

Thirsty for Torah; Thirsty for Water

Dr. Harvey Babich

Rav Aryeh Kaplan, noting that everything in the spiritual world has a counterpart in the physical world, cited several sources showing “water” is the physical counterpart of Torah study [1]. For example, in *Taanis* (7a), R’ Chanina ben Pappa contrasted two verses in *Yeshaya*. On the verse, “Bring water to the thirsty” (*Yeshaya* 21:14), he expounded that water refers to Torah, i.e., a teacher should go to the student to teach Torah. On the other verse, “Everyone that is thirsty, go to water” (*Yeshaya* 55:1), he explained that the student also must go to the teacher to study Torah. In both verses, water is the symbol for Torah study. In *Avodah Zarah* (5b), R’ Yochanan, in the name of R’ Bannah, explained the verse, “Fortunate are you who sow upon all waters, who send forth the feet of the ox and the donkey” (*Yeshaya* 32:20) as follows. Fortunate is Israel for when they engage in studying Torah and in bestowing kindness, their evil inclination is delivered into their hands and they are not delivered into the hands of their evil inclination. Again, water is analogous to Torah study. Other Talmudic sources in which Torah study is symbolized by water include *Avodah Zarah* 19b, *Baba Kama* 17a and 82b, *Berachos* 56b, and *Chagigah* 14a. *Shir HaShirim Rabbah* contains numerous passages providing analogies between Torah study and water. “Just as water is a source of life for the world, as it says, ‘A fountain of gardens, a well of living waters’ (*Shir HaShirim* 4:15), so the Torah is a source of life for the world, as it says, ‘For they are life unto those that find them and health to all their flesh’ (*Mishlei* 4:22).” Rav Slifkin also notes parallels between Torah study and water in Nature’s Song [2].

Water is the most abundant chemical in life, comprising about 60-70% of the total body weight of most living organisms. Life cannot exist without water. As noted in *Yerushalmi Horayos* (3:48), “Water is cheap and wine is expensive, yet

the world can exist without wine, but not without water.” In *Bereshis* (2:5-7), we read, “All the bushes of the field had not yet come into being on the Earth and all the grass of the field had not yet grown, for G-d had not brought rain on the Earth.... Then a mist rose from the Earth and watered the face of the ground. G-d then formed man out of the dust of the ground and blew in his nostrils a soul of life.” Until G-d brought water to the Earth, no life was possible. Rav Kaplan cited the *midrash* (*Yerushalmi Shabbos* 2:6 (20a); *Bereshis Rabbah* 14:1) that man is a combination of “dust and water.” As long as man is alive, “water” is a most essential part of his being. Water is omitted when the Torah speaks of man’s death; “you are dust and to dust you shall return” (*Bereishis* 3:19) [2].

The association between life and water is of concern to cosmologists. Space probes sent to distant planets initially ascertain whether that planet ever had water, which would indicate the planet’s potential, at least at one time, to support life. Shortly after their formation, the Earth, Venus, and Mars had abundant supplies of water. Yet, today, surface waters occur only on the Earth. The Earth is sufficiently distant from the sun so that its surface waters neither evaporated nor decomposed, as occurred on Venus. If the Earth was a bit closer to the sun, its surface temperatures would exceed the boiling point of water, precluding the possibility of life. The Earth is sufficiently near the sun so its temperature remains high enough to prevent the oceans from freezing permanently, as happened on Mars. Therefore, of these three planets, the Earth alone is capable of supporting life. This idea that the Earth appears if it was specifically designed for the maintenance and well being of human beings is termed the anthropic principle [3].

Water is a nutrient. Although often overlooked as a nutrient, water has numerous vital

functions in the human body. It acts as a solvent, as a lubricant, and as a medium for transporting other nutrients and waste products, for temperature regulation, and for chemical transformations [4]. The *Shulchan Aruch (Orach Chaim, 204:7)* states that the blessing, *SheHaKol*, must be recited prior to drinking water to quench a thirst. The aspect of "to quench a thirst" may be the critical factor in prompting the recitation of this blessing. The *Mishnah Berurah* (#42) notes that the palate is not "pleased" by water per se, presumably, as water is odorless and tasteless. Thus, the question arises concerning the need to recite a bracha prior to drinking water. However, the *Mishnah Berurah* continues that one's palate is "pleased" when the consumption of water is prompted by the need to satisfy a thirst, thereby, necessitating the recitation of *SheHaKol*. Thirst is governed by changes sensed by the mouth and the brain (i.e., the thirst center is located in the portion of the brain, termed the hypothalamus). When the concentration of solutes in blood is too high, water out is drawn from the salivary glands into the blood. The mouth then becomes dry and the person drinks to wet the mouth. Also, when brain cells detect that the blood is too concentrated, impulses are initiated to stimulate drinking behavior. [5].

The movement of water into and out of cells is termed osmotic flow, as this movement is dependent on the relative osmotic pressures of the environment and of the protoplasm. Plants, being non-mobile, cannot physically go to a water source; they manipulate their cytoplasmic composition so water flows naturally into their cells. Relative to the osmotic pressure of their protoplasm, plants live in hypo-osmotic environments and water moves from the external environment into their cells. If the environment would be hyper-osmotic, meaning that the environment has an osmotic pressure higher than that of the internal cell, water would move out of the cells into the environment, causing cellular plasmolysis. Plants cannot live in hyper-osmotic environments. Abimelech apparently, recognized this. After destroying the city of Shechem he "sowed it with salt" (*Shoftim* 9:45), thereby making the soil hyper-osmotic, thus killing the vineyards and depriving the Shechemites of their livelihood.

Water has several properties making it essential for life. Water is the best solvent; more substances dissolve in water than in any other liquid. It is in the watery milieu of the cytoplasm and nucleoplasm that all the cellular biochemical

reactions of a cell occur. These biochemical transformations, both catabolic and anabolic, provide the cell with properties of metabolism, repair, growth, and development. Water is the medium in which spiritual transformations also occur, as exemplified by the *mikveh* (see Rambam, *Moreh HaNevuchim* 2:30). To quote Rav Aryeh Kaplan [1] "...water itself represents the change and flow towards G-d's goal. When a person immerses himself in a mikveh, he immerses himself spiritually in the basic concept of change itself. Man's ego represents the element of his permanence and, therefore, when he is totally immersed in the concept of change, his ego is nullified. Thus, when he emerges from the *mikveh*, he is in a total state of renewal and rebirth." Apparently, water is the medium both for physicochemical and spiritual transformations.

The unique properties of water are related to the polarity of the water molecule and to the hydrogen bonding among neighboring water molecules. The many hydrogen bonds linking individual water molecules give water its property of being a temperature stabilizer. Water adsorbs a great deal of heat before its temperature increases. Conversely, water retains heat as its temperature falls slowly. Thus, the temperature of water does not change rapidly with accompanying changes in the ambient environment. For example, compare the responses of sand and seawater to temperature fluctuations on a hot, summer day. As the morning progresses, the temperature of sand at the beach quickly rises, whereas the temperature of seawater remains cool. Conversely, as the sun sets, the temperature of sand quickly decreases, whereas that of seawater remains warm. The large amount of water in a human being lessens the impact of sudden changes in environmental temperature and thereby helps to maintain the temperature homeostasis of the human body.

This property of water to resist quick changes in temperature may explain, in part, the concept of *mayim shalenu* (i.e., water kept overnight). During the month of *Nissan*, water used to knead the dough for matzah was drawn from wells. It was believed that during *Nissan*, as the sun's position was low on the horizon, underground waters were, to some extent, heated at night (*Pesachim* 94b). As warmth hastens yeast fermentation, well water drawn in the morning was not suitable for making matzah. Water used to knead dough for *matzah* must be cool. Thus, in *Pesachim* (42a), R' Yehudah said: A woman should

knead the dough for *matzah* only with well water that was drawn in the morning and subsequently kept overnight (*mayim shalenu*) in a vessel. As water only slowly releases heat, well water drawn in the morning required a time period of about 12 hours to lose its excess heat and, thus, to be suitable to make *matzah*.

Although well water drawn in the morning may be warmer than water stored in a vessel, the rationale for this temperature differential stated in *Pesachim* 94b (i.e., that at night the sun passes beneath the Earth and heats up the underground springs) is not scientifically valid. Rabbi Aryeh Carmel (cited in Slifkin [6]) offered another reason for water stored in a vessel to be cooler than well water drawn in the morning. During night, as the ambient air temperature cools rapidly, water stored within vessels also cools. However, because of the enormous heat capacity of the Earth, the underground water is insulated and, as water is a temperature stabilizer, the heat accumulated in well water slowly leaves. Thus, well water drawn in the morning is likely to be warmer than water stored in a vessel which was exposed to the cool night air.

A considerable amount of heat energy is required to change liquid water into a gas, or, we say that water has a high heat of vaporization. Because the transition of water from a liquid to a gas requires the input of much energy to break its many hydrogen bonds, evaporating water thereby cools surfaces. Organisms, including human beings, dispose of excess body heat through evaporative cooling (i.e., sweating) [7]. Three types of sweat are beneficial for the body: the sweat of toil, bathing, and illness (*Avos de Rabbi Natan* 41:4). Fever, or an abnormally high body temperature, is a systemic response that results from infection by invading microorganisms. Body temperature is regulated in the hypothalamus, the thermostat of the body. In response to pyrogens, chemicals secreted by injured tissue, white blood cells, and macrophages exposed to bacteria, the thermostat is reset upwards, causing the body to initiate heat-promoting mechanisms. A mild or moderate fever is an adaptive response that stimulates the liver and spleen to sequester iron and zinc, micronutrients needed for bacterial proliferation. The body temperature is maintained at the "fever setting" until natural body defenses reverse the disease process. The thermostat is then reset to a lower (i.e., the normal) level, causing heat-loss mechanisms to swing into action. Sweating

begins; physicians have long recognized this as a sign that the body temperature is falling and the patient is recovering [8]. Or, as simply stated by *Chazal*, "Perspiration is a good prognostic sign for sick patients" (*Berachos* 57b; *Bereshis Rabbah* 20).

Another aspect of the unique thermal properties of water is its anomalous behaviors. First, water contracts as it cools, being most dense at 4°C. Thereafter, water expands until the point at which it becomes ice (0°C). A second anomaly is that in the very act of freezing, sudden expansion takes place (consequently, ice, being less dense than aqueous water, floats!). These peculiarities unique to water are other examples of the anthropic principle. During a cold winter, the heavier 4°C water sinks to the bottom of the aquatic system, leaving the cooler and less dense waters at the surface. At 0°C, water forms ice, which is lighter than liquid water. Hence, ice floats on the surface of the aquatic system, permitting the preservation over the winter months of the aquatic life dwelling at the bottom of the ecosystem. [9]. For other liquids, progressively lowering their temperature causes corresponding increases in their densities, with freezing occurring from the bottom up.

Neighboring water molecules are constantly making and breaking their hydrogen bonds. Each hydrogen bond is individually weak, lasting only 10-11 seconds. However, the cumulative effect of large numbers of these bonds is enormous. For example, the hydrogen bonding among neighboring water molecules is responsible to the high surface tension of water, as exemplified by ability of small insects to walk on the surface of pond or lake water [7]. Therefore, liquid water is not composed of individual water molecules, independent of each other, but rather as a three dimensional complex of interacting, interconnected water molecules. This concept may have relevance to the halachic procedure called "hashaka" or "making contiguous." Through the procedure of hashaka, water that has contracted tumah may be cleansed on Yom Tov. The procedure is as follows. Tamei water is placed into a utensil, which is lowered into a mikveh to allow the water in the utensil to touch ever so slightly the mikveh water. When the two waters touch, hydrogen bonds instantaneously form, making the waters contiguous and forming a single entity of mikveh water, thereby removing the tumah from the water in the utensil (*Beitzah* 17b).

The Hebrew word for water – *mayim* – is in the plural form, perhaps indicating its existence

in multiple forms [a liquid (aqueous water), a solid (ice/snow), and a gas (water vapor)] and its transference between terrestrial and aquatic ecosystems and the atmosphere (Abarbanel, *Bereshtis* 1:2). The Talmudists recognized that water evaporation is crucial for the cycling of water through the biosphere. 97% of the Earth's water is in oceans, 2% is frozen in the polar ice caps, and 1% is in lakes, rivers, underground streams, and the atmosphere [10]. In *Taanis* (9b), R' Eliezer stated that the entire world drinks from the waters of the ocean, which is interpreted to mean that the biota obtains its "sweet" water from the water evaporated from the oceans and subsequently returned via precipitation to the Earth. R' Yehoshua questioned this concept of water cycling, as the waters of the ocean are salty, yet, the returning precipitation lacks a significant salt content. R' Eliezer answered that the waters become sweetened within the clouds. Apparently, R' Eliezer had an understanding of the evaporative process, realizing that water molecules alone, without their salts, leave the ocean surfaces.

References to the cycling of water through the biosphere are noted in *Koheles* (1:7): "All the rivers flow into the sea, yet, the sea is not full; to this place where the rivers flow, there they flow once more." The Ibn Ezra, as the *Midrash Lekach Tov*, explained this verse to mean that moisture rises from the oceans and is absorbed by the clouds, which, in turn, cause precipitation to descend to the Earth in an endless cycle. *Mayim* is

a palindrome, read the same backward or forward, perhaps, as suggested by G. Marks [11], to reflect the water cycle of repeated precipitation and evaporation.

Rav Yaakov Culi [12], in *MeAm Lo'ez* (translated by Rav Aryeh Kaplan, 1988), noted that sailors traveling on the ocean occasionally used a distillation method to desalinate seawater and make it potable. Realizing that vaporizing seawater left behind its salts, they boiled seawater in one vessel and collected and condensed the steam vapors in another vessel. This technique, termed distillation, apparently, had an impact on the halacha regarding the type of water ritually suitable for the blessing of *Al Netilas Yadayim* before eating. Water suitable for *Al Netilas Yadayim* is defined as water that is potentially drinkable, thus, disqualifying salty seawater. However, the potential to desalinate salt water and thereby make it drinkable was the basis for the Radbaz allowing the use of seawater for this blessing (see *Magen Avraham, Shulcan Aruch, Orach Chaim*, 160:12) (cited in *MeAm Lo'ez*, volume 1, page 221).

In summary, quoting Katz [10], "Water is a wonderful blessing. Although it is easy to take it for granted, we should never cease from appreciating it, for it is anything but simple. Its abundance, its unique atomic structure, and its versatility all point to the Great Intelligence that has showered us with this liquid far more precious than gold." ■

DR. BABICH is a professor in the Department of Biology at Stern College for Women.

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