



# **BALKAN CYBERIA**

**COLD WAR COMPUTING,  
BULGARIAN MODERNIZATION,  
AND THE INFORMATION AGE BEHIND  
THE IRON CURTAIN**

**VICTOR PETROV**

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**History of Computing**

William Aspray and Thomas J. Misa, editors

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**VICTOR PETROV**

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To my parents, for everything



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# LIST OF ABBREVIATIONS

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<b>ASU</b>	Automated System of Governance
<b>BAS</b>	Bulgarian Academy of Sciences
<b>BCP</b>	Bulgarian Communist Party
<b>BISA</b>	Bulgarian Industrial Economic Association
<b>BNB</b>	Bulgarian National Bank
<b>BSP</b>	Bulgarian Socialist Party
<b>CICT</b>	Central Institute for Computer Technology
<b>CoCom</b>	Coordinating Committee for Multilateral Export Controls
<b>Comecon</b>	Council for Mutual Economic Assistance
<b>CNC</b>	computer-numerical controls
<b>CPSU</b>	Communist Party of the Soviet Union
<b>CSTP</b>	Committee for Scientific and Technical Progress (Bulgaria)
<b>DKMS</b>	Dimitrov Communist Youth Union
<b>DS</b>	Committee of State Security (Bulgaria)
<b>DSO</b>	State Economic Union
<b>ES</b>	Unified System (of Computers)
<b>ESGRAON</b>	System for Civilian Registration and Population Administration
<b>ESSI</b>	Unified System of Social Information
<b>GKNT</b>	Committee for Scientific and Technical Progress (USSR)
<b>IIASA</b>	International Institute for Applied Systems Analysis

<b>ICCT</b>	Intergovernmental Commission on Computer Technology
<b>IMF</b>	International Monetary Fund
<b>ITCR</b>	Institute for Technical Cybernetics and Robotics
<b>IZOT</b>	Computational, Recording and Organisational Technology
<b>KESSI</b>	Committee for the Unified System of Social Information
<b>RB</b>	Robot series (Bulgaria)
<b>SM</b>	System of Minicomputers
<b>STI</b>	Scientific-Technical Intelligence
<b>SPC</b>	State Planning Commission
<b>TCC</b>	Territorial Computer Center
<b>TNMT</b>	Technical and Scientific Creativity of Youth
<b>UNIDO</b>	UN Industrial Development Organization
<b>VMEI</b>	Higher Machine-Electrotechnical Institute
<b>VTO</b>	Foreign Trade Organisation

# NOTE ON TRANSLITERATIONS AND ABBREVIATIONS

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The book uses the Library of Congress (LoC) romanization system for Bulgarian and Russian, except for peoples' and place names that have a more common English spelling or an author who transliterates their name in their unique, non-LoC way.

Abbreviations of Bulgarian organizations come in two varieties: abbreviations of the English translation of the Bulgarian name or abbreviations using the LoC spelling of the Bulgarian organization. For ones that have appeared in literature, such as the Bulgarian Communist Party (BCP) or institutes' own publications (ITCR and CICT), the first convention is followed. For most others, the second has been followed. A note on IZOT: this transliteration is more commonly seen in secondary literature and is closer to the Bulgarian than "ISOT," which is sometimes seen on the company's own documents—hence, IZOT has been chosen.

Archive abbreviations are as follows:

**AKRDOPBGDSRSNBA-M/R**—Arkhiv na Komisiĭata za Razkrivane na Dokumentite i Obiaviavane na Prinadlezhnost na Bŭlgarski Grazhdani kŭm Dŭrzhavna Sigurnost i Razuznavatelnite Sluzhbi na Bŭlgarskata Narodna Armiiā—M/R (Archive of the Commission for the Uncovering of Documents and Notification of Belonging of Bulgarian Citizens to

State Security and the Intelligence Services of the Bulgarian People's Army, Sofia, Bulgaria)

**AMVnR**—Arkhiv na Ministerstvoto na Vŭnshnite Raboti (Archive of the Ministry of Foreign Affairs, Sofia)

**ARAN**—Arkhivŭ RAN (Archive of the Russian Academy of Sciences, Moscow, Russia)

**BAN-NA**—Bŭlgarska Akademiia na Naukite-Nauchen Arkhiv (Scientific Archive of the Bulgarian Academy of Sciences, Sofia, Bulgaria)

**DA-V**—Dŭrzhaven Arkhiv Varna (State Archive, Varna, Bulgaria)

**NAI**—National Archives of India, New Delhi, India

**NMML**—Nehru Memorial Museum and Library, New Delhi, India

**TsDA**—Tŝentralen Dŭrzhaven Arkhiv (Central State Archive, Sofia, Bulgaria)

**RGAE**—Rossŭyskiŭ Gosudarstvennyŭ Arkhiv Őkonomiki (Russian State Archive for the Economy, Moscow, Russia)

## PREFACE

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“One of the things that hurts me the most is that we didn’t save anything. There were machines, unique ones, that we built, that in the 1990s we housed in the basement of our institute, and then sold for scrap metal because we had no space anymore. Very few made it to a museum, if any. That hurts.” So told me Petŭr Petrov, then in his 80s, over tea in his apartment in central Sofia. He had worked at the Institute of Technical Cybernetics and Robotics since its inception in the 1960s, had automated copper mines, and had made it a goal of his retirement to record his institute’s history. I met him by chance in the archives of the Bulgarian Academy of Sciences, when, as it happened, we were both looking at the same files. Over the next couple of years, he became not just a source for this book, but a friend.

“I know that in the Soviet space program, there were Bulgarian computers, and you understand that they couldn’t do their calculations without [them], of course.” These were Koŭcho Dragostinov’s words, spoken to me in his firm housed within the old Central Institute of Computing Technology, where he had worked during the socialist period. He took me around the premises, introduced me to many of the other surviving actors in the story of Bulgarian computing, and he, too, was invaluable for this book. Subsequently, much of this book was researched not just in the archives but at the tables and living rooms of multiple people who built, traded, and thought with Bulgarian computers.

All these people's stories have rarely been told. Petrov, Dragostinov, and the rest were engineers and scientists, involved in either fundamental or applied research in the electronics sector. In the socialist world, they fell under the umbrella of the "scientific-technical intelligentsia," which encompassed occupations that were both in the sectors of industrial production and management and in scientific research. They built the tools of modernity and often thought about the future horizons these tools opened up. Often these horizons are less explored than those advanced by the cultural intelligentsia that much of literature on the socialist period is interested in. These are the technical intellectuals this book is concerned with and whose stories it endeavors to bring to the front and center. These stories are global and full of pride in achievements that transcended political or parochial concerns. They are about the Bulgarian computer and its many lives, including its role at the very frontiers of human knowledge (such as in the Soviet space program mentioned in the quote above), but most importantly, the stories are about the people involved. In some ways, this book is a modest attempt to soothe Petrov's lament—if the machines never made it to a museum, I hope this book goes some way toward recovering the words and worlds of the people who made them.

# ACKNOWLEDGMENTS

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This book is a story born out of many stories I heard—as a child and then as a researcher. Some of these stories were told in dry reports, but the most interesting of them were told by people. And the big story, well, that came in conversations with so many people that these acknowledgments threaten to balloon beyond all proportion. Writing a book is never truly a solitary task. Thus, I want to repay some of my debts here.

I thank my department at the University of Tennessee, Knoxville, where this book took its final shape. It remains an incredibly hospitable place to write, think, and teach, and a shining example of the role that public universities and humanistic education have to play in our world today. All my colleagues here have made this a stimulating home, but I want to thank in particular Monica Black, Tore Olsson, Luke Harlow, Ernie Freeberg, Nikki Eggers, Matthew Gillis, Kristen Block, and Chad Black for their intellectual, social, and musical contributions to this work of prolix. I also thank my students who have made me a better teacher, and thus a better historian.

This book started its life as a dissertation under the supervision of Mark Mazower. It was in one of his classes that it was born as a paper, and it was in his office that the inspiration to make a Balkan story a global one was born. I will be eternally grateful for his push to make this story wider than originally envisioned, for his keen sense of style (which I hope has rubbed off on my own writing), and for the comments that made



this book a sharper work. I thank Adam Tooze for not only chairing the defense but also for encouraging me to clarify every muddled issue and to draw out what my findings mean for European or economic history. His intellectual curiosity remains truly inspirational. Malgorzata Mazurek was an especially close reader and helped me place my story in the long *durée* of Eastern Europe. She continuously invited me to workshops, conferences, and other venues where her comments and questions have been part of the evolution of the thesis into a book. Matthew Jones's expertise in computer history was invaluable for this amateur. Without him, and his approach to my work, I would have never realized what kinds of arguments I was making—and his advice was always delivered with humor. I must also thank Elidor Mëhilli, whose guidance and support have been with me throughout the evolution of the project. It was his own dissertation, now an astounding book, read during that fateful class with Mark Mazower, that launched me on my topic and methodology.

This book has been influenced by conversations, classes, and musings with many others throughout the years. I thank Columbia University's history department for its global outlook and encouragement to follow the story wherever it takes me. Victoria de Grazia gave me my first chance to lecture in a university setting and spun the story of European history beautifully. Susan Pedersen's class on modern state formation is always in the back of my mind. Tarik Amar's insight into Soviet modernity and interest in socialist spying have been key. I also acknowledge the great privilege of being in a funded program, which is the *sine qua non* of doing global history—and I take this opportunity to call for more funding for graduate students to allow such work to be done. Many stories die at the planning stages; this book is a product of fortunate circumstances.

I thank my first university mentors, Dimitar Bechev and Robert J. W. Evans, for patiently teaching me how to be a historian and a writer, ever since my bachelor's degree. I thank the very first teachers who inspired me to do history, too, as such passions start early: the teaching staff at Gosford Hill School in Kidlington, England. I hope this work is a fitting culmination to all their efforts. Holly Case's continuous guidance and friendship has been an enormous source of energy throughout the years. Odd Arne Westad listened to my first ideas as they were taking shape and

suggested India as a case study—for that I can't thank him enough. Larry Wolff's classes broadened my concept of the region immensely.

I also thank all my colleagues in Bulgarian studies who have shaped my thinking as it develops. Mary Neuburger and Theodora Dragostinova, especially, have read drafts and reviewed different versions, far too many times to count. Their work, methodologies, and insights into Bulgarian history have been absolutely invaluable in inspiring me and helping me find out what I wanted to say about the country.

At the European University Institute where I was lucky enough to spend a wonderful year, I thank Federico Romero for serving as my mentor; his and Corinna Unger's class was a strong vision of how to do global history. I especially thank my partner in crime, Veneta Ivanova, for not only arguments about history and socialism but also wine—so much wine—and all the amazing memories of Florence (and beyond).

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of my results, but more importantly for the laughs and her warding off of snakes in the Rhodopes.

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Friends are what make this work possible. Its scope has left me with numerous groups all over the world to thank, and the bittersweet knowledge that such scattered distribution makes it rarer that I get to see them. Yet like nodes in a network, we are connected. I thank Gerard, Pat, Joe, Garry, Kat, Derek, Kelli, and Betsabe for making Knoxville a home. My graduate school cohort remains an amazing group, and despite now being dispersed beyond New York, will always be the key to making my years there amazing. I thank Harun Buljina for Balkan solidarity and willingness to escape history into football or music discussions; Manuel Bautista for too many reasons to count or share in polite company; Sean O'Neill for endless back-and-forth insults; Hannah Elmer for laughs in at least two different countries for now; Chien Wen Kung for computer game and Liverpool v Arsenal tête-à-têtes; Dominic Vendell for Indian companionship and beer; him and Nishant Batsha for wit and a crash course in Indian history; Suzy Vuljevic for always making me laugh even if we see each other rarely; Ulug Kuzuoglu for mulled wine and walks by the Neva; Alana Hein for haircuts; Mary Freeman for skee-ball introductions and Robbie for cocktails; George Aumoithe for smiles; and Peter Walker and Melissa Morris for hurricane margaritas and my first trip to Wyoming.

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In England, I thank Eddy, Roy, Paul, Alex, Kim, Joel, Boxy, and Ian for always being a home away from home (wherever home is). Thanks to all my friends from my undergraduate days: We see each other less and less, but you are more and more important. You have all put up with a lot from me! In Sofia, where a lot of this research and writing was carried out, the gang has always kept me wined, dined, laughed out, traveled out, and out and about after the archives close. I can never thank you enough, so cheers to Stunyo, Stela, Desi, Vanko, Stamen×2, Vankata, Adamov, Nicole, Iva, Hristo, Geri, Yuliyana, Yoanna, and all the rest! Sasho: special thanks for not just Sofia, but now Rhode Island, too, and for everything since the age of seven! I also want to thank Yulkata for his help in setting up one of the interviews.

I thank Katie Helke at the MIT Press for seeing potential in this project and taking it on, as well as the series editors and Laura Keeler. Thank you so much for working with me, guiding me through this process, and putting up with missed deadlines. I also thank the anonymous reviewers whose comments and suggestions have been invaluable in making this a sharper, better book. I think my book has found exactly its right place.

Much of this research has been based on interviews with people who were part of this industry, and I thank all of them for their time. Two, however, stand out: thanks to Koicho Dragostinov for his tireless help and setting up interviews with colleagues; and Petür Petrov, whom I met by chance, but who became not only an invaluable font of knowledge

but also a companion through this process. Sadly, he didn't live to see the publication of this book, but I hope in a small way it continues his legacy.

Another person who didn't get to see the end of this project, but was with it from its very early days, is Etien. We got there in the end, right? You are missed every day, and I can't thank you enough.

Finally, my family. I thank my grandparents, Pesho and Penka. And also uncles, aunts, and cousins: Dido, Megi, Petya, Stefcho, Joro, and big and little Ventzis. To my sister Lora: Thank you for always asking me what the hell I am doing, and then doing your best to show me the latest stupid video to distract me from writing. That's what siblings are for. My parents, Pavlina and Plamen, have forever supported me and cared about me and what I do. They dragged me to too many historical sites as a kid, so ultimately, they are to blame for all this. They lived through it, and were part of this story in more ways than one. This is why it is to them that I dedicate this work, with love.

All mistakes and attempts at humor remain, contrary to popular opinion, my own fault.

# INTRODUCTION: THE WORLDS OF THE BULGARIAN COMPUTER

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You can find the father of the computer at the center of Sofia, right in front of the imposing Telephone Palace. A solid bronze monument 6 meters high depicts a stylized tree—or is it an electronic schematic?—framing the face of a distinguished older man as a halo. Erected in 2003 to commemorate the centenary of John Vincent Atanasoff's birth, it embodies claims I had heard around the dinner table when I was a child—did you know that a Bulgarian invented the computer? Sure, I thought, his name sounded Bulgarian.

Born in Hamilton, New York, Atanasoff was a physicist and inventor now credited as being part of the team that developed the first electronic digital computer. His father had come to the new world as a teenager in the 1880s, his own father having been killed in the 1876 April Uprising. Atanasoff's father was a Bulgarian electrical engineer, his mother an Irish mathematics teacher. Virtually unknown in the country and largely in wider computer history until the 1970s, he was discovered for socialism and lauded by the young scientists of a nascent computer industry. By the time of his death in 1995, he had received various honors, including the US National Medal of Technology, and an annual prize in his name is awarded in Bulgaria to this day.

Atanasoff was a professor of physics and mathematics in Iowa State University before the Second World War. Tired of mechanical calculators,



I.1 John V. Atanasoff as a legend. (Source: Wikicommons.)

he started developing what would eventually become the Atanasoff-Berry Computer together with his graduate student Clifford Berry in 1939, completing it in 1942. The first electronic digital calculating device in the world, it had a mechanical rotating drum for memory usage. Atanasoff claimed that the inspiration had come in a flash, during a night drive in Illinois. Whatever the truth, the device lacked stored program capability and true programmability, distinguishing it from modern computing—and in any case, it was quickly forgotten due to the Second World War. It was during that conflagration that Atanasoff, like other early electronics pioneers, entered the service of American Big Science. While Norbert Wiener worked on anti-aircraft guns, Atanasoff developed acoustic devices for the US Navy. During these years, he often met with John Mauchly, one of the creators of ENIAC, the first programmable, general-purpose, Turing-complete computer. By 1945, he was placed in charge of the Navy program to create a large computer, having been personally picked for this project by John von Neumann. However, the Navy had prioritized his acoustic duties, so by the time he could devote himself to his true passion, the ENIAC project had beaten him to the punch.

Between 1954 and 1973, however, Atanasoff became embroiled in the legal proceedings of *Honeywell, Inc. v Sperry Rand*, as older inventors fought to invalidate the patents given to the ENIAC team. By 1973, the judge proclaimed that J. Presper Eckert and John Mauchly did not themselves invent the automatic electronic computer, but instead derived the subject matter from one Dr. John Vincent Atanasoff.<sup>1</sup> Debates still rage about Atanasoff's place in computer history, but his and Berry's machine had been designated an IEEE Milestone by 1990. By then, thanks to the news of the case having reached Bulgarian science through specialized Western literature, he was a cause célèbre in his ancestral country. A young mathematician in the Bulgarian Academy of Sciences (BAS), Blagovest Sendov, had followed the legal proceedings beginning in the 1960s. In 1970, Sendov contacted Atanasoff, inviting him to visit Bulgaria, which he did in December. Atanasoff and his wife were official guests of the Academy, receiving a warm welcome, as well as the Order of St. Cyril and Methodius, First Class, Bulgaria's highest such honor. He also met distant relatives in his father's village of birth. In 1985, he visited again, delivering lectures at Sendov's conference in Varna on children in the computer



world. Another medal—the Order of the People’s Republic of Bulgaria First Class—and the keys to the city of Yambol, near which his father’s village was situated, accompanied this. He had “become” Bulgarian.

Atanasoff was a providential gift to the regime but also to Bulgarian science. Here was proof that Bulgarians were uniquely gifted and tied to the birth of the machine that was being constructed in such cities as Stara Zagora, Sofia, and Plovdiv. In this narrative, here was the man who had set the whole thing in motion in the United States, visiting his father’s rural cottage in southern Bulgaria. The future was meeting the past. His roots were in this land, the poverty of which his father had escaped. Now he was back to witness the leaps that “his” country had achieved. The Bulgarian seed of the computer was reaching its natural blossoming as the Bulgarian Communist Party (BCP) championed the information age.

When the communists seized power in September 1944, a generation before, they inherited an agricultural and rural country. Bulgaria was one of the perennial cases of underdevelopment that European economists pondered over before the Second World War, its people and resources largely tied to the land. Within 40 years, it was producing the high technology of the late twentieth century—computers, electronics, teleprocessing systems, and even space exploration instruments. This achievement seemed, and indeed was, incredible. By the end of the regime, despite having undergone Stalinist breakneck industrialization (as well as other hallmarks of the takeover of Eastern Europe, such as camps, repression, and the party-state), Bulgarian socialism had a different language and image than those of its allies.

This self-image was most evident around many tables and dinners shared with family and family friends when I was younger. Talk among contemporary Bulgarians often turns back to tropes, and sometimes jokes, about “what we lost,” a particular case of *Ostalgie*. A commonly heard narrative continues to be that Bulgaria had been a technologically advanced nation, an industrial exporter with its own specialties and achievements. They would throw out the names “Pravetz” (a Bulgarian PC) or “Atanasoff” as proof, and only later would I find out a bit more about the provenance of both words. At the same time, a childhood in the first post-socialist decade was replete with a sense of something shutting down: shuttered factories, buildings, and institutes. I do not claim

that I understood what that meant then, but the impression of the past that “we had lost” was all around. In my home city of Varna itself, a radio-electronics factory that my father had worked in stood vacant and imposing on a lot at the edge of the city. Many of his stories centered on it, but there was a keen sense for me that this time was irreversibly gone.

At the same time, I could play games such as *Prince of Persia*, *Duke Nukem*, or *Karateka*, on those fabled computers as I found them in the offices my father worked in at the technical university in Varna, and then in the software company he set up. Computers were intriguing, they were entertaining, and they were mysterious. I didn’t want to program them, but I did want to use them. Years later, when I searched for a topic for a dissertation, these strands coalesced as I discovered that this story was largely untold but concerned numerous questions I had about history. How did countries modernize under socialism? Why did factories shutter in the way they did after 1989, yet the technologies and skills persist so that my father could create his own software firm? And to what extent were the stories that my childhood ears heard true—how Bulgarian was the computer, and what did we lose?

This book tells the story of the socialist bloc’s biggest electronics producer. In 1944, when the Red Army crossed the Danube and the communist party took power in Sofia, the country was a garden, one of its golden exports being the tobacco that calmed Axis troops in occupied Europe. By the 1980s, when the Interkosmos 22 satellite beep-beeped its way through the heavens, Bulgaria held a 45 percent market share of electronic exports within the Eastern Bloc.<sup>2</sup> Its population, just under 9 million by the end of the regime, was heavily engaged in the industry. The exact number of workers in the electronics industry depends on whom you ask and who is counting: In the official annual statistics for 1987, out of just over 1.4 million workers engaged in some sort of industry or extraction, 161,302 worked in “electrical and electronics industry”—or just over 11 percent of all industrial workers. If we take the important statistical sector of “machine-building manufacturing,” which employed around 419,000 people, the proportion was over 38 percent, a gargantuan number for the small state.<sup>3</sup> Kiril Boi̇anov, a computer specialist closely involved with the industry, estimates that 181,000 individuals were at work in it by 1990,<sup>4</sup> Milena Dimitrova, in her compendium of interviews with luminaries

from the sector, pushes the figure to as high as 215,000.<sup>5</sup> The exact number is difficult to gauge—some in the official statistics worked in power engineering, while the number does omit scientific workers, technological experts, data and software specialists, and other workers that can be seen as working with computers or in the electronics sector. What is clear from these numbers, however, is that the sector was huge and extremely important for a country presenting itself as an advanced industrial nation that created complex machines.<sup>6</sup>

The surprising existence of this industry in the supposedly gray, small, orthodox, and backward satellite is alone worth telling this story, but uniqueness does not necessarily bring relevance. The Bulgarian computer is a prism, however, through which one can tell a story of the late twentieth century's multiple trajectories of technological change, socio-economic shifts, and socialism's modernity. The unique perspective of a small state on the periphery of its alliance ("which I knew wasn't an-all-that-important place," as the US ambassador in the 1970s saw it)<sup>7</sup> allows multiple stories to be intertwined: the maturation and fall of the socialist regimes, but also the rise of the information economy, the nature of technological innovation, the relationship between politics and technology, and the impact of the computer on society. In this respect, Bulgaria was just as an important place as anywhere else, and it entered the computer age with all its hopes and anxieties, just like the rest of the world. But the size of the sector relative to the rest of the economy, the prestige that the party wanted to derive from it, and the international openings it entailed for a socialist economy mean that the Bulgarian case had its own unique characteristics, too: cybernetics as a tool to create a new human, or the fertile interaction of economic shortages and widely proclaimed dreaming of a new world that ensnared the last socialist generation.

This book treats the computer as both a commodity and a tool. This approach helps keep the disparate threads united through the materiality of the product as it was created, circulated, and imbued with meaning. Other innovative work on the region's commodities, especially tobacco, has successfully told a deep and broad story through one locus.<sup>8</sup> The electronics industry was created primarily as a means of profit and prestige, but its construction required not just factories but thousands of trained specialists. Thus late socialist Bulgaria became a veritable Cyberia:

supposedly locked away behind the Iron Curtain, isolated, part of the socialist camp but in fact richly engaged with the meaning of the information age and how it could help build socialism, create a new type of persona, and eventually pit it against the regime's failed promises. Its promise of automation in labor, as well as its abilities of modeling and prognosis based on the huge quantities of data that a modern economy produced, captured the imagination of intellectuals, party members, and society as well. Thus, this commodity history of the computer allows us to trace the circulation of the ideas, technologies, and money that created the item, but also the vistas of intellectual history and cultural ramifications of this tool of the future.

Thus this book is also about people. Utilizing oral-history methods, it uncovers the world of those who managed the industry and worked in both its scientific and managerial positions. Some are high-ranking members of the party and state, the captains of industry and candidate members of the Politburo, while others are pitched at what I call the middle level—scientific workers in institutes in academia and industry, and in the gargantuan electronics conglomerate IZOT (the Bulgarian abbreviation for Computational, Recording and Organizational Technology). To those we can add a motley crew of philosophers, pedagogues, sociologists, psychologists, and novelists, who grappled with the information age, its tools, and its implication for the future of socialism, Bulgaria, and humanity. Interviews with such actors add detail to how these people lived, what they thought about what they were doing, and how they made decisions and forged links—information that is sometimes absent from official sources. A rich culture of debate emerges around the computer as a “trading zone” where different scientific fields can meet and exchange knowledge.<sup>9</sup> However, moving beyond this view, I include other cultural and artistic fields in which participants both dreamed and were anxious about the roles played by the computer and cybernetics. It was not just scientists who thought about the computer, but increasingly the whole of society. This book is not a bottom-up history of the industry, as its source base and methodology do not allow a full study of those hundreds of thousands of workers who toiled in factories or in offices and automation centers equipped with computers. Yet by using popular magazines and oral interviews, it does posit that there was wide engagement with the

computer in a society that is usually seen as not having entered the information age. The actions of workers facing automation, or of children who had to take computer classes or flocked to clubs, do speak of an engagement—on their own terms—with the ideas circulating in both the regime and specialist literature at the time. This book thus argues that the history from below can be uncovered by also looking at the interaction between action and plan, which often also meant that some of those from “below” assumed middling positions in the information economy of late socialism as it sought to mobilize creative powers beyond the institutes.

## TWO PRISMS: COMPUTERS AND SMALL STATES

Words that abound in this book include “prism,” “small,” “dream,” and “anxiety.” They speak to both methodological and intellectual concerns. One is the computer as an organizing principle of socialist politics and a zone for fertile discussion. Zubok and Pleshakov called late socialism “the senile cold war.” However, it was anything but: The relative security and power that the Eastern Bloc achieved in the Brezhnev era was just as important as the identified need to intensify the economy in creating the space for the computer and cybernetics to become powerful symbols of the future.<sup>10</sup> But this development was also playing out in a small state. The limits but also possibilities that both the Cold War and the need for technological progress offered, however, allow a small state to show us new ways of how geopolitics operated. High technology allowed Bulgaria to carve out niches and defend its own economic interests not only in Eastern Europe but also in the global market. Thus, dreams and anxieties were always intertwined. The BCP dreamed of profiting from this industry and of solving its economic problems without giving up its political monopoly. At the same time, it was anxious about its hard-won gains in the socialist international economy, as well as whether its bet on the computer and cybernetic governance would actually enhance the economy. The technical intellectuals dreamed of professional advancement, modern technology, and its successful application. But they were also anxious about the shortages, the difficulty in implementing computers into everyday life, the uneven access to Western knowledge, and their own position in the party–state hierarchy. For ordinary people, it was a

dream of less arduous work or of a creative future, but also a cause for anxiety about job loss, surveillance, and new burdens.

There is a temptation to tell stories like this as ones of failure. This book is not a prehistory of the fall of socialism, with 1989 looming over all. It argues that the technological and political projects of the Bulgarian computer should be seen on its own terms and within the contours of its own logic. People under socialism didn't live with the constant expectation of its imminent failure, even if they welcomed its eventual demise—in Alexei Yurchak's immortal phrase, everything was forever until it was no more.<sup>11</sup> Well, while it was forever, it was vital, creative, and constructive. The Bulgarian computer industry had its successes—it allowed the party to function as a nonagricultural periphery in the socialist world system. Moreover, it became a pervasive language and framework for the development of the economy and society. It was an increasing part of everyday life in the factories, offices, schools, and even homes of the socialist citizens. And it was also becoming a wide-ranging framework for thinking about the economy, society, psychology, and the future itself. The Bulgarian computer is part of the universal story of the late twentieth century's rise of an information society where knowledge work became increasingly important. It was a part of the socialist order's concept of the scientific-technical revolution as the next step in boosting economic production and bringing the communist future. But it was also Bulgarian—it served that regime's aims, often contra the interests of Moscow and others, and it intersected with a cultural landscape that was its own. This book brings together the local, socialist, and universal dimensions of these predicaments.

As soon as the regimes fell, specialists rushed to explain why, after being supposedly forever, the socialist order was no more. Economic reasons were tantamount in many explanations of 1989, with the socialist bloc's heavy focus on such industries as steel being cited as an obvious reason—they failed to enter the information age. Written as the regimes fell, Francis Fukuyama's by-now infamous "end of history" thesis is a solid summary of the myriad texts that can be cited here: "the failure of central planning in the final analysis is related to the problem of technological innovation."<sup>12</sup> Manuel Castells' powerful trilogy on the information age also makes it clear: the USSR and the socialist world system as a whole never made the jump from industrial and Fordist to postindustrial,

post-Fordist, and informational organizations. Imperfectly reformed and nascently innovative, these societies were doomed.<sup>13</sup> This is the conventional narrative of the computer revolution's failure in the East.

A still-influential thesis is that of Charles Maier, who argued that the collapse of the German Democratic Republic (GDR) is at least partly tied to its investment in computers in the 1980s: "a race between computers and collapse," as he called it.<sup>14</sup> The East Germans tried to master the construction of such systems and expand them to mass production, leading to increasing costs and investments that took away from the rest of the economy while giving few results. But that is a country- and time-specific thesis. With a lens on the late 1980s, it ignores the longer history of the computing industry during socialism, and even tacitly admits it: Bulgaria had already cornered the low-cost market. It was, as this book argues, cornering other markets, too, much to East German chagrin. Maier's view is true in one sense—Bulgaria also incurred debt as it tried to modernize its industry while still failing to generate convertible Western currency from sales abroad, and this trap did contribute to the collapse. But to see the whole industry's history as failure misses both its chronology and logic. Bulgaria's high-technology story starts in the 1960s, and its computer production—with all its problems and costs—was a successful sector right up until the end. This success can only be explained through the logic of the socialist international economic order. Bulgaria had maneuvered itself into primacy in the electronics sector years ahead of the GDR. East German computer failure is thus in some ways the story of a latecomer. Moreover, this book shows that the failures in computer policy were instrumentalized by party and technical elites to call for reform, but they cannot be disentangled from a general internal diagnosis of total socio-economic problems, not just sectoral problems. The Bulgarian computer industry was created for a specific local purpose in the logic of Comecon, and within that framework, it succeeded. If different political choices had been made in the late 1980s in Moscow, Berlin, Sofia, and elsewhere, this industry could have survived. This is not a triumphalist nationalist slogan, but a recognition that even while falling ever further behind economically, if Comecon had continued, it would have perpetuated the niches where the logic of Bulgarian production could have continued (of course, comparison with the ideological enemy was unavoidable and

was the kernel of reformism within the Bloc). Taking the Second World—the world of the socialist states that opposed the Western First World—seriously as a market, shows us a way to tell the story that is different from that of Maier and other authors.

Through this prism, the Cold War appears as a much freer space for smaller states, where possibilities for independent policies and paths existed. Bulgaria has often been peripheral to these stories, sidelined by the other Balkan mavericks: Yugoslavia with its nonaligned path and charismatic marshal; Romania, which opposed Soviet policies obstinately and eventually became a basket case of shortages and oppression, while its neighbors seemed to liberalize; or Albania, which slalomed between Moscow and Beijing. Bulgaria, by contrast, was led at the start by the Stalinist mouthpiece of Georgi Dimitrov and eventually by the wily but seemingly bootlicking Todor Zhivkov. Thus the story is often told as one of loyalty.<sup>15</sup> This view was also widespread among the US diplomatic corps. Contrasting Zhivkov to the Romanians, the political officer at the US embassy in the late 1960s, Donald Tice, said “he [Romanian leader Georghiu Dej] seemed actually to think for himself, whereas the Bulgarians all just ‘hewed’ to the Soviet line. I could read the opening paragraphs of a speech by Todor Zhivkov, put the newspaper aside and write the rest of it, because they were all the same.”<sup>16</sup> Yet political orthodoxy, trumpeting socialist fraternity and Soviet primacy, masks real economic and intellectual divergences. The computer as a focus for Bulgarian efforts was not because Moscow wanted it so—in fact, as my book shows, the Soviets and others increasingly bristled at Bulgarian practices—but because Sofia did, for domestic reasons. Once the industry was set up, the party and intellectuals dreamed big of a cybernetic future, which did speak a language similar to that of Moscow and its scientific-technical revolution but was never identical.

Moreover, loyalty can prove beneficial. The maverick story in the Cold War is eye opening, and attractive, but if we take the lens of integrating into alliances, we can see the contours of an alternative modernity arising even more clearly. The socialist bloc integrated economically, not just militarily, in order to win the Cold War. Close links at the personal level (Zhivkov was a successful wooer of both Khrushchev and Brezhnev) enabled both the financial and technological help for setting up high-technology industries and access to huge markets that made these



industries viable. At the same time, the troubled but real road of socialist economic integration created a Second World, juxtaposed to the Western First World, where experts and their languages circulated widely, creating a tangible material and intellectual culture that was distinct. Small states could thus both exploit their superpower backers and show locally the image of the world that was being built. The Bulgarian computer was part of a wider world of socialist technology, that of Comecon and its unified system of ES (mainframe computers) and SM (minicomputers) series machines. Industrial and scientific cooperation created a common experience from the inner German border to Vladivostok, but also with outposts in Havana, Hanoi, and Maputo. The circulation of the Bulgarian computer, which was a part of the material integration of this space, shows how the socialist world order made itself into a project distinct from capitalism as both a geopolitical force and a technological system.<sup>17</sup>

The Iron Curtain was porous, however. Metaphors have already been advanced of replacing the term “iron” with “nylon” and the term “curtain” with “membrane.”<sup>18</sup> The computer industry was dependent on knowing about and learning from the centers of the information age, which of course lay in the West. The state not only trained thousands of engineers to leapfrog into the computer age but also financed a huge intelligence operation to acquire the items and expertise denied to them by the West’s restrictions placed on this high-value good, which was key to the arms and space race. My book argues that this massive know-how transfer needs to be integrated into our stories of technology, where there were many channels of engaging with ideas, especially in authoritarian states. Spies transferred not just computers but also models, and they were involved in a very complex symbiosis with the civilian sector. The Bulgarian case shows that the distinction between licit and illicit exchange becomes meaningless, as the Cold War logic defined these terms. Instead, we should concentrate on how the dreaded socialist security services were a key part of the story of technological exchange in the twentieth century. The feared Bulgarian State Security was violent—against its internal opponents but also in infamous cases, such as Georgi Markov’s assassination in 1978 in London—and none of my work aims to minimize that. However, intelligence was also a channel without which the Bulgarian computer industry could not have existed.<sup>19</sup>

The computer was also a pathway to the new world that the late twentieth century had wrought. The Cold War is a key part of my story, but it can't and shouldn't be privileged, especially in the period when it intersected with decolonization and newly liberated states' projects. The independent states of the Global South sought allies in their own quests to build modern institutions and economies. Bulgaria was a self-avowed friend of these states, an anti-imperialist state, and it reached out to this new world. Bulgaria's opening to the global market was thus played out as much in Africa, Asia, and Latin America as anywhere else. But this book sees the Third World also as a place where the Second met the First—in technological terms, markets such as India were open to all computers, and the restrictions that prevented socialist specialists from operating freely in the West were mostly absent. India and other states were places to learn but also to sell. Often the Global South has been presented as a space where development models competed directly.<sup>20</sup> However, they were also markets where socialists had to sell, in much more open markets than Comecon, often competing with Western firms that practiced modern advertising and management techniques. As such, the Bulgarian computer was a commodity to sell but also one for which Bulgarians had to learn to do things differently. What did socialists learn, and how did they change when they acted like capitalists? The experience of the Bulgarian computer in India thus goes some way toward answering questions about how nonsocialist ideas can enter the regime's mindset and its professionals' practices.

When the regime ran into trouble and fell, it was the people who were politically involved who made the transition to the post-socialist world—not so much the computer industry, which having lost its market and *raison d'être*, quickly laid off workers and closed down factories. This book doesn't consider the industry as merely the enterprises, machines, and tools that it created and sold throughout the world, but much more importantly, as the workers and intellectuals it spawned, fostered, and developed. To say that socialism ended in 1989 would be reductive when looking through this prism. At the highest levels, some of the elite transformed their positions and continued to exercise political and economic power well into the democratic period. At the level of the engineer and the technical intelligentsia, the end didn't signal a cessation of their

professional activities but a change of context. Communism collapsed as a framework for science, with particular goals and investment, but as this book shows, the world in which these intellectuals had been operating for decades wasn't colored just by the regime but also by their professional concerns. To build machines for a socialist regime didn't mean that every day you thought about how it would bring about Marx's dream. Instead, you pondered over chips, blueprints, and development plans. If we thus take the lens of that middle strata, engaged in creating the tools of tomorrow, the endpoints of this story do not coincide with the fall of the party that kickstarted it all. Conventional chronologies driven by pure political events obscure the richness of life, as it continues despite these changes. Even more importantly, it is impossible to explain the political, technological, and economic landscapes of post-socialism if 1989 is taken as a *tabula rasa*.

## WHAT WORLDS?

The subtitle of this book boldly claims that this narrative is an engagement with the world: both geographic and geopolitical worlds, as well as intellectual and cultural ones. The Bulgarian computer circulated throughout the socialist and decolonizing world, while it also invaded the horizons of the party, the intelligentsia, and the ordinary person. The computer changed the economic, cultural, and intellectual horizons of the late twentieth century, and Bulgaria was no different. Yet within this universal stream is a local story, in which the machine interacted and changed discourse and possibilities in particular ways.

It is Bulgaria's engagement with the whole world that is of note. The call to write a pericentric history of the Cold War, with multiple polarities, is now more than 20 years old, but it still resonates.<sup>21</sup> My book offers this perspective as part of an increasing literature on the subject. Seen from the sidelines, both Cold War and global developments take on a new hue—a space to engage with the world, learn from it, and participate in it.<sup>22</sup> I argue that the need to build a computer in a state with no previous techno-economic base for this industry made the regime more open to global developments in ways hitherto hidden. The world was a dangerous place in the conditions of superpower confrontation, but it was not uniformly so.

Bulgaria's desire to create a technologically advanced economy pushed the elites to create the conditions for an engagement with global circulation of knowledge, expertise, material, and even capital, in order to achieve the computer dream. Thus, the pericentric perspective I offer combined with the history of technology opens up vistas that are rarely explored in the history of socialist states. It builds on work that has shown how Bulgaria opened up culturally or politically, demonstrating that it was often technology that created the conditions for a wider interaction and an "opening to the West" as the regime (mistakenly) often saw technology as a value-neutral sphere after Stalinism's end. Whatever the political reservations the party may have had about its global engagements, it granted much wider freedom to its technological elites than to the general public.

The transnational circulation of electronics know-how, however, concerned not just the party's managers or its technological elites but also spies. My book shows that we must incorporate hitherto underappreciated stories into our understanding of the global information age. In our age of increased concerns about surveillance, this approach is maybe not so controversial. The world of expertise was not created just by those who created the machines but also by those who acquired them. This book shows how often the lines blurred, and how the civilian economy controlled the concerns of the spying agencies. Moreover, I argue that in the conditions of not just the Cold War but also in any technological competition, we must jettison distinctions such as "legal/illegal" when talking about knowledge acquisition. Often the actors in this book received knowledge from their colleagues through the simple chit-chat over a conference coffee, or by visiting one another in their workplaces, wherever they may be in the world. Espionage and expertise combined and melded in the global information age, as they did at many other times. This book thus argues that we should expand our source base and purview when discussing how and why knowledge systems were created, building on the work of scholars who have shown the close interrelation of the military and the dawn of computing. What constitutes Big Science in the socialist world was slightly different from that of the Western world, where it is usually studied.<sup>23</sup>

The computer was part of both opening and closing the worlds available to a society. It has been seen as constituting a closed world—both in

itself and in helping model the Cold War as such. Born as part of the British and American military-industrial complexes, it also fostered a mentality of “closing the world” as it became a self-contained set of logic, models, and techniques. Of course, the story is similar in the USSR: From its earliest days, the computer was a tool for the nuclear and space confrontation between Moscow and Washington.<sup>24</sup> However, as I argue in this book, the computer operated differently in Bulgaria. It is true that it became a tool for closing the Cold War: The embargo of goods imposed by CoCom (Coordinating Committee for Multilateral Export Controls) created a closed world of socialist computing, which in fact enabled the Bulgarians to win their markets. However, although the Bulgarian military undoubtedly used the computer for its own Cold War ends, the “seepage” of models and knowledge between the military and civilian sectors was much less in the socialist world than in the West. The need to constantly update the technology meant that the computer allowed Bulgarians to open up to the world; at the same time, the closed world of socialism was a boon and a positive, rather than a negative, as it created the international economic conditions for the Bulgarian computer to flourish. Moreover, as my book shows, the overwhelmingly civilian nature of the computer industry in socialist Bulgaria created different intellectual horizons centered on new forms of creativity and seamless production control: the right steps toward utopia. The world of ideas, of reform, of a future without work, allowed Bulgarian intellectuals to open up discussions beyond the world of the party’s mantras.

What of that socialist world, however? My book shows that this world existed and was vital in its exchange. I treat Comecon seriously as a project that self-consciously constituted an alternative economic order that was aimed at winning both the ideological and economic conflict with the West. Facing an enemy that constituted itself into a powerful economic bloc in the form of the European Economic Community, in the 1960s, Comecon increasingly sought a unified division of labor, too. This was the world in which the Bulgarian computer could be born and make its claim to fame. Recent scholarship has pushed us to see this economic space as a geopolitical order that allowed countries to leverage their own national positions in the hierarchy supposedly dictated by Moscow.<sup>25</sup> Western contacts on a national level—which Bulgaria fostered as well as

any country—were then instrumentalized to gain comparative advantages. Comecon was not a straitjacket but an opportunity for the Bulgarian computer industry. But it was not just a world in which to generate a profit, but a world in which to compare, learn, trade, and proclaim successes. Mēhilli has excellently argued that tensions existed between internationalism and conflicting nationalist interests, but illiberal regimes' interactions and constitution into a system of institutional arrangements—Comecon and the Warsaw Pact—had tangible, real results.<sup>26</sup> My book similarly illustrates this vitality of socialist economic alliances and how states hitherto relegated to the southern and underdeveloped tier maneuvered this world to show themselves as just as (if not more) advanced as their East German or Czechoslovak allies. The socialist world was thus a place of possibility and widespread economic-technological circulation, rather than a moribund space doomed to fail. But it wasn't just an alternative economic order but an alternative modernity, shaping and being shaped by a socialist political project that resulted in similar approaches to politics, philosophy, and culture.

The computer also allowed Bulgaria to operate as an agent and participant in globalization. The world was framed not only by the Cold War but also by decolonization, and the story of interconnectivity in this new age should not and cannot be told just as Westernization. The increasingly rich literature on socialist globalization has pushed many observers to consider the myriad political, economic, and cultural ways that the Soviet's supposed satellites hewed their own roads into the Global South. Eastern European allies, the Bulgarians among them, were important agents of modernization in political, economic, and military terms, as they trained engineers, agriculture specialists, doctors, and armies throughout the newly independent states—or at home.<sup>27</sup> This book continues on this path to look beyond Moscow as the agent of socialist globalization and to show the rich technological engagement between East and South. Recent works have shown the circulation of architects, women's organizations, and cultural diplomacy as part of this Bulgarian engagement with the decolonized world.<sup>28</sup> The computer contributed not only to the circulation of expertise but also to the creation of different geographies of exchange: Bulgaria possessed unique advantages, even if its technology was not as modern as that offered by the Americans and Japanese. States

in the Global South desired this tool of the future and were willing to look for it in the socialist world for both political and economic reasons. The computer allowed Bulgaria to present an image to its newfound allies—that of a modern country that had leapfrogged backwardness in a single generation, from the apple orchard to the computer age.

My book is also an argument about the limits of globalization and in particular, the socialist kind. Through the prism of the computer, we can see how important capitalist globalization remained for the development of the socialist world's technology, and more importantly—the priestly class that created it and used it. Trying to avoid using the hindsight of knowing that this system failed, my book investigates how the limits of socialist globalization in terms of technical expertise fostered a strata of transnational experts that developed reformist ideas about politics in Bulgaria. Moreover, their very existence and circulation are also evidence of other globalizing limits, just as they are of the limits of the party's electronics dream. Both fostered the exchange of ideas between Bulgarian experts and global institutes or markets, but they often distanced those same experts from the shop floors and villages that surrounded them, the latter being objects of these forces, to be acted on by the more confident and technically capable state. At the same time, the workers in those villages and shop floors were also political subjects—but ones with different ideas, different anxieties, and different experiences from those who were most mobile in socialist globalization.

My book looks beyond the Global South as a space where socialists tried out their ideas and presented development projects as proof of their modernity's success, however. The biggest Asian market that Bulgaria targeted was India, a country that held a unique place in Cold War history. Odd Arne Westad posits it as an almost "anti-Cold War" nation that aimed to create an alternative to the superpower ideological confrontation.<sup>29</sup> India was a key world meeting ground during the Cold War, a place that both capitalist and socialist globalization tried to invade and sway to their respective models, and a locality that is a great prism for seeing the contours of this exchange and clash. Although much of the literature focuses on the contracts between center and periphery—Washington and Moscow as the centers around which models orbited—there was more to contact with the Global South than specific development projects.<sup>30</sup> This

book shows that the computer, despite being a tool to develop and modernize, was also a commodity that states such as India desired without necessarily wanting to harness them to the same projects that the superpowers desired. I argue that the exchange between East and South must also be seen through the lens of business history rather than just international development. Moreover, Bulgaria could meet the world's technology and practices without the same restrictions it faced in the West. India, like other places in the Global South, was a world of business transactions and competition. Bulgarians had to cut their teeth on models that were absent in their trade and business dealings within the logic of the Second World, as they competed with the West for Indian contracts. My book shows that through engagement with India's electronics landscape, Bulgarian specialists also met and learned from the world of advertising, customer relations, and modern marketing. The Global South was thus a space to learn and not just to sell or manipulate. The computer was a channel through which new, nonsocialist techniques could filter back into the Second World's economies, with important consequences in creating a "worldly" professional class.

However, the computer also opened up other worlds beyond geography. The computing age opened new vistas that were technological, intellectual, and political, touching on every part of life in a modern society from the ideas about how one should govern to what kind of literature people read. The late twentieth century was also the age of cybernetics, even when the term lost its popularity in the West. In Bulgaria, it was part of political discourse and the popular imagination for much longer, a key ingredient of the scientific-technical revolution that the communist parties imagined they were harnessing. Chapter 1 delves into the definition of the term more fully, but it suffices to say that in socialism, cybernetics became a driving force of planning and economic thinking from the 1960s on. Robert Kline has highlighted the "disunity of cybernetics," which as a science took on many different forms, depending on national contexts, despite its birth in America.<sup>31</sup> My book shows how it meshed with the party's dream of nonmarket reform, its burgeoning industry, and particular national concerns. The story of the Bulgarian computer is also that of engaging with the world of cybernetics, a field that spread octopus-like across disciplines as well as nations. But development was not simple



diffusion, as despite reading Wiener or Shannon, Bulgarian cyberneticians developed their own concerns born out of the state's attempts to reform the socialist workspace into the office or factory of the future.

The history of cybernetics in a non-Western context is rich and growing. Slava Gerovitch's work on Soviet cybernetics has been highly successful in showing how the discipline emerged from its tainted position as "bourgeois science" in the Stalinist period to become an exciting, exact language in the 1960s. Soviet scientists latched onto it to defend their positions and autonomy versus the Soviet state, before it became subsumed within the official language as little more than a language of rent-seeking by Soviet science, losing its earlier vitality. My book, however, shows that the specifics of the Bulgarian example are different. Most importantly, Bulgarian cybernetics was a late comer—it enters at the "official" stage, when the party enshrines it in its development plan, in service to a state-led industrial effort to build the computer into the Comecon structures. Thus from the very start, it allowed Bulgarian science to frame its projects in an official language. However, the BCP's obsession with cybernetics as the key to their dream of intensifying the moribund economy meant that qualified engineers of the new ilk were much more likely to have strong positions in the power structures. In effect, Bulgarian science—to a larger degree than its Soviet counterpart—used cyberspeak to get a position at the high table. Unlike the Soviet case, this late-coming status meant that the chronology is reversed: Cybernetics, and the failure of the centralized party to win the wager it had placed on this new technology and attendant science, became mobilized against it toward the end as a language of reform.<sup>32</sup>

The harnessing of cybernetics to different socialist projects has also been explored in the Eastern Bloc context, where the vision of a network of computers was attractive to parties that sought to find the optimal way to run their command economies. This appeal resulted in gargantuan, ambitious projects such as OGAS (the Russian acronym for National Automated System for Computation and Information Processing) in the USSR, which never came to fruition. Bulgaria was no different, with its own dreams of a networked economy. The story of the Bulgarian computer thus allows us to look into the world of socialist governance and its utopian aims, building on work such as that by Benjamin Peters, who shows

how competing interests in a centralized party ultimately stymied the project.<sup>33</sup> Following his lead, I also trace the Bulgarian techno-utopian dream of reforming both society and economy through the possibilities of the computer. However, once again, the local matters as much as the global. It is true that the computer was part of the alternative modernity of Comecon, but it also assumed a larger relative weight in Bulgarian policy thinking due to the industry's predominance; as a result, the actors who championed it were often more successful than their Soviet counterparts, even if ultimately they, too, were defeated. Moreover, this book shows how the social networks of socialist society mattered as much as the computer networks. The computer allowed automation, and the computer-controlled machine entered the workforce alongside the socialist worker. By meditating not just on the rival political factions that used the computer to advance communism, or the scientists who created it and wrote papers on it, my book looks at how its successes and failures were also embedded in the deeper structures of Bulgarian society, especially labor practices. The computer gave birth to the dream of automation, and little research has been done on how this march of the machines impacted the workers themselves. What did it mean to be a laborer with a robotic coworker? Socialist governance had real results, despite the ultimate failure of the project in both the USSR and Bulgaria. This book explores the world it wrought not just in the Politburo meetings or the cybernetic institutes,<sup>33</sup> but also in the anxious minds of ordinary people.

Computing at the periphery thus complicates our notions of what this tool could be used for. Technology was embedded in political visions, and those visions could change the brief of the design. Not every computer was harnessed to creating the Western information age or the socialist command network. Other worlds existed. Historians have looked at particularly illuminating projects, such as the Chilean Cybersyn, a vision of a participatory society through the technology of the computer. Such a view from the periphery has shown us that technology circulation was not unidirectional; nor did it necessarily carry predetermined political baggage.<sup>34</sup> Similarly, the Bulgarian computer engaged with the wider world—technology, ideas, and discourses often came from the West or from Moscow. But they also existed in a local Bulgarian world. The political project of Bulgarian socialism was different, tied to its own concerns.

Cultural politics in Bulgaria demanded a new type of human, driven by the politics of Liudmila Zhivkova, and Bulgarian computing discourse dutifully answered: How could the new machine and its network liberate humanity and foster creativity? My book contributes to our understanding of how local conditions impacted the ways technology was used. However, by locating the story in a country that had put such a premium on the industry relative to its exports and economy, I also show how it was actually at the periphery that the computer and cybernetics could become a political cipher that filled political ideology with meaning. All socialist states proclaimed that the “scientific-technical revolution” was the driving force of their policies and that only they could harness it properly. The industrial policy of Bulgaria, however, made this notion increasingly computerized, right down to the regime’s end. Late socialist ideology, with its focus on science as productive force, was not just empty words—or at least not in the mouths of all party members. It is precisely from the Balkan periphery, where the ruling elite and much of society had placed such hopes in the computer as both a source of currency and a solution to slowing productivity, that we can see how cybernetics was a vital discourse that nested right at the heart of the regime’s utopian utterances. Because the factories existed, and because they were the future, elements of the Bulgarian elite could sincerely believe that Wiener’s science could give meaning to the chosen vanguard party, fusing the two into a cyber-socialism that claimed it had the tools to reach the utopian horizon. But precisely because this story starts with the profit motive, it also made it thinkable that the regime’s politico-economic framework had to be discarded if the industry were to truly succeed and be modern. The Bulgarian computer is thus a path to both the socialist and capitalist worlds, dependent on both the period and subjects involved.

The computer connected various intellectual and dream worlds in Bulgaria itself. As a trading zone, it was itself a world, a black box, which fascinated and promised solutions to myriad problems. A true “cyborg science” existed—computer science, operations research, and game theory were all discussed in socialist countries as they were in capitalist ones. Information was a paradigmatic key to all kinds of problems faced by an increasingly complex society, stretching from economic planning to pedagogy to self-perfection. The computer and its terminology thus allow us to

blur the lines between different professions and spheres of life. Computer specialists were in demand in many different aspects of Bulgarian life—from the automation of factories to discussions of workplace psychology. The social life of the technology thus meant that the worlds of science and politics intertwined and informed each other. The desire to automate more and more aspects of life also impacted the personal worlds of many people, as well as the social webs that they used to make sense of their position. Women were workers and also mothers, who had to contend with the computer as it invaded their offices and also their duties raising the next generation. That very next generation, too, was connected to politics and the economy through the computer—subjected to computer education, they were not just observers but also participants in the increasingly obvious slippage between the promise and the reality of cyber-socialism. Children were supposed to be the future cyborgs, but by the end of the regime, the computer had already made them cyborgs, as they entered the world of work through the software they created. Cyborg science invaded more and more areas of life as the computer was applied to every dilemma posed by modern industrial society. By the 1970s, within only a few years of the creation of the industry, a cyborg culture had emerged, too—in the workplaces that were to be automated, but even in literature, where writers in fact modeled the future that computers were supposed to bring. My book shows how if we follow the thread of computing as both a commodity and intellectual tool, we can weave together multiple strands of how an entire society reacted to the information age, to socialism, to the West, and to its own anxieties.<sup>35</sup>

If the computer was to change everyone's life, it had to be everywhere; thus each social world had to react to the new age. The technical intellectuals who were its priestly class were a serious force in politics and increasingly even in culture, popularizing the terms "governance," "information," and "automation." Used by the party, these terms also confronted ordinary people. This book does not claim that the history of late socialism is dominated only by computing, because life is much more than a screen. What I do ultimately argue is that due to the particular choices made in Bulgaria to create this important industry, which dominated economic discourse and party proclamations, the computer became a solution to be applied to multiple problems and thus also a vessel to be imbued with

multiple expectations and fears. The particular content of those expectations and fears depended on whether you were a high-ranking bureaucrat, economic tsar, trader, cybernetic specialist, science fiction writer, or a teacher, student, woman, or worker. Thus, by focusing on the electronics world in Bulgaria, we glimpse the multiple worlds of social, cultural, and political life in the country.

## STRUCTURE

Why Bulgaria chose computing as its niche is of course the most pressing question, and chapter 1 places this emergence in both the longer-term history of perceived Bulgarian backwardness and the challenges and opportunities that the BCP faced in the early 1960s. These local developments not only made sense because of the Bulgarian entanglement in debt but also because of a new desire to create an alternative modernity in the socialist bloc. Chapter 2 takes up this story and follows the developments that helped this industry grow into the behemoth it became by the 1980s. By doing so, the industry took advantage of both the logic of cooperation and competition within Comecon, and the openness of countries like Japan to trade, creating a vibrant and growing scientific community and the actual factories that made up the industry. These two chapters constitute an argument for the existence of a real, viable Second World of material and intellectual exchange.

But the majority of cutting-edge knowledge remained in the West, and chapter 3 thus explores the intelligence services' role as an industrial research arm of the civilian economy, a real conduit of information into the supposedly cut-off technical community. This engagement with the wider world through illicit means is followed by the engagement through licit means, as Bulgarian computers sought new markets in the Global South. Chapter 4 follows the attempts to break into the Indian market. The chapter argues that socialists could become capitalists when they needed to, which fed back into thinking about business practices behind the Iron Curtain. Chapters 3 and 4 are thus an exploration of the global outlook of this sector and the various ways it learned from and interacted with both the capitalist and newly liberated worlds.

Taken together, the first four chapters discuss the global outlook and positioning of the Bulgarian computer, creating either a global socialist community or chasing markets. Then the next two chapters zoom back into the country, right down to the shop floor. The computer created fascinating vistas for the BCP and for intellectuals, but it also provoked resistance and anxiety among workers. Chapter 5 juxtaposes the political program computing was harnessed to with some labor responses to it, while chapter 6 follows the story to the academy and schools, and finally to science fiction. Taken together, these two chapters argue for a local response to the information age, which only makes sense within the political and cultural debates and forces that shaped the BCP rather than the whole Eastern Bloc.

Chapter 7 ties these stories together by showing how the forces set in motion by these elite decisions in the 1960s created a new managerial class that was increasingly transnational and at odds with the older BCP generation. This chapter follows the globetrotting technocrats as well as the global dreams of the new electronics generation to argue that the human developments created by this industry complicate our view of both the fall of socialism and 1989 as a convenient end point to our stories.

In the following pages, the reader will meet old party functionaries, young computer specialists, charmed philosophers, worldly trade representatives, anxious writers, confused spies, ordinary workers, and fascinated children. Although the computer is the trading zone and organizing principle of these multiple networks, this story is above all about people and the worlds they wrought or met through the machine. In this corner of the world, the electronics choice made by one party opened up a Pandora's box of possibilities and anxieties, many of which are still with us today. Bulgaria was not gray and loyal as it is often presented, a backwater that may as well have been in Siberia. Just like the real Siberia, the Balkan Cyberia was its own world, with its own concerns—vital, real, and in this case cybernetic.



# NOTES

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## INTRODUCTION

1. The story's details are taken from Blagovest Sendov, *John Atanasov: Elektronniyat Prometey* (Sofia: UI Sv Kliment Ohridski, 2003). That is just the latest book to appear in Bulgaria regarding Atanasoff, who spawned a number of texts dating back to the socialist period.
2. TsDA f. 1B op. 68 a.e. 1836 l. 201. Archive abbreviations can be found in the frontmatter.
3. *Statisticheski Godishnik na Narodna Republika Bŭlgariĭa 1988* (Sofia: Tzentrarno Statisticheskoto Upravlenie, 1988), p. 165.
4. Kiril Boĭanov, "Kratki Svedeniya za Razvitiето na Izchislitelnata Tehnika v Bŭlgariĭa," in *Godishnik na Sektsiya Informatika*, vol. 7 (2014), p. 16.
5. Milena Dimitrova, *Zlatnite Desitiletiĭa na Balgarskata Elektronika* (Sofia: IK Trud, 2008), p. 62.
6. By comparison, Singapore—a leading Asian Tiger, especially in electronics—currently sees 17 percent of its manufacturing workforce engaged in the sector (<https://www.edb.gov.sg/en/our-industries/electronics.html>; last accessed July 18, 2022).
7. Interview with Horace G. Torbert by Charles Stuart Kennedy, US Ambassador to Sofia 1970–1973, in "Bulgaria Country Reader" at *Association for Diplomatic Studies & Training Oral History Collection* (<https://adst.org/Readers/Bulgaria.pdf> ; last accessed July 18, 2022).
8. The history of commodities has experienced a notable boom and has reached a wider popular audience, too—see Mark Kurlansky's books on fish, salt, and milk: *Salt: A World History* (New York: Walker and Co., 2002); *Cod: A Biography of the Fish That Changed the World* (New York: Walker and Co., 1997); and *Milk! A 10,000-Year*



*Food Fracas* (London: Bloomsbury, 2018). Sven Becker's *Empire of Cotton: A Global History* (London: Penguin Books, 2015) is only one of many widely acclaimed books that came out of mainstream academia and tell global stories through commodities. But here I am mostly referring to the country-specific, excellent study by Mary Neuberger: *Balkan Smoke: Tobacco and the Making of Modern Bulgaria* (Ithaca, NY: Cornell University Press, 2012), and her latest, food-centered, *Ingredients of Change: The History and Culture of Food in Modern Bulgaria* (Ithaca, NY: Cornell University Press, 2021). Not least, my own book is in some ways an homage to the title of *Balkan Smoke*.

9. This idea draws on Peter Galison's influential study *Image and Logic: A Material Culture of Microphysics* (Chicago: University of Chicago Press, 1997), where he posits the computer as an extremely important trading zone in the modern age.

10. Vladislav Zubok and Constantine Pleshkov, *Inside the Kremlin's Cold War: From Stalin to Khrushchev* (Cambridge, MA: Harvard University Press, 1997).

11. Alexei Yurchak, *Everything Was Forever Until It Was No More: The Last Soviet Generation* (Princeton, NJ: Princeton University Press, 2005).

12. Francis Fukuyama, *The End of History and the Last Man* (New York: The Free Press, 1992), p. 93.

13. The argument first appeared in essay form in Manuel Castells and Emma Kiseiyova, *The Collapse of Soviet Communism: A View from the Information Society* (Berkeley: International and Area Studies, University of California, 1995). It was then integrated in Castells' *The Information Age: Economy, Society and Culture*, consisting of three volumes: *The Rise of the Network Society* (Cambridge, MA: Blackwell, 1996), *The Power of Identity* (Cambridge, MA: Blackwell, 1997), and *End of Millennium* (Cambridge, MA: Blackwell, 1998).

14. See Charles Maier, *Dissolution: The Crisis of Communism and the End of East Germany* (Princeton, NJ: Princeton University Press, 1997), p. 73; the whole of chapter 2, on economic collapse, is worth citing as an influential example of this historiography.

15. For one example, see Gale Stokes, *The Walls Came Tumbling Down: The Collapse of Communism in Eastern Europe* (Oxford: Oxford University Press, 1993). While older now, the book's description of the regime has not substantially changed in general overviews of Eastern European socialism, which often pass over Bulgaria in a couple of sentences. There is a wide range of literature on Yugoslavia as different. For example, Yugoslav socialism's difference has been highlighted through its consumer culture in Patrick Patterson, *Bought and Sold: Living and Losing the Good Life in Socialist Yugoslavia* (Ithaca, NY: Cornell University Press, 2011) or through its engagement with the nonaligned world, a great example of which is Patterson's more recent *Non-aligned Modernism: Socialist Postcolonial Aesthetics in Yugoslavia 1945–1985* (Montreal: McGill-Queen's University Press, 2019). For Romania, see Vladimir Tismaneanu, *Stalinism for All Seasons: A Political History of Romanian Communism* (Berkeley: University of California Press, 2003). For Albania, see Elidor Mëhilli, *From Stalin to Mao: Albania and the Socialist World* (Ithaca, NY: Cornell University Press, 2017).

16. Interview with Donald C. Tice, Political/Economic Officer 1964–7, in Bulgaria Country Reader" at *Association for Diplomatic Studies & Training Oral History Collection* (last accessed: January 20, 2021)

17. In this I draw on the forceful point made by Mēhilli, *From Stalin to Mao: We need to treat the Second World as a real project of modernity and a real space where ideas and materials circulated*. For a longer-term and thought-provoking view of this, see Stephen Kotkin, “Mongol Commonwealth? Exchange and Governance across the Post-Mongol Space,” *Kritika: Explorations in Russian and Eurasian History*, vol. 8, no. 3 (Summer 2007), pp. 487–531. See also Łukasz Stanek, *Architecture in Global Socialism: Eastern Europe, West Africa, and the Middle East in the Cold War* (Princeton, NJ: Princeton University Press, 2020).

18. György Péteri, “Nylon Curtain—Transnational and Transsystemic Tendencies in the Cultural Life of State-Socialist Russia and East-Central Europe,” *Slavonica* vol. 10, no. 2 (November 2004), pp. 113–123; Michael David-Fox, “The Iron Curtain as Semi-permeable Membrane: Origins and Demise of the Stalinist Superiority Complex,” in Patryk Babiracki and Kenyon Zimmer (eds.), *Cold War Crossings: International Travel and Exchange across the Soviet Bloc, 1940s–1960s* (College Station, TX: Texas A&M University Press, 2014), pp. 14–39.

19. The history of the Bulgarian security services has been told, understandably, mainly through its repressive apparatus and its alliance with the KGB—Jordan Baev, *KGB v Bŭlgariĭa* (Sofia: Voенно Izdatelstvo, 2009); and Momchil Metodiev, *Mashina za Legitimnost: Rolyata na Dŭrzhavna Sigurnost v Komunisticheskata Durzhava* (Sofia: Ciela, 2008). Journalist Khristo Khristov has however delved more into both the ring of companies that the Security Services created and some of their scientific-technological work in his book, Khristo Khristov, *Imperiyata na Zadgranichnite Firmi: Suzdavane, Deynost i Iztochvane na Druzhestvata s Bulgarsko Uchastie zad Granitsa 1961–2007* (Sofia: Ciela, 2009)—and in a series of articles in the newspaper *Kapital*. In the fields of electronics, cooperation, and Polish efforts, Mirosław Sikora has done groundbreaking work: “Cooperating with Moscow, Stealing in California: Poland’s Legal and Illicit Acquisition of Microelectronic Knowhow from 1960 to 1990,” in C. Leslie and M. Schmitt (eds.), *Histories of Computing in Eastern Europe. HC 2018. IFIP Advances in Information and Communication Technology*, vol. 549 (Cham, Switzerland: Springer, 2019).

20. Nick Cullather, *The Hungry World: America’s Cold War Battle against Poverty in Asia* (Cambridge, MA: Harvard University Press, 2013). In his introduction, Cullather explicitly calls out how both the American and Soviet models were predicated on being able to yield statistical proof of their superiority.

21. Tony Smith, “New Bottles for New Wine: A Pericentric Framework for the Study of the Cold War,” *Diplomatic History* vol. 24, no. 4 (2000), pp. 567–591.

22. Theodora Dragostinova, *The Cold War from the Margins: A Small Socialist State on the Global Cultural Scene* (Ithaca, NY: Cornell University Press, 2021).

23. There is a rich literature on both Big Science and state/military support for the rise of computing. See Christophe Lecuyer, *Making Silicon Valley: Innovation and the Growth of High Tech, 1930–1970* (Cambridge, MA: The MIT Press, 2007); Peter Galison and Bruce Hevly (eds.), *Big Science: The Growth of Large-Scale Research* (Stanford, CA: Stanford University Press, 1992). Slightly tangential to this point, but key to the discussion of how expertise is formed, is John Agar’s *The Government Machine: A Revolutionary History of the Computer* (Cambridge, MA: The MIT Press, 2003).

24. See Paul Edwards' seminal *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: The MIT Press, 1997).
25. See both Suvi Kinsikas, *Socialist Countries Face the European Community: Soviet-Bloc Controversies over East-West Trade* (Frankfurt am Mein: Peter Lang, 2014), and Angela Romano and Federico Romero (eds.), *European Socialist Regimes' Fateful Engagement with the West: National Strategies in the Long 1970s* (New York: Routledge, 2021), the result of the PanEuro1970s project at the European University Institute, Florence.
26. Mēhilli, *From Stalin to Mao*, pp. 9–12
27. Oscar Sanchez-Sibony, *Red Globalization: The Political Economy of the Soviet Cold War from Stalin to Khrushchev* (Cambridge: Cambridge University Press, 2014) remains a defining work. See also: James Mark, Artemy Kalinovsky, and Steffi Marung (eds.), *Alternative Globalizations: Eastern Europe and the Postcolonial World* (Bloomington, IN: Indiana University Press, 2020); Besnik Pula, *Globalization under and after Socialism: The Evolution of Transnational Capital in Central and Eastern Europe* (Stanford, CA: Stanford University Press, 2018); Philip Muehlenbeck and Natalia Telepneva (eds.), *Warsaw Pact Interventions in the Third World: Aid and Influence in the Cold War* (London: IB Tauris, 2018). An influential call and contribution has been made by the "Beyond the Iron Curtain: Eastern Europe and the Global Cold War" special issue in *Slavic Review*, vol. 77, no. 3 (2018), pp. 577–684.
28. Łukasz Stanek, *Architecture in Global Socialism: Eastern Europe, West Africa, and the Middle East in the Cold War* (Princeton, NJ: Princeton University Press, 2020) is an astounding contribution. See also Kristen Ghodsee, *Second World, Second Sex: Socialist Women's Activism and Global Solidarity during the Cold War* (Durham, NC: Duke University Press, 2019) and Theodora Dragostinova's work *The Cold War from the Margins*.
29. See Odd Arne Westad's chapter 16, "The Cold War in India," in his *The Cold War: A World History* (London: Penguin, 2018), pp. 423–449.
30. The literature on modernization, development, and Second–Third World contacts is growing. See David C. Engerman and Corinna R. Unger, "Towards a Global History of Modernization," *Diplomatic History*, vol. 33, no. 3 (June 2009), pp. 375–385, as well as the whole special issue; David C. Engerman, "The Second World's Third World," *Kritika*, vol. 12, no. 1 (Winter 2011), pp. 183–211. Also see Engerman's "Learning from the East: Soviet Experts and India in the Era of Competitive Coexistence," *Comparative Studies of South Asia, Africa and the Middle East*, vol. 33, no. 2 (August 28, 2013), pp. 227–238. For an example of another socialist state's efforts, this time in the Middle East, see M. Trentin, *Engineers of Modern Development: East German Experts in Ba'thist Syria, 1965–1972* (Padua, 2010).
31. Robert Kline, *The Cybernetics Moment: Or Why We Call Our Age the Information Age* (Baltimore: Johns Hopkins University Press, 2017). For more on cybernetics, its history, and various contexts, see Flo Conway and Jim Siegelman, *Dark Hero of the Information Age: In Search of Norbert Wiener, the Father of Cybernetics* (New York: Basic Books, 2005); Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (Chicago: University of Chicago Press, 2010); David A. Mindell, Jérôme Segal, and Slava Gerovitch, "Cybernetics and Information Theory in the United States, France, and

the Soviet Union,” in Mark Walker (ed.), *Science and Ideology: A Comparative History* (New York: Routledge, 2003), pp. 66–97.

32. Slava Gerovitch, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics* (Cambridge, MA: The MIT Press, 2002); studies of Bulgarian computing in the language do a great job of tracing the reasons for its creation and its industrial development, but they do not touch on the politico-economic impacts it had on official policy in terms of the party’s governance. See Kiril Boianov, *Shtrihi ot Razvitiето na Izheshlitenata Tehnika v Būlgariā* (Sofia: AI Prof Marin Drinov, 2010) and his memoir *Istinata e Kladenets: Zhivotiit Mi v Kompyutūrnata Era* (Sofia: AI Akad Marin Drinov, 2018); Dimitūr Shishkov, *Zvezdnite Migove na Bulgarskata Kompiūtūrna Tehnika I Kompiūtūrna Informatika 1956–1966* (Sofia: IK Tangra, 2002); Milena Dimitrova, *Zlatnite Desitiletīa na Bulgarskata Elektronika* (Sofia: IK Trud, 2008); Evgeniū Kandilarov, “Elektronikata v Ikonomicheskata Politika na Būlgariā prez 60te–80te Godini na XX Vek,” *GSU-IF*, vol. 96/7 (2003/4), pp. 431–503. I must also mention other works by actors in the industry, such as Yordan Mladenov and Ognemir Genchev, *Panorama na Elektronmat Promishlenost na Būlgariā* (Published online, 2003). Yordan Trenkov’s 4-volume *Entsiklopediya na Elektronikata* (Sofia: IK Tehnika, 2010) is a technical reference encyclopedia on electronics, but due to its Bulgarian authorship, it also includes information about various domestic electronics developments from the period, proving invaluable when chasing down obscure disc drives, etc.

33. Benjamin Peters, *How Not to Network a Nation: An Uneasy History of the Soviet Internet* (Cambridge, MA: The MIT Press, 2016).

34. Eden Medina, *Cybernetic Revolutionaries: Technology and Politics in Allende’s Chile* (Cambridge, MA: The MIT Press, 2012) remains a guiding light. Work on Latin American science has been very illuminating—see the volume edited by Eden Medina, Ivan da Costa Marques, and Christina Holmes, *Beyond Imported Magic: Essays on Science, Technology, and Society in Latin America* (Cambridge, MA: The MIT Press, 2014). For the Cold War angle, see Gabrielle Hecht (ed.), *Entangled Geographies: Empire and Technopolitics in the Global Cold War* (Cambridge, MA: The MIT Press, 2011). For a Soviet example of a technological community that uses the computer to advance its own claims, build its own project, and exchange information across the Cold War divide, see Ksenia Tatarchenko, *A House with the Window to the West: The Akademgorodok Computer Center (1958–1993)* (PhD dissertation, Princeton University, Princeton, NJ, 2013).

35. I borrow the concept of “cyborg science” from Phillip Mirowski, *Machine Dreams: Economics Becomes a Cyborg Science* (Cambridge: Cambridge University Press, 2002). For the computer specialists as “high priests” of this new universal science in an American context, see Nathan Ensmenger, *The Computer Boys Take Over: Computers, Programmers, and the Politics of Technical Expertise* (Cambridge, MA: The MIT Press, 2010). I am also reacting more broadly to Jeffrey Herf’s work, which shows how the technical intelligentsia is a creative class that needs to be taken seriously as a political, cultural, and social force, too; see Jeffrey Herf, *Reactionary Modernism: Technology, Culture, and Politics in Weimar and the Third Reich* (Cambridge: Cambridge University Press, 1984). For the role of women in computing, see Mar Hicks, *Programmed Inequality: How Britain*

*Discarded Women Technologists and Lost Its Edge in Computing* (Cambridge, MA: The MIT Press, 2017). Joy Lisi Rankin's *A People's History of Computing in the United States* (Cambridge, MA: Harvard University Press, 2018) has also been inspirational in showing the myriad ways users and those usually excluded from computing history contributed.

## CHAPTER 1

1. See Angela Romano and Federico Romero (eds.), *European Socialist Regimes' Fateful Engagement with The West: National Strategies in the Long 1970s* (London: Routledge, 2021).
2. These ideas can be found in Rosenstein-Rodan's article "Problems of Industrialization of Eastern and South-Eastern Europe," *Economic Journal*, vol. 53, no. 210/211 (1943), pp. 202–211; Kurt Mandelbaum's are in his short but influential *The Industrialization of Backward Areas* (Oxford: Blackwell, 1945).
3. See Rumen Avramov's magisterial three-volume *Komunalniĭat Kapitalizŭm* (Sofia: Bulgarska Nauka I Izkustvo, 2007) for a discussion of Bulgaria's pre-BCP economic history.
4. Iliĭana Marcheva, *Politikata za Stopanska Modernizatsiya v Bŭlgariĭa po Vreme na Studenata Voina* (Sofia: Letera, 2016), p. 39.
5. Michael R. Palaret, *The Balkan Economies c. 1800–1914: Evolution without Development* (Cambridge: Cambridge University Press, 2003).
6. Marcheva, *Politika za Stopanska Modernizatsiya*, p. 40.
7. On Bulgarian tobacco, see Mary Neuburger's *Balkan Smoke: Tobacco and the Making of Modern Bulgaria* (Ithaca, NY: Cornell University Press, 2012).
8. Marcheva, *Politikata za Stopanska Modernizatsiya*, p. 35.
9. L. Berov et al., *Razvitie na Industriyata v Bŭlgariĭa 1834-1947-1989* (Sofia: Nauka I Izkustvo, 1990), pp. 139–140.
10. Iliĭana Marcheva, "Problemi na Modernizatsiyata pri Sotsializma: Industrializatsiyata v Bŭlgariĭa," in E. Kandilarov and T. Turlakova (eds.), *Izsledvaniĭa po Istoriiĭa na Sotsializma v Bŭlgariĭa 1944–1989* (Sofia: Grafimaks, 2010), pp. 179–180.
11. Berov et al., *Razvitie na Industriĭata*, p. 149.
12. Marcheva, "Problemi na Modernizatsiyata," p. 182.
13. Jan T. Gross, "Social Consequences of War: Preliminaries to the Study of Imposition of Communist Regimes in East Central Europe," in *East European Politics and Societies*, vol. 3, no. 2 (March 1989), pp. 201–202.
14. Quoted in Marcheva, "Problemi na Modernizatsiyata," p. 184.
15. Berov et al., *Razvitie na Industriĭata*, p. 272; Marcheva, "Problemi na Modernizatsiĭata," pp. 194–195.
16. It is worth mentioning that early twentieth-century Bulgaria saw the only majority agrarian government in Europe and was a key part of the "Green International."

See Alex Toshkov, “The Rise and Fall of the Green International: Stamboliiski and His Legacy in East European Agrarianism 1919–39,” PhD thesis, Columbia University, 2014.

17. Marcheva, “Problemi na Modernizatsiāata,” p. 204.

18. All figures are from Ulf Brunnbauer, *‘Sotsialisticheskiāt Nachin na Zhivot’: Ideologiā, Obshestvo, Semeistvo I Politika v Bŭlgariā (1944–1989)* (Ruse, Bulgaria: MD Elias Kaneti, 2010), pp. 188–189.

19. All figures are from Brunnbauer, *Sotsialisticheskiāt Nachin na Zhivot*, pp. 208–209.

20. Taken from recordings of the speech, accessible online at the Bulgarian National Radio: <http://bnr.bg/radiobulgaria/post/100483520/1958-sedmiat-kongres-na-bkp-obavava-pobedata-na-socializma> (last accessed: July 19, 2022).

21. Todor Zhivkov, *Izbrani Sucheneniāa*, vol. 4 (Sofia: Partizdat, 1975), p. 52.

22. Collectivization was also at the root of the “Goryani” armed resistance movement of dissatisfied peasants and military officers that spread throughout the early 1950s. Most armed resistance was put down by 1956, but the movement’s illegal radio station broadcast until 1962. In some ways, the Congress also celebrated a real victory against interior enemies. For more on the Goryani, see the two volumes of documents by the State Archive Agency, *Goryanite* vol. 1 (2001) and vol. 2 (2010).

23. For a good discussion of the Congress, see Evgeniĭ Kandilarov’s “Ot ‘Realen’ kum ‘Demokratichen’ Sotsializum: Iz Zig-Zagite na Ideynoto I Programnoto Razvitie na BKP sled Vtorata Svetovna Voina” E. Kandilarov and T. Turlakova (eds.), *Izsledvaniya po Istoriā na Socializma v Bŭlgariā 1944–1989* (Sofia: Grafimaks, 2010), pp. 97–99.

24. Marcheva, “Problemi na Modernizatsiyata,” p. 200.

25. On the little-researched topic of Chinese influence on late-1950s Bulgarian development, see Jan Zofka, “China as a Role Model? The ‘Economic Leap’ campaign in Bulgaria (1958–1960),” *Cold War History*, vol. 18, no. 3 (2018), pp. 325–342.

26. Brunnbauer, *Sotsialisticheskiyat Nachin na Zhivot*, pp. 139–140.

27. Marcheva, “Problemi na Modernizatsiyata,” p. 201

28. Ivailo Znepolski (ed.), *NRB: Ot Nachaloto do Kraiā* (Sofia: Ciela, 2011), pp. 292–293.

29. Znepolski (ed.), *NRB*, p. 297.

30. TsDA f. 132 op. 1 a.e. 19 l. 79–88.

31. Janos Kornai, *The Socialist System: The Political Economy of Communism* (Princeton, NJ: Princeton University Press, 1992), p. 346.

32. Martin Ivanov and Daniel Vachkov, *Istoriā na Vŭnshniā Dŭrzhaven Dŭlg na Bŭlgariā 1878–1990*, Vol. 3 (Sofia: Pechatni Izdaniya na BNB, 2007), p. 114; chapter 12 in the book, on which much of this section is based, is a great overview of the crisis.

33. Ivanov and Vachkov, *Istoriā*, Vol. 3, p. 115.

34. For more on the “grand tour,” see Ivanov and Vachkov, *Istoriā*, Vol. 3, pp. 116–118.

35. Khristo Khristov, *Tainite Failiti na Komunizma: Istinata za Kraha na Bŭlgarskiĭa Sotsializŭm v Sekretrnite Arkhivi na Delo N 4/1990 za Ikonomicheskata Katastrofa* (Sofia: Ciela, 2007), p. 54.
36. Khristov, *Tainite Failiti*.
37. Ivanov and Vachkov, *Istoriĭa*, Vol. 3, p. 129.
38. Khristov, *Tainite Faliti*, p. 54.
39. Todor Zhivkov, *Memoari* (Sofia: IK Trud I Pravo 2006), p. 213.
40. TsDA f. 132 op. 5 a.e. 1 l. 23.
41. Daniel Vachkov and Martin Ivanov, *Bŭlgarskiĭat Vŭnshen Dŭlg 1944–1989: Bankruptŭt na Komunisticheskata Ikonomika* (Sofia: Ciela, 2008), p. 247. This book is the best in-depth account of the regime's indebtedness; for a more outright critical view, based on the 1990 judicial case against Zhivkov, see Khristov's *Tainite Failiti*.
42. Andre Steiner, "The Council of Mutual Economic Assistance—An Example of Failed Economic Integration?" *Geschichte und Gesellschaft*, vol. 39, no. 2 (April–June 2013), p. 241.
43. Steiner, "The Council of Mutual Economic Assistance," p. 242.
44. See Romano and Romero, *European Socialist Regimes' Fateful Engagement with The West*.
45. Steiner, "The Council of Mutual Economic Assistance," p. 243.
46. Iliĭana Marcheua, *Todor Zhivkov—Putiĭat kŭm Vlastta. Politika I Ikonomika v Bŭlgariĭa 1953–1964* (Sofia: IK Kota 2000), p. 116.
47. Marcheua, "Problemi na Modernizatsiĭata," p. 200.
48. Marcheua, "Problemi na Modernizatsiĭata," p. 197.
49. Vachkov and Ivanov, *Bŭlgarskiĭat*, p. 127.
50. Vachkov and Ivanov, *Bŭlgarskiĭat*, p. 131.
51. Marcheua, "Problemi na Modernizatsiyata," p. 202.
52. Steiner, "The Council of Mutual Economic Assistance," p. 244.
53. Maria Mursean, "Romania's Integration into Comecon. The Analysis of a Failure," *The Romanian Economic Journal*, vol. 11 (2008), p. 46.
54. Steiner, "The Council of Mutual Economic Assistance," p. 244.
55. Johanna Bockman and Gil Eyal, "Eastern Europe as a Laboratory for Economic Knowledge: The Transnational Roots of Neoliberalism," *American Journal of Sociology* vol. 108, no. 2 (September 2002), pp. 324–328.
56. Randall W. Stone, *Satellites and Commissars: Strategy and Conflict in the Politics of Soviet-Bloc Trade* (Princeton, NJ: Princeton University Press, 1996), p. 5.
57. Dina Rome Spechler and Martin C Spechler, "A Reassessment of the Burden of Eastern Europe on the USSR," *Europe-Asia Studies* vol. 61, no. 9 (November 2009), pp. 1645–1657.
58. Dennis Deletant and Mihail Ionesci, "Romania and the Warsaw Pact 1955–1989" (Cold War International History Project, Working Paper no. 43; April 2004), p. 27.

59. Jordan Baev, *Sistemata za Evropeiska Sigurnost I Balkanite v Godinite na Studenata Voina* (Sofia: Damyan Yakov, 2010), p. 99.
60. Baev, *Sistemata za Evropeiska Sigurnost*, p. 117.
61. Milena Dimitrova, *Zlatnite Desitiletiā na Bulgarskata Elektronika* (Sofia: IK Trud, 2008), p. 112.
62. Interview with Stoian Markov, July 28, 2015.
63. Ivan Popov, who died in 2000, did not leave a publicly accessible personal archive, or memoirs, to the detriment of history. However, the contours of his life are well known due to his biographical sketches as a party member, while all interviewees, memoirs, or narratives of the industry talk about him at length, leaving us with a plethora of impressions by subordinates and colleagues. Unless otherwise stated, the biographical sketch here draws extensively from Appendix 3 of Kiril Boianov's *Shtrihii ot Razvitiето na Izchislitelnata Tehnika v Būlgariā* (Sofia: Akademichno Izdatelstvo Prof. Marin Drinov, 2010), pp. 178–194; the chapter “Ivan Popov” in Dimitrova, *Zlatnite Desitiletiā*, pp. 95–112; and Jouko Nikula and Ivan Tchalakov, *Innovations and Entrepreneurs in Socialist and Post-Socialist Societies* (Newcastle: Cambridge Scholars Publishing, 2013), pp. 78–112.
64. Interview with Petūr Petrov, June 10, 2016.
65. “Kūsi Sūedeniniā,” *Rabotnichesko Delo*, no. 46 (February 15, 1952).
66. Dimitrova, *Zlatnite Desitiletiā*, p. 101.
67. Dimitrova, *Zlatnite Desitiletiā*, p. 25.
68. A feeling familiar to many doctoral students across time and space.
69. *Entsiklopediā Būlgariā*, vol. 3 (Sofia: Izdatelstvo na BAN, 1982).
70. Peter Totev interview in Dimitrova, *Zlatnite Desitiletiā*, pp. 37–38.
71. Peter Totev interview in Dimitrova, *Zlatnite Desitiletiā*, p. 40.
72. Stoian Dzhamiikov, *Zapiski na Konstruktora* (Sofia: Avangard Prima, 2015), pp. 96–97.
73. Dimitrova, *Zlatnite Desitiletiā*, p. 43.
74. Liubomir Antonov, *Kakvi Sūm Gi Vūrshil* (unpublished memoir, available at <http://bbaei.webnode.com/bylg-electronica-i-inormatika/>; last accessed July 19, 2022), pp. 66–67.
75. Antonov, *Kakvi Sūm Gi Vūrshil*, p. 68.
76. Antonov, *Kakvi Sūm Gi Vūrshil*, pp. 74–75.
77. For the turbulent history of Soviet cybernetics, see Slava Gerovitch, *From New-speak to Cyberspeak: A History of Soviet Cybernetics* (Cambridge, MA: MIT Press, 2002).
78. Kiril Boianov, “Pūrviiāt Izchislitelen Tsentūr v Būlgariā—Nachalo na Informatiionoto Obshetsvto u Nas,” in *Bulgarska Nauka*, vol. 6, no. 4 (2011), pp. 53–58.
79. E-mail exchange with his daughter Yana Hashamova, February 28, 2015.
80. Boianov, “Pūrviiāt Izchislitelen TŠentūr.”
81. Antonov, *Kakvi*, p. 77.



82. Interview with Petŭr Petrov, March 19, 2015.
83. Petŭr Petrov, "Angel Simeonov Angelov na 85 Godini" (copy of an article celebrating Angelov's 85th birthday, kindly presented to me by Petrov).
84. Evgeniŭ Kandilarov, "Elektronikata v Ikonomicheskata Politika na Bŭlgariĭa prez 60te-80te Godini na XX Vek," in *GSU-IF*, vol. 96/7 (2003/2004), p. 440.
85. Kandilarov, "Elektronikata v Ikonomicheskata Politika, p. 441.
86. Marcheva, "Problemi na Modernizatsiĭata," p. 204.
87. Petŭr Petrov, "55 Godini Avtomatika, Kibernetika I Robotika v BAN" (Chronological piece available at the website of one of ITKR's successors at <http://css.iict.bas.bg/history.html>; last accessed October 23, 2016).
88. Petrov, "Angel Simeonov Angelov."
89. Slava Gerovitch, "Mathematical Machines of the Cold War: Soviet Computing, American Cybernetics and Ideological Disputes in the Early 1950s," *Social Studies of Science* vol. 31, no. 2 (April 2001), pp. 256–257.
90. Loren R. Graham, *Science, Philosophy and Human Behaviour in the Soviet Union* (New York: Columbia University Press, 1987), p. 273. Norbert Wiener is considered the father of cybernetics, introducing and elaborating the term in his 1948 seminal work, *Cybernetics: Or Control and Communications in the Animal and the Machine* (New York: The Technology Press, John Wiley & Sons, Inc., 1948); Claude Shannon was also a key figure in the discipline with his 1949 *Mathematical Theory of Communication*, a foundational work in information theory, introducing the concept of noise in communication channels. These philosophical works impacted discussions that are elaborated in chapter 6; for more on the cybernetic moment, see Robert Kline, *The Cybernetics Moment: Or Why We Call Our Age the Information Age* (Baltimore: Johns Hopkins University Press, 2017).
91. David Mitchell, Jerome Segal, and Slava Gerovitch, "From Communications Engineering to Communications Science: Cybernetics and Information Theory in the United States, France, and the Soviet Union," in Mark Walker (ed.), *Science and Ideology: A Comparative History* (London: Routledge, 2003), p. 81.
92. Igor Poletaev, *Signal: O Nekatoriyh Ponyatiyih Kibernetiki* (Moscow: Izdatelstvo Sovetskoe Radio, 1958), p. 23.
93. *Kratka Bŭlgarska Entsiklopediĭa Tom 3 Kvant-Opere* (Sofia: Izdatelstvo na BAN, 1966), p. 19.
94. The history of Soviet cybernetics is beyond the scope of this book, so for an overview of the topic, see Slava Gerovitch's enthralling *From Newspeak to Cyberspeak: A History of Soviet Cybernetics* (Cambridge, MA: The MIT Press, 2002).
95. Slava Gerovitch, "InterNyet: Why the Soviet Union Did Not Build a Nationwide Computer Network," *History and Technology*, vol. 24, no. 4 (December 2008), p. 337; for an entertaining and more general look, see Francis Spufford, *Red Plenty* (New York: Graywolf Press, 2012).
96. Spufford, *Red Plenty*; for an excellent overview of the attempts to network Soviet society to achieve this control, see Benjamin Peters, *How Not to Network a Nation: The*

*Uneasy History of the Soviet Internet* (Cambridge, MA: The MIT Press, 2016), a work that will return in later chapters.

97. Gerovitch, “InterNyet,” p. 340.

98. Gerovitch, “Mathematical Machines of the Cold War,” pp. 265–266.

99. Boris Malinovsky, *Pioneers of Soviet Computing* (Published electronically, 2010; [http://www.sigcis.org/files/SIGCISMC2010\\_001.pdf](http://www.sigcis.org/files/SIGCISMC2010_001.pdf); last accessed October 24, 2016), p. 23.

100. Gerovitch, “Mathematical Machines of the Cold War,” p. 268.

101. James W. Cortada, “Information Technologies in the German Democratic Republic (GDR), 1949–1989,” *IEEE Annals of the History of Computing*, vol. 34, no. 2 (February 2012), p. 37.

102. Petri Paju and Helena Durnova, “Computing Close to the Iron Curtain: International Computing Practices in Czechoslovakia and Finland 1945–1970,” *Comparative Technology Transfer and Society*, vol. 7, no. 3 (December 2009), p. 311.

103. Anonymous, “History of Computing Developments in Romania,” *IEEE Annals of the History of Computing*, vol. 21, no. 3 (1999), p. 58.

104. Zsuzsa Szentgyorgi, “A Short History of Computing in Hungary,” *IEEE Annals of the History of Computing*, vol. 21, no. 3 (1999), p. 51.

105. Andrew Targowski, *The History, Present State, and Future of Information Technology* (Santa Rosa, CA: Informing Science Press, 2016), pp. 123–126.

106. Cortada, “Information Technologies in the GDR,” p. 37.

107. Here I call on the work of Alexander Gerschenkron, *Economic Backwardness in Historical Perspective: A Book of Essays* (Cambridge, MA: Belknap Press, 1962).

## CHAPTER 2

1. A popular slogan of supporters of Levski-Sofia, one of the country’s most popular football clubs.

2. Kiril Boianov, *Shtrihii ot Razvitiето na Izchislitelnata Tehnika v Bŭlgariĭa* (Sofia: Akademichno Izdatelstvo Prof Marin Drinov, 2010), p. 22.

3. TsDA f. 1B op. 68 a.e. 1836 l. 201 (Politburo Discussions on Electronic Development, 1986).

4. For an argument about this Soviet amalgamation, see Vladislav Zubok and Constantine Pleshakov, *Inside the Kremlin’s Cold War: From Stalin to Khrushchev* (Cambridge, MA: Harvard University Press, 1996).

5. Elidor Mehilli, *From Stalin to Mao: Albania and the Socialist World* (Ithaca, NY: Cornell University Press, 2017), p. 5.

6. Quoted in Ivan Chalŭkov’s *Da Napravish Holograma: Kniga za Uchenite, Svetlinata I Vsichko Ostanalo* (Sofia: AI Prof. Marin Drinov, 1998) p.17; the provocative joke of Zhivkov as venture capitalist was first uttered by Quinn Slobodian at a workshop at Columbia University in April 2016.

7. Boianov, *Shtrihii*, p. 16.

8. Boi̇anov, *Shtrih*, pp. 17–18.
9. Boi̇anov, *Shtrih*, p. 19.
10. Boi̇anov, *Shtrih*, p. 22.
11. Boi̇anov, *Shtrih*, p. 24.
12. TsDA f. 1B op. 6 a.e. 5513 l. 150–153 (Politburo Discussions 1964).
13. TsDA f. 1B op. 6 a.e. 5513 l. 152.
14. TsDA f. 1B op. 6 a.e. 5513, l. 136.
15. TsDA f. 1B op. 6 a.e. 5513 l. 138–144.
16. I thank Michel Christian for drawing my attention to UNIDO's importance in his paper, "Developing a National-Based Electronics Industry. UNIDO's Cooperation with the Bulgarian Research Institute for Instrument Design in the 1970s and 1980s," presented at the Pan-European Economic Spaces in the Cold War Conference in Geneva on June 2022. UNIDO is curiously absent from the Bulgarian archives, and this archival silence probably speaks volumes about how national documents reflect a certain technological nationalism. So I thank Michel very warmly for bringing in this angle from the UN in the eleventh hour! A mention of UNIDO can be seen in passing in Kiril Boi̇anov's memoir *Istinata e Kladenets: Zhivoti̇t Mi v Kompyutiṙnata Era* (Sofia: AI Akad Marin Drinov, 2018) but without much detail—again, demonstrating how different the focus is if it is local!
17. *Higher Mechanical and Electrical Engineering Institute Varna* (Sofia: Septemvri Publishing House, 1987), pp. 6–7, 13.
18. *45 Godini Katedra Elektronika*—available at [https://electronica-tugab.eu/images/stories/Documents/knijka\\_45.pdf](https://electronica-tugab.eu/images/stories/Documents/knijka_45.pdf) (last accessed: August 1 2022).
19. TsDA f. 1B op. 6 a.e. 5513 l. 142 (Politburo Discussions).
20. Postanovlenie 26 in *Dürzhaven Vestnik*, issue 36, 1965.
21. Li̇ubomir Antonov, *Kakvi Sum Gi Vurshil* (unpublished memoir, available at <https://6593fa9ac5.cbaul-cdnwnd.com/ea204c52c98c1613523a2e268ca812d5/200000313-d338ed432c/LAntonovAvtobio0512.pdf> (last accessed August 1, 2022)), pp. 86–87.
22. Antonov, *Kakvi Sum Gi Vurshil*, p. 88.
23. Dimitür Shishkov, *Zvezdnite Migove na Bülgarskata Elektroika* (Sofia: TangraTan-NakRA IK 2002), p. 352.
24. Evgeni̇i Kandilarov, "Elektronikata v Ikonomicheskata Politika na Bülgari̇a prez 60te–80te Godini na XX Vek," in *GSU-IF*, vol. 96/7 (2003/2004), pp. 445–446.
25. Antonov, *Kakvi Sum Gi Vurshil*, pp. 95–97.
26. Antonov, *Kakvi Sum Gi Vurshil*, pp. 95–97.
27. TsDA f. 517 op. 2 a.e. 169 l. 45–7 (CSTP Discussion on Soviet Co-Operation 1966–7).
28. TsDA f. 517 op. 2 a.e. 169 l. 45.
29. TsDA f. 517 op. 2 a.e. 169 l. 47.
30. TsDA f. 830 op. 1 a.e. 88 l. 1–2 (Izotimpex Exports 1968).

31. TsDA f. 830 op. 1 a.e. 90 l. 1–2 (Izotimpex Exports 1970).
32. TsDA f. 830 op. 1 a.e. 90 l. 5.
33. TsDA f. 830 op. 1 a.e. 91 l. 3 (Izotimpex Statistical Report 1971).
34. TsDA f. 830 op. 1 a.e. 92 l. 2 (Izotimpex Statistical Report 1972).
35. TsDA f. 830 op. 1 a.e. 93 l. 3 (Izotimpex Statistical Report 1973).
36. Antonov, *Kakvi Šüm Gi Vürshil*, p. 104.
37. Antonov, *Kakvi Šüm Gi Vürshil*, p. 100.
38. Milena Dimitrova, *Zlatnite Desitiletiã na Bŭlgarskata Elektronika* (Sofia: IK Trud, 2008), p. 216.
39. Jouko Nikula and Ivan Tchalakov, *Innovations and Entrepreneurs in Socialist and Post-Socialist Societies* (Newcastle: Cambridge Scholars Publishing, 2013), pp. 95–96.
40. Sayuri Guthrie-Shimizu, “Japan, the United States, and the Cold War 1945–1960,” in Odd Arne Westad and M. Leffler (eds.), *Cambridge History of the Cold War, Vol. 1—Origins* (Cambridge: Cambridge University Press, 2010), p. 257.
41. Guthrie-Shimizu, “Japan, the United States, and the Cold War 1945–1960,” p. 258.
42. Michael Schaller, “Japan and the Cold War 1960–1991,” in Westad and Leffler (eds.), *Cambridge History of the Cold War, Vol. 3—Endings*, pp. 161–162.
43. Evgeniï Kandilarov, *Bŭlgariã I ĪAponiã: Ot Studenata Voïna kum XXI Vek* (Sofia: Izdatelstvo Damyan Yankov, 2009), p. 42; the only monograph on Bulgarian-Japanese Cold War relations is also a great overview of the country’s importance for Bulgarian technological policy.
44. Kandilarov, *Bŭlgariã I ĪAponiã*, p. 63.
45. Kandilarov, *Bŭlgariã I ĪAponiã*, p. 47.
46. Kandilarov, *Bŭlgariã I ĪAponiã*, p. 71.
47. Interview with Dimo Dimov, in Dimitrova, *Zlatnite Desitiletiã*, p. 79.
48. Dimitrova, *Zlatnite Desitiletiã*, p. 82.
49. Dimitrova, *Zlatnite Desitiletiã*, p. 84; Marangozov was the future father of the Bulgarian personal computer.
50. Kandilarov, *Bŭlgariã i ĪAponiã*, p. 86.
51. Dimitrova, *Zlatnite Desitiletiã*, p. 86.
52. Dimitrova, *Zlatnite Desitiletiã*, p. 87.
53. Dimitrova, *Zlatnite Desitiletiã*, p. 88.
54. Vera Vutova-Stefanova and Evgeniï Kandilarov, *Bŭlgariã I ĪAponiã: Politika, Diplomatsiya, Lichnosti I Subitiya* (Sofia: Iztok-Zapad, 2019), p. 341.
55. Both Papazov and Doïnov’s experiences will be discussed more fully in chapter 7.
56. The Bulgarians took EXPO’70 very seriously, as a chance to boost relations with this important country. Preparation started in 1967, and the innovative pavilion design was approved in 1968, granting the project to the team of architects led by

Todor Kozhuharov and Evlogi Tsvetkov, who aimed to symbolize the Balkan mountains through the four glass peaks. In six months, it was visited by over 9 million people and was the subject of 1,200 publications, a real surprise hit at the exposition. It was decided to bring the pavilion back to Bulgaria and make it permanent, either in Sofia or on the premises of the Plovdiv Trade Fair. The project, however, never saw the light of day due to ever-rising costs.

57. Todor Zhivkov, *Memoari* (Sofia: IK Trud I Pravo, 1996), pp. 512–513.
58. Zhivkov, *Memoari*, p. 513.
59. Zhivkov, *Memoari*, p. 514.
60. TsDA f. 1B op. 35 a.e. 1457 l. 11–13 (Politburo Discussions 1970).
61. TsDA f. 1B op. 35 a.e. 1457 l. 17.
62. TsDA f. 1B op. 35 a.e. 1457 l. 19–21.
63. TsDA f. 1B op. 35 a.e. 1457 l. 19–21.
64. The ITCR's story is key to chapters 5 and 6 and will be picked up in more detail there.
65. Lūbomir Iliev, *Matematikata v Narodna Republika Būlgariā* (Sofia: Sayuz na Matematitsite v Būlgariā, 1984).
66. Snezhana Khristova, *40 Godini Tzentralen Institut po Izhislitelna Tehnika* (unpublished memoir, available at <http://bbaeii.webnode.com/bylg-electronica-i-inormatika/>; last accessed: November 4, 2016).
67. TsDA f. 37A op. 1 a.e. 1 l. 7–32 (CICT Annual Plans 1966–8).
68. TsDA f. 37A op. 1 a.e. 2 l. 46 (Plans & Reports 1969–70).
69. Shishkov, *Zvezdnite Migove*, p. 225.
70. Kiril Boiānov, Speech Commemorating Angel Angelov's 80th Birthday, February 12, 2009, Sofia (text accessible at <http://bbaeii.webnode.com/bylg-electronica-i-inormatika/>, last accessed August 1, 2022).
71. Interview with Angel Angelov conducted by e-mail through his daughter Sonia Angelova Hirt, June 29, 2016.
72. TsDA f. 136 op. 44 a.e. 10 l. 27–33 (Council of Ministers 1966).
73. TsDA f. 136 op. 44 a.e. 10 l. 27–33 l.1.
74. TsDA f. 1B op. 35 a.e. 381 l. 41–2 (Politburo Discussions on Electronic Siting 1968).
75. TsDA f. 1003 op. 1 a.e. 1 l. 2 (IZOT Decisions 1969–78).
76. TsDA f. 1003 op. 1 a.e. 1 l. 1.
77. The Bulgarian Agrarian National Union was a coalition partner of the BCP throughout the regime's history, a curiosity that had practical benefits, such as using it to negotiate with regimes and organizations that would not do so with the Communist Party.
78. TsDA f. 1B op. 35 a.e. 54 l. 24–5 (Politburo Seminar on Technical Progress 1968).
79. The integrated circuit, or the microchip, was the revolution in electronics that allowed for the fast development of computers after the 1960s and their entry into

everyday life. The first such circuit was created in 1958, with mass production starting in the 1960s and increased miniaturization throughout the following decades.

80. TsDA f. 136 op. 48 a.e. 434 (Council of Ministers 1969).

81. The semiconductor became the basis of one of Bulgarians' favorite Zhivkov gaffes, commonly cited as proof of his low education and unclear understanding of what he was championing: "This year we have built a factory for semi-conductors, next—for full conductors!"

82. TsDA f. 136 op. 48 a.e. 422 (Council of Ministers 1975).

83. *Doklad vurhu Proekta za Ikonomicheski Rastezh i Prehod kum Pazarnata Ikonomika v Bŭlgariĭa*, prepared for the United States Chamber of Commerce by Richard Rahn and Ronald Utt, October 31, 1990, chapter 22, p. 16.

84. TsDA f. 1B op. 35 a.e. 1063 (Politburo Decision 1969).

85. TsDA f. 1B op. 35 a.e. 1172 (Politburo Discussion on Territorial Distribution of Factories 1970).

86. Evgeniĭ Kandilarov, "Elektronikata v Ikonomicheskata Politika na Bŭlgariĭa prez 60te-80te Godini na XX Vek," *GSU-IF*, vol. 96/97 (2003/2004), p. 464.

87. TsDA f. 136 op. 51 a.e. 158 l. 23 (Council of Minister **Minutes**)

88. RGAE f. 9480 op. 9 a.e. 217 l. 3 (5th Session of Bulgarian-Soviet Co-Operation Commission 1966).

89. RGAE f. 9480 op. 9 a.e. 217 l. 5, l. 21.

90. RGAE f. 9480 op. 9 a.e. 218 l. 11 (GKNT Data on Co-Operation 1966).

91. RGAE f. 9480 op. 9 a.e. 218 l. 1.

92. RGAE f. 9480 op. 9 a.e. 462 l. 12 (6th Session of Co-Operation Commission 1967).

93. Benjamin Peters, *How Not to Network a Nation: The Uneasy History of the Soviet Internet* (Cambridge, MA: The MIT Press, 2016), p. 163.

94. RGAE f. 9480 op. 9 a.e. 880 l. 12 (GKNT Report on Computers in USSR—1969).

95. RGAE f. 9480 op. 9 a.e. 880 l. 150.

96. RGAE f. 9480 op. 9 a.e. 880 l. 151–154.

97. RGAE f. 9480 op. 9 a.e. 880 l. 221.

98. Vasil Nedeŭ, *Hronika na Bulgarskata Kompiŭtŭrna Tehnika* (unpublished, available at <http://bbaei.webnode.com/bylg-electronica-i-inormatika/>; last accessed August 1, 2022).

99. Stoĭan Shalamanov, *NRB V Sotsialisticheskata Ikonomicheska Integratsiya: Strukturna Politika* (Sofia: Partizdat, 1981), p. 140.

100. Boĭanov, *Shtrih*, p. 185.

101. "Western Computer Companies Step Up Sales Drive," *Financial Times*, February 12, 1969, p. 7.

102. TsDA f. 37A op. 1 a.e. 7 l. 16 (CICT On ES Elements 1968).

103. TsDA f. 37A op.1 a.e. 17 l. 7–11 (CICT Documents for ES Meetings 1968).

104. TsDA f. 37A op. 1 a.e. 22 l. 2–10 (CICT On ES Input-Output Meetings 1969).
105. Kandilarov, “Elektronikata v Ikonomicheskata Politika,” p. 437.
106. Interview with Alexander T̄svetkov, April 6, 2015.
107. Interview with Angel Angelov in Dimitrova, *Zlatnite Desiteletiãa*, p. 130.
108. TsDA f. 136 op. 49 a.e. 243 l. 77–8 (Council of Ministers).
109. TsDA f. 1B op. 35 a.e. 493 l. 5–6 (Politburo on Comecon Integration 1968–9).
110. TsDA f. 1B op. 35 a.e. 493 l. 10.
111. TsDA f. 1B op. 35 a.e. 493 l. 11.
112. TsDA f. 1B op. 35 a.e. 493 l. 14.
113. TsDA f. 1B op. 35 a.e. 493 l. 16–17.
114. TsDA f. 1B op. 35 a.e. 493 l. 22, l. 39–41.
115. TsDA f. 517 op. 2 a.e. 173 l. 62 (CSTP on Trade Problems 1969).
116. William Butler (ed.), *A Source Book on Socialist International Organizations* (Alphen aan den Rijn, The Netherlands: Sijthoff & Noordhoff, 1978).
117. Elitza Stanoeva, “Balancing between Socialist Internationalism and Economic Internationalisation: Bulgaria’s Economic Contacts with the EEC,” in Angela Romano and Federico Romero (eds.), *European Socialist Regimes’ Fateful Engagement with The West: National Strategies in the Long 1970s* (London: Routledge 2020).
118. TsDA f. 1B op. 35 a.e. 12 l. 18–23 (Politburo on Relations with EC 1967–8).
119. RGAE f. 9480 op. 9 a.e. 939 l. 3, 49 (11th Session of Commission 1969).
120. RGAE f. 9480 op. 9 a.e. 938 l. 19–20 (10th Session of Commission 1969).
121. RGAE f. 9480 op. 9 a.e. 1198 l. 29 (13th Session of Commission 1970).
122. RGAE f. 9480 op. 9 a.e. 1199 l. 17–19 (Session Participation 1970).
123. RGAE f. 9480 op. 9 a.e. 1471 l. 12–18; RGAE f. 9480 op. 9 a.e. 1725 l. 12, 20, 38; RGAE f. 9480 op. 9 a.e. 1727 l. 24 (14th, 16th, and 17th Sessions—1971–2).
124. RGAE f. 9480 op. 9 a.e. 1474 l. 20 (Report on Activity 1971).
125. RGAE f. 9480 op. 9 a.e. 1473 l. 32 (14th and 15th Sessions 1971).
126. RGAE f. 9480 op. 9 a.e. 1474 l. 21 (Report on Activity 1971).
127. RGAE f. 9480 op. 9 a.e. 1726 l. 22 (17th Session 1972).
128. RGAE f. 9480 op. 9 a.e. 2250 l. 6 (GKNT Reports 1974).
129. TsDA f. 378B a.e. 360 (Minutes of Zhivkov-Brezhnev Meeting 1973).
130. Khristo Khristov, *Tainite Faliti Na Komunizma* (Sofia: Ciela, 2007), p. 104.
131. RGAE f. 9480 op. 9 a.e. 1726 l. 12–23 (17th Session 1972).
132. RGAE f. 9480 op. 9 a.e. 1728 l. 8–10 (GKNT Ukrainian Co-operation 1972).
133. RGAE f. 9480 op. 9 a.e. 1197 l. 33 (12th Session 1970).
134. RGAE f. 9480 op. 9 a.e. 1474 l. 6 (GKNT Report 1972).
135. RGAE f. 9480 op. 9 a.e. 1727 l. 99–104 (16th and 17th Sessions 1972).

136. RGAE f. 9480 op. 9 a.e. 1987 l. 1 (GKNT Negotiations 1973–4).
137. RGAE f. 9480 op. 12 a.e. 585 l. 1 (GKNT Co-Operation in Information 1977).
138. TsDA f. 517 op. 4 a.e. 24 l. 79 (CSTP Licenses 1975).
139. TsDA f. 517 op. 4 a.e. 15 l. 8 (CSTP On Soviet Integration 1973).
140. Shishkov, *Zvezdnite Migove*, p. 226.
141. Angel Angelov et al., *Elektronikata v Bŭlgariĭa: Minalo, Nastoĭashte, Bŭdishte* (Sofia: Tekhnika, 1983), pp. 44–46.
142. RGAE f. 9480 op. 9 a.e. 1471 l. 33 (14th Session 1971).
143. Interview with Nedko Botev, Boyan T̄sonev, and Koĭcho Dragostinov, June 23, 2015.
144. TsDA f. 136 op. 51 a.e. 158 l. 15–18 (Council of Ministers).
145. Interview with Stoĭan Markov, July 28, 2015; Interview with Plamen Vachkov, June 30, 2015.
146. TsDA f. 1B op. 35 a.e. 4189 l. 5–6 (Popov Report to Zhivkov 1973).
147. TsDA f. 1B op. 35 a.e. 4189 l. 89.
148. *Dŭrzhaven Vestnik*, issue 56, 1973.
149. He had also started his rise while Papazov was ambassador to Japan; from 1971 Papazov had replaced Popov as head of CSTP.
150. Ognĭan Doĭnov, *Spomeni* (Sofia: Trud, 2002).
151. As will be seen in chapter 5, this did not stop him from retaining an active and constructive role in scientific policy, turning the organization into a space of innovation.
152. TsDA f. 1B op. 35 a.e. 5176 l. 1–20 (Central Committee Plenum 1975).
153. TsDA f. 1B op. 66 a.e. 1303 l. 34 (Doĭnov Politburo Report on Accelerated Development 1977).
154. TsDA f. 1B op. 66 a.e. 1303 l. 23.
155. Boĭanov, *Shtrihi*, p. 213; the years of introductions below are taken from the list the author presents between pages 212 and 230.
156. Ognemir Genchev, *Panorama na Elektronnata Promishlenost na Bŭlgariĭa: Fakti I Dokumenti* (Sofia: Ciela, 2003), p. 72.
157. Shalamanov, *NRB V Sotsialisticheskata Ikonomicheska Integratsiya*, p. 147.
158. TsDA f. 517 op. 5 a.e. 15 l. 119 (CSTP Development Strategy 1979–1980).
159. TsDA f. 136 op. 68 a.e. 107 l. 720 (Council of Ministers); the issue of debt and capitalist currency for electronics will be discussed in the conclusion.
160. The standard in hard drive technology from the 1970s until the 2010s, the Winchester drive was introduced by IBM in 1973. Its low mass and low-load heads allowed for much greater recording density and faster read times, as well as reduced complexity and costs—and thus higher profits.



161. TsDA f. 517 op. 5 a.e. 38 l. 67 (CSTP on Permanent National Exhibit 1979).
162. TsDA f. 517 op. 5 a.e. 38 l. 13.
163. TsDA f.1B op. 59 a.e. 42 l. 9 (Politburo on Socio-Economic Plan 1979).
164. TsDA f. 517 op. 6 a.e. 108 l. 198 (CSTP Automation-8 Program 1982).
165. TsDA f. 517 op. 7 a.e. 86 l. 1 (CSTP Automation-8 Program 1980).
166. Dimitrova, *Zlatnite Desitiletiia*, pp. 192–194.
167. Interview with Krasimir Markov, February 4, 2016.
168. See Appendix B for a list of Bulgarian electronics production.
169. TsDA f. 1003 op. 1 a.e. 22 l. 5 (IZOT Cost Reports 1981).
170. Boianov, *Shtrihi*, p. 231.
171. TsDA f. 517 op. 6 a.e. 21 l. 42 (CSTP On Memory Devices 1981).
172. TsDA f. 830 op. 1 a.e. 89 l. 2 (Izotimpex Statistical Report 1969).
173. TsDA f. 830 op. 1 a.e. 90 l. 6 (Izotimpex Statistical Report 1970).
174. TsDA f. 830 op. 1 a.e. 90 l. 2.
175. TsDA f. 830 op. 2 a.e. 25 l. 13 (Izotimpex Report 1984).
176. TsDA f. 830 op. 2 a.e. 26 l. 6 (Izotimpex Report 1985).
177. TsDA f. 830 op. 2 a.e. 34 l. 11 (Izotimpex Export Bulletin 1987).
178. TsDA f. 830 op. 2 a.e. 28 l. 1 (Izotimpex Report 1987).
179. TsDA f. 1003 op. 1 a.e. 71 l. 12 (IZOT Specialists Council Meetings 1978–80).
180. “Milliarden Dollar Schulden in Moskau,” *Der Spiegel*, no. 46 (1982).
181. Quoted in Ivailo Znepolski (ed.), *NRB: Ot Nachaloto do Kraya* (Sofia: Ciela, 2011), p. 314.

### CHAPTER 3

1. Mirosław Sikora, “Cooperating with Moscow, Stealing in California: Poland’s Legal and Illicit Acquisition of Microelectronic Knowhow from 1960 to 1990,” in C. Leslie and M. Schmitt (eds.), *Histories of Computing in Eastern Europe. HC 2018. IFIP Advances in Information and Communication Technology*, vol. 549 (Cham, Switzerland: Springer, 2019), p. 171.
2. Sikora, “Cooperating with Moscow, Stealing in California,” p.166; see also M. Sikora, “Clandestine Acquisition of Microelectronics and Information Technology by the Scientific-Technical Intelligence of Polish People’s Republic in 1970–1990,” 2017 Fourth International Conference on Computer Technology in Russia and in the Former Soviet Union (SORUCOM), (IEEE 2017) (Zelenograd, 2017), pp. 200–212.
3. For his ideas on the closed-world metaphor, see Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996).
4. Yoko Yasuhara, “The Myth of Free Trade: The Origins of CoCom 1945–1950,” *Japanese Journal of American Studies*, vol. 4 (1991), p. 128. For more on different

perspectives on CoCom, see Gary K. Bertsch, Heinrich Vogel, and Jan Zielonka, *After the Revolutions: East-West Trade and Technology Transfer in the 1990s* (New York: Routledge, 2019).

5. Bertsch, Vogel, and Zielonka, *After the Revolutions*, pp. 143–144.
6. C. Leslie, “From CoCom to Dot-Com: Technological Determinisms in Computing Blockades, 1949 to 1994,” in C. Leslie and M. Schmitt M. (eds.), *Histories of Computing in Eastern Europe. HC 2018. IFIP Advances in Information and Communication Technology*, vol. 549 (Cham, Switzerland: Springer, 2018).
7. Interview with Alexander Tsvetkov, April 6, 2015.
8. Interview with Krasimir Markov, February 4, 2016.
9. R. Bergien, “Programmieren mit dem Klassenfeind,” *Vierteljahrshefte für Zeitgeschichte*, vol. 67, no. 1 (2019), pp. 1–30.
10. Commission on the Dossiers, *Dürzhavna Sigurnost i Nauchno-Tehnicheskoto Razuznavane* (Sofia: KRDOBPBGDSRSBNA, 2013), p. 6.
11. Momchil Metodiev, *Mashina za Legitimnost: Rolyata na Dürzhavna Sigurnost v Komunisticheskata Durzhava* (Sofia: Ciela, 2008), p. 18.
12. Khristo Khristov, “Dürzhavna Sigurnost. Chast 2.1: Nauchno-Tehnicheskoto Razuznavane,” *Kapital*, August 29, 2010.
13. For a great work on this issue, see Jordan Baev, *KGB v Bülgariia* (Sofia: Voenno Izdatelstvo, 2009).
14. Metodiev, *Mashina za Legitimnost*, p. 113.
15. “Information” was the catch-all term that STI used to designate any document or item that was acquired; it could thus be anything from a material good to a research plan. The acquisition and implementation of “informations” was at the heart of its activities.
16. Khristov, “Dürzhavna Sigurnost. Chast 2.1.”
17. TsDA f. 1B op. 64 a.e. 313 l. 30 (Politburo Reports 1964).
18. AKRDOPBGDSRSNBA-M/R f. 66 op. 1 a.e. 70 l. 1 (Central Committee Decisions 1966).
19. Metodiev, *Mashina za Legitimnost*, p. 117.
20. Metodiev, *Mashina za Legitimnost*, p. 117.
21. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 589 l. 21 (Council of Ministers Order 1980).
22. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 466 l. 35 (Politburo Decision 1979).
23. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 412 l. 13 (Organizational Structure 1967).
24. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 412 l. 69 (Organizational Structure 1967).
25. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 367 l. 1–2 (Organizational Instructions 1976).
26. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 418 l. 20 (Suggestions to First Directorate 1974).

27. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 418 l. 21 (Suggestions to First Directorate 1974).
28. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 367 l. 2 (Temporary Instructions 1976).
29. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 466 l. 38 (Politburo Decision 1979).
30. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 149A l. 67 (First Directorate Order 1977).
31. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 432 l. 125–7 (Internal Report 1971).
32. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 462 l. 124–6 (Instructions on ISKRA Usage 1981).
33. Joshua Sanborn is currently working on a study of the KGB and computers, and I thank him for sharing some of his preliminary insights with me.
34. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 453 l. 305–7 (Report on Trip to KGB 1980).
35. AKRDOPBGDSRSNBA-M, f. 1 op. 11 a.e. 445 l. 12–13 (Information Plan of Directorate 1980).
36. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 527 l. 1 (Meeting with Mongolian Representative 1983).
37. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 476 l. 9 (Trip to Havana 1981).
38. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 528 l. 1 (Joint Meeting with Vietnam 1983).
39. Charles Tilly, "War Making and State Making as Organized Crime," in P. B. Evans, D. Rueschemeyer, and T. Skocpol (eds.), *Bringing the State Back In* (Cambridge: Cambridge University Press 1985), p. 184.
40. Evgeniĭ Kandilarov, "Elektronikata v Ikonomiceskata Politika na Bŭlgariĭa prez 60te-80te Godini na XX Vek," *GSU-IF*, vol. 96/97 (2003/2004), p. 461.
41. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 38–9 (Activity Report 1972).
42. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 40 (Activity Report 1972).
43. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 38 (Activity Report 1972).
44. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 14 (Activity Report 1972).
45. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 378 l. 67 (Activity Report 1976).
46. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 375 l. 54–6 (Activity Report 1973).
47. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 376 l. 57 & f. 9 op. 2 a.e. 366 l. 56 (Activity Reports 1974 & 1975).
48. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 378 l. 67 (Activity Report 1976).
49. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 390 l. 19 (Post-Helsinki Situation 1976).
50. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 390 l. 20 (Post-Helsinki Situation 1976).
51. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 433B l. 61 (Exchanges with KGB 1976).
52. Khristov, "Dŭrzhavna Sigurnost. Chast 2.1."
53. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 171 l. 46 (Exchanges with KGB 1978).
54. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 441 l. 1 (Report on Allied Services Meeting 1970).

55. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 441 l. 1–3 (Report on Allied Services Meeting 1970).
56. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 382 l. 20 (Received Materials 1968).
57. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 398 l. 181 (Soviet Materials 1969).
58. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 171 l. 44 (Exchanges with KGB 1978).
59. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 540 l. 205–6 (Exchanges with KGB 1985).
60. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 540 l. 204 (Exchanges with KGB 1985).
61. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 556 l. 166–172 (KGB Exchanges 1986).
62. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 576 l. 166 (KGB Exchanges 1987).
63. Which Charles Maier argues is a key part in the GDR's collapse—see chapter 2 of his *Dissolution: The Crisis of Communism and the End of East Germany* (Princeton, NJ: Princeton University Press, 1999).
64. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 449 l. 227 (Report on Berlin Talks 1972).
65. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 150B l. 27 (Talks with Germans 1975).
66. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 433B l. 76 (Talks with Germans 1976).
67. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 451 l. 101 & f. 9 op. 4 a.e. 487 l. 36 (Talks with Germans 1980 & 1982).
68. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 451 l. 101 & f. 9 op. 4 a.e. 487 l. 150 (Talks with Germans 1980 & 1982).
69. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 543 l. 153 (Exchange with GDR 1985).
70. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 181 l. 42 (Exchange with Czechoslovakia 1977).
71. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 489 l. 33–4 (Exchange with Czechoslovakia 1982).
72. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 508 l. 62–71 (Exchange with Czechoslovakia 1983).
73. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 476 l. 5–8 (Havana Trip 1981).
74. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 508 l. 31 (Exchange with Czechoslovakia 1983).
75. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 535 l. 60 (Exchanges with Czechoslovakia 1985).
76. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 150V l. 4 & f. 9 op. 4 a.e. 473 l. 32 (Exchanges with Hungary 1976 & 1981).
77. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 150V l. 4 & f. 9 op. 4 a.e. 473 l. 129 (Exchanges with Hungary 1976 & 1981).
78. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 507 l. 41 (Exchange with Hungary 1983).
79. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 156 l. 11 (Consultations with Poles 1968); see also the articles quoted at the beginning of this chapter.
80. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 156 l. 125 (Consultations with Poles 1968).

81. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 156 l. 193 (Consultations with Poles 1968).
82. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 525 l. 87 (Exchange with Poland 1984).
83. Khristov, "Dŭrzhavna Sigurnost. Chast 2.1."
84. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 368 l. 26 (Activity Report 1965).
85. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 449 l. 228 (Berlin Talks 1972).
86. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 371 l. 2–3 (Activity Report 1968).
87. Interviews regarding topics that touch on espionage are always delicate affairs. Getting people to talk more openly about the topic usually involves a measure of trust built over a few interviews, which is the case with Peter Petrov. Several interviews, in increasingly friendly circumstances, predisposed the interviewee to such stories. The question of his involvement with the intelligence services might always remain open, but his name has not been found on lists of agents or informants published by the Bulgarian Commission on Dossiers.
88. Interview with Petŭr Petrov, March 19, 2015.
89. Interview with Petŭr Petrov, December 11, 2015.
90. Interview with Petŭr Petrov, December 11, 2015.
91. Interview with Petŭr Petrov, December 11, 2015.
92. TsDA f. 37A op. 1 a.e. 2 l. 31 (CICT Report 1969–70).
93. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 373 l. 33 (Activity Report 1970).
94. AKRDOPBGDSRSNBA-R, f. 1B op. 64 a.e. 438 l. 5 (Politburo Decision on DS 1974).
95. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 139 l. 24 & f. 9 op. 3 a.e. 137 l. 130 (Activity Reports 1978 & 1979).
96. The company name was changed to Thomson-CSF after 1968.
97. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 379 l. 9 (Work Evaluation 1965).
98. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 370 l. 32 (Activity Report 1967).
99. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 373 l. 25 (Activity Report 1970).
100. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 373 l. 25 (Activity Report 1970).
101. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 5 (Activity Report 1972).
102. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 7 (Activity Report 1972).
103. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 12 (Activity Report 1972).
104. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 408 l. 13 (Activity Report 1972).
105. The Eastern Bloc term for "station," a base of intelligence operations in a foreign country.
106. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 443 l. 271 (Plan Fulfilment 1980).
107. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 376 l. 56 (Activity Report 1974).
108. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 140A l. 79–80 (Note on Lisbon Purchase 1977).

109. "Portugal Country Reader," interviews at *Association for Diplomatic Studies and Training Foreign Officers Oral History Project*, pp. 102–104 (<https://adst.org/Readers/Portugal.pdf>; last accessed: August 2, 2022).
110. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 139 l. 108 (Report on STI Contribution to Economy 1978).
111. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 140V l. 8 (Report on Elektronika S Program 1979).
112. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 139 l. 131 (Ministerial Report to Zhivkov 1979).
113. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 449 l. 1–4 (Economic Effect 1980).
114. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 449 l. 12, l. 102 (Economic Effect 1980).
115. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 482 l. 143–151 (Report on Magnetic Discs 1982).
116. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 555 l. 48–9 (Doñnov, Stoïan ov, Markov Note to Zhivkov 1986).
117. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 418 l. 41 (Canadian Line 1974).
118. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 442 l. 77 (Activity Report 1980).
119. "Bulgarian Seized in New York and Charged as Spy," *New York Times*, September 24, 1983.
120. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 483 l. 75 & f. 9 op.3 a.e. 139 l. 26 (Orders & Reports 1978 & 1982).
121. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 548 l. 38 (Activity Report 1986).
122. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 388 l. 32 (Work Evaluation 1974).
123. Momchil Metodiev and Mariya Dermendzhieva, *Dürzhavna Sigurnost—Predimstvo Po Nasledstvo: Profesionalni Biografii na Vodeshti Ofitseri* (Sofia: Ciela 2015), p. 15.
124. Metodiev and Dermendzhieva, *Dürzhavna Sigurnost*, p. 62.
125. Metodiev and Dermendzhieva, *Dürzhavna Sigurnost*, p. 63.
126. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 413, l. 2–9 (Note on Foreign Lines 1968).
127. Metodiev and Dermendzhieva, *Dürzhavna Sigurnost*, pp. 733–737.
128. AKRDOPBGDSRSNBA-R f. 9 op. 2 a.e. 418 l. 5–6 (Servicing the Economy Report 1974).
129. AKRDOPBGDSRSNBA-R f. 9 op. 2 a.e. 418 l. 7 (Servicing the Economy Report 1974).
130. Interview with Peter Petrov, December 11, 2015.
131. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 376 l. 58 & f. 9 op. 2 a.e. 378 l. 70 (Activity Reports 1974 & 1976).
132. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 518 l. 28 (Implementing Acquisitions 1984).

133. *Statisticheski Godishnik na Narodna Republika Bŭlgariia za 1984* (Sofia: KESSI, 1984), p. 106.
134. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 375 l. 53 (Activity Report 1973).
135. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 137 l. 127 (Plan Fulfilment 1979).
136. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 518 l. 30 (Implementation 1984).
137. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 554 l. 20–21 (CAI Cooperation 1986).
138. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 572 l. 41 (Internal Historical Note 1987).
139. TsDA f. 37A op. 10 a.e. 12 l. 122 (CICT Correspondence 1982).
140. TsDA f. 37A op. 10 a.e. 13 l. 30–226 (CICT Correspondence 1983).
141. TsDA f. 37A op. 10 a.e. 16 l. 313–314 (CICT Correspondence 1986).
142. TsDA f. 37A op. 10 a.e. 16 l. 59 (CICT Correspondence 1986).
143. TsDA f. 37A op. 10 a.e. 17 l. 19, 200 (CICT Correspondence 1987).
144. TsDA f. 37A op. 10 a.e. 18 l. 29–30, 187 (CICT Correspondence 1988).
145. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 139 l. 100 (Co-operation Report 1978).
146. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 473 l. 32–33 (Cooperation with Hungary 1981).
147. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 150D l. 11 (Talks with Poland 1979).
148. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 412 l. 63 (Report on Enterprises as Covers 1967).
149. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 364 l. 15 (CSTP Co-operation 1970).
150. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 415 l. 14 (Undercover in Bulgaria 1971).
151. AKRDOPBGDSRSNBA-R, f. 9 op. 3 a.e. 140A l. 74 (CSTP Co-operation 1977).
152. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 410 l. 15 (Activity Report 1975).
153. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 438 l. 6 (Work Evaluation 1969).
154. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 366 l. 19–20 (Gen. Kotsev Report 1975).
155. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 366 l. 1–2 (Gen. Kotsev Report 1975).
156. AKRDOPBGDSRSNBA-R, f. 9 op. 2 a.e. 410 l. 11 (Meetings Minutes 1975).
157. Khristo Khristov, *Imperiyata na Zadgranichnite Firmi: Suzdavane, Deynost, I Iztochvane na Druzhestvata s Bulgarsko Uchastie zad Granitsa 1961–2007* (Sofia: Ciela, 2009), p. 15.
158. While some use this term for current geopolitical tensions, here I use it in its original meaning to denote the changes in US-Soviet relations after the Afghanistan invasion, used at the time by authors such as Frank Halliday in *The Making of the Second Cold War* (London: Verso, 1983).
159. Gus W. Weiss, “The Farewell Dossier: Duping the Soviets,” *Studies in Intelligence*, vol. 39, no. 5 (1996), pp. 124–125.
160. This story, most likely false, can be found in Thomas C. Reed, *At the Abyss: An Insider’s History of the Cold War* (New York: Presidio Press, 2004).

161. Bruce B. Weyhrauch “Operation Exodus: The United States Government’s Program to Intercept Illegal Exports of High Technology,” *Computer/Law Journal*, vol. 7, no. 2 (1986), p. 212.
162. OSWR Report CIA/SW 89–10023X, June 1989, pp. iii–v (Available at the CIA FOIA Electronic Reading Room, <https://www.cia.gov/library/readingroom/>; last accessed November 14, 2020).
163. OSWR Report CIA/SW 89–10023X, June 1989, p. 1.
164. OSWR Report CIA/SW 89–10023X, June 1989, p. 6.
165. Metodiev, *Mashina za Legitimnost*, p. 114.
166. Interview with Alexander T̄svetkov, April 6, 2015.
167. Interview with Stoian Markov, July 28, 2015.
168. Interview with Nedko Botev and Boyan T̄svonev, June 23, 2015.
169. AKRDOPBGDSRSNBA-R, f. 9 op. 4 a.e. 596 (Report to Minister 1987).

#### CHAPTER 4

1. AMVnR f. 20 op. 38 a.e. 1171 l. 45–6 (Gandhi Visit 1981).
2. The daughter of Todor Zhivkov and the minister of culture during the late 1970s and early 1980s, Liudmila Zhivkova became a towering figure in both the domestic cultural sphere and cultural diplomacy. For more on her ideas and development, see Veneta Ivanova, “Occult Communism: Culture, Science and Spirituality in Late Socialist Bulgaria,” PhD dissertation, University of Illinois, 2017. For Zhivkova, Bulgaria, and India more widely, see V. Atanasova, “Aktzenti na Bulgarskata Kulturna Politika po Otnoshenie na Indiya (60-te I 70-te Godini na XX Vek),” *Istoricheski Pregled*, vol. LXVII, no. 1–2 (2011), pp. 174–193, and Bŭlgarskoto Ogledalo, *Obrazut na Indiya v Bŭlgariia—Krayat na XIX Vek-Krayat na XX Vek* (Sofia: Akad. Izd. Prof. Marin Drinov, 2015).
3. The term I use is differs from how the Bulgarian documents often address the region—“Third World” and “developing world” were terms often employed by the analysts. However, “Global South” captures a wider sense of the newly liberated countries, which differed hugely in their development. It also allows me to include the less-developed socialist countries, or those which had socialist regimes for a time, which were not strictly speaking “Third World” in the geopolitical sense but battled many of the same development problems.
4. For the role of Bulgarian architecture globally during this period, see parts of Lukasz Stanek’s *Architecture in Global Socialism: Eastern Europe, West Africa, and the Middle East in the Cold War* (Princeton, NJ: Princeton University Press, 2020).
5. For an overview, see David Engerman, “The Second World’s Third World,” *Kritika: Explorations in Russian and Eurasian History*, vol. 12, no. 1 (January 20, 2011), pp. 183–211. For India specifically, see his “Learning from the East: Soviet Experts and India in the Era of Competitive Coexistence,” *Comparative Studies of South Asia, Africa and the Middle East*, vol. 33, no. 2 (August 28, 2013), pp. 227–238. For an



example of another socialist state's efforts, this time in the Middle East, see M. Trentin, *Engineers of Modern Development: East German Experts in Ba'athist Syria, 1965–1972* (Padua: CLEUP 2010).

6. For a very good overview, see C. R. Unger, "Histories of Development and Modernization: Findings, Reflections, Future Research," *H-Soz-Kult* (December 9, 2010); available at: <https://www.hsozkult.de/literaturereview/id/forschungsberichte-1130> (accessed May 16, 2018); for an exploration of the US efforts in India in such spheres, see C. Unger, "Towards Global Equilibrium: American Foundations and Indian Modernization 1950s–1970s," *Journal of Global History*, vol. 6, no. 1 (March 2011), pp. 121–142.

7. Nick Cullather, *The Hungry World: America's Cold War Battle against Poverty in Asia* (Cambridge, MA: Harvard University Press, 2010), p. 5.

8. C. Unger and D. Engerman, "Introduction: Towards a Global History of Modernization," *Diplomatic History*, vol. 33, no. 3 (April 2009), 381–383.

9. A. Hilger, "GDR and Soviet Bloc Policy towards India 1971–1989," Parallel History Project on Cooperative Security (February 2009), available at: [http://www.php.isn.ethz.ch/lory1.ethz.ch/collections/coll\\_india/documents/intro\\_Hilger3ee91.html?navinfo=56154](http://www.php.isn.ethz.ch/lory1.ethz.ch/collections/coll_india/documents/intro_Hilger3ee91.html?navinfo=56154) (accessed May 16, 2018).

10. C. R. Unger, "Industrialization vs Agrarian Reform: West German Modernization Policies in India in the 1950s and 1960s," *Journal of Modern European History*, vol. 8, no. 1 (2010), p. 51.

11. For great work on how the developing world impacted Eastern European intellectuals and development ideas, the new project "Reconfiguring Backwardness: Polish Social Scientists and the Making of the Third World" by Malgorzata Mazurek is particularly illuminating.

12. For more on Indian modernization and computing's role in it, see N. Menon, "'Fancy Calculating Machine': Computers and Planning in Independent India," *Modern Asian Studies*, vol. 52, no. 2 (March 2018), pp. 421–457.

13. TsDA f. 1B op. 64 a.e. 268 l. 3–5 (Politburo Protocol 1960).

14. The history of Texim is worthy of a work on its own. Headed by Georgi Naidenov, a trade representative in Turkey and Egypt, as well as a State Security agent, it became a veritable empire of trade and logistics, worth hundreds of millions of dollars by 1969, when it was closed under pressure from Moscow. Its assets became the core of the Bulgarian Merchant Fleet, while Naidenov was tried and found guilty of embezzlement, serving five years out of a 20-year sentence. In 1992, he refounded the organization as Texim Bank, branches of which dot Bulgaria. In many ways, Texim was a capitalist company par excellence operating in a planned economy—precisely the reason Moscow was opposed to it.

15. TsDA f. 136 op. 86 a.e. 523 l. 1–2 (Council of Ministers Resolution 1961).

16. TsDA f. 259 op. 17 a.e. 80 l. 1–2 (Foreign Trade Ministry—MFT—on Egypt 1965–6).

17. TsDA f. 259 op. 17 a.e. 81 l. 38–43 (Syria, Tunisia, Algeria 1965–6).

18. TsDA f. 259 op. 19 a.e. 382 l. 1–4 (Kabul Report 1971).

19. TsDA f. 259 op. 44 a.e. 408 l. 2–7 (Angolan Report 1977).
20. TsDA f. 1B op. 66 a.e. 1950 l. 59 (Politburo on Tanzania 1979).
21. TsDA f. 259 op. 44 a.e. 16 l. 115–123 (MFT Fairs 1978).
22. TsDA f. 1B op. 35 a.e. 704 l. 59 (Politburo Minutes 1969).
23. TsDA f. 1B op. 35 a.e. 106 l. 2 (Politburo on Mongolia 1968).
24. TsDA f. 1B op. 35 a.e. 3010 l. 45 (Politburo on Tanzania 1972).
25. TsDA f. 259 op. 20 a.e. 501 l. 4 (MFT India 1967).
26. TsDA f. 259 op. 44 a.e. 129 l. 44 (MFT Contracts 1977).
27. TsDA f. 517 op. 2 a.e. 74 l. 28 (CSTP Report 1972).
28. TsDA f. 517 op. 2 a.e. 74 l. 27 (CSTP Report 1972)
29. TsDA f. 517 op. 2 a.e. 74 l. 38 (CSTP Report 1972)
30. TsDA f. 1B op. 35 a.e. 4459 l. 52 (Politburo Reports 1973).
31. TsDA f. 259 op. 45 a.e. 351 l. 86 (MFT Exports 1977–81).
32. TsDA f. 259 op. 45 a.e. 351 l. 139–140 (MFT Exports 1977–81).
33. TsDA f. 259 op. 45 a.e. 353 l. 44–46 (MFT Exports 1985–7).
34. TsDA f. 1003 op. 1 a.e. 28 (IZOT Report 1986).
35. TsDA f. 259 op. 44 a.e. 131 (MFT Imports 1977).
36. TsDA f. 259 op. 44 l. 44.
37. TsDA f. 259 op. 44 l. 78.
38. TsDA f. 37A op. 10 a.e. 11 l. 8 (CICT Correspondence 1981).
39. TsDA f. 259 op. 45 a.e. 848 l. 6 (MFT on Mozambique 1981–7).
40. TsDA f. 259 op. 45 a.e. 203 l. 12 & f. 37A op. 10 a.e. 11 l. 8 (MFT & CICT Reports 1982).
41. TsDA f. 830 op. 2 a.e. 3 l. 4 (Izotimpex on Zimbabwe 1983).
42. TsDA f. 830 op. 2 a.e. 27 l. 28 (Izotimpex Report 1986).
43. TsDA f. 830 op. 2 a.e. 28 l. 6–7 (Report 1987).
44. TsDA f. 830 op. 2 a.e. 87 l. 5–6 (Market Program 1982).
45. TsDA f. 378 op. 1 a.e. 1101 (Foreign Ministry Report 1976).
46. TsDA f. 1003 op. 1 a.e. 14 l. 34 (Izotimpex Plan 1974).
47. TsDA f. 259 op. 45 a.e. 832 l. 2 (MFT on Joint Firms 1987–8).
48. TsDA f. 259 op. 45 a.e. 832 l. 25 (MFT on Joint Firms 1987–8).
49. TsDA f. 37A op. 9 a.e. 8 l. 102 (CICT Trips 1985).
50. Albena Shkodrova, *Sots-Gurme: Kurioznata Istoriia na Kuhnyata v NRB* (Sofia: Zhanet 45, 2014), p. 176.
51. TsDA f. 259 op. 44 a.e. 449 (MFT Libya 1975).
52. TsDA f. 37A op. 4 a.e. 11 l. 10 (CICT Progress Report 1971).

53. AMVnR f. 20 op. 43–5 a.e. 136 l. 7–17 (Hanoi Report 1986–7).
54. AMVnR f. 20 op. 43–5 a.e. 136 l. 19 (Hanoi Report 1986–7).
55. TsDA f. 830 op. 2 a.e. 90 l. 23 (Izotimpex Market Program 1985).
56. TsDA f. 1B op. 35 a.e. 4459 l. 34 (Politburo Minutes 1973).
57. TsDA f. 830 op. 2 a.e. 21 l. 5 (Izotimpex Report 1979).
58. TsDA f. 37A op. 9 a.e. 8 l. 48 (CICT Trips 1985).
59. TsDA f. 830 op. 2 a.e. 91 l. 78 (Izotimpex Market Program 1986).
60. TsDA f. 259 op. 45 a.e. 677 l. 3–31 (MFT China 1985–9).
61. TsDA f. 259 op. 45 a.e. 677 l. 53 (MFT China 1985–9).
62. TsDA f. 259 op. 45 a.e. 677 l. 68 (MFT China 1985–9).
63. TsDA f. 830 op. 2 a.e. 91 l. 69–71 (Izotimpex Market 1986).
64. TsDA f. 259 op. 20 a.e. 501 l.95; Indira Gandhi generally expressed more pro-Soviet and anti-US sentiments than her predecessors, and the Indian alignment with the Eastern Bloc was helped by the early-mid 1960s wars with China and Pakistan, as well as the US intervention in Vietnam. See R. J. McMahon, “On the Periphery of a Global Conflict: India and the Cold War 1947–1991,” in A. Hilger and C. Unger (eds.), *India in the World since 1947: National and Transnational Perspectives* (Frankfurt am Main: Peter Lang GmbH, 2012), especially pp. 290–294.
65. TsDA f. 259 op. 20 a.e. 501 l. 98 (Indian Cooperation Agreement 1967).
66. TsDA f. 259 op. 20 a.e. 501 l. 7 (Indian Cooperation Agreement 1967).
67. TsDA f. 259 op. 20 a.e. 501 l. 96 (Indian Cooperation Agreement 1967).
68. TsDA f. 1B op. 35 a.e. 138 l. 16 (Politburo Meeting 1968).
69. TsDA f. 378 op. 30 a.e. 1205 l. 9 (Todorov Visit 1974).
70. Sugata Bose, “Instruments and Idioms of Colonial and National Development: India’s Historical Experience in Comparative Perspective,” in Frederick Cooper and Randall Packard (eds.), *International Development and the Social Sciences: Essays on the History and Politics of Knowledge* (Berkeley: University of California Press, 1997), pp. 45–63.
71. TsDA f. 259 op. 20 a.e. 501 l. 60 (Co-Operation 1967).
72. TsDA f. 259 op. 20 a.e. 501 l. 18 (Co-Operation 1967).
73. TsDA f. 259 op. 19 a.e. 385 l. 7 (MFT Tractors 1969–70).
74. A Bulgarian import-export company set up in 1966, tasked with exporting a variety of industrial goods. A company run by state security, it often took the lead in breaking into new markets, but its biggest purview was weapon sales.
75. TsDA f.259 op. 19 a.e. 341 l. 134 (MFT Protocol 1970).
76. TsDA f. 1B op. 35 a.e. 1202 l. 204 (Politburo Discussion 1970).
77. Washington National Records Office, OSD Files; FRC 76–0197, Box 74, Pakistan 092 (Aug–Dec 1971), Memorandum for the Secretary of Defense.

78. TsDA f. 259 op. 36 a.e. 520 l. 14 (Todorov & Gandhi Meeting 1974).
79. TsDA f. 1B op. 35 a.e. 3079 l. 99 (Politburo Plan 1972).
80. TsDA f. 1B op. 35 a.e. 3079 l. 139 (Politburo Plan 1972).
81. TsDA f. 259 op. 36 a.e. 522 l. 41 (MFT Trips 1971–4).
82. TsDA f. 259 op. 36 a.e. 524 l. 345 (MFT Trips 1974).
83. Menon was the premier scientific administrator in India during the 1970s, the perfect counterpart to Popov. He was a protégé of Homi Bhabha, the founder of atomic research in India, and succeeded him as the head of the Tata Institute for Fundamental Research on his mentor's death in 1966. From 1971, he was the head of the Department of Electronics, and eventually head of CSIR itself. His last administrative position was in 1990 as Minister of Science. He was the man who took on IBM in India, and the one who set up the foundations of the Indian electronics industry. At the start of 2016, his personal archive was handed over to the Nehru Memorial Museum and Library, but sadly, it has not yet been processed.
84. TsDA f. 1477 op. 30 a.e. 1210 l. 14 (Ministry of Foreign Affairs—MFA—Note on Menon 1974).
85. NAI, List 193; 17/855/1974 PMS, pp. 8–9 (Computer Industry Report 1974).
86. NAI, List 193; 17/635/74 PMS, p. 1 (Economic Report 1974).
87. NAI, List 193; 17/635/70 PMS, pp. 1–4 (Economic Report 1970).
88. NAI, List 193; 17/802/71 PMS, p. 1 (CSIR Enquiry 1971).
89. NAI, List 193; 17/3/71 PMS, p. 17 (CSIR Correspondence 1971).
90. NAI, List 193; 17/1702/1972 PMS, p. 3 (Ministerial Meeting 1972).
91. NAI, List 193; 17/855/74 PMS, p. 10 (Industrial Report 1974).
92. K. R. Bhandarkar and Raja Kulkarni, *Computer and Labour Problems in India* (Bombay: United Asia Publications, 1971).
93. Bhandarkar and Kulkarni, *Computer and Labour Problems in India*, p. III.
94. Bhandarkar and Kulkarni, *Computer and Labour Problems in India*, p. 61.
95. Bhandarkar and Kulkarni, *Computer and Labour Problems in India*, p. 102.
96. NAI, List 193; 17/1596/72 PMS, p. 6 (Investment Report 1978).
97. NAI, List 193; 17/1596/72 PMS, p. 4 (Investment Report 1978).
98. NAI, List 193; 17/1596/72 PMS, p. 1 (Investment Report 1978).
99. NAI, List 193; 17/855/77 PMS, pp. 2–3 (Industrial Report 1977).
100. NAI, List 193; 17/855/77 PMS, pp. 2–3 (Industrial Report 1977).
101. NAI, List 193; 17/855/77 PMS, p. 39-correspondence (Industrial Report 1977).
102. NAI, List 193; 17/855/74 PMS, pp. 1–3 (Industrial Report 1974).
103. NAI, List 193; 17/1533/74 PMS, p. 2 (ETTDC Report 1974).
104. AMVnR f. 20 op. 32 a.e. 1335 l. 63 (Zhivkov Visit 1976).

105. AMVnR f. 20 op. 32 a.e. 1335 l. 56 (Zhivkov Visit 1976).
106. AMVnR f. 20 op. 32 a.e. 1335 l. 63 (Zhivkov Visit 1976).
107. AMVnR f. 20 op. 32 a.e. 1338 l. 9 (Zhivkov Visit 1976).
108. AMVnR f. 20 op. 24 a.e. 1300 l. 6 (Program for India 1968).
109. AMVnR f. 20 op. 24 a.e. 1300 l. 4 (Program for India 1968).
110. AMVnR f. 20 op. 24 a.e. 1305 l. 27 (Economic Correspondence 1968–9).
111. AMVnR f. 20 op. 32 a.e. 1353 l. 10–11 (Cooperation Questions 1976).
112. TsDA f. 259 op. 45 a.e. 203 (MFT Mozambique 1981–7).
113. AMVnR f. 20 op. 32 a.e. 1388 l. 11 (Specialists Exchange 1975–6).
114. AMVnR f. 20 op. 32 a.e. 1375 “News from Bulgaria,” Issue 11 of 1976, p. 13.
115. AMVnR f. 20 op. 32 a.e. 1417 l. 30–31 (Administrative Documents 1976).
116. AMVnR f. 20 op. 32 a.e. 1387 l. 15–27 (Session Minutes 1975–6).
117. TsDA f. 1003 op. 1 a.e. 128 l.2–11 (IZOT on India 1978).
118. TsDA f. 259 op. 39 a.e. 343 l. 41 (MFT Trade Report 1976–7).
119. TsDA f. 1003 op. 1 a.e. 128 l. 18 (IZOT 1978).
120. TsDA f. 1003 op. 1 a.e. 128 l. 19 (IZOT 1978).
121. TsDA f. 1003 op. 1 a.e. 128 l. 5 (IZOT 1978).
122. TsDA f. 1003 op. 1 a.e. 128 l. 16 (IZOT 1978).
123. TsDA f. 830 op. 2 a.e. 84 l. 9 (Izotimpex Market 1976).
124. AMVnR f. 20 op. 32 a.e. 1397 l. 15 (MFA Economic Report 1975–6).
125. AKRDOPBGDSRSNBA f. 9 op. 4 a.e. 548 l. 38 (Activity Report 1986).
126. AKRDOPBGDSRSNBA f. 9 op. 4 a.e. 438 l. 5–7 (CSTP Work 1980).
127. AMVnR f. 20 op. 40 a.e. 1587 l. 34–6 (Embassy Evaluations 1983).
128. AMVnR f. 20 op. 43–5 a.e. 150 (Embassy Self-Evaluation 1986).
129. AMVnR f. 20 op. 33 a.e. 1277 l. 108 (Future Plans 1975–7).
130. TsDA f. 259 op. 36 a.e. 513 l. 10–14, 176 (MFT Delhi Report 1974).
131. TsDA f. 259 op. 36 a.e. 513 l. 80–81, 176 (MFT Delhi Report 1974).
132. RGAE f. 9480 op. 12 a.e. 244 l. 32 (GKNT Subcommittee 1976).
133. TsDA f. 259 op. 44 a.e. 284 l. 10 (MFT Report 1978).
134. TsDA f. 259 op. 44 a.e. 287 l. 55–57 (MFT Commission 1977).
135. AMVnR f. 20 op. 36 a.e. 1249 l. 18 (Embassy Letters 1980).
136. AMVnR f. 20 op. 34 a.e. 1210 (Administrative Use 1978).
137. AMVnR f. 20 op. 36 a.e. 1277 l. 15 (Report on Electronics 1980).
138. AMVnR f. 20 op. 36 a.e. 1277 l. 7 (Report on Electronics 1980).
139. AMVnR f. 20 op. 36 a.e. 1277 l. 16 (Report on Electronics 1980).

140. TsDA f. 259 op. 44 a.e. 292 l. 10 (MFT Meetings 1979).
141. AMVnR f. 20 op. 36 a.e. 1277 l. 17 (Report 1980).
142. AMVnR f. 20 op. 38 a.e. 1168 l. 1 (Visits 1981).
143. Violina Atanasova, "Bulgarskiya Kulturno-Informatzionen Tzentur v Delhi—Istoriia I Deynost," *Svetilnik*, vol. 14 (2002), pp. 30–34.
144. For more on Bulgaria's cultural links with India, see Violina Atanasova, "Akcenti na Bulgarskata Kulturna Politika po Otnoshenie na India (60te I 70te godini na XX vek)," *Istoricheski Pregled*, vol. 1, no. 2 (2011), pp. 174–193.
145. AMVnR f. 20 op. 39 a.e. 1282 (Propaganda Report 1982).
146. AMVnR f. 20 op. 36 a.e. 1276 l. 83 (Future Plans 1978–80).
147. AMVnR f. 20 op. 39 a.e. 1282 l. 7 (Propaganda Report 1982).
148. AMVnR f. 20 op. 39 a.e. 1297 l. 9 (News from Bulgaria 1982).
149. AMVnR f. 20 op. 39 a.e. 1297 l. 28 (News from Bulgaria 1982).
150. AMVnR f. 20 op. 39 a.e. 1297 l. 30–31 (News from Bulgaria 1982).
151. AMVnR f. 20 op. 40 a.e. 1618 l. 31 (Doñnov Visit 1983).
152. AMVnR f. 20 op. 40 a.e. 1618 l. 31 (Doñnov Visit 1983).
153. NMML, Dr. Gopal Singh Papers, List 378; Series 2, Doc. 29, p. 304 (Ambassador Correspondence 1970–2).
154. AMVnR f. 20 op. 40 a.e. 1663, "News from Bulgaria," no. 11, 12, 1983, p. 9.
155. TsDA f. 259 op. 45 a.e. 630 l. 32 (MFT Sessions 1983–8).
156. Bipan Chandra, Mirdula Mukherjee, and Aditya Mukherjee, *India after Independence* (Delhi: Penguin, 2008), pp. 348–349.
157. Chandra, Mukherjee, and Mukherjee, *India after Independence*, p. 350.
158. Sumit Ganguly and Rahul Mukherjee, *India since 1980* (Cambridge: Cambridge University Press, 2011), p. 77.
159. AMVnR f. 20 op. 41 a.e. 1918 l. 82–4 (Economic Report 1984).
160. AMVnR f. 20 op. 44–5 a.e. 182 l. 8–9 (Press Overview 1987).
161. AMVnR f. 20 op. 44–5 a.e. 182 l. 10 (Press Overview 1987).
162. AMVnR f. 20 op. 44–5 a.e. 182 l. 11 (Press Overview 1987).
163. AMVnR f. 20 op. 44–5 a.e. 193 l. 11 (Trade Talks 1987).
164. *Kompiūtūr Za Vas*, no. 9, 1987, pp. 9–11.
165. It is worth noting that this computer was faster than the Elbrus series of Soviet supercomputers of the same generation, designed for similar usages. It was based on the massive parallel design concept of supercomputing.
166. Milena Dimitrova, *Zlatnite Desitiletiia na Bulgarskata Elektronika* (Sofia: Trud, 2008), p. 192.
167. Dimitrova, *Zlatnite Desitiletiia*, p. 8.

168. AMVnR f. 20 op. 44–5 a.e. 191 l. 11 (US-Indian Cooperation 1987).
169. Mani Ayar (ed.), *Rajiv Gandhi's India*, Vol. 3—*Foreign Policy* (New Delhi: UBS Publishers, 1998), p. 116.
170. Mani Ayar (ed.), *Rajiv Gandhi's India*, Vol. 2—*Economics* (New Delhi: UBS Publishers, 1998), p. 108.
171. AMVnR f. 20 op. 46–5 a.e. 163 l. 33 (Activity Report 1989).
172. Interview with Krasimir Markov, February 4, 2016.
173. Dimitrova, *Zlatnite Desitiletiia*, pp. 200, 259.
174. TsDA f. 259 op. 45 a.e. 630 l. 116 (MFT Sessions 1983–8).
175. AMVnR f. 20 op. 46–5 a.e. 163 l. 31 (Activity Report 1989).
176. AMVnR f. 20 op. 46–5 a.e. 165 l. 3 (Joint Commission 1989).
177. TsDA f. 259 op. 36 a.e. 107 l. 337 (MFT Reports 1973).
178. TsDA f. 259 op. 36 a.e. 107 l. 339 (MFT Reports 1973).
179. TsDA f. 259 op. 36 a.e. 107 l. 340 (MFT Reports 1973).
180. TsDA f. 259 op. 44 a.e. 116 (MFT Advertising 1974).
181. TsDA f. 259 op. 44 a.e. 128 (MFT Reports 1977).
182. TsDA f. 259 op. 44 a.e. 128, l. 22–23.
183. TsDA f. 259 op. 44 a.e. 128, l. 25.
184. TsDA f. 259 op. 44 a.e. 128, l. 26–27.
185. Interview with Atanas Shopov, “Bez Emotsii za Starozagorskata Elektronika,” in *Septemvri* newspaper, no. 52, 1989.
186. TsDA f. 830 op. 2 a.e. 99 l. 4 (Izotimpex Advertising 1982–3).
187. TsDA f. 830 op. 2 a.e. 99 l. 7 (Izotimpex Advertising 1982–3).
188. TsDA f. 830 op. 2 a.e. 99 l. 9 (Izotimpex Advertising 1982–3).
189. TsDA f. 830 op. 2 a.e. 99 l. 9–11 (Izotimpex Advertising 1982–3).
190. TsDA f. 830 op. 2 a.e. 100 l. 7 (Izotimpex Fairs 1981).
191. TsDA f. 830 op. 2 a.e. 56 l. 29 (Izotimpex Report 1982).
192. TsDA f. 830 op. 2 a.e. 56 l. 29 (Izotimpex Report 1982).
193. TsDA f. 830 op. 2 a.e. 99 l. 12 (Izotimpex Advertising 1982–3).
194. TsDA f. 830 op. 2 a.e. 99 l. 12 (Izotimpex Advertising 1982–3).
195. TsDA f. 830 op. 2 a.e. 100 l. 3 (Izotimpex Fairs 1981).
196. TsDA f. 259 op. 39 a.e. 392 l. 287 (MFT Iran 1976).
197. TsDA f. 259 op. 39 a.e. 343 l. 101 (MFT Reports 1976–7).
198. TsDA f. 37A op. 10 a.e. 16 l. 17 (CICT Correspondence 1986).
199. NMML, Dr. Gopal Singh Papers, List 378; Series 2, Doc. 28, p. 108 (Ambassadorial Correspondence 1965–75).

## CHAPTER 5

1. Vladislav Zubok and Constantine Pleshakov, *Inside the Kremlin's Cold War: From Stalin to Khrushchev* (Cambridge, MA: Harvard University Press, 1996), p. 8
2. TsDA f. 517 op. 2 a.e. 277 l. 2 (CSTP Plan 1969).
3. For more on these policies, see Iliana Marcheva, "Problemi na Modernizatsiyata pri Sotsializma: Industrializatsiyata v Bŭlgariia," in E. Kandilarov and T. Turlakova (eds.), *Izledvaniya po Istoriia na Socializma v Bŭlgariia 1944–1989* (Sofia: Grafimaks, 2010), pp. 207–208.
4. Martin Ivanov, "Ikonomikata na Komunisticheska Bulgaria (1963–1989)," in I. Znepolski (ed.), *Istoriia na Narodna Republika Bŭlgariia: Rezhimut I Obshtestvoto* (Sofia: Ciela, 2009), p. 306.
5. This paragraph draws heavily on Kevin Baker's innovative work on the GDR and cybernetics, "Red Helmsman: Cybernetics, Economics, and Philosophy in the German Democratic Republic," (MA thesis, Georgia State University, 2011), especially chapter 3: "Control: Cybernetics, Market Stimulation and State Planning."
6. TsDA f. 1B op. 35 a.e. 154 l. 10 (Politburo Discussions 1967–8).
7. This idea is most masterfully studied in the Soviet case by Benjamin Peters in *How Not to Network a Nation: The Uneasy History of the Soviet Internet* (Cambridge, MA: the MIT Press 2016).
8. TsDA f. 1B op. 35 a.e. 453 l. 8–9 (Politburo Commission 1968).
9. TsDA f. 1B op. 35 a.e. 453 l. 12–15 (Politburo Commission 1968).
10. TsDA f. 1B op. 35 a.e. 888 l. 8–6 (Central Committee Directives 1969).
11. TsDA f. 1B op. 35 a.e. 888 l. 8–6 (Central Committee Directives 1969).
12. TsDA f. 1B op. 35 a.e. 888 l. 8–7; l. 8–17 (Central Committee Directives 1969).
13. TsDA f. 1B op. 35 a.e. 888 l. 8–18/19 (Central Committee Directives 1969).
14. TsDA f. 1B op. 35 a.e. 888 l. 8–20 (Central Committee Directives 1969).
15. TsDA f. 1B op. 35 a.e. 888 l. 8–21 (Central Committee Directives 1969).
16. TsDA f. 1B op. 35 a.e. 888 l. 8–25 (Central Committee Directives 1969).
17. TsDA f. 1B op. 35 a.e. 888 l. 8–26 (Central Committee Directives 1969).
18. TsDA f. 1B op. 35 a.e. 888 l. 8–27 (Central Committee Directives 1969).
19. TsDA f. 1B op. 35 a.e. 888 l. 8–35 (Central Committee Directives 1969); interestingly, the Chilean Cybersyn system's sole practical application turned out to be in logistics.
20. TsDA f. 1B op. 35 a.e. 3079 l. 16 (Politburo Plan 1972).
21. TsDA f. 1B op. 35 a.e. 3079 l. 21 (Politburo Plan 1972).
22. See Slava Gerovitch, *From Newspeak to Cyberspeak: A History of Soviet Cybernetics* (Cambridge, MA: The MIT Press, 2004), especially chapter 6.
23. TsDA f. 1B op. 35 a.e. 4940 l. 28–33 (Politburo Plan 1974).



24. TsDA f. 1B op. 66 a.e. 1287 l. 67–1 (Politburo Report 1978).
25. TsDA f. 1B op. 66 a.e. 1287 l. 67–2 (Politburo Report 1978).
26. TsDA f. 1B op. 66 a.e. 1287 l. 68–9 (Politburo Report 1978).
27. TsDA f. 1B op. 67 a.e. 142 l. 48–9 (Politburo Congress 1981).
28. TsDA f. 1B op. 67 a.e. 142 l. 13 (Politburo Congress 1981).
29. TsDA f. 1B op. 67 a.e. 668 l. 26 (Politburo Plan 1981).
30. TsDA f. 1B op. 67 a.e. 668 l. 32 (Politburo Plan 1981).
31. TsDA f. 1B op. 67 a.e. 668 l. 32–3 (Politburo Plan 1981).
32. TsDA f. 1B op. 67 a.e. 2198 l. 158–160 (Politburo Discussions 1983).
33. RGAE f. 9480 op. 13 a.e. 2487 l. 10 (GKNT Tasks 1986–7).
34. RGAE f. 9480 op. 13 a.e. 2487 l. 23 & 26–7 (GKNT Tasks 1986–7).
35. TsDA f. 517 op. 2 a.e. 172 l. 15 (CSTP Co-operation Plans 1969).
36. TsDA f. 517 op. 2 a.e. 172 l. 14 (CSTP Co-operation Plans 1969).
37. TsDA f. 1B op. 35 a.e. 1246 l. 87 (Politburo Plans 1970).
38. TsDA f. 1B op. 35 a.e. 1246 l. 88 (Politburo Plans 1970).
39. There is no need to repeat here Stephen Kotkin's arguments in *Magnetic Mountain: Stalinism as a Civilization* (Berkeley: University of California Press, 1997), which puts steel front and center in Stalinist industrialization. The Bulgarian regime, too, built an outsized steelworks and metal work sector, centered around the huge Kremkovtsi plant outside Sofia.
40. TsDA f. 1B op. 35 a.e. 1990 l. 15–17 (Politburo Discussions 1970–1).
41. TsDA f. 1B op. 35 a.e. 1990 l. 21 (Politburo Discussions 1970–1).
42. TsDA f. 1B op. 35 a.e. 1990 l. 22 (Politburo Discussions 1970–1).
43. TsDA f. 1B op. 35 a.e. 1990 l. 24 (Politburo Discussions 1970–1).
44. TsDA f. 1B op. 35 a.e. 1990 l. 24 (Politburo Discussions 1970–1).
45. RGAE f. 9480 op. 9 a.e. 261 l. 51–68 (6th Bulgarian-Soviet Session 1966).
46. TsDA f. 1B op. 35 a.e. 1501 l. 121 (Politburo Discussions 1970).
47. TsDA f. 1B op. 35 a.e. 1501 l. 130–1 (Politburo Discussions 1970).
48. TsDA f. 517 op. 2 a.e. 115 l. 5 (CSTP Reports 1972).
49. TsDA f. 517 op. 2 a.e. 115 l. 9 (CSTP Reports 1972).
50. TsDA f. 517 op. 2 a.e. 115 l. 10 (CSTP Reports 1972).
51. TsDA f. 517 op. 2 a.e. 115 l. 10 (CSTP Reports 1972).
52. TsDA f. 517 op. 2 a.e. 115 l. 11 (CSTP Reports 1972).
53. TsDA f. 517 op. 2 a.e. 115 l. 12 (CSTP Reports 1972).
54. TsDA f. 517 op. 2 a.e. 115 l. 13–15 (CSTP Reports 1972).
55. TsDA f. 517 op. 4 a.e. 35 l. 64 (CSTP Automation-7 Program—1974).
56. TsDA f. 517 op. 4 a.e. 35 l. 53 (CSTP Automation-7 Program—1974).

57. TsDA f. 517 op. 4 a.e. 35 l. 52 (CSTP Automation-7 Program—1974).
58. TsDA f. 1B op. 35 a.e. 5368 l. 30 (Politburo Theses 1975).
59. TsDA f. 1B op. 35 a.e. 5368 l. 35 (Politburo Theses 1975).
60. TsDA f. 1B op. 35 a.e. 5368 l. 68–71 (Politburo Theses 1975).
61. TsDA f. 1B op. 35 a.e. 5368 l. 94 (Politburo Theses 1975).
62. TsDA f. 517 op. 5 a.e. 14 l. 63 (CSTP Agreements 1978).
63. TsDA f. 517 op. 6 a.e. 29 l. 7 (CSTP Automation Program 1981).
64. TsDA f. 517 op. 6 a.e. 29 l. 10 (CSTP Automation Program 1981).
65. TsDA f. 517 op. 6 a.e. 29 l. 27 (CSTP Automation Program 1981).
66. TsDA f. 517 op. 6 a.e. 29 l. 28 (CSTP Automation Program 1981).
67. This is best seen in the most (in)famous pet project—the giant Radomir machine-building plant (the “factory for factories”), which was to be based on the latest Japanese technologies. Clashes with the pro-Soviet party faction in the face of Lukanov, however, led to the factory being equipped to Soviet standards, losing its Japanese contracts (which its profits were predicated on), and Radomir became a black hole for over 1 billion levs of investments.
68. *Zhenata Dnes*, no. 2 (1987), p. 4.
69. TsDA f. 517 op. 6 a.e. 38 l. 11 (CSTP Report 1982).
70. TsDA f. 517 op. 6 a.e. 38 l. 12–13 (CSTP Report 1982).
71. TsDA f. 517 op. 6 a.e. 38 l. 14 (CSTP Report 1982).
72. TsDA f. 517 op. 6 a.e. 38 l. 15 (CSTP Report 1982).
73. TsDA f. 517 op. 6 a.e. 38 l. 16 (CSTP Report 1982).
74. TsDA f. 517 op. 6 a.e. 38 l. 37 (CSTP Report 1982).
75. TsDA f. 517 op. 6 a.e. 38 l. 45 (CSTP Report 1982).
76. TsDA f. 517 op. 6 a.e. 52 l. 24 (CSTP Report 1983).
77. TsDA f. 517 op. 6 a.e. 52 l. 23 (CSTP Report 1983).
78. TsDA f. 517 op. 6 a.e. 52 l. 20 (CSTP Report 1983).
79. TsDA f. 517 op. 6 a.e. 52 l. 23 (CSTP Report 1983).
80. TsDA f. 517 op. 6 a.e. 52 l. 22 (CSTP Report 1983).
81. TsDA f. 517 op. 6 a.e. 52 l. 26 (CSTP Report 1983).
82. TsDA f. 517 op. 6 a.e. 52 l. 27 (CSTP Report 1983).
83. TsDA f. 517 op. 6 a.e. 52 l. 29 (CSTP Report 1983).
84. TsDA f. 517 op. 6 a.e. 52 l. 31 (CSTP Report 1983).
85. Information can be found in both Bulgarian and Russian archives; see RGAE f. 9480 op. 13 a.e. 481; TsDA f. 517 op. 6 a.e. 52; and a Soviet dissertation: Yuri Polyakov, “Optimizatsiya Planov Proizvodstoa Predpriyateiy Mashinostroeniya (Na Primere ASU Sigma),” PhD dissertation, SAN-Novosibirsk, 1984.
86. DA-V; f. 1230 op. 1 a.e. 1 l. 1 (Ministerial-DSO Correspondence 1972).

87. DA-V; f. 1230 op. 1 a.e. 31 l. 1 (Catalogues 1969–78).
88. DA-V; f. 1230 op. 1 a.e. 33 (Centre Plan 1977–8).
89. DA-V; f. 1230 op. 1 a.e. 31 (Catalogues).
90. DA-V; f. 1230 op. 1 a.e. 15 l. 28–9; l. 54–5; l. 69 (Director's Reports 1972–3).
91. DA-V; f. 1230 op. 1 a.e. 10; a.e. 47; op. 2 a.e. 8; a.e. 14; a.e. 26 (Misc Correspondences 1976–83).
92. DA-V; f. 1230 op. 1 a.e. 30 l. 1–4 (FORAN Report 1976).
93. DA-V; f. 1230 op. 1 a.e. 61 l. 30 (Implementation Notes 1976).
94. DA-V f. 1230 op. 2 a.e. 48 (Qualifications Documents 1983).
95. DA-V f. 1230 op. 3 a.e. 54 (Staff Statistics 1983–93).
96. DA-V f. 1230 op. 2 a.e. 49 (Qualifications Documents 1981–3).
97. DA-V f. 1230 op. 2 a.e. 1 & 4 (Protocols 1979–83).
98. DA-V f. 1230 op. 1 a.e. 80 (Educationa Statistics 1981–3).
99. DA-V f. 1230 op. 2 a.e. 32 (Annual Plan 1982).
100. DA-V f. 1230 op. 2 a.e. 14 (ASU Program 1981).
101. DA-V f. 1230 op. 3 a.e. 2 a.e. 41–43 (Ministerial Orders 1981–9).
102. TsDA f. 517 op. 2 a.e. 102 l. 42 (CSTP Report 1967).
103. TsDA f. 517 op. 2 a.e. 95 l. 13–15 (CSTP Report 1965).
104. Alexander Petkov, "Razvitie na Informatsionnite Sistemi I Tehnologii v Ruse," *Izvestiya na Suyuza na Uchenite-Ruse*, no. 2 (2001), p. 1.
105. "U.K. Part in Bulgarian Contract," *Financial Times* (June 28, 1968), p. 6; and Adolf Herman, "Western Computer Companies Step Up Sales Drive," *Financial Times* (February 12, 1969), p. 7.
106. Petkov, "Razvitie na Informatsionnite Sistemi," pp. 1–2.
107. TsDA f. 517 op. 2 a.e. 106 l. 15 (CSTP Co-operation 1971).
108. Petkov, "Razvitie na Informatsionnite Sistemi," p. 4.
109. Vela Lazarova, *Istoriia na Gabrovo* (Sofia: Otechestven Front, 1980), p. 398.
110. TsDA f. 517 op. 2 a.e. 115 l. 17 (CSTP Reports 1972).
111. TsDA f. 517 op. 2 a.e. 115 l. 18 (CSTP Reports 1972).
112. TsDA f. 517 op. 2 a.e. 115 l. 18 (CSTP Reports 1972).
113. TsDA f. 517 op. 2 a.e. 115 l. 19 (CSTP Reports 1972).
114. TsDA f. 517 op. 2 a.e. 115 l. 19 (CSTP Reports 1972).
115. TsDA f. 517 op. 2 a.e. 115 l. 12 (CSTP Reports 1972).
116. TsDA f. 517 op. 2 a.e. 115 l. 13 (CSTP Reports 1972).
117. TsDA f. 517 op. 2 a.e. 115 l. 14 (CSTP Reports 1972).
118. TsDA f. 517 op. 2 a.e. 115 l. 14 (CSTP Reports 1972).
119. TsDA f. 517 op. 2 a.e. 115 l. 15 (CSTP Reports 1972).

120. TsDA f. 1B op. 35 a.e. 5106 l. 194 (Politburo Plan 1974).
121. TsDA f. 1B op. 35 a.e. 5106 l. 192 (Politburo Plan 1974).
122. TsDA f. 1B op. 35 a.e. 5106 l. 196 (Politburo Plan 1974). The cross-point or cross-bar switch is a collection of switches arranged in a matrix; the electronic cross-point allowed for large-scale telephone exchanges and telephony systems after the mid-1960s.
123. TsDA f. 1B op. 35 a.e. 5106 l. 72–78 (Politburo Plan 1974).
124. TsDA f. 1B op. 35 a.e. 5106 l. 79 (Politburo Plan 1974).
125. Taken from the brief historical overview on the website of the private company Information Services AD, a successor of the state-owned ESSI systems under their various guises after 1970: <https://www.is-bg.net/bg/about> (last accessed: December 8, 2020).
126. TsDA f. 517 op. 4 a.e. 33 l. 44 (CSTP Report 1974).
127. TsDA f. 517 op. 4 a.e. 33 l. 44–5 (CSTP Report 1974).
128. TsDA f. 517 op. 4 a.e. 35 l. 66 (CSTP Automation-7 1974).
129. TsDA f. 1B op. 35 a.e. 5106 l. 265 (Politburo Plan 1974).
130. TsDA f. 1b op. 35 a.e. 5368 l. 70 (Politburo Theses 1975).
131. BAN-NA f. 20 op. 5 a.e. 113 l. 2 (BAS Paper 1976).
132. BAN-NA f. 20 op. 5 a.e. 113 l. 24 (BAS Paper 1976).
133. BAN-NA f. 20 op. 5 a.e. 113 l. 25 (BAS Paper 1976).
134. BAN-NA f. 20 op. 5 a.e. 113 l. 27 (BAS Paper 1976).
135. BAN-NA f. 20 op. 5 a.e. 113 l. 30–35 (BAS Paper 1976).
136. BAN-NA f. 20 op. 5 a.e. 113 l. 49–53 (BAS Paper 1976).
137. RGAE f. 9480 op. 12 a.e. 583 l. 1 (GKNT Co-Operation 1977); for more on the creation of the system and the assistance by Glushkov and the Soviets, and its technical specifications, see A. A. Morozov, V. V. Glushkova, and T. B. Korobkova, “Sozdanie Edinoĭ Sistemy Soĭsual’noĭ Informaĭsii (ESSI)—Bolgarskoĭ OGAS,” *Matematichni Mashini I Sistemi*, no. 3 (2013), pp. 3–21.
138. TsDA f. 517 op. 7 a.e. 58 l. 6 (CSTP Report 1979–80).
139. TsDA f. 517 op. 7 a.e. 58 l. 8 (CSTP Report 1979–80).
140. TsDA f. 1003 op. 1 a.e. 130 l. 57–8 (IZOT Reports 1980).
141. RGAE f. 9480 op. 12 a.e. 1777 l. 36 (GKNT Co-operation 1980).
142. RGAE f. 9480 op. 12 a.e. 1777 l. 37 (GKNT Co-operation 1980).
143. TsDA f. 517 op. 5 a.e. 20 l. 2–4 (CSTP Reports 1978).
144. TsDA f. 517 op. 5 a.e. 20 l. 6 (CSTP Reports 1978).
145. TsDA f. 1B op. 67 a.e. 2695 l. 104 (Politburo Discussions 1983).
146. TsDA f. 37A op. 9 a.e. 37 l. 7 (CICT Papers 1982).
147. TsDA f. 37A op. 9 a.e. 37 l. 8 (CICT Papers 1982).

148. For more, see Paul E. Ceruzzi, *A History of Modern Computing* (Cambridge, MA: The MIT Press, 1998), chapters 7 and 8.
149. TsDA f. 517 op. 6 a.e. 38 l. 66 (CSTP Report 1982).
150. TsDA f. 517 op. 6 a.e. 38 l. 56 (CSTP Report 1982).
151. TsDA f. 517 op. 6 a.e. 38 l. 62–3 (CSTP Report 1982).
152. TsDA f. 517 op. 6 a.e. 38 l. 66 (CSTP Report 1982).
153. TsDA f. 517 op. 6 a.e. 38 l. 67 (CSTP Report 1982).
154. TsDA f. 517 op. 6 a.e. 38 l. 69 (CSTP Report 1982).
155. TsDA f. 517 op. 6 a.e. 38 l. 70–71 (CSTP Report 1982).
156. TsDA f. 517 op. 6 a.e. 38 l. 79 (CSTP Report 1982).
157. TsDA f. 517 op. 6 a.e. 48 l. 34–6 (CSTP Reports 1983).
158. TsDA f. 517 op. 6 a.e. 98 l. 12 (CSTP Reports 1983).
159. TsDA f. 1B op. 67 a.e. 3090 l. 167; Milena Dimitrova, *Zlatnite Desitiletiã na Bulgarskata Elektronika* (Sofia: IK Trud, 2008), p. 221.
160. TsDA f. 1B op. 65 a.e. 24 l. 39–41 (Central Committee Plenum, 1978).
161. TsDA f. 1B op. 65 a.e. 24 l. 46 (Central Committee Plenum, 1978).
162. Evgeniï Kandilarov, “Elektronikata v Ikonomicheskata Politika na Bŭlgariã prez 60te-80te Godini na XX Vek,” *GSU-IF*, vol. 96/97 (2003/2004), p. 461.
163. TsDA f. 1B op. 65 a.e. 25 l. 79 (Closed Plenum 1978).
164. Vera Vutova-Stefanova and Evgeniï Kandilarov, *Bŭlgariã I ÎAponiã: Politika, Diplomatsiya, Lichnosti I Subitiya* (Sofia: Iztok-Zapad, 2019), p. 249.
165. TsDA f. 517 op. 5 a.e. 20 l. 81–3 (CSTP Report 1978).
166. TsDA f. 517 op. 6 a.e. 29 l. 10 & TsDA f. 1B op. 67 a.e. 1604 l. 61 (CSTP and Politburo Reports).
167. TsDA f. 517 op. 7 a.e. 55 l. 88B & l. 89; TsDA f. 1B op. 67 a.e. 668 l. 33 (CSTP and Politburo Reports).
168. RGAE f. 9480 op. 13 a.e. 875 l. 13 (Robotics Working Group 1982).
169. TsDA f. 1B op. 65 a.e. 24 l. 97–8 (Plenum 1978).
170. *Zhenata Dnes*, no. 2 (1987), p. 4.
171. TsDA f. 517 op. 6 a.e. 56 l. 122 (CSTP Report 1983).
172. TsDA f. 535 op. 3 a.e. 58 l. 69 (Automation Plan 1985).
173. TsDA f. 1B op. 66 a.e. 66 l. 7 (Plenum 1985).
174. DA-V f. 1230 op. 1 a.e. 54 l. 101 (Centre Plan 1971).
175. DA-V f. 1230 op. 1 a.e. 12 l. 6 (Activity Report 1975).
176. TsDA f. 830 op. 1 a.e. 11 l. 11 (Izotimpex Activity 1970).
177. Interview with Nedelcho Vichev, August 8, 2019.
178. Mar Hicks, *Programmed Inequality: How Britain Discarded Women Technologists and Lost Its Edge in Computing* (Cambridge, MA: The MIT Press, 2017).

179. *Zhenata Dnes*, no. 7 (1985), pp. 6–7.
180. *Zhenata Dnes*, no. 7 (1985), pp. 6–7.
181. *Zhenata Dnes*, no. 7 (1985), pp. 6–7.
182. *Zhenata Dnes*, no. 9 (1985).
183. *Zhenata Dnes*, no. 8 (1986), p. 33.
184. *Zhenata Dnes*, no. 1 (1986), pp. 15–16.
185. ARAN f. 579 op. 6 a.e. 380 l. 84–7 (Co-operation Agreement 1972).
186. BAN-NA f. 20 op. 5 a.e. 40 l. 21 & BAN-NA f. 20 op. 5 a.e. 65 l. 6 (BAS Reports).
187. BAN-NA f. 20 op. 5 a.e. 55 l. 7 (BAS Plan 1974–5).
188. Petūr Petrov, *55 Godini Avtomatika, Kibernetika I Robotika v BAN* (Unpublished; shared with me by author), p. 10.
189. BAN-NA f. 20 op. 5 a.e. 93 l. 17–21 (BAS Report 1976).
190. Interview with Petūr Petrov, December 11, 2015; curiously, we get a glimpse of the working day of an anonymous BAS member working on the “Astra” project in Petko Simeonov’s *Individualna Deynost: Sotsiologicheskoto Znachenie I Ritum* (Sofia: Nauka I Izkustvo, 1982), a sociological study of individuals’ days and work rhythms. On March 10, 1975, this person spent around 3 hours working on technical documentation related to the project in the afternoon and reported on recent trips to the mine to fix parts.
191. Interview with Petūr Petrov, December 11, 2015; corroborated by Vasil Sgurev in an interview on July 7, 2016.
192. Albena Shkodrova, *Sots-Gurme: Kurioznata Istoriia na Kuhnyata v NRB* (Sofia: Zhanet’45, 2014).
193. Shkodrova, *Sots-Gurme*, p. 110.
194. Shkodrova, *Sots-Gurme*, p. 113.
195. TsDA f. 1B op. 67 a.e. 3792 l. 104–6 (Politburo Discussions 1984).
196. TsDA f. 517 op. 6 a.e. 56 l. 129 (CSTP Report 1983).
197. Quoted in Seymour Goodman, “Information Technologies and the Citizen: Towards a ‘Soviet-Style Information Society?’” in Loren R. Graham (ed.), *Science and the Soviet Social Order* (Cambridge, MA: Harvard University Press, 1990), p. 60.

## CHAPTER 6

1. Slava Gerovitch, *From Cyberspeak to Newspeak: A History of Soviet Cybernetics* (Cambridge, MA: The MIT Press, 2002). See also his “Mathematical Machines of the Cold War: Soviet Computing, American Cybernetics and Ideological Disputes in the Early 1950s,” *Social Studies of Science*, vol. 31, no. 2 (April 2001), pp. 253–287; and “Russian Scandals: Soviet Readings of American Cybernetics in the Early Years of the Cold War,” *The Russian Review* vol. 60 (October 2001), pp. 545–568.
2. See Ksenia Tatarchenko, “A House with the Window to the West: The Akademgorodok Computer Center (1958–1993),” PhD dissertation, Princeton University, 2013;

Ksenia Tatarchenko, “Thinking Algorithmically: From Cold War Computer Science to the Socialist Information Culture,” *Historical Studies in the Natural Sciences*, vol. 49, no. 2 (2019), pp. 194–225; Peter Galison, *Image and Logic: A Material Culture of Microphysics* (Chicago: University of Chicago Press, 1997).

3. I use the term in the sense that James C. Scott does in his *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven, CT: Yale University Press, 1999), which discusses how high modernist states aim to make their societies “legible” to themselves through categorization and other tools that quantify populations and make them easily “read” by bureaucracies.

4. BAN-NA f. 20 op. 3 a.e. 77 l. 27 (Institute Council 1965).

5. Vasil Nedev, “Zapisi ot Khronikata na Bulgarskata Kompjūtŕrna Tehnika” (available at <https://bbaei.webnode.page/bylg-electronica-i-inormatika/>; last accessed August 3, 2022); and Evgeniŕ Kandilarov, “Elektronikata v Ikonomicheskata Politika na Bŕlgariã prez 60te-80te Godini na XX Vek,” *GSU-IF*, vol. 96/97 (2003/2004), p. 444.

6. TsDA f. 517 op. 2 a.e. 97 l. 42–46 (CSTP Report 1966).

7. For more on this, see Georgi Konstantinov, *Tom III, Chast 1—Napred I Ako Putyat Vodi Kum Golgota* (Sofia: Shrapnel, 2009), pp. 15–20; and Georgi Konstantinov, *Tom III. Chast 2—Svobodata, Sancho, E Veliko Neshto!* (Sofia: Shrapnel, 2009), pp. 6–7.

8. Tzvetana Dzerhmanova, *Spomeni ot Lagerite* (Sofia: Farago, 2011), pp. 169–170.

9. TsDA f. 517 op. 2 a.e. 105 l. 19 (CSTP Progress Report 1970).

10. TsDA f. 517 op. 2 a.e. 89 l. 44–45 (CSTP Protocols 1972).

11. TsDA f. 517 op. 2 a.e. 113 l. 100 (CSTP Reports 1972).

12. TsDA f. 517 op. 2 a.e. 74 l. 5 (CSTP-BAS Co-operation 1972).

13. TsDA f. 517 op. 2 a.e. 111 l. 21–22 (University Meetings 1972).

14. Interview with Petŕ Petrov, March 19, 2015; the author’s father himself spent his service in the Navy in radio decryption.

15. TsDA f. 1B op. 67 a.e. 3517 l. 24 (Politburo Discussions 1984).

16. TsDA f. 1B op. 66 a.e. 1731 l. 7 (Politburo Discussions 1979).

17. TsDA f. 1B op. 66 a.e. 1731 l. 22, 37, 57 (Politburo Discussions 1979).

18. *Kompjŕtŕr za Vas*, no. 1 (1984), p. 36.

19. *Kompjŕtŕr za Vas*, no. 2 (1985), p. 9.

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## CONCLUSION

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