

Environmental Health in the Regions During Late Stalinism: The Example of Water Supply

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**ENVIRONMENTAL HEALTH IN THE REGIONS
DURING LATE STALINISM:
THE EXAMPLE OF WATER SUPPLY¹**

Donald Filtzer

This paper is part of a larger study of the urban environment and living conditions of industrial workers during late Stalinism. The main aim of the project is to reconceptualize our understanding of workers' standards of living in this period, to include such factors as the housing stock, urban sanitation, diet, access to health care, and infant mortality. The work draws largely (but by no means exclusively) on the files of the State Sanitary Inspectorate (*Gosudarstvennaya Sanitarnaya Inspektsiya*, or GSI). The GSI's local inspectors compiled annual reports on the state of public and environmental health in almost every major city and oblast' in the RSFSR.² These allow us to trace conditions in a given locality longitudinally over a number of years, and also to compare conditions across regions. The range of topics these reports covered was expansive: the condition of the housing stock and dormitories; urban waste removal; sewerage and water supply; public baths; measures to prevent the spread of epidemics, in particular lice-borne epidemics, through the monitoring of hygiene in dormitories, hairdressers, and among transients passing through railway stations and river terminals; hygiene in food-processing enterprises, public dining rooms, and local markets; the physical state of, and hygiene conditions in, local hospitals and clinics; school hygiene and the physical health and stature of pre-school and school-age children, and of teenagers already working in industry.

In most of the research I focus deliberately on what I call the hinterland regions of the RSFSR, that is, those regions which were not under German occupation during World War II and did not see major fighting (Moscow oblast' is a partial exception to this pattern). The reason is methodological. There are quite excellent reports on Leningrad, Rostov-on-Don, Rostov oblast', Stalingrad, and other cities which suffered wartime devastation. My aim, however, is to analyze what we might call the urban environment specific to the Stalinist system. Obviously the war took a heavy toll on every city and town in the hinterland: local infrastructure came under enormous pressure as populations grew, often exponentially, and systems deteriorated through lack of maintenance. When

¹Research for this paper was financed by a major project grant from the Arts & Humanities Research Council (United Kingdom). I should like to thank Natasha Kurashova and Chris Burton for their valuable advice on the location of material and how best to interpret it. They share responsibility, of course, only for any strengths the paper may have, not for any of its weaknesses.

²The GSI came under the USSR and Republican Ministries of Health, but the USSR GSI has its own *fond* in GARF (*Fond 9226*). This *fond* contains *inter alia* a number of oblast' and city reports for the RSFSR, plus a few Republic-wide (but no local) reports for Ukraine. The most consistent run of Russian city and oblast' reports is in the GARF *filial*, which I designate in the notes as GARF-RSFSR. From 1951 the detailed local reports became the responsibility of the Sanitary-Epidemic Centres [*Sanitarno-epidemicheskie stantsii*, or SES] after the latter were made organizationally independent of the GSI. With few exceptions, the oblast' GSI reports then concern themselves mainly with internal organizational matters.

the war ended they could not simply pick up where they had left off in 1941; they had to make good the often substantial damage caused by wartime neglect. Yet these problems were relatively minor compared to the needs of wholesale reconstruction in the occupied territories. Most of the problems confronting hinterland cities were the same in nature as they had faced before the war and would have persisted as problems even if the war had not happened. Put another way, they cannot be “explained away” by the war. It is my contention that by examining urban living conditions in this manner we can learn a great deal about the Stalinist elite’s broader attitude towards its working population and about the inner dynamics and contradictions of the Stalinist industrial economy.

Here in this paper I take up the question of water supply. Access to clean water for drinking and for bathing was closely tied to other problems of the urban infrastructure, most notably housing (very little urban housing had indoor utilities except electricity), sewerage, and waste removal. Yet while sewerage systems and housing stock underwent limited expansion during late Stalinism, the problem of providing clean water to the urban population became more severe, rather than better. The growth of the urban population generated increased volumes of human waste which towns could not treat or dispose of other than by dumping it into local water sources. As industrial recovery and expansion gathered pace, so, too, did the amount of pollutants which factories discharged into rivers. As we shall see, industry was poisoning scarce water resources. Factories then competed with people for access to these limited supplies of usable water. This was not a phenomenon unique to the Soviet Union. It was characteristic of the countries of Western Europe when they began to construct sanitation systems during the last quarter of the nineteenth century, and we are observing it again in modern-day China.³

I begin by briefly describing two historical reference points: Germany in the late nineteenth century, and Ukraine from 1945 to 1948, the latter as an example of how the problem affected the occupied territories. Then I make a more detailed analysis of water supply in the non-occupied regions. Finally, as indicated, I draw out the connection between the developing water crisis and the Stalinist planning system and its tendency towards what I call self-negating growth.

THE HINTERLAND REGIONS IN COMPARATIVE CONTEXT

In his examination of urban mortality in England and Germany during the 40 years preceding the First World War, Jörg Vögele warns his readers not to exaggerate the pace and impact of the introduction of urban sanitation. Construction of urban water supplies and draining and sewerage systems had indeed been rapid, but also highly uneven. In a slightly sobering tone, he notes that although Berlin had begun to build a central water supply in 1853, by 1873 “only” 50 per cent of all dwellings were

³On China, see the revealing article by Jonathan Watts on the growing water crisis created by the unplanned expansion of Shanghai in the G2 Section of the *Guardian*, 11 November 2004. I discuss nineteenth century Europe immediately below.

connected. Half of London's population had centralized supply "only" in the 1890s, while in Sheffield, coverage reached 100 per cent of the population "only" in 1906. Moreover, in their initial stages the systems were not always very effective. In Germany, for example, the pressure was not always sufficient to reach the upper floors of multi-storey tenements. Hot summers were also a problem, "and could interrupt the constant supply of water until late in the nineteenth century." Although by 1912 the systems in Germany's largest cities were serving virtually 100 per cent of properties, there were still significant variations in average per capita daily consumption, from 60 litres a day in Breslau and 80 litres in Berlin, to 160 litres in Frankfurt.⁴

What Vögele considers to be a cautionary note of historical realism also shows how Trotsky's concept of combined and uneven development applied just as well to Stalinism as it did to pre-revolutionary Tsarism. While Stalin may have sought – and in gross quantitative terms partially succeeded – to bring Soviet heavy industry up to near-Western standards by the end of the 1930s, in terms of their urban infrastructure Soviet industrial towns and cities were from 30 to 70 years behind.

Clearly this lag was made worse by the war, but even in the occupied territories the war cannot explain all of it. We can take Ukraine as an example. There the postwar years saw a concerted effort to repair and restore water supplies and treatment works in all its major cities, including Kiev, Khar'kov, Zaporozh'e, and the Donbass. During 1947 the urban population received nearly 20 per cent more water from water supply systems than it had in 1946; further progress was made during 1948. For all this, water problems remained severe. Per capita consumption could vary from as much as 150 litres per day in *some* districts of Zaporozh'e, to as little as 10 litres a day in cities of the Donbass. During the summer of 1948, people living on the upper floors of houses in Khar'kov had water only at night. That same year there were districts of Dnepropetrovsk where the mains system did not work at all and residents had to draw water from wells. In L'vov the water was turned on only at certain times in the day. Supply, however, was only part of the problem. In every town it was difficult to carry out adequate purification because of under-capacity of filter beds, shortages of chemicals (chlorine and coagulants), and even the incompetent design and manufacture of chlorination equipment.⁵ Yet further inspection shows that even in Ukraine the results of wartime neglect and destruction were compounded by deeper structural problems. This was especially the case in the Donbass, where forced industrialization had taken little account of the region's geological limitations and poor endowment with powerfully-flowing rivers. Coal mining is a high water-consuming industry, and so the mines were competing with their workers for water resources. Already in 1938 the Donbass had a shortage of drinking water of some 19 million cubic metres; by the outbreak of war in June 1941, the shortfall had grown by a staggering 42 per cent, to 27 million cubic metres. It was not surprising, then, that even several years after the war workers' families in

⁴Jörg Vögele, *Urban Mortality Change in England and Germany, 1870-1913* (Liverpool, 1998), pp. 150-9.

⁵GARF, f. 9226, op. 1, d. 838, l. 67-83, and d. 924, l. 60-80.

Voroshilovgrad might go several days at a time without drinking water, or stand in long queues at street pumps in the summer.⁶

The case of the Donbass should already suggest that the war alone was not the culprit. If we look at the major hinterland cities and compare them to Vögele's portrait of Wilhelmine Germany, we see that the USSR's lag in sanitary development was structural, not conjunctural. In 1947, over 30 per cent of the inhabitants of Moscow still had neither sewerage nor running water – and Moscow was far and away the most advanced city in the country. Coverage in other large urban centres was far worse: the percentage of the population *without* indoor plumbing and sewerage was 50 per cent in the industrial towns of Moscow oblast' (1947 data), 70 per cent in Gor'kii (1948), and over 90 per cent in Ivanovo (1946). In the city of Molotov (now Perm') as late as 1951, although 35 per cent of its people took water from a central supply, few actually had indoor running water, which extended to only 10 per cent of dwellings.⁷ This reveals another aspect of daily reality outside of Moscow: most people had to draw water from outdoor pumps located in courtyards or on the streets, and then haul it up flights of stairs in buckets. Those not served by pumps and standpipes had to draw water from wells, the quality and safety of which varied dramatically, from the exceptionally pure to the extremely dangerous. Like German towns over half a century earlier, to have indoor piped water did not guarantee supply: sometimes the pressure fell so low that water would not reach the upper floors or the supply stopped altogether.⁸ As for per capita consumption, as we shall see in the subsequent discussion, 60 to 70 litres per person per day – the bare minimum in German cities in 1912 – was considered a satisfactory target in most postwar Soviet towns, battleground and hinterland alike. Many, especially in mining areas, could not provide their residents with even half or a quarter of that figure.

WATER SUPPLY IN HINTERLAND CITIES

Basic utilities in Soviet towns and cities came from two principal providers: the municipality, via the Communal Services Departments of the local Soviet, and industrial enterprises. In most cities the municipal systems were based on older, sometimes pre-revolutionary systems installed originally in

⁶GARF, f. 9226, op. 1, d. 779, l. 23-35ob., 72-5, and d. 924, l. 57-9. Voroshilovgrad was a large city. There were other mining towns where in the summer of 1948 workers might have to wait weeks for drinking water to be available.

⁷GARF-RSFSR, f. A-482, op. 47, d. 6351, l. 106-107ob. (Moscow); RGAE, f. 1562, op. 329, d. 4591, l. 32 (Moscow oblast'); GARF, f. 9226, op. 1, d. 895, l. 109ob. (Gor'kii); GARF-RSFSR, f. A-482, op. 47, d. 4925, l. 221 (Ivanovo); GARF-RSFSR, f. A-482, op. 49, d. 3250, l. 5, 6, 8 (Molotov).

⁸This situation was universal. See, for example, GARF-RSFSR, f. A-482, op. 47, d. 4941, l. 117 (Moscow, 1946); op. 47, d. 4925, l. 163 (Ivanovo oblast', 1946); and op. 49, d. 3243, l. 8 (Kuibyshev, 1951).

the historic town centres, from which they had gradually expanded into outer districts. The enterprise systems served not just their own factories, but usually also the workers' settlements located around these factories or in other parts of the city where their own workers and the latter's families predominantly lived. Not all factories had their own systems; many took water from, and discharged sewage into, the municipal systems. As any student of the Soviet city in the Brezhnev era will remember, coordination between the different suppliers was almost nonexistent. The enterprise systems were drawn up and paid for by the parent ministries; any general planning which integrated the expansion of the enterprise networks into an overall strategy of urban growth and development was purely accidental.

It is important to keep this in mind when we consider the different aspects of water supply. We can identify at least four. First, there was the problem of access. As already indicated, even if you lived in a building which was hooked up to one of the local systems, the probability was overwhelming that you did not have running water in your flat, but had to draw water from an outdoor pump. For those urban residents – and they were a substantial proportion of the population in every urban setting – who lived not in a publicly-owned building, but in one of the myriad private, single-storey wooden dwellings which dominated housing even in Moscow, the chances of having indoor plumbing were almost microscopic.⁹

Secondly, there was the problem of sewage and water treatment. Towns tended to expand provision of water supply faster than they extended their sewerage systems. The amount of sewage generated therefore exceeded the amount that local sewerage systems could handle. Sewage either built up in cesspits or, in extreme, but by no means rare cases, spilled out onto the streets. Further, insofar as towns did manage to expand the network of sewage pipe, they did this faster than they could increase their capacity to neutralize the sewage before discharging it into waterways. Towns had to dispose of their untreated sewage and storm runoffs by simply dumping them into nearby rivers, lakes, or ponds. This in turn placed greater pressure on the capacity of water purification works, which, as we shall see, rarely had the ability to put water through a full cycle of treatment before delivering it to the local population. All of this had enormous implications for problems of waste removal and the quality of life in the towns.¹⁰ It also created problems of water safety for town populations and for people living towns and settlements further down river from their discharge points.

⁹In Moscow in 1947, 70 per cent of all dwellings, providing 37 per cent of the city's total living space, were made of wood. Most of these were low-lying individual homes with no utilities, or at best access to water supply through a nearby pump. GARF-RSFSR, f. A-482, op. 47, d. 6351, l. 106ob.

¹⁰I discuss the problems urban sanitation in my forthcoming article, "Standard of Living versus Quality of Life: Struggling with the Urban Environment in Russia During the Early Years of Postwar Reconstruction," in Juliane Fürst, ed., *Late Stalinist Russia: Society Between Reconstruction and Development* (London: Routledge, 2006). A near-final version of this article is available as PERSA Working Paper No. 44, at: www.warwick.ac.uk/go/persa. I thank Routledge and Juliane Fürst for permission to post the article in advance of publication.

Thirdly, it follows from this last point that just as each town was a potential perpetrator, it was also victim, because its own water sources were being polluted by the sewage discharged from communities and factories lying upstream.

Finally, even where water could be treated for sewage, there was the ever-growing menace of chemical pollution, which by the end of the late Stalin period was overwhelming waterways, rendering them unusable, and exceeding the limited ability of local treatment works to neutralize the toxins through coagulation. These four problems were closely interrelated, a point we can illustrate by looking at water supply on a region-by-region basis.

Moscow and Moscow Oblast'

In 1946, all of Moscow, save for three outlying districts (Sokol'niki, Timiryazev, and Shcherbakov) where people had to boil water drawn from wells, took water from the city's own central supply. The water came from three main sources: the Moscow River; the Moscow-Volga Canal; and the Yauza River basin around Mytishchi in Moscow oblast'. The water from the Moscow River and the Moscow-Volga Canal went through full treatment, although the GSI complained that coagulation, needed to remove chemical pollutants and solid particles, was done only during the periods of flooding caused by the spring thaw.¹¹ The Moscow-Volga canal presented a special problem, because pollution from river traffic had worsened dramatically since June 1941. Bacterial contamination ranged from 10 to 100 times pre-war levels, depending on which stretch of water was being measured, and in July 1947 contamination around Rechnoi Vokzal was on the order of *1,000* times higher. Since the GSI found it almost impossible to impose any kind of enforcement regime to halt the pollution, everything depended on proper treatment.¹² As already noted, roughly a third of Moscow's population took its water from outdoor pumps. The horrendous toil this imposed in terms of fetching and carrying was exacerbated by the fact that the pumps tended to freeze up in winter whenever the pressure dropped, as it frequently did, forcing residents to traipse a kilometre or more to fetch water from somewhere else. By 1951, although the proportion of residents still relying on outdoor pumps seems to have remained more or less the same, there is no mention of irregularities in supply. Water treatment, too, seems to have become more reliable, with the addition of a new temporary treatment station on the Klyaz'ma Reservoir. The one thing that did not improve, however, was the coordination of control over water quality: with the administrative reorganization of the Sanitary-Epidemic Centres and the GSI, the former now had the task of monitoring the safety of the water supply itself, but the GSI retained responsibility for the work of the treatment plants.¹³

¹¹GARF-RSFSR, f. A-482, op. 47, d. 4941, l. 110-116.

¹²GARF, f. 9226, op. 1, d. 1010, l. 18-21.

¹³GARF-RSFSR, f. A-482, op. 47, d. 4941, l. 117, 117ob., 119; op. 49, d. 3249, l. 3, 4, 27.

As we shall see, Moscow was quite exceptional here, both in its relative lack of major problems and in the trajectory of improvement over time. Here we see a sharp contrast with the situation in Moscow oblast'. The oblast' was heavily industrial, with an old and well established textile and garment industry, iron and steel, heavy engineering, chemicals, coal mining, and oil refineries. At war's end all of its 58 listed towns and cities had a central water supply, provided either by the municipality, local industrial enterprises, or a mixture of both. A few towns on the outskirts of Moscow (Perovo, Mytishchi, Kuntsevo, Babushkin, and Tushino) took water from Moscow city. Yet all of these systems had suffered serious decline during the war. Pumping stations did not have spare parts, suffered from interruptions to the supply of electricity, and lacked trained technical staff to look after and maintain them. Street pumps were in a very poor state of repair. Some of the largest industrial towns (Shchelkovo, Lyubertsy, Orekhovo-Zuevo) had to endure occasional total shut-offs, and there was not a single oblast' town where at least some of the street pumps did not go out of action. What prevented this from turning into a sanitary disaster was the fact that only two towns (Stupino and Krasnozavodsk) relied on rivers for their water; all the rest (excepting the ones hooked into the Moscow supply) drew water from artesian springs and wells, where the water was so pure as not to need purification, even with chlorine. The years following the war saw considerable progress repairing, restoring, and expanding town and enterprise supplies – yet this restoration of capacity merely kept pace with population growth. The percentage of the population with access to water supply (as opposed to drawing water from wells) was the same on 1 January 1948, as it had been two years before: 64 per cent. Average daily consumption had risen by 10 per cent, but still stood at only 68 litres per head.¹⁴

Most seriously affected were the coal mining communities. In every respect, living conditions in the Greater Moscow coal fields were amongst the worst in the country, and deteriorated further after the war. Beginning in the second half of 1945, the coal mines saw a massive influx of new labour power, primarily repatriates and other indentured labourers. The mines had dormitory space for only 10 per cent of the new arrivals; the rest were crammed into whatever space could be found. No other sanitary infrastructure had been prepared either, including access to drinking water. In 1945 half the mines were able to take water from relatively safe artesian springs, but this had already fallen to 40 per cent just a year later. The rest took water from unsafe wells. Some mines had not even these, and workers had to use mine water for washing and drinking. By the end of 1949 some improvement had been made, most notably in Stalinogorsk, which completed construction of a municipal water supply, but on the whole mining towns remained short of drinking water.¹⁵

The truly intractable problem in Moscow oblast' was pollution of its waterways, a phenomenon which also illustrates the nature of its political relationship with Moscow city. Neither the city nor the oblast' were able to cope with the huge amounts of sewage generated by their

¹⁴GARF, f. 9226, op. 1, d. 691, l. 109-114; GARF-RSFSR, f. A-482, op. 47, d. 6347, l. 38.

¹⁵GARF, f. 9226, op. 1, d. 691, l. 73-4, 118; GARF-RSFSR, f. A-482, op. 47, d. 4937, l. 14-5, and op. 49, d. 103, l. 14-5.

populations. There were a number of oblast' towns situated along the Moscow River, upstream from the capital, and whatever efforts were made to clean up the river and control pollution were concentrated here, in order to protect the water sources of the capital itself. As the Moscow River left Moscow, however, the story was rather different. Each and every day Moscow discharged 500,000 cubic metres of untreated domestic and industrial waste into the Moscow River and its various tributaries, including the Yauza. As this waste entered Moscow oblast' downstream from Moscow, the oblast' towns and factories added another 350,000 cubic metres: 150,000 cubic metres of chemical pollutants and 200,000 cubic metres of untreated sewage. Many of the pollutants were highly toxic, including arsenic, sulfuric acid, iron salts, phenols, and oil. To this were added untreated infectious material from several oblast' hospitals.¹⁶ Equally important was the fact that this situation did not improve over time. On the contrary, it became increasingly worse. By January 1950, Moscow city was still pumping the same amount of domestic and industrial waste – 500,000 cubic metres a day – into its rivers, but the pollution from the oblast' itself had grown by some 15 per cent, to 400,000 cubic metres a day. The list of pollutants was both long and daunting; what follows is only a very small sample:

- ◆ The Shchelkovo chemical combine dumped over a ton of arsenic a day into the Klyaz'ma River, together a “huge quantity” of sulfuric acid and other chemicals which, in the words of the GSI, “overwhelmed the normal life” of the river for a distance of 10 km. downstream.
- ◆ The oil refinery in Ukhtomskii District (which later became Lyubertsy District), each day discharged into the Moscow River “tons of petroleum” (over and above several thousand cubic metres of untreated sewage), which rendered the river completely unusable over a distance of several kilometres. The water surface was covered with a thick film of oil, the river bed had become black with sludge, and fish had died off.
- ◆ The Karbolit factory dumped so much carbolic acid and formalin into the Klyaz'ma that the smell contaminated the water supply of Vladimir, over 150 km. away.
- ◆ The dyes discharged by the melange yarn combine in Egor'evsk into its local river, the Guslanka, killed off fish over a distance of 10 km. downstream.
- ◆ The Kolomna locomotive works dumped each day into the Moscow River “up to” 17,000 cubic metres of toxic chemicals, including cyanide compounds, lead, and chromium salts.

In total, 90 per cent of the industrial and domestic wastes discharged into the oblast' rivers and their tributaries went untreated. The Klyaz'ma, as noted, carried its pollution all the way to Vladimir. The Moscow River flowed south, carrying its pollution into the Oka at Kolomna, and the Oka was said to remain polluted at least 40 km. further downstream, as it made its way southeast towards Ryazan'.¹⁷

¹⁶GARF, f. 9226, op. 1, d. 691, l. 130-5, 139-40.

¹⁷GARF-RSFSR, f. A-482, op. 47, d. 4937, l. 35, and op. 49, d. 103, l. 20-7.

The Central Industrial Region

From Ryazan', the Oka veers east-southeast, and then northeast into Gor'kii oblast' and on to Gor'kii, where it formed one of that city's two water sources, the other being the Volga. The Gor'kii water supply covered almost 100 per cent of the population, except for a few outer districts which took their water from wells. Less than a third of the population, however, had indoor running water. Everyone else had to rely on water pumps in streets and courtyards. Ten of the city's 11 districts were fed by a municipal system; the other system belonged to the Molotov motor vehicle works, which supplied the Avtozavodskii District, in which the factory was located. Both systems had filtering stations, but they did not work properly. One, built only in 1928, had "defects" in its design and construction; the others were old installations which badly needed major overhaul and modernization. The water taken from the Volga was deemed to be especially hazardous; the Oka less so, although the Oka was coming under increasing threat from raw sewage discharged by the neighbouring city of Dzerzhinsk, whose discharge point was, incredibly enough, located inside the protection zone of Gor'kii's water supply.¹⁸

What is most instructive about Gor'kii, however, is that the quality of the city's water deteriorated over time, and for two reasons. First, the city's filter stations encountered ever more severe technical problems, and secondly, the Oka and the Volga were becoming more polluted. As of the end of 1951 the main water intake serving two major pumping stations in Avtozavodskii District (one belonging to the motor vehicle works, the other to the municipal system) had gone completely out of service. The stations therefore began to take their water from a water supply intended strictly for industrial purposes because of its unsafe quality (the water was heavily polluted by storm runoffs and raw sewage), but they could give it only partial treatment. The filters did not have regulating instruments; the chlorination units did not have spare parts; and they could carry out coagulation only during the spring floods because of a shortage of coagulant. Other stations in the city faced the exact same problems, but produced even worse results than in Avtozavodskii District because the water they were trying to purify was even more heavily contaminated. One filter station had 35 outbreaks of bacterial contamination during 1951; another had 74.¹⁹

By the time the Volga River reached Gor'kii it would already have been polluted by the industrial regions further north, most prominently the industries of Yaroslavl' oblast'. Like neighbouring Ivanovo oblast', it was heavily dependent on textile production, but also had a chemical industry, several defence plants, some engineering, petroleum refining and storage, and food processing. Its main city, Yaroslavl', is an interesting case study because its industrial layout was such that it did not just compromise the water quality of towns and communities down river, but was in effect poisoning itself with its own industrial wastes and its own sewage. In 1946 the city had 15

¹⁸GARF, f. 9226, op. 1, d. 798, l. 28ob.-31; GARF-RSFSR, f. A-482, op. 47, d. 7656, l. 60.

¹⁹GARF-RSFSR, f. A-482, op. 49, d. 3240, l. 8-11, 20.

different water supplies, one belonging to the city itself, and 14 enterprise systems. Eight of these 15 supplies took their water from open bodies of water; seven drew water from artesian wells. Around 20 per cent of residential dwellings (but probably a larger percentage of the population) had indoor running water; the rest had to use outdoor water pumps. Crucially, the city had a small basic sewerage system, but no sewage treatment works: it discharged all raw sewage untreated into the Volga at a point still within the city limits, and below which lay a number of factories that used the river for their own water requirements. The safety of the drinking water therefore depended exclusively on the capacity of the city's water purification plants. The municipal water supply took its water from the Volga, but the collection point was extremely badly located. If most Soviet cities made at least some attempt to draw their water upstream from major pollution discharges, the Yaroslavl' supply took water downstream from a whole number of major industrial enterprises. I suspect that this was not due to careless planning of the original water supply, which (rarely for Soviet cities) dated back to the nineteenth century. Bad planning there surely was, but it very probably was on the part of Soviet officials who decided to locate a number of enterprises – a chemical works, a blacking factory, a defence plant, and a petroleum refinery – up river from the city's water supply, without any regard for the implications this might have for public health. The system's advanced age had another drawback: its network of pipe and its purification works were completely unable to cope with the volume of pollution in the water, so much so that, in the words of the GSI inspectors, the chemical properties of the water following treatment differed little from the water in the Volga itself. Yet matters were even worse with the 14 smaller enterprise supplies, only two of which were able to put water through a reasonably full cycle of treatment. Of the other 12, 11 had no treatment plant at all, and one had only sedimentation tanks. Six of these 12 systems carried out basic disinfection via chlorination, the other six did nothing at all. This means that none of them took any steps to neutralize chemical contaminants.²⁰

This same general arrangement, where upstream polluters degraded the water for users down river, was reproduced in microcosm by many of the city's factories. The Krasnyi Pereval textile mill, for example, took its water downstream from the faecal discharges of a number of blocks of flats, a hospital, and a wharf. It had only "primitive" chlorination equipment to try to deal with this, and some 90 per cent of its pipe was beyond repair and needed replacement. The Krasnyi Perekop textile mill took water not from the Volga, but the Kotorosl', which was polluted by logs being floated down river. Although it managed to discharge its own wastes and those of its workers' settlement downstream from the collection point of its water supply, these wastes in turn poisoned the water supply of a large settlement of railway workers, the city's main railway station, and one of its polyclinics.²¹

²⁰GARF, f. 9226, op. 1, d. 745, l. 60-1, 88-9; GARF-RSFSR, f. A-482, op. 47, d. 6367, l. 23, and op. 49, d. 3236, l. 28.

²¹GARF, f. 9226, op. 1, d. 745, l. 67-8, 70; GARF-RSFSR, f. A-482, op. 47, d. 6367, l. 26-7.

As in Gor'kii, the situation in Yaroslavl' worsened over time. The 1951 SES report described the area along the Volga where the city's sewage collector disgorged its wastes as thick with sediment and bubbling with gasses. It also added three further factories to the list of those polluting the Volga upriver from the city: an asbestos factory, a tyre factory, and a factory making rubber technical goods. Whereas in 1948, 100 per cent of all water samples taken from the Volga had been free of chemical odours, now nearly three-quarters failed, most of them due to traces of petroleum products. One quarter of samples failed tests for chromaticity, although this was actually a significant improvement over past years. Most important, the city's treatment facilities could not cope with the demands now being made on the system. Time spent in sedimentation tanks and on filtration were both curtailed. More water was being coagulated, but still during less than half the year. The worst levels of water quality were recorded during the spring and fall floods and in the summer, when inadequate chlorination imposed a real health hazard. Enterprise-run water supplies were even worse, as water shortages forced at least two of them to start giving unchlorinated, industrial-grade water to domestic users. Bacterial contamination reached a point where the SES had to intervene and arrange for emergency chlorination units to be set up.²²

The Urals and Western Siberia

The Urals and Kemerovo oblast' in Western Siberia experienced feverish development during the 1930s, which brought with it a large and rapid increase in the urban population with very little regard to the creation of a suitable infrastructure. This trend was exacerbated further during the war, as cities like Molotov (Perm'), Sverdlovsk, Chelyabinsk, and the smaller industrial towns in the surrounding oblasti received hundreds of thousands of evacuees and mobilized workers when there were neither the time, the resources, nor the political inclination to construct the necessary housing or to cope with the increased pressure on sewerage systems, waste removal, and water supplies. As if this was not enough, the postwar recovery targeted the Urals and Kemerovo oblast' for a further rapid spurt in industrial output. Once again, a massive new wave of workers, largely conscripted, poured into the region, and again with almost no investment to provide them with housing or sanitation.²³ Especially in the oblast' towns, where infrastructure was already extremely weak, the increase in industrial production wreaked havoc with local water supplies and the ponds and rivers on which they depended.

Let us look first at the oblast' centres, Sverdlovsk, Molotov, and Chelyabinsk. Sverdlovsk built its first water supply only in 1924. Initially it relied on ground water, but by the start of the First Five-Year Plan this was already inadequate, and the city began to take water from the Verkh-Isetskii Pond,

²²GARF-RSFSR, f. A-482, op. 49, d. 3236, l. 15-19, 28.

²³For a more detailed discussion of this point, see Filtzer, "Standard of Living versus Quality of Life," details of which are given above, in fn. 10.

which at the time was relatively clean, because it lay upstream from the city along the main river, the Iset'. The water supply underwent two further phases of expansion before the war, and further work had been planned for 1942 but was not completed. The large industrial enterprises, such as the Uralmash heavy engineering works and the Urals Chemical Engineering Factory (Uralkhimmash-zavod) had their own water supplies. The Uralmash system must have been comparable in scale to those in many small towns, and would have exceeded them in water quality. It provided water not just for its factory buildings and its own "socialist city," but also to some of Sverdlovsk's other large enterprises. Already by 1945, the Verkh-Isetskii Pond had been compromised as a water source, since it had become badly polluted by the city's railway sorting yard. As a result, the various supplies had to begin mixing pond water with water from the Chusovaya, a river which was itself to become a poisonous cauldron. In terms of scope, in 1945, only around 70 per cent of the population took water from any of the water supplies, but this had already fallen to around 60 per cent by 1947, with an even smaller percentage (around 25 per cent) having domestic hookups and indoor running water. The rest of the population had to use wells of questionable safety. Yet the main problem in Sverdlovsk appears not to have been pollution, but the sheer inability of its systems to cope with demand. In 1945 the city system could only pass about two-thirds of the water it supplied through filtration beds; the rest, along with that of most of the enterprise systems, was simply chlorinated. By 1947 the city was facing severe shortages of water. Pressure was so low that water would not reach the top floors of buildings; but the problem also affected outdoor pumps, and there were districts where residents could draw water from the pumps only between four and five o'clock in the morning. The age of the pipe, combined with unspecified abuse by the public, meant a number of pumps were always out of action; repairs were slow and often shoddily done, so that the pumps might break down again just a few days after they had been fixed. Another difficulty was that factories were competing with the population for the same water. Instead of having their own supplies of "industrial grade" water, they were drawing water from the city system. This was water that had already been purified, but the factories were then taking it, re-polluting it, and sending it back again for repurification.²⁴

A very similar picture emerges from the reports on Chelyabinsk. Considering the speed with which the city had mushroomed into a major industrial city during World War II and the catastrophic state of its housing and sewerage systems, its water supply seems to have coped surprisingly well. In terms of coverage, the system of pipe extended almost throughout the city, and in theory could supply water to between 80 and 100 per cent of the population, depending on the district – although few people actually had running water in their flats. In reality, however, access was far below this. The number of outdoor pumps was woefully inadequate, and like Sverdlovsk, the pumps were frequently broken. There were thus a number of parts of town where people had to take untreated water directly out of the Miass River, from wells, or from pumps in other parts of town. For all these problems, however, the water quality in 1946 was reasonably safe. By 1951 the shortages had certainly not improved and may even have become worse. One of the three main enterprise-run water supplies

²⁴GARF-RSFSR, f. A-482, op. 47, d. 3443, l. 58-62, and op. 47, d. 6358, l. 4-6.

was able to supply water only four or five hours a day in the summertime, but in fact the entire city suffered water shortages in hot weather. On the whole, however, the water from the city and the principal enterprise systems was still safe to drink, largely thanks to repair and renovation of the treatment works. The same was not true, however, of the large number of wells. These were badly polluted with ammonium chloride, nitrous and nitric acids, and e-coli. The sanitary inspectors had to organize street committees to clean and chlorinate the wells, and where this was not possible they did it themselves.²⁵

Turning finally to Molotov, the city's main districts relied on a large system built in 1936, which took its water from the Kama River, plus two local systems, each of which served a specific district. At the far end of the city, away from the major industrial areas, there was an old municipal system which relied on ground water, the quality of which was good enough not to require any purification. In general the population was not well served: only around 40 per cent of residents could take water from these various supplies, although average daily consumption had increased from a very low 39.5 litres per person in 1941, to 60 litres by 1945. The other 60 per cent of the population had to use wells, but as in other towns we have discussed, the wells were polluted and inadequately cleaned. As in Yaroslavl', the location of the pumping stations for the Kama River system was catastrophic: they were actually inside the grounds of the giant Molotov engineering works, a major defence enterprise, which discharged all of its faecal and chemical wastes untreated into the Kama, just above the location of the pumping stations. But this was not all. The factory's gas generator station had a major construction defect, as a result of which two or three times a year it poured large amounts of resins into the river, causing the city's drinking water to smell of chlorophenol for a week or two afterwards. The Molotov factory was not the only polluter, however. Further upstream from the pumping stations were a chemical plant, an iron and steel works, coke-oven products factories, and a petroleum depot, all of which dumped their wastes into the Kama. So polluted was the Kama River that the GSI report commented wryly that its water "was like a very complex chemical solution which, as they say, 'contains the entire Mendeleev system.'" Incredibly, the actual water supplied into the pipes and street pumps was of satisfactory quality, mainly because, almost uniquely among industrial towns, it went through a full cycle of treatment: chlorination, sedimentation, filter beds, and coagulation.²⁶

This happy-ending scenario proved unsustainable. In quantitative terms coverage shrank, and in 1951 supplied 35 per cent of the population, versus 40 per cent in 1945. Quality also deteriorated due to a variety of causes. For reasons that are not clear, the Kama River supply no longer had enough coagulant to coagulate the water on a regular basis – it did so for no more than four months a year. The local supply in the Kirov District went to the expense and effort of purifying its water but

²⁵GARF-RSFSR, f. A-482, op. 47, d. 4960, l. 30-7, and op. 49, d. 3261, l. 11-14.

²⁶GARF-RSFSR, f. A-482, op. 47, d. 3431, l. 11-18; the quotation is from l. 12. Molotov was one of the few cities to have sufficient supplies of coagulant, mainly because one of its chemical works produced ferrous hydroxide as a byproduct of making sulfuric acid.

then mixed it with untreated water set aside for industrial use. One military factory which relied on this system was taking the untreated water from the Kirov substation, rather than the treated water, for its living quarters, hospital, and dining room. Elsewhere in the city high-quality ground water was contaminated by the poor condition of the pipe and street pumps. At the Molotov works there was an outbreak of dysentery in 1951, brought about when a cooling pipe running through a tank of boiled drinking water sprung a leak and contaminated the tank. What all of these examples had in common was that they took water that had been intrinsically clean, either through treatment or because it came from a pure source, and turned it into a health hazard. In such circumstances it might have been a blessing that such a small proportion of the city's residents took their water from a water supply, were it not for the fact that the safety of the city's wells was even worse than it had been in 1945, with 99 per cent of samples failing to meet minimum standards for drinking water.²⁷

As difficult as the situation may have been in these cities, it was in the smaller industrial towns of the oblasti that the real environmental and public health catastrophe was taking shape. In Kemerovo oblast' only one town, Gur'evsk, took its water from good-quality ground water. Every other town and city drew water from rivers polluted by industrial wastes "of the most diverse character and to the most diverse degree."²⁸ Stalinsk, Prokop'evsk, and Kemerovo depended on the River Tom'. Stalinsk and Prokop'evsk both took their water from a point on the river polluted by runoffs from coal mines upstream around Osinniki. The Tom' at Kemerovo was polluted by discharges from the coke-oven factories in Stalinsk. Osinniki in turn took water from a tributary of the Tom', the Kondoma, which was polluted by iron ore workings further upstream. The other major towns – Leninsk-Kuznetsk, Anzhero-Sudzhensk, Kiselevsk – relied on other rivers, all of which were polluted by nearby coal mines. What made the situation worse was that none of the municipalities except Kemerovo controlled their own water supplies – all relied on industrial enterprises and mining trusts, for whom production was their first priority, and which "only due to extreme necessity" began to provide water to their local populations. This created two problems. First, the mines and factories took the lion's share of what water was available. Thus daily per capita consumption in most Kuzbass towns in 1947 was barely more than 30 or 40 litres, and exceeded 60 litres only in Stalinsk. Secondly, they displayed little urgency when it came to making investments to upgrade and extend local supplies. Plans to construct a new water supply for the Prokop'evsk-Kiselevsk industrial complex during 1948 never even made it to the design stage: of the 4 million rubles allocated for the project, a munificent 71,000 rubles were actually spent. This was the grandest, but by no means the only investment project to be stalled because of the indifference of local mining trusts. It left a large number of workers scavenging for water, taking it from puddles and mine runoffs in the summer, melting snow in the winter, or hiking long distances to the nearest pump.²⁹

²⁷GARF-RSFSR, f. A-482, op. 49, d. 3250, l. 10-20, and op. 52s, d. 309, l. 15, 22ob.

²⁸GARF, f. 9226, op. 1, d. 932, l. 28.

²⁹GARF, f. 9226, op. 1, d. 932, l. 27-39. GARF-RSFSR, f. A-482, op. 47, d. 7659, l. 35-41.

The story of Sverdlovsk oblast' is really the story of its rivers, since few urban areas were able to take water from underground sources. Most industrial towns – Kushva, Nizhnii-Tagil, Karpinsk, Revda and the Revda-Pervoural'sk industrial district, Krasnoural'sk – had water supplies, but these varied considerably in terms of their safety. They were also very limited in scope, and most people had to rely on wells. Krasnoural'sk, for example, was said to have a very good system because it put its water through a full cycle of purification and properly maintained a protection zone around the source of its supply, but the system in fact provided water to less than 10 per cent of the local population; everyone else had to use wells. Nizhnii-Tagil also took its water from a pure source, and chlorination was sufficient for it to meet safety standards, but only 15 per cent of the town's residents had access to it; here, too, most people relied on some 78 wells, the quality of which varied from one to another. The other towns in the above list were even less fortunate: they could not provide consistent or adequate chlorination to kill bacteria, much less cope with the increasing amounts of industrial pollution.³⁰

The most important rivers in the oblast' were the Chusovaya, the Tagil, the Neiva, the Iset', the Tavda, and the Sos'va, but smaller rivers like the Tur'ya were to acquire what we might call considerable ecological significance. The Chusovaya flowed westwards from just north of Sverdlovsk over a stretch of 600 km., where it fed into the Kama River, the main waterway in Molotov oblast'. It provided much of the water – both drinking water and water for industry – for the city of Sverdlovsk and for the large number of industrial enterprises located on its shores. At its source it was already polluted by fluorine, sulfuric acid, oil, alkalis, and slag from copper mines, a cryolite factory, and an iron and steel works along two of its tributaries, the Zheleznyanka and the Severushka. As it passed through the area around Revda it picked up more of these same pollutants from the copper mines around Degtyarka, the metallurgical works in Revda itself, and the copper smelting plant in Sredne-Ural'sk. As it flowed further west through Pervoural'sk it acquired chromium salts, phenols and a wide variety of resins from the Novo-Trubnyi iron and steel works, a dinas brick factory, and a chemical plant. As impressive as this list is, the early postwar GSI reports were more sanguine about the situation than we might suspect, and pointed to a number of protective measures which at least partially reduced the discharges of phenol and fluorine. They did, however, warn that there were stretches along the river where the contamination was so bad that the water could no longer be used even for industry, much less for people. The same was true of the Tagil, which was already polluted at its starting point by copper, zinc, iron, and various acids. Downstream in the city of Tagil itself, the Nizhnii-Tagil coke oven factory poured phenols, cyanide, ammonia, and rhodium compounds into the river, most of it in the city centre, and around 10 per cent into a tributary of the Nizhnii-Tagil pond, just upstream from where the town took its drinking water. Aside from the health hazards this may have caused to people, the discharges from the factory were killing off fish and other life for a considerable distance down river. Here, too, the GSI noted attempts to capture the toxic metals and

³⁰GARF, f. 9226, op. 1, d. 693, l. 55-8, and d. 736, l. 52-4, 57-64, 157-65.

neutralize the acids from the copper mines, but these were blocked – as were the measures designed to protect the Chusovaya – by a shortage of lime, needed as a coagulant.³¹

Whatever optimism the GSI may have harboured in 1945 and 1946 had completely disappeared by 1953. The quality of the water supply in Nizhnii-Tagil, which the 1946 report had considered to be very good, was now described as “catastrophic,” as the pond from which it drew its water was also the receptacle for the industrial wastes of a whole slew of local factories. There were plans to switch to a new water source, but these were going to require massive investment in a bulkhead and a new chlorination plant. The remedial measures along the Chusovaya appear to have come to nought: it was receiving “tens of thousands of cubic metres” a day of copper compounds, iron, phenol, resins, various acids, and other organic compounds. The Tagil was taking in phenol, resins, xanthates, cyanide, and iron. The Iset’ continued to be a virtual sewer for the large metallurgical and engineering plants in Sverdlovsk. The Tur’ya, a small river just 70 km. long, within just a few years had been turned into a virtual “sewage collector” of the aluminum factory in Bogoslovskii (now the city of Karpinsk), which had come on line after the war. The Bogoslovskii plant also did serious damage to the Sos’va, a river already contaminated by gold mines and the iron and steel works in Serov. So concentrated was the pollution in the Sos’va that the electric power station along the river could not use the water in its boilers; nor, in fact, could factories some 800 km. away along the Tavda, into which the Sos’va emptied as a tributary. Even more sinister was what happened to the Neiva. This river had long been incredibly polluted by copper and ore mines, the Kirovgrad chemical works, and other factories. To these were now added nuclear waste from the uranium enrichment plant at Novoural’sk, known as “Sverdlovsk 44.”³²

Turning finally to Molotov oblast’, the situation there was in many ways even more unsatisfactory than in Sverdlovsk oblast’. The oblast’ had been carved out of Sverdlovsk oblast’ before the war, and regime policy had been to focus on building up its industries and exploiting its vast natural resources at the expense of any investment in social infrastructure. It lacked just about everything needed to make life tolerable: housing, paved roads, schools, hospitals, and not least, adequate sewerage and water supplies. Its main waterway was the Kama River, which, like the rivers elsewhere in the Urals, was very badly polluted. The main culprits were paper mills in Krasnokamsk and Krasnovishersk; chemical works and a paper mill in Solikamsk; more chemical plants and a power state in Berezniki; iron and steel works in Chusovoi, Chermoz, and Dobryanka; two large coal fields around Kizel and Gubakha; and last but not least the chemical and engineering works in Molotov city itself. The paper mills were especially hazardous, because in addition to chemicals they also

³¹GARF, f. 9226, op. 1, d. 693, l. 63-72, and d. 736, l. 72-84. The Chusovaya was the subject of a 1943 order issued by the Council of People’s Commissars, and a 1946 decree of the Council of Ministers.

³²GARF, f. 9226, op. 1, d. 1249, l. 27-9, 30-1, 33, 47-8, 52-3. Regarding Sverdlovsk 44, the GSI commented cryptically that, in addition to sewage, the factory was discharging “industrial waste waters, the composition of which the Oblast’ Sanitary Inspectorate does not know.” *Ibid.*, l. 28.

discharged cellulose fibres which killed off fish by blocking up their gills. The effluent from the soda factory in Berezniki was said to be so toxic that even at dilutions of 500,000 to 1 it was still killing off fish and microorganisms. The fish kills were of some significance, as they jeopardized the oblast' fishing industry – not to mention the risk to anyone who ate the fish which managed to survive.³³

In 1948 the oblast' listed 19 towns and cities and 36 workers' settlements, some of which were quite large. These 55 communities were served by just 44 water supplies: seven belonged to municipal authorities and 37 to enterprises or equivalent organizations. In fact, coverage was worse than these figures suggest. Of the 19 towns, only 13 had a water supply. Given that there were only seven municipal systems, this implies that six towns were supplied by one or more local industrial enterprises, and six other towns had nothing at all. Worse off still were the 36 workers' settlements, only eight of which had water supply. Thus the bulk of the enterprise systems served only their own needs, and not those of the immediate residential population. Yet this, too, is deceptive, because a quarter of the enterprise supplies did not provide drinking water even for their workers while they were in the factory; their water was only for industrial use. In all just 18 per cent of the oblast' population was able to take water from some form of water system.³⁴

The quality of the water coming from these systems was highly unreliable. Only four of the seven municipal systems chlorinated their water. However, in one of these – the system at Chusovoi, home of a large iron and steel works – the chlorination plant broke down in 1941 and was not repaired until six years later, in October 1947; at another, the system in Lys'va, chlorination, which has to be maintained on a constant basis, was frequently interrupted by shortages of chlorinated lime. Two other municipal systems, in Berezniki and Osa, took their water from pure underground sources which required no chlorination, although the Berezniki supply covered only 60 per cent of its population, and even then could give them just 40 litres a day. Unlike many localities, however, the wells on which the remaining 40 per cent relied were clean and the water from met basic safety standards. The quality of the water from the enterprise supplies was considerably more questionable: only one, in Krasnokamsk, had a modern treatment plant with American fast-acting filters; only six others chlorinated their water; the rest did nothing at all. Even Krasnokamsk, which took its water from the Kama River, could not ensure adequate water quality. The effectiveness of the main treatment works was compromised by the high temperature of water taken in from the Zakam thermal-electric power station; a subsidiary supply belonging to the Krasnovishersk paper mill was jeopardized by discharges from a local hospital and a leather processing factory.³⁵

³³GARF, f. 9226, op. 1, d. 899, l. 56-60, 291-300. GARF-RSFSR, f. A-482, op. 47, d. 6345, l. 255-7. Significantly, the latter report (l. 257) commented only on the economic damage done by the fish kills, and not their potential implications for public health.

³⁴GARF, f. 9226, op. 1, d. 899, l. 223, 236, 277.

³⁵GARF, f. 9226, op. 1, d. 899, l. 150-2, 226, 238. GARF-RSFSR, f. A-482, op. 47, d. 6345, l. 290, 294.

Chusovoi is worth further comment, because the health risks there were especially high. The city had both a municipal supply and a supply from the iron and steel works. Until 1948 the iron and steel works did not chlorinate its water at all, despite numerous sources of contamination – including the factory’s own discharges – at the part of the Chusovaya River from which it took its water. Repeated demands from the Oblast’ GSI that the factory build a chlorination plant met with equally persistent refusals, on the grounds that this would “hinder the technological process.” Even when the factory finally relented and built a chlorination facility, its water still led to an outbreak of typhoid fever in 1948. As for the city supply, this had to deal with sewage from a local school, a tuberculosis dispensary, and a creche, as well as the danger of seepage into the local water supply of waste stored in unsound cesspits at the city’s hospital. If we recall that the city’s chlorination plant was out of action from 1941 until late 1947, we can readily grasp how serious the threat must have been – reflected officially in the fact that the water from this supply failed to meet state health standards.³⁶

We need also to keep in mind that the oblast’ had a large coal mining industry, where, like coal mining communities everywhere, the water situation was very serious indeed. The two main mining towns, Kizel and Gubakha, both had water supplies, but neither was of sufficient capacity to meet the needs of their local populations. In Gubakha the supplies were contaminated by runoffs from mining communities further upstream along the Kos’va River, yet the water was not chlorinated. Outside Gubakha and Kizel the pressure on water resources was far greater. Only three mines in the town of Kospash provided adequate quantities of drinking water to their settlements. Elsewhere in Kospash workers and their families had to take water from ditches or from melted snow. Nowhere had indoor running water to houses or dormitories – if there was water supply it was only available from outdoor pumps, and was never chlorinated. In Polovinka, another small mining community in the Kizel fields, most mines took water from ponds too polluted to be used for human consumption; other mines had supplies, but these, too, were not chlorinated, despite numerous orders to the mine managements to start doing so.³⁷

CONCLUSION: ENVIRONMENT, HEALTH, AND SELF-NEGATING GROWTH

When reading through the GSI files two things stand out to the contemporary reader: just how well the inspectors understood the deeper significance of what they were reporting, and their powerlessness to do anything about it. The Soviet Union actually had anti-pollution legislation dating back to 1923, including a number of regulations imposed during the 1930s. I have not studied this period, but there is nothing in the postwar literature to suggest that these rules were adhered to. What we do know is that they were relaxed during the war, and when the GSI attempted to reimpose tougher

³⁶GARF, f. 9226, op. 1, d. 899, l. 155, 229, 236-7.

³⁷GARF-RSFSR, f. A-482, op. 47, d. 6345, l. 303. GARF, f. 9226, op. 1, d. 899, l. 154, 243-4, 256-7, and op. 1, d. 900, . 117-9.

controls in 1945, their affirmation was “delayed.” In 1946 the GSI made a further attempt to impose a comprehensive set of anti-pollution measures on the industrial ministries and to set up a special committee on water protection under the USSR Council of Ministers, but Gosplan blocked it.³⁸ I do not know what All-Union regulations were in force after that date, but the oblast’ reports make it clear that the GSI had ample authority to levy fines on industrial enterprises, and it did so frequently. In almost all cases – not just with polluters, but in other areas of public health – the fines were far too small to have had any deterrent effect. In Sverdlovsk oblast’ major industrial enterprises had either undertaken – or had been compelled – to construct treatment plants to remove toxic wastes from their discharges. In almost all cases the construction of such installations was either years behind schedule or had not even begun. The GSI duly responded by fining some of the worst offenders. In 1953, the Tagilstroi construction organization – which must have had an annual turnover of several million rubles – was fined just 13,000 rubles, and its director a mere 700; the Novo-Tagil iron and steel works received a fine of 12,000 rubles, and its director a fine of 500. These sums were derisively small, and could have had no impact on the behaviour of the offending enterprises. Yet as small as they were, not even these penalties could always be collected. The bank refused to collect a fine on one iron and steel plant in the oblast’ because the GSI had drawn up the order on an old version of the appropriate form. Even threats of criminal prosecution did not work: a pending prosecution of the director of the Bogoslovskii Aluminum Works – who for years had simply ignored GSI demands to halt the astronomical volume of pollution generated by his factory – had to be dropped because of the Beria amnesty following Stalin’s death. In the new post-Stalin atmosphere he simply carried on as before.³⁹

What we are witnessing here is not simply evidence of the institutional weakness of the GSI when up against the power of the industrial ministries, but the insidious calculus which informed all Soviet safety legislation, from Stalin’s day until the end of *perestroika*. The fact was, even if the fines and penalties had been higher, it would still have been cheaper for an industrial manager to pay them than to invest in traps, treatment facilities, or less polluting technologies – even assuming that the required equipment was in fact available.⁴⁰ The financial logic of the Stalinist planning system produced antinomies not very dissimilar from those created by the capitalist market. What was rational behaviour from the point of view of the individual enterprise or industrial ministry, proved catastrophic for the economy (not to mention the society) as a whole.

³⁸GARF, f. 9226, op. 1, d. 1010, l. 89-90, 105.

³⁹GARF, f. 9226, op. 1, d. 1249, l. 31-4, 40.

⁴⁰GARF, f. 9226, op. 1, d. 1010, l. 99. The same principle applied to safety regulations inside the factory. During *perestroika* a manager might pay a fine of just 10 to 50 rubles for violating safety rules (*Rabotnitsa*, no. 7, 1990, p. 10). If a worker suffered a serious accident it was actually more profitable to the factory if the worker died rather than survived, since the level of compensation was lower (*Rabochaya tribuna*, 5 December 1990).

What were these costs? One, of course, was the short-term impact on human health and the quality of life. Lack of sewerage and inadequate facilities for treating and disinfecting human waste posed a constant threat of outbreaks of typhoid, dysentery, and other serious gastro-intestinal diseases. Another cost, but more difficult to measure, is the long-term effect that prolonged exposure to industrial pollution had on health and life-expectancy. It is interesting that, of these two classes of hazard, the GSI already in the early postwar period identified industrial pollution as by far the greater danger. A. Lavrov, the author of a 1947 internal GSI report on water pollution, calculated that a single sugar-beet refinery producing 10 tons of granulated sugar per 24 hours discharged as much pollution into its local waterway as a town of 320,000 people; a wool-washing plant processing 10 tons of wool per day would generate the same pollution as a city of 635,000 people; and a paper mill making 400 tons of paper a day would yield as much as a city of 550,000. These calculations were obviously very crude, being based on just one indicator (the impact each type of pollution had on the oxygen content of the water) and on unspecified assumptions about the degree to which the water was or was not purified before being released; but they nonetheless show the order of magnitude of the problem. Nor was the author in any doubt as to the cause: the absence of any genuine planning. Citing the very cities and oblasti we have studied in this paper, he noted that, when siting plants and the residential settlements for their workers, ministries paid no regard to the availability of water resources, or to the harm that additional discharges of sewage and industrial wastes would do to local rivers and lakes; nor did they make any effort to coordinate the location of new enterprises with the plans of other ministries. To illustrate his case, Lavrov cited the experience of a manganese enrichment plant in Marganets, in Dnepropetrovsk oblast' of Ukraine. The factory regularly discharged untreated sludge into its local river, transforming that stretch of the river around the town from a navigable waterway into a swamp. This then created a backwash, which flooded and destroyed residential homes in the factory's workers' settlement, inundated a bridge, and put the local water supply and treatment works completely out of action. The combined cost of dredging the river bed, rebuilding the homes, repairing the bridge, building a levee, and combatting the malaria brought by the swamp, came to many tens of millions of rubles. This may have been a rather large-scale example, but it was not exceptional. River contamination damaged the turbines of hydroelectric plants, destroyed steamship boilers, killed fish, and deprived farms located near waterways of drinking water for their livestock.⁴¹ Nor does this take into account the sheer physical waste of resources. Factories could have recovered and recycled many of the chemicals they spewed into rivers, but they did not.⁴² To the extent that these materials literally floated away, the Soviet economy had to invest in additional chemical production – factory buildings, equipment, and labour power – to replace them, all of which constituted an unnecessary drain on its resources.

⁴¹GARF, f. 9226, op. 1, d. 1010, l. 80-105.

⁴²GARF, f. 9226, op. 1, d. 899, l. 303a.

What Lavrov had perhaps inadvertently highlighted, and what the raft of GSI reports reiterate through their local examples, was simply one dimension of a phenomenon which lay at the very essence of the Soviet system: its tendency towards self-negating growth. The economy expended labour power and means of production, but these did not lead to commensurate increases in usable output. Defective products had to be remade. Poor quality equipment demanded frequent repair. Wasted fuel and raw materials had to be replenished. The byproducts of one factory – as we have seen here – could damage or destroy the results of the labour process carried on somewhere else. In the case of the urban environment this process began to negate the most important product of all – human labour power. Beyond the misery and tragedy it caused to the individuals whose health it ruined, degradation of this environment had a more general significance for the political economy of the system. By endangering workers’ health it limited the value-creating capacity of those who generated the surplus from which the Soviet elite drew their privileges. Of course the same is true of capitalism. But capitalism rarely destroyed its labour power without being assured of its ready replacement: a reserve army of the unemployed, pools of women and children vulnerable to hyper-exploitation, streams of migrant workers, and now in its more “global” phase, the migration of the factories themselves to regions of the world where the replacement of labour power costs almost nothing. The Soviet system had fewer such replacement sources at its disposal. While Stalin was alive it had the Gulag and later the labour power of Eastern Europe. When it lost these it found temporary sources of internal migrants through its *limitchiki*. But these supplies were not endless, and yet the system continued to undermine their health and well being. Here is yet another example of how the collapse of the Soviet system was inherent in its Stalinist origins.

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