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Cold War Networks or Kaiserstr. 2, Neubabelsberg

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Translated by Peter Krapp

The task of introducing Cold War networks came unexpectedly. Usually such assignments, with the exception of those requested from the *Wolfsschanze*, are also possibilities. But when even contemporary historians prefer the baker's guilds in former zones of Soviet occupation to their own thing, only Beckettian imperatives remain. First: *"Il faut que le discours se fasse."* Second: *"Qu'importe qui parle?"* So I will start here, ideally even with the beginning.

Here in Potsdam, they say, is where the Cold War broke out and its networks began. Historians, whose mask I am going to wear for this lay engagement, seem to ignore the event, but other laypeople have reported it. Thomas Pynchon tells of Tyrone Slothrop, also known as Rocket Man, searching for the biggest chunk of pot of all times, who crosses the Avus and Lake Griebnitz, sneaks past Soviet guards through Neubabelsberg and finally excavates the hashish in the garden of a villa where a newly elected U.S. President has just arrived. Thus the first network, that of drugs, is already in place. Paul Virilio continues the story by recalling what that President talked about with his British counterpart, just before elections did away with Alan Turing's boss.

According to Virilio, Churchill told Truman that the European part of World War II had been decided not so much by blood, sweat, tears and similar things, but rather by eleven unassuming devices that were able to imitate other such unassuming devices perfectly. All operative and tactical command-lines of the *Wehrmacht*, translated by tens of thousands of encoders into apparently bug-proof, secret radio transmissions, were read in real time by those eleven British proto-computers. Thanks to the colossi of Bletchley Park, the British premier knew days ahead of time that paratroopers were going to jump over Crete, or Tiger tank divisions prepared to attack around Kursk. (Not to mention the police battalions whose radio communications were released only two months ago, for good reasons.) While the attack on Crete only concerned lieutenant general Freyberg and his New Zealanders, Operation Citadel concerned the entire Red Army in general and its commander in chief in particular. It was not for nothing that the Secretary General of the Soviet Communist Party had himself promoted to the rank of Marshall and Generalissimus. Rundstedt's attack plans, deciphered in time by Bletchley Park, had to be passed on to the ally, Stalin. But that could have meant telling Stalin how this information and the War fortunes of the British had come

about. Despite all his historical materialism, it was hardly acceptable to inform the Generalissimus that since 1941, wars no longer needed men, whether as heroes or as spies, but were victories of machines over other machines. So the British Secret Service invented someone who was supposedly working for it as hero and spy in the highest ranks of the German military, passing copies of secret files such as those on Operation Citadel through Allen Dulles' Switzerland to London. From then on, all deciphered intercepts that landed on Stalin's desk were presented as heroic deeds of a certain General Werther, who could not be found even after the War ended, despite great efforts on the behalf of the Russians.[1] *Gravity's Rainbow* anticipated this as well: good old espionage is at its end. Under computing conditions, HumInt or human intelligence is only a cover for SigInt or signal intelligence. Slothrop's complaint that the spy's tradecraft depended too much on leg-work is met with Semyavin's wry comment: "It will get easier. One day machines will do it. Information machines. You are the bow wave of the future."[2]

Only Stalin could not fathom the future. For what Churchill and Truman agreed upon in Potsdam, behind the back of their ally in the East, amounted to a systematic and uninterrupted continuation of the cover-ups of all V-days. The eleven computers in Bletchley Park, the various listening posts all over Europe that fed them with secret transmissions, eventually also the U.S. American parallel efforts that were mostly directed against Japan—all that remained operational around the clock. What changed was merely the angle of their antennae: they no longer aimed at Rastenburg, Berlin, or Tokyo, but at Moscow, Murmansk, Vladivostok.

Thus the Cold War began, two years before it was officially declared, in the shape of a computer technology that remained as invisible as nature was to Heraclitus. For that reason, Stalin could declare all computer science a bourgeois aberration, in spite of the beautiful computing theories of Moscow academicians like Kolmogorov or Markov. In its effort to catch up with American nuclear technology and German rocket science, the Soviet Union failed to develop the controls necessary for the marriage of those two monstrous technologies, as if General Werther, that most simulated of all spies, had won twice. For years the payload, delivered by the Rosenbergs from Los Alamos, and the carrier rockets, procured from Peenemünde by Marshall Rokossowski, were lacking the proper computing power. Evidently not even Philby and McLean knew that it was available from Turing's Bletchley Park.

Just once, the secret is said to have trembled at its height. If it is true that only the machine cryptanalysis of Soviet radio transmission led to the Rosenbergs, if it is true that Turing still worked on the British interception schemes after the War, while he was supposedly already distracted by handsome young students and new research tasks, then it does not seem unlikely that Turing would have come across the names of some old acquaintances in those radio transmissions. Except those old Cambridge friends, homosexuals like him, were now serving the NKVD, the Soviet secret service.[3] So the security risk Turing may have seen no other way out than to become the first victim of Anglo-American computing relations—just like Snow White, he bit into an apple laced with cyanide.

This was 1954, twenty years before Turing machines even emerged from the cover of the Official Secret Act, and a year after the Cold War had bid adieu to its innocent predecessor. The winners of World War II, Turing and von Neumann, were finally allowed to die. For in 1953, the U.S. Air Force laid the groundwork for a network that, instead of merely linking listening posts to computer decryption, connected a system of distributed radar positions, computers fed with von Neumann's game theory, and strategic weapons. This network changed from a defensive stance as it was necessitated by Britain's need and chance in World War II to an offensive stance. SAGE, the Semiautomatic Ground Environment Air Defense System, was conceived as an answer to the Soviet atomic fleet, and it brought us everything today's computer users have come to love: from the monitor to networking to mass storage. "70 radar stations were in touch with 27 command centers, evenly distributed over the territory of the U.S."[4] The concept of the center itself lapsed into disuse, although it had only recently been cast in concrete in the designs for the Pentagon.

The great decentralization now celebrated as the civilian spin-off called information society began with the building of a network that connected sensors (radar), effectors (jet planes), and nodes (computers).

SAGE and its various successors gave rise to a series of problems. I mention only three aspects: hardware, software, networking. The hardware, to grant it its well-deserved primacy, was functioning, but its tube computers were too clunky and delicate to run the sensors and effectors themselves. Thus in contrast to the central computer, its terminals remained literally stupid. It was worse in the case of software: the data and routines expected to run on the semi-conductors to allow for a unified strategy only exacerbated the Babylonian difficulties of communication between the programmers on the one side and the military command structures on the other side. And then it proved fatal only too soon that strategic and operative data streams were still entrusted to telephone lines, even though they had served well in two World Wars. This fatality was paradoxically a side-effect of technological progress. By substituting transistors for tubes and integrated circuits for silicon transistors, the size of computers had shrunk by a factor of ten in the fifties and seventies, respectively, while their computing power had grown by a factor of more than ten. This miniaturization allowed the military, which had requested and financed these innovations, to use computers on land, in the air, and on the sea, before they landed on every desk today. But on the other hand, the Cold War consisted essentially of a simulation of hot war, which is to say of atomic explosions in the sky over a tropical atoll or the steppe of Kazakhstan. One of these test runs is said to have resulted in the vertiginous coincidence of simulation and reality over Hawaii, tens of thousands of miles away from the test center. Not that soldiers or anyone else had suffered—no, much worse: in addition to 300 vulgar street lights, top secret measuring devices and transistor computers were incapacitated as if by a ghost.[5] This was the experimental discovery of the electromagnetic impulse induced by every atmospheric nuclear explosion in semiconductors and copper cable, and it led to much nostalgia about the good old tubes that had been much too robust even to notice any such disruption, let alone fall prey to it. Both sides in the Cold War, even and especially the offensive party, ran the risk of being not only defeated by its own weapons, but robbed of all means of control.

The birth of the first strike doctrine was also the initiation of a new algebra which translated fundamental military terms into mathematical symbols, and finally received priority over all other weapons systems with Reagan's Presidential directive of October 1982.[6] In taking leave from its expensive armor, the military turned into probably the only subsystem of society that obeys Luhmann's systems theory literally, i.e., in empty self-reference. Communication, command, control, and intelligence were unified in the acronym C3I, until it recently shed the last vestiges of intelligence, in keeping with Churchill's fireside chat, and became C4: communication, command, control, computing.

C4 means nothing else than the permutation of these four elements, which have nothing in common with the four elements of ancient Greece. On the one hand, thanks to a Pentagon request for very high speed integrated circuits or VHSICs, contemporary microprocessors have been woken out of their leisurely megahertz pace and are beginning to run at frequencies that until recently had been reserved for radio communication.[7] On the other hand, where possible or whenever no enemy impact is anticipated, information technology leaves its domain of copper cable and ether waves in order to gird itself against the always threatening electromagnetic impulse. For the only connections that are atom-bomb proof are those that can, in contradistinction from metals, shield their inside by mirroring it against the outside, which is to say fiber-optic cable. And once computers communicating with each other over such connections are capable of appropriating all information to their own architecture and packet switching, the commands can pick their own route. Thus the kind of triumphal entries into cities like Moscow, Paris or Berlin that marked modern wars up to and including World War II are obsolete, since one fundamental rule of all strategy—the accumulation of one's own powers—is no longer relevant against distributed networks. While into the

sixties the cables for early warning systems had led to buried bunkers, contemporary command centers can stand unprotected like holiday bungalows in greenery. In the spirit of magnanimity that the military inherited from its aristocratic predecessors, one only needs to open the networks to universities, programmers and finally entertainment concerns—and all dreams of technological democracy seem to come true. For that is how the Internet, favorite of the feature pages and philosophers of the day, was derived from the Pentagon's ARPAnet.

However, C4 has other worries. The result of all manner of permutations of communications, command, control and computers is a Babylonian tower of hardware architecture and programming languages, operating systems and net protocols. Evidently the silicon technology with its rate of evolution that according to Moore's law doubles every 18 months is far ahead of all soft- and wetware. That led in 1967 to the memorable declaration of a software crisis by NATO, presenting itself as scientific committee under the October sky of Garmisch-Partenkirchen. And that is why programmers today have to beg permission to use an old standby such as the GOTO command. Now there are whole programming languages that can only enter the market once a military authority has "validated" them, as they say. Cold War networks—this may be the best thing one can say about them—have given us a style that appears identical with Nietzsche's great style: dancing in shackles, as he put it, is now dancing in networks.

That is how the Cold War could end. The bourgeois aberration, as the clueless general secretary had been calling it, unaware that it was eavesdropping on him, proliferated no less than those weapons which were impossible without it. Yeltsin's team allegedly made it through the critical days (of the attempted coup that could have returned the new old Russia to the Soviet stone age) only because the insurgents had no idea of an operating system called UNIX. Having forgotten to interrupt a few Internet connections from Moscow to Helsinki was enough to break the rebels' news monopoly. And if Gorbachev's ghostwriter is not sponsored by Silicon Valley, the only reason the evil empire did not expire with a nuclear bang was that five-year plans were good for developing intercontinental missiles or space travel, but could not force Moore's fantastic evolutionary rate for microchips. Gordon Moore was co-founder of Intel, not of the VEB Robotron.[8] The Cold War that began in theory in the escalatory paradox of a certain Schiller who is only homonymous with the German dramatist, thus ended in proliferations of the kind of paradox that it had generated. The COCOM list (by which the NATO prevented the export of the silicon chips now operating on every desk to the East) was as ineffective as its heroic circumvention by Dr. Schalck-Golodkowski.[9] For as IBM realized, the pivot of the 30-year plan to computerize the Warsaw Pact countries was the cloning of every Intel gate and IBM operating system by the VEB Robotron, and this did not cause any consternation in Armonk—on the contrary: if Systemotekhnia as the leading technology of the Warsaw Pact worked on IBM standards, the domination of the world market of tomorrow was already guaranteed.

Even this was not the end of the proliferation, here called cloning; whatever the Warsaw Pact had to reverse-engineer as a last resort in the Cold War turned into the peace-time industry standard, and the successors to VEB Robotron are now companies like Cyrix and AMD who try to break Intel's patents—for the greater glory and market dominance of Intel. The industry ceased to think in the self-satisfied terms of customers as buyers, and finally learned from the Cold War about the concept of the enemy. In the same week the Potsdam conference dismantled the German military, the organization charts of the Prussian Chiefs of Staff were exported overseas as training materials for business schools, and now computer technology has brought reconnaissance and knowledge to coincide.[10] "Industry remains industry, regardless of its direction towards the destruction or creation of objects," as Friedrich Engels already knew.[11] Reverse engineering brings this identity to full coincidence, because henceforth generation requires destruction. To know what one does is to know first what the other does.

The huts of Bletchley Park, that analytic crypt of World War II, won a total victory. Turing's assumption that computers would be infinitely better suited for cryptanalysis than for physics has

become reality. At this point, I could report the execution of my task, since the end has found its way back to the beginning. These days British historians are restoring the huts of Bletchley Park to their 1945 state, and the eleven colossi of Bletchley Park are able to run again. Their Russian, formerly Soviet colleagues have also signaled that the first computer of the Red Army will rise from the scrap heap in Novosibirsk, and it might even take a trip to Bletchley Park—a reunion, at last, of almost all the monsters of the Cold War.[12] To round off the mausoleum, Helmut Hoelzer, NASA veteran from Huntsville, Alabama and V2 veteran from Peenemünde/Usedom would have to place next to its digital colleagues the analog computer that replaced Vannevar Bush's languid mechanics with real time electronics.[13] Dwarves, as the pious Peter von Blois already knew, see farther on the shoulders of giants.

But the truth is—we know nothing. The museum-quality reconstruction of Bletchley Park only darkens the mirror in which we look for the heritage of the Cold War. The message of the digital computer, ending all media history in its universality, might support the Pax Americana for another while, but it cannot be verified, as Helmut Hoelzer may have suspected already. For it is quite possible that one day, wars will not be decided by C4 as they are today, but again by the physics for which Turing machines are somehow unfit. It is just feasible that someone somewhere invents a machine that is no longer based on reverse engineering and optical fiber proliferating from here to Baghdad, but turns a new page in the history of media. That would spell the end of the Pax Americana, for the entire military-industrial complex of silicon glow and fiber-optic light, of net topologies and end users, is only one side of the system, the side we can see. On the other side there is still poverty and darkness. I am here not referring to developing countries or migration, but to that unique resource that no distributed network can increase. As the head of the U.S. Chiefs of Staff, Admiral Moore, put it so unmistakably: victory in future Wars will go to the side which controls the electromagnetic spectrum. Carl Schmitt, who was talking of a very different sovereignty after the end of World War I, had to agree with the Admiral, without knowing it, after World War II—he revoked one of his best-known statements and decreed that sovereign is who commands the waves of space.

However, the electromagnetic spectrum is a principally limited resource, as the dominant military doctrine in the U.S. never ceases to emphasize. It extends to several frequency bands, from the almost unaffordable long waves used for submarine remote control to the quantum effects any rain can drown out. This finitude is brought home every time the net leaves its own high-tech infrastructure and takes steps beyond basically defensive war games. Silicon chips, even if they run in grenades or ICBMs instead of desktop computers or assembly lines, have the remarkable trait of self-destruction on either side of an acceptable temperature level. Evidently, fiber-optic cable is as easy to cut as the transatlantic telegraph was on the first summer day of World War I. For maintaining offensive capabilities in deserts of sand or water, the electromagnetic spectrum is the sole refuge. Like a dark mirror, its finitude reflects the bad infinity of the deserts that contemporary war implies, generates, and leaves behind.

In a book that appeared in the year 1832, one may read this: "Imagine a traveler who late in the day decides to cover two more stages before nightfall. Only four or five hours more, on a paved highway with relays of horses: it should be an easy trip. But at the next station he finds no fresh horses, or only poor ones; the country grows hilly, the road bad, night falls, and finally after many difficulties he is only too glad to reach a resting place with any kind of primitive accommodation. It is much the same in war. Countless minor incidents—the kind you can never really foresee – combine to lower the general level of performance, so that one always falls short of the intended goal."[14] Today, we have the electronic net instead of post horses and digital computers instead of paper, while the mechanically integrated theater of war prepares to replace the traveler as the metaphoric field commander. But in every world of limited resources Clausewitz's statement still stands: "Friction is the only conception that more or less corresponds to the factors that distinguish real war from war on paper."

Notes

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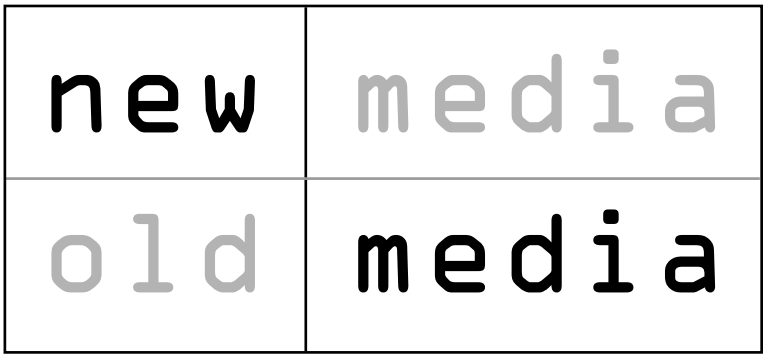
1. See Jósef Garlinski, *The Enigma War* (New York: Scribner 1980), 138.
2. TN: See Thomas Pynchon, *Gravity's Rainbow* (New York: Penguin 1987), 258.
3. TN: the NKVD (Narodny Komissariat Vnutrennich Del, or People's Commissariat for Internal Affairs) was the Soviet secret service predecessor to the KGB, as it was renamed in 1953 after Stalin's death.
4. Claus Eurich, *Tödliche Signale. Die kriegerische Geschichte der Informationstechnik von der Antike bis zum Jahr 2000* (Frankfurt: Luchterhand 1991), 111.
5. Eurich, 142.
6. Eurich, 169.
7. Eurich, 128f.; see Marco de Arcangelis, *Electronic Warfare* (New York: Sterling 1985).
8. TN: The VEB Kombinat Robotron was a computer manufacturer founded in 1969 by the East German Government in Dresden; it was the main software developer and system integrator for Warsaw Pact countries. It was dismantled in 1990, and one of its privatized successor companies now maintains offices in Russia and Bellville, Texas (near Houston), focusing on Internet and Intranet communication, as Robotron-Projekt GmbH.
9. TN: Alexander Schalck-Golodkowski was a highly decorated East German politician who came under suspicion, right after the fall of the Berlin Wall, for his role in covert trade relations with other countries over the preceding decades. Accused of drug trafficking, embezzlement, espionage and treason, he was eventually tried and convicted for arms dealing only.
10. See Rolf Elble, ed., *Clausewitz in unserer Zeit* (Darmstadt: Wehr- und Wissen-Verlagsgesellschaft, 1971).
11. TN: cited after Karl Marx / Friedrich Engels, *Gesamtausgabe* (MEGA), vol. 20. Edited by the International Marx-Engels-Foundation (Berlin: Dietz 1991–1993), 155.
12. See Georg Trogemann, Alexander Y. Nitussov, and Wolfgang Ernst (eds.), *Computing in Russia: The History of Computer Devices and Information Technology revealed* (Braunschweig: Vieweg Verlag 2001).
13. See Helmut Hoelzer's contribution to Norbert Bolz and Friedrich Adolf Kittler (eds.), *Computer als Medium* (Munich: Fink 1994).
14. Carl von Clausewitz, *On War* (Princeton: Princeton University Press 1984, 119). See Carl von Clausewitz, *Vom Kriege* (Berlin: 1912), 60. TN: An older translation is available on the Web: "Suppose now a traveller, who, towards evening, expects to accomplish the two stages at the end of his day's journey, four or five leagues, with post horses, on the high road—it is nothing. He arrives now at the last station but one, finds no horses, or very bad ones; then a hilly country, bad roads; it is a dark night, and he is glad when, after a great deal of trouble, he reaches the next station, and finds there some miserable accommodation. So in war, through the influence of an infinity of petty circumstances, which cannot properly be described on paper, things disappoint us, and we fall short of the mark."—"Friction is the only conception which, in a general way, corresponds to that which distinguishes real war from war on paper." Carl von Clausewitz, *On War* (London: 1873), Book 1, Chapter 7; see http://www.clausewitz.com/CWZHOME/Waystatn.html.



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