritage, and craft forms of repair alongside those associated with the repair (or lack thereof) of highly networked, densely manufactured, and increasingly 'intelligent' objects. Addressing the sheer abundance, built-in forms of obsolescence, and the toxic end-of-life of contemporary devices, to date, our work has focused on producing new artworks and exhibitions, mapping cartographies of local repair economies, and co-designing Local Repair Declarations and the People's Archive of Everyday Repair with communities. With our current work focused on amplifying and designing practical pathways for repairing objects across different sites and locations through an interdisciplinary and applied critical art, design, and academic lens. Working in this place-based, story-led manner, we bring different people and communities to the table, with projects taking place in urban centres, such as Bristol, New Delhi, Belo Horizonte, London, and rural regions, such as Westmeath, Ireland.

It is from this context that the series "Working the Break Point" emerges, with v.1 building on existing scholarship on glitch and failure in media art histories (for reference see Betancourt 2017; Cascone, 2000; Goriunova and Shulgin, 2008; Hammer, 2015; Holloway, 2013; Menkman, 2011; Russell, 2020), as well as highlighting Gaulon's piece "KindleGlitched, Aesthetics of Planned Obsolescence" 2012), as an example of artistic practices deploy the 'break point'.

For KindleGlitched, Gaulon sourced broken Amazon Kindle e-readers. Capturing scrambled images from the e-readers, he spotlights the glitched states, by printing and re-framing the broken image, in the shell of the original Kindle device. The augmented readers, with their newly printed image, are signed and sound on Amazon. In a purposeful act of 'reselling' broken works back into an online market, what Gaulon refers to as retail poisoning "the act of disrupting consumerism by intentionally injecting: critical / corrupted / fake / glitched data and/or hardware, into existing online and offline retail outlets' (see recyclism.com/retailpoisoning_menu.html, last accessed 7th April 2024). Through this act of reselling, and/or poisoning, there

is a further play on circularity that provokes questions about what we want from an object in the first place. For example, why do we always require devices to be new and shiny? Or what marketing tactics are needed to elevate reused objects, as attractive options? In returning them, as art objects to the market, what transactional practices do they trigger and/or evoke? Framed against these questions, Gaulon's signed devices transform the broken Kindle, into desirable and unique art objects. His signature, a gesture towards traditional speculative trading, where signed works not only denote completion but also provide proof of provenance, that are further central to notions of attribution, authentication, and later value gain. Here the break point is propelled, returned to the market, as a rarefied artefact of electronic waste that is marketed on platforms, whose economic dynamics, further bely their environmental impact.

Working the Break Point, v.2, emerged as a response and invitation from Dasha Ilina to provide commentary on her work "ADVICE WELL TAKEN". Ilina works alongside Gaulon as a co-director of NØ SCHOOL, a summer residency programme that takes place in Never, France. Running annually, from 2019 (aside from 2020, when it was postponed due to COVID), No School focuses on supporting practitioners, who are interested in developing skills and critical research around the social and environmental impacts of information and communication technologies. This is enabled through a fee-paying residency programme that includes two-weeks accommodation, all meals and daily workshops led by a rotating cast of international teachers. Evening events are curated as a means of connecting with local interested parties and providing an opportunity for teachers and participants to collectively share their work. With the closing weekend celebrating the work created, through a public exhibition and concert programme that also draws in locals, invited friends, colleagues, and passers-by. From a pedagogical perspective, the NØ SCHOOL's ethos emphasises peer-to-peer learning, where students and teachers are considered as equal, in their artistic explorations, with emphasis on skill sharing, collaboration, cooperation, mutual exchange and support. The intensity of the programme often leads to lasting friendships, with

the networking effects extending beyond the formal residency period, leading to further collaborations and exchanges between all involved. In the context of No School, Ilina's invitation arose, and it was through NØ SCHOOL that I had my first direct encounter with Minitels (outside of seeing them in computer and technical museums). But more on that later.

For now, Working the Break Point, v.2 addressed Illina's "ADVICE WELL TAKEN", which draws on stories gathered from people interviewed about the tactics they use to maintain their digital devices. The stories and memories collated are contextualised as folk narratives, vernacular renderings that range from blowing onto floppy disks or a headphone jack, to keeping the dust away, to duct tape manoeuvres while mending a broken mobile phone screen. The advice presented in this work captures the mundane, ritualistic, and made-up, idiosyncratic habits that often emerge from everyday use and maintenance of digital devices. Recorded as a series of interviews, the full set, including a director's cut, are accessed through a DVD format, and accompanying publication. The DVD, invented, developed, and released in the mid-1990s, focused on digitally encoding video and multimedia content onto a signal format. It required as specialist player and quickly replaced VHS tape, as a primary mode choice for domestic movie releases and distribution. However, by the 2020s DVDs were already considered as a redundant medium, a relic even, as high speed, home Internet connects paved the way for video-on-demand, streaming services, and other hi-definition media formats. As with many of us who work with older technologies, Ilina's decision to utilise older hardware, as the primary carrier of the work may be perceived as a nostalgic turn. However, it also subtly acknowledges the rapid evolution of formats and standards. By framing "ADVICE WELL TAKEN" as an ethnographic account the mundane labours, breakdowns and malfunctions that occur in everyday life, Ilina challenges the conversational narrative of technological progress. In reviving the DVD format, a series of questions emerge that extend beyond the specific technical issues involved and prompt instead a reflection on the broader systemic issues surrounding consumer technologies.

By choosing the DVD player as one of the media through which the work is received, Iliana subtly draws attention to how the DVD format has not only been pushed onto the market in the space of two decades, stimulated by a whole range of interlocking industrial, economic, and marketing factors, but also as the title of the book suggests, became (un)dead (Hertz and Parikka, 2012, Sterling, 1995) in this period. Regulated as 'team redundant', the DVD player, despite its continued functioning, no longer served the logic of the market or of capital. Like many domestic applicates that once served the leisure needs of families, DVD players are now likely to be 'littered' in the homes of many who grew up in the 1990s.

In this sense, Illia, like artists whose work speaks to the 'break point', highlight how objects become obsolete, not through technical malfunction or wear and tear, but through deliberate and systematically planned obsolescence. Where the break is the result of wider, economics, and market-driven decisions. While one could argue that the lifespan of an object that has played its role for 2-3 decades is respectful, perhaps even considered in today's timeframes as 'long', from a geological, deep time perspective this is nothing, as the materials that go into making such devices have taken millions of years to form. Furthermore, when we consider the amount of plastic that itself never decomposes, the need to rethink what constitutes a "successful", technological timescale begins to collapse.

In summary, artworks that 'work the break point' engage in 'what if' questioning through their aesthetic choices, challenging our perceptions of technological life cycles, and prompting a re-evaluation of the necessity for upgrades, speed, and efficiency. Taking this exploration to the next level, Working the Break Point, v.3 delves deeper into the narrative and reuse of the Minitel.

HELLO MINITEL!

It is the year 2012, I'm working in Dublin and lead curator for HACK-THE-CITY at the former Science Gallery, Dublin. An extensive city-

wide, free public programme, HACK-THE-CITY ran for three months and took the form of an international gallery exhibition, outreach programme, hacklab, conference and performance programme. At this time, Benjamin Gaulon was working in Dublin, running the Recyclism Hacklab from the former CTVR research centre, which has since been rolled into CONNECT - the Science Foundation Ireland Research Centre for Future Networks and Communications at Trinity College Dublin. Gaulon was also lecturing at the National College for Art and Design (NCAD, Dublin) and co-organising with the writer and lecturer Rachel O'Dwyer, a public community events programme called D.A.T.A (Dublin Art and Technology Agency).

Running on open-source principles, D.A.T.A was initially set up by the producer and director, Nicky Grogan and artist, writer, and researcher Jonah Brucker-Cohen. At the time, Grogen was heavily involved in the media art scene in Dublin and remains as one of its critical pioneers. Working as a curator for the Digital Hub, Hogan teamed up with the artist, educator, and writer Jonah Brucker-Cohen who at the time was working at the former, Media Lab Europe (MLE), a research institute that was set up in Dublin, in the early 2000s that was based on the MIT Media Lab concept. Grogen and Brucker-Cohen established D.A.T.A to share work coming from the lab with local artists, designers, and media practitioners. Originally taking place outside of formal institutional spaces, D.A.T.A has become a long-standing fixture in the Irish media scene. Run as a voluntary network, it has been passed through a line of practitioners that seek support for the programme in a myriad of ways. Currently D.A.T.A is run by the media artists Paul O'Neill, Aisling Phelan (both of whom attended NØ SCHOOL) and Tom O'Dea.

While D.A.T.A and HACK-THE-CITY became the common ground, through which I came to know and work with Gaulon, this timeframe also marks our goodbye to the Minitel. For as we prepared for the opening night of HACK-THE-CITY (22nd June 2012) and first week of the programme, my now abandoned Twitter feed (known, since April 2023 as X), pushed messages with the hashtag #RIPminitel.

#RIPminitel
15th July 1980 - 30th June 2012
FRANCE

Reflecting on the #RIPminitel feeds and media coverage at the time, serves as its own form of media archaeology. Pre-empting Minitel's closure headlines Bruce Sterling writing for the Wired magazine ran on 14th June 2012, with the headline "Dead Media Beat: Minitel", while the English newspaper the Guardian online captured the moment on the 28th and 29th June, with a more celebratory tone, leading with "France says farewell to the Minitel – the little box that connected a country" (Chrisafis, 2012)) and "The Minitel remembered - an online farewell" (Oliver, 2012). BBC news online offered a summative account with the article "Minitel: The rise and fall of the France-wide web" on June 28th (Schofield, 2012), while The New York Times focused on the revolutionary impact of Minitel on French farmers in their headline "On the Farms of France, the Death of a Pixelated Workhorse" on June 27th (Sayare, 2012). Al Jazeera succinctly captured the event with "France pulls the plug on Minitel" on June 30th. This selection of English-speaking headlines offers a brief retrospective, but a search in French and other languages would likely yield further insights.

These global news headlines marked the 30th of June 2012, as the closure of 32 years of Minitel's servers. Running from 1980-2012, including Minitel's initial experimental phase (1981) and commercial roll out (1982). This "Little French Box", as the BBC article affectionately notes, relates to its distinctive size width 25cm, height 22.5cm, and depth 21cm (figures here relating to the Minitel 1B) and the now classic mushroom-beige, coloured plastic frame. Considered as a pioneering model Minitel, remains as one of the most successful examples of an online network, prior to the World Wide Web (WWW). A particular case of a data-network-in-a-country, the journalist David Meyer, in an article for ZDNET, reported that at the time, the telecommunications provider Orange, France, explanation for the decision to close the service was reported in their FAQ, as follows:

> *"The shutting-down of Minitel is a result of the decrease in its use and the closure of the Minitel support network…This support network is being used less and less, and given technological developments, it has been decided to end its operation."*

These technological developments, essentially related to the increasing proliferation of the global data-network, the Internet, but also the cost of maintaining the network. Yet, despite its closure, Minitel (abbreviated from the French title of Médium Interactif Par Numérisation D'information Téléphonique: Interactive Medium For Digitized Information by Telephone), retains a position, within contemporary scholarship and technological imaginaries for its innovative use of videotex formats, that at the time and ahead of any other country, leap-frogged France ahead into the online world. As below, Mailland's description of videotex, provides a summary of what this two-way communication model enables.

> *"Developed in the 1970s, videotex (also known as videotext) was a digital information-distribution technology that connected dumb terminals to information databases through phone networks. The terminals either had their own screens or were simple "plates" connected to TV screens. In contrast to teletext services that transmitted data through televisions' vertical blank intervals, videotex's two-way capability allowed for innovative interactive services such as email, chat, e-commerce, news services, online banking, online porn, and searchable information databases. Videotex ecosystems were launched around the world amid great promises that the future was here. In 1981, videotex and virtual circuits were the hot computer network technologies and promised to bring the world to the masses. Amid a worldwide battle over standards, France started Minitel, which quickly became the first successful mass-market digital information-distribution ecosystem" (Mailland, 2016, p.6).*

Essentially, where Teletext was broadcast only, Minitel's videotex enabled two-way communication. This meant that, like today's

Internet, it allowed people to create and build their own content and communicate simultaneously, even if it was only small groups.
So how did France, in the early 1980s become a global leader in this field? Historians of computer, media and Internet histories, Valérie Schafer and Benjamin Thierry analysed Minitel's socioeconomic position and published "Le Minitel: l'enfance numérique de la France": The Minitel: France's digital childhood (2017). Their work, which also contributed to "The Routledge Companion to Global Internet Histories" (2017), describes the Minitel story, as a state-sponsored roll out with multiple reversals. For example, as one of the first open networks of its scale, newspaper companies were offered the first consumer services to ease their concerns that electronic news would make printed papers redundant. In this way, Minitel anticipates many of the issues that remain between private-public partnerships and state supported entrepreneurship. For those interested in such matters, Schafer and Thierry's chapter is not just illustrative of the "the winding and multicentred nature of innovation trajectories" (p.88), but also a reminder of the lessons that can be learnt from such national and government sponsored programmes.
Another key book that emerged in 2017 on Minitel was co-written by the technology industry attorney Julien Millard and telecommunications and computer historian, Kevin Driscoll. They released the first comprehensive book to date in English, on the network, titled "Minitel: Welcome to the Internet". Millard and Driscoll's passion for the network, also led to the establishment of the Minitel Research Lab, United States of America (see minitel.us, last accessed 31st Jan 2024). Like Schafer and Thierry, for Mailland and Driscoll, Minitel is also of particular interest because of the state, technical and economic relations that lead to its birth, roll out, initial success, as well as closure.

From Mintel's initial success in revolutionising an ailing telephone network, to becoming a hot-bed of digital entrepreneurialism and culture, to its stagnation and failure to translate to other countries, it is important to understand such matters and how they relate to Gaulon and Saint-Clair, IoDTI work. Therefore, it is worth briefly

stating how Minitel rolled it, with the following section seen as a complement to Saint-Clair's chapter in this book.

TÉLÉMATIQUE DREAMS

Contextualised with the presidency of Valery Giscard d'Estaing (1974-1981) who cultivated France's technological visions through large-scale space, travel, culture, and telecoms programmes, the Minitel emerged. Appearing in the milieu of rocket designs (Ariane, 1975-onwards), high-speed trains (Train à Grand Vitesse/TVG, first line ran, 1981), and cultural builds, such as the Pompidou Centre (doors opened, 1977). Aimed at positioning the country ahead of English-speaking nations, Minitel's national roll out in 1982, can be read as an intentional, political attempt on France's behalf for technological independence.

In 1976, Giscard d'Estaing asked Simon Nora, a senior French administrative professional, and the French businessman and political advisor Alan Minc to propose ways in which computers could help revolutionise French society. Their report formed the basis of a book titled "The Computerization of Society: A Report to the President of France", which was later published by M.I.T Press (Nora and Minc, 1980). In the report, Nora and Minc argued for upgrading France's existing telephone network through a combination of telecommunications and information technology, also known as télématique/telematics. They proposed achieving this by adding an interactive layer of videotex technology that could provide an open online platform for entrepreneurial incentives.

In implementing Nora and Minc's recommendations, the French government spawned the first example of a state-supported and regulated, nationwide, digital platform - an "expression of State power in modernising infrastructure" (Milland and Driscoll, 2017, p.399). Many scholars from the fields of network cultures, net, and computing histories now understood by many scholars from the

fields of network cultures, net, and computing histories Minitel as a forerunner to contemporary digital commerce, electronic or e-government, and entertainment. Furthermore Mintel, provided the foundations for understanding various net neutrality laws and regulations and demonstrated, well before the Internet became mainstream, the possibilities of online economies and cultures (see Carpenter, 2013; Cats-Baril and Jelassi, 1994; Kramer, 1993; Mailland, 2018; Mailland & Driscoll, 2017; Schafer & Thierry, 2012; Schafer, 2015).

From providing a platform through which students protests and strikes in 1986-87, against the Devaquet bill - a law that would mean universities could implement, more selective administration into universities and increase fees - to becoming a forum for supporting queer and ethnic minorities, Mintel also acted as a space for curating and producing new media art. Reviving the capabilities of the 'broken' Minitel network taps into not just histories of network cultures but also points to how slow network modalities, could become exemplars of more holistic, circular economic and social transitions. For such transitions to be fully realised, we need to completely rethink cradle-grave material practices, meaning how materials are sourced, products are designed, produced, sold, used, and disposed of at the end of their life, which in the case of plastics, is perpetual. Situating artistic practices that engage in the digital upcycling and the revival of older computing networks may therefore have much to say when it comes to actualising such material questions.

IMAGINED COMMUNITIES

Distributed by the PTT (Postes, Télégraphes et Téléphones; since 1991 now divided into France Télécom and La Poste) terminals were given for free, alongwith a free online phone directory, added as an incentive to go digital, with the accompanying threat that the printed version would be discontinued. Designed for the general citizen and

home context, anyone could host a Minitel service by connecting for private as well as public run services, with the prefix 3615 (or 3617 for premium charges). It was the Minitel centralised billing system, the "Kiosque," that enabled a pay-as-you-play model, which did not require a subscription that has become one of Minitel's most successful elements. As Schafer & Thierry (2017, p. 81) note:

> *"..the amount was directly applied to the customer's phone bill, and 60 percent of it on average was paid to service providers. For most services, the cost for one hour of use was between 50 and 70 francs (approximately US$9–12). Between 1984 and 2000, net revenue was about four billion francs, for a total cost of 60 billion francs, with a rate of return oscillating between 11 and 15 percent, according to various interpretations. From an industrial standpoint alone, the national effort served its purpose, injecting 5.5 billion francs into the components industry (Masset 1986). Content providers also reaped rapid and significant rewards, and new market entrants stood out, like AGL, whose famous pink Ulla messaging service earned US$16 million profit in 20 years" (2017, p. 81)*

This micropayment method, as argued Schafer & Thierry, Milland and others was later optimised by United States/US, big-tech corporates.

> *To connect to the privately managed databases, users would dial up to a PTT-maintained network videotex access point (VAP, or PAVI in French) using a home or office phone landline maintained by the PTT. The PTT would then establish the digital connection from the PAVI to the private host. With the kiosk system, the PTT would monitor the time the user spent on each server. The usage fee, accounted for on a per-minute basis, was then added monthly on the user's phone bill. This guaranteed a high rate of collection because users who did not pay the often-exorbitant Teletel bill would have their phone lines disconnected. The PTT would then rebate a portion of the fee (about two-thirds) to the Teletel service*

> *provider, a model later replicated by Apple for its iTunes app store. This system enabled the service providers to monetize their products in a simple, transparent, convenient, and efficient manner. The kiosk is widely considered one of the keys that made the overall ecosystem successful. (Milland, 2016, p.7).*

Additionally, akin to how URL addresses or social media handles are used to promote work, physical real-world advertising billboards often included the Minitel code as the promotion for accessing a service. It's no surprise that the porn industry maximised on Minitel's offering, entrepreneurially capitalising on online sex chat lines (aka the Minitel Rose/pink chat services), where people could talk to strangers online for a fee. As the world's first electronic cybersex channel, it also provided a safe space for people, such as non-metropoltian gay, queer, and lesbian communities, to connected, as noted by feminist and linguist, Anna Livia (r.i.p, 2007) and historian and scholar on contemporary French culture, Tamara Chaplin (2014). Quoting Chaplin,

> *"With its capacity for email, chat, press reviews, news forums, and online listings, the Minitel enabled instant communication, group dialogue, and information access. Lesbian activists sought to utilise the Minitel as a feminist technology that could advance their shared vision of collectivist, non-capitalist community based on solidarity and affective ties. The Minitel made possible new forms of lesbian identity untethered to specific locations, organisations, embodiment, or proximity. It also made possible unique ways of being "out of the closet" in a virtual space that was at once private (experienced in the intimacy of home or office) and public (accessible to others and premised on representation and communication). The result was dialectical: the Minitel not only put a self-identified group of lesbian individuals into contact but also helped to construct a very specific incarnation of the social category— "lesbian"—that it was deployed to support. In so doing, it contributed to the emergence of an "imagined community" characterised not by geographic proximity but by*

> *a level of social cohesion born of personal intimacy, common understanding, shared political vision, and mutual experiences of social exclusion" (2014, p.452).*

The notion of imagined communities here relates to the work of the political scientist and historian, Benedict Anderson's, whose influential book, Imagined Communities (1983) addressed how the role of mass vernacular literacy, through the emergence of print capitalism and the standardisation of calendars, clocks, and languages, coincided with the Industrial revolution and the construction of national identity. Such sociometrical relations (print, clocks, newspapers), produced a sense of community - in Anderson's case the nation; in Livia's work the online Minitel queer community – where individuals, while never physically meeting, are bound through a network of things that enable an orchestra of sorts, through which notions of solidarity, common purpose and comradeship emerge. In this respect, Livia and Chaplin's work addresses the specific importance of Minitel for those living in rural communities, creating a sense of connection, interaction and inter-relat-ionality that was not bound by geographical constraints.

Such accounts of connection and that sense of being seen and understood, are echoed in anthropologist, design researcher and writer, Nicolas Nova, contributions to this book, where he shares his teenage experiences, as a person living outside of France's "big cities" of connecting with those who shared an interest in science-fiction, role-playing games and manga. Illustrating how chat channels such as 3615 Akela, where limited by bandwidth, only enabled small groups/communities of five or so to talk simultaneously, endangered a sense of care and respect, as young teenagers held space for sharing hobbies and passions. It is no doubt, as Nova notes in his chapter, that the Minitel offered a "foretaste of our digital futures" that opened a window into, what multiple scholars have addressed in relation to net neutrality and the associated online regulation, freedoms and protections that continue to play out (for reference, see Castells, 1996; Citron, 2022; Lessig,

XXX, Rheingold, 2000; Turkle, 1995, Wiszniewski and Coyle, 2002, Zubroff, 2019).

Another key non-metropolitan Minitel community that is particularly worth mentioning is the French farmers. As the previously mentioned New York Time article in an article, written by the journalist Scott Sayare, on the 27th June 2012:

> *"The Minitel was hugely useful to farmers. Realising that the devices could save time and money, local agricultural organisations developed programs for farmers to, say, track pork prices, inform the authorities of animal births and deaths, or consult the results of chemical tests on milk. "It was a revolution," said Alain Bazire, a coordinator at the local chamber of agriculture, who helped promote the Minitel 30 years ago. While many farmers were initially reluctant — it cannot be said that the French agricultural sector is a bastion of technological sophistication — about half of the region's 30,000 dairy farmers used the Minitel by the mid-1990s, Mr. Bazire estimated" (On the Farms of France, the Death of a Pixelated Workhorse, The New York Times, Sayare, 2012)*

A small side note: referring to the Minitel as a "pixelated workshorse" is not entirely accurate, as the graphic system was character, not pixel based, but more on that later.

In sum, for those interested in alternative tech histories, Minitel, provides a counterpoint to the data-network architectures ARPANET (the first version of the Internet) and NSFNET (also known as the World Wide Web), which can obfuscate the systems developed outside of the US framework. Examples from Cybersyn in Chile and the Soviet Internet, to other nations' videotex and state-run, single networks, for example UK (Prestel, 1978-1994), West Germany (Bildschirmtext, abbreviated as BTX, 1983-2001), and Brazil (videotext, circa 1982-mid1990s), hold potential for reframing the what and who of dominant net narratives. They also provide early

evidence of both the positive and negative issues related to online medias, highlighting in advance issues relating to cybercrime and misinformation. Importantly, they also provide compelling, technical, and useful examples of how spectrum management can be done differently.

As Mailland (2018) notes, "the fact that Minitel was shut down in 2012 makes it no less relevant to current Internet policy issues" (p.3).

> *"The success of the platform for three decades and the billions that were made by Minitel entrepreneurs disprove the libertarian belief, widespread in Silicon Valley, that regulation is always an enemy of innovation. In the absence of sensible regulation, today's platforms are governed by "Terms of Service" agreements, impenetrable reams of fine print capturing our rights to privacy, property, and due process. Minitel, in contrast, provided a platform for entrepreneurship and private innovation while maintaining a commitment to the public interest. Applying core ethical principles to cyberspace through regulation did not prevent private enterprise to thrive, quite the contrary. With the Minitel model in mind, we should imagine a better future for the internet, a future in which innovation is accomplished through ethical business practices, public accountability, and a commitment to the flourishing of society." (Milland, 2017. pX)*

VIVE LES (NON)MORTS ! / LONG LIFE THE (UN)DEAD !

It is against the backdrop of HACK-THE-CITY in Dublin in 2012, and the programme's sub-text "take control" that my interactions with Minitel were born through the connect with Gaulon and the closure of Mintel services in the first week of the programme.

Themes explored via HACK–THE-CITY resonate deeply with the sentiments that Milland flagged in relation to how we could imagine

"better futures for the Internet". Specifically, HACK-THE-CITY's call-to-action and the programme's sub-text, "take control" addressed what it means to unpack digital black-box/closed systems. This involved taking hacking not just as a symbolic metaphor but as a tactical, playful, critical method - an exposing inquiry that questions notions of accessibility and authority. By signalling through aesthetic, direct, and experimental participatory, civic tech action, the event demonstrated what it means to develop open structures and platforms for public good. The works presented exploring new constellations of autonomy, freedom of expression, public accountability, and the commons in relation to digital infrastructures, specifically the radio spectrum and cyberspace management in city contexts.

While we did not have capacity at the time to hold our own #RIPmintial party in Dublin, in the run up to the June 30, 2012, French programmer, artist, and engineer Jérôme Saint-Clair (aka 01010101), along with colleagues the designer and educator Martin De Bie and Antonie Bonnet (r.i.p, 2017), remade the Minitel's emblematic "3615" pages and created some visuals and animations to say goodbye to the machine. This group later formed the DEad Mintel Orchestra (DeMO), which emerged in-part from the French branch of the Graffiti Research Lab, which Saint-Clair was instrumental in establishing.

DeMO's mane is an intentional play and nod to the demoscene cultures, within which it was embedded. The word "dead"(and later "un(dead)") refers to the terminals' silent passivity, as it was the actual servers hosting the various Mintel services that were terminated on June 30, 2012, and not the actual machines, which customers could recycle.

The DeMO's website describes their work as a penchant for "...media archaeology and a taste of French technological chauvinism to repurpose the Minitel (one of the world's most successful pre-World Wide Web online services) with open-source hardware and software,

giving it a brand new and unique function: producing sound and visuals for live performances". (DeMO's at minitel.re, last accessed January 31, 2022).

This 'dig' at French technological chauvinism a reflection on the forms of nation building and technological progress that underpinned Mintel's rollout. Reflecting on this form of enculturation, national building, and its intergenerational effects, Saint-Clair, De Bie and Bonnet in their interview with Régine Debatty, author and creator of the blog that we-make-money-not-art (April 2017) note:

> *"Looking back, it feels strange to realise, while watching archived national news dealing with the Minitel, that there was a real nationalist pride accompanying it. There was a real struggle to stay competitive against other countries in terms of technology and industry, to remain autonomous. Remember, every country had its computer company (Olivetti, Sinclair, ...).....As a consequence of this mass adoption and national exception feeling (you know how French people are), everyone above 20 yo in France has a story with the Minitel. For the youngest ones, it's the weird computer sitting near the telephone at their grandparents' place. For the others it's the first connected terminal they have ever used. And it's true.*
>
> *It also sometimes becomes an intergenerational transmission thing. Kids (who are too young to be aware about it) are usually super curious about it and their parents are always proud to tell them what it is and the relation they had with the Minitel. Maybe some sort of "finally a technological item my kids don't know about and that I can explain" effect.*
>
> *Despite all this, we wouldn't say there is now a cult developed around it. But it was part of people's everyday life. Not only as a device they used, but also through TV and billboard ads and many wild ads for the "pink minitel" services showing nude women, along the roads, in abandoned gas stations ... The Minitel was*

> *also present during turning points of people's life: you were able to check online if you passed the baccalaureat, or register for University. And that's the kind of story we hear each time. The Minitel is our digital Madeleine de Proust. (DeMO's interview, we-make-money-not-art.com/the-dead-minitel-orchestra. Last accessed 31st Jan 2024).*

It is this sense of knowing one's media history, combined with the technological skills, curiosity, and fun that comes with tinkering with microcomputers, that likely lead Saint-Clair and colleagues to not just create a farewell salute to the machine but also sparked their interest in what else they could do with it, particularly given its restrictions. As noted in the interview:

> *"...the Minitel does a single and monotone beep. It's not even 8-bit music capable. On a graphical point of view, it has 2 display modes (text and graphics), using grayscale colours (late models, difficult to find allow colour though). In addition to that, the graphical mode is not even pixel based but rather character based, with, for each block of character, a 2×3 stack of rectangles whose colour can be either the foreground or background colour of the character. This explains why it has its own aesthetic in terms of graphics and that's what makes it so interesting." (DeMO's interview, we-make-money-not-art.com/the-dead-minitel-orchestra. Last accessed 31st Jan 2024).*

Examples of DeMOS sound and visual manipulations and play can be found via the website. For those interested in a further analysis of Minitel's functionality, it is worth reading, Chapter 2 (Disaggregating the Minitel) in Milland and Driscoll's (2017), book, Minitel, Welcome to the Internet. Overall, as the Minitel is limited in what it can do, the distinctive aesthetic look and feel of the works, while varying in their arrangement, and configuration can be similar.

To further push the potential uses of Minitel, in 2018, Saint-Clair and Gaulon, joined forces with graphic designer and developer, Sarah

Garcin, writer, Pauline Briand and musician and live coder, Mamady Diarra to set up "The Internet of Dead Things Institute" (IoDTI). The institute is dedicated to repurposing so-called obsolete information and communication technologies. To date, IoDTI has focused on creating the MinitelSE, an Open-Source Operating System ("Système d'Exploitation"), which runs on a Raspberry Pi - brand name for small, single-board, modular computers that are essentially stripped down computers without a shell or screen.

This led to a form of digitally upcycling, whereby Minitels dumb terminal, keyboard and screen are fitted with the Raspberry Pi's, allowing them to connect to the Internet. Given that a range of Minitels were still available and in working order, this upgrade allowed for the terminals to become active again. However, due to the graphic and textual limitations access to certain sites is restricted. For example, Facebook cannot be accessed as it demands that you use JavaScript and other monitoring analytics.

In this respect, the MintelSE system affords existing Mintel hardware, through a process of digital upcycling, the ability to becoming part of a contemporary Internet of Things (IoT). This process draws us into a set of constraints that become the creative conditions through which alternative pathways are formed.

Having known little about Minitel, aside as noted from its museum and academic status and #RIPmintel notices, my first experience of MintelSE in operation was when Gaulon, Saint-Clair and colleagues, introduced the system at No School, 2019. Picking up on their love of this cute, little device, the American creative technologist, designer and educator, Joselyn McDonald, who participated in the first No School, in 2019, worked with Saint-Clair, to create 'MiniTaime'. Quoting from McDonald's website:

> *"MiniTaime (a portmanteau of Minitel and Taime meaning "to love you") pays homage to the popular early use of the Minitel computer for dating and dreamy chatroom connections. Reflecting*

> *the aesthetics of modern app-based dating profiles, the MiniTaime system allows users to create a profile and select a potential match based on shared interests". (joselynmcdonald.com, Last accessed, 7th April 2024).*

This fun intervention enabled participants at No School to load a profile picture (mine included) and enter their name, location, age, interests, and gender into the system, with matches as noted being made possible via the shared interests entry.

ACCESS ART

Regarding the artistic legacy of the Mintel, Gaulon, Saint-Clair et al., and McDonald's interventions on and with Minitel form part of a wider heritage of practices not just carried out on the platform but as art historian Marie Vicet (2022, p.16). Videotext art has existed in various countries, notably Canada and Brazil, but has been more developed in France due to Minitel. For example, ORLAN, Frédéric Develay, and Frédéric Martin, created the telematic magazine Art Accès (1984-87), and used the Minitel platform to invite hundreds of artists of artists from the fields of art, experimental literature, and music to create new works.

While much of these works no longer exist, due to the service being terminated, some documentation and descriptions of works remain. Within the context of "working the break point", it is useful to flag the ongoing curatorial practices that deal with maintaining and reviving media artworks that due to format degradation and/or platform and device termination or obsoletism are now longer available to the exhibit (see for example, Rhizome.org, Net Art Anthology, last accessed April 12, 2024). While this constitutes a separate discussion and was touched upon briefly, in "Working the Break Point, v.2:, for now, Vicet's translation from ORLAN and Develay's descriptions of their intentions and how they commissioned work, including the documentation which exists and sits at the Kandinsky

Library, MNAM/CCI, Centre Pompidou, is worth noting.

As quoted in Vicet's article, the intention of Art Accès was to invite artists to propose original works "absolutely without concession [and] without thinking about the general public" (from Vicet/Develay and ORLAN 1987, p. 58). In this way, the magazine is best described as a curated online gallery. While the core of Vicet's article discusses examples of visual, music, and written works that still have traces, it is particularly relevant how ORLAN and Develay transmitted instructions about creating work to artists who lived outside of France who were not familiar with Minitel. This aspect is pertinent to understanding how it might articulate another sensibility when it comes to Gaulon, Saint-Clair, and others' distribution and use of the MinitelSE. Essentially, on the invitation to create work for Art Accès, participants received instructions about what was possible.

Alongside this, each contributor also received a paper model of the screen grid, as artists from abroad would send their contributions by mail, which they returned on paper. A technician was employed by the magazine to assist in interpreting the artist's instruction for the screen. Vicet's article shares the image of John Cage, one of many artists that created works for the magazine, working side-by-side with the technician. Other examples of artists' documentation of work and their instructions can be found, as noted, at the Kandinsky Library at the Centre Pompidou. Despite ORLAN's central place in making the magazine, it is with some regret, and likely a sign of the times, that it is only photo documentation and instruction of the male, contributors to the magazine.

Returning to 'working the break point', what can we learn from the Art Accès example is how artists circumnavigated the limitations of the format, working with its aesthetic and technical constraints, as well articulating the mediums possibilities to those who did not have actual access to the format. This turn reflects dynamics of ownership, control, and access, which also speak to potential futures, where the co-creation of work, within limits is required. Further

points on this are expanded upon in the closing and final section.

However, before such moves, it is worth noting that prior to Art Accès, French media artist Fred Forest, whose expansive media art archive is available online (fred-forest-archives.com, last accessed April 7, 2024), touched on many of these points of who has the power and access to the established or dominant market. Forest is known for his "information" and "communication works", where he uses existing mass media structures to reverse power dynamics or read only cultures. Often defined as a prankster-provocateur, whose hacks poked fun at the establishment. As one of the first artists to create work using the Minitel, his piece, "Art de la communication : le message est le médium dans le village global:The art of communication: the message is the medium in the global village" (1982), while also no longer in existence, is catalogued and documented at the fred-forest-archives.com/en which at the time of writing will be exhibited from 24 January to 22 July, 2024 at the Centre Pompidou, Paris.

For this work, Forest uses the Minitel in combination with other media, telephone lines and answering machines, leaving space for others to create, and come into the process. In a performative-installation scenario, the public are invited to send him messages via post, which, from what I can interpret, were recorded on Minitel. Those who sent in the messages could then be consulted remotely by the artist or audience members in the gallery, who could also answer the phone and take messages.

The contemporary French scholar Mike L. Leruth (2004, 2017), who has written extensively on Forest's work, quotes from Forest's artist book Vart à l'heure d'Internet: Art at the Time of the Internet (1998):

> *"Artistic practice finds itself taking on an exploratory role that involves a special kind of research touching upon our self-awareness. [. . .] This evolution leads art to define itself as an enterprise of knowledge, albeit one of a different nature than that*

which is specific to the field of science. [. . .] The artistic approach still attaches primary importance to emotional, symbolic, existential, ethical, and aesthetic issues: the need for meaning. [. . .] For the sake of clarifying this distinction, we will say that art takes shortcuts designed to place the subject in configurations and situations that lead him to experience alternative forms of sensorial and mental adaptation (Forest, 1991, taken from Leruth, 2004, p. 81).

ADAPTION

This chapter opened with the statement, that artists working with and at the 'break point', sensorially articulate a set of intertwined sociomaterial questions that come to fore when an object breaks down. The entangled issues relate to a set of questions not exclusive to aesthetics choices, such as working with the visual, sonic, and performative affordances of broken, glitched, and crashed technology, as well as the digital upcycling that is associated with the revival of functioning but no longer, used or out of fashion hardware and software.

Such practices intentionally expose visual mending practices, repairs, patches, and hacks, utilise technology in its various states of failure and malfunction and promote upgrades and workarounds to bring tech back to life. Such practices are often ethical choice, from which arise a set of diverging conscious and subconscious relationalities. As Forest notes, "take shortcuts" through the "configurations and situations" to reveal the undertones of an interrelating factors, that include but not are exclusive to design (planned obsoletism, intentional redundancy, regular wear and tear, express of quality and craft and poor materials), labour conditions (access to professional repairs, one's own repair skills, working conditions of people who make tech and deal with its waste), standards (industrial decisions regarding formats and protocols, repairability indexes), policies, law and regulation (Rights to Repair

and associated eco-directives), as well as issues relating to the availability of supporting materials (tools, spare parts and manuals) and market logics.

From an artistic standpoint, central to such work is also the fun, pleasure, joy, and the self and peer learning and the community network that occurs, when making with others. This can give rise to heightened states of flow, meaning and satisfaction, when tinkering with objects and getting things to work. Politically, artists are increasingly contextualising this work as a mode of climate action. Framed in the manner, the critical and urgent necessities that we now need to make, to avoid "catastrophic climate and ecological change" (Laybourn, Theory and Sherman, 2023) are demonstrated, in some small ways through artistic practices that 'work the break point'. While I am not making claims here that media artists practice will "save the world", what I am saying is that from an aesthetical and applied position, artists whose work sits at "the break point" hold the potential to cut through abstract, obscured, denied or remote, climate change scenarios, by bringing "things" into a more immediate and tangible present.

It is this shortcut that is the contemporary ethical and political act, that is now at play, when we speak to those artists whose work addresses the 'break point'. With a nod here to the anthropologist's Anna Tsing's work on process of salvaging, work at the "break point", helps us to "look around rather than ahead" (p.22) by showing us potential histories and alternatives in the making. This is what writer, tech activist and lawyer, Lizzie O'Shea would refer to as "usable pasts", which media archaeology scholars such as Lori Emerson, Media Archaeology Lab at the Communication and Information, the Department of English at the University of Colorado at Boulder, also draws on in relation to their work on slow networking (see relevant chapter in this book; plus also their "Other Networks" project (see othernetworks.net/).

Similarly, Garnet Hertz's, from Emily Carr University in Canada, is

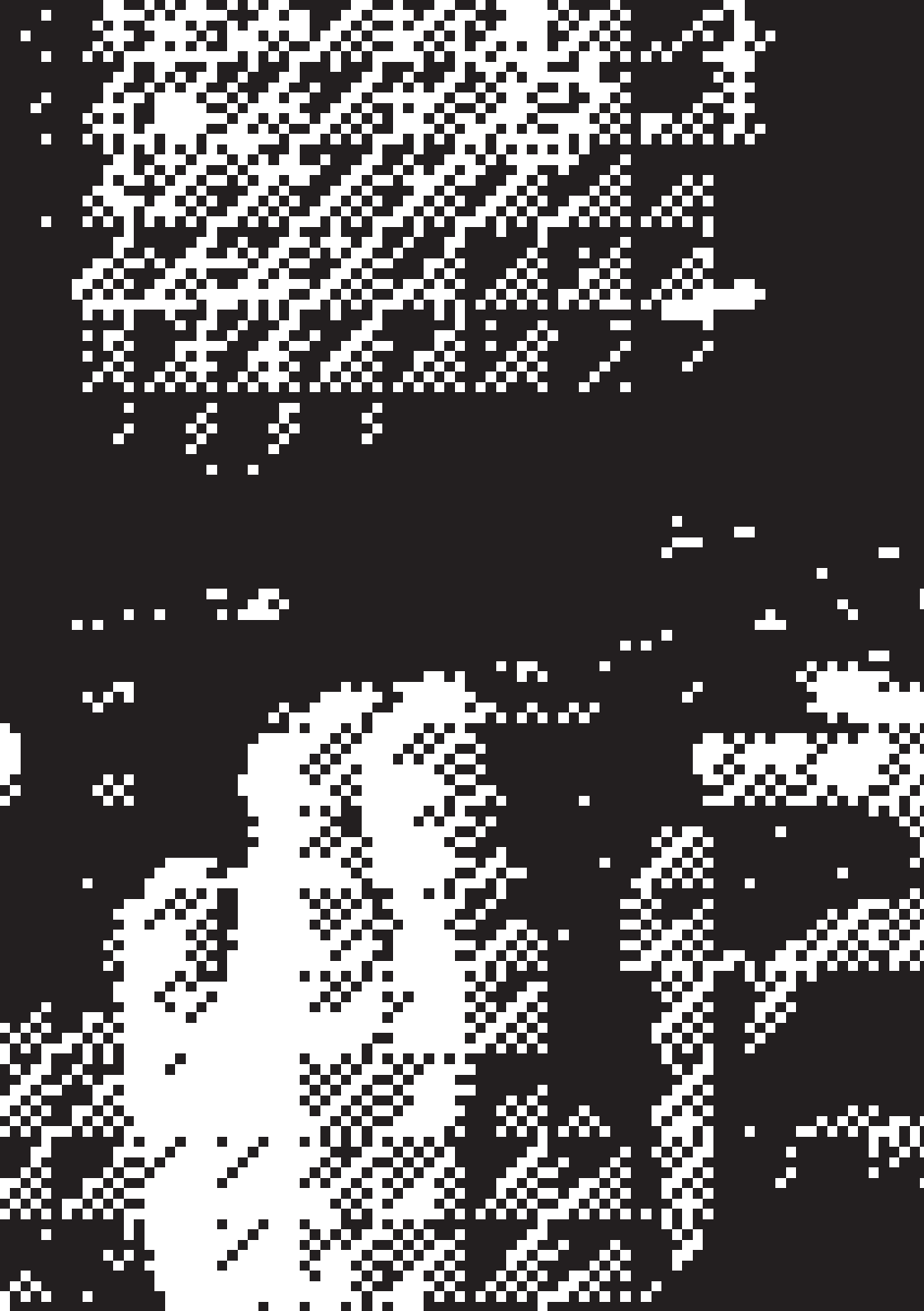
also engaged with these notions of "useable pasts". His work creates bridges between scholarship in media archaeology and studio art practices. Extending, for example, Parikka's (2012) initial work in this field, Hertz makes the point that "media archaeology was only a description of how history should actually be done.... materialist historical research is only the start of media archaeology" (as outlined in this publication).

As Hertz notes in this publication, media archaeology art practice is 1) tactile, meaning you get your hands dirty, by opening the device, getting to know its physical and I would also extend this to older software's manners and ways of working and turning up in the world. 2) should be alien, meaning, it should allow you to enter foreign or unknown technological mindsets and wallow in them, that enable you to uncover layer of media history, consider the evolution of communication technologies and create capacities for fabulous artwork; 3) as an art method, leads to proto-oriented, neoretro work or new revivals. For Hertz, neoretroism (2023) creates a bridge between technologies historical past, and contemporary context. This as Emerson (2022), notes, calls for reading media horizontally, as well as vertically:

> *"If humanities-based disciplines teach us how to read content that appears on the surface of discrete media technologies (what I call a horizontal reading practice) and if materialist media studies teach us how to read individual media technologies by descending down through layers of hardware and software functionalities (what I call a vertical reading practice), what if we more explicitly combine both approaches to offer up accounts of complex, connected technologies such as networks? (Emerson, p.98 2022)*

Networks, referring specifically to Emerson's work on Transmission Control Protocol/Internet Protocol – or TCP/IP. Within the lineage of these practices, this is where Repair Acts sits, as an artist-led practice, that aims to building out from such scholarship and studio-led media archaeologies, by amplify the community contexts

within which this work sits. In doing so, this work proposes a more community-centred approach to media archaeology that works with existing publics and communities in place-based situations and/or in service of existing issues. At the heart of this approach sits the question of how we do this in a pluralistic manner that moves conversations about computing imaginaries and their useable histories, from the studio, schools, labs, and universities of the northern hemisphere to contexts, where partners and colleagues in the global south, together with colleagues in the north, continue to expose, the circular layers that bind our worlds, through the digital devices and platforms that we consume, abandon and discard.



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05

FOREWORD

Between 1987 and 1995, I spent several hours a week "on" the Minitel. I used the family terminal to look up phone numbers, chat on various message boards, download games, or simply to perform various administrative tasks (filing health insurance claims, booking train tickets, completing a university application). This was my first "online" experience, even before access to the Internet and the Web became widespread some years later. The servers I visited most often were Minitel communities for fans of Japanese anime and manga, and role-playing and video games. These spaces were a key part of my teenage experience, and some of my acquaintances from that time are among my social contacts today.

I kept many notes from this period, including photocopied newspaper and magazine clippings, jottings responding to things I read on these Minitel servers, and excerpts transcribed from different documents. Archived in a school notebook and ring binders, these different elements comprised an unintended investigation of Minitel user practices. A few years ago, I started transcribing some of this material, following a hunch that it might provide material for my research on the anthropology of digital media, or serve as an aid for teaching.
This chapter includes annotated excerpts from these notebooks, which

sit alongside notes from my recollections of that time[1]. These shorter fragments provide a kaleidoscopic portrait of an era now largely forgotten, even as its language and social practices show continuities with our contemporary digital world.

3611 (PHONE DIRECTORY)

My earliest memory of the Minitel dates to when I was 10 years old, when my father showed me how to look up an acquaintance's phone number. Taking the beige telephone reciever in hand, turning the rotary dial to call 3611, waiting for a continuous dial tone to push the "Connection Fin" ("End Connection") key, hanging up the handset, waiting for the appearing lines of a form to complete using the integrated AZERTY keyboard[2], entering the name of a distant cousin, tapping the green "ENVOI" key ("Send"), and, finally, watching for the text output. This was the operating sequence of the Minitel[3], a series of actions with its own distinct rhythm, a certain slowness, and a repetition of gestures later calcifying as ritual. There was no need for endless scrolling, with everything fixed on a single screen.After this initial interaction, I kept my distance from this curious new device. The terminal[4] was placed on a small, low item of furniture, intended for the telephone and the cassette answering machine, in a corner of the house with no chair or obvious place to sit. Using the Minitel required a kind of awkward crouching posture, either kneeling on the floor or sitting on one leg, which quickly became uncomfortable. A striking physical memory, the use of the Minitel has always been for me associated with bodily contortions, which were a significant—if unintended—part of the user experience.

DÉRIVE & DEMO

For a long time, my own use of the Minitel was exploring the 3611 directory, mapping the possible routes through its menus. A kind of stroll among the various branches, an unplanned psychogeographic

drift taking advantage of the service's three minutes of unmetered access. I remember evenings with a babysitter, Roselyne, who came to watch my brother, my sister and me, showing her the possibilities of these detours through virtual space. She was clearly intrigued, as I showed her how to browse the pages of the PTT[5] for random names: finding several Mr. Assholes (Monsieur Trou du Cul), the striking absence of Mrs. Shit (Madame Merde), and tracking down the addresses of friends who had since moved... This was an early introduction to the world of information research, within the constrained interface of the 3611.

WARNING!

Seen in the book *"Les Secrets du Minitel"*, The Secrets of the Minitel, by Christian Tavernier (1984):

> "As with the telephones provided by the administration, Minitel terminals remain the property of the administration. It is forbidden to dismantle or modify them in any way. In case of non-return of the Minitel following the administration's injunctions or in case of breakage or deliberate damage, a sum of 2520 francs (as of 1/9/84) will be charged to the responsible subscriber. Any breakdown or problem when using a Minitel must be immediately reported to the complaints department (dial 13), so that the terminal can be exchanged, at no cost, by the administration." (*"Comme pour les postes téléphoniques mis à disposition par l'administration, les terminaux Minitel restent la propriété de celle-ci. Il est interdit de les démonter ou de les modifier de quelque manière que ce soit. En cas de non-restitution de Minitel suite aux injonctions de l'administration ou en cas de casse ou de détérioration volontaire, une somme de 2520 francs (au 1/9/84) sera facturée à l'abonné responsable. En cas de panne ou de problème lors de l'utilisation d'un Minitel, il faut le signaler sans délai au service des réclamations (le 13), afin que le terminal soit échangé, sans aucun frais, par l'administration"*)

No attempts at dismantling were made on my part, with this same "dead media" terminal[6] still on my office desk today, propping up a series of books. The strip of paper prohibiting such tampering remains in place today, with my family name still legible, scrawled in black marker pen. Perhaps by the agent of the PTT who entrusted it to us back in 1986.

VIDEO GAME DOWNLOADS AT ADELINE'S

007: Licence to Kill / 1942 / 1943: The Battle of Midway / 20,000 Leagues Under the Sea / 3D Snooker / 500cc Grand Prix / ACE / ACE 2 / Action Force / Advanced Dungeons & Dragons: Heroes of the Lance / Barbarian / ... / Wizball / WWF WrestleMania / Zox 2099. A list of Amstrad CPC (6128) games from 1990 written in my Minitel notebook—a catalogue of possibilities. With this comment clumsily copied next to the list: "Dial 3615, connect to the AMCHARGE server, connect the Minitel to the CPC joystick port with a cable, load a piece of software, select the games in the menu by their type and download time (from 12 to 23 minutes), save on the K7 player" (Faire le 3615, branchement sur le serveur AMCHARGE, connecter le Minitel au port joystick du CPC avec un câble, charger le logiciel de téléchargement, sélectionner dans le menu les jeux suivant leur type et leur durée de téléchargement (de 12 à 23 minutes), enregistrement sur le lecteur K7)

I had neither a CPC 6128 nor a modem, only a French-made Thomson TO7/70 that I never tried to connect to the Minitel. This set of download instructions came from a discussion with a college friend, Adeline, whose father knew about these kind of operations. I kept the list as a promise of possible contents, never downloaded.

3615 AKELA

"To meet people and chat about these topics of role-playing, manga

and Japanese animation, go to 3615 AKELA" ("Pour rencontrer du monde sur ces thèmes de jeu de rôles, de manga et d'animation japonaise, tu vas sur 36-15 Akela")

This recommendation came in a personal letter from Erik. A document typed on the computer, and delivered by mail in June 1991, as I was seeking information about Japanese science-fiction series featuring mechas (Robotech, Appleseed, Gundam). At the time, I was a member of a non-profit organisation set up to talk about these topics, and one of the people in charge sent me this information about the AKELA Minitel server. I registered my first account in 1991 (with the nickname "ledoc") but I lost the password after a few months, leading me to create a second ("cabell" from an American/Japanese anime). For me, this server was my first encounter with what would later be called geek culture, connecting me with fans of manga, video games, tabletop role-playing games and science-fiction, and the hackers and programmers who gathered to chat and argue about the relative merits of different shows or games, and sometimes play rudimentary text-based role-playing games such as Killer or Paranoia.

Upon discovering this service and its community, I started spending more time on the Minitel, usually in the late afternoon or early evening. Focusing on the screen in the middle of the living room, I was impervious to the outside solicitations of my family (so much so that I clearly recall being alone, even as they were present). For me, reading and exchanging messages on the Minitel was a solitary activity within the home, with nobody else taking much interest in this device and its remote discussions.

APPLESEED

World War III is over, and nomad soldier Deunan Knute and her cyborg partner Briareos Hecatonchires struggle to survive in the abandoned cities and demilitarized zones of the post-war wasteland, the "Badside." Things look up, however, when they are found and brought to Olympus,

an urban utopia and centerpiece for the rebuilding of civilization. Deunan and Briareos join the Olympus police, a force that seems hardly needed in such a paradise. But, as in most pretty pictures, perfection is an illusion, and Olympus' peaceful facade hides a dark secret, a violent struggle between humans and cyborgs that could once again plunge the world into war... and genocide. ("La troisième guerre mondiale est terminée, et le soldat nomade Deunan Knute et son partenaire cyborg Briareos luttent pour survivre dans les villes abandonnées et les zones démilitarisées du désert d'après-guerre, le "Badside". Les choses semblent toutefois s'améliorer lorsqu'ils sont découverts et amenés à Olympus, une utopie urbaine et le centre de la reconstruction de la civilisation. Deunan et Briareos rejoignent la police d'Olympus, une force qui ne semble guère nécessaire dans un tel paradis. Mais, comme dans la plupart des jolis tableaux, la perfection est une illusion, et la façade paisible d'Olympus cache un sombre secret, une lutte violente entre humains et cyborgs qui pourrait à nouveau plonger le monde dans la guerre... et le génocide.")

A paragraph hand-copied in my notebook, matching the back cover blurb of the first volume of Masamune Shirow's manga series Appleseed, I found this short text on the AKELA server. At 1.25 francs (20 euro cents) a minute – the cost of accessing 3615 services – I had to quickly look and copy these passages, which were a rough translation of the English by a community member with the nickname 'yeti'. These lines represent a vivid memory of unexpectedly finding something interesting on the server. I would have read and reread these words many times before getting my hands on a copy of the manga in English from a comic shop in Roanne, a small town close to the village I lived in at the time.

MINITELIC WRITING

c koi ce pseu (wat's dis nickname?)
z'avez vu urotsokidoji? (did U C Urotsokidoji?)
Dis pas la fin stp (don't tell us the ending pls)
suis largué!!! (I'm lost!!!)

t dingue (u're crazy)
CDZ... sourire... c trop lent pfff... (Saint Seya... smile... too slow pffft)
"Ce que je n'aime pas : ceux ki naime pas kan je koz nitel com ça koi" (wat I dislike: those who dont lk wn I tlk minitel like dis)
(La Jungle, No2, p3)

Rereading these notes today, I can see the similarities with other forms of communication from the past 30 years. SMS text messages and social media posts also impose limits on the number of characters, but the most obvious similarity is the orality of written conversation[7]: abbreviated writing, missing verb subjects, limited capital letters, and a generous use of onomatopoeia and punctuation for emphasis. But I do not remember seeing any emoticon (nor why I kept track of these sentences!). These real-time exchanges closely tracked later instant messaging on IRC, ICQ or AIM, but the Minitel interface never showed the full message history.

SOME MINITEL IDIOMS DISCOVERED ON AKELA

BAL: acronym for "Boîte aux lettres" (mailbox), a private messaging system on Minitel servers. Each member, identified by a nickname, had a private mailbox and could write to any other member. An early ancestor of e-mails, this only worked within a given server, and had limited storage space for old messages.

SysOp: short for system-operator, a neologism for the editorial manager a Minitel server, who was generally in charge of steering the conversation. Depending on the services, the SysOp would sometimes have a dual role, acting as a moderator but also a community manager, working to attract users and keep them online, generating income for the server's owners. SysOp was the Minitel term that fascinated me most, perhaps as a result of the mysterious powers associated with those holding this rank.

Walls: a term used by certain Minitel services to label a kind of forum for topic-based discussions, with no upper limit on the number of participants. When Facebook walls were first introduced, I was struck by how closely they resembled these Minitel walls.

X-Bal: ('X' for eXtended) this was a kind of message board for roughly a dozen participants, a bit like a mailing-list or web forum.

DEBATES AND INTERPRETATIONS

I remember two prominent figures from 3615 AKELA, "yeti" (a policeman from the North of France) and "clebs" (professional status unkown), who were constantly talking about recent and upcoming episodes of Saint Seiya (CDZ standing for Chevaliers du Zodiaque) and Dragonball Z (DBZ). These exchanges alternated between political debate and careful readings of the protagonist's motivations, the slow pace of action, and possible sequels to the current episodes. It took me a while to figure out how they knew what was coming, debating details from episodes that hadn't yet aired. Reading their messages on a Minitel wall, I realised they had not seen the series on TV, but instead read the mangas bought in the Parisian bookshops Junku (rue des Pyramides) and Tonkam (rue Keller)... and that many doubts came from the fact they did not understand Japanese and were reading from the original version of the manga.

PINK AUTOMATION

My use of the Minitel was a largely solitary activity. But I remember Sébastien, a childhood friend who took pride in introducing me to the dark blue Philips Minitel 2 that his parents had at home... and in showing me one of the "messageries roses" ("pink mailboxes") where

erotic messages were exchanged by scammers and lonely hearts. As a 12-year old, facing a flood of racy messages, I remained unmoved. Sébastien was amused that these messages looked like the automated babbling of bots… a hypothesis that Rafi, a Minitel entrepreneur who went on to work with Internet-connected objects, confirmed to me some 20 years later.

X-BALS CONTROVERSIES

List of topics causing heated debates on the AKELA and RTEL X-Bals (another Minitel service): the performance of artificial intelligence, the advantages of the Amiga 500 over the Atari ST, the absence of female Minitel users, the role of religion in social debates.
Lighter themes, causing momentary irritations: dwarves versus elves, whether or not elves had pointed ears, Megadeth versus Metallica.

Hundreds of messages that remain only as memories and scattered notes, with (to my knowledge) no surviving back-ups.

COMMAND LINE TIPS ON 3615 AKELA

***ZYEUTE** (0 min[8])
Allows you to see a list of your attributes:
Code = code specific to your BAL name
Pass = your password
Boot = where you first arrive when you become a subscriber
Color = display color of your text
Hide = if you are hidden: YES (see *HIDE)
Size = size of text, normally 0

***S** nickname, message (60 min)
Sends a short message (less than one line) to the top of the specified user's screen. The message also appears on your screen as it is received. Do not worry if there are messages

coming from nowhere at the top of the screen, AKELA sends them automatically from time to time. A trick that not everyone knows: the SysOps have a command to send a message to everyone currently connected. To differentiate these from a personal message, the name of the SysOp is followed by a small arrow (instead of a colon).

***OR** nickname (300 min)
Tells you where in the jungle the specified user is located.

***OASIS**
AKELA displays a list of occupied oases[9], with 3 letters specifying the oasis ID (A to Z), number of occupants (1 to 5), and current status (@ for closed).

***AVOID** nickname
This command prevents the specified user from messaging you or entering an oasis you are currently in. This helps you to avoid intruders, but shouldn't be overused, as it is not always received well.

***HIDE**
This command causes you to disappear from the list of active users on the server. Other users will not be able to know you are there, see you, or send you messages. To become visible again (and cancel the command), enter ***JEKYLL**.

Transcribed from La Jungle, no1 (1990), page 10.

TIME IS MONEY

For a long time, any encounter with a 3615 service on a billboard while out driving or walking with my parents was a reminder of the guilty time I used to spend on the Minitel. A sensation reinforced, when we came to Lyon to visit my grandparents on weekends or during the

holidays, crowded urban streets had more signs, advertisements, and flyers than our small village in the Loire Valley, many with their own Minitel numbers.

Billing for Minitel services was a big deal, and I understood that I spent a lot of time using it (too much?). My father said that France Telecom had told us we had the highest bill in the Loire region for a month in 1992. Even without me being able to see these figures, I knew that this was a problem... especially given I was the responsible party, since neither my brother nor sister spent time on the Minitel, and my parents only used it when strictly necessary.

At this time, I started looking for ways to reduce the amount of money we spent on the Minitel. For example, I learnt of similar services on 3614 which were much less expensive, by using 3614 HEXALOR to join the same server as 3615 AKELA for a third of the fee. Or subscribing by cheque to a quarterly credit system (250 Francs), which granted access to a number of additional commands (such as the famous *HIDE, while allowed you to hide from non-hidden users[10]).

COMPUTER VERSUS MINITEL

Looking back, I am struck by the difference between the activities performed on the Minitel and those on the computers I owned between 1987-1995. I used the Minitel to search for information, access administrative services, and participate in social exchanges and discussions, while playing games, creating graphics and music, and writing texts on my computers (a Sinclair ZX81, a Thomson TO7/70, and a Commodore Amiga 500). Where all those tasks can be performed on one machine today, whether a smartphones or laptop, this was not the case then, even though the Minitel and the computers of the time had very similar interfaces (screen/keyboard). Even if we could have networked these two devices, they belonged to distinct categories, reflecting a division of information technologies (computers, calculators) and communication technologies (Minitel, telephones, BBS[11]), that have since merged.

MINITEL CONTACT LIST

30 years later, some traces of my contacts from this time, found in my Minitel notebook:

• **"florient"**, from Rennes, a regular private BAL contact, we exchanged ideas for a Warhammer 40,000 fanzine, Codex 40K, of which two issues were produced. 5-6 sheets typed on an Amiga 500, printed in a copy store and stapled, these zines were distributed partly by exchanging postal addresses on another X-Bal, and via a small ad placed in the French role-playing magazine Casus Belli.

• **"sam lowry",** a man from Bordeaux named Jérôme, we communicated several times about publishing the translation of an American role-playing game manual that I worked on through the summer of 1991. I was 13 years old and had no idea what to do with this text, which never left my bedroom shelves.

• **"benx"**, a Québécois who lived in France, who sold me several copies of the Montreal fanzine Protoculture Addicts[12], which was near-impossible to find in France at the time. benx first sent me a call for submissions for the participatory fanzine Animapa, to which I contributed articles for several years.

• **"lou"**, who lived in Paris, was one of the few female Minitel user Active on 3615 RTEL, she shared excerpts and summaries of interviews with science fiction authors, that were scheduled to be published in her paper fanzine.

• **"chen"**, a man from Macon who had established a highly efficient system for copying games on the Amiga 500, and who somehow had access to new releases from German demomaker and cracker communities.

These people, and our discussions, reflect my discovery of a form of online social life with people I never met physically (and never will). One exception was "twix", the first person I met IRL, in a café in Roanne, having spent several months discussing Japanese animation on Minitel X-Bals. I remember playing pinball with him, talking anime, and listening to George Clinton.

CYBERPUNK X-BAL

"This X-Bal is dedicated to the Cyberpunk movement in all its forms. Of course, it focuses on Cyberpunk role-playing games: Cyberpunk, GURPS Cyberpunk, Simulacra-Cyber Age, Cyberspace, Traveller Cyberspace. For those who don't know, the Cyberpunk genre was defined by William Gibson's novel Neuromancer. (...) As for the XBAL itself, it is very dynamic, often with passionate debates. And with the translation of the 2nd edition of Cyberpunk at Christmas, its success can only grow. And remember, the 90s will be Cyberpunk—or maybe it won't..." (*"Cette X-Bal est consacrée eu mouvement Cyberpunk sous toutes ses formes. Bien entendu, elle privilégie les jeux de rôle Cyberpunk: Cyberpunk, Gurps-Cyberpunk, Simulacres-Cyber age, Cyberspace, Traveller-Cyberspace. Pour ceux qui ne connaîtraient pas, le genre Cyberpunk a été défini à la suite du roman "Neuromancien" de William Gibson. (...) Pour ce qui est de la XBAL proprement dite, elle est très dynamique, avec souvent des débats passionnés. Et avec la traduction à Noël, de la 2ème édition de Cyberpunk, son succès ne peut aller que croissant. Et rappelez-vous, les années 90 seront Cyberpunk, ou ne seront pas..."*)

Transcribed from La Jungle, no1 (1990), page 14.

TIRED OF COPYING

My notes from 1992: Big fuss in the Japanese animation X-Bal, as the usually generous Vazkor complains that too many people are sending him video tapes to duplicate. Matthieu, a school friend of mine, sent him a blank VHS tape with a message asking him to copy the content of a Leiji Matsumoto anime, and Vazkor is now fed up with copying things for everyone who asks. This resulted in several hours of heated debates in the X-Bal, ending with a recognition that there were, in fact, humans behind the screen.

INTERNET EPILOGUE

After moving to Lyon for university, in October 1995, I slowly stopped using the Minitel (despite having used it for my university application). Most of my earlier contacts had moved on, leaving the service behind. At the same time, my interests in science-fiction culture, role-playing games and manga had switched to another medium, after JD, a friend from my university residence, showed me how to access this thing called the World Wide Web using the Sun Microsystems stations on Université Lyon 1's La Doua campus. I occasionally found the same contacts who had migrated from Minitel's X-Bals (hi twix!). I don't think I've used a Minitel since, beyond buying a train ticket or changing my health insurance plan and eventually the Minitel service ended.

In hindsight, my transcriptions of these notebook entries show how the widely-mocked Minitel was neither a failure nor a cheap, second-rate precursor to the internet. Instead, my experiences reveal something of the early advent of online communities[13], testifying to a now long departed world of slowness, and interactions constrained by limited bandwidth, in which conversations were the responsibility of very small communities (with no more than five simultaneous users in some X-Bals and Oases). At a time when specific kinds of content were difficult to access (Japanese cartoons, comic books, science-fiction novels in translation), making contact with other people with

similar tastes and interests opened the door to a nascent grey market of Japanese animation and illegally-copied video games, distributed by mail or—in rare circumstances—by connecting the Minitel to our early computers.
For those, like me, living outside France's big cities (and the Paris area), the Minitel was an opening to the outside world, a way to communicate with all kinds of people, and to obtain fanzines, novels, video tapes, and photocopied comics from Tokyo, Montreal, New York and Milan.

The Minitel, a curious object predating the dominance of the personal computer as the primary means of telecommunication, offered a kind of foretaste of our digital future, with services and interfaces that preempted much of the user experience of the internet (albeit with no hyperlinks). Beyond these technical features, the Minitel also supported a range of new communication practices and forms of sociability[14], offering early exposure to an ethos fostered by digital technology and online platforms from the 1990s to today.

Acknowledgements: thanks Justin Pickard and Pauline Briand for proofreading the manuscript.

Lori Emerson

After being in the English Department at CU Boulder for 14 years, I am now an Associate Professor in the Media Studies Department. I am also Director of the Intermedia Art, Writing, and Performance Program and Founding Director of the Media Archaeology Lab. I co-authored (with Darren Wershler and Jussi Parikka) The Lab Book: Situated Practices in Media Studies, authored Reading Writing Interfaces, and co-edited three collections. My research focuses on uncovering crisis points in past media, or, points at which there was the possibility, never fully realized, for technologies that are "other" than what we have now. I also try to undo established narratives of how contemporary technologies came to be by looking at artists and writers' experiments with, for example, network technologies. As part of my Other Networks project I describe below, I recently became an amateur radio operator; my callsign is KF0LCB.

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06

RECLAIM THE FUTURE WITH THE PAST IN THE MEDIA ARCHAEOLOGY LAB

Since 2009, when I founded the Media Archaeology Lab (MAL) at the University of Colorado Boulder, the lab has become known as an entity that undoes many assumptions about what labs should be or do. Unlike labs such as the infamous MIT Media Lab, the MAL does not "invent the future"- instead, it's a means by which we dig up past technological alternatives and incarnations in the spirit of wresting back control of the future from corporations whose future profits rely on them laying claim to their own vision of the future. Part of the way the MAL accomplishes the foregoing is, instead of being structured hierarchically and driven by a single person and/or a single vision, as is the case with most science as well as media labs, the lab intentionally and constantly shape-shifts: it is an archive for original works of early digital art/literature along with their original platforms; it is an apparatus through which we come to understand a complex history of media and the consequences of that history; it is a site for artistic interventions, experiments, and projects; it is a flexible, fluid space for students and faculty from a range of disciplines to undertake practice-based research; it is a means by which graduate students come for hands-on training in fields ranging from digital humanities, literary studies, media studies and curatorial studies to community

outreach and education. In other words, the MAL is an intervention in "labness" insofar as it is a place where, depending on your approach, you will find opportunities for research, teaching, and creative practice in myriad configurations as well as a host of other, less clearly defined activities made possible by a collection that is both object and tool. My hope is that the MAL can stand as a unique hybrid entity that is not interested in pre-legitimation, scientificity, or blackboxed production of knowledge and tech but that is instead interested in experiments with temporality, with a see-saw and even disruptive relationship between past, present and future, and in experiments with labness in general.

As of right now, in 2021, the MAL has one of the largest known collections of still functioning media available to anyone to play, tinker, research, create with. Its collection spans roughly a 130 year period - from a camera from 1880, a collection of early 20th century magic lanterns and an Edison diamond disc phonograph player; to hardware, software and game consoles from the mid-1970s through the early 2000s as well as a range of equipment and infrastructure for experimenting with what we call "slow networks" – small and often slow networks that existed before or outside of the internet that have become a mainstay in our ongoing work to rethink technological affordances in terms beyond the increasingly unsustainable ones of speed and efficiency.

However, the MAL initially came to life in 2008-2009 as the Archaeological Media Lab. At that time, the field of media archaeology had not yet become well known in North America and the lab was nothing more than a small room in a 1940s building on the edge of campus formerly reserved for family housing (hence it was also located next to a decrepit three-piece bathroom). All the room contained was fifteen Apple IIe computers, floppy drives, and copies on 5.25" floppy disks of a work I had come to admire very much: First Screening, one of the first (if not the first) digital kinetic poems created by the Canadian experimental poet bpNichol. I began the lab partly because I wanted to start experimenting with stockpiling hardware

and software as a complimentary preservationist strategy to creating emulations such as the one of First Screening that had recently been made available. Without being aware of the very nascent debates in archivist communities that were then pitting emulation against original hardware/software, initially I wanted to simply augment students' and scholars' access to early works of digital literature and art while also collecting other works and their original platforms in order to eventually make available emulations of these works.

I also created the lab because I wanted to bring in small groups of undergraduate and graduate students to work directly on the machines, with the original work by bpNichol, rather than only study the emulated version. In other words, the lab allowed me to think through with my students the difference the original material, tactile environment makes to our understanding of First Screening. It was a straightforward enough experiment, but even now the implications of this kind of literary/historical work are far reaching and unsettling to the discipline. This kind of work involves turning away from close reading and from studying literary products (as surface effects), to studying instead the literary production process – looking at how a work was made and how the writer pushed up against the limits and possibilities of particular writing media. From there, the ramifications of such an approach start to become more obvious as soon as one realizes that learning and teaching "the how" of literary production cannot take place without access to the tools themselves in a hands-on lab environment. That said, while using hands-on work not just as an added feature but as the driving force behind teaching and research is quite new to the humanities, the production-oriented approach to interpreting literature has been around in one form or another since the early twentieth century. As many are fond of pointing out, nearly all foundational media studies scholars (from Walter Benjamin to Marshall McLuhan and Friedrich Kittler) were first literary scholars with a keen understanding of process; moreover, one can read the long history of experimental writers, especially poets, as one that is inherently about experimenting with writing media - whether pens, pencils, paper or typerwriters and personal computers.

Since my academic background is in Twentieth Century experimental poetry and poetics, the move to exploring the materiality of early digital poetry was a logical next step. Furthermore, once my attention turned to the intertwinement of First Screening with the Apple IIe, it likewise made sense to add to the lab's collection other, comparable personal computers from the early 1980s such as the Commodore 64 - at least partly to get a sense of why bpNichol might have chosen to spend $1395 on the IIe rather than $595 on the C64. (The answer likely lies in the fact that the IIe was one of the first affordable computers to include uppercase and lowercase along with an 80-column screen, rather than the C64's 40-column display for uppercase letters only.)

In these early years, I tried to sell the lab to the larger public by saying that it was an entity for supporting a locavore approach to sustaining digital literature–a pitch I also hoped justified our very modest online presence while also underscoring the necessity of working directly with the machines in the lab rather than accessing, say, an Apple IIe or Commodore 64 emulator online. Thus, from 2009 until 2012, the "Archaeological Media Lab" maintained its modest collection of early digital literature and hardware/software from the early 80s and gradually increased its network of supporters–from eBay sellers who had become ardent supporters of the lab, to students and faculty from disciplines ranging from Computer Science, Art, Film Studies, and English literature, to digital archivists. However, 2012 was a turning point for the lab for a number of reasons: first, and most importantly, the lab was given a 1000 square foot space in the basement of yet another older home even further on the edge of campus, making it possible for the lab to become the open-ended, experimental space it is today with the largest collections of still-functioning media in North America; second, I renamed the lab the "Media Archaeology Lab" to better align it with the field of media archaeology I was then immersed in; and third, and perhaps most importantly, the MAL became a community enterprise no longer synonymous just with me. Now the lab has an international advisory board of scholars, archivists, entrepreneurs, and technologists; faculty fellows from CU Boulder; a regularly rotating cohort of undergraduate interns, graduate research

assistants, post-graduate affiliates; and volunteers from the general public.

The MAL is also now a kind of anti-museum museum in that all of its hundreds of devices, analog and digital, are meant to be actively played with, opened up, tinkered with, experimented with, created with, and moved around and juxtaposed next to any other device. Again, everything that is on display is functional though we also have a decent stockpile of spare parts and extra devices. The MAL is particularly strong in its collection of personal computers and gaming devices from the 1970s through the 1990s ranging from the Altair 8800b (1976), the complete line of Apple desktop computers from an Apple I replica (1976/2012) to models from the early 2000s, desktops from Sweden (1981) and East Germany (1986), a Canon Cat computer (1987), and game consoles such as Magnavox Odyssey (1972), Video Sports (1977), Intellivision (1979), Atari 2600 (1982), Vectrex (1982), NES (1983) and other Nintendo devices. These are just a handful of examples of hundreds of machines in the MAL collection in addition to thousands of pieces of software, magazines, books and manuals on computing from the 1950s to the present as well as the aforementioned analog media we house from the Nineteenth and 20th Centuries.

The MAL, then, is essential for exploring the functionality of historically important media objects – functionality that cannot be understood in any depth if one only has access to promotional material or archival documents and that fundamentally shapes one's understanding of the media object's place in the history of technology. Otherwise put, the lab invites one to reread media history in terms of non-linear and non-teleological series of media phenomena or ruptures as a way to avoid reinstating a model of media history that tends toward narratives of progress and generally ignores neglected, failed, or dead media.

In sum, the MAL is unique for a number of reasons. Rather than being hierarchical and classificatory both in its display of objects as well as its administrative organization of people, the MAL is porous, flat, and branching objects are organized in any way participants want;

everything is functional and made to be actively used. Rather than setting out to adhere to specific outcomes and five year plans, we change from semester to semester and year to year depending on who's spending time in the lab. Rather than being an entity you need to apply to be a part of or something you can only participate in as a researcher, librarian, PhD student, anyone may participate in the lab and have a say about what projects we take on, what kinds of work we do. Rather than being about the display of precious objects whereby you only ever get a sense of the external appearance or even external functionality of the objects, we encourage people to tinker, play, open things up, disassemble. Rather than the perpetuation of neat, historical narratives about how things came to be, we encourage an experimental approach to time – put Edison disks beside contemporary proprietary software or put the Vectrex and its lightpen up next to a contemporary tablet and stylus to see what we can learn through the juxtapositions. And, rather than participating in the process of erasing the knowledge production process or perpetuating the illusion of a separation between those who work in the lab and the machines they work on and hiding the agency of the machines themselves as well as the agency of the larger infrastructure of the lab, we are interested in constantly situating anything and everything we do in the lab and being self-conscious, descriptive about the minute particularities of the production process for any projects we undertake.

Further, as I noted at the beginning of this piece, more recently the MAL has also turned its attention to exploring the functionality not only of media objects but of networks, or what we call "slow networks." While we have not yet had the opportunity to perform experiments with Minitel terminals, we have performed and documented experiments with mesh networks, packet radio, two-way analog phone simulators, videotelephony, short range over-air transmission, VHF radio transmission, and Bulletin Board Systems. The MAL takes seriously Sofia Samatar's declaration that "To propose an alternate history is to propose that history can be altered, to change directions, to inaugurate an alternate future." As such we are attempting to investigate what alternatives to the internet have existed – and still

might exist – and how artists and writers used these networks. Over the next couple of years, we will look at mail art networks, newsletter networks, socialist and countercultural teletype machine networks, time-sharing networks, slow scan TV networks, videotex networks, and more. Our hope is that we will deeply internalize Lizzie O'Shea's moving statement that "The networked computer represents an exciting opportunity to reshape the world in an image of sustainable prosperity, shared collective wealth, democratized knowledge and respectful social relations. But such a world is only possible if we actively decide to build it." We will, then, learn how to build this future world with a range of probes into the history of media technologies and their networks.

Acknowledgements

Parts of this piece appeared in a book chapter I wrote, "The Media Archaeology Lab as Platform for Undoing and Reimagining Media History," for the collection Hands on Media History: A New Methodology in the Humanities and Social Sciences (edited by John Ellis and Nick Hall and published by Routledge in 2019).

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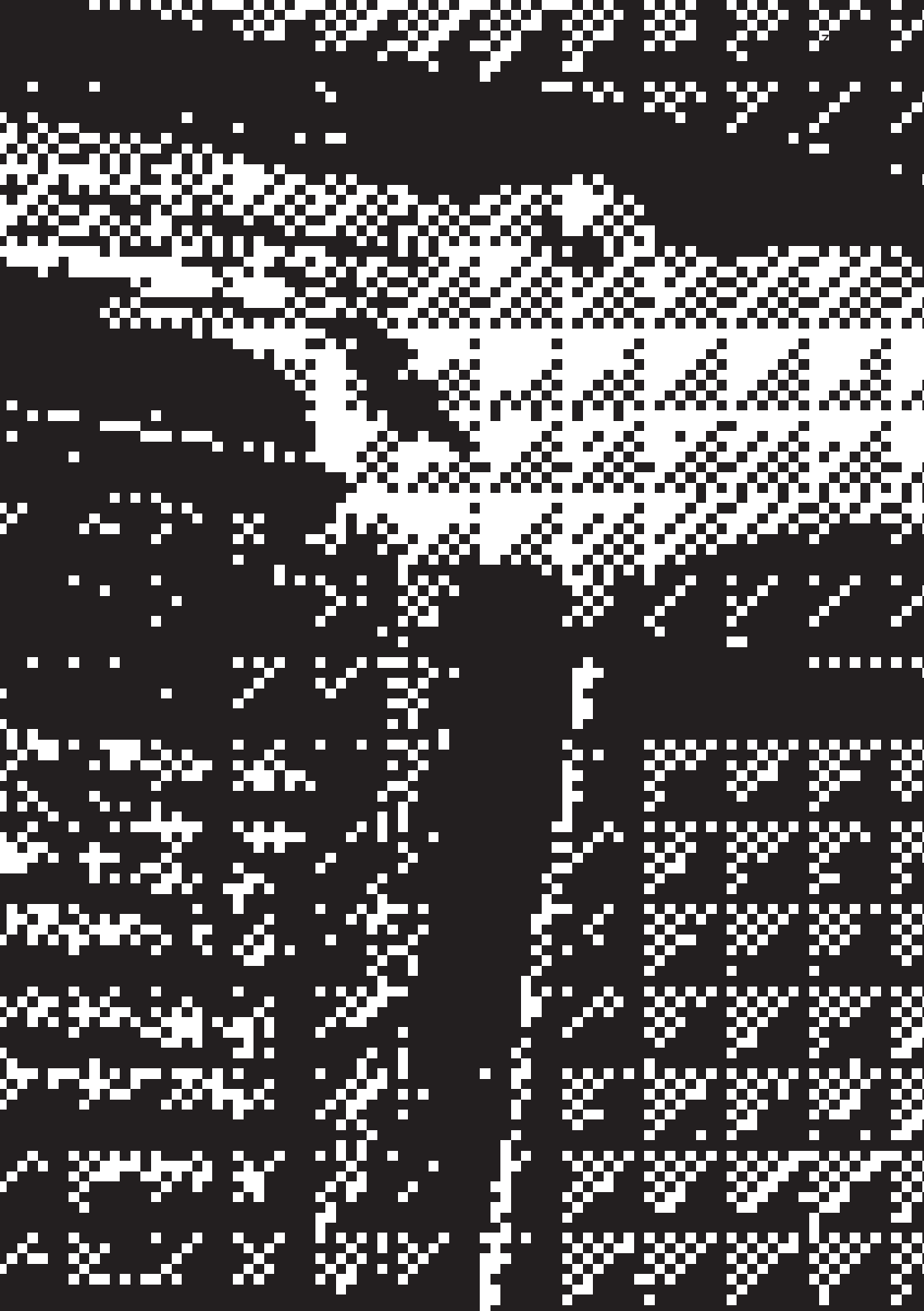

Garnet Hertz

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He has worked as Faculty at Art Center College of Design and as Research Scientist at the University of California Irvine. His research is widely cited in academic publications, and popular press on his work has disseminated through 25 countries including in publications like The New York Times, Wired, The Washington Post, NPR, USA Today, NBC, CBS, TV Tokyo and CNN Headline News.

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07

TACTILE, ALIEN, PROTO: MEDIA ARCHAEOLOGY AS A STUDIO PRACTICE

HOW IS MEDIA ARCHAEOLOGY AN ART STUDIO PRACTICE?

Media archeology is a discipline that has grown out of the media arts and art history circles and provides some clues as to the importance of materiality while researching historical communication technologies. However, although it is primarily discussed in historical terms, it also provides some interesting applications when it is used as a studio methodology. In other words, the attitude and approach of making history through the format and perspective of media archeology can also be applied to an approach that we use to art practice and the critical making of things.

Before looking at how to use media archeology as a studio practice, it is crucial first to differentiate and define what media archeology is in the first place and how it differs from standard media historical work. These clues give us tips to leverage this into studio practice.

IS MEDIA ARCHAEOLOGY HISTORY?

What is 'media archaeology' anyhow? The best definition of the term that I know of comes from a conversation I had with Jussi Parikka in 2010:

> *"Media archaeology exists somewhere between materialist media theories and the insistence on the value of the obsolete and forgotten through new cultural histories that have emerged since the 1980s. I see media archaeology as a theoretically refined analysis of the historical layers of media in their singularity—a conceptual and practical exercise in carving out the aesthetic, cultural, and political singularities of media. And it's much more than paying theoretical attention to the intensive relations between new and old media mediated through concrete and conceptual archives; increasingly, media archaeology is a method for doing media design and art." ["CTheory Interview: Archaeologies of Media Art". Conversation between Jussi Parikka and Garnet Hertz, ctheory.net, 1 April 2010.]*

Let's dig into this and unpack a few of Parikka's points. He sees media archaeology as digging through history to find old and forgotten types of media - things like old films, music, or technology. But media archaeology isn't just about thinking deeply about how old and new media are connected – it is also about actually using this knowledge to create art and design new things. It involves looking closely at the unique qualities of each piece of media, like its style, impact on culture, or politics, to understand it better and use it in today's world.

It is useful to bring this into contrast with "art history" as an approach, which is an expansive term and diverse field of practice. I base a significant portion of what I understand about historical research from Mark Poster, who I did doctoral work with. Poster was an intellectual historian of French critical theory – like Lefebvre, Sartre, Foucault, Baudrillard, Althusser, Deleuze and Derrida – and he worked to apply their ideas to new media technologies. As my doctoral advisor (circa 2009), I talked to and argued with Mark extensively about media

archaeology in comparison to historical research in general. In his mind, media archeology was only a description of how history should actually be done. History must investigate the specifics of undiscovered artifacts, people, situations, documents, and devices. His take was that the term media archaeology was an academic marketing effort to re-brand solidly researched history – and in some ways, I'd agree. History should do this, and media archaeologists are, in some sense, rebranding good old-fashioned history.

In hindsight, I hadn't really articulated media archaeology in its entirety – I was still working that out. What I should have pointed out more clearly is that materialist historical research is only the start of media archaeology. Media archaeology often exists as an uncovering of historical details through a careful material analysis of artifacts, but it is much more. It is focused on the forgotten paths of communication technologies. It is also artistic in nature, and its relationship to artistic practice is rather complex.

Historians typically focus on documents rather than technological artifacts, studying texts over physical objects. Traditional research might delve into the Lumiere brothers' documents without attempting to recreate or dissect the actual cinematic devices they used. Unlike art historians, who rarely venture beyond archives, media archaeologists are encouraged to physically engage with the technology they study, offering a more hands-on approach to understanding historical media.

There is significantly more to media archaeology than exploring artifacts, however. In hindsight, the following is part of how I should have explained media archaeology to Mark Poster.

THE MEDIA ARCHAEOLOGY ATTITUDE: TACTILE, ALIEN, PROTO

To begin with, people who use the term media archaeology are typically not historians. Or at least this used to be the case. Media archaeologists

are more a collection of artists interested in technology's knotted and complex history. Several collectors of rare communication devices also embrace the term, like Errki Huhtamo. Instead of a document-oriented approach, media archaeology is primarily tactile – or at least it is often device-oriented. Media archaeologists generally have a tactile interest in the "stuff" of lost history, scarce species of devices that never were mainstream. We could say that there is a "tactile" media archaeology that places importance on artifacts in the spirit of historical materialism.

Media archaeology is also sometimes linked to searching for unique devices that display an unexpected technical approach, worldview, or foreign style today. This search for obscure mindsets might be thought of as an "alien" approach to media archaeology. Gray's bathtub telephone serves as a good case study of this approach: exploring the odd convergence of how the bathroom – not the living room – was envisioned as the communication hub of the home gives us a view into a different time and mindset. Strange devices and perspectives like this can be used to help us question how we envision domesticity and telecommunication, for example. The alien aspect of media archaeology has fun reviving these lost devices, mindsets and metaphors – in a similar way that the steampunk subculture enjoys playing and creating with 'alternate universe' mindsets.

Media archaeology can also search for early and forgotten predecessors of things we use today. This might be termed as "proto" media archaeology. An example of this is researching phenakistiscopes to understand contemporary animation. Phenakistiscopes are an early animation technology that used a spinning paper disc with slots to display simple movement. Historical technology like this from over a century ago might be helpful in terms of gaining better insight into how a looping animation technology like GIF animations work in contemporary times. These insights can serve as good inspiration to make studio work.

MEDIA ARCHAEOLOGY ART PRACTICE

How does one do media archeology as an art practice? What would be a practical guide for performing or exploring media archeology as a studio approach? I think looking at the themes above gives good clues as to how to proceed with media archaeology as an art method.

First, media archaeology as an art method should be "tactile." It can start by getting an actual physical device and studying it carefully, inside and out. In addition, it is essential to research and study as much of the original archival materials related to that device as possible. In some ways, I believe that the core thing that differentiates history from media archeology is the idea of the researcher actually putting their hands on and unscrewing and ripping apart the physical device and artifact and trying to get it to work and actually use it in a functional sense. It's a tactile, hands-on history. Significantly greater insight into the device is achieved when a practical knowledge of its mechanics are clear – and this can be an essential component in figuring out how to transform something like an obsolete piece of technology into an artwork. An example of an artist that uses this approach is Tom Jennings: in much of his studio work, he deeply investigates the historical technical details, which form the core thrust of his studio production. [https://www.sensitiveresearch.com/Objects/index.html] The technical details matter, and they can serve as a starting point in the studio.

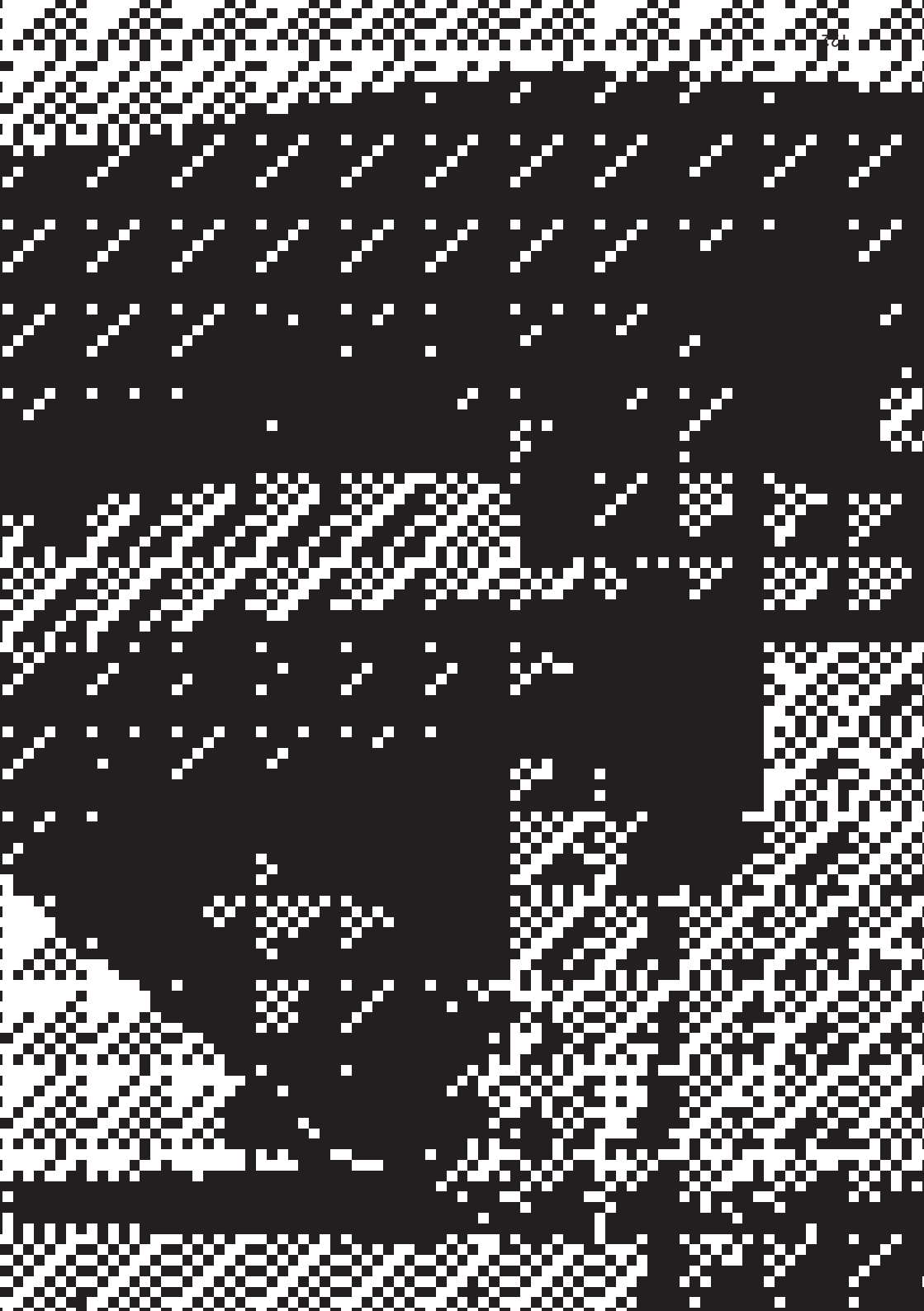
Second, media archaeology as an art method should be "alien." It should enter foreign historical mindsets and wallow in them. Artists like Tom Jennings clearly do this - they immerse themselves in the alien landscape of a lost technological system and breathe new life into it. Another elegant use of this approach can be seen in the work of Paul DeMarinis, where he takes telegraphy, early voice recording methods, and obsolete communication devices as repurposes them into new contexts. Entering the alien zone of lost devices he uncovers layers of media history and encourages viewers to consider the evolution of communication technologies in general. It also makes for fabulous artwork.

Thirdly, media archaeology as an art method can also be "proto"-oriented. One straightforward technique is to use historical devices to gain insight into present-day systems. For example, archaic animation devices like phenakistiscopes, praxinoscopes, or kineographs can be used as tools to to reinvent the present. To do this, simply splice together a present-day technology with the past. As a test, try porting a contemporary GIF animation over into the archaic format. Also, try the reverse - try bringing the archaic into the contemporary. I refer to this in my recent MIT Press book as "neoretroism," a blending of the archaic and the contemporary. "Neoretro" encompasses creations that bridge distant historical eras, exemplified by Steampunk's fusion of Victorian or pre-electrical mechanics with modern technology. It merges sophisticated and rudimentary tech within a singular artifact, embodying a paradoxical blend of outdated styles and futuristic vision. But it is much more than steampunk – steampunk is stuck in a Victorian rut – hundreds more technologies other than steam can be used to reinvent new things.

A PATH FORWARD INTO THE PAST

In conclusion, media archaeology studio practice emerges as a compelling approach to art creation, where the tactile, alien, and proto aspects of historical technologies serve as a canvas for innovation. This methodology goes beyond standard historical inquiry; it is a hands-on exploration that dismantles and reassembles the past to gain profound insights to inspire contemporary art. Artists like Tom Jennings and Paul DeMarinis exemplify this approach, exploring the deep technical and cultural layers of obsolete media to make insightfully interesting artistic systems. This tactile engagement with the materiality of media, a willingness to immerse in the alien landscapes of forgotten tech, and a drive to unearth the proto-origins of modern devices, collectively transforms historical artifacts into dynamic components of modern art practice. This approach doesn't just unearth the past; it actively converses with it, creating a dialogue by hands-on making. Media archaeology, in the process, becomes an

artistic venture that stitches together disparate timelines: a mashup of innovation that is as much a reinterpretation of history as it is a blueprint for future creativity.



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www.therestartproject.org

08

THE MINITEL AGE, PREDATING NETWORKED HELPLESSNESS AND THE RIGHT TO REPAIR

Many of us live in an age of virtually no "down-time" from the network. This network is still very much physical and wired, but most of us can often go for hours or days without remembering this.

But for those who still remember earlier times, one of our most formative moments was physically connecting to the network. A network. Any network. In the 80s and early 90s almost all were pre-World Wide Web.

If we can transcend nostalgia for its own sake, and revisit this moment, perhaps we can glean some lessons for a better future.

The singular Minitel experience - centralisation with autonomy
Connecting via the Minitel was a singular experience around the world: the phone company decided to send every household a computer connected to their network. Through this computer, French users could initially search phone directories, but France Telecom allowed other companies to provide numerous useful services via Minitel.

At its peak, users accessed tens of thousands of services such as those run by cinemas or transport companies. This broadened its use, and its sheer national up-take was unparalleled: nine million terminals, 25 million users.

The Minitel terminal is remembered for its ease of installation and use. This was "plug and play" technology.

Those of us who do not remember do not have "unboxing" videos from the time, for a window into this experience. But print adverts from the period reveal that it, and its various services, were marketed as accessible to different ages and genders. We see women searching for recipes. A sombre Banque Nationale de Paris advert with a checkbook and fountain pen, signalling the beginnings of online banking. Families querying the machine together.

Compared to early experiences of other pre-web networks, which required buying a modem, installing software via floppy disk, and putting all of the pieces together, the Minitel was easy out of the box. And this was part of its success.

But this didn't mean that it was easy like an iPhone is easy, in effect "dumbed down" so that most of its operations were hidden from a curious user.

Minitel manuals provide a great deal of information for the curious user. For example, Minitel 2 allowed parents to set passwords on services, and provided "technical annexes" for those who wanted to configure their modem, use keyboard shortcuts or even print.

An early culture of user customisation and configuration led to Minitel users to literally invent messaging on the network - it was not part of France Telecom's original plan. Legend has it occurred with a crucial discovery by a 10 year old boy in Strasbourg. It's worth noting that this feature arose from a city-level network within the national network.

Users stretched the uses of the network to even contest the government's power, with the 1986 student strike against proposed reforms. Student organisers convinced "Libération télématique" (service run by the newspaper Libération) host their organising and discussion, allowing them to organise more quickly and respond to media in near real-time.

Interestingly, the Minitel represented a combination of centralised control of the network and a degree of autonomy by the user, or companies operating on the network.

DEVELOPMENTS AND SUDDEN MASS OBSOLESCENCE

Minitel terminals appeared to have a long life. Basic models were given to users free by France Telecom, and new models were rolled out to customers as and when needed.

Premium models by various manufacturers were available for sale or rental, even a handheld model. But it appears the mass of Minitel terminals ever sold were from the first basic models (1, 1b, 2). As new services were launched, with some exceptions, most older terminals could be used to access them. The Minitel was a model of backwards compatibility. The advance of the network did not enforce obsolescence of the hardware.[1]

Looking back it appears the profits of the sales of physical terminals themselves paled in comparison to the profits to be made by providing services on the network. France Telecom took a large share of the fees paid by users via their phone bills, but shared these with service providing companies. (Some of these companies were big, but many were quite small.)

In a way this was a preview for what Big Tech is realising today - centralising and owning the platforms is where the profit is to be made. Admittedly, with power centralised in the hands of private

companies, we're living in a very different scenario. However this does open up the possibility that we can regulate to curtail the throw-away economy of electronics and tech for the planet without necessarily hurting our prosperity as a society.

When the internet finally "won" in 2012, and France Telecom pulled the plug on the Teletel network rendering the Minitel terminals useless, they did what most Internet Service Providers (ISPs) do today when a router fails: blink. Many in France criticised the lack of emphasis on recycling of the end of life of the Minitel terminals, which with cathode ray tube monitors needed to be dealt with safely.

This mass obsolescence shined a light on the impact at scale of network hardware in households, a very unsexy topic that continues to go mostly unaddressed. ISPs now pat themselves on the back for "innovative" takeback of routers, when this is something network operators should have been doing for years.

Today, a Wifi router is considered disposable technology. In some cases, quality control seems to be just sending out models to customers en masse and finding out what happens. As with many disposable consumer electricals and electronics, when customers have a problem, ISPs routinely send a new router without taking any responsibility for the existing one.

Routers are much less loved than Minitels, and their lifetimes seem shorter, the environmental impacts of these practices are non-trivial.

TODAY'S NETWORKED HELPLESSNESS

At home or in the office, downtime from the network has come to represent a major annoyance for some, and at worst a moment of terror for others.

We now live in an age when the term "engineer" is used to describe

those who help us connect to the network. They are charged with uniting the physical and wireless, with the devices in our laps and in our hands. They visit houses to install the connection, and when things go wrong, can be called out to check cabling, and even do such simple tasks as troubleshooting our routers or checking for competition on Wifi frequencies. (Although these are increasingly occurring remotely, via less-trained customer service agents reading through scripts.)

In the time of Minitel, engineers were solely tasked with maintaining the external telecommunications infrastructure.

The Web yields little information on the culture or economy of repair of Minitel terminals at the time, but we can see based on restoration attempts by Minitel enthusiasts in the past ten years that they were repairable. Standardisation of parts and screwdriver bits, its boxy design, all lent themselves to this.

It's safe to say, the Minitel lived and died in a time before the "Right to repair" movement really emerged.

Today's movement for a Right to repair recognises that we face a double-threat: of obsolescence of hardware through physical barriers to repair (lack of access to spare parts, design where non-destructive disassembly is almost impossible, lack of access to documentation like schematics) and of software obsolescence.

And this kind of obsolescence is more often than not enforced through the network itself. Connected devices can be killed off via updates pushed to devices, but equally devices can be left obsolete by changes in the operation of the network itself. This includes for example shutting down functionality of say a printer or a mobile when an "unauthorised" part is used.

As UK scholar Alison Powell explained "We can think about 'rights to repair' as also being rights to have autonomy. To have autonomy over how the things that are around us are actually working. Our autonomy

to make decisions about if we are going to modify them. Or if they break, and we want to fix them, the autonomy to be able to fix them with our own intelligence or to develop our own capacities to do that."

The story of Minitel terminal and network challenges us to envision the governance of networks and the hardware that comprises them, down to the machine in your lap or the palm of your hand, that allows for this autonomy and these rights.

Spideralex

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donestech.net
digitaldefenders.org
fembloc.cat

sobtec.gitbooks.io/sobtec1/content/
sobtec.gitbooks.io/sobtec2/content/

09

CONTEXT

This text is a remix of several texts I wrote on the issue of Technological Sovereignty as part of a collaboration with the community of Calafou, and with Ritimo, in 2014 and 2018. Our aim was to coordinate a publication on the panorama of technological sovereignty (TS) that is written in the first person by the collectives developing these projects. It is also important to underline that the 2 volumes have been translated into 6 languages, into French, Spanish and English thanks to Ritimo and into Catalan, Italian and Dutch thanks to volunteer activists.

The texts are short and try to explain in a simple and accessible language what these projects do, why they do it, and what kind of social need they try to solve, how they do it, what problems and joys they encounter on their way. It was important for us that these volumes on technological sovereignty would be developped from an activist research perspective where the actual subjects of action are in charge of investigating and presenting their own political project. In the end, TS is about doing together and contributing to the creation and maintenance of more fair and appropriate technologies.

This work is about making visible the diversity of contributions to the development and maintenance of the technologies we need. It is about

rethinking and rewriting the history of technology from a perspective that is neither military nor commercial, showing how civil society, women, LGTBIQ+ people, people of colour and indigenous people have always actively contributed to the development and maintenance of technologies appropriate to their needs and communities.

This text is therefore a patchwork that compiles together excerpts from the texts introducing the two volumes in 2014 and 2018 and complements them with a more down-to-earth proposal for activity to open dialogues on the issue of TS and appropriate technologies with diverse communities.

IN THE EARLY DAYS...

An initial problem faced by TS is the lack of free technologies. As indicated by Padilla: "The alternative projects that we are developing require contributions, but there is a void and we do not currently have the available resources for the sector of humanity that is using the Internet. We have completely lost sovereignty. We are using 2.0 tools as if they were gods, as if they were eternal, but they are not; they are in the hands of companies who, for better or for worse, may fail".

We need to ask ourselves, how is it that, regarding the tools we use in an increasingly ubiquitous manner,we decide so easily to delegate our electronic identity to multinational companies, multimillionaires with an impact on our daily lives, a kafkaesque nightmare: "We do it because we do not value it. We would do the same with food but self-consumption groups self-organize in order to have direct contact with providers, but then, why don't people self-organize their technological providers, buying the technological support they need directly from them, like carrots?"

For people whose activism lies in the development of free technologies, it is (often) important to be able to convince their own friends, family, work colleagues, as well as the groups of which they are members,

that it is important to value free alternatives. To do so they must also devise inclusive, pedagogical and innovative ways of persuasion.
In the previous question regarding the value we give to those who produce and maintain technologies that we need, the analogy between TS and food sovereignty is useful. This concept was introduced in 1996 by Vía Campesina to mark the Food and Agricultural Organization (FAO) World Food Summit. A later statement (Mali, 2007) defined it as follows: "Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations. It defends the interests and inclusion of the next generation. It offers a strategy to resist and dismantle the current corporate trade and food regime, and directions for food, farming, pastoral and fisheries systems determined by local producers. Food sovereignty prioritises local and national economies and markets and empowers peasant and family farmer-driven agriculture, artisan fishing, pastoralist-led grazing, and food production, distribution and consumption based on environmental, social and economic sustainability. Food sovereignty promotes transparent trade that guarantees just income to all peoples and the rights of consumers to control their food and nutrition. It ensures that the rights to use and manage our lands, territories, waters, seeds, livestock and biodiversity are in the hands of those of us who produce food. Food sovereignty implies new social relations free of oppression and inequality between men and women, peoples, racial groups, social classes and generations."

From this perspective, it is easier to make the notion of TS understandable. One could almost take this statement and swap "food" with "technology" and "peasants and farmers" with "technology developers". If this idea can be taken on-board, there is potential for it to start permeating the social imagination, producing a radical and transforming effect. Other starting points when thinking about TS lie in asking ourselves what ability and desire do we have to dream up

our own technologies? And, why have we forgotten the crucial role that civil society plays in the designing of some of the most important technologies of recent history?

We define civil society as the ensemble of citizens and collectives whose individual and collective actions are not motivated primarily by profit, but rather by an attempt to meet desires and needs while promoting social and political transformation. However, in order to counter certain contingencies specific to social movements, such as the paradox of collective actions, unfavourable structures of political opportunities or the lack of resource mobilisation, civil society has developed tactical uses of ICT, the media and other forms of expression. They include: campaigning to make struggles, actions and alternatives more visible; fund-raising and developing mechanisms to involve volunteers and participants (expand social strength and base); documenting processes to generate collective memory; facilitating the transfer of knowledge as well as access to information for all; improving internal collective management and organisation; setting up channels for interaction, promoting transparency and interaction with institutions and other agents; providing services and solutions to end-users, etc.

Civil society has never limited itself to the passive use of technological tools developed by others, mostly white, rich, often sociopathic men such as Bill Gates, Steve Jobs and Mark Zuckerberg. It has always contributed to the design of its own tools, thus promoting its own TS: community radio and television, launching the first non-military satellite by radio freaks, indymedia the first website with open and anonymous posting, freeing of cryptography with PGP and then GPG, invention of software and free licences like Licencia Feminista de Produccion de Pares.

TS deals with technologies developed by and for civil society, and the initiatives that form it attempt to create alternatives to commercial and/or military technologies. Their actions aim to adhere to the imperatives of social responsibility, transparency and interactivity,

which strengthens the degree of confidence placed in them by the people who use them. They are based on free software, hardware or licenses because they use and develop them (often combining both dynamics), but their characteristics go beyond this contribution. In other words, belonging to the free and open world is not necessarily synonymous with belonging to the TS world, that asks for ethics, ecology, responsibility, feminism, etc.

Based on a critical approach to technology, these initiatives also reveal how we relate to each other, how we interact, and the way we consume technology. They aim to understand how ecological and social costs in their production centres can be met fairly, as well as dismantling programmed obsolescence and extending the life and efficiency of any technology, product or service, as much as possible. Thinking about TS also means researching the types of social processes in which diverse technologies appear and how they promote autonomy, agency and liberation.

THEN IN 2018...

We need to talk a lot more, here and now, about the psychological, social, political, ecological and economic costs of these technologies. Not about the freedom to take selfies in the Google, Amazon, Facebook, Microsoft and Apple shopping malls, and upload yet another photo to an instashit account; but about repression, control, surveillance and the quantification and discretization of life and resources. In order to have this conversation we call on those of you who are exploited, driven mad, led to suicide, or killed in the femicides of the borderlands or in the special economic zones, fodder for a dystopian global technological ecosystem.

The Technological Sovereignty (TS) that we want is one which designs, develops, distributes and dreams technologies that offer well being and good living, those which do not perpetuate or create more injustice. It creates its own version of the ethical and political food

sovereignty revolution, which seeks the production and consumption of fair and local food. What we can learn from this analogy between food sovereignty and technological sovereignty was what we talked about in the first volume.

In terms of how the TS panorama has evolved since the last book, we would highlight the following:

> *" Today, everybody uses open source code, including Fortune 500 companies, governments, major software companies and start-ups. Sharing, rather than building proprietary code, turned out to be cheaper, easier, and more efficient. This increased demand puts additional strain on those who maintain this infrastructure, yet because these communities are not highly visible, the rest of the world has been slow to notice. Most of us take opening a software application for granted, the way we take turning on the lights for granted. We don't think about the human capital necessary to make that happen. In the face of unprecedented demand, the costs of not supporting our digital infrastructure are numerous ".*

This research, entitled Roads and Bridges highlights how large companies are taking advantage of the digital commons and giving little or nothing back in return..

In the previous book we already indicated that being part of the free-software/open source world was not enough to make TS. Similarly, being part of TS does not necessarily mean that all the participants are working together to develop liberating technologies. TS initiatives need to build more just and sustainable communities, where all the participants know how to work with diversity and inclusion, and with an understanding of privilege and power dynamics. This is not happening in a systematic way across TS initiatives. We are still leaving a in patriarcapitalist system and many people willing to develop fair and appropriated technologies might not be feminists (yeah this radical idea that women are people too). However we can also say that in the field of TS we will find more feminists developing and maintaining

technologies than in other tech related fields.

The Coconut revolution and the ecology of freedom as theorised by Murray Bookchin remind us that appropriate technologies are the ones that are developed in a community that chooses freely and knowingly the level, or grade, of technologies it needs, and takes into account the development processes and ways of doing things, in order to advance towards liberating technologies.

With these ambitions in mind, we highlight new contexts in which the concept of TS has become popular. Framasoft association in France has developed an ambitious plan of action to de-googlize the internet, and their book "Digital: taking back control" proposes resistance practices that combine sovereignty, autonomy and new forms of collaboration. In Catalonia there have been Technological Sovereignty congresses, the Anti Mobile Congress and the Social Mobile Congress. These events raise awareness and create action networks with the purpose to develop technologies based on different paradigms.

The concept of TS has also been taken up by some public institutions related to the "rebel municipalities". The promotion of hybrid public-civilian formats that offer more support to TS might ring alarm bells, but it could be a call for celebration. Only the future will tell where this will go.

Imagine if public money were freed up to maintain our digital infrastructures and offered, for example, alternatives to Google services from a non-commercial perspective, hosting data in a decentralised way in architectures that incorporate the right to privacy and encryption by default into their design. This could be a line of action where the public administration and civil society could mutually support each other.

For that we must offer more support to the small and medium-sized communities that develop appropriate technologies and TS, so that they can continue to provide technologies to communities

that need them. Technologies that are as beautiful and unique as multicoloured butterflies. A powerful example of that is the work of Atelier Paysan("the farmer's workshop"), a training and innovation center coupled to a network of farmers that has spent years designing lowtech machines to work the land and the fields, exchanging their designs and knowledge, providing training.

In any case, for these alliances to function, institutions need to lose the disdain they feel for small initiatives developing grassroots TS. To achieve TS we need to call on and involve all levels: the micro, the middle sized and the macro.

The future does not look good, and that is why we believe that TS can help us to counter the individualism encouraged by global capitalism. There are more and more messages calling for ways to get past connected violences. They have taken down my web page, censured the content, harassed, insulted, blackmailed me... The attacks are incessant, boring, dangerous, creative. There is no longer freedom of expression on the internet, only levels of privilege when it comes to being able to shout the loudest.

Today the TS is still that utopian horizon towards which we orient our footsteps...

We still want to go to that place where they speak unknown languages, meet vocabularies that do not exist, use grammars that don't fit together.

To be able to name phenomena that are not yet among us, but which prefigure us, and sometimes, transfigure us. Our narratives become speculative fiction, generating ideas and memes that travel across time and space to become an alternative technological ecosystem, in which we don't have to sacrifice our fundamental rights: freedom, privacy, security, communication, information, expression, cooperation, solidarity, love.

"A self-fulfilling prophecy is a prediction that, once made, is, in itself, the cause of making it become a reality."

They feed us with dystopian futures: news, series, films and books generated by the society of the spectacle. That pierce us and paralyse us, we only see blurry images of gadget technology. The shitty future is now, which means we believe that the only way open to us is to sacrifice our freedoms to feed a technological machine that speaks to us of innovation, creativity and participation to improve their power to quantify us and turn us into singular units, parts of social groups within patterns that no one understands any more. Closed algorithms processing inside proprietary black boxes are demonstrating their growing capacity to influence and harm us.

Dystopia is easy. Its perversity lies in its lack of imagination, and its potential to create culture and representations of the future based on negative loops: more discrimination, more machine singularity, more injustice based on algorithms, the new weapons of math destruction. Dystopia closes us into a great loop of cynicism and defeatism, the belief that technologies are what they are and that there are no alternatives.

The Internet is dying, the world wide web is shrinking. In my self-prophesizing utopian fiction there are worlds that reconnect thanks to the electromagnetic spectrum, waves that vibrate around us and are part of the commons. People rethink the technological infrastructures that they need, they develop them, audit them, test them, maintain them, transform them and improve them.

I wake up in the morning, the smartphone no longer sleeps at my side, almost no wifi passes through my house. The coffee machine and the refrigerator are free from the internet of things, they do not connect to Starfucks + Monosanto to send my consumer data. On the table there is a tablet built to last for life. All my devices are encrypted by default and come from a local factory a few kilometers away.

Some years ago, some biohackers popularised the use of bacteria that could store digital information thanks to oligoelements. Moore's law was broken. Planned obsolescence was made illegal. The cycles of war, hunger and injustice created by the extraction of minerals and the mass production of technologies, gradually disappeared. At school we generated encryption keys: in Primary School using antiquated technologies like GPG, and later on using processes based on the analysis of our sound imprint when having an orgasm.

I can configure my own algorithmic agent so my data will only be shared with who I wish it to be shared with. The friends of my friends make up a network of networks of trust and affinity; between us we often meet to share our ideas, resources and needs. I activate my wind, light and water capturers in order to generate all the energy I need. This lifestyle frequently requires my presence away from the screen; I am not always connected. There are no longer technophobes and technophiles, because no one gives technology that much importance any more. It has gone back to the place it should never have left.

There are so many worlds left to be created. To bring down alien capitalism we must imagine futures that are not dystopian, futures where playing at creating our appropriate technologies is something common and happily mundane.

Spideralex
+ Margarita Padilla
+ Fieke Jansen
+ Benjamin Cadon

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Benjamin Cadon has been working since 1999 within the Labomedia association based in Orléans, helping individuals and groups to carry out artistic, cultural and social projects involving a technological dimension.

tabakalera.eus/en/margarita-padilla/
thegreenwebfoundation.org/fellowships/fieke-jansen/
labomedia.org

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HOW TO OPEN A CONVERSATION WITH YOUR COMMUNITY ABOUT TECHNOLOGICAL SOVEREIGNTY

There are several ethical, political and philosophical reasons why a person or a community feels uncomfortable, upset or at odds when using many of the digital technologies that exist today. These may include:

Abuses committed by big tech companies: the inaccessibility of their terms of service and privacy policies; the existence of industrial monopolies; tax evasion; soft power, misinformation and mental health issues; precarious working conditions for IT industry workers from fabric to software; lack of cultural and gender diversity; and sexism and discrimination that occurs in many of the environments responsible for the development and governance of these tools and services.

The use by governments, hate groups and mysoginists of digital technologies to control, monitor, censor, trap and/or create new forms of violence against individuals and citizens (especially women, LGTBIQ+ and marginalized communities).

Ecological and environmental protection reasons, including the conditions under which materials are extracted and assembled; the lack of options against planned obsolescence; the production of toxic waste; the energy and water consumption, and carbon emissions involved.

Despite the availability of alternative and non commercial tools and the options for producing, consuming and developing more ethical technologies, it seems that there are few digital technologies that are produced, developed and consumed in an entirely fair and ethical manner. This can lead to the feeling that nothing has any meaning or is worth trying, leading to a disenchanted and cynical relationship with the technologies we use. The more we use digital technologies we don't trust, the more we lose our ability to regain power.

We encourage the renewal of popular and feminist education practices for the appropriation of technologies as there is an urgent need to support civil society initiatives that enable people to educate themselves not only about the functionalities of ICTs but also about the political, social and ecological issues they raise, so that they can make much more informed use of them.

We'd like to propose a workshop that invites you to open a critical and political reflection on technologies with your communities of belonging (family, school, local authorities, neighborhoods and districts, associations, cultural centers, etc.) in order to become aware of our margins of maneuver and our ability to regain control.

The aim is first to facilitate and organize small group conversations to share our feelings, fears, perceptions and experiences with technologies, and then to discuss what attitudes and actions we could take individually or with others to influence changes in the negative aspects of ICTs that we would like to change. In particular, we invite those involved in awareness-raising and/or critical education activities on the Internet and ICTs to take up this chart and create local versions.

Indeed, the means of action will vary according to the possibilities offered by the territories, the people, knowledge and resources that inhabit them, and the needs, desires and political values that drive them.

As for the actions to be identified together, they can be singular or plural. You can make changes at an individual level, by changing your habits, practices and use of digital technologies, and/or you can make changes at a collective level, by creating ephemeral or stable collective actions with other people to create movements, networks and convergences between struggles.

However, given that the people who use digital technologies, and much less the companies that develop them, are constantly being held responsible, we also want to question the effectiveness of individual actions. We can draw a parallel with the results obtained in other areas, such as product boycotts (with the sacralisation of consumer choice) or the reduction of consumption demanded of citizens in order to advance environmental struggles, although we know that the necessary changes must come first and foremost from business, transport and the military-industrial complex.

So, in order to bring about change in the digital technologies panorama, all individual actions undoubtedly add up, but we believe that the real changes come from the ability to articulate collective actions together and create convergences. We also want to recognise that collective action is becoming increasingly difficult in atomised and individualised societies, partly even because of our use and consumption of digital content and services.

Collective action remains a necessity, however, because apart from the urgent need to stimulate a culture of political and civic appropriation of technologies, we also need to succeed in forcing changes in the way commercial companies provide us ICTs and online services underlining the urgent need to break big tech, and continuing to create and, above all, consolidating the resilience of ethical digital alternatives in the

long term by multiplying their capacity to accommodate and serve many more people.

The table below is an example of what a local table of possible actions might look like; the options in it have been drawn from various workshops we have run with different communities over the last few years.

The table lists 5 main types of strategies (Ignore/Reject > Choose/Adopt an Alternative > Modify/Adapt > Create/Invent > Hijack/Sabotage) that you can use to influence and bring about change at different levels of the technological production life cycle (extraction, production, access, use, development, governance, end-of-life).
We have ordered these from those that seem easiest to implement to those that may require the most energy (time/means/knowledge), need to be done with others and/or may involve more risk and therefore possible criminalisation.

Regarding the fifth type of strategy, whether alone or accompanied, depending on our conscience and ethics, these tactics can be fully justified from the perspective of self-defence or the defence of territories and nature. We would like to invite each community to open a dialogue on these issues and to agree on what makes sense for them, always from an ethical and digital care perspective; technological sovereignty is about creating awareness, autonomy and liberating technologies for ourselves and others.

ICT cycle	Ignore/Reject	Choose/Adopt an Alternative	Modify/Adapt	Create/Invent	Hijack/Sabotage
Production of the technologies (extraction of the minerals and components)	Don't change your phone and computer frequently; extend the duration of their lives.	Be committed to alternatives that take these criteria into account in the chain of operations, production (e.g. Fairphone).	Recycle and give your devices new uses.	Create appropriate technologies and proximity, invent analogue solutions.	Find clever ways of minimizing extraction while retaining income Sabotage of means of extraction (e.g. coconut revolution).
Production of the technologies (assembly of the technologies, centres of production).	Find out about the manufacturing conditions of the technologies; support the resistance and trade union movements of those who make them.	Supports global network actions (e.g. Good Electronics). Accept a slow Internet and computers with limited computing power.	Configure and reduce the power consumption of your browsing and devices. Turn off devices completely when not in use.	Encourage spaces to recycle and create new machines for the community. (e.g. repair cafés, urban mining etc).	Break, alter or slow down the production chain, work as badly / slowly as possible. Sanding down production mechanisms, leaking information on social and environmental production conditions.
Access to ICTs	Educate yourself about the social, economic and political advantages of using free and open source software. Do not use proprietary operating systems if you are not required to.	Choose non-commercial, citizens, free and neutral internet providers (e.g. Guifi.net). Ask your city council to also offer internet access provided by citizenship / public organisations.	Ask public institutions to design responsible portals that are accessible to all and from all operating systems. Request training to free and open technologies	Set up a hacklab/fablab with friends in your neighbourhood or civic centre. Create a feminist hackerspace with your friends, look for safe spaces with internet connection. Translate content and software of interest into your languages.	Learn how to access the Internet without paying Identify initiatives where you can get a recycled computer or phone for free or a cheap price Learn how you can reset a stolen device

ICT cycle	Ignore/Reject	Choose/Adopt an Alternative	Modify/Adapt	Create/Invent	Hijack/Sabotage
Using ICTs	Read the terms of service and privacy policies before installing a new app or create a new account on a service. Ask yourself what its business model and its turnover are. Speak out against any harassment, abuse or violence that you see in the network.	Install free, non-commercial, ethical alternatives on your computer and mobile. Seek technological cooperatives of social solidarity and economy to develop and maintain the technologies you need. See if you can contribute in any way to the free programmes or services you use, whether it's making a financial contribution, taking on some task or making it known among your networks.	Demand technology tools in schools and universitues that run on free operating systems. Promote spaces for critical and civic education in ICT. Use what is necessary, not more. Even if they are free, technologies have an environmental and social cost.	Promote spaces for critical and civic education in ICT. Everything you learn, teach others. Offer yourself as a trainer and be generous in sharing your knowledge. Create a peer support group to share experiences of Technology facilitated Gender Based Violence.	Expropriate enterprises PCs for collective purposes (squatting on professional computers or networks, using the photocopier at work, etc.) Use malfunctions as an excuse for not being productive or rejecting technologies.
ICT development	Do not buy or consume technological products that convey sexist and/or racist ideas (in their presentation, advertising or design).	Support free culture networks and the defence of the right to share and to repair Promote the use of open licences in publicly funded academic and scientific research.		Set up a hacklab/fablab with friends in your neighbourhood or civic centre. Find out who is producing free technologies in your local networks and support them. There are people everywhere trying to build free technologies. Not everything is produced in Silicon Valley.	Share security vulnerabilities or hijacking tips with friends Infiltrate and alter the functioning of an enterprise developing harmful software Report bugs and security flaws in friendly software

ICT cycle	Ignore/Reject	Choose/Adopt an Alternative	Modify/Adapt	Create/Invent	Hijack/Sabotage
Internet governance	Minimise the use of applications that build "walls" in the Internet, such as mobile applications.	Use browsers and other software for the net built by foundations that defend net neutrality (for example, the Mozilla Foundation). If you can afford, open an email account on a non-commercial server, even if it costs a small annual fee. Support an organisation that protects digital rights.	Ask your representatives to protect a free and neutral Internet. Get informed and take part in petitions and participatory processes.	If you have knowledge of inequality and/ or human rights Join an IETF group to strengthen its plurality.	Leak information when there is knowledge of attacks on the scale of the Internet (global surveillance, state initiatives to divert traffic or operate denial of service, deliberate weakening of security measures, etc.). Participate to global actions when a company or state acts to the detriment of the collective interest (e.g. anonymous, electronic disturbance ...)
Governance of the platforms	Don't use internet services that attack freedom and net neutrality, monetize hate speech and facilitate Gender Based Online Violence.	Use non-commercial alternatives that respect the privacy and security of their users.	Demand that public institutions break up tech monopolies.	Don't contribute to the creation of monopolies. Use several browsers and search engines. Be plural. Keep active and do not abandon the use of basic federated technologies, which do not depend on a single company or technology (for example, e-mail, or the various fediverse services). Organise an advocacy campaign in your neighborhood or in your networks..	Pollute the content of these platforms, create unnecessary noise, exploit APIs to orchestrate robotic campaigns Provoke or promote scandals regarding their operations by usurping identities, exploiting security loopholes or deliberately creating content that discredits them

ICT cycle	Ignore/Reject	Choose/Adopt an Alternative	Modify/Adapt	Create/Invent	Hijack/Sabotage
End of life technologies (waste and recycling)	Don't change your phone and computer frequently; extend the duration of its life.	Don't upload all your information to the cloud. Having your information on your computer makes you aware of the space it takes up and the energy it consumes.	Share some devices. Maybe you don't need one for each person.	Encourage spaces to recycle and create new machines for the community.	Find hacks to extend the lifespan of devices, for example by enabling alternative operating systems to be installed on devices that are not supposed to accept them.
Is there another step in the ICT cycle that should be added?					Is there another strategy that should be added? (e.g. Deal with mycelium networks and biocomputers

Geert Lovink

Geert Lovink is a Dutch media theorist, internet critic and author of Uncanny Networks (2002), Dark Fiber (2002), My First Recession (2003), Zero Comments (2007), Networks Without a Cause (2012), Social Media Abyss (2016), Organisation after Social Media (with Ned Rossiter, 2018), Sad by Design (2019) and Stuck on the Platform (2022). Almost all these books have been translated into German, Italian and Spanish. In 2019 an anthology of his work appeared in Russian with other translations in Turkish and Chinese.

His centre organizes conferences, publications and research networks such as Video Vortex (online video), The Future of Art Criticism and MoneyLab (internet-based revenue models in the arts). Recent projects deal with digital publishing experiments, critical meme research, participatory hybrid events and precarity in the arts.

www.networkcultures.org

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"The real power of a neganthropic and anti-anthropic institution comes from its energetic potential, which it knows how to conserve and save for new transformations allowing it to postpone irreversible institutional sclerosis. Such an institution recognizes transformation as its mode of existence. The capacity to transform should therefore become the object of a specific and primordial institutional care." (Bifurcate, Bernard Stiegler, 2021)

Extraction Rebellion: the uprising against planned obsolescence is well underway. The solution will not just be less consumption + recycling but come from full-scale integration of old and new products and services. The challenge will be to design and scale up these modes of perma-hybridity. What Ocean-Cleanup is rolling out in the Pacific Ocean for plastics[1] will soon be done for media hardware, software and related infrastructures: material nets collecting everything from record players, DVD and VHS players, PCs, tablets and laptops, synthesizers, mobile and smartphones, switches, motherboards and amplifiers, Walkmans, mp3 players, radios, TVs to video projectors. Gathering them will only be stage one, hybridizing them is stage two, synthesizing past and present, high and low tech. The integration of second-life hardware into the everyday life of the billions is upon us. Welcome to the fifth industrial revolution.

The hype is on for the vintage phone with the latest or the oldest chip inside: surprise! Finally, there will be sustainable universal software that works on all devices, regardless which age or version. The e-fairness approach is an integral one and restores to unity of hardware, software, content and user culture: interfacing with holistic junk. Everything can and will be revived. Let's reanimate dead media and bring its mysterious-miraculous 'ghost in the shell' back to life again. Compensate the toxic electro dumps in Africa or Asia. Instead, there will be a range of planetary 'capture movements' of electronic heritage. The aim will be to reuse and reintegrate, and above all, bring back the spirit that once lived deep inside the device to bring alive as part of a new cultural alignment.

It is vital to upscale the perma-computing project[2]. Instead of lamenting—time and again—the appropriation by vulture capitalism of a well-intended avant-garde tech movement, it will be important to envision real-world alternatives that can overcome this dead-end cultural logic. Another Scale is Possible. The current moral bankruptcy of open source/free software to Silicon Valley is the point in the case here. Everyone (except a dwindling group of aging hackers) can see that the once heroic 'black box' versus 'open box' choice is no longer an issue—especially not for GenZ which grew up with proprietary digital technology. Platform capitalism has effectively rendered the 'open' and 'free' terms useless.

The world is eager for alternatives that scale up—but why are so many so clueless about how to roll them out? Why is hype, sell-out and betrayal the only available option? Reuse and Repair should indeed be thought of together with the third R: Refuse. Refuse to be summarized—as in the case of AI. Many agree that alt-tech movements from now on have to refuse to be neutralized, crushed and silenced. But this also implies refusing to give up, refusing to be fragmented and refusing to be reduced to the logic of fashion. Reclaim the Tech[3], the Italian name for the movement under discussion here is mobilizing techno-social forces in society that refuse to be taken over by Big Tech as an ever-alienating, ever-regressive force.

Reclaim is the fourth R. What does it mean to reclaim? At the time, the UK 1990s movement 'Reclaim the Streets' aimed to retake the street as a free public space, against police repression and surveillance but also the car as the dominant mode of transportation in cities. This, in turn, built on a 1977 feminist protest called 'Reclaim the Night' against patriarchal violence. To reclaim means to take back lost territory. What does this mean for the 'tech' context? The answer can be simple: program or be programmed (as Douglas Rushkoff's booklet is called). In this case, a program for multiple and diverse commonalities.

Reclaim the Tech goes further by claiming "We are Tech". This means that tech is no longer some passing phenomenon, enforced upon us. Tech is inside us, we carry it close to our skin (and in some medical cases even underneath). It is intimate, like the 'femtech' menstruation apps, as described by Morgane Billuart in her book Cycles[4]. In the case of social media platforms, tech has shaped our mental wellbeing. We will learn to live with it and find a balance between the poison and the cure, the pharmakon Bernard Stiegler so often spoke about.

To make this happen techno-culture's intent will have to be to sidestep both authentic nostalgia for the old and artificial longing for the new. Let's overcome retromania and future addiction and start to get used to the idea of timeless tech. Reuse implies one-off assemblages of old tech that we use to create new styles and modes of expression. The aim is to prevent regression to a past that was patriarchal, totalitarian, racist and violent. The past can be fully integrated into the future: hybridpunk not cypherpunk. Forget the false romanticism for industrial ruins. Don't be lured by right-wing libertarian honeypots. And remember, neoliberal tech-misery is real. This movement aims to overcome involuntary regression and stagnation—the decease of our time. The cultural problem of today is that one can dream up and prototype no matter how many solutions we want but we're all running up against the thick corporate walls of technofeudalism. Instead of burnout and depression, let's extend the degrees of freedom. Liberatory movements in culture will be celebrated. Collective weirdness and ecstasy are passed on to new generations, time and

again. This is a techno-cultural rite de passage. Go mad but do not follow the footsteps of any bro or sister. Become, and overcome your heroes of the past (and their peculiar techno-extensions).

The techno-cultural design can go in two directions: inside out and outside in. There is the Commodore 64 with a Nvidia Blackwell B200 chip to assist the solar punks in the image generation rituals. An Intel 386 was inserted in the slow phone to provide for human-speed communication. What is low-tech online video? Generative AI freed of its data centre chains? At first, all this will look retro, clumsy and post-industrial. Once scaled up hybrid tech itself will appear normal and will no longer attract attention – unless we travel to other parts of the globe where different arrangements and techno customs will amaze us.

Old and new media do not just coexist in parallel time-space universes. During the roaring 1990s 'multi-media' era, the dream was to synthesize audio, video and text with smell, gestures and distance, using the one digital gateway to push them all through, to forcefully converge all possible levels of meaning into one platform of universal understanding. In the theory of mixing from the same era, synthesis was not its cultural ideal. The mix allowed different technologies and rhythms. How privacy, anti-surveillance and crypto and blockchain can play a role in this, will have to be discussed and tried out.

Today's digital culture is stagnant, not escapist. It lacks direction and fate. The Will to Organize is absent now that even low-commitment networks have been been superseded by the platform. The Zeitgeist is regressive, which is the opposite of accelerationist. There is no goal to move towards – at whatever speed. There is no dissolution of the self into the virtual realm either. The cloud is the new uncool. Nothing is more boring than the pure virtual. Nothing is more corporate than the data centre. What we experience is an endless sequence of short boosts of orgasmic ecstasy, followed by long periods of exhaustion. This dominant cultural rhythm has had a devastating effect on the search and implementation of sustainable alternatives. Predictive

optimization has erased the inner energy to revolt. What's left are eruptions of anger, resulting in erratic social movements—a dynamic fuelled by short attention span social media usage.

A question of today is how to make (post)coloniality visible in technology and design. We see this coming up not just in the case of raw materials but also in the context of 'data colonialism'. It is one thing to demand the Decolonization of Everything. Tech will not voluntarily give up its dominance of the New in favour of 'tech creolization'[5]. Decolonizing tech is not just one of many possible issues: it goes to the core of today's value production. Let's be cautious not again to speak on behalf/for others but act together, create cultures of 'hybrid togetherness'[6] that overcomes new geo-political enclosures and other subliminal and explicit forms of techno-apartheid. Technological violence today ranges from algorithmic bias and exclusion to very real military destruction of land, cities and lives.

There's no shortage of alternatives, cool designs, roadmaps, and exit strategies. The exodus will not be televised. The world cannot wait for data prevention principles to be implemented. Let's dry up the data flows once and for all. As data 'privacy' has proven to be a legal abys that cannot be guaranteed, the next option available will be built-in mechanisms, filters that prevent data from exiting devices and apps in the first place. This includes a worldwide ban on the sale of data.

Alternatives are nothing if they are not local. Popping up after the revolution, Urban Tech for the People 'corner shops' will not just provide repair, have a paper printer and maybe even a fax machine, receive deliveries but also offer a one-off local range of emulators, cables, spare parts, old and new batteries. They are par excellence points of social connection. This wetware aspect is an integral part of Operation Tech Clean-Up. And there is also an aesthetic agenda here: McLuhan's proposition to beautify junkyards. Instead of externalization waste, it will live with us. Most waste will be immaterial anyway (not to mention the mental waste society will have to deal with in, likely, similar fashion). A big task ahead will be to make waste visible again.

(Inspired by NØ SCHOOL, Aymeric, Jaromil, Felipe and above all Luca, Emanuele, Donatella, Tisiana and all others of the Reclaim the Tech movement)

Notes

NOTES CHAPTER 00 FOREWORD BY ALESSANDRO LUDOVICO

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3. *Minitel: Welcome to the Internet, Julien Mailland and Kevin Driscoll, 2017*
4. *ibid.*
5. *https://en.wikipedia.org/wiki/Minitel*
6. *Kac, E. (2019) Reabracadabra, 1985 in The Art Happens Here: Net Art Anthology, (edited by) Michael Connor, Aria Dean, New York: Rhizome, p.023*
7. *Mailland and Driscoll ibid.*

NOTES CHAPTER 02 A MINITEL HISTORY BY JEROME SAINT-CLAIR

1. *Most models were CRT, and only a few used LCD screens (more expensive to produce), like the portable Minitel Matra 5 or the Alcatel Web Touch.*
2. *Needless to say that since there was no way to track your consumption, nor had detailed bills, this led to some surprises.*
3. *https://en.wikipedia.org/wiki/Simon_Nora*
4. *https://en.wikipedia.org/wiki/Alain_Minc*
5. *https://en.wikipedia.org/wiki/Val%C3%A9ry_Giscard_d%27Estaing*
6. *J.H. Lorenzi & E. Le Boucher (1979), Mémoires volées. Ramsay ISBN 978-2859561130 "Chapter 4"*
7. *https://fr.wikipedia.org/wiki/Fran%C3%A7ois_de_Closets*
8. *François de Closets (1978 & 1979), Scénarios du Futur. Denoël. ISBN 978-2207224601 and 978-2207225592*
9. *DDOS : A distributed denial-of-service attack occurs when multiple systems flood the bandwidth or resources of a targeted system (source Wikipedia)*
10. *J.H. Lorenzi & E. Le Boucher (1979), Mémoires volées. Ramsay ISBN 978-2859561130*
11. *LP standing for Lignes Principales (main lines)*
12. *Transpac (Transmission par paquet) C.C.E.T.T. Rémi Després team / adjoint Guy Pichon*
13. *https://en.wikipedia.org/wiki/Centre_commun_d'%C3%A9tudes_de_t%C3%A9l%C3%A9vision_et_t%C3%A9l%C3%A9communications*
14. *Association des abonnés à TéléTEL*
15. *Association Française des Fournisseurs de Services Télématiques*
16. *Direction Générale des Télécommunications*
17. *Direction des Affaires Commerciales et Télématiques*
18. *https://en.wikipedia.org/wiki/World_System_Teletext*
19. *T.A.E. Terminal Annuaire Électronique / Electronic Directory Terminal*
20. *Centre d'Information sur les Techniques Avancées des Télécommunications*
21. *https://en.wikipedia.org/wiki/Roger_Tallon*
22. *https://data.inpi.fr/brevets/FR2510782*
23. *Cathode Ray Tube*
24. *MIAMI standing for MInitel À MInitel (Minitel to Minitel)*
25. *Source Orange/DGCI*
26. *Source Orange/DGCI*
27. *https://fr.wikipedia.org/wiki/Bruno_Lussato*

28. *33% of the available services in 1997*
29. *Sexist would be more accurate*
30. *https://en.wikipedia.org/wiki/Xavier_Niel*
31. *The Alcatel WebTouch™ One device launched in 1998 is a typical example*
32. *https://www.lesechos.fr/1997/08/le-pere-du-minitel-soutient-la-ligne-adoptee-par-lionel-jospin-819073*
33. *This technology was later adapted to set the basis of the TCP protocol developed by Vint Cerf for the Internet.*
34. *https://en.wikipedia.org/wiki/Louis_Pouzin*
35. *https://en.wikipedia.org/wiki/CYCLADES*
36. *https://www.ina.fr/ina-eclaire-actu/video/cn00001296278*
37. *https://www.zdnet.fr/actualites/france-telecom-se-separe-de-ses-minitels-sur-fond-de-polemique-39182290.htm*

NOTES CHAPTER 03 BEFORE IODT THERE WAS DEMO BY RÉGINE DEBATTY

1. *https://graffitiresearchlab.fr/?lang=en*
2. *https://cargocollective.com/kik*
3. *https://www.martindebie.com/*
4. *https://www.saint-clair.net/*
5. *http://www.ina.fr/video/CAA7901420401-video.html*
6. *https://fffff.at/people-staring-at-computers/*
7. *https://www.flong.com/*
8. *https://www.florentdeloison.fr/*
9. *https://www.tetalab.org/fr*

NOTES CHAPTER 04 WORKING THE BREAK POINT V.3: MAINTENANCE, REPAIR AND FAILURE IN ART: #RIPMINITEL 1980-2012 BY TERESA DILLON

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NOTES CHAPTER 05 NOTES FROM MY MINITEL NOTEBOOKS, 1987-1995 BY NICOLAS NOVA

1. *To give an accurate account of my recollections, and avoid appending my own anachronistic reflections, the italics correspond to those notes copied from my notebook, while the rest of the text is new, written specifically for this chapter.*
2. *AZERTY is a specific layout for the characters of the Latin alphabet on typewriter keys and computer keyboards used in France and Belgium.*
3. *Chaîne opératoire (French for "operational sequence") is a term used in anthropology to describe, step-by-step, the technical processes and social acts involved in the production, use, and eventual disposal of artefacts, from stones to computers.*
4. *A Minitel 1B, manufactured by Alcatel from 1986*
5. *PTT (Postes, Télégraphes et Téléphones) was the acronym for the former public administration in charge of telecommunication, which became France Télécom (later Orange) and La Poste in 1991.*
6. *The term "Dead Media" was coined by science-fiction writer Bruce Sterling in order to refer to "forgotten, unwanted, unremembered, and generally unrecorded" media. See also Sterling's Manifesto: http://www.deadmedia.org/modest-proposal.html*
7. *As shown by this paper in Linguistics: Jacques Anis, 1996. « La construction de dialogues télématiques : quelques stratégies discursives », Linx, 8, URL : http://journals.openedition.org/linx/1165*
8. *The number of minutes listed in brackets is the minimum remaining credit required to use each command.*
9. *Oases were a type of forum limited to a small number of AKELA participants.*
10. *For an extensive description of the time-based business model see also: Mailland, J. & K.*

Driscoll 2017. Minitel. Welcome to the Internet, Cambridge : MIT Press.

11. *Bulletin board system, a server running software that allowed users to connect to the system to upload files, read news, and leave messages.*
12. *Protoculture Addicts was a Canadian anime and manga fanzine, which later became a magazine.*
13. *Rheingold, Howard. 1993. The Virtual Community. Cambridge: MIT Press.*
14. *For a more extensive description of how the Minitel paved the way for digital practices in France, see Schafer, V. & B. G. Thierry 2012. Le Minitel: l'enfance numérique de la France, Paris : Nuvis.*

NOTES CHAPTER 08 THE MINITEL AGE, PREDATING NETWORKED HELPLESSNESS AND THE RIGHT TO REPAIR BY JANET GUNTER

1. *Long-time volunteer of the Restart Project David Mery argues that instead the in-built obsolescence of Minitel was sealed by "technical choices motivated by protectionist measures. France Telecom opted for a V.27ter modem, which is basically the asymmetric modem that was used in faxes" with one crucial modification. "This meant that one had to use a modem specifically developed for the French market. It was small enough that this meant French modem manufacturers, in effect. When US Robotics and other US modem manufacturers started producing cheap modems, these couldn't be used to access Teletel services. So either you remained locked in the Minitel infrastructure or you got a cheap foreign modem and got into BBS, then Internet and WWW."*

NOTES CHAPTER 11 PRINCIPLES OF PERMA-HYBRIDITY BY GEERT LOVINK

1. *The Largest Cleanup in History: https://theoceancleanup.com/.*
2. *The project describes itself as "an invitation to collectively and radically rethink computational culture. It is not a tech solution searching for a problem." https://permacomputing.net/*
3. *https://reclaimthetech.it/. "Reclaim The Tech is a community on the move, fighting for digital justice. In a world marked by conflict and transformation, we seek a space for hybridization and reappropriation of technologies, open to alliances with struggles for social, gender, and climate justice. In 2023 Reclaim The Tech was a bet; today it is a collective reality based on participation and the sharing of ideas, projects, and alternative technologies."*
4. *https://www.setmargins.press/books/cycles-the-sacred-and-the-doomed/.*
5. *For more on this see: https://www.cambridge.org/core/journals/cambridge-journal-of-postcolonial-literary-inquiry/article/creolization-hybridity-and-archipelagic-thinking-interrogating-inscriptions-of-postcolonial-agency/.*
6. *Motto of UKRAiNATV: https://ukrainatv.streamart.studio/knowledge/.*