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Developing Scales of Development: A review essay on *The Measure of Civilization* by Ian Morris (Princeton University Press)

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One hundred years ago, the societies of the West were ascendant. Many European countries held substantial colonies and territories overseas. The USA had become the world's largest economy after seeing a period of rapid growth, and had begun to assert itself on the world's stage. Industrialization had lead to expanding populations and increased levels of production, and had given these societies the technological capacity to wage war in ever more efficient and horrifying ways, as the next 4 years would demonstrate. In comparison, China had just gone through the Xinhai revolution, overthrowing the last emperor of the Qing dynasty, and abandoning the feudal social system. While it is true that Japan's star was rising, and was developing imperial ambitions of its own, the recent Japanese defeat of Russia had lead to only limited territorial gains and a refusal by Russia to pay war reparations. Five years later, attempts by Japan to secure equality with western countries in the League of Nations would fail, indicating that the balance of power lay very much with the West.

Western societies continue to dominate the world today in terms of military strength, economic power, and cultural influence. In his previous book, *Why the West Rules—For Now* (*WWR*), Ian Morris set out to assess competing explanations about why this is the case (Morris, 2010)[1]. Such questions have become increasingly relevant because this position can no longer be taken for granted. The second half of the last century saw the rapid economic development of Japan and the Asian tiger economies, and recent years have seen China re-emerging as a global force. Understanding the fluctuating fortunes of societies over time, and how the present state of affairs came about are not just important matters of historical enquiry, but may provide clues to our future.

Although a huge number of explanations have been put forward to explain the dominance of the West, these ideas can basically be placed into two camps: those that propose the West has benefitted from some kind of intrinsic, long-

[1] *WWR* was previously reviewed in this journal (Pomerantz 2011)

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term advantage, and those that stress the importance of more recent events that allowed the west to overtake its competitors. Long-term lock-in theories come in many flavours, but all emphasize some kind of geographic, cultural, or even genetic endowment that bequeathed Western societies with higher levels of social development from the beginning. Alternative ideas stress that societal development was actually higher in the East for much of history, or that East and West were not that different until the "great divergence" of the 19th Century, at which point Western Europe, fuelled by the industrial revolution, began to pull ahead (the reason for this divergence itself is attributed to various geographic, cultural and sociopolitical factors, e.g. Acemoglu and Robinson, 2012; Darwin, 2008; Ferguson, 2012).

Debates in this area have been hampered by a lack of consensus. The fact that many of the people involved come from different disciplinary backgrounds has lead to important terms being defined in different ways, and different types of evidence being employed with different standards of proof. This means that there has been disagreement about even the most basic and fundamental patterns of history. In order to assess these ideas, Morris argues that what is needed is a clear, empirical measure of long-term social development in the East and the West. Such numerical indices are commonly used in the social sciences to compare contemporary societies, e.g., the United Nations Human Development Index (http://hdr.undp.org/en). Morris extends this approach by developing an index of social development for the East and West, going back to the end of the last glacial period. The idea is that by making explicit assumptions and definitions, and quantifying things in this way we can go beyond the futile and frustrating back-and-forth misunderstandings that have dominated these debates.

The results of this endeavor are presented in *WWR*. There, Morris focused on the big picture of the conclusions that can be drawn from developing and interpreting this index, and the potential for projecting these patterns into the future. The general pattern that emerges is that according to this measure social development was indeed higher in the West from the earliest times. The East began catching up sometime after 2000 BCE, but did not overtake the West until around the middle of the first millennium CE. The East then remained more developed until the 18th Century, when the industrializing West pulled ahead once more. Since the conclusions reached in *WWR* depend on this index of social development, it is important to understand the nitty-gritty of its construction. This is the role of the book that is the subject of this review, *The Measure of Civilization*. Here, Morris covers the intellectual background to the index, the selection of suitable units of analysis and variables, and the description of the variables that make up the index and how the values for these variables were arrived at (which makes up the bulk of the book).

In seeking to examine the long-term history of social change this endeavor is located squarely within the tradition of cultural evolution in anthropology and archaeology (also known as neo-evolutionism; Carneiro 2003). This approach argues that human societies have tended to increase in complexity over time, with societies going through broadly similar sequences of change. It should be noted that the intellectual lineage of this evolutionary approach can be traced back to Herbert Spencer rather than Charles Darwin (Currie and Mace, 2011). Social evolutionary theory has gone in and out of fashion over the years, and has received criticisms of varying degrees of validity. Morris's aim is to construct a measure of social development, which he defines as *"social groups' abilities to master their physical and intellectual environments and get things done in the world"* (p. 3). In seeking to boil down the evolution of human societies to a single measure, this approach follows most closely that of the anthropologist Leslie White. White proposed that the defining feature of human social evolution was the ability of societies to harness and utilize increasing amounts of energy over time (White, 1959). Therefore, the social development index used here includes a measure of energy capture as one of its contributing variables. Morris's approach also owes a debt to researchers such as Raoul Naroll and Rober Carneiro who developed indices of social development using cross-cultural data. While noting their importance, Morris claims that his index improves on these earlier efforts. These are issues to which I will return later.

In order to compare social development in the East and West it is important to define how those terms are being used. If this is not done clearly, unfair comparisons can be made and dubious conclusions can be drawn. For example, some have argued that social development was higher in Europe substantially before the industrial revolution. However, Kenneth Pomeranz rightly points out that this is unfairly comparing the whole of China with just the smaller, most developed core of Northwest Europe (i.e., England and the Low Countries; Pomeranz 2000). Furthermore, being able to locate the "East" and the "West" in a meaningful way becomes even more challenging the further back in time you want to push the comparison (and Morris wants to push it back a *long* way). A contemporary comparison between East and West might realistically focus on the USA and China. Yet such a comparison is less relevant just a hundred years prior, when China was in turmoil and the USA was not yet dramatically more powerful than Europe. Morris's solution is ingenious and rather elegant. Instead of sticking to a rigid, geographically inert view of East and West, Morris allows for what he calls the "core" regions of these two areas to change over time. Given the long-term view he is taking, Morris ties his definitions of East and West to the development of agriculture in these two areas. This makes sense because the spread of agriculture is linked to some extent to the spread of peoples, language, and culture (Diamond and

Bellwood, 2003), although later innovations and contact between societies are also important. Although it is not commented upon much in the book, an intriguing difference between East and West emerges from making the distinction in this way. Apart from a few brief excursions to Japan (jointly with China in 1600, exclusively in 1900, and again jointly in 2000), the core region of the East stays exclusively in China (either the Yangzi or Yellow river valleys, or combination of both). However, the core region of the West shifts much more dramatically; from the Hilly Flanks of the fertile crescent, to Egypt, to various parts of the Mediterranean, to Western Europe, and finally to North America.

Some will undoubtedly quibble with this approach and argue that the West should be synonymous with Christendom, or a deeper cultural inheritance from the Classical World. For example, the Greek-Persian wars have been described as the first clashes between the East and the West (Holland, 2005), yet according to Morris's scheme, the Persian Empire forms part of the Western core region in 500–400 BCE. The important point is that the definition Morris is using has been made explicit, and the subsequent findings about the relative development in the East and West should be judged on those terms. One thing that is not entirely clear is how this shifting way of defining the regions of interest feeds into the construction of the development indices. For example, in 1500CE and 1600CE the core region is listed as being Western Europe, yet the largest cities at this time (which goes into constructing the social organization variable) are listed as being Cairo and Constantinople, respectively. Such discrepancies are rare, however, and I doubt whether they substantially affect the overall picture.

In constructing his index, Morris rather sensibly follows the principle that it should be "*as simple as possible, but no simpler*" (p. 26). There are trade-offs to be made about the correct number and type of variables that should be chosen. Having too many can make the task laborious or difficult to complete, while examining too few variables potentially risks missing important sources of variation in different aspects of social development. In deciding what traits should be measured, Morris follows other social scientists in suggesting that such traits should be *relevant* (i.e., they tap into what we want them to), *culture independent* (i.e., they track the same thing in different societies), *independent of other variables* (otherwise time and effort are wasted in measuring essentially the same thing, and the overall index can be biased), *well-documented* (a very practical concern when extending the measure back in time), *reliable* (i.e., experts generally agree on the evidence), and *convenient* (i.e., it should be realistic to acquire the necessary information). Morris decides that just four variables meeting these criteria are sufficient for constructing the social development index: Energy Capture, Social Organization, War-Making Capacity, and Information Technology.

The majority of the book describes in admirable detail exactly how Morris arrived at the values he uses in his index. The overall index is constructed so that the maximum value East or West could obtain in the year 2000 CE would be 1000 points. Each one of the four variables can achieve a maximum of 250 points, so in theory, each variable is given equal weight in the overall index. The construction of each variable relies on different sources of data and employs slightly different approaches. The energy capture variable attempts to measure the amount of energy that societies use per capita, and is composed of the energy that humans get from food (including the amount of energy required by any animals in the diet) as well as non-food sources of energy used in heating, cooking, transportation, etc. Much of the work here is based on historical estimates of production in past societies and sensible rules of thumb about the types and degree of non-food sources of energy in different types of societies. The values are first estimated in terms of kilocalories (kcal) using a variety of sources of information, before being scaled and converted into the index score. Social organization is based on estimates of the size of the largest human settlement in the East and West at the different time periods. This seems like a reasonable proxy as maintaining large group sizes requires the cultural evolution of forms of social organization that enable groups to solve collective action problems and prevent them from falling apart (Turchin et al., 2013). These raw city population sizes are scaled to create the index score. The next variable, war-making capacity, follows a slightly different approach in that Morris first decides whether East or West had the highest value for this variable in 2000 and assigns it the maximum value of 250. Subsequent scores (i.e., those for earlier time periods) are then estimated relative to this score and also other subsequent scores derived from it. The war-making capacity variable takes into account information about army sizes, military technology, and effectiveness in battle, but does not use quantitative estimates directly to calculate the scores. Finally, the information technology score derives from estimates of literacy rates and the technological capacity for societies to communicate and share information (e.g., the presence of electric or electronic forms of communication).

Morris makes clear that his aim is not necessarily to produce objective measures of these variables, but to make clearer and more explicit the decisions made and the reasoning behind them. This general strategy is understandable given the fragmentary nature of the historical and archaeological records. Furthermore, because these records consist of the material remains of societies, or selective accounts from limited perspectives, much of the information we want to gain from these records about social evolution requires some degree of interpretation. The more these interpretations and their assumptions are made explicit the easier it is for the wider academic community to assess them or offer alternatives. In general, I

am very much on board with Morris's general approach and many of his decisions. However, there is one practice that Morris employs that I think is less than ideal for his purposes. In deciding on the values of some of his scores, Morris not only compares historical societies to those within the same region, but also to societies in the other region. For example, the war-making capacity of 16th Century of Ming China is compared unfavorably to that of the Habsburg and Ottoman empires (p. 203). While not necessarily fatal, this does reduce the impact of comparing the overall indices later on, as the answer is already built in to the index to some degree.

Another important issue is that despite Morris's claim that each variable is given equal weighting in the overall developmental index, the energy capture variable is overwhelmingly the biggest contributor to the overall score. In fact, examining the numbers provided, it generally contributes 75 percent or more to the overall score. This comes partly from scaling the raw values of variables of different magnitudes in the same way (e.g., the real values used to calculate energy capture range from 4,000 to 230,000, whereas the values for city size go from 0 to over 26,000,000). To be fair, this is an issue acknowledged by Morris, and he shows that basically the same pattern remains if a correction for this is introduced by log-transforming the scores before adding them together. Although this reduces some of the effect of energy capture, a better approach would be to assign the variable scores in different ways so that this bias was minimized from the outset.

So how robust are Morris's overall findings to these potential problems in the calculation of the index? One way to assess this issue is by examining some of the data Morris provides. In my opinion, the data on the population of the largest city is probably the most objective, well-measured, and interpretable of the variables described. Examining the city population sizes for East and West, the following pattern is in evidence: the West has a head start, the East catches up somewhat around 1100 BCE (although city sizes were still generally below those of the West), the West pulls away with the rise of Rome, and from 600 CE to 1800 CE (roughly from the Tang to Qing dynasties) China emerges as the place with the largest cities. In 1900 CE, the West returns to prominence with London, while in 2000 CE, the largest city was again in the East with Tokyo. In other words, pretty much the same pattern that is seen in the overall index (with its heavy bias to the energy capture variable), can be seen in the population data. This suggests that broad conclusions drawn from looking at the index are probably on reasonably safe ground.

Of course, the variables that make up the index cannot be known without error. Morris recognizes this and demonstrates the consequences of adjusting the scores up and down by 10 percent and 20 percent. This exercise reveals that the broadest patterns remain, particularly at the lower level of error. One point to note here is that given the arbitrary nature of the values used in the

scale, and the different sources of information and methods used in compiling the data, it is somewhat difficult to assess whether these levels of error are appropriate. Again the information on city population size might be instructive here as the degrees of error associated with these estimates are probably better understood. Certainly errors of the magnitude of 10–20 percent seem unlikely to affect things too much. The fact that the overall picture remains much the same even if there is some degree of error in the estimates is another reason for optimism.

The undoubted strength of Morris' work is the synthesis of an enormous body of information ranging across multiple different disciplines and world regions. Although the decisions that are made in deciding on particular values can be questioned and sometimes involve making guesses or applying arbitrary scaling factors, they have the virtue of being made explicit. Anybody that disagrees with a particular decision can see the effect of making an alternative decision or arriving at a different value. Furthermore, the extensive citing of sources and pointing towards the sources of information on which these judgments are based is also to be applauded. The breadth and depth of knowledge is truly impressive, and shines through in this book. Morris is also admirably aware and upfront about the limitations of his approach.

In attempting to develop measures of important variables, and trace them back through deep history in very different parts of the world, the impressive collation of information exhibited in this book is probably about as far as one person can get alone. Morris's decision to take on this challenge by himself is probably partly due to the fact that the majority of archaeologists and historians have tended to shy away from broad, comparative questions, and focused on describing particular regions at certain points in time. However, in order to answer the big questions properly, we need people who work in different regions and time periods to share their expertise. This has been the motivating factor behind the creation of the SESHAT: Global History Databank project (http://evolution-institute.org/seshat), where we seek to work closely with experts to collate information about a range of different variables in ways that can be used to scientifically test different hypotheses about human history and social evolution (Turchin et al., 2012). An interesting point of departure from the method employed by Morris in this book is that in Seshat the coding of redundant variables is implemented by design. This is so that different variables can serve as proxies for those cases where data are missing at a particular point in time, which is a frequent occurrence with historical and archaeological data. Furthermore, in working collaboratively a broader range of variables and parts of the world can be reasonably tackled.

I am completely in favour of Morris's general approach; however, there are a few points in relation to social evolutionary theory where this work can be called into question. While acknowledging that his index doesn't say

everything about social development, Morris argues that it improves on previous attempts to construct social evolutionary scales, and distills things down into a single measure. To some extent, this may well aid in assessing the plausibility of certain long-term, lock-in theories, yet it does not by itself allow us to assess more general hypotheses about social evolution. For example, Morris attempts to relate the index to debates about multilinear versus unilinear evolution (i.e., whether all societies develop in the same way, or whether there are different evolutionary pathways that can be followed). However, the index is unsuitable for this purpose since it is ranged only along a single continuous dimension, and does not allow us to assess whether societies have taken different routes in moving along this scale.

A criticism often leveled at traditional social evolutionary theory is that it merely offers descriptions of the pattern of change, rather than saying anything much about the process by which this change has occurred (Shennan, 2008). In many ways, the same criticism can be made of the procedure Morris has followed. In fact, collapsing everything into a single measure gets rid of important information that could indeed be used to address questions of process. Crucially, although the data presented here clearly show that social development goes through the roof as a consequence of the industrial revolution, the approach taken does not allow us to assess competing explanations about *why* this occurred, or what role institutions or other aspects of culture played in this process (Acemoglu and Robinson, 2012; Ferguson, 2012). In general, approaches to investigating cultural evolution which derive more directly from evolutionary biology and ecology, with their focus on developing formal statistical and mathematical models of social and cultural change, offer a broader perspective with which to address these questions (Mesoudi, 2011; Spencer and Redmond, 2001; Turchin, 2003). While sometimes seen as incompatible (Dunnell, 1980; Lyman and O'Brien, 1998), in previous work I have demonstrated how these Spencerian and Darwinian approaches can be reconciled (Currie and Mace, 2011). None of this is to say that the index developed here is without merit. It does indeed serve the intended purpose of clarifying the relative development of East and West over the long-term of human history. Morris does not conduct any statistical tests in this work but it is possible to see how such an index could be employed in further analyses that formally tested various hypotheses about human social evolution. This would be particularly valuable if it was extended to other regions of the world, too. Approaches that retain information about the individual traits and combine them with statistical analyses that reveal the relationships between different variables and the order in which they change would also be more powerful in addressing questions about social evolutionary processes (see, for example, Carneiro 1970; Currie et al. 2010; Currie & Mace 2011; Peregrine et al. 2007; Peregrine et al. 2004).

Overall, *The Measure of Civilization* is a really interesting book, which serves as a great companion piece for *Why the West Rules*. Morris writes in an engaging style and his enthusiasm for the questions at hand shines through. Refreshingly, the reader is invited to engage critically with the information presented, and not merely take the arguments presented at face value. My only grumble about the book is that the way the data are presented can be quite frustrating at times. Often the information about the index is plotted as a line chart with the y-axis on a linear scale. Because the scores for the present day are often well in excess of earlier scores this has the effect of creating a series of "hockey stick" graphs, where interesting differences in earlier periods are difficult or impossible to pick out. To be fair, the issue of how the data are presented is raised by Morris, and the data are sometimes presented on a log-scale. While he rightly points out that there is no neutral way to present the index, a clearer presentation of the data would help the reader to extract more of the information that is present here, particularly in these earlier periods. This is a minor point though, and shouldn't detract from what is an extremely thorough piece of work. The book really makes you engage with the assumptions behind our attempts to interpret the information left to us from past societies. The overall project highlights both the difficulties and opportunities for attempting to quantify social development in the present, past, and future. In doing so, it makes a convincing case that such quantification is vital if we are to have a better understanding about how the present came about and where we are going in the future. In short, the *Measure of Civilization* should provide stimulating reading for anybody interested in understanding the long-term patterns of history and the forces that may shape our destiny.

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