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Reindeer herding statistics in Russia: issues of reliability, interpretation, and political effect

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Abstract

Official reindeer herding statistics are an invaluable source of data for both social and natural scientists wishing to understand and model ecological systems in the Arctic. However, as with all official statistics, reindeer herding statistics are subject to certain distortions emerging from the way they are collected and processed as well as from a priori assumptions. In this article, we analyse Soviet/Russian reindeer herding statistics in order to reveal these distortions and assumptions and show how these statistics should be interpreted. Particularly, we analyse reindeer ownership categories and reindeer age/sex categories, spatial organization of the data, so-called magical numbers (statistical parameters used by the state to assess the quality of reindeer herding management), and the manner of collecting statistics. We show that official Soviet/Russian statistics reflected the world as the state wanted to see it, even if it obviously did not completely correspond to the world 'out there'. In Soviet times, the state even made systematic attempts to change this world to better correspond to the statistics, which, however, was never fully achieved. On the basis of this analysis, we offer some recommendations for how an interested researcher should read and understand Russian reindeer herding statistics.

Keywords: Magical numbers, Reindeer, Russia, Statistics, Soviet Union

Introduction

Official statistics are used as data in a variety of social and natural sciences. Thus, reindeer herding statistics, which constitute the object of study in this article, play an important role not only in economic writings, anthropological theorizing, and historical reconstructions, but also in ecological research. In his well-known study on the history and role of quantitative data and numerical thinking in science, Theodore Porter (1996) argues that statistics and other forms of quantification represent a 'technology of distance': they build up a discourse in which arguments and statements become separated from the persons who produce them, therefore contributing to the elimination of subjectivity and the production of

objectivity. In the words of Porter himself, '[s]trict quantification, through measurement, counting, and calculation, is among the most credible strategies for rendering nature or society objective' (Porter 1996: 74). Thus, insofar as objectivity remains an ideal of science, quantification—including statistics—remains indispensable.

Objectivity as created by this strategy, even if it is taken in the narrow sense of 'impersonality' rather than in the broader sense of 'truth', is more discursive than absolute. Indeed, it is rather well known that the results of any statistical assessment do depend on a set of subjective assumptions and choices made by the researcher. Thus, already in the 1920s, young Karl Polanyi observed that the results of a statistical assessment (*Uebersicht*) of economy essentially depend on the approach the researcher adopts, which, in its own turn, is grounded in the economic theory he/she uses as his/her basis (Polanyi 2018 [1925]; see also Bockman et al. 2016). More

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recently, several scholars, among them Theodore Porter (1986, 1996), Alain Desrosières (1998), Joel Best (2001, 2004, 2005, 2008a), and Morten Jerven (2014), have demonstrated that multiple a priori and subjective assumptions and choices reflecting cultural, social, and often political factors are inevitably involved in collecting and representing statistical data and, therefore, that statistics—and most notably official statistics—are inevitably socially constructed. It is notable, however, that all of the above-mentioned authors explicitly rejected the position taken by some researchers (termed ‘vulgar constructionists’ by Best (2008b)) that any form of statistics was necessarily wrong, arbitrary, faulty, and indeed something worse than ‘damned lies’ (Best 2001), as a popular saying would have it. Despite being socially constructed, statistics are not arbitrary, and unless deliberately forged, they reflect not only the cultural and social forces, ideologies, and political agendas active at the moment and in the place where they were produced, but also the world external to the minds of its producers, which may be called the objective world (Best 2005). What the scholars were actually arguing was that any use of statistical data should be reflexive: any statistics should be treated in the context of the cultural, social, and political circumstances of their creation while keeping in mind the a priori choices inevitably made by their creators. As Theodore Porter has put it:

I do not claim that quantification is nothing but a political solution to a political problem. But that is surely one of the things that it is, and our understanding of it is poor indeed if we do not relate it to the forms of community in which it flourishes. (Porter 1996: x)

The principal aim of this article is to provide such socio-cultural and political context for official reindeer herding statistics of the Soviet Union/Russia, with a special focus on its north-western part, that is, the European part of Russia and Western Siberia, with which the authors have first-hand experience. We believe that such a contextualization can be of interest and help to other researchers from both social and natural sciences who wish to use Russian reindeer herding statistics in their research and, more generally, to anyone planning to do research based on official statistical data.

Theoretically and methodologically, our research draws on the results of the above-mentioned studies of the social construction of statistics. These results point to what we consider the four most important ways that statistics are socially constructed, beyond a number of other ways that are also mentioned. The first is the construction of analytical categories or variables, which then become objects of statistical measurement. Quite often, statistics literally create the things they describe, and it

can be argued that hot topics of popular debate such as ‘unemployment’, ‘mortality’, and ‘fertility’ are pure products of the statistics that relate to them: they exist insofar as they are measured (Desrosières 1998). The role of statistical work and statistical categories in creating national and ethnic identities has been often highlighted, particularly in the context of the Soviet Union/Russia (see, e.g. Cadiot 2005). However, even if the object of statistical counting is not created by the act of that counting, it can nonetheless have a rather complicated relation to the resulting statistical category.

For example, statistics on adolescent suicides can vary enormously depending on how exactly we define suicide as well as adolescence (what age categories we include). Do we restrict suicide to obvious self-harm, such as hanging or shooting oneself? Do we include deaths resulting from various forms of so-called suicidal behaviour, such as narcotic overdose, which may or may not result from a deliberate plan to die? Do we include extremely risky behaviour such as swimming far away from the coast or walking on a roof ridge? Note that none of these definitions can be proven correct or incorrect on a purely empirical basis: they must be chosen a priori, before any empirical research can begin, and therefore, their choice is inevitably subjective. Statistical categories are particularly important in the case of official statistics. The use of statistics in state affairs predates its use in science; indeed, according to Desrosières (1998), the relation of statistics to state formation can be seen in the very etymology of the word. Karl Polanyi argues, in his work mentioned above, that statistics represent the eyes of the state, so to speak, allowing it to see the world outside (Bockman et al. 2016; Polanyi 2018 [1925]). Porter, however, believes that the primary role of statistics in the functioning of the state is similar to its role in science: promoting discursive impersonality and objectivity as a strategy to win trust (Porter 1986, 1996). Indeed, as we know from James Scott (1998), the state is ‘seeing’ in quite a specific way, and its sight is often greatly and purposely distorted. One of the most important features of this way of seeing is simplification—that is, organizing empirical diversity ‘on the ground’ into a limited set of pre-defined categories ‘on paper’. This simplification tends to be greater in the case of high-modernist (including socialist) states, whose statistical categories are often based on ideology (see Ghosh 2020 for an extended discussion of the example of socialist China).

The second way statistics can be socially constructed is through particular procedures used for collecting data. Thus, the late twentieth-century rise of suicides among American—and particularly Afro-American—teenagers, which provoked great concern in the USA in the late 1990s (Best 2004: 104), was accompanied by a proportional drop in the number of deaths resulting from

'undetermined causes', as well as accidental drownings, gun fatalities, poisonings, and falls—that is, from a decrease in four categories of fatal accidents, which are also the four most common ways to commit suicide (Best 2004, 105–7). It is quite likely, therefore, that the rise of adolescent suicides in the 1980s and 1990s actually reflects a change in the way adolescent deaths were registered by officials, which could be related to the continuing de-stigmatization of suicide as society became more secularized. This shows that the application of any finite set of mutually exclusive categories always leaves certain 'grey zones', cases which fall in between these categories by virtue of their objective characteristics as perceived by the organization or person who conducts the count. It is up to the counter to classify these cases as belonging to one category ('suicide') or another ('accident') or to use the 'trash category' provided for cases that do not fit any other category ('cause of death undetermined'). This choice is unavoidably subjective and is therefore open to social and cultural influences, such as the degree of stigmatization attributed to suicides. We will see that the same holds true for several aspects of counting reindeer.

The third way statistics are inevitably socially constructed consists in the manner of grouping and presenting the results of the counting procedure. Thus, in the National Vital Statistics Reports provided by the Centers for Disease Control and Prevention, suicides appear as a relatively minor cause of adolescent deaths in the USA: they are outnumbered by accidents (the leading cause), homicides, and diseases. However, if one subdivides the other categories and compares suicides not to accidents, diseases, and homicides in general, but to transportation accidents, drownings, accidental poisonings, deaths from cancer or coronary diseases, and deaths in fights, killings, etc., one can legitimately claim, as some activists of suicide prevention actually have, that 'suicide is the second leading cause of death among [American] adolescents' (cited by Best 2001: 125). There are no objective reasons to prefer one way or another of grouping and presenting the results: the choice between them is again necessarily subjective.

Finally, the fourth way statistics can be socially constructed concerns the use of statistics and particularly what Joel Best calls 'magical numbers' (Best 2004: 116–43). The purpose of 'magical numbers' is to perform the trick of quantitatively assessing phenomena that are qualitative—and therefore unquantifiable. An example of a 'magical number' any modern academic would know is the number of publications in high-rate (SCOPUS and Web of Science) academic journals used to assess the quality of academic work. As with any magic, this magic of numbers is a social and cultural phenomenon having little—if any—relation to the real world. Its effectiveness

depends exclusively on its practitioners' belief in its effectiveness. The exact role of 'magical numbers' is a matter of debate: while Joel Best thinks that they are just a by-product of the bureaucratic quest for total quantification (which, as we also know from James Scott (1998), represents another aspect of state vision), Theodore Porter believes that 'their highest purpose is to instil an ethic', to provide 'the basis for a crucial kind of self-discipline' harnessing the interest of those whose achievement is so measured (Porter 1996: 45). In this way, these 'measures become... "technology of the soul"' (Porter 1996: 45), creating governmentality (in the sense of Michel Foucault) of their objects. In any case, however, the 'magical numbers', which are social and sometimes even political phenomena, affect statistics by affecting—and essentially constructing—the very reality that such statistics are meant to assess.

None of these ways of socially constructing statistical data includes deliberate lies or even unintentional error or bias. Rather, they refer to certain choices which must be made if statistical data are to be collected, presented, and used, and yet cannot be made on any objectively correct basis; that is, there is no way to assess any of the possible options as objectively better than any other. The choices are necessarily made under the influence of culturally informed subjective preferences, tradition, and other social factors, as well as various political agendas. However, deliberate lies and intentional biases are by no means absent in statistics, including state-collected statistics: since statistics are the eye of the state and since their producers are more often than not citizens under the eye of that state, they may be strongly motivated to conceal something from that eye or attract its attention to a 'sight' that is for some reason profitable to them. This motivation adds the final layer of social constructivism to statistical data.

Although Soviet/Russian reindeer herding statistics have been used for many purposes, including formal mathematical models, critical assessments have been for the most part limited to data lacunae and the possible 'factual' reliability of the data (e.g. Klovov 2011, 2013; Litvinenko 2009) and have rarely addressed the a priori assumptions and premises of the sort described above. The exceptions are studies on the history of statistical work in the Russian North and particularly on the First Polar Census (e.g. Anderson 2011a; Klovov and Ziker 2010; Glavatskaia and Kliukina-Borovik 2013), along with a few very recent publications (e.g. Konstantinov et al. 2018; Filant 2017). These contributions are cited in the corresponding sections of this article.

Study area

The Russian Federation—like its precursor, the Soviet Union—has reported considerably higher numbers of

(semi-)domesticated reindeer than any other state. In fact, reindeer husbandry was considered an important branch of the northern—in particular, indigenous—contribution to the state's economy. Throughout the Soviet period, there was a marked zest for increasing productivity (notably, output of meat) against the backdrop of an ideological emphasis on modernization and industrialization, leading one commentator to describe the tundra as a vast 'open-air factory floor' for meat production (Vitebsky 1992: 242). Soviet ideology also prescribed collectivization of the means of production, which included reindeer. The more or less forceful transition from private reindeer husbandry to collective farms (*kolkhozy*) and, increasingly, state farms (*sovkhozy*) was mirrored by the inclusion of different forms of ownership in reindeer statistics. Our analysis pays particular attention to the north-western regions of the Russian Federation/the Soviet Union but has explanatory value for all parts of the Russian North and for the study of livestock statistics in general.

Methods

This article is based on archival research conducted by the authors in regional archives of Northwest Russia: Murmansk Region, Nenets Autonomous Okrug (part of Arkhangel'sk Region), Komi Republic, Yamal-Nenets Autonomous Okrug, and Khanty-Mansi Autonomous Okrug. Reindeer statistics of the Soviet period are relatively easy to access in local and regional archives; collectivization meant that reindeer numbers never constituted a 'commercial secret'. However, this does not mean that the statistical figures were exact, for there were reindeer whose ownership was ambiguous: neither entirely collective nor entirely individual. Such ambiguities provide important clues to explaining the general layout of reindeer statistics—and the social construction of the logic behind them. Moreover, as part of their previous ethnographic fieldwork, the authors attended reindeer counts in several enterprises of the region under study.

Results of the analysis of reindeer herding statistics

Below, we first turn to the categories of ownership, then to those of herd composition, which are closely connected to the emphasis on productivity, and to the spatial aspects of presenting reindeer statistics. We then proceed by analysing the statistically established 'magical numbers' of Soviet/Russian reindeer herding and their impact on reindeer management. Further, we give a short description of the process of compiling reindeer statistics, from the counting chamber at the ground level to the offices of regional and country-wide statistical departments.

Ownership

We begin with the statistical categorization of reindeer in Murmansk Region (*Murmanskaia oblast'*) in the period 1951–1981. After compiling deer headcounts at the local level, statistics for districts (*raiony*) and cities (*goroda*) as well as for the entire Murmansk Region reported different forms of ownership on the Y-axis of all tables:

- Collective farms (*kolkhozy*)¹
- Fishery collectives (*rybolovetskie arteli*)
- Members of collective farms (*chleny kolkhozov*)
- Members of fishery collectives (*chleny rybolovetskikh artelei*)
- Individual owners (*edinolichniki*)
- Workers, clerks, and other groups of inhabitants (*rabochie, sluzhashchie i drugie gruppy naseleniia*)
- State enterprises (*gosudarstvennye khoziaistva*) [later: state farms (*sokhozy*)]
- Cooperative enterprises (*kooperativnye khoziaistva*) [later: other state and collective enterprises (*prochie gosudarstvennye i kooperativnye khoziaistva*)]

The Communist Party, state ministries, and regional administrations all had a vested interest in reducing the number of individual owners as well as the number of reindeer in individual ownership. In 1951, out of tens of thousands of reindeer in the Murmansk Region, only 29 were reported to be in the ownership of seven individual owners. One may assume that 'individual owners' had reasons and strategies for hiding part of their deer; what is important, however, is how this figure demonstrates a high degree of reindeer collectivization (expectedly) but also shows it was not yet at 100% (rather unexpectedly). The last year that mentions reindeer in individual ownership is 1960; after that, the row labelled *edinolichniki* is empty, and the category as such vanished in 1966 or 1967.

Thus, by the 1960s, full collectivization had been officially achieved; however, this statement does not take into account the thousands of reindeer—roughly 5% of the overall number—that 'belonged' to the members of the collective farms (or fishery collectives, respectively) and that were listed systematically in the rows labelled *chleny* throughout the 1950s. In hindsight (and based on his ethnographic fieldwork), our colleague Yulian Konstantinov speaks of 'private-in-the-collective' reindeer (Konstantinov 2015; Konstantinov et al. 2018). The standard Russian term to designate the ownership of these reindeer was *lichnye* (lit. 'personal'), which differentiated them from both *chastnye* (lit. 'private', that is,

¹The exact wording is *kolkhozy (sel'skokhoziaistvennye arteli)*, for there was a time when *kolkhoz* encompassed different types, notably *kommuna* and *tovarishchestvo po sovместnoi obrabotke zemli* (Osad'ko 1973: 475). From the 1950s onwards, *sel'skokhoziaistvennaia artel'* became the standard form of *kolkhoz*.

reindeer individually owned by herders not belonging to any enterprises) and *obshchestvennyye* (lit. 'collective', that is reindeer belonging to collective enterprises) (Konstantinov et al. 2018). Throughout the 1960s and 1970s, the statistics report decreasing numbers of reindeer belonging to 'members of collective farms' or 'members of fishery collectives' versus increasing numbers of animals belonging to 'workers, clerks'. This trend is concomitant with the shrinking numbers of reindeer in collective farms and fishery collectives vis-à-vis growing numbers in the category 'state enterprises' (*sovkhozy*, sing. *sovkhov*), later renamed 'state farms of all systems' (*sovkhozy vsekh sistem*). Thus, along with the amalgamation of collectives into state farms, collective-farm members became state employees ('workers, clerks'), collective-farm and fishery-collective reindeer became state-enterprise reindeer (*sovkhovnyye oleni*), and the private-in-the-collective reindeer gradually morphed into workers' and clerks' reindeer. These processes took place mainly in the 1970s.

This arrangement for categories of reindeer ownership was representative for the statistics in all other regions of the Soviet Union. Specific to the Murmansk Region and some other coastal regions is the fact that statistics initially differentiated between (agricultural) collective farms and fishery collectives. This differentiation lost relevance during the 1960s for several reasons, one of them being the transition from collective enterprises to state farms (see below). Further, the statistics included a residual category that featured low numbers of reindeer in the ownership of sundry enterprises that focused on neither agriculture nor animal husbandry nor fishing.

From the perspective of the Communist Party and the state, it was important first and foremost to secure the growth, or at least stability, of the number of reindeer in collective-farm and state-farm ownership; second, to facilitate the transition from collective farms to state farms; and third, to keep the number of private-in-the-collective reindeer at a low level—approximately 5%. When assessing how and where statistics were massaged, it is exactly here: while the collective-farm and state-farm herders were interested in augmenting their quasi-private stock, their bosses were interested in enlarging the overall herd size and improving productivity. The bosses, however, had no direct control over the herd, but had to rely on the herders; they could make an official accounting only once or twice per year (Habeck 2005: 101 ff). The intermediaries between herders and state-farm directors had to strike a reasonable balance—indeed, a compromise—between these divergent interests, about which more below.

Herd composition I: Transport vs. production

Among the different categories of domesticated reindeer recognized by Soviet statistics, the oldest were those of

'transport' and 'productive' reindeer. These two categories featured prominently already in the First Polar Census (*Pripoliarnaia perepis*, 1926–1927), which represented the first attempt to systematically collect demographic and economic statistics in the Russian Arctic as a whole. Although the census collected information on other categories of reindeer as well (on which more below), it was the ratio of transport animals to productive animals which, along with the total number of reindeer per territory, was shown in what was probably the most well-known product of this census as far as the reindeer herding statistics were concerned: the 'Reindeer and dog breeding map of the USSR' (Napravlenie 1932).

As we stated in the introduction to this paper, the First Polar Census was an object of intensive research during the early 2000s and explaining the design and categories of the census featured highly in this research. According to David Anderson, at least the economic part of the census was designed after the so-called *zemstvo*² statistical investigations of the pre-Soviet period (Anderson 2011b). This position requires some clarifications, which are important for our topic. It is rather well known that *zemstvo* institutions existed only in some parts of the Russian Empire: initially, they were introduced in 32 provinces (*gubernii*) situated in the centre and south of the European part of the Empire (Gerasimenko 1990: 12). Later, the list of *zemstvo* provinces (*zemskie gubernii*) was expanded to include nine provinces in the west of the European part of the Empire and in Cis-Caucasia (Gerasimenko 1990: 40–1). However, the Siberian provinces, as well as the Arkhangel'sk Province of European Russia—that is, all the territories where reindeer herding ever existed—remained *zemstvo*-less (*nezemskie*) until the fall of the Empire in February 1917. Therefore, no *zemstvo* tradition of counting reindeer existed, and the designers of the First Polar Census could at best use the experience that *zemstvo* statisticians had obtained in investigating other forms of animal husbandry in the central and southern parts of European Russia. This experience, however, still had to be adapted to reindeer herding.

The prominent transport and productive categories were one such adaptation. We suggest that this adaptation could have been done under the influence of the two people who were the most prominent specialists on reindeer herding and in general on the economy of indigenous northerners at that time: Vladimir Bogoraz and Sergei Kertselli. They believed that reindeer herding could be divided into two broad types: that of the tundra, where reindeer were kept mainly for their

²*Zemstvo* is the institution (or rather a set of institutions) of local self-government in the Russian Empire introduced by the so-called *Zemstvo Reform (Zemskaiia reforma)* of 1864.

products—meat, skins, blood, etc.—and that of the taiga, where reindeer were kept mainly for transportation (Kertselli 1921; Bogoraz-Tan 1933). These two types (Kertselli further subdivided the ‘productive’ type into ‘primitive’ and ‘market-oriented’ subtypes) required different policies from the state (Kertselli 1921: 12–13) and played different roles in the planned economic colonization (*khozaistvennoe osvoenie*) of the Arctic, while the transport-to-productive reindeer ratio offered a good indicator of whether the local reindeer herding systems belonged to one or the other type.³ Although the economic classification of reindeer herding into ‘transport’ and ‘productive’ types seemingly did not survive the destruction of Bogoraz’s school of Arctic Studies in the late 1930s (cf. Krupnik 1976), the basic division of domesticated reindeer into productive and transport categories, as well as the habit to calculate the transport-to-productive ratio as an indicator of ‘productivity’, survived throughout the Soviet period: in each statistical table, the column reporting totals were always followed by a separate column for draught animals (*iz nikh ezdo-vye*—‘of these, transport animals’). In March 1999, Habeck witnessed an expert from the Komi Ministry of Agriculture expressing criticism towards a certain reindeer-herding enterprise because its statistics featured far too many males and far too few females, allegedly leading to lower productivity (the late Soviet logic continued to be in place). The expert thus followed the logic of ‘magical numbers’ and implied that the local herders should do the same. The herders, however, replied that they knew better. Indeed, draught animals are of utmost importance in the daily operations of the herders and for relocating from one campsite to another, and thus for the entire system of mobile pastoralism.

Until the 1960s, the state itself had relied on reindeer transport (for postal services, geological expeditions, etc.). In the period from the 1930s until the 1960s, reindeer herders were hired to provide transportation of cargo by transport reindeer. In the 1960s and 1970s, when small airplanes (Antonov-2) and then helicopters were introduced, this use of reindeer as a form of state transport was no longer needed; reindeer herders became accustomed instead to helicopters delivering food right to the campsite and providing commuter transportation between campsite and town. The growing percentage of draught animals in the 1990s was mainly due

to the fact that neither the reindeer-herding enterprises nor the local administrations were able to afford the frequency of helicopter flights that had been typical in the late Soviet years.

Herd composition II: Age/sex ratio

The statistical categorization of reindeer based on age and sex had a more controversial history of formation. In the forms of the aforementioned First Polar Census, the categories of ‘transport’ and ‘productive’ reindeer were each further divided into ‘older than 3 years’ and ‘2 to 3 years old’ subcategories. Then, for each age group of adult (that is 2 years and older) reindeer, the number of females (*vazhenki*), uncastrated males (*byki-proizvoditeli*), and castrated males (*kholoshchennye*), as well as the group total, were reported. Finally, the total number of reindeer younger than 2 years (*molodniak*) was reported, and this category was further divided into ‘1 to 2 years old’ and ‘younger than 1 year’ categories (see an example of the form in Glavatskaia and Kliukina-Borovik 2013: 182–3). As one can see, the age-based and sex-based categorizations were completely separated, and only reindeer older than 2 years were categorized based on sex. It is difficult to say why this rather complicated categorization grid was adopted; perhaps, it reflected the pre-Soviet *zemstvo* tradition of counting other animals (cf. Anderson 2011b). In any case, this way of categorizing reindeer did not survive for long: probably already in the late 1930s, these categories were replaced in *kolkhoz* documents by categories that collapsed age and sex (which makes much more sense in reindeer herding) and reflected local folk taxonomies. Thus, in the European part of Russia and in Western Siberia, the age-sex categories first developed by Nenets and then adopted by other reindeer herding groups of the region were used. However, although the categories were the same, the terms used to refer to them differed between the groups. For example, Komi, the second largest group of reindeer herders in the region, use a terminology partly based on the traditional Nenets terms (re-articulated to suit the Komi language) and partly on Russian terms like *vazhenka* (‘female reindeer’), *byk* (‘bull’), and *telia* (‘calf’).

As collectivization of reindeer herding progressed eastwards, the need to develop a unified categorization and terminology emerged. Such a categorization was developed in the late 1940s and early 1950s, perhaps on the basis of the already described Nenets categories. Indeed, its categories coincide with those traditionally used by reindeer herders of north-eastern Europe/Western Siberia (and differ from those used in central and/or north-eastern Siberia) even though the names of these categories are Russian. These names, with one exception (the term *tretiak*, from the root *tri*—‘three’), have been adopted from the Russian terminology used to describe

³Furthermore, in his overview of the reindeer-herding data collected during the census, Vladimir Bogoraz criticized the failure of the census workers to follow his recommendation to divide the ‘transport’ category further into ‘harness reindeer’ (those used in sledges) and riding/pack animals (Bogoraz-Tan 1932: 36), because when economic and cultural work relied on reindeer transport, information about the presence and number of reindeer of each type in a given locality had great practical significance.

Table 1 Categories of reindeer, their terminologies, and recommended herd composition (sources: Habeck 2005: 102; Laptander 2010; various archival materials)

Category	Original Nenets term	Komi term	'Official' (Soviet Russian) term	Recommended composition (in per cent), Komi Republic
Females, over 3 years old	<i>iakhadei</i>	<i>vazhenka</i>	<i>vazhenka</i>	49
Females, 2½ years old	<i>syrei</i>	<i>syritsa/syrycha</i>	<i>netel'</i>	11
Females, 1½ years old	<i>nialoko-syrei</i>	<i>nialuku-vazhenka</i>	<i>tëlka</i>	5
Female calves, ½ year old	<i>iakhadei suiu</i>	<i>telia-vazhenka</i>	<i>telënok-vazhenka</i>	14
Uncastrated males, over 3 years old	<i>khora</i>	<i>khora</i>	<i>byk-proizvoditel'</i>	2
Castrated males, over 3 years old	<i>khabt</i>	<i>byk</i>	<i>iezdovoi byk</i>	9
Males, 2½ years old	<i>namna/namnako</i>	<i>namniuku</i>	<i>tretiak</i>	(Subsumed under 'khora' and 'khabt')
Males, 1½ years old	<i>nialoko-khora</i>	<i>nialuku-khora</i>	<i>bychok</i>	3
Male calves, ½ year old	<i>khora suiu</i>	<i>telia-khora</i>	<i>telënok</i>	7

age/sex categories of cattle (notwithstanding the differences in this branch of animal husbandry). Interestingly, the resulting terminology (in contrast to the categorization itself) differed from any vernacular, including that traditionally used by Russian reindeer herders of the Mezen' and Pustozersk areas and of the Kola Peninsula. We suggest that this re-naming was a strategic decision that helped to make this categorization the 'official' one throughout the Russian Arctic and to force it on people whose traditional reindeer categories were quite different.

Table 1 summarizes the categories and provides three terminologies: the original Nenets terms, the Komi terms, and the 'official' terms. It also gives the recommended percentage of each category in a *kolkhoz/sovkhov* herd (for Komi reindeer-herding enterprises).

Even after the 'official' categorization and terminology was introduced, however, the vernacular terms did not completely disappear from statistics and official documents. Thus, in the western part of Russia, the 'official' terminology has been most consistently used in the statistics and documents of the Murmansk Region. In the Komi Republic and the Nenets Autonomous Okrug, Komi terminology has always been used along with the official terms,⁴ while in the Yamal-Nenets Autonomous Okrug, Nenets terminology has been occasionally used. Apart from that, since the 1950s, the notation of primary reindeer counts gradually became standardized throughout the Russian Arctic: rows in the spreadsheet represented owners, categories of ownership, and/or geographic regions (e.g. district, province, etc.), while

⁴Furthermore, in the Nenets Autonomous Okrug, Komi terminology is consistently used in modern official forms approved by the local government (see Departament prirodnykh resursov, ekologii i agropromyshlennogo kompleksa Nenetskogo avtonomnogo okruga 2019: App. 1 and App. 3).

columns represented the age-sex categories described above, followed by columns labelled 'total' and 'of these, transport animals'.

Thus, Russian statistics differentiated between nine age/sex categories of reindeer and two ('transport' vs. 'productive') functional categories. Note that while the age/sex categorization was indeed quite exhaustive—it represented a rather rare instance when the categories of official statistics and therefore the state matched those of at least part of its citizens—the functional categorization was not. Of course, functions of reindeer in reindeer herding economies are not limited to meat production, reproduction, and transport: there are many other functional classes of reindeer to which the official statistics remained blind. This sometimes led to interesting consequences, which are quite informative about the impact of the rather arbitrary choice of method for collecting statistical information. Here, we will briefly describe just one of these consequences, the campaign against *menorui/menurei*, which, in our opinion, is particularly telling.

The two classes of categories ('age/sex' and 'functional') are somehow linked together by the category of castrated males: the very act of castration is related to assigning to them a particular function. Judging by the statistical categories described above, there are only two functions reindeer can perform: (re-)productive and transport. Since, by definition, castrated males cannot play any role in reproduction, all of them should perform the transport function. This understanding is portrayed by the very term *ezdovoi* (from Russian *ezdit'*—to drive, to travel) used for the category in the official terminology. Therefore, from the viewpoint of the described categories, any deviation between the number of castrated males and the number of transport reindeer is potentially anomalous. Indeed, Soviet administrators

were quite suspicious about such deviations, which, in their opinion, pointed to ineffective herd management.

To be sure, situations in which the number of transport reindeer exceeded the number of castrated reindeer were anomalous, but still tolerable (for example, mature infertile females could logically be used as transport reindeer,⁵ although the very existence of such females betrayed a management mistake: ideally they should have been slaughtered before maturity). However, the opposite situation—in which the number of castrated males exceeded the number of transport reindeer—was not tolerable at all. Indeed, it meant that some reindeer played neither a (re-)productive nor a transport role in the herd and, therefore, represented an inexplicable waste of fodder and effort. Certainly, they should be eliminated as soon as possible.

But in fact, castrated males could play a range of other roles in reindeer herding beyond transportation. One of the most important roles is digging feeding holes for female reindeer in winter. To contextualize this, it should be noted that female reindeer have antlers in winter when males do not and are therefore dominant over males in this period.⁶ They often use this position to displace males from their feeding holes, so that the males end up digging feeding holes not only for themselves but also partly for the females. This makes perfect sense from a biological point of view, because females are pregnant in winter and displacing males from feeding holes enables them to get additional forage without expending additional effort. The negative result of this, however, is that males kept with females during winter end up being weaker and more exhausted by the spring in comparison with those kept separately. This represents a particular problem in the case of transport males, who have to work hard during the spring migration. Therefore, many groups of reindeer herders keep transport males separate from the main herd in winter.⁷ But, they also traditionally had a special category of reindeer called *menorui/menurei*, who were castrated (so they would not lose their weight and power during the rut and would enter the winter period in the best condition) but were never used for transport and were always kept

in the main herd. Usually, the biggest, heaviest, and most powerful males in the herd were selected to become *menorui*. They could dig through hard snow impenetrable for most female reindeer, thus enabling reindeer herders to use pasturelands that could not otherwise be used due to snow conditions. Even if the snow conditions were favourable, the presence of *menorui* improved sometimes quite significantly the spring condition of female reindeer and increased the rate of calf survival.

Nevertheless, *menorui* did not fit the logic of official categorization, and the Soviet officials opened a campaign against them, which lasted throughout the whole *kolkhoz/sovkhoz* period. *Menorui* were classified as *lodyri* (idlers) and *darmonoedy* (spongers) and zootechnicians were instructed to have them slaughtered if they were to be found in collective herds. Interestingly, this campaign cannot be explained by the lack of knowledge about the functions of *menorui* on the part of Soviet officials, as both reindeer herders and some scholars (e.g. Alexander Yuzhakov, pers. comm.) sometimes suggest. Both the literature of the Soviet period (e.g. Druri and Mitiushev 1963) and the way the campaign against *menorui* was actually framed suggest that Soviet agricultural specialists did understand the role of this type of reindeer. Still, they argued that good reindeer herders (who know their land and its climate, spend sufficient time studying the snow conditions of their winter pasturelands, and take care of pastureland rotation) could feed their herds and achieve good survival of calves without raising slackers and spongers in their herds. Furthermore, the use of *menorui* was referred to as *kulak* (upper-class) behaviour, which hard-working reindeer herders should not be guilty of.⁸ In other words, the reason for the campaign against *menorui* was that these reindeer did not fit the officials' ideological image of a good reindeer herding operation, rather than the officials' genuine lack of knowledge. The a priori assumptions through which the officials saw the function of reindeer in the herd was, it seems, the main reason for this lack of fit.

Above, we argued that there were strong incentives to 'massage' the statistics of different categories of reindeer ownership. As to the age/sex and functional statistics, manipulation was perhaps less of an issue, since a degree of variability from year to year could be expected. However, there were two incentives to meddle with the age/sex numbers: first, because reindeer-herding enterprises were given awards when they met high productivity numbers, and second, while living at their campsites,

⁵In Nenets and Komi folk categorizations, such infertile female reindeer used for transport make up a special category called *khaptorka/khaptorka*, a female reindeer which is comparable to a male castrated reindeer *khapt/khapt* and which can be trained and used as a draught animal (Laptander 2010).

⁶In a reindeer herd, an animal with bigger antlers always dominates over an individual with smaller or no antlers (Baskin 1968, 1970). Both males and females have antlers, but they grow and drop them at different times: males drop antlers after the rut in autumn and start to grow them again in spring; females, on the other hand, drop their antlers after calving in spring and start to grow them again in autumn.

⁷Most Komi and some Nenets herders go even further and maintain a separate transport herd during the whole year.

⁸Interestingly, this claim was correct: in the pre-Soviet and early Soviet times, the number of *menorui* in the herd indeed seemed to depend on the size of the herd, and poor reindeer herders indeed did not have any. However, poor reindeer herders, so it would seem, did not have *menorui* because they were poor, not because they were hard working and did not need any.

reindeer herders and their team members consumed meat themselves. The enterprises permitted their employees (the herders) to slaughter a certain number of reindeer for ‘collective nutrition’ (*obshchepit*); yet, beyond that, there was considerable creativity in counting dead reindeer: these may have died from disease (*padëzh*) or predators (*travëzh*) or may have vanished for some unknown reason, the latter appearing in the statistics as ‘losses’ (*poteri*). Informal slaughter could be explained away statistically by using these categories, notably the third one. It was public wisdom in the tundra that reindeer in state-farm or collective-farm ownership were significantly more susceptible to this kind of loss than the private-in-the-collective reindeer mentioned above (Konstantinov 2002: 178). Again, bosses and officials knew what was going on but had to turn a blind eye to informal practices, because they were at least as dependent on the herders as the herders were on them. How these relations have changed practically and statistically is a question to be discussed below.

Spatial aspects of reindeer herding statistics

One particular problem to keep in mind when interpreting Russian reindeer herding statistics is administrative borders. Russian statistics have been mostly collected and reported per administrative units—with two notable albeit short-lived exceptions: during the early period (up to the late 1920s) when statistics were reported per historical areas, and during a short period in the 1950s when they were reported, at least at the provincial level, per so-called *kolkhoz-sovkhoz* directorates (*kolkhozno-sovkhoznye upravleniia*). Unfortunately, administrative borders changed quite frequently, particularly in the first half of the Soviet period, and these changes may affect the interpretation of statistics. Several examples from the European part of Russia and Western Siberia demonstrate their significance.

The five administrative units making up this region were all established by 1930: Murmansk Okrug (Murmansk Oblast after 1938), Nenets Autonomous (National) Okrug, Autonomous Oblast of Komi-Zyrians (Komi ASSR after 1936), Yamal-Nenets Autonomous (National) Okrug, and Khanty-Mansi Autonomous (National) Okrug. Reindeer herding statistics dating back to that point are available for each of these administrative areas, although they can be fragmentary until the early 1950s. However, the administrative borders of most of these areas have changed several times, and this has seriously distorted the regional statistics. For example, the struggle against tundra *kulaki* (wealthy reindeer owners) in the 1930s, as well as the early experiments with collectivization in that period, caused a significant drop in reindeer numbers in the Yamal-Nenets National Okrug by the end of the decade. In the Okrug statistics,

however, this drop is masked by the transfer of the Shuryshkar District, an important centre of reindeer herding at the time, from the Khanty-Mansi to the Yamal Nenets National Okrug in 1937. With this district, the Yamal-Nenets National Okrug obtained a significant number of reindeer, which made the loss of reindeer due to the state policy almost invisible. On the other hand, the same transfer produced a significant drop in reindeer numbers in the Khanty-Mansi National Okrug, which is often believed to be a consequence of political repressions against the local indigenous people. This is one of the factors that explain why the repressions of the 1930s feature more prominently in the narratives of Khanty and Mansi activists in comparison with Nenets and Komi ones, even though the repressions probably affected all four groups more or less equally. Another significant change of borders of the Yamal-Nenets National Okrug occurred in 1944, when the newly organized Krasnosel'kupskii District (*raion*) was transferred to the Okrug from the adjacent Krasnoïarsk Region. This also caused an increase in reindeer numbers, which looks particularly strange (for a person unaware of the border change) because it happened in the middle of the war. On the European side of the Urals, one should be aware of the transfer of present-day Vorkuta District from the Nenets National Okrug to the Komi Republic in 1940. This transfer also led to rather rich reindeer-herding enterprises and a number of private reindeer herders ending up south of the border (in Komi). The transfer of Kandalaksha District (1936) and a part of Finnish Lapland (after 1945) to the Murmansk Region had a much smaller effect on reindeer statistics. Still, there was an effect, and researchers should be aware of it.

After 1950, the borders of the high-level administrative units (the *okrug*, the Murmansk Region and the Komi Republic) did not experience significant changes. The same, however, cannot be said about the low-level units (*raiony*, ‘districts’), which changed rapidly, significantly, and in various ways. Furthermore, reindeer-herding enterprises, if they had seasonal pastures in different districts or regions, could sometimes be ‘transferred’ from one district to another (and sometimes even from one region to another) for economic or administrative reasons, without any change of the border (see discussion in Klokov 2020). This also changed the distribution of animals across districts as it was presented in the statistics, even though the ‘physical’ distribution of animals remained the same. It is not possible to describe all these changes here. We can only advise anyone who wishes to work with Soviet reindeer herding statistics at the regional level to study the territorial history first.

What also comes to the fore in reindeer statistics from Soviet and post-Soviet times is a gradual spatial and organizational concentration of reindeer. To be sure, this

is in line with worldwide trends in agriculture: the numbers of employers and employees are shrinking; fewer individuals are needed to maintain the same, or even a higher, degree of productivity. However, there is a specific relevance of statistics in making this happen, at least for the Soviet period. First, we need to point out the key difference between 1991 (the last Soviet year) and 1960 and then discuss the use of statistics in strategies of planning. In 1991, reindeer herding in the Komi Republic was under the responsibility of eight enterprises. By contrast, for 1960, statistics in the archives of the Komi Republic feature approximately 70 enterprises owning reindeer. Not only were small collective farms merged into larger ones and subsequently into state farms between 1960 and 1991, it is also apparent that enterprises ‘got rid’ of their reindeer in order to focus on their designated functions (e.g. cattle breeding or fishery). According to this logic, if a fishery collective (*rybolovetskaia artel*’, see above) is meant to focus on fishing, why should it own reindeer? The mergers and the growing degree of specialization of enterprises do not fully explain the spatial contraction of the reindeer-herding area from the 1960s to the 1990s; additional reasons include the idea that reindeer husbandry is most efficient in tundra areas and less efficient in southern regions, and the expansion of extractive industries and the transfer of erstwhile reindeer pastures to industrial purposes (e.g. Habeck 2005: 94). Altogether, this coincided with a certain administrative pressure on people and enterprises in some areas to give up reindeer herding completely. Here is where statistics come in. If reindeer numbers were already low (and if productivity indicators were low in particular), the authorities could make use of the statistics to argue for the reduction and discontinuation of reindeer husbandry in the respective region. In short, such a strategy may be called a self-fulfilling prophecy.

‘Magical numbers’ of Soviet/Russian reindeer herding

As we stated in our introduction, we use the term ‘magical number’ to designate a statistical variable used by a decision-maker to assess quantitatively some qualitative phenomenon which either cannot be quantitatively assessed at all or cannot be reduced to an isolated quantitative parameter. ‘Magical numbers’ are never completely arbitrary, but their relation to the qualitative phenomena they are expected to assess is by no means direct. Furthermore, it can be argued that once some variable achieves the status of a ‘magical number’ representing some qualitative phenomenon, its relation to that phenomenon becomes even more indirect because those who are dependent on the assessment have an incentive to ‘improve’ the ‘magical number’ independently of—and sometimes at the expense of—the assessed phenomenon (see Porter 1996, 43–5 for an extended

discussion of this). For example, an academic who is assessed by the quantity of publications will be strongly motivated to increase the number of publications even if this does not facilitate or even hinders his/her overall scientific progress.

In Soviet reindeer herding, two principal ‘magical numbers’ were used to assess the overall state of reindeer herding in a region or in an enterprise: the quality of work performed by the herders and the quality of management. The first and most important of these was ‘the productive output of calves per 100 January females’ (*delovoi vykhod teliat na 100 ianvarskikh vazhenok*), usually shortened to ‘the productive output of calves’ (*delovoi vykhod teliat*, or DVT). This number was expressed as a percentage of the number of calves born and surviving until the autumn count, in relation to the number of females reported in the previous count (that is, a year earlier). DVT shows how closely the herd approaches the ideal state where all females give birth to calves and all of these calves survive. It can be argued that DVT is in some sense an indicator of the economic productivity of the herd, particularly when calves represent a majority of reindeer slaughtered (as is the case in many reindeer-herding systems). However, it would be rather the calves’ quality (weight, quality of skins) and not only their quantity that matters, and in any case, the quantity or price of the meat per herd size would be a much better indicator. The consistent use of DVT to assess the progress in reindeer herding was based on deeper insights held by early Soviet agricultural specialists, who suggested that a mature reindeer, being a rather recently domesticated animal, does not depend much on human assistance for feeding and survival. Therefore, the rate of survival and even the condition (weight, exterior traits) of mature reindeer represent a relatively poor indicator of the reindeer-herding effort. What does depend on this effort is the survival rate, both pre-natal and post-natal, of reindeer calves, which is relatively low in the wild, but can be increased significantly as a result of reindeer herders’ attention and skills (Druri and Mitiushhev 1963). In other words, DVT was used for assessing reindeer herding work because it was believed to represent the aspect of reindeer herding for which this work mattered most.

It was certainly up to the reindeer biologists to decide whether this logic made sense. Importantly for our purposes, however, the use of DVT turned Soviet and, in many respects, post-Soviet reindeer herding into a long quest to maximize this indicator. One immediate consequence of this was the strongly negative attitude of Soviet and post-Soviet zootechnicians towards infertile reindeer females. It often was enough for a reindeer female to miss just 1 year of pregnancy to be scheduled for a slaughter; females who no longer became pregnant

after their fourth year of life were also slaughtered. It was also common to schedule for slaughtering those females who abandoned their calves after giving birth. Indeed, since it was not the number of calves per se but their ratio to females that really mattered, decreasing the number of prospective birth-givers was rational, despite the fact that this obviously could result in decreased herd productivity. Another aspect of the DVT maximization was the fight against *khaptorka*, infertile females used for transportation. From the viewpoint of DVT maximization logic, every infertile reindeer female should be dead as soon as possible. This explains why almost all *khaptorka* that existed in Soviet-era reindeer herding were personal reindeer, that is, reindeer belonging to herders rather than enterprises.

Another aspect of the DVT maximization was the continuing ‘fight for calves’ (*bitva za teliat*), which sometimes took rather grotesque forms. Older informants said that in the 1950s and 1960s, it was common to catch straggling calves during herd migration and carry them on sledges, which, given the length of the migrations of some reindeer herding groups, placed tremendous extra pressure on transport reindeer. In other words, the lives of calves were exchanged for the lives of transport reindeer—an exchange which makes no sense except in the framework of the DVT maximization logic. The herders were constantly told that they should ‘fight for every calf’. Furthermore, those *sovkhos* teams (*brigada*) achieving DVT of 75% or higher were awarded with bonuses. It was only in the 1970s that another ‘magical number’, ‘preservation of reindeer headcount’ (*sokhrannost’ pogolov’ia*, or SP), was introduced. SP represents the percentage of mature reindeer in 1 year relative to the previous year’s headcount. In other words, it shows the percentage of mature reindeer that survived in a given year. Although the consistent application of SP could probably offset the negative consequences of DVT fetishism, this in fact did not happen until the end of the Soviet period. The reason was that the administration always considered DVT first and SP second. For example, although a low SP could be used as an argument against giving bonuses to a herding team with a high DVT, a high SP by itself was not rewarded if the DVT was average, nor did it increase the reward if the DVT was high.

Finally, the purely productive statistics—the amount of reindeer herding products produced and their price—never played a significant role in Soviet reindeer herding. What mattered was fulfilling the productive plan: it was more common for the statistics to indicate the extent to which the plan was fulfilled (which often exceeded 100%) rather than specifying the amount of meat and skins produced. Of course, productive statistics could be calculated on the basis of these percentages, but the

exact plan quotas one would need in order to do this usually cannot be found in the statistical documents. A researcher interested in doing this should consult the documents of the State Planning Committee of the USSR (*Gosplan*), where these quotas are available.

From the reindeer-counting chamber to the Department of Statistics: The procedure for counting and compiling data

If one does not consider the rather chaotic first Russian agricultural census⁹ of 1916 and the even more chaotic second agricultural census¹⁰ of 1917, the first attempt to systematically collect reindeer herding statistics for the whole country was the aforementioned First Polar Census of 1926–1927. As mentioned above, many basic categories and principles still used in Russian reindeer herding statistics today originate from this census. In a manner similar to the pre-Soviet *zemstvo* statistical counts (Anderson 2011b), the census was organized on the principle of personal witness: just as *zemstvo* statisticians (*zemskie statistiki*) did before them, specially trained census-takers were supposed to travel through the tundra from one household to another, writing down the number of the members of each household, the full range of their economic occupations, their economic relations to other households and the market, and the types and amount of property the household had, including, of course, the number and categories of reindeer. The census-takers were prohibited from writing down information about any one household without visiting it: they were not to rely on the words of the members of this or, even worse, another household. They also were advised to check the information supplied by the members of a household with their own observation whenever possible. It is, of course, difficult to say how much these principles were applied in practice. It is difficult to deny, however, that the statistics provided by the census were much more detailed and reliable than the statistics collected by the local administrations in the pre-Soviet period.

One of the things the census-takers of the First Polar Census were expected to do was to teach the local Soviet officials, such as the representatives of the indigenous and rural councils (*tuzsovet* and *sel’sovet*), executive

⁹Carried out in the middle of the First World War by the administration of a state in deep ideological and political crisis, this census was underfinanced and understaffed. It reached only a relatively small number of reindeer herders. Furthermore, some northern areas were deliberately excluded from the census.

¹⁰The primary aim of this census, which was carried out by the so-called Interim Government of Russia soon after the fall of the Czarist regime was to assist in planning the general land reform and organize war-time supplies. Although in many respects it was more informative than the first census (Ostrovskii 1982), it paid even less attention to reindeer herders.

committees (*ispolkom*), etc., to collect statistical information and submit it to the regional committees of statistics. Indeed, the First Polar Census was the last census of agricultural animals in the history of the Soviet Union. It was only in 2006 that the next agricultural census covering, among other spheres, reindeer herding was performed—and that was already in post-Soviet Russia. Meanwhile, from 1927 to the mass collectivization of the early 1930s, the local administrations were responsible for collecting and providing statistics (in order to do that, some of them employed a staff statistician or counter already in the 1930s). The methods the local administrations used for collecting statistics are difficult to reconstruct (most of them did not disclose these methods in their reports), and in many cases, the statistics they provided were full of lacunae and inconsistencies. What was even worse, the forms and categories they used varied: some continued to use the categories and even the forms of the First Polar Census, while others relied on the folk categories and terminologies. Therefore, the reindeer herding statistics of the 1930s and early 1940s in most regions of the Soviet North are messy and rather difficult to work with.

As collectivization of reindeer herding progressed, reindeer herding statistics were increasingly collected through the reindeer-herding enterprises: collective farms (*kolkhozy*) and, later, state farms (*sovkhozy*). This signified a serious change. First, as stated above, the statistical categories were gradually standardized. Second, a regular schedule of reindeer counting was introduced. The enterprises counted their animals once or twice per year. The autumn count took place everywhere several weeks before the slaughter, which was done once the temperature fell to approx. -15°C so that the reindeer carcasses would freeze. In northern European Russia and north-western Siberia, this usually happened in November (for reasons not completely clear, the slaughter everywhere slowly moved later, from November to December and, in the post-Soviet period, even to January). The autumn counting happened in October, after the rut. The autumn counting commonly took place in a specially constructed corral (in the early *kolkhoz* years, temporary corrals made of fishing nets and canvas were often used, but by the late 1960s, they were almost everywhere replaced by permanent wooden corrals). At the corral, reindeer were not only counted but also vaccinated, and the animals selected for future slaughter were separated into a special herd.

During most of the post-WWII period, the usual form of reporting statistics was the ‘number by the first of January’. Possibly introduced with the intention of bringing reindeer herding statistics in line with statistics on other agricultural animals, this principle, in the case of reindeer herding, meant the number remaining after slaughter. In practice, this was almost everywhere

equivalent to the results of the autumn count minus the slaughter herd (the number of slaughtered reindeer, separated into calves and adults, was reported separately together with the DVT and only for the collective reindeer). In other words, the ‘number by the first of January’ represented a certain projection into the future, which is particularly visible from the fact that this number was usually submitted in late December, together with the results of the recent slaughter. The officials clearly recognized this fact and, in the early 1950s, there was an attempt to replace the somewhat hypothetical ‘first of January’ statistics with ‘first of October’ statistics—that is, the results of the autumn count proper. This experiment, however, lasted only a few years, probably because it created too much potential for manipulation of slaughter numbers.

Besides the autumn counting, many *kolkhoz* and *sovkhos* enterprises had summer reindeer counts, which usually took place in late June or early July, 1 to 2 months after the calving. In the western part of Russia, summer counting was common in those enterprises whose administrations were situated in settlements on the Arctic seashore. In these cases, the summer counting took place near the settlements and represented a chance for the administration to control the counting personally, which they often could not do at the autumn counting. By contrast, for enterprises with centres situated near slaughtering grounds and winter pastures, organizing the summer counting required building a corral far away in the deep tundra, which could be so difficult and expensive that even in the late Soviet period, many such enterprises skipped the proper counting and instead required oral reports from teams leaders about the number of calves born. It should be stressed that during both the summer and autumn counts, not only collective but also personal reindeer belonging to the members of the herding teams were counted.

The usual procedure for corral counting, which has not changed since the Soviet period, involves driving the herd into the corral through a ‘funnel’ made of two converging fences ending at the corral gate. The funnel guides the animals into a preparation chamber, from which small groups of animals are taken, often through a system of interlinked chambers, to the working chamber (*rabochnaia kamera*), where they are inspected and vaccinated, calves are earmarked, and from which reindeer for slaughter are diverted into a special side chamber. Then, one of the reindeer herders, often the head of the herding team, takes position at the outer gate and starts to release the animals from the working chamber one by one. In many places, this herder also announces loudly the category to which the animal belongs and, if the animal is a personal reindeer, the name of its owner.

Just above this gate, outside the working chamber, is a cabin for counters. This cabin, or ‘deckhouse’ (*rubka*), hosts representatives from the enterprise’s headquarters (*kontora*) responsible for writing down the count and supervising the whole process. The number of people in the deckhouse varies from region to region (and often from enterprise to enterprise). The main zootechnician of the enterprise is, however, always present, usually accompanied by a bookkeeper who fills out the counting tables. Besides them, if the counting takes place not far from the settlement, the statistician of the local administration (the former *ispolkom*) may be present, as well as other enterprise managers, including the director him/herself. Finally, in some places, it is common to invite a representative of the herders into the deckhouse: this representative either fulfils the function of calling out the categories and the owners of the animals as they exit the working chamber, or repeats the information called out by the herder at the gate if the counters did not hear it correctly. The representative also takes part in settling possible disputes and answering questions. In theory, the people in the deckhouse can see the released animals much better than the man at the gate, and they are supposed to independently verify the information. In practice, however, many of the deckhouse people (sometimes all of them) do not know the personal earmarks. Many of them cannot even differentiate between classes of reindeer, such as 2-year-olds versus 3-year-olds. Therefore, they have to rely on the man at the gate and the herder present in the deckhouse. After all the reindeer in the main herd are counted, the animals in the slaughter herd are counted in the same manner.

The results of the counting are put into a table that makes up a document called the ‘counting certificate’ (*akt proshchëta*), which is signed by the people present in the deckhouse and by the head of the herding team. For each team, a separate counting certificate is prepared. The certificates are kept by the enterprise bookkeeper, with copies to the administration statistician. Theoretically, the bookkeeper and the statistician should use the certificates to independently calculate the totals for the enterprise and its workers and submit those separately to the provincial department (or ministry) of agriculture and to the district and provincial statistical committees, respectively. In practice, particularly in small settlements, they often collaborate on this work. Above their level, however, the information remains separated in these two channels.

This counting procedure produced most of the reindeer herding statistics in the Soviet period, and it continues in those regions of Russia where enterprises (former *sovkhosy*) remain the main organizational form of reindeer herding. It should be noted, however, that even in the Soviet period, there was a certain number of

mostly personal (*lichnye*, see above) reindeer that were not kept together with *sovkhos* animals and, therefore, never entered *sovkhos* corrals. Although private reindeer herders officially ceased to exist from the early 1960s to the early 1990s,¹¹ there still were groups—most notably retired persons, *sovkhos* fishermen, and *sovkhos* hunters—who lived separately from the *sovkhos* herding teams with their personal reindeer.¹² Counting their reindeer was still the responsibility of the local administration’s executive committee (*ispolkom*), most notably of the *ispolkom* statistician. Alexander Yuzhakov (2020 and pers. comm.) has reported that, in order to count their reindeer, special expeditions consisting of the statistician, the *sovkhos* zootechnician, the local veterinarian (who was responsible for vaccinations and some other activities), and sometimes a policeman were organized in the late 1980s. The owners were asked to collect their reindeer and put them into a temporary corral made of sledges and a rope (since the number of reindeer they owned was usually small, such a corral was enough). The reindeer were examined, vaccinated, and counted, and a special counting certificate was compiled and signed by all the people present. This was the usual procedure, but even during the Soviet period, if an owner lived far away from the settlement, his or her reindeer were not physically counted, and the number that was written down was whatever the owner reported. Laptander collected stories from the Yamal reindeer herders which prove that the non-reporting (or hiding) of personal reindeer was not uncommon in the tundra.¹³

After the collapse of the Soviet Union, the *sovkhos* reindeer counting fell out of use, particularly in the Yamal Nenets Okrug, as the number of private herders gradually increased and their reindeer started to dominate the statistics by the late 1990s. Traditionally, the

¹¹This does not mean they did not exist in fact. For example, in the eastern part of Bolshezemel’skaia tundra, a small group of private reindeer herders existed throughout the whole Soviet period and survived until the fall of the regime. Their existence, however, was denied, and they were not reflected in the statistics.

¹²Alexander Yuzhakov (pers. comm. with Istomin) said that in the Yamal Nenets Autonomous Okrug, these groups of independent herders were referred to as *lichniki* (‘personals’), while the private herders proper were called *chastniki* (‘private traders’). In other words, at least in Yamal, these two words meant different things.

¹³Writing about Soviet rule in the Far North, many historians and anthropologists mentioned that tundra and taiga dwellers’ encounters with Party officials and bureaucrats created fear and—at times—open resistance (e.g. Forsyth 1992; Laptander 2020; Slezkine 1994). This also affected the relations between reindeer herders and official stock-takers. Particularly in the 1930s and 1940s, reindeer herders underwent considerable hardship trying to maintain their livelihood *despite* the authorities’ attempts to ‘achieve’ plans and output numbers. By the late 1970s, however, such fears waned: reindeer herders, managers, and stock-takers had worked out semi-formal mechanisms of mutual co-existence, and the category of ‘private-in-the-collective reindeer’ was exactly one of these (Konstantinov 2015; Konstantinov et al. 2018).

local administrations (the erstwhile *ispolkom*) were responsible for collecting statistical information on private reindeer. However, since the early 1990s, these administrations had neither personnel nor funds to make counting expeditions: each had only one statistician, who would have been unable to visit all the private households of the area even if provided sufficient means of transportation and equipment. Therefore, it was common for the statisticians to collect information orally, sometimes even indirectly through neighbours and informal local leaders.

Obviously, such information could not be entirely correct, but it was only after the results of the agricultural censuses of 2006 and 2016 were published that we could see *how* incorrect it was. The re-establishment of the agricultural census was an attempt by the Russian government to get a new source of reliable agricultural statistics to replace the data collected through the erstwhile collective and state farms. In the North, the agricultural census follows the methods of the Polar Census, that is, census-takers personally visit the nomadic households and count their belongings if they can. Of course, numerous deviations from the eyewitness method occur in practice. Particularly in the case of reindeer herding, it is probably rather difficult to visually assess the size of a herd. Still, the results of the agricultural census are believed to be more reliable than the numbers reported by local administrations. The census of 2016 indicated the total number of reindeer in the Yamal Nenets Autonomous Okrug to be approx. 700,000, in stark contrast to the number of 500,000 reported by the administrative statistics.

In order to improve the quality of the statistics, the government of the Yamal Nenets Autonomous Okrug recently transferred responsibility for counting private reindeer from the local administrations to the local veterinary service (Yuzhakov 2020). Private reindeer herders depend on selling reindeer meat. Especially after the anthrax outbreak in 2016 in Yamal, it is difficult (legally impossible) to sell meat without a veterinary certificate, which, in turn, can be obtained only if one's herd is vaccinated. Consequently, the herders do vaccinate their herds. This means that one can assess the number of mature reindeer (but not calves, which are not vaccinated) by the number of vaccine doses spent. The veterinary counting, it seems, tends to be more accurate than estimations made by the administrations, at least as far as the total number of reindeer is concerned. On the downside, the veterinary service, despite requests from the Okrug administrations, still does not collect accurate information on categories of reindeer.

Conclusion

As one can see from our discussion, Soviet/Russian reindeer herding statistics, as with any other statistics, were

subjected to a complex bundle of factors that point to their social and political construction. These factors are of two principal sorts.

First, there is a distortion resulting from the imperfect process of collecting the data. As our analysis demonstrates, this distortion most likely was particularly large in the early Soviet and, at least in some areas, in the post-Soviet period. In the former case, this was due to the objective difficulties of collecting information in the remote and barely accessible areas where reindeer herding was mostly practised; it was also due to the absence of specialized institutions and qualified personnel to collect statistics on a regular basis. In the latter case, this was due to the collapse of the existing data-collecting mechanisms based on state farms and to the underfinancing of statistical work in general. It seems that the post-WWII Soviet statistics have the minimum distortion of this sort. Besides the distortion due to the imperfect mechanisms of data collecting, there is distortion due to the deliberate massaging of this data. Again, this massaging existed throughout the Soviet and post-Soviet periods, but in different spheres and at different scales. Thus, in the Soviet period, the part of the statistics most likely to be massaged was the number of personal reindeer (that is, reindeer belonging to the individual herders working for the enterprise), private reindeer (their existence as well as the existence of private herders was denied), and the structure of reindeer losses. Herders systematically underreported the numbers of personal reindeer as well as reindeer killed for their own consumption. In post-Soviet Russia, it may now be useful for reindeer-herding enterprises to inflate the number of animals, because state subsidies paid to them are calculated per head of reindeer. Unfortunately, we know very little about how widespread this massaging was, nor do we know its scale in different periods. One important research project touching upon this question was carried out by Yulian Konstantinov (2015) in the Murmansk Region. This research suggests that both the scale of massaging and its spread increased throughout the Soviet period and reached unprecedented levels in the post-Soviet period.¹⁴ However, it is still unclear if the same trend can be discerned in other parts of Russia as well.

Second, a wider set of factors affecting Soviet/Russian reindeer herding statistics stems from the fact that, as has been argued by Best (2001, 2004, 2008b) and explained in the introduction to this article, all statistics are socially constructed in the sense that they are based on a set of a priori assumptions, which by themselves are not a product of empirical observations. Furthermore,

¹⁴In a different work (Konstantinov et al. 2018), it is claimed that the current official number of reindeer Murmansk Region may exceed their real number by almost two times.

in the case of Soviet/Russian official statistics, most of these choices reflected the tendency of any state—particularly a high modernist state like the USSR—to actively simplify reality by structuring it in accordance with a limited set of rules (Scott 1998). Thus, the reindeer herding statistics were constructed into categories which simplified reality; they were based on administrative divisions that changed over time; they contained certain conventions which never captured the actual practice (e.g. the ‘number of reindeer by first of January’), and they stressed data which made sense only in the framework of certain, sometimes outdated theories (e.g. the careful ‘extra reporting’ of transport reindeer). To put it simply, the official statistics reflected the world as the state saw it (Scott 1998). It was quite obvious to the state itself that its view did not completely correspond to the world as it was ‘out there’, and like any high modernist state, it systematically made attempts to change this world in such a way as to improve that correspondence (e.g. the campaign against *menorui* animals). Nevertheless, full correspondence was never achieved.

In order to interpret the official statistics properly, it is necessary to take into account these two sets of factors. Moreover, any researcher wishing to understand changing management strategies in Soviet/Russian reindeer herding is advised to keep in mind that the official statistics were not only a reflection of the world of reindeer herders for the state; they also confronted the reindeer herders themselves with a set of ‘magical numbers’ (Best 2004). Despite being somewhat irrational (which is quite common for magical things anyway), these numbers were an important, at times even the most important, factor affecting management decisions, which resulted in a certain size and structure of reindeer herds.

In order to further analyse the social construction of reindeer herding statistics, it could be fruitful to compare Russian/Soviet official statistics to that of Finland and Scandinavian countries (e.g. for Norway Johnsen and Benjaminsen 2017; Marin et al. 2020). Such a comparison could inform us to what extent the situation in Russia is unique and how much the experience of socialism influenced the statistical work in this field. We suggest that such a comparison is the most promising avenue for further research.

Authors' contributions

All three authors participated in the conceptual outline, compilation of literature and data, the writing process, and the revisions made to account for the valuable comments of two anonymous reviewers. All authors read and approved the final manuscript.

Funding

This research was performed as a part of the interdisciplinary research project CHARTER (Drivers and Feedbacks of Changes in Arctic Terrestrial Biodiversity), funded by the EU Horizon 2020 Research and Innovations Programme (Grant #869471) and headed by Prof. Dr. Bruce Forbes.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

All CHARTER Project researchers were asked to indicate their consent. There were no objections.

Competing interests

The authors declare that they have no competing interests.

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Received: 21 November 2021 Accepted: 7 March 2022

Published online: 15 April 2022

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