

The problem was that Marx had predicted the wrong revolution. He had said that socialism would come, not in backward agricultural Russia, but in the most developed and advanced industrial countries: in England, or Germany, or the United States. Capitalism (he'd argued) created misery, but it also created progress, and the revolution that was going to liberate mankind from misery would only happen once capitalism had contributed all the progress that it could, and all the misery too. At that point, there would be so much money invested by capitalists desperate to keep their profits up, that the infrastructure for producing things would have attained a state of near-perfection. At the same time, the search for higher profits would have driven the wages of the working class down to the point of near-destitution. It would be a world of wonderful machines and ragged humans. When the contradiction became unbearable, the workers would act. They would abolish a social system that was absurdly more savage and unsophisticated than the production lines in the factories. And paradise would very quickly lie within their grasp, because Marx expected that the victorious socialists of the future would be able to pick up the whole completed apparatus of capitalism – all its beautiful machinery – and carry it forward into the new society, still humming, still prodigally producing, only doing so now for the benefit of everybody, not for a tiny class of owners. There might be a need for a brief period of decisive government during the transition to the new world of plenty, but the 'dictatorship of the proletariat' Marx imagined was modelled on the 'dictatorships' of ancient Rome, when the republic would now and again draft some respected citizen to give orders in an emergency. The dictatorship of Cincinnatus lasted one day; then, having extracted the Roman army from the mess it was in, he went back to his plough. The dictatorship of the proletariat would presumably last a little longer, perhaps a few years. And of course there would also be an opportunity to improve on the sleek technology inherited from capitalism, now that society as a whole was pulling the levers of the engines of plenty. But it wouldn't take long. There'd be no need to build up productive capacity for the new world. Capitalism had already done that. Very soon, it would no longer be necessary even to share out the rewards of work in proportion to how much work people did. All the 'springs of co-operative wealth' would flow abundantly, and anyone could have anything, or be anything. No wonder that Marx's pictures of the society to come were so rare and so vague: it was going to be an idyll, a rather soft-focus gentlemanly idyll, in which the inherited production lines whirring away in the background allowed the humans in the foreground to play, 'to hunt in the morning, fish in the afternoon, rear cattle in the evening, criticise af-

Socialism would come, not in backward agricultural Russia: at the very end of his life, disappointed by the slow pace of revolution in England and Germany and the USA, Marx reassessed Russia's political potential. But he did not alter his analysis of the economic prerequisites of socialism. See Teodor Shanin, ed., *Late Marx and the Russian Road: Marx and 'the peripheries of capitalism'* (London: Routledge and Kegan Paul, 1983).

But it also created progress: see, to take the most famous of many passages, the paean to the 'most progressive part' played by the bourgeoisie, for which read capitalism, in *The Communist Manifesto* (1848).

It would be a world of wonderful machines and ragged humans: as portrayed, for instance, in Marx-influenced turn-of-the-twentieth-century fictions of the future such as H. G. Wells's *When the Sleeper Wakes* and Edward Bellamy's *Looking Backwards*.

All the 'springs of co-operative wealth' would flow abundantly: 'and on its banners society would inscribe at last ... according to their needs.' Marx, 'Critique of the Gotha Programme', 1875.

It was going to be an idyll: Marx's own hunting and fishing and criticising version is from *The German Ideology* (1845–6). For a late nineteenth-century elaboration of the idyll into a full utopia, see William Morris, *News from Nowhere*; for late twentieth-century Marxian idylls, try Ken Macleod's *The Cassini Division* (London: Legend, 1998), and any of Iain M. Banks's 'Culture' novels, especially *Look to Windward* (London: Orbit, 2000).

ter dinner, just as I have a mind ...'

None of this was of the slightest use to the Marxists trying to run the economy of Russia after 1917. The Soviet Union inherited very few whirring production lines. Marxists elsewhere, in the countries where the revolution was supposed to have happened, had settled down over the years since Marx's death as 'Social Democrats', running parliamentary political parties which used the votes of industrial workers to get exactly the kind of social improvements that Marx had said were impossible under capitalism. Social Democrats still dreamed of the socialist future; but here and now they were in the business of securing old-age pensions, unemployment insurance, free medical clinics, and kindergartens equipped with miniature pinewood chairs. Except in Russia, obscure despotic Russia, which had the oddest Social Democrats in the world. With almost no industrial workers to represent, the Bolshevik ('majority') faction of the Russian Social Democratic Party was a tiny, freakish cult, under the thumb of a charismatic minor aristocrat, V. I. Lenin, who had developed a doctrine of the party's, and by extension his own, infallibility. The Bolsheviks had no chance of influencing events, and certainly no chance at getting anywhere near political power, until the First World War turned Russian society upside down. In the chaos and economic collapse following the overthrow of the Tsar by disorganised liberals, they were able to use the discipline of the cult's membership to mount a coup d'état – and then to finesse themselves into the leadership of all those in Russia who were resisting the armed return of the old regime. Suddenly, a small collection of fanatics and opportunists found themselves running the country that least resembled Marx's description of a place ready for socialist revolution. Not only had capitalist development not reached its climax of perfection and desperation in Russia; it had barely even begun. Russia had fewer railroads, fewer roads and less electricity than any other European power. Its towns were stunted little venues for the gentry to buy riding boots. Most people were illiterate. Within living memory, the large majority of the population had been slaves. Despite this absence of all Marx's preconditions, the Bolsheviks tried anyway to get to paradise by the quick route, abolishing money and seizing food for the cities directly at gunpoint. The only results were to erase the little bit of industrial development that had taken place in Russia just before the First World War, and to create the first of many bouts of mass starvation. It became inescapably clear that, in Russia, socialism was going to have to do what Marx had never expected, and to carry out the task of development he'd seen as belonging strictly to capitalism. Socialism would have to mimic capitalism's ability to run an industrial revolution, to marshal investment, to build modern life. Socialism would have to compete with capitalism at doing the same things as capitalism.

But how?

A tiny, freakish cult: the membership of the Bolshevik faction of the Russian Social-Democratic Labour Party was 'several thousand' in 1903, swelled in the aftermath of the failed 1905 revolution to a maximum of maybe seventy-five thousand by 1907 (but this was while temporarily reunified with the Mensheviks), and then (separate again) plunged during the period of disillusionment and police repression that followed, until by 1910 no Bolshevik branch anywhere in the country had more than 'tens of members', and from his exile Lenin could contact no more than thirty to forty reliable people. See Alan Woods, *Bolshevism – The Road to Revolution: A History of the Bolshevik Party* (London: Well Red, 1999). In 1912, when the Bolsheviks held a separate party congress in Prague, the membership was around five hundred, and according to the delegate from St Petersburg, Lenin could count on 109 supporters in the city. See R. B. McKean, *St Petersburg Between the Revolutions: Workers and Revolutionaries* (New Haven CT: Yale University Press, 1990). That was the nadir, and membership was higher by 1914; but it was the First World War that really changed things.

There was in fact an international debate in the 1920s, partly prompted by the Bolsheviks' strange situation, over whether a state-run economy could really find substitutes for all of capitalism's working parts. No, said the Austrian economist Ludwig von Mises, it could not: in particular, it couldn't replace markets, and the market prices that made it possible to tell whether it was advantageous to produce any particular thing. Yes, it could, replied a gradually expanding group of socialist economists. A market was only a mathematical device for allocating goods to the highest bidder, and so a socialist state could easily equip itself with a replica marketplace, reduced entirely to maths. For a long time, the 'market socialists' were judged to have won the argument. The Bolsheviks, however, paid very little attention. Marx had not thought markets were very important – as far as he was concerned market prices just reflected the labour that had gone into products, plus some meaningless statistical fuzz – and the Bolsheviks were mining Marx's analysis of capitalism for hints to follow. They were not assembling an elegant mathematical version of capitalism as described by its twentieth-century theorists. They were building a brutish, pragmatic simulacrum of what Marx and Engels had seen in the boom towns of the mid-nineteenth century, in Manchester when its sky was dark at noon with coal smoke. And they didn't easily do debate, either. In their hands, Marx's temporary Roman-style dictatorship had become permanent rule by the Party itself, never to be challenged, never to be questioned. There had been supposed to be a space preserved inside the Party for experiment and policy-making, but the police methods used on the rest of Russian society crept inexorably inward. The space for safe talk shrank with the list of candidates to succeed Lenin as the embodiment of infallibility, till, with Stalin's victory over the last of his rivals, it closed altogether, and the apparatus of votes, committee reports and 'discussion journals' became purely ceremonious, a kind of fetish of a departed civilisation. The only necessary ideas about economics – and the only acceptable ones – were those embodied in the particular programme of crash industrialisation on which Stalin rose to total power.

They were not very complicated, these ideas. Until 1928, the year of Stalin's 'Great Break', the Soviet Union was a mixed economy. Industry was in the hands of the state but tailors' shops and private cafes were still open, and farms still belonged to the peasant families who'd received them when the Bolsheviks broke up the great estates. Investment for industry, therefore, had to come the slow way, by taxing the farmers; meanwhile the farmers' incomes made them dangerously independent, and food prices bounced disconcertingly up and down. Collectivisation saw to all these problems at once. It killed several million more people in the short term, and permanently dislocated the Soviet food supply; but forcing the whole country population into collective farms let the central government set the purchase prices paid for

There was in fact an international debate in the 1920s: useful summaries of, and commentaries on, the socialist calculation debate can be found in Mirowski, *Machine Dreams*, Joseph E. Stiglitz, *Whither Socialism?* (Cambridge MA: MIT Press, 1994) and Geoffrey M. Hodgson, *Economics and Utopia: Why the learning economy is not the end of history* (London: Routledge, 1999), especially 'Socialism and the Limits to Innovation', pp. 15–61. Von Mises' opening criticisms are to be found in Ludwig von Mises, *Socialism*, 1922, translated by J. Kahane (Indianapolis: Liberty Fund, 1981). For Hayek's initially ignored but deeply influential contribution, see F. A. Hayek, 'The Use of Knowledge in Society', *The American Economic Review* vol. 35 issue 4 (September 1945), pp. 519–30. For late rejoinders by two Western socialists, see W. Paul Cockshott and Allin F. Cottrell, 'Calculation, Complexity and Planning: The Socialist Calculation Debate Once Again', *Review of Political Economy* vol. 5 no. 1, July 1993, pp. 73–112; and Cockshott and Cottrell, 'Information and Economics: A Critique of Hayek', *Research in Political Economy* vol. 16, 1997, pp. 177–202.

Investment for industry, therefore, had to come the slow way: a policy particularly associated with Nikolai Bukharin, 'Rightist' Bolshevik and theorist of the NEP. See Moshe Lewin, *Political Undercurrents in Soviet Economic Debates: From Bukharin to the Modern Reformers* (Princeton NJ: Princeton University Press, 1974).

crops, and so let it take as large a surplus for investment as it liked. In effect, all but a fraction of the proceeds of farming became suddenly available for industry. In the same way, nationalising all shops and eating places allowed the state to take direct control of the proportion of the USSR's income that was spent on consumption: and to lower it drastically, in favour of investment again. The diverted funds went to start the production lines going, to feed industries picked out for superfast growth in the new Five-Year Plans. Which industries? The heavy ones, of course; the ones supplying goods like steel and coal and concrete and machine tools, which in turn could be used to bootstrap other industries into existence. Marx had helpfully pointed out that capitalist economies grow fastest when they are producing to expand the production base itself. Stalin took the hint. Managers of plants turning out 'producer goods' were given dizzily increasing targets for output. If they met them, by whatever means they could contrive, they would be rewarded – and the targets would increase the next year by another leap and a bound. If they failed to meet them, they'd be punished, often by death. When things went wrong, in Stalin's industrial revolution, someone was always to blame.

Between them, these policies created a society that was utterly hierarchical. Metaphysically speaking, Russian workers owned the entire economy, with the Party acting as their proxy. But in practice, from 8.30 a.m. on Monday morning to 6 p.m. on Saturday night, when the work week ended, they were expected simply to obey. At the very bottom of the heap came the prisoner-labourers of the Gulag. Stalin appears to have believed that, since according to Marx all value was created by labour, slave labour was a tremendous bargain. You got all that value, all that Arctic nickel mined and timber cut and rail track laid, for no wages, just a little millet soup. Then came the collective farmers, in theory free, effectively returned to the serfdom of their grandfathers, since they weren't issued with the internal passports which they'd have needed ever to leave the kolkhoz. A decisive step above them, in turn, came the swelling army of factory workers, almost all recent escapees or refugees from the land. It was not an easy existence, crowded into squalor in cities built for populations half the size, systematically deprived of consumer goods, exposed to splashing molten metal and unguarded machines that ripped off arms and legs. The spare income workers couldn't spend was raked off through compulsory 'bond purchases' and fed back into even more investment. Discipline at work was enforced through the criminal code. Arrive late three times in a row, and you were a 'saboteur'. Sentence: ten years.

But from the factory workers on up, this was also a society in a state of very high mobility, with fairytale-rapid rises for those who could fill the Soviet state's insatiable hunger for skills. The economy needed whole categories of trained people

Slave labour was a tremendous bargain: see Anne Applebaum, *Gulag: A History of the Soviet Camps* (New York: Random House, 2003).

Ever to leave the kolkhoz: the collective farm, in theory an independent co-operative selling food to the state, in practice a mechanism of forced labour under an appointed director.

A society in a state of very high mobility: see Sheila Fitzpatrick, *Education and Social Mobility in the USSR 1921–1934* (Cambridge: CUP, 1979); Fitzpatrick, *Everyday Stalinism*, pp. 85–8.

to spring into existence in the twinkling of an eye: teachers, nurses, doctors, chemists, metallurgists, pharmacists, electricians, telephonists, journalists, architects, designers, book-keepers, aviators, car drivers, truck drivers, locomotive drivers, and engineers, engineers, engineers of every description. Every new factory needed its cadre of managers, every level of the new bureaucracies handling retail and food distribution needed its office staff, every part of the apparatus of control and surveillance needed its white-collar specialists. If you could fill a quota, if you could talk the talk convincingly as laid down in Stalin's Short Course, while negotiating the subtler personal politics of the hierarchy, then a middle-class life beckoned in short order.

Or something grander still, especially once Stalin started purging away all the original Bolsheviks, and opened up every job but his own to the ambitious. You could go to work as a foreman in a textile plant in 1935, and be the commissar for the whole textile industry four years later: that was the fairytale rise of Alexei Nikolae-vich Kosygin, for example, who will come into this story later. You could be an ex-coal miner with a gift of the gab and the knack of making Stalin feel unthreatened, and go in two years from semi-literate rural apparatchik to deputy mayor of Moscow. That was the upward ride of Nikita Khrushchev. You could be the mayor of a city at twenty-five, a minister of the state at thirty; and then, if you were unlucky or maladroit, a corpse at thirty-two, or maybe a prisoner in the nickel mines, having slid from the top of the Soviet ladder right back down its longest snake. But mishaps apart, life was pretty good up at the top, with a salary twenty times, thirty times the wages on the shopfloor, as steep a relative reward as the spoils of any capitalist executive. There'd be a car and a cook and a housekeeper, and a fur coat for Mrs Red Plenty to wear when the frost bit. There'd be a dacha in the country, from whose verandah the favoured citizen could survey the new world growing down below.

And it did grow. It was designed to. Market economies, so far as they were 'designed' at all, by their institutions and their laws, were designed to match buyers and sellers. They grew, but only because the sellers might decide, from the eagerness of the buyers, to make a little more of what they were selling, or because the buyers might decide to use what they'd bought to sell something else. Growth wasn't intrinsic. It wasn't in the essence of a market economy that it should always do a little more this year than it had last year. The planned economy, on the other hand, was created to accomplish exactly that. It was explicitly and deliberately a ratchet, designed to effect a one-way passage from scarcity to plenty by stepping up output each year, every year, year after year. Nothing else mattered: not profit, not the rate of industrial accidents, not the effect of the factories on the land or the air. The planned economy measured its success in terms of the amount of physical things it produced. Money was treated as secondary, merely a tool for accounting. Indeed,

Then a middle-class life beckoned in short order: for the new respectability of the Stalinist bourgeoisie, see Vera S. Dunham, *In Stalin's Time: Middleclass Values in Soviet Fiction* (Cambridge: CUP, 1976), and T. L. Thompson and R. Sheldon, eds, *Soviet Society and Culture: Essays in Honour of Vera S. Dunham* (Boulder CO: Westview Press, 1988); Fitzpatrick again.

And a fur coat for Mrs Red Plenty to wear: for the wearable dimension of the Stalinist good life, see Djurdja Bartlett, 'The Authentic Soviet Glamour of Stalinist High Fashion', *Revista de Occidente* no. 317, November 2007; and *ibid.*, 'Let Them Wear Beige: The Petit-Bourgeois World of Official Socialist Dress', *Fashion Theory* vol. 8 issue 2, pp. 127–64, June 2004

And it did grow. It was designed to: a point made in Mark Harrison, 'Post-war Russian Economic Growth: Not a Riddle', *Europe-Asia Studies* vol. 55 no. 8 (2003), pp. 1,323–9. For a consideration of the specific window of opportunity that was open to a command economy in the middle of the twentieth century, see Stephen Broadberry and Sayantan Ghosal, 'Technology, organisation and productivity performance in services: lessons from Britain and the United States since 1870', *Structural Change and Economic Dynamics* vol. 16 issue 4 (December 2005), pp. 437–66.

there was a philosophical issue involved here, a point on which it was important for Soviet planners to feel that they were keeping faith with Marx, even if in almost every other respect their post-revolutionary world parted company with his. There was a system that generated use-values rather than exchange-values, tangible human benefits rather than the marketplace delusion of value turned independent and imperious. For a society to produce less than it could, because people could not 'afford' the extra production, was ridiculous. By counting actual bags of cement rather than the phantom of cash, the Soviet economy was voting for reality, for the material world as it truly was in itself, rather than for the ideological hallucination. It was holding to the plain truth that more stuff was better than less. Instead of calculating Gross Domestic Product, the sum of all the incomes earned in a country, the USSR calculated Net Material Product, the country's total output of stuff – expressed, for convenience, in roubles.

This made it difficult to compare Soviet growth with growth elsewhere. After the Second World War, when the numbers coming out of the Soviet Union started to become more and more worryingly radiant, it became a major preoccupation of the newly-formed CIA to try to translate the official Soviet figures from NMP to GDP, discounting for propaganda, guessing at suitable weighting for the value of products in the Soviet environment, subtracting items 'double-counted' in the NMP, like the steel that appeared there once as its naked new-forged self, twice when panel-beaten into an automobile. The CIA figures were always lower than the glowing stats from Moscow. Yet they were still worrying enough to cause heart-searching among Western governments, and anxious editorialising in Western newspapers, especially once the launch of Sputnik in October 1957 provided a neat symbol for backward Russia's sudden technological lift-off. For a while, in the late 1950s and early 1960s, people in the West felt the same mesmerised disquiet over Soviet growth that they were going to feel for Japanese growth in the 1970s and 1980s, and for Chinese and Indian growth from the 1990s on. Nor were they just being deceived. Beneath several layers of varnish, the phenomenon was real. Since the fall of the Soviet Union, and the opening of its archives, historians from both Russia and the West have recalculated the Soviet growth record one more time: and even using the most pessimistic of these newest estimates, all lower again than both the Kremlin's numbers and the CIA's, the Soviet Union still shows up as growing faster, in the 1950s, than any other country in the world except Japan. Officially, the Soviet economy grew 10.1% a year; according to the CIA, it grew 7% a year; now the estimates range upwards from 5% a year. That was still enough to squeak past West Germany, the other growth star of the period, and to cruise past the US average of around 3.3% a year for the decade.

On the strength of this performance – which they probably valued at their own,

Indeed, there was a philosophical issue here: for the planners' philosophical fidelity to Marx, despite everything, see Paul Craig Roberts, *Alienation and the Soviet Economy* (Albuquerque: University of New Mexico Press, 2002).

This made it difficult to compare Soviet growth: there is a whole specialised literature, spread over fifty years, on the difficulty of assessing the USSR's growth rate. For an accessible way in, see Alec Nove, *Economic History of the USSR*, and Paul R. Gregory and Robert C. Stuart, *Russian and Soviet Economic Performance and Structure*, 6th edn. (Reading MA: Addison-Wesley, 1998). For Western calculations during the Cold War, see Abram Bergson and Simon Kuznets, eds, *Economic Trends in the Soviet Union* (Cambridge MA: Harvard University Press, 1963); Janet G. Chapman, *Real Wages in Soviet Russia Since 1928*, RAND Corporation report R-371-PR (Santa Monica CA, October 1963); Franklyn D. Holzman, ed., *Readings on the Soviet Economy* (Chicago: Rand-McNally, 1962). As a useful retrospective, see Angus Maddison, 'Measuring the Performance of a Communist Command Economy: An Assessment of the CIA Estimates for the USSR', *Review of Income and Wealth* vol. 44 no. 3 (September 1998), pp. 307-23. For Soviet reassessments of the historic growth record during perestroika, see Tatyana Zaslavskaya, 'The Novosibirsk Report', English translation by Teresa Cherfas, *Survey 1* (1984), pp. 88-108; Abel Aganbegyan, *Challenge: The Economics of Perestroika*, translated by Michael Barratt Brown (London: I. B. Tauris, 1988); and most pessimistic of all, G. I. Khanin's calculations, as described in Mark Harrison, 'Soviet economic growth since 1928: The alternative statistics of G. I. Khanin', *Europe-Asia Studies* vol. 45 no. 1 (1993), pp. 141-67. Then, for Khanin's response to the Western studies, see G. I. Khanin, *Sovetskii ekonomicheskii rost: analiz zapadnykh otsenok* ('Soviet economic growth: an analysis of western evaluations') (Novosibirsk: EKOR, 1993). And finally, for Khanin's revisionist reappraisal of his own previous pessimism, see Khanin, '1950s – The Triumph of the Soviet Economy', which proposes a completely new growth metric based on fuel consumption.

People in the West felt the same mesmerised disquiet: for the analogy between Western reactions to Soviet growth and to the growth of Japan/China/India, see Paul Krugman, 'The Myth of Asia's Miracle: A Cautionary Fable', *Foreign Affairs* vol. 73 no. 6 (November/December 1994), pp. 62-78.

On the strength of this performance – which they probably valued at their own, higher figure – Stalin's successors set about civilising their savage growth machine. The prisoners (or most of them) were released from the labour camps. The collective farmers were allowed to earn incomes visible without a microscope, and eventually given old-age pensions. Workers' wages were raised, and the salaries of the elite were capped, creating a much more egalitarian spread of income. To compensate managers, the stick of terror driving them was discarded too: reporting a bad year's growth now meant only a lousy bonus. The work day shrank to eight hours, the work week to five days. The millions of families squeezed into juddering tsarist tenements, and damp ex-ballrooms subdivided by walls of cardboard, were finally housed in brand-new suburbs. It was clear that another wave of investment was going to be needed, bigger if anything than the one before, to build the next generation of industries. There'd need to be factories soon turning out plastics, and artificial fibres, and equipment for the just-emerging technologies of information: but it all seemed to be affordable, now. The Soviet Union could give its populace some jam today, and reinvest for tomorrow, and pay the weapons bill of a superpower, all at once. The Bolshevik simulation of capitalism had vindicated itself. The Party could even afford to experiment with a little gingerly discussion; a little closely-monitored blowing of the dust off the abandoned mechanisms for talking about aims and objectives, priorities and possibilities, the road already travelled and the way ahead.

And this was fortunate, because as it happened the board of USSR Incorporated was in need of some expert advice. The growth figures were marvellous, amazing, outstanding – but there was something faintly disturbing about them, even in their rosier versions. For a start, at a point when the plans called for growth to rise faster still, it was in fact slowing from one plan period to the next, not much, but unmistakably. And then there was a devil in the detail of the amazing growth, if you looked closely. For each extra unit of output it gained, the Soviet

Set about civilising their savage growth machine: see Nove, *Economic History of the USSR*.

There was a devil in the detail: the figures in the discussion that follows come from Gregory and Stuart, *Russian and Soviet Economic Performance and Structure*.

Union was far more dependent than other countries on throwing in extra inputs: extra labour, extra raw materials, extra investment. The USSR got 65% of its output growth from extra inputs, compared to the USA's 33% and the frugal 8% achieved by France. This kind of 'extensive' growth (as opposed to the 'intensive' growth of rising productivity) came with built-in limits, and the Soviet economy was already nearing them. There weren't that many more extra Soviet citizens to employ; timber and minerals couldn't be slung into the maw of industry very much faster than they already were; and investment was a problem in itself, even for a government that could choose what money meant. Whisper it quietly, but the capital productivity of the USSR was a disgrace. The Soviet Union already got less return for its investments, in terms of extra output, than any of its capitalist rivals. Between 1950 and 1960, for instance, it had sunk 9.4% of extra capital a year into the economy, to earn only 5.8% a year more actual production. In effect, they were spraying Soviet industry with the money they had so painfully extracted from the populace, and wasting more than a third of it in the process.

Yet somehow this economy had to grow, and go on growing, without a pause. It wasn't just a question of overtaking the Americans. There were still people in the Soviet Union, at the beginning of the 1960s, who believed in Marx's original idyll: and one of them was the First Secretary of the Party, Nikita Sergeyeovich Khrushchev. Somehow, the economy had to carry the citizens of the Bolshevik corporation all the way up the steepening slope of growth to the point where the growing blended into indistinguishable plenty, where the work of capitalism and its surrogate were done at last, where history resumed its rightful course; where the hunting started, and the fishing, and the criticising after dinner, and the technology of abundance would purr in the background like a contented cat.

But how?

'Why do you weep?' asked the wise wife.

'How can I help weeping?' replied the archer. 'The king has commanded me to make apple trees grow on both sides of the bridge, with ripe apples hanging on them, birds of paradise singing in them, and strange kittens mewling beneath them; if all this is not done by tomorrow, he will cut off my head.'

The same afternoon that twenty-eight people died on the square in Novocherkassk, Khrushchev gave a speech to an audience of Soviet and Cuban teenagers. He was supposed to be talking about something quite different: instead, compulsively, he talked about the price rise. He told the young people what he'd hoped Mikoyan and Kozlov would be able to make the strikers believe, that having more expensive meat and butter would make agriculture 'rise as if on yeast!' He turned it and turned it about. 'What were we supposed to do?' He said the government had trusted in the good sense of citizens. 'We decided to tell the people and the party the truth.' Knowing what we know now, it is hard not to hear a confused anger. The Politburo's announcement had come as a shock to a population which had been trained to expect prices only ever to fall, but it represented one of the few occasions in Soviet history where the decision-makers genuinely tried to share their reasoning with the public. Khrushchev had taken the advice of experts. He had tried to do the virtuous thing, the anti-Stalinist thing, and it had just made him a mass-murderer again.

The teenagers may have been puzzled by his mood, but no one detected any incongruity, that day or the next day, or for many years after, because, of course, the Soviet people were certainly not told the truth about what had happened at Novocherkassk. Fire hoses were used to wash the blood off the ground, and when stains still remained, the square was repaved overnight with a fresh layer of asphalt. The bodies were distributed to five different cemeteries, and buried anonymously, in graves already filled with more peaceful bones. Relatives were never told what had become of the dead. It was as if they had suddenly evaporated. Not a word about the massacre appeared in the newspapers, or on the radio or television; and great pressure was applied to the students and workers of the town to doubt the evidence of their senses, or, if they stubbornly insisted on remembering, to do so at least in silence and in private. There had been some unrest, provoked by a handful of troublemakers, now all tried and convicted for their crimes. The authorities had stepped in, calm had been restored, end of story.

Since no one knew different, except in Novocherkassk itself, and later on in samizdat whisperings, the massacre damaged nobody's reputation. Frol Kozlov continued as Khrushchev's heir apparent till he had a stroke the following April. Anastas Mikoyan went on being the civilised man of Soviet politics. Far more powerful in their effect were the events played out, unignorably, in public: the missile crisis Khrushchev blundered into in the autumn, which killed nobody but might have killed billions, and the next year's atrocious wheat crop, which put paid to his predictions of yeast-like success in agriculture. Khrushchev was by this time

Khrushchev gave a speech to an audience of Soviet and Cuban teenagers: see Taubman, *Khrushchev*, p. 523.

Fire hoses were used to wash the blood off the ground: see Baron, *Bloody Saturday in the Soviet Union*.

Till he had a stroke the following April: see Taubman, *Khrushchev*, pp. 613–14.

gleamingly bald, except for a white fuzz above each ear. Contemporary joke: What do you call Khrushchev's hairdo? 'Harvest of 1963'. Compared to these, the massacre at Novocherkassk caused nothing to happen. It had no consequences anywhere – except in the thinking of the Politburo.

By 1963, almost all the elements seemed to be coming together in Academician Nemchinov's scheme to reform the Soviet economy mathematically. New cybernetics institutes and departments had sprung up right across the Soviet Union, and were hurrying to complete pieces of the puzzle; or perhaps of several different puzzles. Mathematical models were being built for supply, demand, production, transportation, factory location, short-term planning, long-term planning, sectoral and regional and national and international planning. Automated control systems for factories had been commissioned. A group of Red Army cyberneticians were proposing an all-Union data network that could be used by civilians and the military alike. But Nemchinov himself was no longer in charge. Another casualty of 1963, he was now too ill to go on acting as patron and progress-chaser-in-chief to the proliferating, multiplying discipline he'd helped to guide into existence. When his own base of operations in the Academy expanded into the fully autonomous TSEMI, the Central Economic-Mathematical Institute, with a building out among the muddy new boulevards of the Sparrow Hills and a banner in the hall reading 'Comrades, Let's Optimise!', he could not be its director. The alliances he had created would have to work by themselves. 'The main task', he had told a new conference at Akademgorodok, was now 'the widespread introduction of the results of research'. Others were less sure that the research was ready, or that it all pointed in the same direction. Academician Glushkov's group down in Kiev favoured the direct cybernetic control of the entire economy, eliminating the need for money altogether. The Akademgorodok crowd called for rational pricing. An economist from Kharkov by the name of Evsei Liberman had made a big splash in Pravda by urging for profit to become the main indicator of industrial success. But the premise of the whole intellectual effort was the practical improvement, very soon, of the Soviet economy; of all its ten thousand enterprises, and of the systems that integrated and co-ordinated them. The countdown to paradise in the Party Programme required the economy to grow, through the 1960s, at the rate it had in the official figures for the 1950s: 10.1%. The economists had undertaken to support this by bringing theory swiftly down to the shopfloor. Mines, department stores, chemical plants, fur farms, freight depots: all of it had to be optimised.

Every year, every enterprise in the Soviet Union had to agree a tekhpromfinplan with the organisation it reported to. The tekhpromfinplan covered finance for the enterprise, and the technology it would be using over the next twelve months, but most importantly it stated targets for production. It specified what the enterprise

Contemporary joke: What do you call Khrushchev's hairdo?: see Graham, 'A Cultural Analysis of the Russo-Soviet *Anekdot*'. 206 **New cybernetics institutes and departments had sprung up:** see Gerovitch, *From Newspeak to Cyberspeak*. 206 **But Nemchinov himself was no longer in charge:** for a sharp-tongued account of his sudden loss of standing, and the appointment of Academician Fedorenko to TSEMI instead, see Katsenelinboigen, *Soviet Economic Thought and Political Power in the USSR*. Trying to read the situation from California eight years later, Simon Kassel, *Soviet Cybernetics Research: A Preliminary Study of Organisations and Personalities*, RAND Corporation report R-909-ARPA (Santa Monica CA, December 1971), pp. 86-7, remarked that Fedorenko seemed to be 'without observable experience in computer technology or automation', and wondered whether this was why TSEMI 'appears to have gradually changed from an economics laboratory, engaged in the realization of a preconceived theoretical system of ideas, into an operational support agency for the Gosplan'. The banner saying 'Comrades, Let's Optimise!' **'The main task, he had told a new conference at Akademgorodok:** see V. Kossov, Yu. Finkelstein, A. Modin, 'Mathematical Methods and Electronic Computers in Economics and Planning' [report of Novosibirsk conferences, October and December 1962], *Problems of Economics* (International Arts & Sciences Press, NY) vol. 6 no. 7, November 1963; originally in *Planovoe Khozyaistvo* no. 2, 1963.

Academician Glushkov's group down in Kiev: see, again, Gerovitch, *From Newspeak to Cyberspeak*, pp. 271-4, and for Glushkov's life history and the story of his negotiations with government, Malinovsky, *Pioneers of Soviet Computing*, pp. 29-59.

An economist from Kharkov by the name of Evsei Liberman: see E. G. Liberman, 'Planning Production and Standards of Long-Term Operation', *Problems of Economics* (International Arts & Sciences Press, NY) vol. 5 no. 8, December 1962, pp. 16-22; originally in *Voprosy Ekonomiki* no. 8, 1962. Liberman was interpreted outside the Soviet Union as being the leader of economic reform in general, as in V. G. Tremi, 'The Politics of Libermanism', *Soviet Studies* 19 (1968), pp. 567-72. He was put on the cover of *Time* – 'Borrowing from the Capitalists', *Time Magazine*, 12 February 1965 – and an answer appeared under his name in the magazine *Soviet Life* in July 1965, for which see E. G. Liberman, 'Are We Flirting With Capitalism? Profits and "Profits"', *Problems of Economics* (International Arts & Sciences Press, NY) vol. 8 no. 4, August 1965, pp. 36-41.

Every enterprise in the Soviet Union had to agree a tekhpromfinplan: for the tekhpromfinplan system, and a mercilessly lucid demonstration of why it could not produce a plan that was either complete or consistent, see Ellman, *Planning Problems in the USSR*. For the *zaiavki* (indents) see Herbert S. Levine, 'The Centralized Planning of Supply in Soviet Industry', in Franklyn Z. Holzman, ed., *Readings on the Soviet Economy* (Chicago: Rand McNally, 1962).

must produce, and in what quantity, and at what quality, in order to fulfil its plan. There were bonuses for the managers if they overfulfilled the plan, penalties if they underfulfilled it. Exactly how the tekhpromfinplan was worked out kept changing, as initiatives from the top restlessly rejigged the Soviet Union's bureaucracy. But there were always three main players. There was the enterprise, down at the bottom; there was Gosplan, up at the top; and in the middle, there would be an intermediary. Sometimes the intermediary gathered together all the enterprises working in one particular area of industry, and then it would be called a 'ministry'. Minradioprom, for instance, the Ministry for Radio Production. But at the time we are talking about, the intermediary was a sovmarkhoz, a regional economic council, which gathered together all the enterprises in one geographical zone of the country, no matter what products they made.

If you were reading the official descriptions of the system published by Gosplan, you would think it worked liked this. Every spring, as the Soviet Union's rivers broke up into granitas of wet ice, Gosplan analysed last year's performance figures, paying close attention to the strategic priorities for the economy, and the big picture of the march to communist abundance. But before it had quite finished – alas, there was never enough time to do things in strict sequence, and the year's work tended all to proceed via estimates, later corrected – the zaiavki, the 'indents', had already been sent out to the enterprises. On these printed forms, the enterprises requested the supplies they would need for next year's production. But the enterprise, of course, did not yet know how much it was going to be asked to manufacture. So management would estimate how much coal, gas, electricity, wool, ammonia, copper piping, polystyrene etc. it might need, one material per printed form, on the basis of a plausible percentage rise from its output last year. Around about the end of June, Gosplan would complete the set of draft production targets. They, descending from Gosplan, would arrive in the offices of the sovmarkhoz at the same time as the ascending mass of zaiavki and production proposals from the enterprises, and a period of negotiation then followed in which the sovmarkhoz and the enterprises together explored the true productive possibilities of the enterprises. Gosplan's 'control figures' came in a highly aggregated form, for ease of handling: general categories of production, from ferrous metals to foodstuffs. It was up to the sovmarkhoz to disaggregate them into the actual products its region produced, and to divide the making of them between its enterprises. Needless to say, the management of the enterprise might prefer a looser plan, and a more generous flow of materials, than suited the overall interests of the economy. Negotiation continued until the sovmarkhoz had imposed on the enterprise a taut but not impossible level of output and a lean but not impossible level of inputs. Then, around the end of September, the sovmarkhoz combined all of the adjusted zaiavki and production targets for its region and sent

But at the time we are talking about, the intermediary was a sovmarkhoz: see, again in Holzman, ed., *Readings on the Soviet Economy*, David Granick, 'An Organizational Model of Soviet Industrial Planning', and Oleg Hoeffding, 'The Soviet Industrial Reorganization of 1957'. For an assessment of the effects of Khrushchev's experiment with the *sovmarkhozy*, and the planning of production by region rather than 'branch', see Nove, *Economic History of the USSR*. 208 **Every spring, as the Soviet Union's rivers broke up into granitas of wet ice:** for the detailed chronology of the planning year, in pristine theory and imperfect practice, see Levine, 'The Centralized Planning of Supply in Soviet Industry'.

them on to Gosplan.

Gosplan added up all of the *zaiavki* from round the country to give a figure for the total demand for each commodity, and added up all of the production targets to give a figure for each commodity's total supply. This was called 'the method of balances'. It ensured that, at every upward step of the socialist economy, the quantity of each product the USSR produced always balanced the quantity of each product that was required. But it might be that the two figures, at first, did not quite match. Then there would follow a second period of negotiation, this time between Gosplan and the various *sovnarkhozy*, with Gosplan doing its best to limit demand (or at least to prioritise it on the most strategic sectors) and to expand supply. Negotiation continued until Gosplan had agreed with the *sovnarkhozy*, in turn, a challenging but manageable programme of production. The economy once balanced, the Council of Ministers signed off Gosplan's work in late October, just allowing time for the final production targets and supply quotas to be passed down to the *sovnarkhozy*, for the *sovnarkhozy* to divide them between the enterprises, and for the enterprises to go shopping for their needs in the coming year in the vast compendium of the 'specified classification', which listed every item produced anywhere in the Soviet Union. This last pulse of paperwork passed through the economy in early December. With their order-books now filled firmly for the coming year, managers could dot the *i*'s and cross the *t*'s on their *tekhpromfinplan*, and (precious document in hand) board the train to deliver it to the *sovnarkhoz* just before New Year, in a spirit of justified celebration.

All clear so far?

'I want the lovely Swan Maiden to stand before me, and through her feathers let her body be seen, and through her body let her bones be seen, and through her bones let it be seen how from bone to bone the marrow flows, like pearls poured from one vessel to another.'

All clear so far?: a phrase shamelessly borrowed from the explanation of mid-twenty-first-century US military procurement in Kim Stanley Robinson, *The Gold Coast* (New York: Tor, 1988).

The Method of Balances, 1963

Maksim Maksimovich Mokhov was a very kind man. All of his colleagues remarked on it. When he travelled on business to the Comecon countries or beyond, he would always bring back a thoughtful little present, and by no means the stereotyped or obvious things for which those places were known. From Bulgaria, for example, he brought back for his secretary a small flask of the genuine attar of roses, presented with a little bow: too strong to be used as perfume in the ordinary way of things, but nevertheless delightful. When she uncorked it, a heavy richness soaked the air of Gosplan, like crimson dye sinking into a bowl of water. From Poland he brought ceramic plaques of kings and knights, as thin and brittle as iced biscuits. From Sweden came children's toys, beautifully made from wood. Not having any children himself, he gave these to his deputies in the department; and when the seven-year-old daughter of one wrote him a thank-you letter, he replied, covering a sheet of paper in careful script, and replacing many of the nouns with charming little pictures. A horse instead of 'horse', for example.

The same consideration, it was said, applied in his private life. His wife had been killed in the siege of Leningrad, when they were both in their later twenties. Although he had never remarried, he had been attached virtually since the end of the war to a woman in a similar position, a young widow then, a rather older widow now. This lady had suffered some sort of street accident a couple of years ago which had injured her face, causing great problems to her and, apparently, ruining what was left of her looks. Maksim Maksimovich had remained devoted throughout, securing the services of the best doctors for her, and taking no steps to replace her with a new mistress, even though it would not have been difficult for a man in his position to do so. A number of young women in the building would in fact have been willing, impressed by his fidelity. He received looks of sympathy and admiration when he handed out the traditional bouquets on Women's Day. But he seemed content to leave things as they were. Tuesday evenings were the regular time for him and his lady friend to hear a concert, or to go to the opera together. He could be seen standing at the mirror in his office, just before he left, tidying his

¹ **Maksim Maksimovich Mokhov was a very kind man:** but an entirely fictional one. Deputy Director of the Sector of Chemical and Rubber Goods was a real job, but the relationship I have suggested between professional-bureaucrat deputies and political-appointee sector directors is conjectural, and I have no knowledge of anyone being called up from the middle ranks to serve in a 'kitchen cabinet' for the Minister, as Mokhov does here. He is acting in this book as a confabulated embodiment of the institution. His tone of voice draws on the exasperated Gosplan witness in Ellman and VolodyaKontorovich, eds, *The Destruction of the Soviet Economic System*, and on the Gosplan official interviewed in Adam Curtis's TV documentary 'The Engineers' Plot', programme 1 of *Pandora's Box*, BBC TV 1992; but also, and especially on his return in [part V chapter 2](#), on Dostoevsky's Grand Inquisitor in *The Brothers Karamazov*. There's also useful material on official attitudes (at different levels) to property, in Hachten, *Property Relations*.

² **When he handed out the traditional bouquets on Women's Day:** International Women's Day was celebrated (and still is in present-day Russia) on 8 March, with this flower-giving tradition by men as a kind of courtly grave-marker for the early Soviet Union's feminism.

brilliantined hair and making efforts to reduce the diabolical appearance of his bushy eyebrows. Then he would hook his coat jauntily off the hatstand, check the envelope of tickets in his inside pocket and be off down the long corridors, bending his dark head and his spindly shoulders obligingly to acquaintances.

What a mind, though. As sharp as a razor. Even in his kindness, you might feel that he was amused by what he understood of you, and perhaps also by what he understood of himself. In times alike of frenzy, denunciation, desperation, triumph, complaisance and anxiety, he had made himself valuable. He had risen as high as you could go at Gosplan before the posts became purely political appointments; to the top, in other words, of one of its industrial departments, but not into the general policy apparatus at the apex of the pyramid, which tended to be staffed from the Central Committee. Yet, since his was the level at which competence was known to reach its ceiling, people at it were sometimes, paradoxically, a good deal more important than their job title suggested. On paper, Maksim Maksimovich was Deputy Director of the Sector of Chemical and Rubber Goods, responsible for the forty-one strategic commodities in the chemical and synthetic-rubber industries which the notional Directors of the sector rarely had time to contemplate in detail, being (as they were) apparatchiks in a hurry, and often unable to find their arses with both hands, let alone to analyse the accounts of a chemical factory. And this was significant enough, for chemicals were a vital sector at present, growing so fast that it took all the planners' agility to keep the expansion under control. But in practice much of the day-to-day running of the department was handled, in turn, by Maksim Maksimovich's trusted assistants, because he himself was now being called on flatteringly often by Minister Kosygin, poised right on the very point of the Gosplan pyramid, to act as one of his kitchen cabinet of advisers.

Year by year Maksim Maksimovich understood the stress points, the secret path dependences, of the plan. On a whole range of subjects, he could give you a view of the most refined realism about what was likely to work and what to run into apparently unforeseeable trouble. Moreover, he kept up (so far as Gosplan's library let him) with Western commentary on the plan, which he could translate into Soviet terms. He could tell you, with beautiful ideological tact, what foreigners meant when they said the Soviet system suffered from 'suppressed inflation' or a 'permanent sellers' market'. Conversely, he could see where the unfolding developments of the plan might create business opportunities for the Soviet Union in the West. Hence the trips he now found he was taking, not to Romania to talk about nylon, but to Stockholm to help Kosygin talk to the capitalists, riding along in a jump seat of the ministerial Zil, other competent persons from Trade and Finance and Gosbank perched around him. Then an unobtrusive conference room, with the Soviet Union's technicians of money on one side and the West's on the other: loans, credits, wheat purchases, petroleum sales. It was impossible for

For chemicals were a vital sector at present: for the rapid build-up of the chemical industry, see Theodore Shabad, *Basic Industrial Resources of the USSR* (New York: Columbia University Press, 1969).

'Suppressed inflation' or a 'permanent sellers' market': two linked phenomena, though the first chiefly affected the Soviet Union's perpetually low-priority consumer sector, and the second was true of the cherished industrial sector too. The USSR had 'suppressed inflation' in the sense that it had the classic conditions for runaway inflation in a market economy, with far too much money chasing far too few goods to buy – but insisted on fixed prices for the scarce goods, thus pushing competition for them into non-money forms. The 'permanent seller's market' was the situation in which both individual consumers, and more significantly whole enterprises, were so desperate to be able to buy that they would accept whatever the seller gave them, almost irrespective of quality or convenience.

Maksim Maksimovich not to notice that, on the other side of the table, the intelligence types and security men served the bankers, while on his it was the bankers who whispered advice to the commissar. In the West, he saw, the limousine would have been his own. You may be sure that this thought manifested itself only as an invisible addition to the irony of his gaze.

Maksim Maksimovich would probably not have been working the balances himself, this particular October morning, if a plague of flu had not swept through the Gosplan tower, felling several of his subordinates just as the frantic final weeks of plan revision began. The situation was a nuisance: yet how exhilarating to get back into the specifics of the system again, with its never-ending judgement calls, its hidden little psychological games, its lateral complexities. He whistled under his breath as he trundled his famous chair in front of him across the herringbone parquet of the eighteenth floor. The chair was famous because he could trundle it. It was an ingenious East German contrivance, terribly comfortable to sit in, which had four little castors at the end of legs curving out from a central metal column. He had brought it back himself, by train from Berlin, and used it to spin to and fro across his office at alarming speeds. On its seat, two volumes of chemical-industry input co-efficients were weighing down a thin file of correspondence.

'Going into battle?' said a passer-by from Non-Ferrous.

'That's how the steel was tempered,' he said.

'How many down with it, with you?'

'Eleven so far, and two more suspiciously green. You?'

'Worse!'

The balances were kept in a long, library-like room lined with filing cabinets, watched over by a librarian-like gorgon at a central desk. Mokhov showed his pass – though in his case, it was not strictly necessary – and seated himself at a workspace where there was a convenient spare abacus. He shot his cuffs with a touch of theatre, and opened the file. This room had been his playground for many years, and it stimulated him still. In its grey metal drawers this year were 373 folders, each holding work-in-progress on the balance for a commodity. Three hundred and seventy-three commodities: represented, for the most part, in the highest possible state of generality, so that each one of them rolled together under a single heading what was in practice a mass of different products. Yet still they cast only the loosest and most imperfect conceptual net over the prodigious output of the economy as a whole. There were quarter of a million separate items listed in the specified classification of the electro-technical industry alone. You could never capture the activity of something so huge, so irredeemably multiple, in 373 folders. It would have been an absurd error, therefore, to suppose that the room in any substantial sense contained the economy. The best that could be said was that it contained a kind of strategic outline of it. No; that was not quite true. The best that

Across the herringbone parquet of the eighteenth floor: my visual sense of the Gosplan building comes from Curtis, 'The Engineer's Plot', but I have no real information about its internal geography.

He had brought it back himself, by train from Berlin: a little later he could, if he were very lucky, have bought it from a popular Moscow showroom for East German goods. Under communism, East Germany continued to manufacture office furniture to 1920s and 1930s designs, some of them rather stylish; and it was unusual too, for an Eastern Bloc country, in having a substantial industry producing plastic homewares, which were held up as a sign of socialist rationality. See Eli Rubin, *Synthetic Socialism: Plastics and Dictatorship in the German Democratic Republic* (Chapel Hill NC: University of North Carolina Press, 2009). An equivalent to Galina in the GDR would not have been so impressed by the little beakers in Sokolniki Park.

Chemical-industry input coefficients: a planner's tool giving standardised proportions of the inputs required to produce a unit of a given output, the idea being that all enterprises could be kept up to a set level of efficiency by supplying them only with the appropriate level of materials. Also known as input norms. For the pitfalls of this system, and the tendency for the norms to proliferate into a mass of exceptions, and rules applying to one factory only, see Ellman, *Planning Problems in the USSR*.

'That's how the steel was tempered,' he said: Mokhov is alluding to the title of Nikolai Ostrovsky's famous socialist-realist novel *How the Steel Was Tempered* (1936), which had become a common catchphrase. Computer programmers at Akademgorodok shouted it in August 1960 as they fought with the construction workers who kept turning off their power supply. See Josephson, *New Atlantis Revisited*.

The balances were kept in a long, library-like room lined with filing cabinets: the individual balances looked as I describe them here, and as a paper system they worked in the way I describe, and they must certainly have been kept in filing cabinets in a room (or rooms) in Gosplan, but this particular room I have invented. The Soviet gorgon with hair the colour of dried blood is a generic gorgon, from Central Casting.

A workspace where there was a convenient spare abacus: the most common calculating device throughout the history of Soviet Russia, and slightly different in construction from a Chinese abacus. See Wikipedia for description and photograph.

373 folders, each holding work-in-progress on the balance for a commodity: the number of these most strategic commodities, also known as 'funded commodities', was diminishing in an attempt to make the system more manageable. There'd been 892 of them in 1957, and 2,390 in 1953 – but the deleted ones were presumably reappearing in the wider category of 'planned commodities', which didn't need their balances signed off by the Council of Ministers but still had to be calculated by Gosplan. When these were included, Gosplan's annual output of commodity allocations went up from c.4,000 typescript pages in twenty-two volumes to c.11,500 pages in seventy volumes. Figures all from Gertrude E. Schroeder, 'The "Reform" of the Supply System in Soviet Industry', *Soviet Studies*, vol. 24 no. 1, July 1972, pp. 97–119.

could be said about the room was that it worked, and had done for thirty years. Some of the folders tracked the basics of industrial life: steel, concrete, coal, oil, lumber, electric power. Some were devoted to the food supply, and to agriculture's inputs of tractors and fertiliser. Some attended to sensitive military items. Some followed the production of very specific pieces of critical machinery, because these were the tools on which whole other sectors depended for their existence. Some paid special attention to new technologies just now being bootstrapped into being. Some concentrated on things many different industries used. It was an ad hoc apparatus, not one generated predictably from a set of axioms. It was not the result of any economic theory. But it functioned. It provided the economy with something necessary: a place where the incompatible demands made on it would reveal themselves, where they finally rose up and required to be reconciled, with whatever finesse a planner could muster. And finesse it needed to be, for the 373 commodities did not exist independently. They were interconnected. A change to the output of one might send ripples of change through many others. At this time of year, teams from the different department were all pursuing the consequences of their own last-minute revisions from folder to folder, trying to make the balances compatible with each other, trying to make the balances balance; before the time ran out, and the revisions had to end, and a summary of the state of the room had to be sent on up to the Council of Ministers for approval, in the form of twenty-two typed volumes of figures, four thousand pages or thereabouts, loaded onto a trolley.

So. Maksim Maksimovich spread documents and telegrams with his long fingers. A little problem with Solkemfib, the viscose plant at Solovets, away off in the green gloom of the north-eastern forests. It was one of Maksim Maksimovich's new generation of chemical-fibre operations, along with the big new installations at Barnaul and Svetlogorsk, and it ought not to have been causing trouble at this point in its life-cycle, with machines only four years old and the trials of running them in safely behind. It had its own wood-pulp mill, to provide cellulose, and a nice big lake for water. Power came by 220-kilovolt line from one of the hydro stations on the upper Volga. Everything else arrived and departed on a railroad spur. Really, it was only salt, sulphur and coal in, viscose out. That was the particular simplicity of viscose production from the planner's point of view. None of the more complex chemical inputs the process required – sulphuric acid, lye, carbon disulphide – could easily be transported in bulk. They all had to be manufactured on the spot, at the plant itself; which meant that, to the remote and abstracting eye of someone chiefly concerned with supply chains, a viscose plant could be treated as robust. It was relatively insensitive to disruption. It could be supplied from multiple sources. It was not a hostage to problems elsewhere. Feed it its raw materials, and it chugged along, an economic black box, busily turning trees into sweaters and cellophane and high-strength cord for car tyres. This always struck Maksim

A little problem with Solkemfib, the viscose plant at Solovets: Solkemfib is an invented addition to the genuine portfolio of new-generation chemical fibre plants that were opening in the Soviet Union in the early 1960s. I've picked up details for Solkemfib from Ye. Zhukovskii, 'Building the Svetlogorsk Artificial Fiber Plant', *Sovetskaya Belorussiya*, 2 December 1962; translated in *USSR Economic Development, No. 58: Soviet Chemical Industry*, US Dept of Commerce Joint Publications Research Service report 18,411, 28 March 1963, pp. 17–20. The town of Solovets, on the other hand, is allusive rather than just illusory. There was a real place of that name, an island in the White Sea where some of the nastiest atrocities in the early history of the Gulag took place. The name was borrowed by Arkady and Boris Strugatsky in the 1965 novel *Monday Begins on Saturday*, to give a little unacknowledged satirical edge to the town off in the northern forests somewhere where the institute for studying magic stands. And I've borrowed it in turn, to give my viscose factory a fantastical (and slightly sinister) frame.

Really, it was only salt, sulphur and coal in, viscose out: exhaustive descriptions of the viscose production process can be found on Wikipedia. Wood (pine/fir/larch/aspens) is boiled up with sodium bisulphite in digesters to give a special grade of cellulose called 'dissolving pulp', which is then steeped in sodium hydroxide (lye), squeezed out, crumbled, and aged in the oxygen of the air, before being churned with the industrial solvent carbon disulphide. This gives you cellulose xanthate, which is chemically viscose, but not yet in usable form; so you dissolve it again in more sodium hydroxide, and squirt it through spinnerets into a 'spin bath' of sulphuric acid, where the viscose liquid becomes filaments which can be stretched, wound, washed, bleached, rewashed and dried as viscose yarn. This is the form of viscose that can be woven as 'rayon' or 'art silk', as in Leonid Vitalevich's necktie in [part II chapter 1](#). Squirted through different spinnerets, however, the liquid can become viscose tyre cord or even cellophane. Solkemfib is not in the cellophane business. It clearly has one line set up for fabric and the other for cord. Of the three basic inputs Mokhov mentions, you need the salt to make the lye and the sodium bisulphite, the sulphur to make the sodium bisulphite, the carbon disulphide and the sulphuric acid, and the coal to make the carbon disulphide. Simple though these inputs are, they will still have put the Soviet viscose industry in competition for raw materials with soap-making, rubber-vulcanising, glue-manufacturing, ore-processing, petroleum-refining, steel-galvanising, brass-founding, metal-casting and fertiliser-producing. For an outline of the different industries' interconnecting needs, see Shabad, *Basic Industrial Resources of the USSR*.

Maksimovich as a very obliging way for a physical process to work – and charmingly close to the political textbooks too. Trees into sweaters! Brute matter uplifted to serve human purposes! What could be more dialectical? Who knows, perhaps this thought had figured in Mr K.'s decision that the citizens of his radiant future should, mainly, be wearing viscose and polyester. Yes, a viscose plant was an activist. It woke nature from its idle sleep and set it to work. Unfortunately, it also created a mighty run-off of lignins and poisonous sulphide compounds, but Solovets was a good long way from anywhere else.

Yet somehow Solkemfib had contrived to fumble. The week before last, according to the report in front of him, a piece of heavy earth-moving equipment had been left overnight on a hilltop beside the plant where construction was due to begin. Sometime in the small hours, the clutch had slipped. The behemoth rolled downhill, gathering speed as it jolted over tree stumps, until by the time it reached the bottom it had acquired the momentum of a wrecking ball at full swing. It rolled straight through the thin brick wall of Solkemfib's No. 2 Stretching and Spinning Shop and crashed into the delicate machinery for stretching the fresh viscose filament as it emerged from spin baths of sulphuric acid. Since the line was running at the time, the collision caused considerable spillage of acid, and it was some time before workers were able to separate the wreckage. At this point it became clear that, between the impact and the spill, the stretching machine was beyond the reach of even the most ingenious repair. The plant's mechanical engineer had submitted a list of the crushed and damaged parts. Inspectors from the *sovmarkhoz* confirmed that the machine was, indeed, a write-off. Local police investigating the accident, with the help of the same Solkemfib engineer, had found that the brakes and clutch had been properly set when the earth-mover was parked. A flaw in its hydraulic system was to blame.

Enterprise-level difficulties were supposed to be dealt with at the *sovmarkhoz*, and the stage for bargaining over them was definitively over for this year. But the *sovmarkhoz* had behaved quite correctly in passing this particular problem straight on up. It had the potential to cause serious disruption. Without the stretching machine, the whole No. 2 line at Solovets was out of action. Half the capacity of the plant had suddenly become unavailable; and it was the half that produced tyre cord, not the half that turned out viscose fibre for clothing. Without Solkemfib's contribution of tyre cord, the tyre cord balance would sink into deficit on the supply side; and that could have a knock-on effect on the output of tyres; and that in turn could cause a fall in the output of cars and trucks and buses; and so on, and so on, the original shortfall leaping from commodity to commodity, from folder to folder, propagating itself around the room and therefore around the economy, branching and multiplying and creating chaos. So many of the strategic commodities were themselves inputs in the production of other strategic commodities that a big

¹ **The original shortfall leaping from commodity to commodity:** for the classic analysis of the reasons for inevitable, permanent shortage in 'unreformed' planned economies, see Janos Kornai, *Economics of Shortage*, vol. A (Amsterdam/Oxford/New York, 1980). Kornai points out that, as well as the 'vegetative process' by which in such a system every actor sensibly overstates their needs, the system's own insistence on perpetual growth ensures that any given supply of a material is going to be too little for what its users would want to do with it.

change in the availability of one could, in theory, ripple on undamped, or perhaps even amplified, through areas of the plan utterly removed from the starting point, seeding all the balances it passed through with incompatibilities that would themselves require further disruptive waves of revision to deal with. In theory – Maksim Maksimovich had seen the mathematical demonstrations – you would need to revise all the balances a minimum of six times over, and a maximum of thirteen times, to make them consistent with one another again, and if all 373 commodities were evenly interconnected, each iteration would require 373×373 , or 139, 129 separate calculations. The academic would-be reformers of the economy made much play with this. It was the basis for Emil Shaidullin's entertaining prediction that, by 1980, the entire population would have to work full-time on balancing the plan.

But here, thought Maksim Maksimovich, was precisely where the reformers showed their naivety. They missed the point entirely of the planner's task; which was not to adjust passively to disrupting developments, but to take active steps to limit their effect. The art of the planner was to lead away a ripple of change through the balances in such a direction that it died down, with the minimum of consequences, in the minimum number of steps. Gosplan did not deal with alterations in the plan by repeatedly revising all 373 balances, or anything like it. And nor was he going to chase the consequences of a shortfall of tyre cord meekly through balance after balance. He would cut off the forward-running shortage before it could seriously affect tyre production, let alone run on into the balance for vehicles. Tyre cord could be made of other things than viscose, and quick orders for the substitutes would make up part of the gap. The rest he would fill by last-minute increases to the tyre-cord target for all the other viscose producers. They would groan and strain, but they would probably manage to cover most of the increase, and he could sweeten the situation for them by generosity with viscose's handily generic raw materials; also, perhaps, with extra dollops of cash, under some suitable heading, to make up for the fulfilment bonuses those plants would probably lose. Alas, the effect of moves like these was always to tighten the plan a notch or two further than anyone had originally intended. It would be pushed (everywhere, as other colleagues did what he was doing) that bit more towards a state where its goals could only just barely be achieved. Thus it would be more vulnerable to bad luck, and even more susceptible to proliferating gridlock should anything *else* go wrong. But the alternative was the incoherent wonderland of the mathematicians.

First, though, he had to know just how big the shortfall of tyre cord was going to be. It depended, of course, on how long the No. 2 line at Solovets stayed down; which in turn depended very much on what he, Maksim Maksimovich, now decided to do about it. Again, not at all a mathematical problem. He had been sent numbers,

¹ **In theory ... you would need to revise all the balances a minimum of six times over, and a maximum of thirteen times:** see the very clear exposition of the theory, and the pragmatic Soviet ways around it, in Ellman, *Planning Problems in the USSR*.

² **It was the basis for Emil Shaidullin's entertaining prediction:** really a prediction by Abel Aganbegyan, made in 1964.

but his task was to descry, through them, the human situation behind. What was going on at Solovets? The accident made him instinctively suspicious. He counted the pieces of bad luck required for it to have happened. Earth-mover parked just so; fault in the hydraulics; treeless path down the hillside; entry point through the wall exactly beside the machine; acid spill. Five separate unlikelihoods all lined up in a row, one after the other. Very neat. In the old days, heads would have rolled over this on principle. It would have been labelled as sabotage just to close the books on it. The organs of security would swiftly have uncovered a conspiracy of wreckers, vilely determined to cheat the people of their rightful viscose. But the policy now was not to compound the effects of an accident by losing, in addition, the expertise of skilled workers over it. After all, accidents did happen. It was not a very satisfactory objection to an event that it was unlikely, for in the nature of probability, unlikely things took place all the time. And then, to set against his suspicions, there was the one great counteracting factor that he could not for the life of him see what motive there could be for deliberately doing such a thing. The risk would be enormous, even now. You would have to be desperate. A personal grudge of some kind, a disaffected individual? Hard to believe that they could have covered their tracks so well. Management? Hard to see what cause the management at Solkemfib would have for desperation. He slid the relevant page in front of him. Some teething troubles with the tyre-cord line last year, and as a result a mix of output slightly awry from what the plan had called for, with a good gross output but too much ordinary yarn in it. But this year, solid progress: tyre cord output 2% above target in the first quarter, 3% in the second quarter, smack in the golden zone of plan overfulfilment which brought bonuses raining down. You wouldn't imperil that voluntarily.

Mokhov sighed. The gorgon, whose hair was rinsed the red of old blood, smiled at him. He kicked off gracefully from the table and his wheeled chair flew backwards across the room towards the rank of cabinets where the balances for 133 types of machinery were kept. The replacement stretching machine Solkemfib was requesting, urgently backed up by the *sovmarkhoz*, was itself a strategic commodity. He rifled through a drawer and found it: the PNSh-180-14S continuous-action engine for viscose, exclusively produced in Sverdlovsk by a division of Uralmash, the giant of machine-building enterprises. Recent technological upgrade. The folder was thin, which suggested that this balance had hardly been altered at all. He was not surprised. With just one manufacturer, and a take-up determined by the rate new viscose plants opened, there would not be much volatility in the call for a PNSh-180-14S, unless something like this happened. But that might make it all the worse to introduce an alteration now. A viscose stretching-machine was not some handy lathe-sized object, three metres by two. It was a metal porcupine the width of a subway hall. Building one was a sizeable commitment of resources in itself, and

The PNSh-180-14s continuous-action engine for viscose: a real machine, referred to in 'Results of the Work of the Chemical Fibres Industry for 1968', *Fibre Chemistry* vol. 1 no. 2, March-April 1969, pp. 117-20; translation of *Khimicheskie Volokna* no. 2, March-April 1969, pp. 1-3. But I have no evidence that it was yet in production in 1963, and the technical upgrade, the figure of 17 for the annual output, the nomination of the Uralmash machine-building combine as its manufacturer, the description of it as a metal porcupine as big as a subway hall and the idea that it had its own balance at Gosplan all, all come straight out of the conjurer's hat of invention.

for that matter a major capital cost too. He picked out the folder and propelled himself across the floor again, with paddling motions of his shining black shoes.

Ah yes: a total production of only seventeen machines for the whole USSR, and no revisions paperclipped to the original balance. The page in front of him was simplicity itself compared to some balances. On the left, under 'SOURCES', it gave production as 17, imports as nil, suppliers' stocks as nil. On the right, on the 'DISTRIBUTION' side, it listed the plants receiving the machines, in order of their *sovmarkhoz*. Nil distribution for export, nil for suppliers' stocks, nil for the special reserve of the Council of Ministers. Nil nil nil. Crisply pencilled words and numbers inside the smudgy boxes of the form; departmental authorisation code and operator's initials down at the bottom. Maksim Maksimovich hesitated. If he added one more to the production side, he would be condemning the Uralmash division in question to squeeze out the equivalent of a 6% output boost, on top of the agreed growth for next year, just by that act. It would certainly stress their operations and disarrange their timetable for the year. But the alternative would be to lose one of the seventeen machines already on order, and with it a chunk of the longer-term output growth in viscose he needed to satisfy the targets of the Seven-Year Plan. He was supposed to get chemical-fibre production up to four hundred thousand tonnes per annum by 1965.

He could have wished that Solkemfib's No. 1 line had broken down instead. True, clothing manufacturers were waiting for the ordinary yarn it made, but compared to the tire plants they were a distinctly low priority; because, one single step beyond them, you arrived at the consumer, and the consumer was an end-point of the system, and therefore a natural sink for shortages. All that consumers did with viscose was to wear it. No one stood beyond them in the chain, so there were no consequences whatsoever for inconveniencing them, no farther balances to consider. You could inconvenience the consumer with impunity.

He cast himself off once more, shuttling sideways to the central desk. The gorgon gave him a blank balance form, fresh from the mimeograph, and he signed for it. Then he sailed back to where the papers were spread out. He poised his pencil. He would, he decided, do a little something to keep Solkemfib's minds on the job, by tautening their coal and salt and sulphur supplies a tad. Bad luck might spring from carelessness, and should be discouraged. A reminder of plan discipline would do no harm. But they would have their PNSh-180-14S, and so would all of his enterprises that were already expecting one. Uralmash could be soothed some other way. In the box next to the word 'production' on the left-hand side of the new page, he wrote firmly, '18'. There; there was the budget of pain shared out, and shared out more or less evenly, since there must be a budget of pain.

Maksim Maksimovich Mokhov was a very kind man.

The page in front of him was simplicity itself: taken from the model of a balance-page illustrated in Levine, 'The Centralised Planning of Supply in Soviet Industry'.

He was supposed to get chemical-fibre production up to 400,000 tonnes per annum by 1965: target taken from Shabad, *Basic Industrial Resources of the USSR*.