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politics by an information-based, autonomous 'administration of things and the conduct of processes of production'. This can well be imagined with comprehensive techno-cybernetic models that run smoothly and without poor human decision-making. *Cybersyn* and *OGAS* were indeed intended to reorganize and partly replace the 'government of persons'. But as we have seen the states run by persons failed to wither away due to cybernetic rearrangements but instead even got stronger by fragmenting the technological and epistemic possibilities of cyber-communisms.

Socialist states and especially the Soviet Union in fact became ultra-robust while they already started as an oppressive political system. Why this happened is still a difficult question (and answers range from references to historical circumstances of the October Revolution to analyses of authoritarian roots in Leninism), but the facts indicate that arguments derived from historical materialism should be handled carefully. Srnicek and Williams have buried Lenin's idea of an exclusive revolutionary party and its revolution again, nevertheless I am not convinced that an idea of hegemony and counter-hegemony has historically proven as the best strategy.

A question for contemporary accelerationism could therefore be: What is the state today, should it be abolished, and how should a post-capitalist society in whole be organized instead? Or repeating Lenin's formulas with the deep hope for better answers than those we know: *What is to be done?*, and *Where to begin?*

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Nikita Khrushchev was skeptical whether computers can help boost history towards communism. Nevertheless, he was willing to give it a try and ordered a super-computer for economical support of soviet socialism. The mostly talented and best trained soviet engineers set up the computer and asked him to test the machine directly after completion. Khrushchev, still not convinced, decided to pose an unimaginably complex question: 'When will communism be reached?' The box rattled and clicked until a metallic voice said 'In seventeen kilometers'. Khrushchev laughed and repeated his question very clearly pronounced. Without any delay, the machine answered 'In seventeen kilometers'. Now, the comrade got very mad and called for his engineers so he could complain about the expensive machine's stupidity. The technicians were surprised because every test they had done before went sufficiently, so they asked the computer kindly to explain its answer. The machine, resting on the table, said fearlessly: 'The result of seventeen kilometers is based on data from comrade's Khrushchev last speech where he said that with every five-year plan we will be one step closer to communism.'

This old soviet joke indicates an abyss of technology's potential for emancipatory progress. The story has at least two possible sequels: either the imaginary machine is destroyed because it clearly proves the current insufficiency of soviet politics, or the power of computers is taken as a starting point to try to calculate and decide what to do instead of depending on the weak human machines and their millions of papers. The joke's speculative hidden track reflects what Slava Gerovitch has described as the difference between 'Cyberocracy' and 'Cybureaucracy'. In short, cyberocracy means organizing a society by cybernetic ideas, methods and technologies, whereas cybureaucracy is a traditional non-cybernetic bureaucracy with access to single cybernetic technologies like computers or communication networks. The first would be a radical break in human history and as such a possible step forward in emancipation, the latter

would be an adjustment of typically modern governing techniques aimed at stabilizing the status quo.

Recent radical and speculative politics today also try to tackle the relation between emancipatory change and today's frontiers in automation, robotics and communication technology. While trade unions fight against the robotic replacement of human labor, cyber-communists dream of a fully automated luxury communism. Cyber-activists battle online surveillance with sophisticated technological skills; transhumanists hack their own bodies while warning of bio-technological enhancements for economical rationalization; feminists discuss ectogenesis as a liberating vision as well as a male dream of finally getting rid of women. Such questions on technology's potentials and threats regularly take one step back behind the difference between cyberocracy and cybureaucracy and ask whether certain technologies are applicable for emancipatory progress at all. A specific question embedded in these politicized debates is whether cybernetic technologies and epistemics could make communism possible, or just help capitalism becoming stronger.

So what exactly are we talking about? The term cybernetics describes an influential set of assumptions and terms that arose after the Second World War. Basic cybernetic interests focus on communication, information and control in self-regulating organisms and machines (as in Nobert Wiener's ground-breaking work). Cybernetic concepts and methods were applied to various disciplines and research areas like language, social groups, education, cognition, political regimes, ecology, and computers (for a brief overview see the famous Macy Conferences). Equipped with cybernetic methods, a whole economy could be conceived as a system, constantly adjusting and being adjustable by information flows delivered in feedback loops.

Within the emancipatory discourse on cybernetics there is a rather pragmatic issue: what are the political limits worth considering for emancipatory progress facilitated by informa-

cies of decelerating and fragmenting massive innovations as we have seen in the Soviet and Chilean examples.

To understand these pitfalls for technological innovation a sociological theory is needed that can shed light on internal structures and mechanism of the self-referential political sphere and the self-referential organizations acting in it. Political sociology and organizational theory can identify formal/informal characteristics, path dependencies, selective adaption and self-referential reproduction of state bureaucracies and political parties without reducing them to ideological conflicts or individual human motives. Under such a perspective it is however highly questionable that formal organizations will replace their freedom with contingent decisions by functional equivalents like autonomous techno-cybernetic systems.

The last reflection concerns a speculative post-capitalist society. In both examples, cybernetic reorganization towards communism has been decelerated by a socialist state. So, the states acted in the opposite way as socialists predicted it for around two hundred years. I just want to highlight the final part of this famous quote by Friedrich Engels:

> 'The first act by which the state really comes forward as the representative of the whole of society – the taking possession of the means of production in the name of society – is also its last independent act as a state. State interference in social relations becomes, in one domain after another, superfluous, and then dies down of itself. The government of persons is replaced by the administration of things, and by the conduct of processes of production. The state is not "abolished". It withers away.'

Particularly this 'replacement' can be related to cybernetic dreams of the last seventy years, which hoped for the replacement of corruptible and ideologically confused human

The accelerationist intervention emphasizes an undogmatic perspective on technological potential in a speculative mindset concerning possible futures and the contingent present. However, Srnicek and Williams object the contemporary leftist dogma of folk politics. Their understanding of navigational strategies towards emancipatory futures in turn promotes a culture of utopic thinking and radical political networks, including hierarchical organizations. Srnicek and Williams follow an idea of counter-hegemony in the ideological and material subfields of culture, knowledge production and technical infrastructures. As we have seen in the history of cybercommunism, one should keep in mind that the implementation of computerized and automated network structures depends on multilevel decision-making as well as on the acceptance of several classes of developers and users. Organizations such as proposed by Srnciek and Williams are highly probable to face such structural limits as well.

Formal organizational structures tend to breed informal structures. This informal level then (seemingly paradoxically) stabilizes these hierarchies or offers possibilities to slow down organizational communication and decision patterns. These basic sociological findings have to be considered when specific organizational demands are postulated. Especially when those demands should flanked by the acceleration of technological innovation. Concerning the Accelerationist Manifesto's call for leftist think tanks and strictly organized political bodies, every further investigation has to keep in mind that changing established power structures is always problematic and will be contested when these very structures are confronted with possible systematic destabilization. The balance between a minimum of general control one the one hand and open structures for technological and social innovation on the other, remains a question that has to be tackled (again) by critical thinking. One would have to speculate whether such organizations anticipated by Srnicek and Williams will show the same tendention technology and complex system modeling? Two emancipatory positions help to grasp the immense range of contemporary radical politics tackling cybernetics and up-to-date technologies: Accelerationism and Tiqqun's Cybernetic Hypothesis. From two concrete historical attempts, Chile's Project Cybersyn and soviet cybernetics, problematic mechanisms of political structures can then be deduced. These insights can help identify fundamental obstacles for an emancipatory application of complex epistemics and technologies. While these cases deserve deeper investigations, I conclusively suggest brief questions on further political organization within and beyond today's toxic order.

Cybernetic thinking can be used as the explanatory background for organizing complex phenomena in general and a whole society in particular. In that case, are cybernetics and computer technologies 'machines of communism', a potential path to emancipatory coordination that is capable of hypercomplexity? Or are they just the next governing techniques for boosting capitalistic exploitation, surveillance and oppression?

The French radical collective Tiqqun analyzes contemporary power structures with a strong emphasis on technology and its logics. Today's power – Tiqqun claims – is driven by the cybernetic hypothesis, which assumes that biological, physical and social patterns are programmed and programmable. Basic assumptions and political ethics of the cybernetic hypothesis aim at control, prediction and surveillance based on massive data collection grounded in extensive network infrastructures. For Tiqqun, 'cybernetics is an art of war' and the internet 'is a war machine': everything that is produced, sold or consumed, everything said and done is reduced to binary information in dense feedback-patterns that activate scattered governing protocols. There is no top, no head or absolute single authority, no central navigator. The forms of politics, discourse and oppression are analogue to modern information network structures known for example as 'the internet' and control successively

disperses from central institutions into vast techno-human assemblages.

Tiqqun proposes a strategy for resisting and fighting the politics of the cybernetic hypothesis: 'Panic makes the cyberneticians panic' – because chaotic situations make states of equilibriums implode and limit prognostic thinking. The binary machines of information processing should be eluded by producing noise (the old archenemy of cybernetics and information theory). The practice of attacking, sabotaging or overloading infrastructure can be seen as a form of resistance. Tiqqun preaches a double strategy of sabotaging and lingering, they propagate destroying machines and to avoid producing processable information. Both tactics have to be part of the 'politics of rhythm', which means speeding up the technological standard of revolting and slowing down all sorts of information, person and commodity movement. This should be accompanied by the production of fog or interference because opacity of actions and motives is essential for revolts against an ideology of transparency. Tiqqun want to build 'black blocswithin the cybernetic matrix of power' which are assembled by small groups constituting a 'panic-propagating cloud'. For Tiqqun, cybernetics constitutes a specific form of power knowledge and governing techniques. They identify cybernetics as the ideology of transparency and a specific, information-based form of control.

Under the (older) term accelerationism a relatively new approach to progressive politics and technology has recently emerged. Especially the Manifesto for an Accelerationist Politics, by Alex Williams and Nick Srnicek, boosted a new discourse about contemporary leftist perspectives on radical change. I understand accelerationism mainly as an intervention into contemporary leftist politics. The Manifesto and following works (especially Srnicek & William's Inventing the Future) reject the leftist fetishism for what is called 'folk politics': flat democratic organization, spatial limitations, romanticist

these threats. The main incident was a strike against the Allende government backed by ten thousands of truck owners, food shop owners, engineers, doctors and lawyers which took place in October 1972. During the strike high-ranking government officials gathered in a room and used the telex network to receive data and to coordinate the loyal retailers or truck drivers. Using the widespread communication network, they kept supply running and the strike ended. After realizing the potential benefits of the new communication infrastructure in this critical situation, different government agencies and ministries kept using the telex connections but did not work on the cybernetic modeling of the whole state-run sector.

Parallels to the developments in the Soviet Union can be sketched. Both OGAS and Cybersyn were grounded on sophisticated cybernetics and aimed at fundamental change in economic structures. Therefore, the use of innovative computer and communication technology on a large scale was proposed. However, when the models and their implementation reached a critical level of potential usage, different state sections extracted individual components – telecommunication systems, computer networks, data processing and storage tools – from the general cybernetic ideas. As a consequence, the technological innovation helped to stabilize or even strengthen the existing power structures instead of reforming them fundamentally.

CONCLUSION, OR, HOW TO ORGANIZE

Even if the political, economic, cultural and technological circumstances differ widely between the Soviet Union and Chile, we can find similar tendencies of fragmenting and dismantling massive socialist cybernetic plans. How can these historical findings help today's speculation about the future of emancipatory politics? To be more precise: how to organize within and after capitalism?

cently wrote in a personal reflection that Cyberstride was 'the ear on the ground' while CHECO was conceptualized as 'the eye on the future'. The last component was the central operations room in Santiago. All the information of Cyberstride and CHECO were displayable in the Opsroom that was designed for participation of workers, engineers and politicians. This Opsroom is the most famous part of Cybersyn, Claus Pias calls it the system's 'user interface' and today it is a techno-political icon.

Starting in August 1972, the team constructed a hexagon room in central Santiago. It contained seven swiveling chairs with control buttons in the armrest. The geometric forms were used to control the slides, because the future participants were members of the government or factory workers who could not properly use a keyboard. Working on a regular keyboard was a competence of female secretaries at this time and the designers aimed for direct control of the men in the Opsroom instead of any intermediation. Different displays represented the incoming data, not on television or digital screens but on slides handmade and painted by a group of young female design students. The switching of the slides was not automated but had to be done manually behind the facade of the Opsroom. Cybernet, Cyberstride, CHECO and the Opsroom were just the basics in Beer's plans to make Chile a 'viable system' based on cybernetic thinking. For example, there is the never realized Cyberfolk that consisted of thousands of 'algedonic meters' next to radios or TV sets. Using these devices citizens should be able to express their opinion about politics in real-time and the government would receive a direct feedback about their political plans.

The work on Cybersyn and its components went on in Chile, despite worsening economic circumstances and political pressure of the opposition and the US. Parts of Cybersyn played a crucially positive role in political crises. However, single technologies were extracted from the cybernetic model during

deceleration and folkloristic localism. Leftist politics should rather cope with global capitalism and its complex governmental and economic circuits. Here, accelerationists call for education and cognitive mapping in favor of realistic speculations and political manipulation. Concerning this understanding of speculation and productive manipulation, an implementation into leftist politics of a new understanding of the future can be observed. The future has to be regained as such and has to be designed instead of following the non-visionary and defensive trade unions, social movements or the latest Occupy protests. When one looks back from this open future, Armen Avanessian points out, the presence can be seen as contingent and open for manipulation and political navigation. Concerning this productive understanding of political navigation and strategic manipulation, accelerationism also designates the active acceleration of technological progress.

This kind of politics on the one hand implies the overcoming of the technological analphabetism in wide parts of the contemporary left. On the other hand, the techno-political acceleration should proceed within existing capitalism. From an accelerationist point of view, we should not just wait for social progress to be 'naturally' facilitated by technological progress. Technologies are understood as tools and conditions for planning, thinking and doing. A consequence of accelerationist politics is that infrastructure, communication technology, medication, mathematical methods etc., all developed and produced under the reign of capitalism, do not have to be destroyed but to be applied differently, be rebuild and hacked.

Srnicek and Williams deliver some practical hints for navigating towards radical futures, too. In general, they propose a counter-hegemonic strategy including radical think tanks, propaganda, alternative economics, hierarchical organizations, utopian pop-culture and all kinds of technological experimentation. Srnicek and Williams propose that representative parties should work together with mass movements and the state

should be turned into a meaningful tool for the people. The authors shortly mention Chile's Cybersyn and soviet cybernetics, which are analyzed in the next section, praising them as outstanding positive examples and seeing technological and political constraints as reasons for their failure. I want to offer deeper insights into decisive problems with these projects, problems that are related to political and bureaucratic structures in which innovations were implemented.

COMMUNISM IS SOVIET POWER PLUS THE COMPUTERIZATION OF THE WHOLE COUNTRY

Cybernetics and Computer-Based Socialist Economy in the Soviet Union

Questions of economic calculation and cybernetic control were assessed politically in post-WWII Soviet Union. In the early 1950s both cybernetics as well as information theory – having emerged from military research in the US – were called pseudo-scientific, reactionary and idealistic. As seen in Tiqqun's work, cybernetics was nevertheless also conceived as the enemy's powerful ideological and technological weapon. Traditional soviet academics battled the idea of disciplinary take-overs, and media comments imagined the rise of robot-soldiers without conscience and robot-workers without class-consciousness.

After Stalin's death in 1953, the discourse successively changed. Nikita Khrushchev recognized cybernetics as a new form of governing technique and as a way to overcome the weak economic situation of the post-Stalin era. In 1957 the Soviet Academy of Sciences demanded an accelerated development and broader usage of computers and statistics for planning. In this era the so-called 'cyberspeak' gained an aura

The British cybernetician Stafford Beer was a successful consulter and promoter of management models. The young Chilean engineer Fernando Flores contacted him in July 1971. Flores was a high-ranking manager of the Production Development Corporation called CORFO, which had control over several weakly coordinated nationalized sectors. Two of Beer's theoretical concepts seemed to match with Allende's idea of socialism: the 'Liberty Machine', a real-time information and decision network of multimedia backed control rooms, and the 'Viable System Model', an abstract structure of embedded systems and subsystems that enabled part-autonomy and general balance control (a model applicable from the human body to whole economies). These two theoretical proposals were the conceptual foundation of Project Cybersyn.

Cybersyn consisted of four central components. Cybernet was a communications network that was composed of Teletype machines linked to one central mainframe computer in Santiago. In 1971, there were only four governmental mainframe computers in Chile and Cybersyn used an IBM System 360/40 for data processing. Cybernet was therefore not a real computer network like ARPANET or different soviet networks, because it included only one computer.

The best solution to transmit data from the production sites to the center seemed to be a telex network. The second component of Cybersyn was a statistical software called Cyberstride. The data was collected in individual plants by managers and sent to Santiago, where it was worked into punch cards for the mainframe and then calculated. Based on these statistical calculations the information was sent back to the peripheral production sites. Cyberstride should work like an alarm system for resource problems. It was not a strict control or automation tool, because it should only indicate potential problems to factories, which were then relatively free in adjusting. The third component was CHECO, software for dynamic economic simulation and prediction. Raúl Espejo, systems engineer at CORFO, re-

were never to be connected. Each one was sheltered and veiled by intransparency and the fear of losing already gained privileges.

CHILE AND PROJECT CYBERSYN

Latin America offered a rather different effort of socialist politics meeting the frontier of cybernetics and computing. Besides the differences, I will highlight similarities to the Soviet case. There have been several attempts of socialist politics politically distanced from the Soviet Union around the world and the government of the *Unidad Popular* in Chile from 1970 until 1973 is one quite short, but intensively debated case. President Salvador Allende lead the multiparty alliance that ranged from the Communist Party to Christian socialists. Allende's presidency and life ended in the coup d'état on September 11th 1973 and after that, Chile became a brutal military junta lead by Augusto Pinochet until 1990. In the short timespan between 1970 and 1973, the so-called 'Chilean Path to Socialism' was followed by the nationalization of banks, land and industries; the restructuring of the legal and educational system; several food and housing programs; and wage raises.

In this political setting, a small group of government agency employees started to work on a computer and communications program. Two aims were crucial for their effort: the system should coordinate the heavily extended but weakly organized state run sector, and additionally they were looking for a model fitting the specific Chilean style of socialism. Allende was eager to establish radical change within constitutional limits, to strengthen worker participation and to concede civil autonomies. The developers in Chile found a British cybernetician and the short but thrilling story of Project Cybersyn started.

of objectivity and cybernetics became a powerful scientific paradigm in the Soviet Union. The soviet economy was also conceptualized by cybernetic ideas and planning was understood as a control system with various feedback loops. Especially the engineer Anatolii Kitov, deputy head of the Computation Center No. 1 of the Ministry of Defense wanted to reduce staff, inefficient data processing and administrative redundancies by building large computer networks between economic production and political decision patterns. Kitov wrote to Khrushchev in 1959, that computerization

> 'make[s] it possible to use to the full extent the main economic advantages of the socialist system: planned economy and centralized control. The creation of an automated management system [...] would ensure a complete victory of socialism over capitalism.'

Kitov soon lost his academic position and party membership because of formal and power-related reasons after he proposed a dual-use network of the military and civil sector. Military authorities criticized Kitov heavily, because they were not interested in any associations to potential economic weakness. Political authorities were concerned about their loss of direct control and the lack of ideology in automated management.

In 1961, the Communist Party adopted their program's third version at the 22nd party congress, including this passage:

> 'automation will be effected on a mass scale, with increasing emphasis on fully automated shops and factories, making for high technical and economic efficiency. [...] Cybernetics, electronic computer and control systems will be widely applied in production processes in industry, building, and transport, in scientific research, planning, designing, accounting, statistics, and management.'

Within this new party politics Viktor Glushkov was contacted by officials and started to work on new ideas (see also Glushkov's personal reminiscences). His plan for a computer network all over the Soviet Union for monitoring labor, production and retailing would integrate a number of existing informational infrastructures and included more than 100 regional network nodes interconnected by wide-band channels as well as over twenty thousand local computer centers. The structure would additionally provide a distributed data bank accessible from everywhere. This idea for data compiling, storing and processing, later specified together with Nikolai Fedorenko, was crucial to the whole concept and would have meant a major shift in soviet bureaucracy. Instead of collecting raw economic data and feeding different administrative channels, Glushkov and Federenko thought of single storage in central data banks, which would then be made accessible for all different kinds of usage. But Glushkov's plans reached even further: to reorganize the whole bureaucracy and, for example, to abolish material money.

The opposition against such proposals quickly increased. The plans were criticized from three positions. First, bureaucrats and factory managers did not feel attracted to more observation and standardized control over their daily work and general efficiency. Second, more liberal economists saw a new rise of centralization and extensive planning from above. Finally, the building of a universal computerized data network was confronted with resistance from top political level in order to preserve the administrative status quo.

With an eye on the US-American ARPANET in the late 1960s, Glushkov developed and promoted OGAS (Russian abbreviation for Statewide Automated Management System for Collection and Processing of Information), a cybernetic design for controlling all civil production and retailing of the Soviet Union. OGAS included the former plans of thousands of computer centers, the connection of automation networks and the

installation of a powerful supervising agency. Driven by the wish to conserve the balance of power and authority over strictly divided competences, the general cybernetic idea of OGAS was fragmented into separate technological tools. After the 24th Party Congress of 1971, several ministries, agencies, the party and the military increased their individual implementation of networks and information technology for their particular needs. They all focused on the technological aspects and neglected the comprehensive cybernetic management models. The different programs were not compatible to each other, both on hardware and software levels. Beside the secret and non-transparent systems of the military sector, there were single and incompatible networks constructed for aviation, banking, weather prediction, as well as numerous state and party bodies.

I want to emphasize one particular insight that is central for the progress of cyber-communist approaches. Technological and scientific insufficiencies were not the prime problem for building a general cybernetic system for the Soviet economy. Instead, political mechanisms of power, information exclusivity and competence skirmishes prevented a technologically bolstered, cybernetic re-coordination of the economy. The political, academic and military divisions showed a tendency for applying only parts of the large-scale innovations for their particular purpose. Computer technology, information networks and especially cybernetic modeling are by definition general ideas applicable to various problems. Military authorities, economics, politicians and scientists did all anticipate benefits for their particular needs in the Cold War. One problem in the Soviet Union was, for example, the lack of standardization and coordination for computer networks. In the US and the Western World, general communication protocols, like TCP/IP, or addressing systems, like DNS, were widely implemented over a battled period spanning into the 1980s. Without such standards for digital communication and because of incompatible hardware and software the bunch of different soviet networks