A tale of the tall : A short report on stature in Late Neolithic–Early Bronze Age southern Scandinavia

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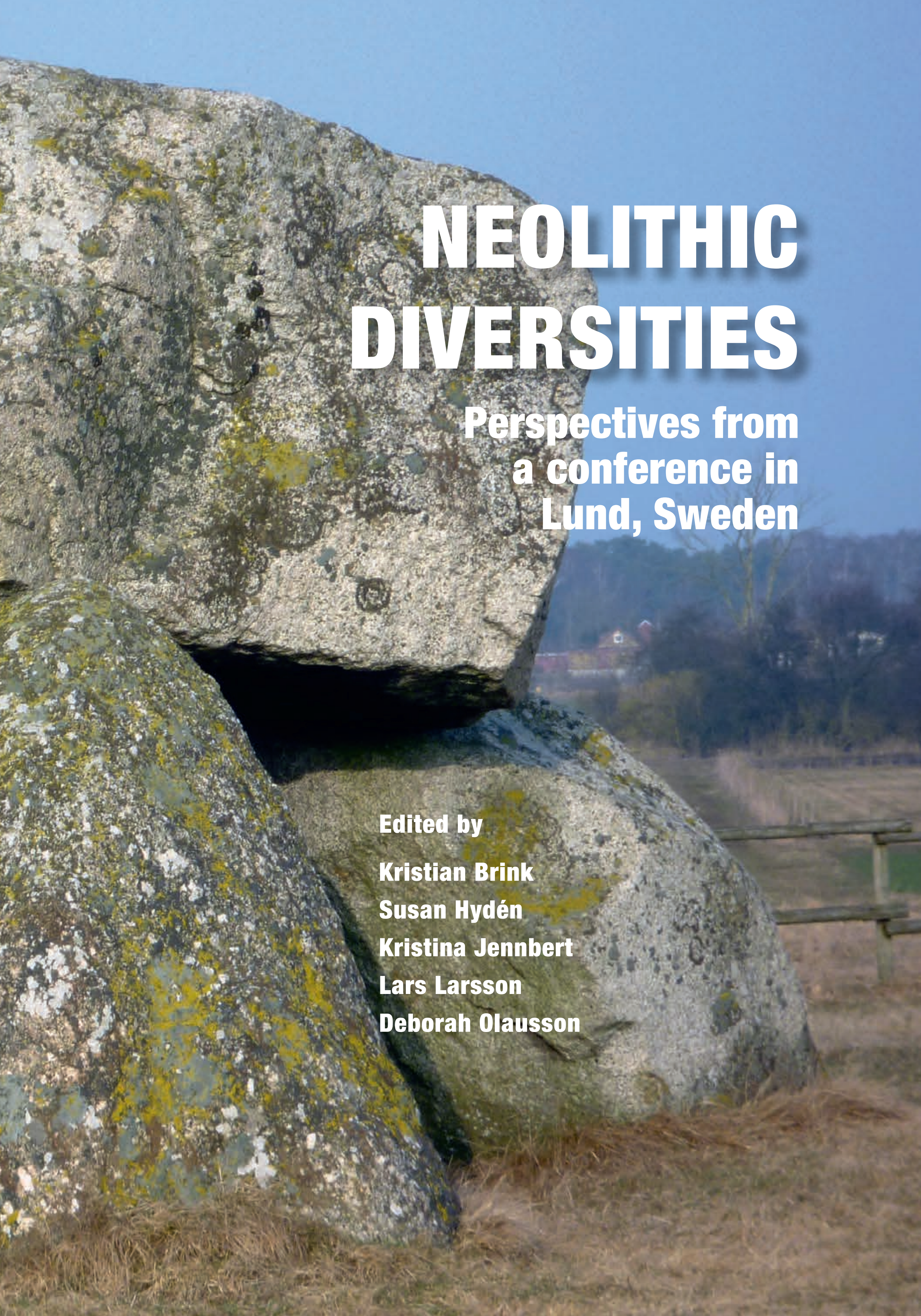

NEOLITHIC DIVERSITIES

Perspectives from a conference in Lund, Sweden

Edited by

Kristian Brink
Susan Hydén
Kristina Jennbert
Lars Larsson
Deborah Olausson

The members of the conference “What’s New in the Neolithic”, May 2013. Photo by Kristina Jennbert.

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Preface

In the study of the distant human past, certain events and periods have come to represent decisive passages from one human state to another. From a global perspective, the characteristic feature of the last ten thousand years is that people in different parts of the world, and at different points in time, started to grow plants and domesticate animals. The rise and dissemination of agriculture were crucial factors for the continued existence of humankind on earth. The incipient agriculture is often regarded as the very beginning of human *culture*, as it has traditionally been perceived in western historiography, that is, as control over nature and the "cultivation" of intellectual abilities.

As a result of the increasing national and international interest in the northern European Neolithic (4000–2000 BC), combined with large-scale archaeological excavations which helped to nuance and modify the picture of the period, senior researchers and research students formed a Neolithic group in 2010. The Department of Archaeology and Ancient History at Lund University served as the base, but the group also included collaborators from Linnaeus University and Södertörn University, and from the Southern Contract Archaeology Division of the National Heritage Board in Lund and Sydsvensk Arkeologi in Malmö and Kristianstad.

Meetings and excursions in the following two years resulted in the holding of an international conference in Lund in May 2013 entitled "What's New in the Neolithic". Invitations to this conference were sent to two dozen prominent Neolithic scholars from northern and central Europe.

The conference was a great success, with presentations and discussions of different aspects of innovative research on the Neolithic. The members of the Neolithic group took an active part in the discussions following the presentations.

It was decided before the conference that the papers would be published. The members of the Neolithic group also had the opportunity to contribute current research to this publication.

After the conference an editorial group was set up, consisting of Dr Kristian Brink, PhD student Susan Hydén, Professor Kristina Jennbert, Professor Lars Larsson and Professor Deborah Olausson.

A grant was received from Riksbankens Jubileumsfond for the meetings and excursions of the Neolithic group 2010–2013. We would like to thank The Royal Swedish Academy of Letters, History and Antiquities and Berit Wallenbergs Stiftelse for grants which enabled us to hold the conference "What's New in the Neolithic". Grants from The Royal Swedish Academy of Letters, History and Antiquities, and Stiftelsen Elisabeth Rausings Minnesfond financed the layout and printing of this publication.

I. PERSPECTIVES ON PEOPLE, IDENTITY AND PRACTICE

A tale of the tall

A short report on stature in Late Neolithic–Early Bronze Age southern Scandinavia

Anna Tornberg

Abstract

Human stature as a measurement for evaluating physical status is used by the World Health Organization (WHO) as well as bioarchaeologists. The reason for this is that only about 80% depends on genetic factors, while 20% depend on the environment. Bad living conditions decrease stature in a population. This paper aims to make a short review of earlier reports on stature in Late Neolithic–Early Bronze Age Southern Scandinavia and to provide some new data. It is clear that stature in Late Neolithic–Early Bronze Age Scandinavia was very high, equal to modern statures.

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Introduction

IN RELATION TO the transition to agriculture in central Europe there seems to have been a decline in health (Meiklejohn *et al.* 1984; Papathanasiou 2005; Larsen 2006; Wittwer-Backofen & Toma 2008; Meiklejohn & Babb 2011; Mummert *et al.* 2011). There is no notable change within the south Scandinavian record (Bennike 1985) following this event. This is possibly linked to a different adaptation to agriculture (e.g. Richards 2003; Cramon-Taubadel & Pinhasi 2011; Isem & Fort 2012). However, there are interesting reports of indicators of good health, such as high statures in the Late Neolithic southern Scandinavia (Brøste 1956; Gejvall 1963; Bennike 1985), a time when farming should be seen as fully established and anchored as subsistence. One might speak of the Secondary Products Revolution (Sherratt 1981), when new ideas and technological innovations (i.e. using cattle also for milk and traction, not only for carcass products, and the use of e.g. ards) lead to the possibility to further benefit from the agricultural smorgasbord, giving more possible outcome (nutrition).

Human stature can tell us a great deal about health in a population, since it is affected by both genetic and environmental factors. About 80% of an individual's stature is considered to be genetic and about 20% is considered as dependent on environmental factors (Philips & Metheny 1990; Carmichael & McGue 1995), such as the amount of nutrition and diseases (Silventoinen *et al.* 2000; Carson 2011a; Carson 2011b).

Human stature is not a static, nor a linear matter through history, but has fluctuated through the ages, with high statures suggesting good physical status (Arcini 2003, pp. 56 f.). This can of course be dependent on genetic factors as well, but is shown to correlate well with poorer or better living conditions, with the highest statures at present (Arcini 2003, pp. 56 f; Statistiska Centralbyrån 2013). Stature, along with other anthropometrical parameters, is also used by the World Health Organization (WHO) as an indicator of physical status (WHO 1995), further emphasizing the strong correlation to human health. Stature adapts quickly to environmental factors and changes can be shown in matters of a generation (Silventoinen *et al.* 2000; Heijmans *et al.* 2008), therefore average statures over time can be used as a good health indicator, given that no large resettlements have taken place in the area of study, then being more affected by genetic factors.

New, interesting results are sometimes achieved by putting on retrospective goggles. This could be viewing old research with a new pair of eyes or examining old, forgotten, physical material, or both. Combining these two retrospective approaches can be used as a foundation for several new research focuses and serve as an overview of available data. The aim of this article is to gather both old and some new data for evaluating joint information about stature in the Late Neolithic as well as to discuss this data as a health parameter.

Methods for assessing stature

There are several methods for assessing stature in past populations. Most of them are based on calculations from long bones, but there is also a possibility to take measurements in the field. Measurements in situ at the excavation are preferable if possible and leave the least bias (Petersen 2005). In situ measurements, however, require extremely well preserved bones, since measurements are taken from above the highest point of the skull to the most distal point of the talus (ibid.), unfortunately making it impossible in most cases.

The most commonly used methods for estimating stature from skeletal remains are based on linear regressions, although through different mathematical formulae. One of the most commonly used methods is the one by Trotter and Gleser (1952, 1958). They made their model from measurements of deceased US soldiers from the Korean War. Their regression formulae are divided between Afro-Americans and individuals of European descent and could be calculated using all long bones, but preferably the maximum length of the femur. The long bones of the lower limb are more accurately linked to living stature than are the long bones of the arm regardless of regression model. The problem with the Trotter and Gleser model is that bioarchaeologists seldom analyse individuals from present populations. People from the south Scandinavian Neolithic and Early Bronze Age differ both in period of time and geographic location from the male soldiers being measured in the 1950s. Body proportions do differ between populations, and so there might be an advantage in using regression models that are non-dependent on population. Two models that are population-non-dependent and therefore suitable for assessing stature in unknown populations such as in the Neolithic or Bronze Age are presented by Sjøvold (1990) and Formicola (1996). In my research I primarily use Sjøvold's model for stature assessment, mainly due to the population non-dependency and a good reputation for the accuracy of regression, not underestimating the stature of short individuals or overestimating tall individuals.

There is no current standard for what method to use when calculating human stature. Different researchers have different preferences as well as having been professionally active in times with different methods in fashion. This could cause bias when data are compared and is one of the pitfalls when comparing research over a vast period of time. It is therefore crucial to be clear about what method is used, and also what elements have been measured. If this is done, any of the above methods may be applied. However, uncalculated measurements of long bones are generally preferable since they are easily compared and not affected by errors in any regression formulae. Because not all long bone measurements were available in the earlier publications referred to in this article, this option had to be ruled out, since comparisons between localities and publications thereby would have been unmanageable.

In this paper I will give values for the Trotter and Gleser model for Europeans as well as the Sjøvold non population-specific model. For the skeletons analysed by the author, maximum length measurements have been taken on all complete long bones. If present, the femur is used for calculating stature. If both femurs are measurable the mean of the measurements was used, otherwise the maximum length of the measurable femur was used (Arcini 1999).

Material

The available data concerning stature in Late Neolithic southern Scandinavia mainly come from three different sources, Kurt Brøste's book about prehistoric man in Denmark (1956), Nils Gustav Gejvall's analysis of the skeletal material from the gallery grave in Dragby, Skuttunge parish in central Sweden (1963) and Pia Bennike's dissertation about palaeopathology in Danish skeletons (1985). Brøste and Bennike analysed the same skeletal material, deriving from several localities in Denmark, though using different methods for calculation, giving somewhat divergent results. Therefore only Bennike's more modern results are used in this paper.

The new data of Late Neolithic and Early Bronze Age stature derives from the author's current research on diet and health in southern Scandinavia as well as from a pilot project conducted in the summer of 2011, also by the author (Tornberg 2013). The results are based on 18 individuals from Scania, southern Sweden, and consist of mound 1 in Abbekås, Skivarp parish (grave 4), which is dated by ^{14}C to the Late Neolithic (3600 ± 50 and 3585 ± 50 uncal. BP, LuS 10619 and LuS 10620) (Tornberg 2013), a secondary burial in a passage grave remade into a gallery grave of Öllsjö no. 7, Skepparslöv parish, flat-earth graves from Snorthög, Lilla Isise parish, dating to early Late Neolithic (c. 2200–2000 cal. BC) (UB-22849, UB-22853) and a gallery grave at Ängamöllan, Vä parish, dated to the Early Bronze Age (c. 1400 cal. BC) (UBA-23996, UBA-23999). Some re-measurements of the Dragby material, Skuttunge parish in central Sweden, previously analysed by Gejvall, have also been made and evaluated by the author.

Stature in the south Scandinavian Late Neolithic–Early Bronze Age – old and new examples

By summing up earlier data on the topic and renewing it with recent data, further insight as well as more empirical data are gathered in this paper, giving opportunities for further interpretations of general health.

Unfortunately, Swedish Late Neolithic data for stature are scarce in published literature. Gejvall (1963) analysed a Late Neolithic gallery grave from Dragby, situated in Uppland, central Sweden. He reported almost extremely high statures, with mean statures of 181.4 cm for males and 169.0 cm for females, the number of individuals being 21 (eight males and 13 females). It should be noted, however, that not only femurs could have been measured since not enough measurable femurs are available in the material – that is, if all of the original material was available for me and not lost in recent times. Because the material is commingled due to burial custom it is also problematic to assess each element to sex. It is therefore hard to sort out small males from large females, possibly biasing the results further. In my analysis of the Dragby material I found only seven measurable femurs, notably divided into three longer femurs and four significantly shorter. It is reasonable to believe that the three shorter and also more slender femurs originate from female individuals and

Table I. Mean stature in Scanian Late Neolithic.

Locality	No. Males	No. Females	Mean stature T&G (M)	Mean stature Sjøvold (M)	Mean stature T&G (F)	Mean stature Sjøvold (F)
Abbekås, mound 1	2	3	177 cm	176 cm	162 cm	163 cm
Öllsjö 7	2	0	178 cm	179 cm	-	-
Lilla Isie, Snorthög	3	2	177 cm	176 cm	164 cm	165 cm
Vä, Ängamöllan	4	2	179 cm	179 cm	161 cm	161 cm
Total	11	7	178 cm	178 cm	162 cm	163 cm

the longer, more robust femurs are those of male individuals. This is my assumption when discussing stature by sex in this paper further. Standardized metric sex determinations of the femoral head, as suggested by Garvin (2012, pp. 240 f., and references cited there) and recently by Spradley and Jantz (2011). have not been applied in this study due to current lack of references on postcranial metric sex assessments in Scandinavian Neolithic skeletal assemblages. My measurements when dividing the three longest femurs from the four shortest femurs in the Dragby material instead suggest mean statures of 175.9 cm for males and 167.3 cm for females using Sjøvold's model. That differs a great deal from the statures reported by Gejvall in the 1960s. Instead, the statures based on re-measurements correspond quite well to the Danish Late Neolithic, where Bennike (1985, p. 51) reports statures of 176.2 cm for males and 162.8 cm for females (50 males and 16 females, using Trotter and Gleser's model for the femur).

The new data from Scania indicate statures during the Late Neolithic similar to earlier investigations from Denmark and central Sweden. Table I shows the mean statures in whole centimetres in the different localities and as a whole. The table is divided both by sex and by regression formula. It shows that the mean statures are slightly different between the localities, especially considering female stature. The mean statures, 178 cm for males and 162–163 cm for females, correlate very well with the mean statures reported by Bennike (1985), even though the male statures in the Scanian example are a couple of centimetres higher. Both male and especially female statures are several centimetres shorter in the Scanian material than in the central Swedish material reported by Gejvall (1963). This discrepancy does not occur in my re-measurements of the same central Swedish material as already noted above, where the Dragby males have a mean stature of 175.9 cm instead of 181.4 as reported by Gejvall. This means mean male statures lower than in the Scanian and Danish Late Neolithic examples. However, the new measurements for female stature (167.3 cm) in the Dragby material confirm Gejvall's reported high statures (169.0 cm), significantly distinguishing them from female statures in Scania and Denmark (162–163 cm). The difference between Gejvall's measurements and my own is not significant and possibly a result of different regression formula. The mean statures are remarkably high, almost as high as in present-day Sweden, where mean statures are 179.4 for males and 165.7 for females (Statistiska Centralbyrån 2013). Only during the Early Roman Iron Age did the statures reach the same height as in the Late Neolithic (Arcini 2003, pp. 56f).

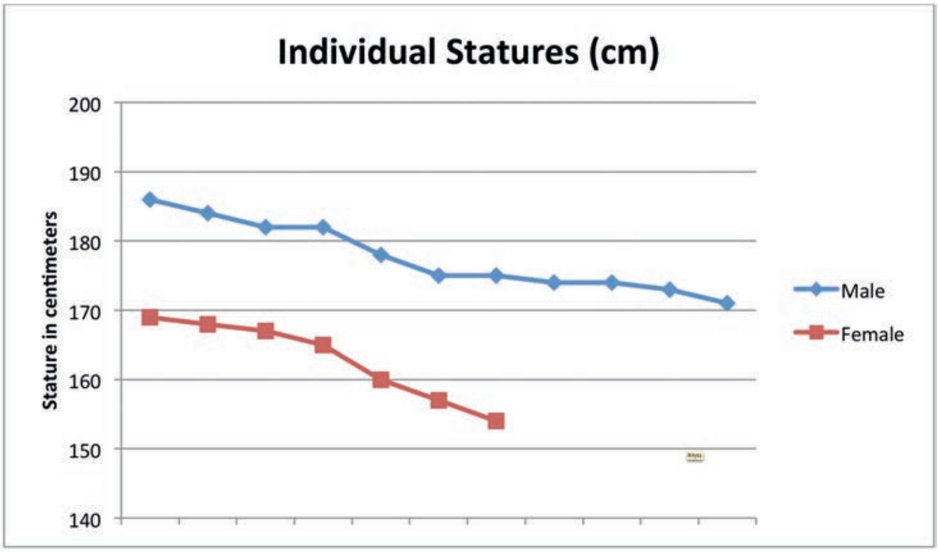

Fig. 1. The spread of individual statures in whole centimeters for males and females according to Sjøvold's (1990) model.

Naturally, the shortest and the tallest individuals differ from each other, both among males and among females (Fig. 1), the shortest and tallest male being 171 cm and 186 cm respectively and the shortest and tallest female being 154 cm and 169 cm. However, a majority of the male individuals are clustered in the span 175–180 cm and the females 165–170 cm. This is to be expected and is probably a hint of genetic variation.

Discussion

The aim of this article was in one part to gather both old and some new data regarding stature in the Late Neolithic and Early Bronze Age and in another part to evaluate and discuss this data in relation to health. The effort to join old and new data together is well spent considering the very sparse amount of data that has been present up to date. Some of the old data also needed revision through newer methods. It is unclear why Gejvall's reported statures differ so pronouncedly from my own calculations. I do not believe that this difference can be blamed on the use of different regression formulae, where Sjøvold's formulae actually give higher statures for tall individuals than that of Trotter and Gleser, nor do I think that Gejvall measured the bone incorrectly. What I do believe could be the cause is a probable inclusion of measurements of other long bones than the femur, known to give different, and also less reliable values for calculations. This also explains why Gejvall was able to find so many more measurable individuals than I could.

The need for more data is obvious but is increasing day by day. The effort is also well spent for evaluating Late Neolithic–Early Bronze Age stature in relation to health considering the very interesting data available. It seems conclusive that the stature of Late Neolithic individuals are high with means statures for males and females being approximately 178 cm and 162 cm respectively. This could be compared to Danish Middle Neolithic data where statures are 10–15 cm shorter for males and 10 cm shorter for females (Bennike 1985, p. 51). Both old and new investigations of Late Neolithic–Early Bronze Age skeletons suggest similar statures that all are almost as high as the present day. This is to be considered quite remarkable considering the welfare in western societies today. It is evident that something quite revolutionary happens in the Late Neolithic, providing one of the highest statures in human history.

Further, it seems clear that the high statures of the Late Neolithic/Early Bronze Age are not a local matter, but consistent over a larger area from central Sweden in the north to, at least, Denmark in the south. High statures and good health can probably be linked to a number of factors in society, not forgetting the rising knowledge and possession of metal and a possible agricultural intensification. New agricultural practices and technical innovations such as the ard, the labour from draught animals to pull it and perhaps the use of manure, made it possible to cultivate larger areas and thereby feed more people. Further, the genetic possibility to digest milk is also linked to an agricultural intensification and might be one reason for the high statures in the Late Neolithic, providing the growing population a good base for calcium and vitamin D, components proved to be closely linked to skeletal growth.

Recent studies of aDNA and lactase persistence (LP) suggest that the high ability to digest milk in Scandinavia is connected to the larger opportunity to survive starvation in history if one could do so (Sverrisdóttir *et al.* 2014). However, the question of where, when and how the LP gene occurred and spread is currently hotly debated and under research, but with results still quite inconclusive, with a variety of different indications (e.g. Bersaglieri *et al.* 2004; Burger *et al.* 2007; Enattah *et al.* 2007; Itan *et al.* 2009; Malmström *et al.* 2010; Vuorisalo *et al.* 2012). This theme also lay outside the area of research in this specific paper.

The possibility that changes in mortuary practices, with a higher degree of social stratification in the graves, are the reason for the increase in stature cannot be definitely excluded. However, it seems less likely since, in an ongoing study, I can find no evident difference in stature, or other parameters for evaluating physical health, between individuals inhumed in different grave construction during the Late Neolithic–Early Bronze Age. It is also possible, but maybe less likely, that the high statures are a result of large migrations and exchange of population, giving one with a new biological basis for stature. Even though it is highly probable that there was increased mobility during this period, an exchange of population finds little support in the archaeological record.

Of course more data are needed for interpreting health in the Late Neolithic and Early Bronze Age, regarding both stature and other health-indicating parameters. Still, current data show signs of good living conditions during the period. Certainly, investigations of human stature should be discussed in relation to archaeological and other bioarchaeological evidence when trying to address questions about subsistence and the impact on human health, which was beyond the scope of this article.

Investigating stature is only one method for discussing health status in a past population, although it is a very important one, giving information sensitive to change over shorter time spans. A large quantity of data is of absolute necessity and is insufficient at present. New data are being registered continuously making it possible to interpret the results from a more solid base and compare it to other health-indicating analyses, nuance and deepen the understanding of human health in the last part of the Stone Age and the first part of the Bronze Age.

References

Arcini, C. 2003. *Åderförkalkning och portvinstår: Välfärdssjukdomar i medeltidens Åhus.* Riksantikvarieämbetet Arkeologiska undersökningar Skrifter 48. Stockholm.
Bennike, P. 1985. *Palaeopathology of Danish Skeletons. A*

Comparative Study of Demography, Disease and Injury. Copenhagen.

Bersaglieri, T., Sabeti, P. C., Patterson, N., Vanderploeg, T., Schaffner, S. F., Drake, J. A., Rhodes, M., Reich, D. E. & Hirschhorn, J. N. 2004. Genetic Signatures of Strong Recent Positive Selection at the Lactase Gene. *American Journal of Human Genetics* 74.

Brøste, K. 1956. *Prehistoric Man in Denmark: A Study in Physical Anthropology*. Vol. 1. Stone and Bronze Ages. Copenhagen.

Burger J., Kirchner M., Bramanti B., Haak W., Thomas M. G. 2007. Absence of the lactase-persistence-associated allele in early Neolithic Europeans. *Proceedings of the National Academy of Science of the United States of America* 105.

Carmichael, C. M. & McGue, M. 1995. A cross-sectional examination of height, weight, and body mass index in adult twins. *Journal of Gerontology: Biological Science*. 50:B2.

Carson, S. A. 2011a. Demographic, residential, and socioeconomic effects on the distribution of nineteenth-century African-American stature. *Journal of Population Economy* 24.

– 2011b. Demographic, Residential, and Socioeconomic Effects on the Distribution of the Statures of Whites in the Nineteenth-Century U.S. *Mathematical Population Studies* 18.

Cramon-Taubadel, N. & Pinhasi, R. 2011. Craniometric data support a mosaic model of demic and cultural Neolithic diffusion to outlying regions of Europe. *Proceedings of the Royal Society of Biological Science*.

Enattah, N. S., Trudeau, A., Pimenoff, V., Maiuri, L., Auricchio, S., Greco, L., Rossi, M., Lentze, M., Seo, J. K., Rahgozar, S., Khalil, I., Alifrangis, M., Natah, S., Groop, L., Shaat, N., Kozlov, A., Verschubskaya, G., Comas, D., Bulayeva, K., Mehdi, S. Q, Terwilliger, J. D., Sahi, T., Savilahti, E., Perola, M., Sajantila, A., Järvelä, I. & Peltonen, L. 2007. Evidence of Still-Ongoing Convergence Evolution of the Lactase Persistence T-13910 Alleles in Humans. *The American Journal of Human Genetics* 81.

Formicola, V., Franceschi, M., 1996. Regression equations for estimating stature from long bones of Early Holocene European samples. *American Journal of Physical Anthropology* 100.

Garvin, H. M. 2012. Adult Sex Determination: Methods and Application. In Dirkmaat, D. C. (ed.), *A Companion to Forensic Anthropology*. Chichester.

Gejvall, N. G. 1963. Skelettmaterialet från Dragby hällkista. *TOR* IX.

Heijmans, B. T., Tobi, E. W., Stein, A. D., Putter, H., Blauw, G. J., Susser, E. S., Slagboom, P. E., Lumey, L. H. 2008. Persistent epigenetic differences associated with prenatal exposure to famine in humans. *Proceedings of the National Academy of Science of the United States of America* 105.

Isem, N. & Fort, J. 2012. Modelling the effect of Mesolithic populations on the slowdown of the Neolithic transition. *Journal of Archaeological Science* 39.

Itan, Y., Powell, A., Beaumont, M. A., Burger, J., Thomas, M. G. 2009. The Origins of Lactase Persistence in Europe. *PLoS Computational Biology* 5 (8).

Malmström, H., Linderholm, A., Lidén, K., Storå, J., Molnar, P., Holmlund, G., Jakobsson, M. & Götherström, A. 2010. High frequency of lactose intolerance in a prehistoric hunter-gatherer population in northern Europe. *BMC Evolutionary Biology* 10:89.

Meiklejohn, C., Schentag, C. T., Venema, A., Key, P. 1984. Socioeconomic change and patterns of pathology and variation in the Mesolithic and Neolithic of Western Europe: some suggestions. In Cohen, M.N. & Armelagos, G.J. (eds.), *Paleopathology at the Origins of Agriculture*. Orlando.

Meiklejohn, C. & Babb, J. 2011. Long Bone Length, Stature and Time in the European Late Pleistocene and Early Holocene. In Pinhasi, R. & Stock, J. T. (eds.), *Human Bioarchaeology of the Transition to Agriculture*. Chichester.

Mummert, A., Esche, E., Robinson, J., Armelagos, G. J. 2011. Stature and robusticity during the agricultural transition: Evidence from the bioarchaeological record. *Economics and Human Biology* 9.

Papathanasiou, A. 2005. Health Status of the Neolithic Population of Alepotrypa Cave, Greece. *American Journal of Physical Anthropology* 126.

Petersen, H. C. 2005. On the Accuracy of Estimating Living Stature from Skeletal Length in the Grave and by Linear Regression. *International Journal of Osteoarchaeology* 15.

Philips, K. & Matheny, A. P. 1990. Quantitative genetic analysis of longitudinal trends in height: preliminary results from the Louisville Twin Study. *Acta Geneticae Medicae et Gemellologiae* 39.

Richards, M. 2003. The Neolithic Invasion of Europe. *Annual Reviews in Anthropology* (32).

Sherratt, A. 1981. Plough and pastoralism: aspects of the secondary products revolution. In Hodder, I., Isaac G. & Hammond, N. (eds.), *Pattern of the Past: Studies in Honour of David Clarke*. Cambridge .

Silventoinen, K., Kaprio, J., Lahelma, E., Koskenvuo, M. 2000. Relative effect of genetic and environmental factors on body height: differences across birth cohorts among Finnish men and women. *American Journal of Public Healt*h 90.

Sjøvold, T. 1990. Estimation of stature from long bones utilizing the line of organic correlation. *Human Evolution* 5.

Spradley, M. K. and Jantz, R. L. 2011. Sex estimation in forensic anthropology: skull versus postcranial elements. *Journal of Forensic Sciences* 56 (2).
Statistiska Centralbyrån (SCB) 2013. *Vi växer på bredden*. [online] Available from: http://www.scb.se/Pages/Article____340901.aspx. [Accessed 13 September 2013].
Sverrisdóttir, O. O., Timpson, A., Toombs, J., Lecoeur, C., Froguel, P., Carretero, J. M., Arsuaga Ferreras, J. L., Götherström, A. & Thomas, M. G. 2014. Direct estimates of natural selection in Iberia indicate calcium absorption was not the only driver of lactase persistence in Europe. *Molecular Biology and Evolution*.
Tornberg, A. 2013. Diet, Health and Agriculture. The Late Neolithic-Early Bronze Age Example of Abbekås, Southern Sweden. *Lund Archaeological Review*.
Trotter, M. & Gleser, G. 1952. Estimation of statures from long bones of American Whites and Negroes. *American Journal of Physical Anthropology* 10.
– 1958. A re-evaluation of estimation of stature based on measurements of stature taken during life and of long bones after death. *American Journal of Physical Anthropology* 9.
Vuorisalo, T., Arjanmaa, O., Vasemägi, A., Taavitsainen, J.-P., Tourunen, A., Saloniemi, I. 2012. High Lactose Tolerance in North Europeans: A Result of Migration, Not In Situ Milk Consumption. *Perspectives in Biology and Medicine* 55.
WHO. 1995. *Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee.* World Health Organization Technical Report Series. 1995; 854.
Wittwer-Backofen, U. & Tomo, N. 2008. From Health to Civilization Stress? In Search for Traces of a Health Transition During the Early Neolithic in Europe. In Bocquet-Appel, J.-P. & Bar-Yosef, O. (eds.), *The Neolithic Demographic Transition and its Consequences*. Dordrecht.