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Public Works in an Autocratic State: Water Supplies in an Imperial Russian Town

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ABSTRACT

In the 1830s and 1840s, Russians became particularly interested in water as a public health issue. Despite the attention of the state and the tsar, localities like the town of Kazan were largely unable to affect changes in public health due to bureaucratic obstacles and financial constraints. After the modernising Great Reforms, private interests helped bring older plans into reality. However, their success caused Russia to lag further behind the West, where private interests were ceding ground to public ones in the face of new understandings of contamination and hygiene.

KEYWORDS

Public health, water supplies, Imperial Russia, urban history, hygiene

By the middle of the nineteenth century, officials in towns across Russia were grappling with an increasingly serious problem: insufficient water supplies. Despite the country's multitude of rivers, lakes, and springs, urban growth, however moderate by Western European standards, had led to a dearth of clean water in towns.¹ Although this problem was quite widespread, a particularly acute problem plagued the provincial capital Kazan. As Edward Turnerelli, an English resident of the town, wrote in 1854,

There are three different species of water in Kazan, and the three degrees of comparison of the adjective *bad*, serve perfectly to give an idea of each of these species. The first, which is merely bad, is the water of the Kaban, a lake that furnishes the whole town with this element. I have certainly been indulgent in the cognomen I have attached to it; to prove it, I need but say that it is a *stagnant pool*, which during the

summer months becomes putrid, and swarms with animalcules. Even in winter it has an unpleasant taste, and if left for a short space of time in a heated room, it becomes absolutely undrinkable ... The second species is obtained from the wells, which are numerous in Kazan. This water is *worse* than the first, and although it may, in cases of necessity, be employed for the kitchen, it is totally unfit for any other use, and in particular for tea, which both the Russians and Tartars drink in great quantity... The third species of water is that of the river Kazanka; this is *bad* to a superlative degree. It is impossible to employ it in consequence of the great quantity of sulphate of lime it contains... In a word, the inhabitants of Kazan employ this water for two purposes only – for washing horses and drowning kittens, nor do I think it can be adapted to any other.²

Turnerelli's description of Kazan's water is far from unique. By 1854, travellers, residents, scholars, and government officials had for decades been lamenting the poor quality of water in Kazan. All these writers shared a certain set of beliefs and uncertainties about water; they may all have believed that water was linked to human health, but the exact mechanism of that connection was unclear. For the most part, writers of the time equated 'bad' water with aesthetically displeasing water. Odour, colour, transparency – these were the measures of water quality that guided critiques of water systems in Kazan and, for that matter, in much of the Western world.³ However, the year Turnerelli published his description of 'bad' water also saw an event that would radically change Western attitudes about water and health. In 1854 Dr John Snow linked an outbreak of cholera to a particular source of water in London; although this was only a first step towards modern germ theory, it gave municipalities a new reason to care about water supplies.⁴ The result, in many Western cities, was a 'movement from [treating water as] an individual to a social concern'.⁵ In essence, the middle years of the nineteenth century saw new understandings of the connections between water and health, and, in Western cities, at least, increasingly public and civic efforts to take over the supply of water from formerly private entrepreneurs. In Russian towns like Kazan, however, the mid-nineteenth century brought new opportunities for individual entrepreneurs within the autocratic state; as a result, and despite long-standing public concern over water, Russian towns began to lag behind their Western counterparts in the realm of urban water policy.

The timing of Turnerelli's publication highlights this shift. Russia was about to undergo its 'Great Reforms'. These would alter the administrative context in which Russians could deal with the newly important environmental problems facing their cities. Many of the reforms affected Russia's social and administrative structures in ways that put new emphasis on meeting local needs by devolving responsibility from the central imperial state. The autocracy of Nicholas I (1825–55) had been notably centralised; as a result, despite the tsar's and the state's interest in such issues, and, indeed, their early efforts to solve them, local problems remained difficult to fix.⁶ The case of Kazan's water supply is a perfect example of these difficulties. Plans to improve Kazan's water supply began to

appear in the late-eighteenth century, and increased in number and ambition during Nicholas' reign. Nicholas was certainly interested in environmental concerns and public works, and his bureaucrats offered many plans for real change. However, most plans either never materialised or ended in failure; the 'enlightened bureaucrats' of the regime were held back by inflexible bureaucratic and administrative structures.⁷ It was not until Alexander II (1855–81) reorganised local authority and created new opportunities for private initiative that local reform – based as it often was on plans created under Nicholas I – could succeed. These reforms, though, created a paradox in Russia's development. In principle, the Great Reforms aimed to modernise Russia, to catch Russia up to the West. However, in practice the Reforms created a situation that left Russia lagging behind when it came to matters like municipal control of water. They legitimised entrepreneurial interest in issues like water supply just as Western municipalities were beginning to realise that the control of water was a matter too important to be left to individuals. As a result, the municipal control of water was retarded in Russia, leaving the country less able to deal with the massive growth in town population by the end of the nineteenth century.

In contemporary societies, water supplies receive significant government scrutiny. In the United States, for example, the federal government sets standards for acceptable levels of contaminants in public drinking water supplies. The standards regulate disease-causing coliform bacteria, viruses, and parasites; inorganic elements like asbestos, chromium, mercury, fluoride, lead, copper, and cyanide; and organic agents like benzene, carbon tetrachloride, and PCBs. The World Health Organization publishes suggested standards for many of these agents, and also recognises that consumers are more likely to trust aesthetically pleasing and palatable water.⁸ In the early nineteenth century, such analysis was unthinkable, and aesthetics became the central focus of interest. Many of these chemicals were unknown before the rise of industry; bacteria and viruses were poorly, if at all, understood and nor were all the health risks associated even with known elements. Not only were the very elements of water contamination misunderstood, scientists had yet to discover a reliable method to investigate these connections. Instead, the period saw many 'scientific' claims, few of which were adequately supported.⁹ As a result, most concern about water quality focused on the aesthetic, with a few scientists beginning to examine the actual substances found in water. In addition, it meant that although water was increasingly seen as something important to public health, there was not yet a body of supporting evidence to make its true significance clear. States might feel an interest in water quality, but only rarely did they feel a need to force action.

In Russia, doctors, scientists, and journalists interested in health kept up with the latest Western discoveries and also sought to compare their own concerns with those of other countries. The idea that water influenced health became quite common, but still problematic, by the second third of the nineteenth century. As a local Kazan journalist put it, doctors and others now increasingly

believed that 'the most natural drink, which man has been granted by God, [was] water'.¹⁰ This was a new sentiment. Because problems with quality had sometimes obscured water's benefits, water supporters had to struggle against anti-water prejudices. An often-reprinted guide to popular medicine noted that, 'there are many people who almost never use water, and others who even laugh at water drinkers... Haters of water also affirm that wine gives strength, while water weakens [the body], and, unfortunately, even some medics agree with this'.¹¹ More specifically, some doctors thought that water was no better than beer or *kvas*, Russia's lightly fermented drink of choice.¹² By the middle of the nineteenth century, though, pro-water sentiment seemed triumphant.

Descriptions of what water ought to be, or, rather, what it ought not to be, are particularly striking to a modern reader, and show the growing concern over water quality. Health manuals and other discussions of water nearly always contained a description of clean water. According to one, 'clean water is completely colourless and transparent, like the cleanest crystal; it is completely tasteless, and, when used, freshens the insides and quenches thirst without any irritating taste or smell; [...] when boiled it should not leave behind any, or only a tiny bit, of scum or sediment'.¹³ Such a detailed description suggests that water was often otherwise. Bad water was everywhere: a book review could matter-of-factly note that 'everyone has happened to see ... [people] drinking water which either contains elements that are dangerous for health or an unpleasant taste'.¹⁴ An article on water purification included reference to the 'river or swamp odour' that much water emitted.¹⁵ So prevalent were these descriptions of what water should not be, it seems likely that the bad types of water were far more common than the clean, ideal water that would support human health.¹⁶

The most intense interest in water appeared during the early 1830s and 1840s, a time when plans for new supplies of water also began to appear in the press and in actual proposals. There seem to be several catalysts for this increase in interest in and concern about water. One was a new fad for water cures. These cures varied enormously; some advised bathing in cold water, others consuming mineral waters. All, though, believed that water was not simply generally healthy, but specifically medicinal. Many of the works published in Russian on the subject of water treatments had been translated from German or French sources, often with additions or commentary by their Russian translators. Russian reviews generally agreed with the idea that water could be considered a medicinal substance, and saved their dislike of these books for those that were particularly poorly translated.¹⁷ Although there were many differences, most of the authors of these works also noted that the principle necessity for any cure was perfectly clean, clear, odourless water.¹⁸ That is, not only did they place importance on water in general, they placed importance on the quality of that water.

Another issue that influenced perceptions of water was the appearance and spread of cholera. Russia was the first European country to find cholera on its own soil; the epidemic that raged in 1830–1 brought international attention to

Russian medical practices. As they treated its symptoms, Russian doctors also investigated the spread of the disease, adding much new information about its transmission. Although germ theory was not yet understood, the current miasma theory of illness, according to which diseases such as cholera were spread by general unhealthy conditions, often included worry over water and its cleanliness.¹⁹ Again, however, because the theory of contagion was still new and unproved, this interest was not yet enough to cause a major shift in attitudes about public health policy. Cholera reinforced the idea that water was important, but did not yet demand specific actions. A final issue that influenced the debate over water was temperance. The 1830s and 1840s saw an increase in movements promoting sobriety. Discussions of temperance societies and the evil of drink began to appear in print during these decades, and though water was not always part of the discussion, it was sometimes used as an example of a better beverage than vodka.²⁰ All these issues gave new force to the perception of problems among reform-minded Russians.

As water quality became more of an issue, it caused greater concern about ensuring decent supplies of it. A decent supply of water became a sign of a good city; it was not just that water was healthy for individuals, but the quality of a town's water supply was a sign of its healthiness.²¹ Perhaps as a result, many journals and books began to discuss how to alleviate water problems in order to make towns better places to live, often citing cases from Western Europe as examples to emulate or avoid. Some articles focused on how households could improve their individual water supplies through elaborate water cleaning machines or smaller filtration devices.²² Many others considered the possibilities of fixing citywide problems. A guide to Russia's medical police listed the role those officers were to play in helping the situation. These included picking good locations for wells, making sure existing wells were free from contamination, and that no one consume water that had been used industrially.²³ Machines and techniques used in foreign cities got their press time, too. The problems facing London, for example, were compared to those facing St. Petersburg or Moscow.²⁴

Many of these articles posed the question of who was responsible for such improvements. The editor of the *Journal of the Ministry of Internal Affairs* commented on this question in the context of an article 'On Supplying Cities with Water'. Largely translated from an English book on the water supply of London, the article included the footnote that the Russian government 'worried about the most convenient delivery of water not only to the capitals, but even to other towns of the Empire', suggesting that water issues were increasingly understood as public-works questions.²⁵ Furthermore, even a late-eighteenth-century writer felt that the government ought to worry about and ensure water availability quality, as had the governments of ancient Rome.²⁶ Russian plans for major improvements, however, proved consistently problematic. Although the autocracy ought to have been able to force changes at will, the combination of broad public action with specific local conditions often stymied its desires.

Nonetheless, water became an important issue in towns around Russia, and very strongly so in the town of Kazan.

Many towns in the Russian Empire suffered from insufficient or unclean water supplies: travel accounts, journal articles, and state commissions reported on such problems in towns ranging from St. Petersburg to Odessa.²⁷ Even so, Kazan is a particularly fruitful subject to examine. For one, the city was a large one, at least in the context of Russia. Its population was large, but even more striking to foreigners was the sheer physical size of the town. A new professor at Kazan University described it as 'very large, such that by size it does not yield to Vienna, but it is so sprawled across hills and valleys that in the town proper there are squares recalling steppes'.²⁸ This sprawl meant that practical issues of geography limited many inhabitants' ability to access water at all, let alone clean water. In addition, the town was growing rapidly in the early nineteenth century. From 1825 to 1856 its population grew by 52 percent, and in consequence, water supplies that were merely strained at the beginning of the century began to seem completely inadequate by the middle.²⁹ An additional advantage of this town is the presence of Kazan's university, and the resulting supply of journalists and scientists. With scientists eager to experiment on the water, and journalists happy to write about it, the question of supplying water to the town had perhaps a greater push behind it than in other towns. As a result, information about the problematic state of water supplies in the town is found in written as well as archival sources.

In principle, Kazan had plentiful sources of water. The old city spread from the bank of the Kazanka River to the edge of lake Kaban, bisected by the Bulak canal between them. In the mid-nineteenth century the town's centre was several versts up the Kazanka from the Volga: not a bad distance, but rather far for regular passage and toting of water.³⁰ Most sources examine the Kaban, the Kazanka, and various wells situated around the town, with a few also mentioning the Bulak (usually so dirty it was totally discounted), the Volga, and several other nearby lakes (all usually considered rather far for practical use). With all these possible sources of water, it took some time for citizens to begin to worry about their water supply. Several sources mention that concern existed as early as the reign of Catherine II (1762–96), but they fail to go into much detail as to plans or perceived problems.³¹ The early nineteenth century saw more, and sometimes contradictory, discussion of water. For example, in 1817 a local journalist described the town water supply as 'good enough', but also noted that inhabitants frequently saw piles of '*manure* and every sort of *trash*' by the side of the lake.³² That same year a guide to the medical condition of the town noted that 'its inhabitants suffer from a lack of clean and healthy water' and that Lake Kaban was a particular problem, with 'water ... at almost all times murky' except in the farthest reaches, far from inhabited areas.³³ Another journalist completed the description of a growing problem. He wrote that the inhabitants of the town

not only washed dirty clothes in the lake, but also bathed themselves and their horses there in the summer.³⁴

As the nineteenth century progressed, the local authorities tried to pin down more exact information about the quality of Kazan's water. They questioned which of the multiple sources of water around town was the best, and whether the best was good enough. Turnerelli, the English traveller noted above, believed that of those sources of water available within the town, the Kaban was the least bad. From the 1810s on, many journalists noted that most of the city got its water from the Kaban, but that the more distant Volga had healthier water.³⁵ Another account noted that the water from the Bulak was not potable, partially due to dirt, partially due to its low level during the summer. Lake water was best, from the chain of lakes of which the Kaban was the nearest; well water in the city was decent, but not very good; and the Kazanka's water could be used 'only to the detriment of public health'.³⁶ Scientists from Kazan University added to the discussion by performing experiments on the water available around the town. The results were disturbing. In 1833 Il'ia Iakovkin wrote that microscopic examination of Kaban water showed 'insects, for the most part with horns, like tentacles, six-legged, of varying appearance'. He also noted that Volga water had even more of these creatures.³⁷ The same year another author wrote that Kaban water was even more disturbing: that in spring it smelled of manure, and in summer it turned into a 'green liquid'.³⁸ In 1837 a report was submitted to the Kazan provincial governor's office about the problem of the annual spring flooding of the Kaban with water from the Volga. This flooding caused a wave of mud and filth to inundate the Kaban and often to overflow its boundaries. One bank of the Kazanka became a 'malignant swamp', considered dangerous for its 'miasma'. The water forced into the Kaban was so dirty that a glass of it proved to be half sediment. Scientists investigating the water noted that this sediment contained various small amounts of minerals, and was 44 percent organic matter.³⁹ Clearly, they concluded, this was not healthy water.

Yet other issues emerged as discussion of the problem continued. The problem of water, it soon became clear, was more central to the lives of the poor. As a commentator wrote, 'which of the inhabitants of Kazan does not know how great is the lack of good water in this highly-populated town? And to whom are unknown the dangerous results of that, especially for the lower class of the people?'⁴⁰ The cost of water in areas far from the Kaban was 'very expensive', leaving the poor in a difficult position.⁴¹ A report of the Economic Department of the Ministry of Internal Affairs made the point more precisely. The problem, as the report writer saw it, was of both quality and availability: 'today the Kaban is in many places surrounded by various factories and is not located in the very centre of town, while the Bulak, passing among many streets, is doused by silt and dirt, due to which there is very little water in it, and that mixed up with trash'. Water supplies tended to be either dirty or hard to get at. As a result, the difficulties involved in getting sufficient clean water were

unequally spread among the inhabitants. The wealthy had the money and leisure to acquire water from distant places. The poor, however, lacked this option. As the report writers noted, 'the numerous class of the poor must use so-called half-mud from the Bulak for food and drink, due to the impossibility to change it for other [water]'.⁴² A few writers dissented, claiming that 'all estates, that is the rich, the middling, and the poor', suffered from the lack of water. Such estimates, however, tend to go with extremely expensive projects, in this case one that involved moving the Volga. To justify such expense, the problem had to be more widespread.⁴³ Furthermore, another author soon contradicted this sort of assessment. This anonymous figure noted: 'Who suffers from the need for clean, healthy water? The poor. The rich man doesn't drink dirty water: he has a water-purifying machine, he has a horse, on which he can bring home good water from far away'.⁴⁴ Lack of resources made the poor more liable to the problems associated with bad water.

A final issue that occasionally appeared involved nationality. Although Russian language sources on Kazan frequently ignore non-Russians, there was a sizeable population of Tatars in the area. Until 1854 Tatars were forced to live in specific settlements. The 'Old Tatar Quarter', dating back to the Russian conquest, stretched along part of the western bank of lake Kaban, but the 'New Tatar Quarter', founded in the eighteenth century, was somewhat removed from even this doubtful source of water.⁴⁵ When articles mentioned the Tatar population, it was often with some uncertainty. For example, an article from 1817 noted that the Tatars of the area lived more healthily than their Russian counterparts. However, the author seemed uncertain how to account for this: one the one hand, he noted, Tatars had a simpler way of life, but on the other hand, they also tended to prefer rich, fatty foods. The first helped, and the second, according to the author, was less dangerous for Tatars than for an average Russian.⁴⁶ Another account noted that its proximity to the Kaban made the Old Tatar Quarter, at least, healthier.⁴⁷ A professor at Kazan University also noted the proximity of the Tatar areas to plentiful sources of water.⁴⁸ In general, however, the Tatar areas were largely ignored, and efforts to improve water focused on the Russian inhabitants of the town.

Kazan's local officials clearly understood the need for solutions to its water problem. However, as concrete solutions began to appear in the second third of the nineteenth century, those officials ran into serious problems of support and funding. As Roderick E. McGrew has written about responses to cholera under Nicholas I, 'on paper, the Imperial administration appeared very advanced in public health and regulatory matters, but the reality was far different from the appearance, and though powers existed to do a great deal, those powers were seldom effectively exercised'.⁴⁹ The sheer number of plans presented to civic leaders suggests no lack of interest in water issues. However, Kazan's municipal and provincial institutions lacked funding and organisation. Governors, town councilmen, multiple Ministries and their functionaries, and individual

merchants would all try their hand at fixing things. This created a serious problem of coordination solved not through organisation, but by appealing to the very top of the autocratic state, Nicholas I himself, as the centre of all hopes for improvement. In an 1832 article, Ivan Arngol'dt used particularly flowery language to address the tsar:

The tender Father of the fatherland, Our wise MONARCH NICHOLAS I, with eagle eye watching over the general good of the entire state governed by HIS sovereign Sceptre and over the personal happiness of every loyal subject, always and everywhere shows examples of particular attention and love for cleanliness and tidiness. . . . How much would HIS philanthropic heart be delighted, if our town, famed for its populousness, buildings, crafts, factories and trade, but, unfortunately, poor in clean air and very sparse in good water, were to be improved [in] these needs, most necessary for our prosperity, that of our children, fellow citizens, and our *posterity*.⁵⁰

Nicholas's legendary interest in control is here expanded to include control over dirt, and the idea of the need for good water and air was tied to the city's, and perhaps by implication to the nation's, economic and physical well being. The next year, another author gave Nicholas and his 'perspicacious, beneficial view' credit for prompting Kazan scientists to determine once and for all which water in the city was best, or at least better.⁵¹ Indeed, Nicholas' hand would hover over many of the plans made over the next decades, expressing autocratic interest but failing to put such plans into action.

Just as general discussions of water problems questioned who had responsibility for water supplies, specific solutions to Kazan's problems addressed public and private initiatives. Some authors felt that water quality was a household, not a public, matter. They often suggested that households acquire some sort of water-filtration machine.⁵² Plans for such machines were easy to come by, as agricultural and other practical journals included letter after letter and article after article touting some new means of cleaning water.⁵³ Practically speaking, however, bringing water filtration into the home was likely to leave out the people most affected by the water problem, the poor. Partially out of concern for the poor, others suggested grander methods of gaining water for a larger public. Some suggested digging a series of new public wells to bring water to new areas.⁵⁴ Another idea called for re-establishing a proper flow of water through the Bulak, based on the realisation that sediment had impeded the flow of water out of the Kaban to the Kazanka.⁵⁵ Still, these were just plans, not actual attempts to change things.

The 1830s brought the first serious attempts to improve the situation. A merchant reportedly built a pump to bring relatively cleaner water from the centre of Lake Kaban to the town during the summer. Others contemplated, but did not succeed in, rebuilding the wooden sides of the Bulak canal in an attempt to shore it up and reduce the amount of dirt floating in the water, hopefully improving the flow of water out of the Kaban. Springs around the town were

better exploited: in one instance, the governor of Kazan province suggested making better use of a spring near the walls of the town's Kremlin. He wrote in a report that it had previously only bubbled weakly, forming a small swampy patch of ground. He asked for funding from the Ministry of Internal Affairs to fix up the spring, both eliminating the eyesore of a swamp next to the Kremlin, and also providing a source of clean water for those living in the area, far from Lake Kaban.⁵⁶ These were all small beginnings, ways of providing better water for a small area or a few who could pay for a merchant's services, financed by individuals or by small amounts from state institutions. Larger-scale projects, however, already faced difficulties.

The single biggest attempt to find cleaner water for Kazan also began in the 1830s. The plan, sponsored by the governor and the city of Kazan, called for engineers to dig an 'artesian well' on a central square. A university mechanic, Mr. Nei, took on the job in 1832. The governor appointed him, but the costs of the well were to be paid for by the city. The initial plan was a small one, with an estimated price tag of 800 to 1000 roubles.⁵⁷ Nei chose a central square as his location, as it was located on one of the lowest spots in the town. In his first year of work, Nei dug down 28 metres, lining his well with cast iron pipes. At that point, the project hit a layer of soggy sand that slowed progress. With the help of extra shafts and tin pipes, Nei persevered and got through the thick layer. Under this layer, however, more sand, rocks, and generally loose soil continued to impede his progress. Two years later the well had reached 132 metres with no ready source of water. The cost for these first years already approached 10,000 roubles. In 1836 this attempt, having reached a depth of 136 metres, was abandoned, leaving behind a big hole, which, in 1843, remained open.⁵⁸

Also in 1836, Nei moved his digging site, and by the end of that year had again reached a depth of 28 metres. Eventually the project was abandoned as a failure, but not before the city had paid out 24,625 roubles to Nei, from 1 January 1833 to 10 September 1841. A later writer commented that the project was likely stopped 'because the master directing it did not know his business well'. As one of the budget items claimed by Nei in 1840, eight years after he had started the project, was 375 roubles 'sent to the Economic Department of the Ministry of Internal Affairs for a model of an artesian spring', the later writer was probably right.⁵⁹ Yet others worried about the enormous costs. In the words of another later writer with a new idea, the search had 'wasted a fistful of money' with no results.⁶⁰ The waste was serious enough that an investigator from Kazan university, Mr. Neshel', looked into the process and its failure. He thought that the second attempt, in particular, came close to finding a decent source of water. He made a trip down the shaft in 1843 and found some water, albeit water clouded with iron oxide. The problem, he found, had been a failure of the mechanical devices and pipes used in the project.⁶¹

The scale of this ultimately unsuccessful project shows the level of importance the water issue was granted by the governor and city, and the significant

monies that could be brought to bear in an attempt to solve the problem. It also shows the technical difficulties that could arise, as well as the tendency to leap without detailed planning ahead of time. Finally, it shows the dangers involved in risking money on these projects; the failure of this project possibly led to later reluctance to invest on the part of the governor and town. Despite this failure, the end of the 1830s and beginning of the 1840s saw increased attention to the issue. Provincial governors frequently complained of the water problem in their annual reports. As one put it, 'now the sole and truly important lack in Kazan: not having fresh, healthy water'.⁶² At other times the governors commented on the aesthetics of the situation (the Bulak was ugly) as well as the danger to public health (including tendencies towards rampant fevers).⁶³ These pleas, or moans, found a receptive ear. The report for 1840 was filed with the following note referring to the water question: 'Next to this article in the report is marked with the pencil of HIS IMPERIAL MAJESTY'S own hand the following MOST HIGH resolution: "Present this definitively no later than August 15th"'.⁶⁴ Though this seems a strong statement of interest, even Nicholas' pencil could not create a workable plan.

Another major plan was proposed in 1837. Major Osinskii of the Corps of Transportation Engineers sent Kazan's governor Strekalov a report on water problems. The report focused on the yearly spring flooding of the Volga, which, it was felt, contaminated the town's water supplies. Osinskii came up with several possible ways of helping the situation. The nearby Lake Arkhiereiskoe he thought, could be used as a reservoir for the overflow water, keeping the Kaban a bit cleaner. In addition, he suggested that filters, such as those invented recently by an Englishman named Tom, could be used to clean up the lake water (this element was soon dropped, as local scientists thought it would be impracticable). The governor found the plan interesting enough to ask for more information from local scientists and doctors, and to forward the it to the Ministry of Internal Affairs. The Ministry, however, quickly rejected Osinskii's plan due to its extreme predicted cost: 1,307,090 roubles 46½ kopeks. Despite this rejection, Osinskii continued to refine his plan and to seek funding. He wrote to the Emperor himself, noting that Kazan itself was not in a position to fund such a plan, as it was 'settled, for the most part, by people of rather poor condition, [and] it would not be possible to collect [enough] capital by means of general collection from them'. Nicholas did not send money.⁶⁵

Even with this rejection from on high, Osinskii kept searching for support. At one point he thought to start a privately funded group to support his plan, to be called 'The Society of Joint-Stock-Holders for the Fulfilment of a Project to Supply Kazan with Healthy Water'. After he approached them, local merchants and gentry claimed they were financially unable to support such a society. Over the next two years Osinskii asked for loans and petitioned the Ministry of Internal Affairs several more times, but it was not until 1839 that his plan was discussed again. By that time, his plan, now with a smaller budget,

had three main points: cleaning up the canal; guarding the Kaban from the dirt of the town, as well as cleaning up its bottom; and creating a second canal to bring water out of the Kaban, to prevent overflow and to let it clean itself. The committee that discussed it at this point, however, decided that these proposals were not enough. Swayed by a recent article in the *Journal of the Ministry of Transportation*, they wanted to reintroduce filters, apparently ignoring earlier statements that they would be useless. More importantly, they wanted to build a system of pipes to bring water from the lake to the population of the town, a huge expansion of the project. This radical alteration in goals also brought forth a change in personnel: in July 1840 the Ministry of Transportation assigned a new engineer, Prescott, to oversee further planning. Unfortunately, Prescott was unable to take up his duties first due to illness, then due to unexpected delays in his previous project, building the famous stone staircase to the sea in Odessa.⁶⁶ Ministerial bureaucratic problems combined with bad luck, lack of coordination of plans, and a widespread unwillingness to risk money. The momentum brought by Osinskii had been lost.

Although grand plans like this continued to run into funding problems, a few smaller plans did make some headway. In July 1839 the provincial governor told the town Council that he had commissioned the provincial architect to come up with a plan to dig several wells with pumps around the town. This was necessary not just because of the lack of fresh water, but in case of fire. In addition, a well already existed on Iamskaia Street, but one 'with an inconvenient mechanism and an unpleasant appearance'. The governor suggested that the town hold an auction for the rights to fix up and modernise the existing well. He felt that these small steps would open up a 'quick and abundant source of water'. The town agreed that this would be a useful project, and advertised an auction for 5 August, less than a month after the proposal was made. Unfortunately, not a soul showed up for the first auction. A second auction was announced, and again no bidders appeared. The Council finally got a bid on the contract in April of 1840, but the governor decided that the single bid was much too high. The contract was eventually awarded in October of that year.⁶⁷ This reconstructed well was completed in 1841, as was a new well in the 4th section of the town.⁶⁸ These do not seem to have been very well built wells, however. In a listing of city structures made in the early 1850s noted that the town had only two wells: one on Mochal'naia square, described as 'dilapidated and with pumps that do not work', and another in good condition in the 4th section, but built in 1850.⁶⁹ The earlier wells were no longer used, or at least no longer in good condition.

Later in the 1840s, more ambitious plans were proposed. Again, a new round of planners ignored what had come before, were hindered by bureaucratic problems, and had troubles finding money (or tried for too much money). A Major Chernikov was in charge of plans in 1842. In that year he requested the somewhat outrageous sum of 1000 roubles for expenses. The governor asked the town Council to give him 250. Two years later, the governor reported, no real

progress had been made, and yet another man was put on the job. Lieutenant Colonel Shembel', from the Ministry of Transportation, took over, but remained involved in other projects, too. As a result, in 1844 the governor asked that he be put exclusively on the Kazan water project, or at least told that it should be the centre of his attention, hoping that this might bring to an end the long history of the project. Also that year, the Emperor again made a note on the governor's report touching on the water project: 'Finish this without fail; it is *strange* that there is not yet an end to it'.⁷⁰ Even with this repeated statement of the importance of the project, things continued to muddle on, caught in a web of bureaucratic entanglement and financial problems.

Yet another bureaucrat, this one of higher rank, was put in charge of the project in 1844. Colonel Mal'te oversaw a new, wide-ranging plan. A pipe system to bring water all through the city was key, as were attempts to utilise the nearby Lake Arkhiereiskoe, to circulate water through the Kaban, both to protect the Kaban from waste and to filter its waters, and to utilise steam power in the pumping process. Just the labour involved in creating a precise plan was estimated at 850 roubles. Still, very little actually happened. For the next several years Mal'te continued to collect information about population, to create various plans, to make budgets, and to try to find a reliable source of funding. The idea of filtration was visited yet again. Another plan called for using water directly from Lake Arkhiereiskoe. The plan for a network of water supply also made it clear that it would reach all possible parts of the town. By the end of 1848 the total projected cost of a plan involving pumps and pipes reached nearly 500,000 silver roubles. Through the early 1850s this plan saw the bulk of official interest, though without the full funding or effort of any single organisational entity.⁷¹

Despite all this effort, throughout the 1840s and into the 1850s governors could do little but report on the poor state of water in Kazan, continuing to place their faith on some hypothetical future improvement. Unsuccessful plans had robbed the town treasury of moneys, making further efforts more difficult.⁷² Ministries could not field the personnel to consider plans. After decades of worry and attention from government bodies from the very local to Nicholas himself, the general water supply of Kazan had not been fixed in any lasting way. Plans perpetually failed not through lack of interest or passion, but through failures in the autocratic system. The public problem of water could not be solved through public action. As a result, and in spite of their frequent appeals to Nicholas, those looking to put plans into action greeted his death, and the arrival of his son, with great excitement. They pinned their hopes for real change on the new tsar and a new administration.

The new hope represented by Alexander II is perhaps best expressed in a letter published in the *Kazan Provincial News* in 1858. A local wrote a letter to the editors, complaining that the water supply problem still existed, despite so many efforts. He wrote, in part,

People of Kazan! We have a university, a seminary, a theatre, two academies, the

regional transportation administration, immense numbers of technical bureaucrats of every kind, but what do we not have? ... We live almost on the Volga, but – it is shameful to say – up to now we drink dirty water! Why is this? Not because we think poorly, or think not at all about the social good? Or sometimes think, or even say: our forefathers drank dirty water, and they lived! – It is sinful to abandon ourselves to sloth and apathy, when a new Sun, rising over Rus', summons all to a new life, and when we already know that our every useful plan will meet with complete sympathy in our noble provincial leader.⁷³

According to this writer, the time was ripe for new plans to alleviate Kazan's biggest problem. A new tsar promised light; the government, a favourable ear. All that was needed was a strong statement of a plan, and the coordination to make it come true.

Of course, this dreamer was a bit too sanguine about the possibilities of immediate reform. The Great Reforms eventually made state institutions more responsive to local concerns, but the transition was neither immediate nor complete. Instead, debate still had to take place, and coordination was not as simple as it might seem. Despite the precedent set by St. Petersburg's municipal code of 1846, and the later general reform of municipal functions, localities were still hamstrung by finances and lack of internal coordination.⁷⁴ Although it was important, the loosening of autocratic control under Alexander II was not the principle change that allowed for action. Instead, a shift in official attitudes toward individual efforts like joint-stock companies allowed for real change in matters like water supplies. Several earlier plans had proposed solutions involving joint-stock companies, but although these were perfectly legal in Nicholas' time, the imperial state (in the person of the Minister of Finance) generally frowned upon such associations. Under Alexander, while efforts to reform the legal status of such companies faltered, they did become more common. Their legal status may not have changed, but the state became more open to such associations.⁷⁵ As a result, it was these newly acceptable private enterprises that allowed individuals to act on the problem of Kazan's water. At the same time, however, this innovation in some ways retarded Russia's ability to deal with public health and the urban environment. Municipalities abdicated responsibility to private enterprises; real reform of public health measures on a larger scale would wait decades.

In the first years of Alexander II's reign, two factions proposed plans, one new, one old. A. Tikhonov suggested one possible option: make the Volga, currently too far away for general use, 'bend to our will and go to where it is useful for us'.⁷⁶ The plan called for not only shifting the riverbed, but also deepening the canal and, possibly, the tributary Kazanka River. This idea had the support of merchants of the town, as it would also help with the transportation of goods into and out of the town.⁷⁷ The major drawbacks, of course, were the idea's exorbitant cost, and the fact that no one really knew where to begin such a plan. Tikhonov, however, pointed out that high costs were something to

be faced, not afraid of: 'for the fulfilment of such an undertaking, promising in various branches of human needs enormous benefits, one should not complain about any sort of expenses'.⁷⁸ Perhaps even more noteworthy than this call for action on a new, grand scale was the response of the newspaper's editor. A note from the editor invited others to contribute to the discussion: 'Please God, that this excellent example... wake in others the wish to speak out publicly their opinions on this subject'.⁷⁹ And speak out others did.

Over the next several months, different locals wrote in on the subject, sometimes giving their names, sometimes anonymously. One thought that the idea of bringing the town and the Volga closer together was a good idea, but perhaps digging a new canal would be easier than shifting the entire riverbed.⁸⁰ But soon another plan appeared – or, rather, reappeared. An anonymous author wrote in most colourful terms about the problem of pinning the town's hopes on such a vaguely conceived, yet certainly expensive, plan. He noted that there already existed a plan to construct an aqueduct from the nearby Lake Arkhiereiskoe (also known as the Farther Kaban), and that, as all technical matters had been considered for that plan, thinking about new grand plans was simply ridiculous.⁸¹ The question of cost still remained. Some authors tried to figure out ways to reduce costs. In 1859, A. Stolbovskii published several letters in which he reiterated the dire need for a better water supply system (a series of terrible fires that year made the supply of water, healthy or not, a bigger issue), and suggested cost-cutting measures to reduce the predicted 300,000 silver rouble cost for the aqueduct system.⁸² Even should such methods be accepted, however, the cost was likely to remain prohibitive.

How should such a huge undertaking be financed? Different ideas appeared in print. The newspaper republished an article on St. Petersburg's situation and possible solutions involving joint-stock societies.⁸³ A later proposal to shorten the distance between the Volga and Kazan stated that it would be financed completely by 'the private charity of benefactor-capitalists'.⁸⁴ To some, this sort of plan seemed a welcome development: the *Kazan Provincial News* hoped that such plans indicated that 'in matters of the common good, private enterprise, the lack of which has to this point been very noticeable, is finally beginning to develop'.⁸⁵ But these ideas disturbed others, especially those others who recognised the particular problems facing the poor. The anonymous author who resurrected the aqueduct idea also took serious offence at the idea of for-profit companies getting into the water supply business. He noted that they cloaked themselves in the guise of philanthropy, but that these companies were truly commercial. He felt, too, that their pretensions to helpfulness were downright offensive: 'Be afraid, philanthropists, of angering God by founding such a company...!'⁸⁶ This point of view, however up-to-date in a larger Western context of municipalisation of public water supplies, could not stand up to the financial and administrative constraints of mid-nineteenth-century Russia. Private interests had to help solve the problem.

In late 1858 the provincial administration set up a 'special committee' to investigate the practical issues involved in the scheme to bring water from Lake Arkhiereiskoe.⁸⁷ The provincial governor reported to St. Petersburg that 'Kazan awaits a great improvement, with the carrying out of the building of a water main', and the committee would speed things along.⁸⁸ By the beginning of 1860 the commission had come to a decision. The solution involved private investment and guarantees by the city. The new system would be built with the financing of a private 'Society' with stockholders, founded initially by fourteen 'trustworthy' people. The company's charter also gave the city the right to purchase shares. This point had been considered most important by the former town head: with this participation, 'the town would take the closest part both in the present business, and in the future benefits from it, and, in the position of a significant share-holder, would be able to have an influence on the affairs of the Society'.⁸⁹ A few weeks later, it was announced that the city was contemplating guaranteeing the shareholders a return of 4½ percent.⁹⁰ The full plan called for cast-iron pipes to carry water from the Farther Kaban, with the help of a steam-powered pumping station, to two reservoirs and then through the city. The Society would charge one kopek for five buckets of water; at that rate the planners assumed a demand that would bring them an income of 36,500 roubles a year. Their net income was predicted at 21,500 roubles a year, suggesting a profit of at least 11 percent each year.⁹¹ After several more changes, most minor, the essential elements of this plan eventually became reality. In 1867 the town administration agreed to allow competitive bidding for the project, and also commissioned an engineer to devise a plan. Engineer Popov finished his planning in 1871, and a building society was finally given the go-ahead in 1873. Although town institutions purchased some of its shares, it was primarily a private enterprise. The Society completed its work quickly, and town officials visited the new waterworks in October 1875.⁹² Kazan finally had a reliable source of good water, supplied through private financing rather than public works.

The people of Kazan strove for decades to improve their water supply. The saga of their efforts is in many ways a history of the difficulties of reform in an autocratic state. On the one hand, it shows the power of ideas of the public good in the nineteenth century. Journalists, scientists, travellers and politicians all agreed that something had to be done about Kazan's situation. They all shared the idea that water was important and that all the inhabitants of Kazan from rich to poor, ought to have access to it. But on the other hand, the saga also shows that in a highly-centralised autocratic state, even unanimous acceptance of the need for change could not make that change a reality. The consistent failure of plans during the Nicholaevan period, in particular, shows the great difficulties involved in reforming on a local level in an autocratic state, even when the autocrat and the state's interests were on the side of reform. Multiple local bodies had to coordinate their efforts with the central state. Private groups, like joint-stock

companies, were frowned upon. Bureaucrats shuttled back and forth between towns, dividing their attention. In addition, towns had to deal with their lack of real wealth when faced with large public works projects. Even once some of these problems were solved, putting plans into practice took time and negotiation. Eventually, perhaps, it was the attitude inherent in the time of the 'Great Reforms,' of the 'new Sun' interested in reform on all levels, that allowed Kazan its water, rather than any specific bit of legislation.

Although Kazan did end up with a new water supply, other issues still lurked. The new water supply system had been built by a private enterprise at a time when, throughout the Western world, municipalities were taking over water supplies, creating new public health networks for newly modernised nations. On a local level, private and public interests almost immediately collided. The town of Kazan wanted to be sure that its new water supply was healthy, and thus expected regular chemical analysis; the Society, however, thought such analysis was too expensive. More damaging was the lack of profits. Profits were lower than expected, however, due to significantly lower demand than anticipated. As a result, its shareholders asked the town to take over the enterprise totally.⁹³ The failure of private enterprise to ensure both quality and its own profits highlights a change occurring elsewhere. Only through public action, it was thought, could properly modern sanitary standards be maintained. Although Russia had kept up with outside trends through the early parts of the nineteenth century, it began to lag significantly by the end of the century. According to one account, by the turn of the century not only did Russia lag behind Western Europe in the number of its waterworks, but it also failed in the quality of the water it did supply.⁹⁴

Russia's backwardness is legendary, whether as something purely negative or as something that allowed Russia certain advantages in areas like industrialisation. By the end of the nineteenth century Russia was clearly backward in the realm of public health just as it prepared to leap forward into the industrial world. Earlier in the century, however, Russia had been not simply not backward, but actually progressive in intent; under Nicholas I, the Russian state had been interested in public works to a great degree. In practice, however, the autocracy's progressive intentions were restrained by its financial and administrative structures. Oddly, the modernising intent of Alexander II's reforms of just these structures ended up retarding the progressive elements of Nicholas I's reign. Purely public efforts had failed, and private enterprise was newly legitimised in the eyes of the state. The result was a shift away from reliance on the state just as Russia's Western counterparts were shifting in the opposite direction. Although private interests created some of the changes only dreamed of by the progressives of Nicholas I's reign, they were unable to keep up with new expectations for public health and public interest. As a result, Russia ended up improved, but still backward, again trailing the West in its concern for its subjects, their lives, and their urban environments.

NOTES

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¹ Many, many examples of problems are reported in N. I. Fal'kovskii, *Istoriia vodosnabzheniia v Rossii* (Moscow: Ministerstvo Kommunal'nogo khoziaistva RSFSR, 1947).

² Edward Tracy Turnerelli, *Russia on the Borders of Asia. Kazan, the Ancient Capital of the Tartar Khans; with an account of the province to which it belongs, the tribes and races which form its population, etc.*, Vol. 1 (London: Richard Bentley, 1854), 249–51 (italics in original).

³ Similar aesthetically based complaints are discussed in Lord Amulree, 'Hygienic Conditions in Ancient Rome and Modern London', *Medical History* 17 (1973): 253 and David Marrack, 'Water and Health', in *Environment and Health*, ed. Norman M. Trieff (Ann Arbor: Ann Arbor Science, 1980), 163.

⁴ Christopher Hamlin, *A Science of Impurity: Water Analysis in Nineteenth Century Britain* (Berkeley: University of California Press, 1990), 127–9.

⁵ Ann Hardy, 'Water and the search for public health in London in the eighteenth and nineteenth centuries', *Medical History* 28 (1984): 250. For a specific example of a town switching from individual voluntarism to a recognition of the need for more general public health measures, see Paul W. Brewer, 'Voluntarism on Trial: St. Louis' Response to the Cholera Epidemic of 1849', *Bulletin of the History of Medicine* 49 (1975): 102–22. For a more general discussion of similar issues in Britain, see John Hassan, *A History of Water in Modern England and Wales* (Manchester: Manchester University Press, 1998), 10, 18, 20–1 and 'The growth and impact of the British water industry in the nineteenth century', *The Economic History Review* 2: 38, no. 4 (November 1985): 531–47.

⁶ On Nicholas as a reformer in general, and as a reformer of local and municipal administration in particular, see David Saunders, *Russia in the Age of Reaction and Reform 1801–1881* (London: Longman, 1992), 119–21, 124–5.

⁷ For a discussion of problems with the bureaucracy during Nicholas' reign, see W. E. Mosse, *Alexander II and the Modernization of Russia* (London: I. B. Tauris, 1992): 20–6 and Sergei Pushkarev, *The Emergence of Modern Russia, 1801–1917*, trans. by Robert H. MacNeal and Tova Yedlin (Edmonton: Pica Pica Press, 1985), 22–3. The standard work on the 'enlightened bureaucrats' is W. Bruce Lincoln, *In the Vanguard of Reform: Russia's Enlightened Bureaucrats, 1821–1861* (DeKalb: Northern Illinois University Press, 1982). On the administrative structures that proved stifling, see N. P. Eroshkin, *Istoriia gosudarstvennykh uchrezhdenii dorevoliutsionnoi Rossii* 4th revised and expanded ed. (Moscow: 'Tretii Rim', 1997), 137–75, *prilozhenie*.

⁸ Joshua I. Barzilay, Winkler G. Weinberg, J. William Eley, *The Water We Drink: Water Quality and Its Effects on Health* (New Brunswick, NJ: Rutgers University Press, 1999), 139–40; *Guidelines for Drinking-water Quality*, 3rd ed., vol. 1 (Geneva: World Health Organization, 2004), 491–3, 210–20.

⁹ Hamlin, *Science of Impurity*, 1–13; Jean-Pierre Goubert, *The Conquest of Water*, trans. Andrew Wilson (Princeton: Princeton University Press, 1989), 34–51.

¹⁰ Iv. Arngol'dt, 'O vliianii vozdukha i vody na zdravie chelovecheskoe', *Zavolzhskii muravei* [*The Volga Ant*], no. 13 (1832): 763. Another author used nearly the same phrasing, but replaced God with nature. See Karl Geling, *Opyt grazhdanskoi meditsinskoi politsii primennoi k zakonam rossiiskoi imperii* (Vilnius: A. Martsinovskii, 1842), 332.

¹¹ Parfenii Engalychev, *O prodolzhenii chelovecheskoi zhizni, ili domashnii lechebnik, zakliuchaiushchii v sebe: sredstva, kak dostigat' zdorovoi, veseloi i glubokoi starosti, predokhraniat' zdorov'e nadezhneishimi sredstvami i pol'zovat' bolezni vsiakogo roda, s pokazaniem prichin i lekarstv, pochti povsiudu pred glazami nashimi nakhodiashchikhhsia, sostavlennii iz luchshikh otechestvennykh i inostrannykh pisatelei Kniazem Parfeniem Engalychevym*, 6th ed., vol. 1 (St. Petersburg: Brat'ia Il'ia i Stepan Loskutovyev, 1848), 65. At other points Engalychev wrote of water's beneficial effect on 'marital relations', and listed cures involving different sorts of water and even of standing underneath waterfalls.

¹² For example, even in the 1840s authors noted that water and *kvas* were about equally healthy. See A. A., *O nastoiashchem sostoianii khoziaistva u krest'ian, s pokazaniem prichin, prepriatstvuiushchikh razvitiu ego, s ukazaniem sredstv k otrvashcheniiu tekhnicheskikh, i s prisovokupleniem kratkikh pravil zemledelii, dlia srednei polosy Rossii* (Moscow: Lazarev. Institut. Vostochn. Iazykov, 1846), 8. Similarly, see a discussion on *kvas*, perhaps safer than water (which would be best) in Akim Charukovskii, *Voennopokhodnaia meditsina*, vol. 1 (St. Petersburg: I. Vorob'ev, 1836), 110. A change is seen in Kondratii Grum-Grzhimailo, *Rukovodstvo k vospitaniiu, obrazovaniiu i sokhraneniuiu zdorov'ia detei*, Vol. 2 (St. Petersburg: M. Ol'khin, 1844), 107, 110 which notes that water is healthiest for children, but that *kvas* and beer should be used only medicinally.

¹³ Arngol'dt, 'O vliianii', 764–5. For similar comments, see Ivan Veltsin, *Nachertanie vrachebnogo blagoustroistva ili o sredstvakh zavisiaschikh ot Pravitel'stva k sokhraneniuiu Narodnogo zdorov'ia* (St. Petersburg: Imperatorskii Shliakhetnyi Sukhoputnyi Kadetskii Korpus, 1795), 44–45.

¹⁴ Review of *Oustroistve i pol'ze vodochistitel'nykh kolodtsov*, 'Bibliografiia', *Moskovskii telegraf* [*The Moscow Telegraph*] 8, no. 8 (1826): 337.

¹⁵ Shreiber, 'Ochishchenie vody gor'kim mindalem', *Drug zdaviiia* [*The Friend of Health*] 7, no. 12 (8 Apr. 1839): 91.

¹⁶ See also Kniaz' Parfenii Engalychev, *Ruskoii sel'skoi lechebnik. Perevel is raznykh avtorov* (Moscow: Universitetskaiia Tipografiia, 1810), 16 and 'Noveishie izsledovaniia vozdukha i vody v gorodakh', *Drug zdaviiia*, no. 6 (1849): 42, on the general dangers of dirty water, whether from bad sources or bad containers.

¹⁷ The most basic statement of the idea is found in the article 'Gidropatiia est' iskusstvo lechit' bolezni vodoi', *Drug zdaviiia* 7, no. 27 (23 June 1839): 213–4, one of several articles on water cures appearing in the journal that year. In a single volume of 1841, the journal *Otechestvennye zapiski* [*Notes from the Fatherland*] reviewed three translated books on water cures. One received praise, the other two criticism that was downright savage, due to their poor translations and general silliness. The worst was *Drug zdaviiia ili Prakticheskoe ob"iasnenie upotrebleniia i deistvii svezhei vody, kak luchshogo dieteticheskogo i vrachebnogo sredstva v dvukh otdeleniiakh 1. dlia zdorovykh 2 dlia bol'nykh sostavleno gidropaticheskimi obshchestvom zdorov'ia v Munkhene i Ansbakhe* (St. Petersburg: Vasil'ii Poliakov, 1841). Critical examinations of grammar and translation can be found in a series of reviews of books on water cures in *Otechestvennye zapiski* 17 (1841): vi, 20–22, 72–4.

¹⁸ 'Lechenie vodoi v II'menaukom zavedenii, opisannoe Berlinskim d-om Zaksom', *Drug zdравиia* 7, no. 6 (12 Feb. 1839): 43. Mineral waters were generally exempted from the odourless rule.

¹⁹ Roderick E. McGrew, *Russia and the Cholera, 1823–1832* (Madison: The University of Wisconsin Press, 1965), 7–8.

²⁰ For example, 'Krest'ianskoe tovarishchestvo trezvosti v Rossii', *Zemledel'cheskaia gazeta* [*The Farming Gazette*], no. 29 (12 Apr. 1838): 230–1 and I. Leonev, 'O broshiuurke A. G., kasatel'no p'ianstva v Rossii', *Zemledel'cheskaia gazeta*, no. 37 (9 May 1847): 290 for general discussions about the benefits of sobriety. For an explicit admonition to drink water instead of vodka, see *Ruchnaia knizhka dlia gramotnogo poselianina* (St. Petersburg: Aleksandr Iakobson, 1857), 271–3.

²¹ Some of this interest was based clearly on the miasma theory of infection, as water and air were considered both important and liable to infect the other. For an example, see 'Noveishie izsledovaniia vozdukha', 41–2; or Kupffer, *Voyage*, 11.

²² For discussions of personal water-cleaning methods, see, for example, B. V — —n [V. P. Burnashev], *Entsiklopediia molodoi russkoi khoziaiki posviashchaetsia vsem dobrym Russkim khoziaiushkam*, Vol. 1 (St. Petersburg: A. Voeikov i Komp., 1839), 16–18. Even the mid-century phenomenon of practical handbooks for peasants included information on cleaning. See *Ruchnaia knizhka*, 271–3.

²³ Geling, *Opyt*, 337–8. Geling further noted that the medical police ought to oversee cleaning methods, but the methods listed seem unlikely to be possible options for most provincial workers.

²⁴ 'Novyi sposob ochishcheniia vody, naznachennai dlia raspredeleniia po Londonu', *Drug zdравиia* 10, no. 9 (1842): 66–7. Other large cities were also topics of interest, for example in 'O rechnoi vode i podzemnykh kanalakh, sluzhashchikh dlia stoka nechistot v bol'shikh gorodakh', *Drug zdравиia*, no. 35 (1841): 284–6.

²⁵ 'O snabzhenii gorodov vodoi', *Zhurnal Ministerstva Vnutrennykh Del* [*Journal of the Ministry of Internal Affairs*], no. 2 (1836): 466. On plans and projects for the capitals, see such articles as 'Snabzhenie S. Peterburga Nevskoi vodoi', *Posrednik* [*The Mediator*], no. 35 (2 September 1853): 137.

²⁶ Veltsin, *Nachertanie*, 46–50.

²⁷ See for example, 'Snabzhenie stolitsy chistoi vodoi', *Severnaia pchela* [*The Northern Bee*], no. 215 (30 Sept. 1840): 857 on cleaning St. Petersburg's canals of 'Snabzhenie S. Peterburga Nevskoi vodoi', *Posrednik*, no. 35 (2 Sept. 1853): 137, on a new society founded to get good water to far-away parts of the capital; Rossiiskii Gosudarstvennyi Istoricheskii Arkhiv [Russian State Historical Archive; henceforth RGIA] f. 1287, op. 2, d. 1373, 'Po proektu mekhanika Merkulova o novom sposobe ochishcheniia vody, vozdukha, a takzhe otopeniia zdanii'. (1848) on uses of technology to help the situation in the capital; or Captain Jesse, *Notes of a Half-Pay in Search of Health: or Russia, Circassia, and the Crimea, in 1839–40*, vol. 2 (London: James Madden and Co., 1841), 196–7, which also describes the ways Odessans got around the problem.

²⁸ Description by Professor Braun, cited in M. Pinegin, *Kazan' v ei proshlom i nastoiashchem: ocherki po istorii, dostoprimechatel'nostiam i soremennomu polozeniiu goroda, s prilozheniem kratkikh adresnykh svedenii* (S. Petersburg: A. A. Dubrovin, 1890), 241–42.

²⁹ For population statistics, see Mironov, *Russkii gorod*, 24. For example, A. Th. Kupffer, a professor at Kazan's university, thought that the city had grown around its water sources naturally, but had only recently become too large for those sources. See his *Voyage dans l'Oural entrepris en 1828* (Paris: Firmin Didot Frères, 1833), 11. Some authors took an even broader historical perspective on the problem. One, for example, noted that when Moscow's forces conquered the city in 1552, there had been plenty of good, healthy water. See Il'ia Iakovkin, 'Zamechaniia, nabliudeniia i mysli o snabdenii goroda Kazani Volzhskoi ili Kabannoi vodoi, o kachestve ikh obeikh i o sposobakh sdelat' Kaqbannye vody obil'nymi i protochnymi', *Zavolzhskaa muravei*, no. 16 (1833): 915–6.

³⁰ Kupffer, *Voyage*, 3–4, which also noted that seasonal differences made the Volga a problematic source. One verst equals 1.067 kilometres.

³¹ Arkhiv Russkogo Geograficheskogo Obshchestva [Archive of the Russian Geographical Society; henceforth ARGO] f. XIV, d. 10, 'O vodosnabzhenii goroda Kazani', l. 1 (1857); *Volga*, 237. A book published in the last years of Catherine's reign noted that, in general, governments ought to worry about water. However, it also began with a paean to the improvements in living conditions completed during Catherine's time, which ignored water. Nonetheless, as the author noted that her reign was making Russians into 'the most enlightened people of Europe', interest in public works makes a certain amount of sense. See Veltsin, *Nachertanie*, 46–7, i–ii.

³² D. Zinov'ev, 'Nechto o dobrote i svoistve vod v Kazani, o prikluchaiushchikhsia liudaiaam bolezniah. skotskikh padezhakh i proch.', *Kazanskii izvestiia* [Kazan News], no. 13 (1817): 49–50. Emphasis in original.

³³ Langel', *Kratkoe mediko-fizicheskoe i topograficheskoe obozrenie kazanskoi gubernii i gubernskogo goroda Kazani* (Kazan': Universitetskaia tipografiia, 1817), 4, 19, 21.

³⁴ 'O kachestve vode v Kazani, i o deistviiakh klimata nad zdorov'em i razmnozheniem naroda, chasto prikluchaiushchikhsia bolezniah liudiam, i skotskikh zarazakh', *Kazanskii izvestiia*, no. 66 (1818): 258.

³⁵ For example, *ibid.*, 258; Tile, 'Zapiska o prichinakh, po koim Kazan' prinadlezhit k gorodam, zdorov'iu neblagopriiatstvuiushchim', *Zavolzhskaa muravei* 3, no. 19 (1833): 1134; Arngol'dt, 'O vliianii', 774–5 and Iakovkin, 'Zamechaniia', 917.

³⁶ Kupffer, *Voyage*, 7, 11–13.

³⁷ Iakovkin, 920.

³⁸ 'Zapiska o prichinakh', 1095.

³⁹ Natsional'nyi Arkhiv Respubliki Tatarstana [National Archive of the Republic of Tatarstan; henceforth NART] f. 1, op. 2, d. 161, 'O snabzhenii goroda Kazani vodoi', ll. 1ob–2, 16–16ob, 21–21ob (1837). For another discussion of the dangers of miasma, see Kupffer, *Voyage*, 11; though not mentioning miasma, ARGO f. XIV, d. 10, 'O vodoshabzhenii', l. 1, suggests that bad water was linked to frequent fevers among the townspeople.

⁴⁰ Arngol'dt, 'O vliianii', 774.

⁴¹ Kupffer, *Voyage*, 4.

⁴² RGIA f. 1287, op. 5, d. 854, 'O neobkhodimosti snabzheniia Kazani khoroshei vodoi i mostovoi', ll. 4–4ob (1830).

⁴³ A. Tikhonov, 'Mysl', 229–30.

⁴⁴ ‘Zamechaniia Kazanskogo zhitelie na stat’iu <<O pol’ze uchrezhdeniia obshchestva dlia snabzheniia chistoi vodoi gorodov Rossiiskoi Imperii,>>’ *Kazanskie gubernskie vedomosti* [*Kazan Provincial Herald*], no. 35N (6 September 1858): 261.

⁴⁵ I. Giliazov, ‘Tatarskie slobody goroda Kazani vo 2oi polovine XVI-seredine XIX vv.’, in *Das mittlere Wolgagebiet in Geschichte und Gegenwart*, Klaus Heller and Herbert Jelitte, eds. (Frankfurt am Main: Peter Lang, 1994), 35, 38.

⁴⁶ Zinov’ev, ‘Nechto’, 50.

⁴⁷ Narkiz Chupin, ‘Obozrenie knig i zhurnal’nykh statei, zakliuchaiushchikh v sebe geograficheskie i statisticheskie svedeniia o Kazanskoi gubernii’, *Kazanskie gubernskie vedomosti*, no. 10N (1851): 94.

⁴⁸ Kupffer, *Voyage*, 4–5.

⁴⁹ McGrew, *Russia and the Cholera*, 15.

⁵⁰ Arngol’dt, ‘O vliianii’, 777–8.

⁵¹ Iakovkin, ‘Zamechaniia’, 916.

⁵² Iakovkin, ‘Zamechaniia’, 920–1. For a dismissal of the idea of large-scale water purification efforts, see Kupffer, *Voyage*, 14.

⁵³ For example, Shreiber, ‘Ochishchenie vody gor’kim mindalem’, *Drug zdaviiia* 7, no. 12 (8 Apr. 1839): 91.

⁵⁴ Arngol’dt, ‘O vliianii’, 776.

⁵⁵ Kupffer, *Voyage*, 13–4.

⁵⁶ RGIA f. 1263, op. 1, d. 904, ‘Obozrenie Kazanskoi gubernii za 1833’, l. 505 (1833); f. 1287, op. 5, d. 10, ‘O neobkhdimosti’, l. 5; d. 1464, ‘Po otnosheniiu Kazanskogo Voennogo Gubernatora ob obdelke nakhodiashchegosia v Kazani bliz kreposti kliucha nazyvaemogo Tainitskim’, ll. 1–1ob (1836).

⁵⁷ ‘Zapiska ob artezianskikh kolodtsakh v Kazani’, *KGV*, no. 24N (9 May 1852): 276; RGIA, f. 1263, op. 1, d. 1049, ‘Ob otchete o sostoianii Kazanskoi gubernii za 1832–1836 gg.’, l. 1138ob.

⁵⁸ ‘Vypiska iz pis’ma iz Kazani, ot 6 Noiabria’, *Zhurnal Ministerstva vnutrennykh del*, no. 12 (1833): 339–42; RGIA f. 1263, op. 1, d. 1045, ‘Obozrenie Voennogo Gubernatora Kazanskoi Gubernii za 1835 g.’, l. 840; ‘Zapiska ob artezianskikh kolodtsakh’, 277.

⁵⁹ NART f. 1, op. 2, d. 117, ‘Statisticheskie i drugie svedeniia dlia vsepoddanneishego otcheta’, l. 74 (1836); d. 53, ‘Kniga o vydache mekhaniku Neiu deneg na ustroistvo aartezianskogo kolodtsa’, ll. 4ob–5 (1833–41); ARGO f. XIV, d. 10, ‘O vodosnabzheniiu’, ll. 2ob–3 (1857).

⁶⁰ A. Tikhonov, ‘Mysl’ o snabzhenii Kazani chistoi, zdorovoi vodoi’, *Kazanskie gubernskie vedomosti*, no. 30N (2 August 1858): 229.

⁶¹ ‘Zapiski ob artezianskikh kolodtsakh’, *Kazanskie gubernskie vedomosti*, no. 27N (30 June 1852): 315–6.

⁶² RGIA f. 1281, op. 3, d. 136, ‘Po otchetu o sostoianii Kazanskoi Gubernii v 1838 g.’, l. 40.

⁶³ RGIA f. 1281, op. 3, d. 105, ‘Po otchetu o sostoianii Kazanskoi Gubernii za 1839 g.’, l. 54ob and op. 4, d. 38, ‘Po otchetu o sostoianii Kazanskoi gub. Za 1842 god’, l. 10.

⁶⁴ RGIA f. 1281, op. 4, d. 32, ‘Po otchetu o sostoianii Kazanskoi Gubernii za 1840 god’, ll. 15–15ob (1840).

- ⁶⁵ NART f. 1., op. 2, d. 161, ll. 3–3ob; 23–24; 30–33
- ⁶⁶ *Ibid.*, ll. 43ob, 59–59ob, 83–85. In the course of all this debate, the Economic Department of the Ministry of Internal Affairs seems to have been the only entity to have asked for ‘data on the number of inhabitants who would use cleaned water’ (l. 83ob).
- ⁶⁷ NART f. 114, op. 1, d. 1383, ‘Po predlozhenii gospodina Voennogo Gubernatora ob ustr-oistve kolodtsa v iamskoi ulitse’, ll. 1–2; 10, 24–24ob, 49–49ob, 91–91ob (1839–40).
- ⁶⁸ NART f. 114, op. 1, d. 1650, ‘Po predlozhenii komiteta ob ustroistve gubernskogo goroda Kazani o dostavlenii svedenii otnositel’ no sostoiianii vsekh voobshche gorodskikh obshchestvennykh zdanii i proch.’, l. 14 (1842).
- ⁶⁹ NART f. 114, op. 1, d. 2198, ‘O dostavlenii Chinovniku osobykh poruchenii Ros-solovskomu raznykh svedenii o gorodskikh imushchestva dlia sostavleniia opisaniia gorodskogo khoziaistva’, l. 85ob (1850–56).
- ⁷⁰ NART f. 114, op. 1, d. 1645, ‘Perepiska kazanskim gubernatorom o vydache maioru Chernikovu 250 rublei serebrom za provedenie izyskatel’nykh rabot po snabzheniiu zhitelei g. Kazani svezhei vodoi’, ll. 2–2ob (1842); RGIA f. 1263, op. 1, d. 1634, ‘Otchet, 1843’, ll. 169–69ob; f. 1281, op. 4, d. 4, ‘Otchet, 1844’, ll. 32ob–33; 130. In the Emperor’s note the word ‘strange’ was underlined four times.
- ⁷¹ NART f. 1, op. 2, d. 439, ‘O snabzhenii g. Kazani vodoi’, ll. 29–29ob; 217–217ob, passim (1844–48).
- ⁷² *Ibid.*, l. 146.
- ⁷³ ‘Zamechaniia kazanskogo zhitelia’, 263.
- ⁷⁴ On the reforms, generally, and municipal reforms, in particular, see Saunders, *Rus-sia in the Age of Reaction and Reform*, 124–5, 253–6; Valeriia A. Nardova, ‘Municipal Self-Government after the 1870 Reform’, trans. Lori A. Citti, in *Russia’s Great Reforms, 1855–1881*, ed. Ben Eklof, John Bushnell, and Larissa Zakharova (Bloomington: Indiana University Press, 1994), 181–96.
- ⁷⁵ Walter McKenzie Pintner, *Russian Economic Policy under Nicholas I* (Ithaca: Cornell University Press, 1967), 102–3; Alfred J. Rieber, *Merchants and Entrepreneurs in Impe-rial Russia* (Chapel Hill: University of North Carolina Press, 1982), 28–9, 111–2.
- ⁷⁶ Tikhonov, ‘Mysl’’, 229.
- ⁷⁷ ‘Kazan’’, *Kazanskie gubernskie vedomosti*, no. 39N (24 September 1860): 307.
- ⁷⁸ Tikhonov, ‘Mysl’’, 229–30.
- ⁷⁹ ‘Ot Redaktsii’, *Kazanskie gubernskie vedomosti*, no. 26N (5 July 1858): 230.
- ⁸⁰ ‘Novaia mysl’ o sblizhenii Volgi s Kazan’iu’, *Kazanskie gubernskie vedomosti*, no. 33N (23 August 1858): 254.
- ⁸¹ ‘Zamechaniia kazanskogo zhitelia’, 261. Although these were the major plans, a letter sent to the Russian Geographic Society listed several other vague plans involving canals or making people not put bad things in the lake, none of which were by that point seen as viable options. See ARGO f. XIV, d. 10, ‘O vodosnabzhenii’, ll. 2ob–3.
- ⁸² A. Stolbovskii, ‘Necho to vodoprovode (Pis’mo k redaktoru)’, *Kazanskie gubernskie vedomosti*, no. 32N (10 August 1859): 296–7 and ‘Vodoprovodnye trubyy’, *Kazanskie gubernskie vedomosti*, no. 44N (2 September 1859): 394–7. His suggestions included using prison labour, simple linings for reservoirs, and glazed earthen pipes rather than cast-iron ones.

⁸³ ‘Opol’ze uchrezhdeniia obshchestva dlia snabzheniia chistoi vodoi gorodov Rossiiskoi Imperii’, *Kazanskie gubernskie vedomosti*, no. 33N (23 August 1858): 255–9.

⁸⁴ The phrase is *chastnoi blagotvoritel’nosti blagodetelei-kapitalistov*. See ‘Kazan’ (24 September 1860): 306–7 for the discussion.

⁸⁵ ‘Kazan’, *Kazanskie gubernskie vedomosti*, no. 37N (10 September 1860): 290.

⁸⁶ ‘Zamechaniia kazanskogo zhitelia’, 261.

⁸⁷ ‘Mestnye izvestiia’, *Kazanskie gubernskie vedomosti*, no. 12N (23 March 1859): 115.

⁸⁸ RGIA f. 1281, op. 6, d. 139, ‘Po otchetu o pervom obozrenii Kazanskoi gubernii’, l. 13.

⁸⁹ ‘Mesnye izvestiia’, *Kazanskie gubernskie vedomosti*, no. 4N (25 January 1860): 29. A few weeks before (issue no. 2N, 11 Jan. 1860) the same regular column featured another report on the formation of this society, but by rumour only.

⁹⁰ ‘Mestnye izvestiia’, *Kazanskie gubernskie vedomosti*, no. 16N (18 April 1860): 131.

⁹¹ ‘Mestnye izvestiia’, *Kazanskie gubernskie vedomosti*, no. 20N (16 May 1860): 162–3.

⁹² A. A. Lebedev, *Zapiska o kazanskom vodoprovode* (Kazan: Gubernskoe Pravlenie, 1883), 2–13.

⁹³ *Ibid.*, 18–35.

⁹⁴ Wm. Paul Gerhard, C. E., *Sanitation and Sanitary Engineering*, 2nd ed. (Boston: Stanhope Press, 1909), 164–5.