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WINDING CLOCKS ON SHABBAT: AN EXAMPLE OF THE PARALLEL DEVELOPMENT OF TECHNOLOGY AND HALAKHA

INTRODUCTION

One element of the process of halakhic development that is particularly fascinating is how halakha develops and expands to incorporate new technology. In this article, I present a summary of the parallel development of the technology of mechanical clocks and the halakhic discussions about their use on Shabbat that spans six centuries. With each new technological advance, new halakhic issues entered the discussion, the gamut of halakhic topics relevant to the use of clocks expanded, and the range of halakhic rulings broadened. In conclusion, I discuss different approaches to the application of halakha to new technologies which are found in the discussions about the use of clocks on Shabbat.

THE FIRST MECHANICAL CLOCKS: BELL TOWERS

The precursor to mechanical wind-up clocks began to appear in the 13th and 14th centuries in the form of automated weight-driven bell towers. These towers often had no faces or hands, but only a weight-driven time

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keeping mechanism which rang the bells at certain hours, generally to indicate the times for daily prayers. These automated bell towers were found primarily in monasteries.¹

Secular wind-up clock towers, often located at the center of a town, became common in Europe in the 15th century. During this period, clock faces with hour hands began to be added to the towers to allow people to see the time between bell-rings. The mechanisms on these towers were wound at least once a day. They then counted and chimed hours with an accuracy of anywhere from 15 minutes to 2 hours per day.²

Wind-up clocks first appear in the halakhic literature in the responsa of two contemporary early 15th century scholars: the Mahari Veil and Rav Yehuda Liva Landa (quoted by his son in the *Sefer ha-Agur*).

The Mahari Veil (*Shut Mahari Veil, siman 130*) addresses the question of whether a *kli he-asui le-mishkolot le-hashmia kol lefi seder ha-sha'ot*, a device made with weights to make sounds according to the hours, can be left operating on Shabbat. His ruling is that it may not be left operating on Shabbat, just as a grindstone may not be left operating on Shabbat, because it makes a lot of noise.

In the *Sefer ha-Agur (siman 519)*, Rav Yaakov Landa quotes the ruling of his father Rav Yehuda Landa that a *zug ha-mekashkesh le-sha'ot asui al yedei mishkolot*, a bell that chimes the hours made with weights, may be left operating on Shabbat. He differentiated such a bell from a grindstone in that everyone knows that a bell is wound each day for the following day and that they are not wound on the day that they are chiming.

The difference of opinion between these two early posekim could have any one of a number of explanations. It could be based on a disagreement about the reason for (and/or parameters of) the rabbinic decree not to leave noise-making devices operating on Shabbat. Rav Yehuda Landa clearly understands the reason for the decree to be that one who hears the noise may suspect that someone has violated the Shabbat. He apparently also sees this as applicable only to situations where people are likely to suspect that someone violated the Shabbat. The Mahari Viel, on the other hand, may think that the decree was inclusive of any situation that involves loud noise and has nothing to do with people thinking that someone violated the Shabbat. Rather, the public awareness (as a result of the noise) of a

¹ All general information on the history of mechanical clocks for which no other reference is cited is from Wikipedia “History of timekeeping devices” and “Clock tower.”

² Willis I. Milham, *Time and Timekeepers*. (New York: MacMillan, 1945), 83 and W. Houtkooper, “The Accuracy of the Foliot,” *Antiquarian Horology* 20:1 (Spring, 1992), referenced in Wikipedia “Verge escapement.”

prohibited activity occurring on Shabbat is inappropriate and must be prohibited, even if the activity is occurring in a permissible manner.

Another possibility is that the Mahari Veil would agree with Rav Yehuda Landa about the nature of the decree, but he was not as familiar with clock towers and was simply not aware that it was common knowledge that they were wound each day for the following day.

A third possibility is that the difference in halakhic ruling results from an actual difference in the common practice of clock winding in the places where these posekim lived. This is entirely speculative, as I have not been able to find any documentation of the common practices of clock tower winding in different locations. However, it is known that in the 15th century in Germany, where the Mahari Veil lived,³ hours were counted from midnight, whereas in Italy, where Rav Yehuda Landa lived, after moving from Germany,⁴ hours were counted from sunset.⁵

Since these clock towers generally needed to be wound and set every day, it is most likely that they were wound and set either at sunrise, noon, or sunset, as these are the most easily and accurately identified times of day. In a place where the hours are counted from sunset, it would make sense to wind and set the clocks at sunset. However, in a place where the hours are counted from midnight, there might be no particular preference to set the clocks at sunset rather than at sunrise or noon.

It is possible, therefore, that in Italy it was common practice, and well known, that clocks were wound at sunset, i.e. before Shabbat, for the following day; whereas in Germany this was not necessarily a common practice.

The ruling of Rav Yehuda Landa, allowing chiming clocks to be left running on Shabbat, is quoted by both Rav Yosef Karo and Rav Moshe Isserles, the two major halakhic authorities of the 16th century, in their respective commentaries on the Tur (Beit Yosef Orah Hayim 338 and Darkei Moshe Orah Hayim 252) and in the Shulhan Arukh (Orah Hayim 338) and Rema (Orah Hayim 252).⁶

It is interesting to note that Rav Yosef Karo, who wrote the Beit Yosef and Shulhan Arukh while living in Turkey and Tzefat, and Rav Moshe

³ WikiYeshiva, “Rabbi Yaakov Veil” available at yeshiva.org.

⁴ Rav Yosef Buksbaum, *Or ha-Mizrah* 49:3-4, 37, and the introduction in *Sefer ha-Agur ha-Shalem* by Rav Moshe Hershler.

⁵ William J. H. Andrewes, “A Chronicle of Timekeeping,” February 2006.

⁶ Although the Darkhei Moshe also quotes the Mahari Veil, he quotes him only to support his opinion that we do not allow leaving a grindstone to run on Shabbat, but as far as leaving a chiming clock running on Shabbat, he rules in the Rema according to the Agur that it is permissible.

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Isserles, who lived in Poland, were both in places that counted the hours from sunset, as was the practice in Italy where Rav Yehuda Landa lived. Their ruling according to the Agur is therefore consistent with the possibility that the disagreement between the Agur and the Mahari Veil was a result of the common clock winding practices in their respective countries.

SILENT CLOCKS AND POCKET WATCHES

In the 14th and 15th centuries, mechanical clocks were driven by hanging weights which required the clock to be stationary and high enough to have room for the weights to fall. The invention of the spring-powered clock in the early 16th century⁷ allowed clocks to be made smaller, movable, and more easily brought into the home or even worn as pendants or pocket watches.

The popularization of portable clocks, together with clock faces with hour hands (and sometimes minute hands, though these were not yet popular due to the poor accuracy of the clocks) led to the gradual removal of the bells and chimes, which were no longer necessary.

Silent clocks raised a new halakhic question: what is the basis for the assumption that one is not allowed to wind a clock on Shabbat, and does it apply to silent clocks as well?

The rulings of the Agur, the Shulhan Arukh and the Rema, and certainly the Mahari Veil all imply that winding a chiming clock on Shabbat would not be allowed. However, none of them indicate why it is prohibited. As silent clocks became popular, the halakhic authorities began to address the question of whether or not they could be wound on Shabbat, and the basis for not winding chiming clocks on Shabbat was debated. A number of 18th century scholars voiced opinions on this question, and the debate continues to this day.

A summary of some well-known opinions is presented here in chronological order:

Panim Me'iroit (1670-1744) – The Panim Me'iroit (question 122) is asked about carrying a pocket watch on Shabbat. He rules that unlike a sundial and hourglass, which may not be used on Shabbat because their use requires an act of measuring on the part of the user, a pocket watch

⁷ National Institute of Standards and Technology, “A Walk Through Time – A Revolution in Timekeeping,” <https://www.nist.gov/pml/walk-through-time-revolution-timekeeping>.

does not require an act of measuring on the part of the user and therefore may be used and carried on Shabbat. He then goes on to say that it would even be permissible to wind a pocket watch on Shabbat because a wind-up clock is designed to unwind and be rewound. Therefore, the winding of a clock on Shabbat is akin to putting together a vessel that is made to be put together and taken apart (*mita refuyah* and *kos shel perakim*; the ancient halakhic equivalent of today's folding chair). In giving this ruling, the Panim Me'iroi seems to be assuming that the prohibition of winding a chiming clock on Shabbat relates only to its noisemaking and would not apply to a silent clock.

Pri Megadim (1727-1792) – The Pri Megadim suggests a number of possible reasons for the prohibition of winding a chiming clock on Shabbat. In *Siman 308 (Eshel Avraham 78)*, the Pri Megadim disagrees with the Panim Me'iroi, commenting that the prohibition seems like it should be on a Torah level, otherwise it should not have been compared to leaving wheat grinding in a grindstone. He therefore suggests that a clock might be different from a vessel that is made to be put together and taken apart because when it is unwound it is not considered a vessel at all. Winding it would therefore be a Torah prohibition of *makke be-patish*, completing a vessel. He then adds that it may also be a rabbinic prohibition because it is like measuring. He concludes that it would be permissible to wind a clock on Shabbat only by a non-Jew or for the needs of a sick person.

In *Siman 252 (Mishbetsot Zahav 7)*, he says that it is questionable whether or not it would be permissible to ask a non-Jew to wind a clock for a Jew on Shabbat because it may involve a Torah-level prohibition.

In *Siman 338 (Mishbetsot Zahav 2)*, he says that even if we would permit winding a silent clock on Shabbat, it would still be prohibited to wind a chiming clock because it is doing an action to create sound on Shabbat, which is like playing an instrument, and would be prohibited out of concern that one might fix it on Shabbat.

Har ha-Carmel (published in 1782) – The Har ha-Carmel (*Shut Har ha-Carmel*, Orah Hayim, question 1) was asked explicitly what is the prohibition, that the Shulhan Arukh and the Rema are assuming exists, of winding a chiming clock on Shabbat. The Har ha-Carmel begins his response by suggesting four possibilities: *binyan* (building), *makke be-patish* (completing a vessel), *shevitat keilim* (the requirement for one's vessels to rest on Shabbat), and *hasbma'at kol* (using a vessel to make noise). He then proceeds to explain why none of these prohibitions would apply to winding a clock on Shabbat.

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I will summarize only a few excerpts from his lengthy discussion, highlighting points with which other posekim disagree.

- With regard to *makke be-patish*, he makes two interesting points: 1) Since all of the parts of the clock are already connected, and one who winds it is only rearranging them by moving the chain from one wheel to another, this would not be considered *makke be-patish*. 2) Since the clock will certainly begin to unwind again as soon as you finish winding it, this cannot be considered completing a vessel, since the action that you are doing will necessarily become undone.
- With regard to *shevitat keilim*, he comments that even if we prohibited work to be done by vessels on Shabbat, in the case of a clock, the clock is not doing any prohibited work. The prohibition of ringing a bell on Shabbat is only a rabbinic decree, and it would therefore not be defined as prohibited work for a vessel. He concludes by commenting that this issue is irrelevant according to most posekim who hold that the requirement of *shevitat keilim* is an opinion of Beit Shamai and is rejected by Beit Hillel, which is the accepted ruling.
- With regard to *hashma'at kol*, he comments that this is only a rabbinic prohibition, and if it applies to clocks at all, it would apply only to chiming clocks and not to clocks that do not chime (any noticeable tick-tock sound would be classified as *mitasek*).

Upon concluding that there is no Torah prohibition involved in winding a clock (apparently even a chiming clock), he addresses the issue raised by the Pri Megadim, namely that the prohibition of winding a clock on Shabbat seems to be a Torah prohibition since it is compared to a grindstone. He overcomes this issue by pointing out that according to the Magen Avraham (Orah Hayim 252:20), even if one puts wheat in a grindstone on Shabbat he would only be violating a rabbinic decree of *shevut*. The Magen Avraham obviously understood that the decree against leaving a noisy vessel operating on Shabbat applies also to activities which are only prohibited by rabbinic decree. It is therefore not necessary to assume that winding a clock on Shabbat should be a Torah prohibition just because it is compared to a grindstone.

The conclusion of the Har ha-Carmel is that winding a clock on Shabbat is prohibited by the rabbinic decree of *mibezi ke-metaken maneh*, the appearance of fixing a vessel.

Hayei Adam (1748–1820) – The Hayei Adam (klal 46, *se'if* 19) compares winding a clock to repairing a broken harp string by winding it around a peg, which according to Rashi in *Eiruvin* 103a is a violation of a Torah prohibition, the *av melakha* of *metaken maneh*.

Hazon Ish (1878–1953) – The Hazon Ish (*siman* 50, *se'if katan* 9) quotes the Hayei Adam and disagrees with him for 2 reasons: 1) the harp repair is permanent, whereas when winding a clock it will immediately unwind and 2) when repairing a harp, one connects a string to a peg, but in a clock the parts are already connected.⁸

The Hazon Ish agrees, however, that winding a clock on Shabbat is a Torah prohibition. He defines the prohibition as *yotser ko'ah hadash*, creating a new force within the device that causes it to move. According to the Hazon Ish, doing an action that provides the device with power to produce motion is a Torah prohibition of either *boneh* (building) or *makke be-patish* (completing a vessel).

The explanations we have discussed for the prohibition of winding a chiming clock on Shabbat and their relevance to non-chiming clocks are summarized in the following table:

Posek	Prohibition for chiming clock	Level of prohibition	Prohibition for non-chiming clock	Level of prohibition
Panim Me'irov	Use of a noisemaking vessel	Rabbinic	None	None
Pri Megadim 1	<i>Makke be-patish</i>	Torah	<i>Makke be-patish</i>	Torah
Pri Megadim 2	<i>Moded</i>	Rabbinic	<i>Moded</i>	Rabbinic
Pri Megadim 3	Use of a noisemaking vessel	Rabbinic	None	None
Har ha-Carmel	<i>Mibzi ke-metaken maneh</i>	Rabbinic	<i>Mibzi ke-metaken maneh</i>	Rabbinic
Hayei Adam	<i>Metaken maneh</i>	Torah	<i>Metaken maneh</i>	Torah
Hazon Ish	<i>Makke be-patish</i>	Torah	<i>Makke be-patish</i>	Torah

⁸ Note that these are the same two reasons given by the Har ha-Carmel for rejecting the possibility that winding a clock would be a violation of *makke be-patish*.

PENDULUMS AND BALANCE SPRINGS

The next major technological advance in mechanical clocks was the invention of the pendulum in 1656, followed rapidly by the invention of the balance spring (1657), the equivalent concept for spring-driven clocks and watches. To improve the control of the speed of clocks, the older oscillating mass foliot mechanism was replaced by the pendulum or balance spring, which are harmonic oscillators which resist disturbances in their natural frequency of motion. This innovation improved the accuracy of weight-driven clocks from about 15 minutes a day to about 15 seconds a day, and of spring-driven clocks and watches from hours a day to about 10 minutes a day.

Although I could not find any explicit mention of this improvement in accuracy in any of the halakhic sources, I will make mention here of two issues that are tangentially related to it.

GIVING THE PENDULUM A PUSH⁹

The Mishna Berura (1838-1933) (338:15) states “if the clock stopped on Shabbat, it is prohibited to wind it and even just to swing the pendulum, and this is a Torah prohibition according to some posekim.” The Mishna Berura lists sources for the prohibition to wind the clock on Shabbat, and references the posekim that say that it is a Torah prohibition. But he brings no sources for the specific prohibition to swing the pendulum. It is not clear from the wording of the Mishna Berura whether he believes that swinging the pendulum would also be a Torah prohibition according to those posekim who say that winding a clock is a Torah prohibition.

None of the posekim listed above mention swinging the pendulum. However, according to the explanations of those who believe that winding a clock is a Torah prohibition, we can assess whether or not these explanations are relevant to swinging the pendulum. The explanation of the Hayei Adam is highly specific to the act of winding, which he compares to fixing the string of a harp, and would therefore presumably not apply to swinging a pendulum. The explanation of the Hazon Ish also seems unlikely to apply, as swinging the pendulum does not provide the

⁹ I include this issue here because people generally associate “giving the clock a push” with a pendulum. Technically, this issue is equally relevant to the foliot mechanism which was the precursor to the pendulum.

power to make the clock work, it only gets it going and then the spring or weights provide the power to keep it going. The Pri Megadim's explanation, however, is general enough that it could possibly include swinging the pendulum. It depends on what he means when he says that a clock that is not wound is not considered a vessel. He may mean what the Hazon Ish says, namely that it is not a vessel because it does not have the power to perform its function. Or he may mean something more general; that anytime it is not going it is not considered a vessel because it requires some "fixing" in order to be used for its function.

In any case, it is fair to assume that even if these posekim would not consider swinging the pendulum to be a Torah prohibition, they would still consider it a rabbinic prohibition for one of the reasons given by the other posekim, all of which would apply equally to swinging the pendulum.

ACCURACY AND *MODED* (MEASURING)

According to the suggestion of the Pri Megadim that winding a clock may be prohibited because of the prohibition of *moded* (measuring) on Shabbat, it is worth considering whether or not the accuracy of the clock would affect this prohibition. The Pri Megadim himself makes only brief mention of *moded* as a possible prohibition, but other posekim discuss the possibility in more detail.

The Panim Me'iroi discusses *moded* as a possible prohibition for winding a clock on Shabbat and rejects it. He points out that those who consider an hourglass and a sundial to be vessels whose use is prohibited on Shabbat are concerned only with measurement of the sand or the shadow, but our clocks do not involve any measuring, they only provide an estimate of the time which is not considered *moded*.

It is not entirely clear from the wording of the Panim Me'iroi whether the distinction between an hourglass or sundial and a clock is related to their accuracy or to their method of use. An hourglass is used by measuring a volume of sand and a sundial is used by measuring the length or angle of the shadow. When using a clock one does not measure anything, but simply looks at the clock and is able to observe the time based on where the clock hands are pointing. On the other hand, the Panim Me'iroi uses the term *mesha'er ha-zman* (estimates the time), which implies that it may be lack of precision that differentiates estimating from measuring. If so, it is possible that his determination that *moded* is not relevant to clocks would have changed as clocks became more accurate.

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It is also worth noting that a number of posekim¹⁰ mention that pocket watches in their time and place were worn primarily as jewelry. Historically, this is associated with the lack of accuracy of early pocket watches, and may underlie their not being classified as a vessel whose use is prohibited. This classification could theoretically change when the increased accuracy of watches makes their primary function timekeeping rather than jewelry.

The Binyan Olam (1789-1853) (*Shut Binyan Olam*, Orah Hayim, question 11) suggests that the prohibition of *moded* would not apply to the measurement of time at all, because *moded* only applies to the measurement of physical things with defined endpoints. He therefore rejects the possibility that *moded* would apply to a clock, seemingly independent of its accuracy.

THE MAINTAINING POWER SPRING

Once the accuracy of clocks had improved to the level of seconds per day, the primary loss of accuracy was during winding, when the clock mechanism did not operate. Numerous solutions allowing winding of the clock without stopping the mechanism were developed over the years, but the solution that was generally adopted was a mechanism referred to as the Maintaining Power Spring developed by John Harrison in the 1720s.

The fact that clocks could now be wound without the mechanism stopping raised an entirely new halakhic question. Many of the reasons for the prohibition of winding a clock are based on the assumption that the clock was not functional before the winding and became functional as a result of the winding. Would the prohibition apply even if the clock was functional before, during, and after the winding?

This question is addressed by almost every posek who discusses clock winding after the mid-1700s and the conclusions cover the entire spectrum of possibilities. I will summarize the well-known opinions from the strictest to the most lenient:

Hayei Adam (1748–1820) – The Hayei Adam (*klal* 46, *se'if* 19), after stating that winding a stopped clock on Shabbat is a violation of a Torah prohibition (the *av melakha* of *metaken maneh*), comments that when the clock is still going, this prohibition might not apply and therefore we can allow winding by a non-Jew for the purpose of doing a mitsva.

Pri Megadim (1727-1792) – The Pri Megadim (*siman* 313 *se'if* 7) says that he has heard it said in the name of one rabbi that when the clock

¹⁰ Pri Megadim 338:2; Rabbi Akiva Eiger, *siman* 308 in the question.

is still going it is permitted to wind it, but that once it has stopped it is forbidden. He says that there is room for such a distinction, but in any case we should not allow the winding to be performed by a Jew, but only by a non-Jew.

The opinions of the Hayei Adam and the Pri Megadim both contain the same two components: doubt about the relevance of the prohibition in the case of a clock that is still going and the conclusion that winding in this case should be allowed only by a non-Jew. Although neither of them spells it out, these two components imply the following halakhic logic: Since there is a *safek* about the prohibition and since we do not apply the decree against asking a non-Jew to perform prohibited work on Shabbat in a case of *safek*, it would be allowed to be performed by a non-Jew.

Rabbi Akiva Eiger (1761-1837) – Rabbi Akiva Eiger (*Mishnat de-Rabbi Akiva*, Orah Hayim, *siman* 308) relates winding a clock on Shabbat to the prohibition of using a noisemaking vessel. However, he believes that even the ticking of the clock would be considered noise for the purpose of this prohibition, and it therefore applies even to clocks that do not chime. With regard to winding a clock that is still going, he suggests that the prohibition of using an hourglass on Shabbat may be a Rabbinic decree based on the prohibition of winding a mechanical clock. Therefore, the same Rabbinic decree would certainly apply to winding a mechanical clock that is still going.

Rabbi Akiva Eiger seems to believe that there is no actual prohibition against winding a clock that is still going, but it would be prohibited as a Rabbinic decree so that we should not come to wind a clock that has stopped.

Ktav Sofer (1815-1872) – The Ktav Sofer (*Shut Ktav Sofer*, Orah Hayim, question 55) disagrees with his grandfather, Rabbi Akiva Eiger, on a number of points. First, he points out that the ticking of a clock is very soft and is not the intended function of the clock and therefore would not be included in the prohibition of using a noisemaking vessel. He backs this up by referencing the Pri Megadim, the Panim Me’irot, and the many other posekim who allow winding a non-chiming clock on Shabbat because the prohibition of using a noisemaking vessel applies only to a chiming clock, whose purpose is to chime.

Secondly, he disagrees with Rabbi Akiva Eiger’s suggestion that winding a clock that is going should be prohibited as a decree because of the prohibition of winding a clock that has stopped. He points out that use of a noisemaking vessel on Shabbat is itself only a Rabbinic decree (and one about which the Rema says we can be lenient because it is not really applicable today). Therefore, this would be a *gezeira le-gezeira* (a decree made on a decree) which we do not do.

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The Ktav Sofer suggests that the question of winding a clock that is going would depend on the debate between the Tosafot and the Rosh on the subject of removing oil from a burning candle on Shabbat. After a long discussion of this debate and its relation to winding a clock that is going, he concludes that winding a clock that is going would have the same halakha as winding a clock that had stopped even though the effect of the winding is not felt until much later. Since the act of winding is a change in the vessel itself, and it causes the vessel to continue functioning on Shabbat when it otherwise would have stopped functioning, this is considered to be a direct act of fixing a vessel (a *ma'aseh* and not a *gramma*).

The Ktav Sofer concludes that most posekim allow winding a non-chiming clock, whether going or stopped, because they believe that the prohibition of winding a clock is from the decree not to use a noisemaking vessel on Shabbat. However, even the Panim Me'irof, the leader of those who are lenient on this issue, believes that one should not be lenient in a place where there is a tradition to be strict. Since, according to the Ktav Sofer, a tradition prohibiting winding clocks on Shabbat exists in all places with which he is familiar, he rules that winding even non-chiming clocks should be prohibited whether they are going or stopped. However, all clocks, chiming or non-chiming, which are still going, may be wound by a non-Jew.

Har ha-Carmel (published in 1782) – The Har ha-Carmel (*Shut Har ha-Carmel*, Orah Hayim, question 1) discusses at great length the question of winding a clock that is still going. I will summarize briefly a few of the halakhic issues to which he compares and contrasts winding a clock that is going before reaching his conclusion:

A non-Jew lighting a candle on Shabbat in a place where there already is a candle lit. Here, as with winding a clock that is still going, an action from which it would ordinarily be prohibited to benefit on Shabbat is performed in a scenario in which the benefit from the action is delayed. The accepted opinion is that it would be prohibited to use the light from the candle lit by the non-Jew once the pre-existing candle goes out. Similarly, it may be prohibited to use the clock once it would have stopped had it not been wound on Shabbat. He concludes that winding a clock would be different because lighting a candle is a prohibited action on Shabbat independent of whether one needs the light, whereas the act of winding the clock is not itself a prohibited act, but is only prohibited because it is fixing a vessel. Thus, if the vessel does not require fixing, the action is allowed and would not be retroactively defined as a prohibited action when the fixing would have become required.

Blood-letting from a sick first-born animal. It is prohibited to perform blood-letting in a first-born animal because first-born animals are holy and blood-letting creates a blemish. This prohibition applies even if the blood-letting is for the purpose of curing a condition that is itself considered a blemish. However, the gemara implies that this prohibition is only because after the original condition is cured, the wound from the blood-letting will remain, and it will appear that you put a blemish in a healthy firstborn. This implies that were it not for this concern, it would be allowed to do blood-letting on a blemished firstborn even though the original blemish would be cured and the blemish that you made would eventually make the animal unusable. The comparison to clock winding is that just as wounding a firstborn who is currently temporarily wounded would be permissible, so would fixing a vessel that is currently temporarily fixed. He concludes that the cases are not comparable. The original blemish in the animal will not heal on its own, but only through actively producing another blemish. This original blemish would therefore be considered permanent, and it would therefore be permitted to perform the blood-letting. On the other hand, the clock will stop on its own during Shabbat if not wound.

*Picking berries off of a hadas branch on Yom Tov.*¹¹ The Gemara in *Sukka* 33b states that it is permissible to pick berries off of a *hadas* branch on Yom Tov, even if by doing so one makes it a usable *hadas* branch, as long as he is picking the berries in order to eat them and he has another kosher *hadas* branch to use and therefore does not need this one. Tosafot (*Ketubot* 6a, s.v. “*hai*”) implies that this would be prohibited if he knew that he will need the *hadas* branch later, even if he does not need it at the time of the picking. Based on this, winding a clock, which will certainly benefit him later when the clock would otherwise have stopped, should also be prohibited. The Har ha-Carmel concludes that winding a clock is not like picking berries off of a *hadas* branch because picking the berries fixes the branch at the time when the berries are picked. The question being discussed relates only to his need for the branch. Winding a clock, however, does not fix the clock at all at the time when it is being wound if the clock was still going.

¹¹ A *hadas* branch with more berries than leaves is not kosher for use in the Arba’at Ha-Minim (4 species) on Sukkot. However, if some of the berries are removed such that it now has more leaves than berries, then it is kosher for use. Although it would ordinarily be permitted to pick berries off of a branch to eat them on Yom Tov, it would not be permitted if by doing so you were “fixing” the *hadas* branch, making it kosher for use.

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Tying up a deer which is already captive inside a house on Shabbat. Capturing a deer is prohibited on Shabbat. However, a deer which is already captive inside a house on Shabbat may be tied up. This is permissible even if you intend to then open the door of the house, resulting in the tying of the deer having the effect of capturing it. Similarly, it should be permissible to wind a clock even though in the future that winding will have the effect of making the clock continue to work. This logic, based on this and numerous similar examples in which an action is defined by the situation at the time when the action is performed, is the logic that the Har ha-Carmel accepts as most relevant for the case of winding a clock that is going.

In his conclusion, the Har ha-Carmel says that for all the reasons discussed above, there is no need to be concerned about winding a clock provided it is still going. However, he concludes with the classic disclaimer: “the issue requires additional investigation and I leave it to those who are greater than me and do not rely on anything I have said in practice.”

Tosafot Hayim (early 20th century) – Commenting on the Hayei Adam’s opinion that winding a clock would be a Torah prohibition just like winding a harp string, the Tosafot Hayim says that winding a harp string is a Torah prohibition only because the string was broken, but winding a clock chain which is already connected to both gears would be only a Rabbinic prohibition. Based on this, he concludes that if the clock is still going, if a non-Jew cannot easily be found to wind it, a Jew may wind it himself for the needs of a mitsva, a sick person, or any other significant need.

Binyan Olam (1789-1853) (*Shut Binyan Olam*, Orah Hayim, question 11) – The Binyan Olam discusses the issues discussed by many of the other posekim and concludes that there is no reason to prohibit winding a non-chiming clock that is still going on Shabbat.

SELF-WINDING WATCHES

Perhaps the last significant technological advance in mechanical timekeeping devices, before they were overtaken by electric clocks and watches, was the self-winding watch. The self-winding watch, patented by John Harwood in 1924,¹² became popular in the 1930s. The self-winding mechanism consists of a swinging weight inside the watch case. The movements of

¹² Harwood Watch Company, “History,” <http://www.harwood-watches.com/en/history/index.html>.

the wearer's hand wind the mainspring automatically without any identifiable winding action on the part of the wearer. That this type of watch is constantly being wound whenever it is worn and lacks any intentional action of winding raises new questions with regard to the permissibility of its use on Shabbat.

Since there is no identifiable or intentional action of winding performed with this type of watch, the posekim tend to allow its use on Shabbat as long as it is going, for a variety of reasons:

Helekat Yaakov (1896-1976) (*Shut Helekat Yaakov*, Orah Hayim, *siman* 113) – The Helekat Yaakov, in a responsum written in 1939, discusses the permissibility of wearing the “new” self-winding wristwatches on Shabbat. He begins by stating that the winding is a *pesik reisha* because the wearer is not performing any particular movement for the purpose of winding the watch. Rather, all of his movements are made for some other purpose and happen to also wind the watch. After much discussion of the parameters of *pesik reisha*, he concludes that it is permissible to wear a self-winding watch on Shabbat because it is a *pesik reisha* on a prohibition that is doubly Rabbinic. First, the prohibition of winding a watch that is going on Shabbat is only Rabbinic. In addition, this winding is being performed in an unusual way (*ki-leAhar yad* – even if intentional, winding a watch by shaking one's arm would be considered unusual), which is only prohibited by Rabbinic decree even for Torah prohibitions.

Rav Ovadia Yosef (1920-2013) (*Shut Yabi'a Omer*, Volume 6, Orah Hayim, *siman* 35) – Rav Ovadia starts his discussion by reminding us that he permits winding a watch that is going on Shabbat. Therefore, it is obvious that a self-winding watch is permissible on Shabbat. He then proceeds to suggest that even those who prohibit winding a watch that is going on Shabbat should permit wearing a self-winding watch. His argument is as follows: 1) Wearing a self-winding watch on Shabbat is a *pesik reisha* on a Rabbinic prohibition. 2) Although we generally rule strictly with regard to a *pesik reisha* on a Rabbinic prohibition, there are many posekim who are lenient, and we should therefore consider it a *safek*. 3) Since there are many posekim who allow winding a watch that is going on Shabbat, even those who do not should consider this a *safek* as well. 4) This situation is therefore a double *safek* (*sefek sefeka*) which is permitted (maybe the underlying prohibition does not exist in the first place, and even if it does, maybe a *pesik reisha* on a Rabbinic prohibition is permitted).

Rav Shlomo Zalman Auerbach (1910-1995) (*Shemirat Shabbat ke-Hilkhata*, Chapter 28, footnote 61) – Rav Shlomo Zalman is quoted in *Shemirat Shabbat ke-Hilkhata* as providing yet another argument why a self-winding watch may be worn on Shabbat. Since it is designed to be

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continuously and perpetually wound by the routine movement of its wearer, as long as it is going it would not be considered to be in the process of becoming “broken.” The winding of such a watch would therefore not be considered “fixing.” This argument is fundamentally different than those of other posekim, as it focusses on the watch itself rather than the action being performed by the wearer.

OTHER SPRING-POWERED DEVICES

Clocks were apparently the first weight-driven or spring-powered devices discussed by the posekim in relation to the laws of Shabbat. Now that there are many other types of spring-driven devices, the question arises as to the applicability of these rulings to other devices.

Rulings that prohibit winding a clock for reasons that relate specifically to clocks, such as *moded*, noisemaking, or issues unique to the act of winding a string around a gear, would not appear relevant to other types of spring-powered devices. However, if winding a clock is prohibited because the act of taking a non-functional device and making it functional is *makke be-patish* or *metaken manah*, then these prohibitions might apply to other spring powered devices as well.

For example, according to the Hazon Ish who says that creating a new force within a device that causes it to move is a Torah prohibition (*boneh* or *makke be-patish*), he would presumably prohibit winding any spring-powered device on Shabbat.¹³

Rav Shlomo Zalman Auerbach disagrees with the Hazon Ish’s ruling and claims that the prohibition of winding a clock on Shabbat is a prohibition of *metaken manah*. Based on this understanding, he concludes that not every winding of springs is prohibited on Shabbat. He provides an explanation of when winding a spring on Shabbat is entirely permitted and when the prohibitions, restrictions, and limitations mentioned in the posekim regarding clocks would apply. This explanation is found in footnote 39 of Chapter 16 of *Shemirat Shabbat ke-Hilkhata* with regard to the permissibility of using spring-powered wind-up toys on Shabbat. Towards the end of the footnote, Rav Shlomo Zalman is quoted as directly disagreeing with the Hazon Ish, saying that despite the fact that by

¹³ See *Shemirat Shabbat ke-Hilkhata*, Chapter 38, footnote 70, in which he quotes the suggestion of Rabbi Shlomo Zalman Auerbach that maybe even the Hazon Ish only meant to prohibit devices that are only wound and not intended to be stopped, but that winding a device that is intentionally stopped would be permitted.

winding the toy you are creating a new force that will make the toy move, this is considered “using” the device rather than “making” a vessel. It is therefore permissible, just like opening a door that is automatically closed by a spring, which is permissible even though by opening the door you are creating the force in the spring that will close the door.

Earlier in the footnote, Rav Shlomo Zalman is quoted as providing two distinctions (the second of which, as I explain below, can itself be divided into two) to explain why winding a wind-up toy is permitted and winding a clock is prohibited. The first distinction is that a wind-up toy runs for only a very short time each time it is wound, whereas a clock runs for an extended period of time. No guideline is provided as to where the threshold lies between a toy that “only drives the gears for a short time... only moving a few meters and then stopping” versus a clock which is “wound and operative to provide the correct time.”

The second distinction relates to the intended use of the device. A clock is intended “to always be correct and show the time, and therefore every time it stops it is considered broken and every time it is restarted it is considered fixing.” Regarding a toy, on the other hand, “it cannot be said that winding the spring is fixing and when it stops it is broken because just as it is intended to move when it is wound, it is intended to unwind and stop, and this is the way it is meant to be used.” I would suggest that this distinction actually has two components, one focusing on the definition of being broken and the other on the intended use. The first component is that a clock that has stopped is considered broken because it can only provide its primary function if it operates continuously, whereas a toy that has stopped is not considered broken. The second component is that a toy is intended to stop, whereas a clock is not. The practical difference between these two components would be a spring-driven device which is not “intended” to stop, but is not considered “broken” if it does. An example of such a device would be a spring-driven sculpture which moves for a number of hours when wound, but remains functional as a sculpture even when stationary.¹⁴ The halakhic basis for the distinction between these two components may relate to the definition of “broken” for the purpose of defining *metaken manah*. Clearly, in order to be “fixed” something must be “broken,” but what defines broken? Is a spring-driven device that has stopped moving considered “broken” only if stopping interferes with its primary function (such as a

¹⁴ The impetus for researching and writing this article was the question of whether or not I was permitted to wind the spring-powered kinetic sculpture I had crafted for my living room wall on Shabbat.

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clock), or is it considered “broken” whenever it stops unless stopping is considered to be a necessary part of its proper functioning (such as a wind-up toy). A spring-driven sculpture may fall in between those two definitions. Stopping is not a necessary part of its functioning like a wind-up toy, but unlike a clock, it continues to fulfill its function as a decoration even when it stops moving.

It is not clear from the explanation of Rav Shlomo Zalman which component he considers to be primary, or if both would be necessary in order to permit or prohibit the winding of a spring-driven device. The permissibility of winding spring-driven devices that fall in between a clock and a wind-up toy according to Rav Shlomo Zalman’s defining parameters of 1) how long does it operate on one winding, 2) does stopping interfere with its primary function, and 3) is stopping a necessary part of its intended function, remains to be addressed.

DIFFERENT APPROACHES TO THE APPLICATION OF HALAKHA TO NEW TECHNOLOGY

In reviewing the responsa and rulings of numerous posekim over many generations on the question of winding mechanical clocks on Shabbat, there are a number of approaches that can be identified as to how halakha should be applied to new technology.

Some posekim simply state their ruling in one line and specify to what they compare winding a clock with no explanations or discussion. Although this type of presentation may simply reflect the style of the book which they were writing, in some cases it also seems to indicate an approach to how halakha should be applied to new technology. The best example of this seems to be the Hayei Adam, who contends that winding a clock is a Torah prohibition because it is the same as winding a broken harp string around a peg. Both the Har ha-Carmel and the Hazon Ish explicitly discount this comparison, and the Binyan Olam goes as far as to call the Hayei Adam’s opinion baffling (“*temuhim*”). The Hazon Ish also presents a one-line explanation for his ruling, that creating a new force within a device that causes it to move is a Torah prohibition. Rav Shlomo Zalman Auerbach points out that according to this logic, opening a door with a spring-closure mechanism would also be prohibited (which he apparently feels is an untenable suggestion). The fact that other posekim find the explanations for these rulings illogical gives the impression that these explanations may not have been the bases for the prohibitions. It is possible that the approach taken by these posekim was to develop a

general understanding of what types of activities are prohibited on Shabbat based on their vast knowledge of the halakhic literature over all generations, and to decide about the permissibility of new technologies based on this general understanding. The particular explanations for the prohibitions were provided only to classify the prohibition into one of the pre-existing classifications.¹⁵ This approach is in sharp contrast to that of posekim who write page after page comparing and contrasting the winding of a clock to numerous other actions discussed in the gemara and rishonim in order to find the most appropriate comparison from which they can discern whether winding a clock should be permitted or prohibited. These posekim are arriving at their halakhic conclusion by attempting to fit the new technology as well as possible into the existing halakhic literature, rather than deciding what the halakha should be based on a general understanding and then assigning it a classification.

Another issue regarding the application of halakha to new technology which is debated among the posekim is the making of new rabbinic decrees related to these new technologies. Rabbi Akiva Eiger rules that winding a clock that is still going is prohibited by a decree lest one come to wind a clock that has stopped, which itself is only prohibited by the rabbinic decree against using a noise making instrument. The Ktav Sofer comments that he cannot understand why Rabbi Akiva Eiger would think that there is, or should be, such a decree. They appear to have different approaches to the appropriateness of applying decrees to new issues in halakha.

Beyond the different approaches to arriving at a ruling regarding new technology on Shabbat, there is also debate about when a new ruling, particularly a lenient ruling, can and cannot be publicized. Some posekim state their opinion with no qualifications, others qualify their ruling, and some refuse to give a lenient ruling altogether despite having concluded that a lenient ruling would be appropriate. The Panim Me'irof, after concluding that it is permissible to wind a non-chiming clock on Shabbat, says that this ruling should not be applied in a place that already has the custom of prohibiting it based on the rulings of other posekim. In the

¹⁵ This approach to rulings about what is permitted and prohibited on Shabbat is described in a shiur entitled "Foundations of Melachot Shabbat" by Rav Mayer Lichtenstein which can be found on the Bet Midrash Tamid website (bmt.org.il). R. Mayer specifically mentions the Hazon Ish and Rav Shlomo Zalman Auerbach with regard to their rulings about the use of electricity on Shabbat. Their rulings on winding spring-powered devices on Shabbat seem to follow the same approach as their rulings on electricity. They first decide what should be permitted and prohibited based on their view of these activities and their general understanding of what should be permitted and prohibited on Shabbat, and they then find an appropriate halakhic category in which to classify it.

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Panim Me'iroi this sounds like the exception, but the *Ktav Sofer* quotes this conclusion of the *Panim Me'iroi* and applies it globally. He states that despite the fact that many posekim permit winding a non-chiming clock which is still going on Shabbat, the custom everywhere that he knows of is to prohibit it, and therefore it is prohibited.

Even among those posekim who do not present any reason to prohibit winding a clock that is still going, many are not willing to entirely remove the prohibition of winding a clock on Shabbat that has already been established, even in a new situation in which the halakhic basis of the established prohibition does not apply. They allow the winding to be done either by a non-Jew or in cases of specific needs, but they are reluctant to allow outright an action whose prohibition has already been established. On the other hand, there are posekim who state outright that winding a non-chiming clock that is still going is permitted.

CONCLUSION

Discussions of the permissibility of winding mechanical clocks on Shabbat abound in the halakhic literature from the 15th century up until today. With every major technological advance in the field of timekeeping came new halakhic considerations which began to appear in the literature. The posekim of each generation debated the previous opinions, considered the issues related to the new technology, and presented their rulings. An overview of the parallel development of technology and halakha related to mechanical clocks provides an illuminating example both of the halakhic process as it relates to new technology and of the different approaches to new technology within the world of halakha.