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To cite this article: Sergei Nefedov & Michael Ellman (2016) The Development of Living Standards in Russia Before the First World War: An Examination of the Anthropometric Data, *Revolutionary Russia*, 29:2, 149-168, DOI: [10.1080/09546545.2016.1243618](https://doi.org/10.1080/09546545.2016.1243618)

To link to this article: <https://doi.org/10.1080/09546545.2016.1243618>



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Published online: 05 Dec 2016.



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THE DEVELOPMENT OF LIVING STANDARDS IN RUSSIA BEFORE THE FIRST WORLD WAR: AN EXAMINATION OF THE ANTHROPOMETRIC DATA

The development of living standards in Russia before the First World War and the relationship of this to the interpretation of the cause(s) of the 1917 Russian Revolution are controversial. This paper analyses one piece of evidence which has been cited in support of the ‘optimistic’ interpretation. This is the anthropometric data. The paper investigates the anthropometric data showing that it is more complicated, less easy to compare over time, and less free from reporting error, than has been argued previously. This weakens the ‘optimistic’ interpretation of living standards and the related interpretation of the cause(s) of the Russian Revolution.

The assessment of the development of Russian living standards in the years preceding the First World War has been extensively debated in recent decades. The traditional view in both the English-language and Russian-language literature was that living standards were declining, and the population was experiencing an economic and demographic crisis. This was the orthodox view in the USSR. It fitted the October Revolution into Marxist categories – a revolution caused by the immiseration of the population under capitalism. An authoritative statement of the traditional view in the English-language literature was Gerschenkron’s 1965 contribution to the *Cambridge Economic History of Europe*.¹ He argued that ‘the peasantry released from serfdom received insufficient allotments of land for which it had to pay a disproportionately high purchase price.’ In the late nineteenth century ‘the economic conditions of the peasantry kept deteriorating.’ The grain production and export statistics were such that ‘it is then difficult to escape the conclusion that the bread consumption of the rural population in the 1890s reached a very low point even if one abstracts from the disaster of the great famine in 1891–92.’ Gerschenkron linked this apparent worsening of the economic situation of the peasantry (the bulk of the population) with peasant attacks on gentry estates and burning of manor houses in 1900–02 and 1905–06. It was natural to apply the same logic to 1917–18.

This view was rejected by subsequent researchers, such as Wheatcroft,² Simms,³ Gregory⁴ and Hoch.⁵ Wheatcroft pointed out that Gerschenkron’s calculation of declining per capita grain production was an artefact of the years chosen for comparison.

Simms noted that rising indirect taxes were a sign of an *increase* in peasant consumption. Hence the crisis interpretation was ‘seriously and irreparably damaged (377–98).’ He did not deny the existence of rural poverty, but argued that it concerned ‘a minority of the peasantry who were experiencing economic deterioration in particular areas.’ Gregory argued that late Imperial Russia was experiencing rapid economic growth with rising per capita consumption. Hoch also rejected Gerschenkron’s view that the emancipation settlement had been very adverse for the peasantry. He undermined its statistical basis and pointed out that the ex-serfs received much better treatment (land) than the ex-slaves in the USA. He concluded that the emancipation settlement allowed the ex-serfs to develop autonomous peasant farming, neither manorial nor capitalist. These writers treated the famine of 1891–92, and the peasant attacks on gentry estates in 1900–02 and 1905–06, as contingent events and in no way a sign of an inevitable revolution. They argued that per capita production, consumption and living standards more broadly were growing in this period, which was predominantly a period of economic success. This new interpretation is often known as the optimistic (or revisionist) school and has become dominant in the English-language literature. It was supported in 1990 by Plaggenborg,⁶ who rejected Gerschenkron’s understanding of the development of agriculture in favour of that developed in later research, both English-language and German-language, and drew attention to the fiscal burden on the *urban* population, particularly that of Moscow and St Petersburg. However, as Robinson,⁷ Simms,⁸ and others have pointed out, there is a paucity of comprehensive and reliable statistics for this period. As a result, as Hoch observed, ‘it should be clear that many of the numbers employed on both sides of the debate are deficient.’⁹

The chief spokesperson for the optimistic school in the Russian-language literature is Boris Mironov. He has repeatedly argued that living standards in Russia were increasing in this period. Hence the revolution of 1917 was not caused by the poor (peacetime) economic performance of tsarist Russia; arguments to the contrary just reflect anti-tsarist propaganda. Mironov rejects the Marxist, Malthusian and structural-demographic interpretations of the causes of the Russian Revolution. He argues that it was a result of the strains and conflicts imposed on Russia by modernisation, combined with one major contingent factor (the First World War) and two minor contingent factors (the mistakes made by both the rulers and the opposition). He argues that the revolution was not inevitable, and was caused primarily by political rather than economic factors. This interpretation rests on the optimistic understanding of the development of living standards, an important piece of evidence for which, in Mironov’s arguments, is the anthropometric data.

Writers such as Allen¹⁰ and Khanin,¹¹ basing their arguments on real wage data, rising land values and peasant actions in 1905–06 and 1917–18, and on the distribution of income and wealth, have rejected these arguments and can be considered as part of the pessimistic (or traditional) school. They consider that the failure of wages to increase, both in the towns and in the countryside during the decades before 1914, peasant demands for more land ownership and its equal division, and the very unequal distribution of income and wealth,¹² were major factors causing the Russian Revolution.

The situation in the huge and very diverse Russian Empire (or the 50 provinces of European Russia) was obviously more complex than brief statements by both sides suggest. Dennison and Nafziger,¹³ for example, on the basis of detailed micro-level

research argue that their findings 'lend cautious support to more recent, revisionist views that see the rural economy in imperial Russia as more dynamic than previously assumed.' However, they also note that 'the optimism of this revisionist view, however, is difficult to reconcile with persistently high infant and child mortality, widespread gender discrimination, and high levels of income inequality even within rural societies.' Furthermore, as Mironov himself has pointed out,¹⁴ the pessimistic school is supported by 'the majority of authoritative researchers' in the late nineteenth and early twentieth centuries, and a large number of Russian researchers ever since.

Mironov's presentation of the anthropometric data and the conclusions that he has drawn from it have given rise to a heated debate in the Russian economic literature.¹⁵ Both of the present authors have participated in that debate.¹⁶ Mironov's work has also been extensively cited in the Anglophone literature, where it is often assumed to be authoritative and often uncontroversial. In his survey of recent research on anthropometric data and welfare, Steckel included a section on Russia.¹⁷ This referred to Mironov's work extensively. Similarly, Lindert and Nafziger used Mironov's work in their analysis of Russian income inequality in 1904.¹⁸ Mironov's work was also used by Baten and Blum in their analysis of the proximate determinants of global biological well-being.¹⁹

Mironov deserves praise for introducing into the study of Russian history a new data source – anthropometric measurements. They are especially useful for periods when traditional economic statistics are lacking or have a wide margin of error. He also deserves praise for criticising existing interpretations of the revolution in 1917 and putting forward a new one. Relevant new data sources are always desirable and criticising the conventional wisdom is frequently valuable. However, it is always important not to jump to conclusions in the excitement of discovering new sources. This article argues that Mironov has exaggerated the virtues of his new data source and that its value as a basis for the views of the optimistic school and for his interpretation of the causes of the Russian Revolution is problematic. The article aims to contribute to the debate between the optimistic and pessimistic schools, and hence also to the debate on the rival interpretations of the cause(s) of the Russian Revolution, by carefully examining the anthropometric data used by Mironov in order to see whether his conclusions are really valid inferences from that data.

Previous authors have already argued that the anthropometric data have been misinterpreted. Wheatcroft, for example, argued that the main impact of nutrition on height was not on infants but on adolescents.²⁰ Similarly, Hoch long ago expressed scepticism of the relevance of the anthropometric data for drawing conclusions about living standards.²¹ He drew attention, *inter alia*, to the importance of anthropometric indicators other than height (such as weight) in determining biological well-being, the influence of disease on final height and the way the grouping of the data into periods affects the conclusions drawn.

From an ideological point of view, the optimistic interpretation has evolved from being a criticism of Marxism-Leninism to being part of the ideology of the current Russian rulers. The notion of a paternalist and conservative regime which successfully implemented a modernisation policy and improved the living standards of the population, but which was unfortunately undermined by liberals and revolutionaries who did not understand Russia and were inspired by alien foreign influences has an obvious contemporary relevance. It currently serves as an example of 'patriotic'

history. The way in which the modernisation paradigm seeks to replace the pessimistic paradigm has even been compared by the late Rafail Sholomovich Ganelin, the distinguished St Petersburg historian to the role of the *Short Course* in the late 1930s.²² This ideological aspect goes part of the way to explaining the heat of the current Russian debates.

This article does not discuss these wider issues, important as they are. It limits itself to another, under-researched, aspect of the anthropometric data. Up to now little or no attention has been paid to the way the Russian anthropometric data were collected and summarised. Understanding how they were collected and summarised is essential in order to understand what they mean. The present article seeks to fill this gap in our knowledge. According to Mironov:

anthropometric data are universal and uncomplicated. They are easy to compare with similar information from different years. When using them, we right away solve the problem of reporting error because height is the most precise and straightforward indicator available for living standards – and it is not falsified.²³

But is it this straightforward?

The Data

What are the data that Mironov has used, their source and their reliability? He used several sources, but paid particular attention to data on the height of conscripts. These data are abundant and Mironov made extensive use of them. He also paid considerable attention to the measurement process and the quality of the resulting data.²⁴ He checked the accuracy of the data both historically and statistically. However, there are still serious issues concerning the meaning of the data, as the following analysis demonstrates.

An example of the data Mironov presented is reproduced in [Table 1](#). At first glance, it would seem, if we concentrate on the data for all conscripts, that the height of Russian men increased by 2.7 cm or 1.6 per cent in this period. This can be considered an indication of an increase in the welfare and nutrition of the population in this period, as is done by Mironov. However, a striking feature of this table is the difference between the data for the height of Russian men derived from measuring them individually and those derived from measuring them as groups. This was pointed out by Ostrovskii.²⁵ Looking at the data for individuals, it seems that the height of Russian men remained roughly constant in this period. Looking at the grouped data it seems that there was an increase in average height in this period. What explains this discrepancy, and has it any significance? Mironov himself drew attention to this issue.²⁶ He suggested that it was because the individual data referred to men from the core Russian regions, whereas the total data included non-Russian regions. However, since he also argued on page 193 of the same book that the differences between the core Russian regions and the whole Empire were quite small, this argument is not very convincing.

In order to understand the significance of the data in [Table 1](#), it is necessary to consider how the total conscripts' height data were collected. The adoption of the conscription law in 1874 required regulations for the work of conscription commissions to be

TABLE 1 Height (in cm) of men in the Russian Empire at various dates as derived from the height of army conscripts (1851–95)*

year of birth	year of conscriptions**	individual conscripts' data***		total conscripts' data		difference in height between conscripts based on total or individual data
		number of observations	height of conscripts****	number of observations	height of conscripts****	
1851–1855	1872–1876	4820	165.8	519,891	164.7	–1.1
1856–1860	1877–1881	613	165.9	1,081,102	164.7	–1.2
1861–1865	1882–1886	774	165.4	1,103,174	164.5	–0.9
1866–1870	1887–1891	741	165.5	1,249,421	165.2	–0.3
1871–1875	1892–1896	1127	165.8	1,334,117	166.6	0.8
1876–1880	1897–1901	1291	165.5	1,446,169	167.1	1.6
1881–1885	1902–1906	1192	166.1	1,921,799	167.5	1.4
1886–1890	1907–1911	969	166.4	2,164,105	167.7	1.3
1891–1895	1912–1916	964	165.8	852,110	167.4	1.6

*Mironov. *Blagosostoianie*, 185. This table is omitted from the English translation (*The Standard of Living*). In its place, the latter contains a similar table (5.1, 119), which differs from this table both in the number of observations and in the average heights.

**This column has been added to Mironov's table. It assumes that conscripts were 21 when called up. Call-up took place in November–December. Up to 1893 men were conscripted into the army who were 20 on 1 January of that year. From 1893 men were conscripted who were 21 on 1 October of that year. This means that up to 1893 most new conscripts were 21, and from 1893 all of them were.

***For each conscript a standard form was completed containing data on him. These forms were put together in special books. It is these books (known as *formuliarnye spiski*) containing lists of conscripts and the information on them that are the source of the data on individual conscripts.

****Since there were minimum height requirements for conscripts, they were on average slightly taller than the general male population of their age. In their critique of selection bias, Bodenhorn, Guinnane and Mroz point out that in a volunteer army, as a result of self-selection, recruits are unlikely to be a representative sample of the population and will probably have an average height below that of the whole population.²⁸ However, in the Russian case, with a conscript army and a minimum height requirement, this argument does not apply.

formulated. Hence an official document, entitled ‘Instructions to military draft offices for carrying out the physical and medical examination of persons called up for military service’ (*Nastavlenie prisutstviiam po voinskoi povinnosti dlia rukovodstva pri osvidetel'stovanii telo-slozheniia i zdorov'ia lits, prizvannykh k ispolneniiu voinskoi povinnosti*), was issued in 1874.²⁷ This laid down the official procedure for the medical examination of new conscripts. This started by measuring their height in the traditional Russian units of *arshins* and *vershoks* (1 *arshin* = 16 *vershoks* or 71.12 cm or 28.0 inches). Doctors were to measure heights to the nearest $\frac{1}{8}$ of a *vershok* (0.56 cm). The height figures, along with other data about the conscripts, were then entered by clerks on lists of the new conscripts. Copies of these lists, with data on the new conscripts, were given to the officers in charge.

When the medical examination of the conscripts was concluded, the conscription commissions were required to write a report on the results of the conscription in their city, district or province. A sample form for such a report was provided in the compendium of draft circulars, 459–485.²⁹ Clause 11 reads:

Enrolled new conscript groups are:

- 1) 2 *arshins* 2½ *vershoks* ...
- 2) 2 *arshins* 3 *vershoks* ...
- 3) 2 *arshins* 4 *vershoks* ...
- 4) 2 *arshins* 5 *vershoks* ...

and so on.

This means that all new conscripts were divided into height groups; each group (apart from the first one) was formed according to the height in whole numbers of *arshins* and *vershoks*. The height figures from all the cities, districts and provinces were added up and presented in the same format in the final conscription report of the Ministry of Internal Affairs (MVD).³⁰ However, from an arithmetical point of view, the data are ambiguous. For example, what actually was the range of heights in the third category (2 *arshins* 4 *vershoks*)? Was it 2 *arshins* 3.5 *vershoks* to 2 *arshins* 4.5 *vershoks*? Or was it 2 *arshins* 3 *vershoks* to 2 *arshins* 4 *vershoks*? The difference is quite considerable – about 2 cm. Unfortunately for modern historians, the data concerning the height of recruits were not collected by a process designed by economic statisticians but were a by-product of bureaucratic procedures.

The MVD was responsible for the conscription process, but the military was responsible for the army and its new conscripts, about which it naturally kept records. Military officers received the fully completed lists with information about each conscript and used them to keep records of new conscripts. These data were added up, summarised within regiments, and eventually presented in the final report of the Ministry of Defence. In 1875–87 the height data were presented in the following way:

Enlisted recruit groups are:

B Height indicator

- 1) 2 *arshins* 2½ *vershoks* ...
- 2) 2 *arshins* 2½ *vershoks* to 2 *arshins* 3 *vershoks* ...
- 3) 2 *arshins* 3 *vershoks* to 2 *arshins* 4 *vershoks* ...
- 4) 2 *arshins* 4 *vershoks* to 2 *arshins* 5 *vershoks* ...

and so on.

Military officers considered only those recruits who had actually started their military service by the reporting date. Therefore, the total number of recruits in Ministry of Defence reports could differ from the totals in MVD reports by a few hundred. For example, in 1875, 588 recruits out of 178,980 had not actually been enlisted by the reporting date of 1 January 1876.³¹ Nevertheless, their reports showed a complete match for the data in some groups. This means that the first group at the top of the list in the military reports corresponded to the first group in the MVD reports, the second one matched the second group, and so on. Thus, if the MVD recorded a group with a height of 2 *arshins* 4 *vershoks*, the military officials assumed the height of the recruits in that group could vary from 2 *arshins* 3 *vershoks* to 2 *arshins* 4 *vershoks*. However, in 1888 the Ministry of Defence started to report the data in the same format as the MVD. In this way the Ministry of Defence recognised that the classification of the MVD was closer to the real situation.

Mironov's different estimates

This examination of how the primary data were collected and classified, with intervals of 4.4 cm, and uncertainty about the range in each height category shows that some data manipulation is necessary to arrive at estimates of the average height of the total number of conscripts. Mironov is well aware of this and argues that the assumption of a normal distribution within each height category interval and attention to bunching of data can lead to reliable estimates of average height for each year.³² However, in his publications he gives several different sets of figures, each purporting to be the average height of recruits in 1874–89. This can be seen from [Table 2](#).

The methods that Mironov used to arrive at his various estimates are not very clear in his publications. To clarify the situation, the average height was calculated using the MVD group data, and assumes that the average height of recruits in the third height group, that is 2 *arshins* 4 *vershoks*, was indeed 2 *arshins* 4 *vershoks*, and so on for the other categories. The figures obtained in this way are in the column MVD data in [Table 2](#). It is clear from comparing these figures with the figures in the first edition of Mironov's book *Sotsial'naiia istoriia (Social History)* that he adopted the Ministry of Defence approach and agreed with it in considering that all recruits from 2 *arshins* 3 *vershoks* up to 2 *arshins* 4 *vershoks* should be classified in the third height group. In this context, Mironov referred to the Ministry of Defence publication, *The Hundredth Anniversary of the Ministry of Defence, 1802–1902*.³³ The upshot was to produce a result about half a *vershok* or about 2 cm less than the result which assumes that the average height in the third group was 2 *arshins* 4 *vershoks*. As a consequence, Mironov criticised authors who used the higher estimates. He wrote that:

... in studies of the late nineteenth and early twentieth centuries, data on the height of recruits, as a rule, is overestimated because the researchers ... took not the average of the height interval, but its maximum level. For example, if the sources gave an interval of 2 *arshins* and 3 *vershoks* to 2 *arshins* and 4 *vershoks*, then the average was taken to be 2 *arshins* and 4 *vershoks* instead of 2 *arshins* and 3.5 *vershoks*, and so forth. Similar methods of approximation raised the average height of recruits by about 2 cm. For example, the noted anthropologist of the

TABLE 2 Average height of conscripts in 1874–89 as estimated by Mironov (cm)

birth year	conscription year	Mironov			Ministry of Internal Affairs (MVD) data*****	Mironov's data excess over MVD data		
		1999* 2003**	Mironov 2000***	Mironov 2013****		1999 2003	2000	2013
1853	1874	162.2	166.2	164.6	164.2	-2.0	2.0	0.4
1854	1875	162.2	166.2	164.6	164.3	-2.1	1.9	0.3
1855	1876	162.2	166.2	164.6	164.3	-2.1	1.9	0.3
1856	1877	162.3	166.3	164.6	164.3	-2.0	2.0	0.3
1857	1878	162.3	166.3	164.7	164.3	-2.0	2.0	0.4
1858	1879	162.2	166.2	164.6	164.2	-2.0	2.0	0.4
1859	1880	162.2	166.2	164.6	164.2	-2.0	2.0	0.4
1860	1881	162.2	166.2	164.5	164.2	-2.0	2.0	0.3
1861	1882	161.7	165.7	164.1	163.7	-2.0	2.0	0.4
1862	1883	162.0	166.0	164.4	164.0	-2.0	2.0	0.4
1863	1884	161.9	165.9	164.3	163.9	-2.0	2.0	0.4
1864	1885	162.2	166.2	164.6	164.2	-2.0	2.0	0.4
1865	1886	162.2	166.1	164.5	164.1	-1.9	2.0	0.4
1866	1887	162.2	166.2	164.6	164.3	-2.1	1.9	0.3
1867	1888	162.2	166.2	164.6	164.1	-1.9	2.1	0.5
1868	1889	162.9	166.4	164.8	164.3	-1.4	2.1	0.5
Average		162.2	166.2	164.5	164.2	-2.0	2.0	0.38

*Mironov, 'New approaches', 1–26. The figures in this column are almost identical to those given in Wheatcroft, 'The first 35 years', 49–50. Wheatcroft's figures seem to come from *Trudy* 1924, 86–89. The latter may well have taken the figures from *Sbornik svedenii* 1897, which used the pre-1890 format of the MVD. As explained in the text, this produced an underestimate of actual heights, as Mironov himself realised in his subsequent publications.

**Mironov, *Sotsial'naia istoriia* 1st ed. and 3rd ed., 338.

***Mironov, *Sotsial'naia istoriia* 2nd ed., 338.

****Mironov, *Strasti*, 267.

*****As explained in the text, the figures in this column assume that the interval boundaries were used as averages of the original measurements. This was the Anuchin method. For the numbers used, see the MVD publication *Sbornik svedenii* 1897, 132.

late nineteenth and early twentieth century, Dmitrii Anuchin, calculated the average height of a recruit in the 1874–83 period to be 1,641 mm, whereas more accurately it should have been 1,621 mm.³⁴

Anuchin's assertion and its confirmation

Dmitrii Anuchin in fact considered that his figures *underestimated* actual heights. In his opinion, when heights were recorded, officials rounded the figures by dropping the fractional part of a number. This means that the third category in the data, 2 *arshins* 4 *vershoks*, actually means 2 *arshins* 4 *vershoks* to 2 *arshins* $4\frac{7}{8}$ *vershoks*. In view of this, Anuchin concluded that his calculations underestimated the 'real mean height.'³⁵ This is because such a rounding system would result in a reduction of the average height by 0.44 of a *vershok*, that is by approximately 2 cm or 0.8 inches.

Anuchin's assertion was confirmed by other researchers. For example, V. A. Levitskii studied the military data for the Podolsk district of Moscow province for 1874–83. In these

TABLE 3 Heights of conscripts in Elets'kii district of Orlov province in 1882 as recorded by Shtegman and the MVD (in *arshins* [a] and *vershoks* [v])*

group	height interval according to Shtegman	number of conscripts	height classification of the MVD	number of conscripts
1	2a 2v–2a 3v	11	2a 2 ¹ /2v	12
2	2a 3v–2a 4v	89	2a 3v	90
3	2a 4v–2a 5v	152	2a 4v	149
4	2a 5v–2a 6v	151	2a 5v	147
5	2a 6v–2a 7v	92	2a 6v	90
6	2a 7v – 2a 8v	42	2a 7v	45
7	2a 8v–2a 9v	6	2a 8v	6
8	2a 9v–2a 10v	1	2a 9v	2
Total		542		541

*Shtegman, 'O rezul'tatakh', 113–20; *Statisticheskii vremennik*, 179.

data the original height measurements were given to the nearest $\frac{1}{8}$ of a *vershok*. Calculating average height on the basis of these primary data, Levitskii found that it exceeded the average data in the statistics of the MVD by approximately half a *vershok*.³⁶ According to the calculations of I. I. Pantiukhov, the excess was 0.4 of a *vershok*.³⁷ According to N. Iu. Zograf, the excess was even bigger at 0.88 of a *vershok*.³⁸ The most detailed information on this question was provided in an 1883 article by A. K. Shtegman, who actually took part in the medical examination of conscripts in Elets'kii district of Orlov province. He provides information about the number of conscripts in various age groups.³⁹ This is set out in Table 3 where it is compared with the MVD data.

Table 3 compares the actual heights as recorded by Shtegman with the data supplied to the centre by the officials in Elets'kii district. From this comparison, it is clear that the conscripts in Shtegman's group 2a 3v–2a 4v were recorded in MVD statistics in the group 2a 3v, and so on for the other groups. This means that the conscripts recorded in the MVD statistics as having a height of 2a 3v actually had heights in the range 2a 3v to 2a $3\frac{7}{8}$ v, which is an average discrepancy of $\frac{7}{8} \div 2$ *vershoks* which equals (to two decimal places) 0.44 *vershoks*. The slight differences in the numbers in each group probably result from inconsistencies in the way Shtegman classified conscripts with a height precisely on a class boundary, such as 2a 4v. Did he put them in group 2 (2a 3v–2a 4v) or group 3 (2a 4v–2a 5v)? Possibly he was inconsistent. Nevertheless, it is clear from Shtegman's data that, when the officials from this district submitted their height data to the higher bodies, they simply discarded the fractions of a *vershok*. This provides clear confirmation of Anuchin's assertion. Hence we consider that up to 1890 the real average height in the height groups of the MVD (beginning with the second one) was 0.44 *vershoks* taller than indicated by the group boundaries.

Problems with Mironov's data

After publishing his 1999/2003 estimates, Mironov changed his mind and adopted the calculation method proposed by Anuchin.⁴⁰ Hence the average height in the third height category was assumed to be 2 *arshins* 4.5 *vershoks*. As he explained:

... in the literature of the nineteenth to the beginning of the twentieth centuries, the data on the height of conscripts, as a rule, was reduced because researchers ... took as the average not the average within the interval, but its lower bound. For example, if the source gave an interval from 2 *arshins* and 3 *vershoks* to 2 *arshins* and 4 *vershoks*, then the average was taken to be 2 *arshins* and 3 *vershoks* instead of 2 *arshins* and 3.5 *vershoks*, and so on. This simplified method of calculation reduced the average height of conscripts by 20–21 mm. For example, the well-known anthropologist of the end of the nineteenth to the beginning of the twentieth centuries D. N. Anuchin estimated the average height of conscripts in 1874–83 to be 1641 mm when actually it was 1662.

Hence in 1999 Anuchin was criticised for exaggerating the height of recruits, whereas in 2000 he was criticised for understating it. However, in the third edition of his *Sotsial'naiia istoriia*, Mironov reverted to the standpoint of his 1999 article and once more criticised Anuchin for exaggerating the heights.⁴¹

The estimates used by Mironov in 1999 and 2003 were problematic for another reason. They gave rise to large and unexplained differences between the data for individuals and the grouped data. For example, for those conscripted in 1877–81 the individual average height was 165.9 cm (Table 1), but for the grouped data (Table 2) it is 162.2 cm, a difference of 3.7 cm.

In 2010 Mironov returned to this subject and published new data for the height of conscripts, which differed from the data he had previously published on this subject. The new data are set out in Table 4, with comparisons with the previous estimates.

The difference between the two estimates in his 2010 book is the result of a printing error. On page 473 the printed text omitted the row for 1836–40. As a result, the numbers for the subsequent periods were all out by five years. Curiously, when Ostrovskii pointed out the discrepancy, instead of explaining it by this printing error Mironov treated it as if it were a substantive difference, saying that his text was absolutely correct and Ostrovskii simply did not understand the data.⁴² When criticised for drawing conclusions from height estimates for which he himself had published different values, he replied that 'whatever method is used for calculating the arithmetic average, the positive

TABLE 4 Average height of conscripts for five-year periods according to Mironov's estimates (cm)*

birth years	conscription years	Mironov 1999/ 2003**	Mironov 2000	Mironov 2010	
				p. 273***	p. 473
1856–60	1877–81	162.2	166.2	164.6	165.8
1861–65	1882–86	162.0	166.0	164.4	164.6
1866–70	1887–91	162.8	166.7	165.1	164.4
1871–75	1892–96	164.0	168.1	166.5	165.1
1876–80	1897–01	164.6	168.6	167.0	166.5
1881–85	1902–06	165.0	169.0	167.4	167.0
1886–90	1907–11	165.1	169.2	167.6	167.4

*Mironov, 'New Approaches'; Mironov, *Sotsial'naiia istoriia*, 2nd and 3rd ed.; Mironov, *Blagosostoianie*.

**The figures in this column correspond almost exactly to those in Wheatcroft, 'The first 35 years', 49–50. See Table 2 note *.

***The figures in this column are identical to those in Mironov, *The Standard of Living*, 386.

trend for 1853–92 does not become negative.⁴³ That does not help us to understand which of the different estimates that Mironov has published for the average height of recruits he thinks is reliable and why.

In 2013, Mironov published annual data (set out in Table 2), from which one can see how he arrived at his latest estimates.⁴⁴ Comparing them with the MVD data (calculated as explained above), one can see that Mironov's new figures differ by only a small amount, generally 0.3–0.4 cm (which is about 0.08 of a *vershok*). Mironov explains that this new correction of the data is because he was able to find in the archives both the lists with individual data and the related group data, and this enabled him to understand how the officials put their measurements into the official interval limits. These new data mainly relate to the period up to 1890 and, on this basis, he concluded that 'in the overwhelming majority of cases' the officials used the method of rounding to the nearest whole number. The heights were measured to the nearest $\frac{1}{8}$ of a *vershok*, so that the third height group included those with a height from 2 *arshins* $3\frac{5}{8}$ of a *vershok* to 2 *arshins* $4\frac{7}{8}$ *vershoks*, the fourth height group those with a height of 2 *arshins* $4\frac{5}{8}$ *vershoks* to 2 *arshins* $5\frac{4}{8}$ *vershoks*, and so on. This means that the average height in the group '2 *arshins* 4 *vershoks*' is just over 2 *arshins* 4 *vershoks*; that is, just over (by about 0.06 of a *vershok*) the MVD data. But the difference is small. Essentially Mironov has adopted the average MVD data (with a small correction), which is the method of Anuchin, who previously had been criticised by Mironov for both exaggerating and understating the average heights.

However, the use of these 2013 estimates produces the discrepancy already mentioned between the individual and group data. If one looks at Table 1, for conscripts born between 1851 and 1860, there is a gap of 1.1–1.2 cm between the height of conscripts, using the individual and the group data. As we have established, this difference resulted from officials discarding fractions of a *vershok* when they grouped the height data.

Easy to compare for different years?

Looking at Table 1, it can be seen that, from 1890, Mironov's height estimates based on the group data, which were formerly below the estimates derived from the individual data, are now above the estimates derived from the individual data. What explains this change? Mironov does not explain it. However, archival research showed that on 18 August 1890, in Circular no. 21, the MVD issued a new form – *Report on conscription and the implementation of military service*.⁴⁵ In point 8.3 of this form, instructions were given as to how the height data were to be registered. They were to be grouped as follows:

- 1) 2 *arshins* $2\frac{1}{2}$ *vershoks*;
- 2) up to 2 *arshins* 3 *vershoks*, inclusive;
- 3) up to 2 *arshins* 4 *vershoks*, inclusive;
- 4) up to 2 *arshins* 5 *vershoks*, inclusive;

and so on.

This new circular banned the method asserted as what was actually being done prior to the 1890 circular by Anuchin and confirmed by Levitsky, Pantiukhov and Shtegman. It

means that the third group now includes recruits from 2 *arshins* 3 *vershoks* to 2 *arshins* 4 *vershoks*, and the fourth group from 2 *arshins* 4 *vershoks* to 2 *arshins* 5 *vershoks*. This circular is unambiguous and was used from 1890 in all the MVD reports.

The Ministry of Defence did not take any account of this change in MVD procedures and continued to register its height groups in whole numbers of *vershoks*. For example, in the 'Comprehensive report on the activities of the Ministry of Defence' (*Vsepoddanneisnem otchete o deistviiakh voennogo ministerstva*, 1877) conscripts in the third category were assumed to measure 2 *arshins* 4 *vershoks*, when in fact their actual height was 2 *arshins* 3 *vershoks* to 2 *arshins* 4 *vershoks*. The confusion was worsened by the publication of the multivolume work, *A Century of the Ministry of Defence* (*Stoletie voennogo ministerstva*, 1914). In this publication, in the text the height groups for particular years are given according to the report of the Ministry of Defence for the corresponding year and in the summary tables according to the form used by the Ministry of Defence in 1875–87 (see above). On the other hand, with the publication in 1897 of the *Collected Information about Russia* (*Sbornik svedenii po Rossii*), the age groups are given according to the pre-1890 form of the MVD, and in the *Reports* of the Medical Department of the MVD (for example, *Otchety meditsinskogo* 1898) and in the *Reports on the health of the population and the organization of medical care in Russia* according to the new (1890) MVD form.⁴⁶

This confusion should not disturb us. In all the publications (except those of the Ministry of Defence) the same MVD data were used, and in the publications of the Ministry of Defence these data were only slightly corrected, taking account of the military data on the newly arrived conscripts. Hence, beginning in 1890 all the above-mentioned publications used the height groups of the 1890 MVD form.

It should be pointed out that in 1903 the report form for military recruits was again altered, but this alteration did not affect the grouping of the height data.⁴⁷ Another change took place in 1913, when the grouped height data reverted to the pre-1890 MVD form,⁴⁸ which (together with an alteration in the length of conscription) led to the non-comparability of the 1913 data with those of previous years.

Mironov did not notice, or ignored, the 1890 change in the form for reporting on new conscripts. This is strange since one has only to take some reports from successive years to see the influence of this change.⁴⁹ For example, in 1890 the number of conscripts in the highest height categories jumped up. The number in the very highest category (2 *arshins* 12 *vershoks*) rose from 0 to 12, in the second highest category (2 *arshins* 11 *vershoks*) quintupled, and in the next two categories combined (2 *arshins* 10 *vershoks* and 2 *arshins* 9 *vershoks*) almost doubled. It also increased significantly in the next three categories in descending order (2 *arshins* 8, 7 and 6 *vershoks*). On the other hand, in the category 2 *arshins* 5 *vershoks* (the largest category) it remained approximately the same and in the remaining three it fell. It is clear from looking at these figures, and knowing about Circular No. 21, that the method of recording heights had changed in a way that increased the recorded heights.⁵⁰

This neglect of the change means that the third group, which, according to the reports from 1890 onwards, included conscripts with a height from 2 *arshins* 3½ *vershoks* to 2 *arshins* 4 *vershoks* (average 2 *arshins* 3.56 *vershoks*), was treated by Mironov as if it included conscripts with a height from 2 *arshins* 3⅝ *vershoks* to 2 *arshins* 4⅞ *vershoks* (an average height of 2 *arshins* 4.06 *vershoks*). A similar situation can be observed in the fourth, fifth and remaining groups. In all these groups Mironov's misinterpretation of the height intervals led to an increase of 0.5 *vershoks* in comparison with the average

heights in the MVD forms calculated according to the 1890 instructions. In the first group Mironov's method does not lead to any increase, and in the second it leads to an increase of only a quarter of a *vershok*. However, these two groups account for only a small share of the conscripts (1 per cent and 5 per cent respectively). Hence, for the conscripts as a whole, the increase in their height introduced by Mironov's misinterpretation of the MVD data is 0.5 *vershoks* (2.2 cm).

Ignoring the introduction of the new method of reporting heights should lead to a leap in Mironov's average height estimates. Such leaps are indeed to be found in some of Mironov's provincial data. In Orlov province the height of conscripts in 1890 was estimated to be 1.9 cm higher than it was in 1889, in Arkhangel, Kovno and Enisei provinces 2.0 cm higher, in Tver' province 2.1 cm higher, in Tula province 2.2 cm higher, in Vilensk 2.5 cm higher, in Lifliand 2.6 cm higher, and in Astrakhan province 2.8 cm higher.⁵¹ However, in the majority of provinces the 1890 leap was 1.0–1.5 cm, and in some provinces it took place later, in 1891–94. Probably some provinces implemented the new procedure immediately and others later. On average, for the whole country, the leap in height in 1890 according to Mironov's calculations was 0.9 cm. Not surprisingly, Wheatcroft refers to the apparent big increase in height in 1890 as a 'somewhat dubious leap.'⁵²

The delayed reaction to the 1890 form was probably because it was not accompanied by a corresponding alteration in the instructions to military conscription offices. Nevertheless, gradually an increasing number of clerks recorded heights according to the 1890 MVD form, as a result of which by 1895 the average height of recruits as estimated by Mironov had increased by 1.9 cm and by 1898 by 2.2 cm compared with 1889.⁵³

Correcting Mironov's data

We have now shown that the average actual height of conscripts up to 1890 was 0.44 *vershoks* bigger than that calculated relying on the MVD data. We can now also calculate the average height for the period after 1890, using the published data,⁵⁴ and the real height groupings given in the above-mentioned Circular No. 21 and sources cited above. This enables us to correct the data published by Mironov. The results are set out in Table 5.

From Table 5 it can be seen that up to 1890 the corrected figures are fairly close to Mironov's data for individuals and for the whole period they are closer to Mironov's individual data than to his total conscripts' data. Examining the data in the last column, it can be seen that Mironov's assertion that there is an increase in the height of conscripts in this period appears not to be true. On the contrary, it seems in reality to have declined slightly.⁵⁵

The idea that using the anthropometric data enables us to neglect reporting errors is oversimplified. It seems from the detailed provincial data that Mironov has published that filling in the forms and summarising them was somewhat erratic.⁵⁶ For example, the data for Moscow for 1873–85 are very erratic. They record a leap of 4.9 cm in 1873, a stable five-year period of relatively tall heights, followed by a three-year crash which reduced average height by 7.4 cm, followed by a leap in 1881 of 7.8 cm, followed by a three-year decline of 4.0 cm. Similarly, the data for Akmolinsk province are very erratic for new conscripts born in the whole period 1853–92. Pending further investigation of their causes, these sharp fluctuations suggest that some of the

TABLE 5 Mironov's height data corrected in the light of the new information (cm)*

<i>year of Birth</i>	<i>year of conscription**</i>	<i>Mironov's individual conscripts' heights</i>	<i>Mironov's total conscripts' heights</i>	<i>real total conscripts' heights</i>
1851–1855	1872–1876***	165.8	164.7	166.2
1856–1860	1877–1881	165.9	164.7	166.2
1861–1865	1882–1886	165.4	164.5	165.9
1876–1880	1897–1901	165.5	167.1	164.7
1881–1885	1902–1906	166.1	167.5	165.1
1886–1890	1907–1911	166.4	167.7	165.3

*Mironov's individual and total conscripts' heights come from Table 1. The real total conscripts' heights for the period before 1890 are the MVD data plus 0.44 *vershoks*, and for the period after 1890 as explained in the text preceding Table 5.

**Column 2 excludes the two five-year periods 1887–91 and 1892–96 because in those years the officials who measured the new conscripts used both old and new rules for recording heights, which makes the data for those years unreliable.

***Call-up years 1874–76.

officials recorded heights in a slapdash fashion and their data is unreliable.⁵⁷ Of course, all economic time series contain errors of one kind or another, but to suggest that anthropometric data are uniquely virtuous and do not suffer from these problems is evidently erroneous.

Conclusion

The unearthing, publication and utilisation of the pre-1917 anthropometric data for Russia by Mironov was a useful contribution to historiography. So was his challenge to traditional and rival interpretations of the development of living standards in the decades preceding the First World War and of the cause(s) of the Russian Revolution. However, the merits claimed for his new data were exaggerated. They are not uncomplicated, not always easy to compare for different years, and not a solution to the problem of reporting error. Careful examination of the data suggests that they do not provide good evidence for the optimistic school about the development of Russian living standards or for the modernisation interpretation of the cause(s) of the Russian Revolution.⁵⁸ This does not necessarily mean that the optimistic school and the modernisation interpretation are wrong. It simply means that one piece of evidence cited in their support is not a valid inference from the underlying data. The evidence-basis for the optimistic view of the development of Russian living standards in the decades prior to 1914 and the related modernisation interpretation of the cause(s) of the Russian Revolution is weaker than some recent publications suggest.

Notes

1. Gerschenkron, 'Agrarian Policies', 741–42, 776, 778, 784.
2. Wheatcroft, 'Crises and the Condition'.

3. Simms, 'The Crisis'.
4. Gregory, 'Russian Living Standards'; Gregory, *Russian National Income*; Gregory, *Before Command*.
5. Hoch, 'On Good Numbers'; Hoch, 'Did Russia's'.
6. Plaggenborg, 'Who Paid'.
7. Robinson, *Rural Russia*, 110.
8. Simms, 'The Crisis', 379.
9. Hoch, 'On Good Numbers', 54.
10. Allen, *Farm to Factory*, 23–24.
11. Khanin, 'Differentsiatsiia dokhodov'.
12. According to Mironov, 'Prichiny russkikh revoliutsii', the income distribution in Russia before the First World War was relatively equal and much more equal than in England or the USA. However, these calculations have been rejected by Khanin, 'Differentsiatsiia dokhodov v dorevoliutsionnoi Rossii'. According to Khanin's calculations, Russia's income distribution was very unequal and more so than in England or the USA.
13. Dennison and Nafziger, 'Living Standards', 400, 440.
14. Mironov, 'Nabliudalsia', 61–65.
15. For Mironov's reply to some of the criticisms, see Mironov, *Strasti*.
16. Ellman, 'Vitte, Mironov'; Nefedov, 'Uroven' zhizni'.
17. Steckel, 'Heights and Human Welfare'.
18. Lindert and Nafziger, 'Russian Inequality'. According to Lindert and Nafziger, income inequality in the 50 provinces of European Russia in about 1904 was relatively low and was modest by international standards. It was much less than in England and Wales in 1867 and less than in the USA in 1917. It was also less than in Russia in 1997, the USA and China in 2003, and very much less than in Brazil in 2001. One reason for the difference between these results and those of Khanin is that Lindert and Nafziger assume that the data concerning high incomes collected by the Ministry of Finance and published in 1906 were both comprehensive and accurate, and that there was neither exclusion of very high income recipients (other than the Tsar) nor significant avoidance or evasion. As far as the relationship between the distribution of income and the cause(s) of the Russian Revolution is concerned, Lindert and Nafziger are cautious about drawing definite conclusions. They write that 'additional research on the dynamics of inequality is necessary before more definitive accounts of the role played by economic processes in the two revolutions can be drawn' (p. 769).
19. Baten and Blum, 'Why Are You Tall'.
20. Wheatcroft, 'The Great Leap', 45.
21. Hoch, 'Tall Tales'.
22. Ganelin, *Pervaia mirovaia voina*, 36. For an overview of Ganelin's life and work, see Lukoianov, 'Slovo'.
23. Mironov, *The Standard of Living*, 15–16.
24. Mironov, *The Standard of Living*, 48, 69–77.
25. Ostrovskii, 'O modernizatsii', 121.
26. Mironov, *Blagosostoianie*, 184.
27. *Sbornik tsirkuliarov i instruktsii Ministerstva vnutrennykh del za 1874 god*, 121–46.
28. Bodenhorn, Guinnane and Mroz, *Caveat lector*.
29. *Sbornik tsirkuliarov i instruktsii Ministerstva vnutrennykh del za 1874 god*, 459–85.

30. *Otchet ministra vnutrennykh del o vypolnenii prizyva k otpravleniiu voinskoï povinnosti v 1874 godu*, 36.
31. *Otchet ministra vnutrennykh del o vypolnenii prizyva k otpravleniiu voinskoï povinnosti v 1875 godu*, 41; *Vsepoddanneishii otchet*, 144.
32. Mironov, *Blagosostoianie*, 173–85.
33. *Stoletie voennogo ministerstva*, Part III, Book II, Section II, 175, 300.
34. Mironov, ‘New Approaches’, 11–12. This argument is repeated in *Sotsial’naia istoriia*, 3rd edition, 342.
35. Anuchin, ‘O geograficheskome’, 75.
36. Levitskii, ‘K voprosu’, 62.
37. Cited by Zograf, ‘Antropometricheskie issledovaniia’, 7.
38. Zograf, ‘Antropometricheskie issledovaniia’, 8.
39. Shtegman, ‘O rezul’tatakh’, 115.
40. Mironov, *Sotsial’naia istoriia*, 2nd edition, 342.
41. Mironov, *Sotsial’naia istoriia*, 3rd edition, 342.
42. Mironov, *Strasti*, 153.
43. Mironov, *Strasti*, 159.
44. Mironov, *Strasti*, 267.
45. Rossiiskii gosudarstvennyi istoricheskii arkhiv (hereafter RGIA), f. 1292, op. 4, d. 1342, l. 1; *Sbornik tsirkuliarov Ministerstva vnutrennykh del po voprosam voinskoï, voenno-konskoï i voenno-povozochnoi povinnosti, 1874–1906*, 165–74.
46. See, for example, *Otchet o sostoianii*, 221.
47. See, for example, *Sbornik tsirkuliarov Ministerstva vnutrennykh del po voprosam voinskoï, voenno-konskoï i voenno-povozochnoi povinnosti, 1874–1906*, 221.
48. *Sbornik tsirkuliarov Ministerstva vnutrennykh del po voprosam voinskoï, voenno-konskoï i voenno-povozochnoi povinnosti. 1874–1913gg.*, 293.
49. See, for example, RGIA, f. 1292, op. 4, d. 656, l. 9; d. 746, ll. 6–7; d. 839, ll. 9–10.
50. *Trudy*, 86.
51. For these figures, see Mironov, *Blagosostoianie*, 720, 722, 730, 736, 754, 756.
52. Wheatcroft, ‘The Great Leap’, 40.
53. Mironov, *Blagosostoianie*, 267.
54. *Trudy*, 86–9.
55. It is important not to rush to economic-historical conclusions on the basis of this finding. Although height data are certainly relevant for ascertaining the level and rate of change of the well-being of a population, they are not decisive on their own. Other factors are also important. Hence Deaton (*The Great*, 162) concluded that ‘average height is not a sensible measure of wellbeing.’ This conclusion was largely based on comparing African and Indian heights. However, changes in the average height of a given population – along with other indicators – are a useful indicator of changes in the average well-being of that population.
56. Mironov, *Blagosostoianie*, 719–63. Mironov (*The Standard of Living*, 72–73) agrees with this and writes that ‘we can concede that the district officials did not always transfer the data among the groups of intervals accurately.’ Nevertheless, he argues that ‘in the vast majority of cases’ the measurements were recorded accurately.
57. The provincial data published by Mironov (*Blagosostoianie*, 719–63) also shows a leap of 4.2 cm in the height of new conscripts born in 1882 in Perm’ province; a leap of 5.1 cm in the height of new conscripts born in 1869 in Irkutsk province (possibly partly a response to the 1890 change in the MVD height measurement method); a leap of 5.2

cm in the height of new conscripts born in 1880 in Taurida province; a shrinkage of 5.1 cm for new conscripts born in 1863 in Semipalatinsk province; a shrinkage of 4.2 cm for new conscripts born in 1860 in Irkutsk province; a shrinkage of 3.9 cm for new conscripts born in 1873 in Kursk province; a shrinkage of 3.1 cm for new conscripts born in 1855 in Tver' province; and a shrinkage of 6.6 cm for conscripts in Odessa born in 1891. But these may be just a result of printing errors. The Dagestan provincial figures for new conscripts born in 1870–81 are also erratic, but this may be caused by the small number of observations, and for 1880 may be a printing error. Similarly, the erratic figures for Yakutsk province (down 3.3 cm for men born in 1857, up 4.2 cm for men born in 1872, down 6.6 cm for men born in 1875, up 6.0 cm in two years for men born in 1878, and up 3.2 cm for men born in 1881) may also be mainly caused by the small number of observations, with the increase for men born in 1872 being a delayed reaction in this very remote province to the 1890 change in the MVD height measurement method.

58. Mironov, too, seems recently to have become aware of the limitations of the height data. It is noteworthy that in his most recent publications, the height data play a much smaller role than in his earlier work. For example, in his massive three-volume work in 2014–15, *Rossiiskaia imperiia*, scant attention is paid to the height data. It is mentioned a couple of times (vol. 3, 300–301, 681) – in both cases not on its own, but together with weight data. Mironov remains a keen supporter of the optimistic school, but now a wide variety of social and economic data are cited in its support.

Disclosure statement

No potential conflict of interest was reported by the authors.

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