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## Technology and Ideology in Middle Bronze Age Canaan

Joe Uziel

*The Albright Institute of Archaeological Research*

### Abstract

This paper attempts to understand why numerous technological inventions and innovations occurred in the southern Levant during the Middle Bronze Age (circa. 1900-1500 BCE). It is proposed that the changes that occur are clearly more extensive than in the periods preceding and following the Middle Bronze Age, and that this is a result of the Canaanite society that arose during this period. This society saw technological innovation as an ideological value, seeing the benefits both individually and collectively. Technological advancement was seen as providing power to both the individual and the society on a whole as it interacted with other international entities.

### Introduction<sup>1</sup>

The Middle Bronze Age<sup>2</sup> (MBA herein) is a period of distinct nature in the history of the southern Levant. Alternatively labeled 'The Dawn of Internationalism',<sup>3</sup> a period of 'Mighty Canaanite City-States'<sup>4</sup> and the "Zenith of the Urban Canaanite Era",<sup>5</sup> few would deny that prosperity reigned on the region during this time. Technological change was at the forefront of this prosperity, although the social context in which the innovations occurred has not been fully explored. While

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<sup>1</sup> This paper is part of the author's PhD dissertation, conducted at Bar Ilan University, and written under the guidance of Prof. Aren M. Maeir, to whom I would like to thank for all of his help, including in reading earlier drafts of this paper. I would also like to thank Dr. Itzhaq Shai and Alexander Zukerman for reading earlier drafts and offering helpful comments and criticisms. Of course, any mistakes and shortcomings are the sole responsibility of the author.

<sup>2</sup> The term Middle Bronze Age used here refers to what many call the Middle Bronze Age II, and does not include the Intermediate Bronze Age many times referred to as the Middle Bronze Age I. The terminology used here follows the principle that the social differences between the Intermediate and Middle Bronze Age are such that even if there is slight continuity in certain aspects of material culture, the two periods must be seen as separate entities.

<sup>3</sup> Ilan 1995.

<sup>4</sup> Mazar 1990.

<sup>5</sup> Dever 1987.

many have referred to the various technological changes that occurred during the MBA,<sup>6</sup> with some even examining social aspects of specific technological developments,<sup>7</sup> few have examined the social context behind the spectrum of changes.

In this paper, I suggest that the technological changes that occurred in the southern Levant during the MBA were a direct result of a social attitude towards technology, particularly seen in the vast quantity of innovations (as opposed to those preceding and following the MBA). On a collective level, this was brought about by a socio-political and economic desire to gain power in the global world which was forming around the Canaanite society. On an individual level, the society accepted innovation as a result of improved standard of living, alongside 'patriotism' in the new global environment.

### **Technology, Invention and Innovation: defining the differences**

Recurring discussions regarding technological advancement have revolved around the various processes linked with the stages of development of technology, particularly related to the difference between 'invention' and 'innovation'. Renfrew points out the differences between the two, with the invention being the discovery of a new process or form, and innovation the widespread adoption of the invention.<sup>8</sup> Shortland divides the process further, separating discovery (the find) from invention (its application) and innovation (its diffusion).<sup>9</sup> When dealing with specific aspects of invention/innovation, the difference between the various stages is critical, particularly since an invention does not always lead to innovation.<sup>10</sup> Therefore, while invention of something

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<sup>6</sup> E.g. Dever 1987; Philip 1989; Mazar 1990; Lillyquist 1993; Ilan 1995; Sparks 2001; Sparks, 2004.

<sup>7</sup> E.g. Knapp et al 1988; Knapp 1993; Franken and London 1995.

<sup>8</sup> Renfrew 1981; 1984.

<sup>9</sup> Shortland 2004: 2-6.

<sup>10</sup> Renfrew 1981: 267; 1984: 391.

new may eventually become socially important, it is only after innovation that this occurs.

In the context of the current discussion, however, it seems that not only is the innovation important, but also the invention. As opposed to discussions on the effects of an innovation on society, here the societal context that leads to technological advancements is being discussed. Therefore, if innovations were being adopted for social reasons, it is reasonable to assume that the same society that felt this was important would also work towards creating more innovations, and in turn place equal importance on discovery/invention. This is a concept which has not been vastly explored in archaeology or history of periods prior to the Industrial Revolution. In fact, many scholars contend that the Industrial Revolution was a turning point in the way inventions occurred.<sup>11</sup> As will be seen below, however, this view is becoming less and less accepted.<sup>12</sup> I propose here that attitudes towards technology in the past are not so different from modern approaches to technology – just as certain modern societies push forward technological advancements, so did certain ancient societies.

In the coming section, various aspects of MBA technology will be discussed, including inventions and innovations covering all stages of technological development discussed above, in order to explore whether all of these were a result of a more general ideology.

### **Innovations in the Middle Bronze Age**

Prior to exploring the social context of technological change, it must be determined whether there was an unusual pattern of innovation during this period. While this is certainly the first impression given when reading about the period, it must be examined whether or not the MBA society functioned differently from other societies that preceded it or followed it. If there was an ideology

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<sup>11</sup> E.g. Landes 2003.

<sup>12</sup> E.g. Bulliet 1994; Perdue 1994:170; Dobres 2000:5-6.

linked to technological advancement, which was unique to the MBA, then the archaeological record would indicate a difference between this period and others. If no difference is detected, then one may be able to explain various aspects of technological change within a social context (something which has been insufficiently studied regarding early Levantine technology, but which is very common in archaeology worldwide), yet not a general attitude towards innovation (which is less developed in archaeology in general, being more common in modern discussions of technological history) during the period under discussion. Below various aspects of MBA technological advancement are examined, in order to examine the hypothesis that the innovation in MBA had a unique pattern, and therefore a unique ideology behind it.

## Pottery Production

The MBA is witness to developments in the pottery production industry, with new forms, styles and technical aspects of production appearing. The potter's wheel, used to 'throw' vessels, was introduced in the period.<sup>13</sup> The pottery production included innovations, not only in the use of the fast wheel,<sup>14</sup> but also in the use of very refined clay, the firing temperature, the sifting out of inclusions and the change in slip application. The forms obtainable from this type of pottery production were much more varied, and produced finer vessels,<sup>15</sup> and it has

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<sup>13</sup> E.g. Ilan 1995.

<sup>14</sup> Scholars have recently suggested that the fast wheel used for throwing vessels did not appear in the Levant until the Classical Era (Courty and Roux 1995; Roux and Courty 1998; Roux 2003). A number of points need to be made here regarding this hypothesis. First of all, these studies focus on the ceramics of the 4<sup>th</sup>-3<sup>rd</sup> millennium BCE, pointing out that they were wheel-turned and not thrown. This may not hold true of (at least a large portion of) MBA ceramics. The assumption that the evolution from the slow to fast wheel would have needed time to develop (Roux and Courty 1998: 748) is still acceptable when one considers that if the fast wheel appeared in the MBA, over 1000 years would have passed since the invention of the slow wheel. Finally, even if the MBA vessels were wheel-coiled and not thrown (pending further analysis of the ceramic production technology and the *chaîne opératoire* in the MBA), the fine vessels of this period still show the application of production technology and care taken during the shaping of the vessels at a level above and beyond that known in periods preceding and following the MBA.

<sup>15</sup> Franken and London 1995.

been claimed that pottery of the region did not reach these levels of quality again until the Roman period.<sup>16</sup>

An interesting aspect of pottery forms is the various types of cooking vessels used in the MBA. Cooking vessels include forms reminiscent of previous periods – globular cooking pots – predecessors of later forms – carinated cooking pots and baking trays, and forms unique to the period, straight-sided cooking pots and skillets.<sup>17</sup> This is particularly interesting when one considers that cooking vessels are generally considered to be the most conservative vessel type, remaining unchanged despite introductions of new ceramic aspects.<sup>18</sup> It already has been noted that the different forms represent functional differences.<sup>19</sup> For example, while the idea that pork consumption can be linked with straight-side handmade cooking pots is no longer acceptable,<sup>20</sup> it still seems likely that different types of cooking pots were used for different types of foods and/or cooking methods.<sup>21</sup> This is an additional innovation in the pottery of the period, as beforehand, in the Early Bronze Age (3300-2300 BCE) and Intermediate Bronze Age (2300-1900 BCE), and afterwards in the Late Bronze Age (1500-1200 BCE), there seems to be relative unity in cooking pot types. This likely suggests innovation in dietary habits as well, with the introduction of new foods that brought about the use of the different cooking pots, as well as possibly new methods of agriculture.

### **Ramparts and Other Fortifications**

The earthworks of the MBA are considered one of the hallmarks of the period,<sup>22</sup> changing the landscape of the region completely, although other innovations in city fortifications, such as the three-pier gate,<sup>23</sup> can be discerned as well. The

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<sup>16</sup> Dever 1987: 161.

<sup>17</sup> Ilan and Marcus forthcoming.

<sup>18</sup> E.g. McGovern 2000: 79.

<sup>19</sup> Stager 2002: 355; Ilan and Marcus, forthcoming.

<sup>20</sup> Maeir 1997.

<sup>21</sup> E.g. Ilan and Marcus forthcoming.

<sup>22</sup> E.g. Dever 1987; Ilan 1995.

<sup>23</sup> Gregori 1986.

ramparts were originally explained as large parking lots for chariots.<sup>24</sup> Once this theory was abandoned, it was suggested that they served as fortifications in response to new weaponry such as the battering ram,<sup>25</sup> as an obstacle in attempts to tunnel under walls,<sup>26</sup> or as a response to the siege tower.<sup>27</sup> The defensive aspects of these structures were soon called into question, with claims that in many examples, they did not contribute to the security of the sites which they surrounded.<sup>28</sup> For example, many of them facilitated the approach to the city, rather than make it more difficult. Many of the structures were not crowned with a city wall. Certain sites were left unsettled, leaving no need for fortifications.<sup>29</sup> In turn, various social explanations were offered, including the construction of the ramparts as a display of power of upcoming rulers. In a competitive peer-polity atmosphere, competition between these leaders led them to outdo each other and construct larger ramparts.<sup>30</sup> Others suggested different applications in different circumstances, with certain ramparts used for fortifications, others as constructional fills for public buildings, while others still were used as artificial podia in order to raise the height of a public building, in order to make it more magnificent.<sup>31</sup>

Whether they were built for security or not, the earthen ramparts created in this period were an innovation of the MBA in the southern Levant. Whether or not they were built as part of fortifications does not mean that they were not built with other intentions as well.

## Weaving

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<sup>24</sup> E.g. Garstang 1931: 184.

<sup>25</sup> E.g. Kenyon 1979: 165-166.

<sup>26</sup> Stager 1991: 30.

<sup>27</sup> Burke 2004: 334-335.

<sup>28</sup> E.g., Tel Michal – Herzog 1997: 129.

<sup>29</sup> Finkelstein 1992; Bunimovitz 1992.

<sup>30</sup> Bunimovitz 1992: 225-228.

<sup>31</sup> Finkelstein 1992: 206-207.

“...The Warp-weighted loom was abruptly imported into Palestine precisely in the Middle Bronze Age”.<sup>32</sup> In her comprehensive study on textiles from the Neolithic and Bronze Ages, Barber expresses her opinion on the drastic change in the character of weaving in the MBA southern Levant. Innovations in the field included the introduction of loom weights used on the warp-weighted loom and spindle whorls and a new style of stitching.<sup>33</sup> Barber explains that these changes were a result of the immigration of women (who were weavers) from Anatolia, although pointing out many problems with this theory – primarily the lack of a geographic trail linking the source with the destination.<sup>34</sup> However, even if one accepts the hypothesis of immigration of a small group of women, this does not explain the widespread appearance of the loom-weights in the southern Levant as suggested by Barber. Even if a few foreign women introduced the warp-weighted loom along with all of its parts, the adoption of its use by many – i.e. the innovation of the loom – must have been promoted by other factors. It is also interesting to note that textile innovations in Egypt during the MBA may have been a result of diffusion from Canaanite practices.<sup>35</sup>

## **Metallurgy**

The introduction of tin bronze to Canaan occurred in the MBA.<sup>36</sup> The importance of this innovation is the quality of the metal, as the addition of a small percentage of tin (up to 10%) to copper greatly increases the quality of the alloy.<sup>37</sup> It seems that in Canaan, tin bronze was produced, while arsenic bronze appears in Egypt.<sup>38</sup> This is attested to, for example, in the difference of bronze alloys from Jericho and Tell el-Daba in Egypt. While the arsenic bronze produced may have been coincidental, as certain sources of copper contain arsenic naturally, the addition of tin was intentional, as it does not appear naturally in copper sources,

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<sup>32</sup> Barber 1991:165.

<sup>33</sup> Barber 1991:300-301; 165-166.

<sup>34</sup> Barber 1991: 300-301.

<sup>35</sup> Sparks 2004:41.

<sup>36</sup> E.g. Ilan 1995: 298; Philip 1989.

<sup>37</sup> Philip 1989.

<sup>38</sup> Philip 1995.

and reached the region from a far distance.<sup>39</sup> The innovation of tin bronze greatly improved tools and weapons of the period and enabled the creation of a variety of styles in weapons, tools and jewelry.<sup>40</sup>

## **Glass**

Very little is known of glass during the MBA. A glass bead from Dan is the earliest known example of glass from the southern Levant, dating to the first part of the MBA.<sup>41</sup> Other glass finds were found at Jericho,<sup>42</sup> Megiddo and Tell el-Ajjul, suggesting that glass first appeared in the southern Levant in this period, with documents from Egypt suggesting that intentional glass production occurred specifically in Canaan.<sup>43</sup> The production of glass cannot be defined as an innovation due to the lack of finds, suggesting that it was not widespread until the Late Bronze Age.<sup>44</sup> It is possible however that the glass finds dating to the MBA attest to attempts made to master the skills that developed in the subsequent period. This is still speculative, as the glass finds could have just as easily reached the region through trade from regions already experimenting with glass, such as Mesopotamia.<sup>45</sup>

## **Summary: technological change in the Middle Bronze Age**

In reviewing the above-mentioned evidence, it is clear that a significant amount of technological change occurred in the MBA southern Levant. Innovation can be seen in various aspects of pottery production, fortifications (including ramparts), weaving, and metallurgy (which in turn brought about innovation in many other aspects of material culture, including weapons, tools and jewelry). Innovation regarding glass production is more questionable, although at the least it can be

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<sup>39</sup> Philip 1995:75-76.

<sup>40</sup> Philip 1989.

<sup>41</sup> Ilan 1993; 1996.

<sup>42</sup> Kenyon 1960: Fig. 138:4-8.

<sup>43</sup> Lillyquist 1993: 52, 57.

<sup>44</sup> E.g. Ilan 1993: 233.

<sup>45</sup> E.g. Moorey 1985: 194-199.

considered within the process of invention (particularly if one separates discovery from invention).<sup>46</sup> Other innovations include certain aspects of city planning attested to at various urban sites, including water systems.<sup>47</sup> Other crafts that were introduced and flourished in the MBA include bone inlays used for decoration<sup>48</sup> and vessels made of gypsum stone.<sup>49</sup> It seems clear, therefore, that the first impression that the MBA is a period of accelerated technological change seems justified. However, in order to further examine this possibility, one must compare the MBA Southern Levant to other periods and regions, in order to see if it is any different in these terms.

### **The Middle Bronze Age Southern Levant in Retrospect**

As Renfrew has stated, in order to analyze the role that innovation played in a society, one must examine the diversity in technological development in that society before and after, in order to see what was different.<sup>50</sup> The technological developments made in MBA Canaan lie in complete contrast with the periods preceding it and following it. The Intermediate Bronze Age, which precedes the Middle Bronze Age, is witness to the abandonment of urban life in favor of a rural lifestyle, and a relatively static culture.<sup>51</sup> In the Late Bronze Age, there is a regression in technological innovation, with the abandonment of certain innovative features that were introduced in the MBA (no earth works are undertaken in this period, the potter's wheel is no longer used, etc.), and a newly found importance is placed on imported products throughout the region. This may have been a direct result of Egyptian policy.<sup>52</sup> This shows the distinct nature of the MBA Age attitude towards technology. While it already has been suggested that the urbanism of the MBA is the reason for developing

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<sup>46</sup> E.g. Shortland 2004.

<sup>47</sup> E.g. Dever 1987: 153, 159.

<sup>48</sup> Sparks 2004: 36.

<sup>49</sup> Sparks 2001: 99.

<sup>50</sup> Renfrew 1984: 413.

<sup>51</sup> E.g. Mazar 1990:151.

<sup>52</sup> See Knapp et al. 1988:101 and below.

technology,<sup>53</sup> urbanism alone cannot be the reason for changing attitudes towards technology.<sup>54</sup> In fact, even when comparing the MBA to other periods of urban growth (e.g. Early Bronze Age II-III, Iron Age II-III), it seems that the innovative nature of the period is still strikingly different, with many more technologically related changes occurring in the material culture. Can the apparent innovative nature be seen as something that affected a wider region in the period, and that the changes in the southern Levant were only part of a larger picture of technological advancement? Comparison to the situation in Egypt may help answer this question.<sup>55</sup> The situation in Egypt differs greatly to that of Canaan. Innovation does not seem to occupy the Egyptians in the same manner. In fact, many of the innovations introduced in Egypt are the result of West Semitic peoples living in Egypt, and not of the Egyptians themselves.<sup>56</sup> It has also been suggested that with the rise of the New Kingdom, many innovations were introduced, particularly in military technology, due to the change in attitude of Egyptians towards technology.<sup>57</sup> Furthermore, it seems that during the New Kingdom, when many innovations were made, it was a result of externally developed technologies/innovations, which were accepted in the Egyptian courts during this time.<sup>58</sup> While this is certainly not to say that no innovations were made directly in Egypt, it certainly stresses that this was not their primary interest. This is not surprising considering the dissimilar status of Egypt and Canaan. Canaan

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<sup>53</sup> Dever 1987: 152, 161; Ilan 1995: 298.

<sup>54</sup> Renfrew 1981: 267.

<sup>55</sup> A comparison to the attitudes towards technology in regions such as the northern Levant may be quite interesting, and may help understand whether or not the northern regions held the same feelings towards technological innovation as the southern regions. However the purpose here is to set apart the southern Levant from what can easily be seen as different (i.e. Egypt), in order to show its different attitude. The differences between the southern and northern Levant are much less distinct, particularly since the material culture of the two regions are quite similar, and the borders between the regions are far from being clear-cut (for example, where does one place the large city of Hazor, which has clear northern affinities and differs greatly in size to the more southern cities). The question of whether the ideas presented here hold true for the northern Levant as well is a difficult one and one that requires intimate knowledge of the culture of that region. I believe that the northern Levant should be viewed differently, particularly considering the more direct continuum from earlier periods, both in material culture and in technological change. Regardless, the suggestions in this paper are restricted to the southern Levant.

<sup>56</sup> Moorey 2001: 12; Sparks 2004: 40-41.

<sup>57</sup> Shaw 2001: 68-69.

<sup>58</sup> Moorey 2001: 11-12.

was clearly trying to recover from a period of pastoral life, and enter into a 'global' world (see below). Egypt was at the forefront of this world, and did not need to make any effort to enhance its status. In fact, there are numerous examples of the leading political/military/economic force not being the leader in technological innovation, as was the case for Egypt in the Middle Kingdom or the Second Intermediate Period. It has been noted that while the poor and weak entities do not participate in innovation due to a lack of means, the rich and powerful entities also do not participate in innovation, as they do not wish to risk the status quo which places them at the head of the table. As innovation is a risk, they leave it to others to fall.<sup>59</sup> This has not only been suggested for Egypt during the MBA, but for other empires as well. For example, it has been suggested that the Roman Empire prevented many inventions from reaching the innovation stage, so as not to disturb the status quo, with the only exception being military innovation.<sup>60</sup> And even military innovations that could have been applied to civilian operations were not implemented for this same reason.<sup>61</sup> As Renfrew has acknowledged, it is easier to remain the same, unless ultimately necessary.<sup>62</sup> Many times, the adoption of an innovation is rejected because of the context in which it is introduced.<sup>63</sup> Egypt may not have been the right context for certain innovations, but MBA Canaan was.

With this in mind, it seems that something drove the people of MBA Canaan to embrace technological development. The spread of new technologies must have reflected social and ideological beliefs.<sup>64</sup> In my view, this was the belief in technological determinism alongside a desire to participate (as a major player) in the rising global environment. This is true both on a collective and individual level.

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<sup>59</sup> Geselowitz 1993: 242.

<sup>60</sup> Finley 1965.

<sup>61</sup> Finley 1965: 44.

<sup>62</sup> Renfrew 1984: 404.

<sup>63</sup> Bulliet 1994: 214.

<sup>64</sup> Sherratt and Sherratt 2001: 25.

## **Social Construction of Technology, and Technological Determinism in the Middle Bronze Age Levant**

### **Defining Technological Determinism and Social Construction of Technology**

Technological determinism refers to the belief that technology is in many instances a central force in society and changes that occur within that society.<sup>65</sup> The idea of technological determinism has been applied primarily to post-Industrial Revolution societies, following the belief of scholars of modern history, as well as many archaeologists, of changing attitudes towards technology and change.<sup>66</sup> Yet, this change in attitude has more recently been called into question, stressing that the same reasoning behind technological change in the present is true of the past, and that it is acceptable to use modern concepts in understanding social attitudes towards innovation.<sup>67</sup> Others, who have studied pre-capitalist societies, stress that technology cannot solely be connected to economics, and must have a social agenda as well.<sup>68</sup> For example, the idea that technology enhances power has been applied to extremely different societies, like those of the Italian Renaissance,<sup>69</sup> as well as the Ju/'hoasni and G/wi tribes of Botswana, Africa.<sup>70</sup>

However, the idea of technological determinism has been further called into question, regardless of whether in modern or pre-modern societies.<sup>71</sup> Many are of the opinion that technological determinism is a fallacy, in that technology does not determine human action, but rather human action forms the development of technology. This view has been labeled The Social Construction of Technology –

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<sup>65</sup> E.g. Smith 1994: 2; Bimber 1994: 83.

<sup>66</sup> Cf. Dobres 2000:5-6.

<sup>67</sup> E.g. Dobres and Hoffman 1994: 234; Perdue 1994: 170, 196; Dobres 2000: 9.

<sup>68</sup> Bulliet 1994.

<sup>69</sup> Misa 2004.

<sup>70</sup> Dobres 2000:121.

<sup>71</sup> E.g. Loney 2000.

SCOT,<sup>72</sup> stressing the social aspects behind technology, and not the influence of technology on society and its views.

While in general, these two outlooks are viewed as contradictory, it is possible to intertwine them in order to understand social aspects of technological change. This is particularly true of 'soft' determinism, but can relate to 'hard' determinism as well. 'Soft determinism' stresses the human actions behind the technology, while 'hard determinism' views technology as an independent agent of change.<sup>73</sup> By integrating the ideas behind the adoption of innovation and technology on a broad scale (SCOT), the influences of the technology on society (soft determinism) and the (hard deterministic) view of that society on the influences and advantages of technology, it is possible to understand the reasons for advancing innovation and the affects of that innovation on the attitudes towards technology, and the society itself.

### **The Middle Bronze Age Levant – A Technologically Determined Society**

Why should a social approach to technology even be relevant for MBA Canaan? Can it not be said, as Shaw suggested,<sup>74</sup> that one technological novelty led to the next, in an ongoing cycle of innovative behavior? Yet there are many reasons to believe that there were ideologies behind the innovation. First and foremost, the social environment is critical to adopting innovations, as noted by the rejection of innovations in certain circumstances and acceptance in others.<sup>75</sup> As Dobres 2000: 96 has already pointed out, 'technologies are meaningful acts of social engagement with the material world that serves as a medium through which world views, values and social judgments are expressed tangibly and reaffirmed or contested in practice',<sup>76</sup> and 'technologies are meaningful acts of social engagement with the material world that serve as the medium through which

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<sup>72</sup> E.g. Pinch and Bijker 1984; 1986.

<sup>73</sup> Marx and Smith 1994: xiii-xiv.

<sup>74</sup> Shaw 2001:68.

<sup>75</sup> E.g. Heilbroner 1994:62.

<sup>76</sup> Dobres 2000: 96.

world views, values and social judgments are expressed'.<sup>77</sup> For example, recent studies on the production of pottery in the ancient world stress the need to see social reasoning behind the technological advancement (and lack of advancement for that matter) in this field.<sup>78</sup> In this light, it seems impossible to ignore the social preconditions of technological change in the MBA. This becomes particularly apparent when one considers the differences between this period and what preceded it and followed it. If the development of technology follows the principle of a smooth continuum, where innovations lead to more innovations (but on a regular pace), then there should be no jagged peaks that illustrate great increases or decreases in technological development.<sup>79</sup> Yet, such a peak is exactly what occurs between the Intermediate Bronze and Late Bronze Ages. This peak between two periods of dormancy can only be explained through understanding the social/ideological atmosphere that existed during the period of this peak.

As pointed out above, it seems that in the MBA extensive technological advancement was made, and that that advancement must have been linked to an ideology related to invention/innovation. The basic question is what was to gain through accelerated innovation as an ideology. When taking into account the context of these changes – i.e., the Ancient Near East in the MBA – it is necessary to consider the entire global environment.<sup>80</sup> As mentioned above, Canaan could not be considered one of the dominant powers of the ancient Near East. Yet, in order to participate in the global environment that was developing

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<sup>77</sup> Dobres 2000: 126.

<sup>78</sup> E.g. Gosselain 1992; Roux 2003; Berg 2006.

<sup>79</sup> Heilbroner 1994: 57.

<sup>80</sup> The concept of globalization in ancient societies is far from agreed upon. One may argue that in ancient societies, the complexity of interaction between entities does not compare to modern world globalization (e.g. Rosenberg 2002:3). It is easier however to accept the existence of a global society in terms of the broader definition of globalization as “the intensification of worldwide social relations” (Giddens 1992: 64). The extent of the global society in the MBA is beyond the scope of this paper. For our purposes, it is enough to concede that different societies interacted politically, socially and economically, affecting one another. This interaction can be noted from the earliest parts of the period. For example, the Execration texts found in Egypt, clearly demonstrate the interest that Egypt had in other parts of the world. It is therefore possible to see the effects of this type of globalization on the decisions that a society makes regarding its own role in this movement.

around them, it was necessary to demonstrate their “right” to do so in this network. In order to do so, they needed to demonstrate power not only to the outside world, but to themselves as well. This does not necessarily refer to military or economic power, but the perception of power in its entirety. That innovation and technological knowledge is perceived as power is a commonality when studying past cultures as well as our own. For example, it has been noted that many officials in the early days of the USA, as well as the general population, saw technology as the source of power available to them that would enhance their political and economic independence.<sup>81</sup> Innovations in the Renaissance also served as a source of power.<sup>82</sup> The innovative ironworking in Karawe society in Peru was seen as a source of power within society.<sup>83</sup> Metal and weaving technologies in the Andes were also a source of perceived power.<sup>84</sup> In the post-World War II environment, Japan abandoned the attempt to be a militarily superior, and turned to technology as its source of power. Japan began to concentrate on civil technology, and through it became a major force in the global world.<sup>85</sup> Samuels states that “today, technological capabilities are stressed more than military ones in the calculation of wealth and power, whether the observer is civilian or military.”<sup>86</sup> I would contest that this is true not only of today, but of choice societies in the past, particularly those that participated in a global environment. These are just a few examples that show that technological advancement is perceived as power in modern and ancient societies. This is what led the population of MBA Canaan to embrace innovation. The innovative nature of this society provided them with the power to be a real player in the global world, amongst already established players, such as Egypt. While each individual innovation may have made its own contribution, on a whole, innovations provided Canaan with the necessary power to stake their claim in the global world.

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<sup>81</sup> Smith 1994:4-5.

<sup>82</sup> Misa 2004.

<sup>83</sup> Reid and MacLean 1995:145.

<sup>84</sup> Lechtman 1993.

<sup>85</sup> Samuels 1994.

<sup>86</sup> Samuels 1994: 34.

Individually, the innovations helped display this power. Innovations, such as weaving, pottery production, various crafts (e.g. bone inlays, possibly glass), and the new forms of metal tools and jewelry that were being produced thanks to the introduction of bronze, served to display the technological innovations made on a large scale for all to see. Furthermore, the superiority of bronze was surely known, and those who held knowledge of innovative metalworking were always perceived as powerful (see examples above on metallurgy). The perception of ramparts as power is easily conceivable. The structures not only provided the perception of security for those living within their confines, but also created a feeling that the Canaanites were in control of their landscape, reshaping it as they pleased. Mitchell has suggested that landscape is an instrument of cultural power.<sup>87</sup> The ideological reasoning behind ruling the landscape – and in turn exerting one's power on it – also promotes this power to one's self and their cultural surroundings.

In order to facilitate the wide-spread adoption of technological innovation, it is necessary to convince the wider population that innovation is good for them. Even if patriotism is part of the motive, it is easier to bring out that patriotism through the changes in daily life provided by the innovations.<sup>88</sup> In order for the society as whole to adopt innovation, it was necessary for the individual to believe in it as well, so that those that come into contact with the new item accept it.<sup>89</sup> If the individuals in society are not given a reason for the change, they may reject it.<sup>90</sup> This is all the more true for societies, such as that of the MBA, where most innovation was not made in laboratories, but rather in day-to-day workshops.<sup>91</sup> While methods of advertising and spreading the news of the new technologies were very different, one can use the technological determinism present in the USA after the Industrial Revolution as an example of how the ideas

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<sup>87</sup> Mitchell 2002: 2.

<sup>88</sup> E.g. Smith 1994: 3.

<sup>89</sup> Renfrew 1984: 393.

<sup>90</sup> E.g. Guille-Escuret 1993.

<sup>91</sup> Renfrew 1984: 395.

were spread from those who wished to spread them, to the masses. In this period, not only were individuals being convinced that technology shaped the future, and provided their nation with power – i.e. an appeal to their partisanship – but that technology made them and their lives better.<sup>92</sup> The same can be applied to MBA Canaan. Individuals may have viewed structures such as ramparts as providing them with security.<sup>93</sup> Better tools (of bronze as opposed to copper) made their work easier and more productive. Pottery and crafts appealed to visual aspects of life, which showed their fine quality and in turn, the fine quality of the owners of the products. Yet at the same time, they made a broader symbolic statement on the importance of that technology.<sup>94</sup> Therefore, the individual may have seen the bigger picture as well, but as the technologies affected day-to-day life for the better, he/she was more inclined to accept the innovations. On a collective level, this played a role as well, but more so the ideological aspects discussed above.

What follows in the Late Bronze Age is a direct result of the ideology of the preceding period. When comparing the culture of the Middle and Late Bronze Ages, a contradictory feeling is perceived. On the one hand, there is a strong feeling of cultural and demographic distinction between the two periods (e.g. the differences in clay noted by Franken and London,<sup>95</sup> the differences in the urban nature of the period, etc.), while on the other hand there is clear cultural continuity between the two.<sup>96</sup> Pottery is a good tool for illustrating the similarities and differences between the two periods. The forms of the latter part of the MBA and the earlier part of the Late Bronze Age are strikingly similar. However, the clay used is different, with well-sifted, plastic clay used in the MBA and less fine clay used in the Late Bronze Age. Furthermore, the fast wheel which was used in the earlier period disappears for the most part in the later period. It seems,

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<sup>92</sup> Smith 1994: 15.

<sup>93</sup> Whether or not ramparts were built as defensive structures is irrelevant here. Regardless, they may have been presented as such to the individuals living in those cities, in order to have them accept the idea.

<sup>94</sup> Franken and London 1995: 221.

<sup>95</sup> Franken and London 1995: 217.

<sup>96</sup> E.g. Bunimovitz 1989: 191.

therefore, that what changes are the technological aspects of production, while the forms remain for the most part.

Why should we expect to see the abandonment of technologically favorable production methods? Knapp has noted that Egyptian policy during the Late Bronze Age included sanctions against innovation, particularly in pottery production.<sup>97</sup> If one takes this in light of a technologically determined ideology in the time preceding this, it makes sense to think that the Egyptians would impose such sanctions, in order to undermine what the Canaanites saw as their source of power.

## **Conclusions**

Trying to understand social aspects of technological change has been widely applied to individual aspects of technology. However, could there have been an ideology behind innovation, which led to widespread innovation, as in post-Industrial Revolution societies? Societies of the past were no different than those of today, leaving no reason to assume that there would not be a societal value placed on technological developments in certain environments. The MBA Canaanite society is exactly one of these cases. This is made clear by the vast amount of innovations (and possibly inventions as well) that were undertaken within this society. This comes in contrast with Canaanite society before and after, which was clearly less involved with technological advancement. The Canaanite society of the MBA promoted technological innovation for a number of reasons. On a more collective level, the Canaanites were trying to shape their niche in a developing global environment. The advancement of technology granted them power within a global environment of existing “superpowers” (i.e. Egypt and the Mesopotamian world). The power associated with the technological advancement was not only self-perceived, but meant to be perceived by others in the same manner. This is attested to by the specific

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<sup>97</sup> Knapp 1988: 101-103.

innovations that were applied, which were very physically apparent (e.g. pottery, tools and weapons, ramparts). That others perceived Canaan as a technologically advanced society has already been noted. For example, Egyptian sources use West-Semitic terminology – i.e. terms from the Levant – for various crafts and technologies indicating the source of the item, and it has also been noted that Egypt did not introduce new technologies, but rather received them from regions that it perceived as its periphery – i.e. Canaan.<sup>98</sup> Furthermore, it has been stated that the large-scale Canaanite presence in Egypt during the MBA caused technological influence and innovation there.<sup>99</sup>

The added value of economic advantages provided by technologies themselves was certainly also a factor in their development, as suggested by others.<sup>100</sup> However the power they provided was no less important in introducing and maintaining their status in those markets.

On an individual level, various reasons probably contributed to the perception of technological innovation amongst the people of the community. First of all, many of these technologies provided certain comforts which would not have been available otherwise. Other innovations provided better quality products, making work easier. Still other innovations provided heightened security. All of these together led to a higher standard of living, adding fuel to the fire burning behind the ideology of technological determinism. This was also probably strengthened by a feeling of patriotism in Canaan during their cultural, political and economic “zenith.” As others before have said, it is the environment in which a discovery is introduced that determines whether it succeeds to pass as an innovation.<sup>101</sup> Shaw expands this, listing five factors that must be present for technology to be adopted: access to materials, knowledge, craftsmen, a social or political need,

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<sup>98</sup> Moorey 2001: 6, 12.

<sup>99</sup> Sparks 2004: 40-41.

<sup>100</sup> E.g. Philip 1995: 81.

<sup>101</sup> Shortland 2004: 10.

and a suitable social context.<sup>102</sup> All of these factors were available in the MBA. As seen here, the environment in MBA Canaan not only allowed for innovations, but encouraged them.

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<sup>102</sup> Shaw 2001: 62.

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