



## Halachic Measurements and Technology: Man vs. Machine

*"Exactly as I show you – the form of the Mishkan and the form of all its vessels – so shall you do." (Shemos 25:9)*

The Gemara in *Bechoros* (17b) discusses whether a human being is capable of acting with absolute precision (*"Efshar Letzamtzeim"*). One of its proofs is that the *B'nai Yisroel* successfully created the vessels of the Mishkan (that are detailed in our Parsha), all of which had to be formed according to very specific dimensions, implying that humans are capable of utter precision. However, the Gemara counters that when Hashem commanded the people to create the vessels with these dimensions, He could only have intended that they create them to the best of their ability, and not necessarily with exactitude.

The extent of human capabilities, and its relevance to Mitzva performance, is an that has become very pertinent with scientific and technological advances. Previously, the laws of the Torah were interpreted solely in terms of human abilities and senses, as these were the only tools we possessed in order to fulfill the Torah's requirements. However, with the advent of devices that can accurately calculate and compute, appraise and assess, are we now required to make use of scientific and technological advances – beyond the limits of human ability – in order to clarify matters of Halacha?

This question is most famously discussed by the Poskim in the context of foods containing living creatures that cannot be seen without magnification. The consensus of the Poskim is that it is permitted because these bugs cannot be detected by the human eye and "the Torah was not given to the *Malachei haShares*".<sup>1</sup> It would therefore seem that Halacha does not demand that a person use specialized tools beyond his innate physical capabilities in order to observe the Mitzvos.

However, this can only be said in cases where the matter is entirely beyond human faculties – such as the ability to see microscopic organisms. What if it is perceptible to the human eye but a more detailed and exact determination is possible with an instrument? Does Halacha require us to use a device in order to definitively

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<sup>1</sup> This topic is discussed at length in *Shu"t Minchas Asher* (1:41)



ascertain the reality? What Halachic status do the results have? What if the results are different than what appears to the naked eye?

An extreme example of this dilemma was placed before Rav Moshe Feinstein *zt"l* (*Igros Moshe Y.D. 2:146*) regarding the complex issue of the Halachic determination of the moment of death. Since the Gemara (*Maseches Yoma 85b*) considers the cessation of spontaneous respiration the definition of death, perhaps all other indicators should be ignored. Therefore, even if electronic monitors (such as an EKG<sup>2</sup>) suggest continued signs of life, since these signs cannot be detected by human beings without the aid of technology, they would not come into consideration, just as microscopic organisms that cannot be detected by the human eye alone are not forbidden for consumption.

Rav Moshe rejected the comparison between microscopic organisms and the determination of death. We aren't concerned about ingesting bugs that cannot be seen by the naked eye, as the air is filled with minute organisms and we swallow thousands, possibly millions, with every breath. Certainly, the Torah never prohibited these organisms. Moreover, the Gemara makes no mention of the possibility of microscopic bugs, and many generations of righteous and pious people had no access to microscopes yet they certainly fulfilled all of the Torah's dictates to the letter. Therefore, bugs that cannot be seen by the unenhanced human eye are clearly not prohibited.

This does not mean that any matter that is not perceptible to the human eye may be ignored. Regarding the determination of death, which is clearly a matter of *Pikuach Nefesh*, Rav Moshe maintained that there is a strong basis for taking the readings of medical instruments into consideration, as below.

The *Pischei Teshuva* (*Y.D. 357:1*) cites a *Teshuva* of the *Chasam Sofer* who discusses a novel ruling of the *Bikurei ha'Itim* regarding leaving a body unburied overnight. The *Bikurei ha'Itim* ruled that one may leave a body unburied overnight as *Chaza"l* (*Maseches Smachos 8:1*) relate that there were certain people who were thought to have died (and had even been buried) who were later found to still be alive and lived for many more years and even sired children! We see, that death cannot be confirmed until the flesh of a body begins to rot<sup>3</sup>. One may therefore, leave a body unburied overnight.

<sup>2</sup> Rav Moshe *zt"l* referred to an "עלעקטריק ראדיאגראם" - electric radiogram" in his *Teshuva*

<sup>3</sup> At that time, science had no instruments that could be used to confirm death. Therefore, death could not be confirmed until a corpse began to rot.



The *Acharonim* (including the *Chasam Sofer*) fiercely dispute the conclusion of the *Bikurei ha'Itim*. Leaving a body unburied overnight is a Torah prohibition and it cannot be violated based merely on a handful of extraordinary episodes recorded in *Maseches Semachos*. Rare incidents that only occur “once in a thousand years” cannot come into our reckoning even in matters of *Pikuach Nefesh*. Therefore, we may safely rely on the fact that in the vast and overwhelming majority of cases, death can be confirmed by the cessation of respiration and we may immediately proceed to burial.

We see, noted Rav Moshe, that the *Acharonim* only disputed the contention of the *Bikurei ha'Itim* because the chances of a person being found to be alive after having been pronounced dead, and even buried, were extraordinarily low. This implies that in cases where there is a distinct possibility that a person is still alive even after he has stopped breathing, we would certainly not pronounce him dead. Therefore, nowadays when modern technology can detect signs of life in patients who are no longer breathing and which in the majority of cases means that they will survive for a little while longer (though they may still die imminently), we would not consider them dead if they have stopped breathing but had other indications of life.

Rav Moshe's discussion of this point highlights that Halacha neither rejects nor ignores scientific observations or discoveries that result from new technologies. Indeed, the Sefarim of the *Poskim* of recent generations are filled with questions about the effects of technology upon Halacha. Though there have been instances when *Poskim* were dubious of certain technological advances, this was generally due to their suspicion and fear that the instruments in question weren't entirely accurate, not because they represented a novel factor in Halachic issues.

However, as explained above, when something can only be detected by means of technology, those observations generally have no bearing on Halacha. This does not reflect a disregard for the technology or scientific “reality”, rather, it is because the laws of the Torah revolve around facts that are observable by humans. Therefore, even though we can definitively observe organisms under a microscope, we can absolutely say that the Torah *permitted us to eat them!* Similarly, when the Torah commanded the Jewish people to build the vessels of the Mishkan according to specific dimensions, those dimensions are defined by the precision that human beings are capable of attaining.

Although Halacha does not ignore scientific and technological advances, when a person has expended maximal efforts to fulfill a Torah obligation, to the degree that it would not be possible to achieve a more accurate outcome with human faculties, he has no obligation to utilize technology in order to achieve a better result.



Nevertheless, it would seem obvious that where a person has not exercised the full extent of his capabilities, and technology that would assist him is available, he would certainly be obligated to use it. Since the incomplete

This concept is best illustrated in the context of the following *Machlokes* among modern *Poskim*. Studies have shown that in the majority of cases, Sifrei Torah that have already been checked by an expert for mistakes or other Halachic concerns are found to have additional issues when checked by a computer. Therefore, Rav Shmuel Wosner *zt"l* ruled (*Shevet haLevi* 7:2) that every Sefer Torah must be checked by a computer after it has undergone inspection by a human. His ruling appears to follow the position we have outlined above – that where the imperfect result is not due to the limitations of human abilities, but rather due to the natural imperfection of human effort, one is obligated to utilize available technology to achieve a better outcome.

However, other *Poskim* disagreed and argued that we cannot say that there is an obligation to use computers to check Sifrei Torah since this option was not available to previous generations. Requiring computer checks would cast aspersions (“*Yotzi La'az*”) upon them! And while it is certainly a praiseworthy thing to do, it cannot possibly be an obligation. (See *Shu"t Kinyan Torah* 5:106, *Teshuvos v'Hanhagos* 2:99 & 3:326 and *Shu"t Mishne Halachos* 11:115).

The *Mishne Halachos* (*ibid.*) adds that this is the same reason that we continue to drink milk and eat meat while relying on the rule that the *Rov* (majority) of animals are not *Treifos*, even though we could conclusively determine their actual status via x-ray. Since the Torah allowed us to rely on the *Rov*, there is no need to use technology to arrive at a definitive answer to the question. It stands to reason that the same would apply to checking Sifrei Torah.

Truthfully, the comparison between checking animals for *Treifos* and checking Sifrei Torah for mistakes can be challenged. In the case of the Sifrei Torah, if the computer reveals previously unrecognized issues, it reveals that the original examination was inadequate. Therefore, there would seem to be good reason to require the use of technology to confirm or improve upon the human effort. However, in the case of *Treifos*, a perfect examination of the animal cannot reveal internal injuries, so relying upon the *Rov* is the maximum possible effort that the Torah expects of us.

HaGaon Rav Asher Weiss *Shlit"a*, in an as-yet unpublished *Teshuva*, discussed a similar question in Hilchos Eruvin. When constructing a *Tzuras haPesach* (two posts



and a lintel or string) to act as one of the sides of an Eruv, the upright posts must be precisely at a ninety-degree angle to the lintel or string on top. In the past, the posts have always been examined by the naked eye to check that they are perpendicular, but it is now possible to use a spirit level or other devices to measure more accurately and precisely.

Rav Asher rules that there is no need to use a spirit level as “the Torah was not given to *Malachei haShares*”. Since it is impossible with the naked eye to be utterly precise in determining the angle of the upright posts, the Torah cannot have required precision, and thus there is no obligation to use technological means to achieve it. Though it is certainly praiseworthy to attempt to fulfill the Mitzvos in the most precise manner, in general there is no obligation to do so. However, in situations where actual errors are common, one would be obligated to utilize technology to avoid errors.

This essay has merely scratched the surface of a vast discussion. We hope in the coming weeks to revisit this topic or perhaps to distribute an expanded version of this essay.