"Open my eyes so that I may see the **wonders** of Your Torah"

Wonders

בס"ד

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שַׁבָּת תַּזְרִיעַ-מְצֹרָע ❁ ל נִיסָן-א אִיָיר תשפ"ו



Even from the Land of Israel, Rebbe Menachem Mendel continued to send letters to the rabbis of those who opposed Chasidut and a certain version of the story of the failed meeting insists that for the rest of his life, he regretted having not broken down the door of the Vilna Gaon's room, in order to secure a meeting with him even for a moment.

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This issue is dedicated in memory of our dear friend and colleague, Prof. Eliezer (Eduardo) Zeiger on the occasion of his first yahrzeit, 2nd of Iyar, 5786.

The Lubavitcher Rebbe to Rav Ginsburgh, Elul 5741

"…It would be proper to publish your classes in book form. With blessings for success…"



Wonders

An anthology from the shiurim and farbrengens
of Harav **Yitzchak Ginsburgh**

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FIVE DYNAMICS OF LEADERSHIP: A DRIVE FOR WHOLENESS

This week, we complete our review of HaRav Ginsburgh's book, Awakening the Spark Within: Five Dynamics of Leadership that Can Change the World. Having treated the broader vision of leadership and the first four dynamics, we now turn to the fifth: a sense of holy folly and humor. Leadership requires the leader to sport both, for his own wellbeing and for the wellbeing of those following him.

The last of the five dynamics of leadership that we have been exploring in recent editions of *Wonders* is holy folly and a good sense of humor. By its very nature, it is the most paradoxical and enigmatic of all the qualities required of a true leader. We will introduce here three different perspectives to what holy folly means as found in the Bible and the oral tradition, and then we will explain each one in more detail.

1) A leader must at certain times apply severity or punish wrongdoing. The result of this is those responsible are held accountable, while others hearing or witnessing punishment are encouraged to heed the warning. Yet, for a leader, punishment is in a sense folly in relation to his own soul, in that it hurts the leader as much as, if not more than, the person being reprimanded.

2) There are times when a leader must resort to making a mockery of himself or, in the case of King David, to feign insanity, in order to redeem a situation or even save a life.

3) A touch of foolishness or a good sense of humor, when used to awaken joy in others, is considered a very positive trait.

PUNISHMENT AS HOLY FOLLY

The idea of holy folly comes from a verse from King Solomon: "Dead flies stink, yet they ultimately express fragrant oil. More precious than wisdom, than honor, is a little foolishness."[1] The simple understanding of this verse, as explained by many commentaries, is that a lifetime of wisdom and honor achieved through building a positive reputation can be ruined in a moment of foolishness. Yet, the Midrash understands it quite differently and relates three specific cases of a leader using punishment, each which expresses a type of folly.[2]

The first case is when Korach and his followers challenged Moses's right to leadership. After many attempts to make peace with him, Moses exclaims: "If as all men die [that is, naturally] will these men, Korach and his followers, meet their deaths, then God has not sent me. But if God will create a new creation and the earth will open its mouth and swallow them along with all their belongings and they will go down alive to the grave, then you will know that these men have angered

1. Ecclesiastes 10:1.
2. *Kohelet Rabbah* 10:1.

God."[3] Immediately upon finishing these words, the earth opened and swallowed up Korach and those following him. Significantly, the Midrash tells us that as Korach descended into the abyss, he was heard confirming Moses's authority, thus actualizing the words of King Solomon of metamorphosing the "stink" of rebellion into fragrant oil of acknowledgement.[4] On the surface, Moses's request of God to create a new creation signified an extreme case of folly, as it runs against normative logic to ask such a thing of God.

The second case the Midrash brings is when two of King David's trusted advisors, Do'eg and Achitophel, turned upon him and spread malicious slander about him. Feeling betrayed, David prayed to God to bring them down to the pit of destruction.[5] It was this prayer that ultimately motivated them to repent.

The last case of punishment described in the Midrash relates to the story of Elijah the Prophet.[6] Elijah, seeing how the Jewish people had turned away from God and were worshipping idols, proposed a "contest of the gods" between himself and 450 priests of Ba'al. Whoever could bring down fire from heaven and consume an offering would show the people who the true God is. After giving the priests of the Ba'al virtually all day to accomplish this feat, Elijah demanded his turn. After preparing his own offering and dousing it with water, he offered a short prayer and immediately fire came down from heaven and consumed not only the offering but the entire altar. The people in awe openly acknowledged the God of Israel as the true God. Elijah then took the priests of Ba'al and brought them down to the valley where they were executed.

Interestingly, all three of these punishments contain the idea of descent. Korach descended into the abyss. David prayed that his foes would be taken down to the pit of destruction, and Elijah brought the priests of Ba'al to the valley where they were executed.

Another verse from King Solomon attests to our previous statement that all these cases included a certain level of folly, because "also punishment for a *tzaddik*, [a righteous person] is not good."[7] In all three cases we see the *tzaddik* acting against his very nature to punish for a greater good.

KING DAVID FEIGNING INSANITY

The second type of folly mentioned above is the necessity in extreme circumstances to act like a fool or even feign insanity. The background to this example comes from a Midrash that states that at one-time David said to God that he did not understand why in such a beautiful world insanity existed. God answered David: "By your life, you will need this someday."[8]

When King David was fleeing from King Saul, who was trying to kill him, he was forced to escape to the land of the Philistines. Soon after entering one of their cities, a person recognized him from when he had slain Goliath. Word was sent to the king, and David, sensing tremendous danger, pretended to be insane. He "scratched on the doors of the gate and let his spittle run down his beard." When the king came and saw this, he exclaimed: "is it not enough that my wife and daughter are insane? You bring me more madmen!" They expelled him from the city, and thus, David's life was spared.[9]

3. Numbers 16:29-30.
4. *Kohelet Rabbah* 10:1.
5. Psalms 55:24.
6. 1 Kings 18:19-40.
7. Proverbs 17:26.
8. *Midrash Tehillim* 34.
9. 1 Samuel 21:11-16.

A SENSE OF HUMOR AND JOY

The third example of folly—or in this sense, a good sense of humor and the ability to awaken laughter and joy in others—is in a certain way the simplest manifestation of folly to understand and to act upon. The Talmud tells a story of Rabbi Shmuel ben Yitzchak, who used to take three myrtle branches and juggle them before a bride at a wedding. One of his contemporaries, Rabbi Zeira, felt that his behavior was not befitting a great sage. When Rabbi Shmuel died, a pillar of fire was seen accompanying him to his resting place. This pillar of fire was considered an acknowledgment from heaven that his actions were not only acceptable but were laudable. When Rabbi Zeira saw this, he realized how wrong he was to have negatively judged Rabbi Shmuel.[10]

Another example is of the third-century sage Rabbah, who was known to begin his public discourses with either a humorous anecdote or an amusing story to relax the participants and to create a warm rapport with them, knowing that this would make them more receptive to his teachings.[11]

When King David was bringing the Ark of the Covenant to Jerusalem, he did so by making it a great public celebration. King David was so full of joy that he began to dance wildly in the streets in complete abandon. When his wife, Michal, saw him from her window, she rebuked him for making a fool of himself. David's response revealed that though on the surface it appeared that he was using the occasion to bring attention to himself, he told her, "And I shall behave even more humbly than this and I shall be lowly in my own eyes."[12] What Michal did not realize is that bringing the Ark of the Covenant to Jerusalem was like a wedding celebration between God and Israel, and David's holy folly was completely appropriate.

Maimonides writes about joy produced by a little foolishness when he describes the celebrations that took place in the Temple during the holiday of Sukkot.[13] Every night water would be drawn from the nearby Shilo'ach spring and brought up to the Temple in a festive procession. The whole night the people would celebrate with singing, ecstatic dancing and even acrobatics. This celebration was so joyous that the Mishnah states: "One who has never seen the joy of the water drawing celebration has never in his life seen joy."[14]

Maimonides further notes that in general, a commandment fulfilled with love and joy represents the purest and most ideal way of serving God. One of the main obstacles to reaching this type of pure joy comes from an inflated ego, pride, and arrogance. Maimonides continues by quoting a verse from Proverbs: "Do not glorify *yourself* before the king."[15] When a person is full of ego and pride, this holds a person back from being able to praise and honor God properly.

Serving God with joy is one of the main objectives of the ultimate leader, the Mashiach. When permuting the letters of Mashiach (מָשִׁיחַ), it produces the word "he will be joyous" (**יִשְׂמַח**) or, with a slightly different vocalization, "he will make others joyous" (**יְשַׂמֵּחַ**). When the Mashiach brings the whole world together in acknowledgment of one God, and peace and harmony create a physical and spiritual global village, joy will spread and infuse every person, bringing out their full potential.

10. *Ketubot* 17a.
11. *Berachot* 64a.
12. 2 Samuel 6:16-23.
13. *Hilchot Lulav* 8:12-13.
14. *Sukkah* 5:1.
15. 25:6.

CONCLUDING SUMMARY

In conclusion, more than any other theme that connects and motivates all five dynamics of leadership is vision. We now quote from the concluding remarks of *Awakening the Spark Within: Five Dynamics of Leadership That Can Change the World*:

> When pursuing the first dynamic, the art of compromise, one must be ever aware of the point of goodness and truth in each person, seeing beyond the dualities of this world to the vision of oneness underlying all creation. The second dynamic, the drive for wholeness and the ability to draw the supernatural into normative reality, entails a vision of a perfect future. The very nature of inspiration, the third dynamic, is aroused and invigorated by a visionary outlook on life. The preoccupation of the leader with refining the physical world and integrating all knowledge with Torah, the fourth dynamic, is predicated on the leader's vision of all existence as a unified Divine revelation. All the different levels of folly, the fifth dynamic, necessitate a keen visionary awareness of the appropriate action needed at a specific moment in time.[16]

May we all learn to integrate these five dynamics of leadership in order to play our part in bringing true leadership to the world. When enough people activate their own spark of Mashiach, it will create a critical mass of redemptive energy that will manifest with the coming of Mashiach. May it be soon!!

16. p. 133.

STORY

REBBE MENACHEM MENDEL OF VITEBSK: DON'T GIVE UP, JUST LOVE

Rebbe Menachem Mendel of Vitebsk was born around the year 5500 (1740), to his father Rabbi Moshe, who was among the disciples of the Ba'al Shem Tov. At a very young age, he was already a student of the Maggid of Mezritch, who nurtured him in Torah and Divine service and even traveled with him to the holy Ba'al Shem Tov. After the Maggid's passing, Rebbe Menachem Mendel returned to Vitebsk and later settled in nearby Horodok, where thousands of chasidim gathered around him, including some of the greatest of the Maggid's disciples.

In the month of Adar 5537 (1777), Rebbe Menachem Mendel set out to make aliyah to the Land of Israel at the head of a group of three hundred Chasidim. They arrived on the 5th of Elul 5537, initially settling in Peki'in—a small town in the upper Galilee with uninterrupted Jewish presence since the

Second Temple era—and then, because of violent attacks from the local Arab residents, they were forced to move to Tzfat. Due to persecution by Arabs and Turks in the city, and because they were rejected by the existing Jewish community in Tzfat, they relocated to the city of Tiberias.

About 10 years later, on Monday, the 1st of Iyar 5548 (1788), Rebbe Menachem Mendel commanded those standing near him to leave the room "for behold, God stands over me," and within an hour he passed away, leaving behind his only son Rabbi Moshe. He was buried in the old cemetery in Tiberias in the section of the Ba'al Shem Tov's disciples. His teachings were recorded in the book Pri Ha'aretz and in letters printed at its end.

In the year 5537, the idea arose in the mind of the holy Rebbe Menachem Mendel of Vitebsk to make *aliyah* to the Holy Land. Before his journey, he was deeply concerned about how he could abandon his many followers to the severe opposition to the Chasidic movement that was led by the followers of the Vilna Gaon. Rebbe Menachem Mendel decided to travel to Vilna to engage in debate with the Vilna Gaon, of blessed memory, until he would acknowledge the truth, and then there would be peace among the Jews. He travelled to Vilna with his student-colleague, Rebbe Shneur Zalman, the Alter Rebbe of Chabad, and they lodged at the house of the Gaon Rabbi Shmuel, the head of the rabbinical court of Vilna. Rabbi Shmuel received them with honor and was very pleased by their visit for he too wanted them to engage in debate so that there would be an end to the controversy.

But the Vilna Gaon did not want to debate, saying that it was forbidden to argue with them. The two rebbes went to him twice, but they did not succeed in entering his chambers because he shut his door to them. The great rabbis of Vilna came to him and said: "Our Rebbe! Behold, their famous rabbi has come to debate with your honor, and when he is surely defeated, there will be peace upon the Jews!" But the Vilna Gaon would not listen to them, and when they pressed him greatly, he left the city and remained there until the two rebbes departed Vilna.

Afterwards, Rebbe Menachem Mendel sent the Alter Rebbe together with Rebbe Avraham of Kalisk to Shklov to engage in debate with the opponents there, but there too, they did not succeed in making peace with them. Even though initially the opponents promised them that if they were defeated by the two rebbes they would accept their words and do nothing to them, afterwards they changed their minds and their promise. For when they saw that they had been defeated, they turned against them and did things that should not be done, such as imprisoning them in a dark cellar to punish them further, but by Heaven's mercy they escaped. The opponents relied on the opinion of the Vilna Gaon, of blessed memory, to justify their actions.

When they saw that there was no hope of reaching an agreement with them, the Rebbes ceased speaking with them. They placed their trust in the Almighty that He would not abandon His *chasidim* and He would seek out the pursued, and they began to prepare themselves for the journey to the Land of Israel.

The mission that faced Rebbe Menachem Mendel and his student-colleague Rebbe Shneur Zalman of Liadi, the Alter Rebbe, was difficult and disappointing. All attempts to reach dialogue with the head of their opponents, who was also a man of truth capable of admitting his error if convinced of it, came to naught. Despite this, they tried repeatedly to bridge the gap and explain, and only when all attempts failed, did they desist.

Even from the Land of Israel, Rebbe Menachem Mendel continued to send letters to the rabbis of those who opposed Chasidut and a certain version of the story of the failed meeting insists that for the rest of his life, he regretted having not broken down the door of the Vilna Gaon's room, in order to secure a meeting with him even for a moment.

Where do you get the strength to repeatedly try to create dialogue with those who oppose you, even when it appears that all hope has vanished?

Let us contemplate this with the help of the famous epistle written by the Alter Rebbe and beginning with the word, "*Katonti*."[1] The Alter Rebbe sent this epistle to his *chasidim* after surviving accusations of having committed treason against the Czar and Russia and following his release from prison and an almost certain death sentence. In that epistle, he warns with a severe warning not to become arrogant over the camp of the mitnagdim—those who opposed the Chasidic movement. Instead, he commands his followers, "to only humble their spirit and heart with the attribute of truth of Jacob." Like the well-known signature of Rebbe Menachem Mendel of Vitebsk, his teacher and guide, the Rebbe warns his *chasidim* to remain "truly lowly." Not as a tactic, not in pretense, but in truth! The lowly one is not broken by being turned away empty-handed, and he recognizes that every person has free choice between good and evil and all his efforts cannot compel the other to respond to him.

But lowliness is only part of the story. The opening of the letter deals with the attitude one should have after experiencing Divine closeness in the form of a miracle—like the miracle that the Alter Rebbe and the entire Chasidic movement merited when the Alter Rebbe was released from his incarceration. From the place of lowliness that such Divine closeness should arouse, the *tzaddik* demands fraternity and gentle language and conduct towards his sworn enemies who planned his demise.

Here too, as in the story with which we opened, the question arises with all its force: the Alter Rebbe instructs his *chasidim* that they should humble

1. *Tanya*, *Iggeret HaKodesh* 2.

their spirit before every person; a gentle demeanor disarms anger and perhaps God will give in their brothers' hearts, as water reflects one face to the other, love and compassion too. How is it possible to make all these efforts for the opposing camp, when the success of touching their hearts is cast in such doubt? Perpetual yearning and grasping at every chance to make peace comes from a strong and genuine desire for a state of closeness even with one's greatest opponent. One continues to hope that perhaps the other will choose good. That unconditional love, which seeks nothing but the fraternity of brothers, will push others to choose the same. This is the essential point of the guidance given by the Alter Rebbe: always conduct yourself with a lowly spirit and a gentle demeanor.

When contemplating the motive behind loving efforts at mediation, we are reminded of two similar teachings found in Chasidic literature. The first is the work of advocacy (*limud zechut*) most associated with Rebbe Levi Yitzchak of Berditchev, and the other is the teaching of *Azamrah*[2] found in the teachings of Rebbe Nachman of Breslov. In these teachings, as in the Alter Rebbe's approach that "perhaps they will come around," there is yearning and hope that the other side will ultimately choose good.

These three approaches together span the full gamut of time: the past, the present, and the future. The advocacy taught by Rebbe Levi Yitzchak of Berditchev deals with the past as it seeks to find revolutionary interpretations for what appears to be evil from a superficial perspective. Rebbe Nachman's Azamrah encourages us to search for the good point that already exists in our opponent, in the present, and we pray and trust that this good will ultimately shift the entire balance to the positive side. The Alter Rebbe's yearning that does not give up even in the face of the hardest obtuseness represents a hope for a change that lies entirely in the future.

Each of the three points by itself is lacking and limited because it addresses only one particular facet of the difficulties found in relationships. But together, they express complete love for every Jew. To better understand this triad and its importance, let us arrange it according to the Ba'al Shem Tov's model of submission, separation, and sweetening. Judging favorably is an action requiring submission, an effort of relinquishing my superficial viewpoint. Searching for points of merit is an action of separation, between the surrounding darkness and a single point of light and goodness. The hope for *teshuvah*, the paradoxical attempt to guide a person with free choice to choose good, is a movement of sweetening.

Even with this three-pronged approach, one does not always succeed in ending conflict and replacing it with peace and love. Indeed, the Vitebsker and the Alter Rebbe in our story were not immediately successful. However, their efforts set the stage for the future, creating the necessary environment that did not allow the feud to grow. Then, in subsequent generations, the opposition largely subsided and the hopes of Rebbe Menachem Mendel and the Alter Rebbe for love and respect between the factions was ultimately fulfilled.

2. *Likkutei Moharan* 1:282.

TORAH AND SCIENCE

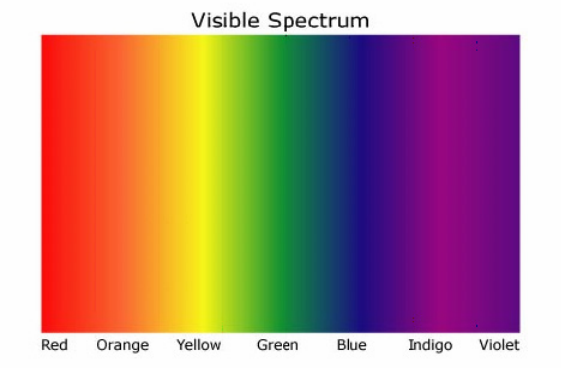
PHOTOSYNTHESIS AND LIGHT—PARALLELS TO LOVE AND FEAR OF GOD

Sunday, the 2nd of Iyar this year, marks the first yahrzeit of Prof. Eliezer (Eduardo) Zeiger obm. Prof. Zeiger was a world-famous researcher, lecturer, and author on Plant Physiology working at UCLA. He met HaRav Ginsburgh some 35 years ago and immediately recognized him as his teacher in his lifelong pursuit of unification between Torah and science. One of Prof. Zeiger's fields of research was photosynthesis, particularly the effects of different colors of light on the process. Inspired by his scientific expertise, HaRav Ginsburgh wrote a monograph on Photosynthesis, which is now nearing completion.

The following is an excerpt from this latest addition to HaRav Ginsburgh's Torah and science library, which will be dedicated and renamed in honor of Prof. Zeiger. It is also related to this week's Torah portion. Prof. Zeiger is survived by his wife Dr. Yael Fischman and their two sons. May his soul be a good advocate for them and their families.

THE SPECTRUM OF VISIBLE LIGHT

Beginning with Isaac Newton, visible light has been traditionally divided into seven sub-regions, named after their main color: Red, orange, yellow, green, blue, indigo, and violet.



Today, indigo's standing as a primary spectrum color is questioned. It seems that Newton identified indigo as a primary color in order to produce a seven-fold division, which fit his mystical theories.* For this reason, some modern texts omit indigo altogether and present a six-fold division.

There is no source in Torah that clearly identifies seven primary colors. The six-fold division has certain logical advantages over Newton's seven-fold division, as it is very similar to the additive color model used by artists (e.g., red plus yellow produces orange and in the spectrum, orange is defined as the region between red

and yellow). Still, the seven-fold division, with a few reservations, fits well with other logical schemes found in Kabbalistic models.[1]

In trying to understand the significance of the seven color regions in visible light, the most straightforward approach is to map the seven regions to the seven emotive and habitual *sefirot* (also known as the seven lower *sefirot*) from loving-kindness through kingdom. Similarly, the seven regions of the entire electromagnetic spectrum also correspond to these seven *sefirot*. However, it would not make good sense to map the *sefirot* with the color regions based on their order in the soul: loving-kindness, might, beauty, victory, acknowledgment, foundation, and kingdom. Rather, we must identify a stronger correlation criterion to base our mapping on.

The first step in defining this criterion is to note that reds and blue-violets appear at opposite ends of the spectrum. In Kabbalah, the *sefirot* are depicted using a chart with three axes as follows:

might loving-kindness

beauty

acknowledgment victory

foundation

kingdom

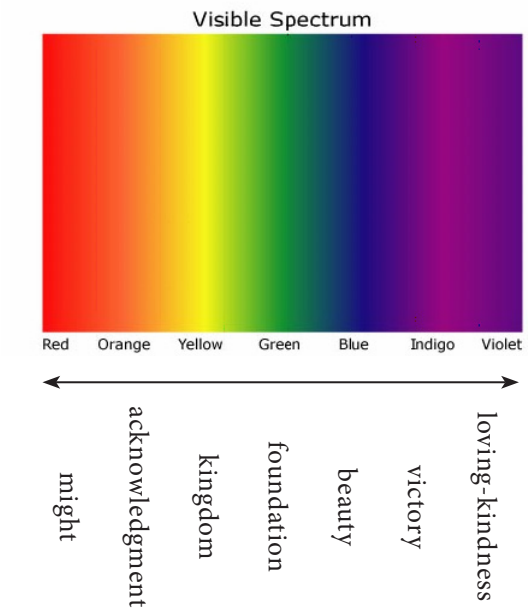
One of the best-known correspondences of the *sefirot* is to the four elements of antiquity used as a model for matter: fire, air, water, and earth. In this correspondence, loving-kindness is associated with water and might is associated with fire. Whereas water is the stuff that life is made from, fire has the power to consume and break life into pieces or forge it and make it tough and robust. Though water itself is colorless, it is almost always associated with blue and therefore loving-kindness too is associated with blue. Likewise, fire displays many colors (even a candle flame has a few colors), but is most commonly associated with red.

When the *sefirot* are placed along three axes as in the chart above, loving-kindness is on the right and might on the left. In Torah in general and Kabbalah in particular, the distinction between right and left carries a great deal of meaning. Perhaps the most basic is that the left is considered feminine and the right masculine. Another way of stating the difference between them is that the right represents a descending vector going from a high place to a low place (just as water, which corresponds to loving-kindness on the right, is always following gravity and descending from a high place to a low place). Left represents an ascending vector, from a low place to a high place (just as the flame of a fire somehow defies gravity and rises upward). Likewise, between the masculine and feminine archetypes in Kabbalah, the masculine is considered descending (in order to subsequently ascend) while the feminine is considered ascending (in order to subsequently descend). It turns out then that the right axis, like photons with blue wavelengths, represents higher energy and the left axis, like photons with red wavelengths,

1. *Kabbalah and Mediatation for the Nations*, pp. 62-7.

represents lower energy. The energy of the right axis is many times described as "greatness" (גְּדֻלָּה) alluding to the inherent and essential exaltedness in the right's source. The energy of the left axis is associated with the power to overcome or hold steadfast against opposition (גְּבוּרָה).

Considering the above differences between the right and left axes and the *sefirot* that populate each, we can ask how relatively left or right each of the seven emotive *sefirot* is. Of course, loving-kindness would be on the extreme right and might would be on the extreme left. Projecting* the remaining *sefirot*, based on how much they lean left or right, we get the following chart:



So far, we have been identifying the red region with the left side of the visible spectrum. This is because we have been plotting the spectrum based on frequency, in order to stress the amount of energy in each color and to ensure that the energy increases as we move to the right. But actually, the spectrum can be plotted using two choices for the horizontal axis: wavelength or frequency. When plotted against wavelength, the reds appear to the far right, while the violet-blues appear on the far left.

THE RATIO BETWEEN RED AND BLUE LIGHT

Though the red and blue light most used by photosynthesis indicate a range of wavelengths, most texts cite the wavelength of red as 780 nanometers and the wavelength of violet as 420 nanometers. Since both 780 and 420 are multiples of 60, and specifically, we have that $780 = 13 \cdot 60$ and $420 = 7 \cdot 60$, then the ratio of the wavelengths of red to violet is a pure ratio: 13:7. The ratio of their frequencies will of course be its reciprocal 7:13.*

In Torah, we find that the numbers 13 and 7 go together like two words in an idiom.[2] From experience, there are many instances where our mathematical analysis of two related words or concepts will yield that one is a multiple of (or related to) 13 and the other to 7.[3] Kabbalah explains that indeed 13 and 7 form a male-female pair. As explained elsewhere,[4] the reciprocal properties, frequency and wavelength, themselves form a male-female pair. Spiritually, frequency is the masculine component of radiation; wavelength is its feminine component. Frequency is a measure of time; wavelength

2. See Wonders, issue 4, p. 7 for more on the occurrences of 7 with 13 in the Torah.
3. See for example *913: The Secret Wisdom of Genesis*, p. 8.
4. See our forthcoming article, "The History of the Discovery of Electromagnetism from a Kabbalistic Perspective."

a measure of space. In Kabbalah, time is associated with the masculine *sefirah* of wisdom and space is associated with the feminine *sefirah* of understanding.

Thus, considering electromagnetic radiation based on its frequency is a relatively masculine analysis; considering it on the basis of wavelength is a relatively feminine analysis. Normally, in Kabbalah, 13 is considered masculine and 7 is considered feminine.[5] Because we have been using frequency as our horizontal axis when plotting the visible spectrum, it follows that we have been utilizing a more masculine analysis. Indeed, the frequency-based analysis yields violet on the right and red on the left, matching the ratio between their frequencies, which is 13:7, and identifies violet as masculine (further to the right) and red as feminine (further to the left). If we were to use a wavelength-based analysis, red would be to the right indicating that it is more feminine and violet would be to the left indicating that it is relatively less feminine, retaining consistency across the spectrum based on wavelength and based on frequency.

It follows that once we associate wavelength with the feminine and frequency with the masculine we should do the same for the wave-particle duality. As discovered by Einstein, every entity in the universe exhibits both wave-like and particle-like behavior. The larger and slower the object, the more difficult it is to measure its wave-like behavior. The smaller and more energetic an object, the more difficult it is to measure its particle-like behavior. Considering that from a philosophical perspective all objects are composed of both matter and form, identified as feminine and masculine properties in Kabbalah, we can identify particle-like behavior with an object's material-feminine aspect and wave-like behavior with its form-masculine aspect.

HEAT LOSS

We have already established the correspondence between the red wavelength light and femininity and between the blue wavelength and masculinity. This of course is only a symbolic correspondence, not to be taken literally, but it does provide us with a frame of reference for analyzing and better understanding scientific findings regarding photosynthesis.

One of the most central representations of the relationship between male and female found in the Torah pertains to arousal during the act of procreation. Based on the first verses of *parashat Tazria*, the sages learn that when the male's arousal comes first the tendency is for the couple to conceive a female. And vice versa, when it is the female whose arousal comes first, the tendency is for a male child to be born. Without considering the possible objections one might think that genetics presents to this notion, let us see how it can be applied to chlorophyll excitation from blue and red wavelength light.

Since blue represents loving-kindness,

5. One example that we have offered elsewhere (see *Kabbalah and Meditation for the Nations*, pp. 22-7) is that Jews have 13 principles of faith, while righteous gentiles have 7. Relatively speaking, the Jewish people and the nations of the world form a male-female pair based on God's choice that the Jewish people provide the nations of the world with true spiritual sustenance.

it can be identified, relatively speaking, as more masculine. Accordingly, red represents might and can therefore be identified as more feminine. However as discussed elsewhere, male and female actually contain aspects of one another, a quality known as inter-inclusion. Scientifically speaking, when chlorophyll is excited by (higher energy) blue light, the energy immediately dissipates through heat loss bringing the chlorophyll molecule to its lower excited state. From there, the energy can follow two pathways: it can be a) used for photochemistry (either by the original molecule, or by transfer to another chlorophyll), or b) it can be released as heat or as light, making it unavailable to the photosynthetic reactions. The first pathway is in a sense viable because it allows the energy to be used for photosynthesis. The second is in a sense inert because the energy never reaches photosynthesis. As far as science currently knows, it is impossible to predict which pathway the energy will follow. But as far as Torah is concerned male arousal, i.e., chlorophyll excitation due to blue light, comes in two flavors: either the male's arousal is independent of the female's or it is a result of it.

Applying this distinction, we would say that when the chlorophyll's excitation due to blue light was entirely masculine, it will yield a feminine—a relatively inert—response, causing the energy to be dissipated through either heat or fluorescence and made unavailable to photosynthesis. But, if the chlorophyll excitation due to blue light is akin to male arousal caused by female arousal, then the energy will find its way to the photochemical reactions. Of course, describing things this way adds a level of complexity in the excitation of chlorophyll which is not yet scientifically documented. But this is an example in which following the correspondence between Torah and science can lead science further by pointing at possible new phenomena or qualities of matter that have yet to be discovered.

WHY ARE PLANTS GREEN?

Most leaves are green because chlorophyll, the pigment responsible for photosynthesis, is green. The fact that chlorophyll is green reveals that while blue and red light is used in photosynthesis, green light is (rejected, or) reflected. Apart from the energy considerations behind this fact, we can find spiritual significance alluded to in the reflection of the green wavelengths.

In our model of the visible spectrum as its colors correspond to the *sefirot*, we saw that green corresponds to the *sefirah* of foundation. The most important verse in the Bible describing the nature of foundation is, "A *tzaddik* is the foundation of the world."[6] This verse identifies the *sefirah* of foundation with a *tzaddik*—a righteous individual, which the Talmud tells us serves as a beacon of Divine light among men.[7] Elsewhere, we find that the *tzaddik*, the righteous individual is himself likened to plants. So strong is this relationship that the *tzaddik* is not only likened to a plant metaphorically but is actually referred to as "a righteous plant," as in the verse, "Behold, the days are coming declares God, when I will raise up a righteous branch of David's line. He shall reign as king and shall prosper,

6. Proverbs 10:25.
7. Yoma 38b.

and he shall do what is just and right in the land."[8] The words translated as, "a righteous branch," literally mean "a righteous plant" (צֶמַח צַדִּיק). As we will see shortly, the identification of the chlorophyll molecule, its functionality, and its structure with the righteous individual carries quite deep.

Chlorophyll can be excited to two different states by red (lower excited state) and blue light (higher excited state). We have just seen that red light corresponds to might and blue light to loving-kindness. Each of the *sefirot* has a psychological or experiential counterpart, which both drives its functionality and serves as the psychological state to which it strives. The inner experiential counterpart of might is fear (or awe) and that of loving-kindness is love. Serving God involves both emotional qualities—serving Him out of an experience of fear or awe and serving Him out of love. Just as chlorophyll absorbs blue and red wavelengths—meaning they are not reflected outwards—so the true *tzaddik* conceals his love and awe of God. Because every Jew is to a certain extent a *tzaddik*, this is relevant to all of us. The analogy extends further, because just as the absorption of light produces carbohydrates—physical sustenance—in plants, so Divine service with love and awe produces both spiritual and physical energy in the *tzaddik*. The most striking example of this conversion of Divine energy into physical sustenance happened during Moses' 40 days on Mt. Sinai, when he neither ate nor drank but was sustained by God's energy.

Now recall that in practice, only the energy of the lower excited state, i.e., the energy in red photons, can be used to drive photosynthesis. The higher excited state induced by blue photons must first decay to the lower excited state. Interestingly, there is an exact parallel to this phenomenon in the relationship between love and awe. First, it is explained that love of God already contains fear of God.[9] In other words, it is impossible to love God without first being in awe of God. This relationship between love and awe is identical to the relationship between blue photons and red photons. The higher energy state induced by blue photons, which correspond to love of God, also includes the lower excited state induced by red photons.

Still, when serving God, it is explained[10] that the primary mode of service in our present reality is service out of awe, because that is the manner in which God revealed Himself to us at Mt. Sinai[11] and because a true experience of loving God is considered a gift that will be realized only in humanity's future state. In other words, though love of God, corresponding to blue wavelength photons can be experienced, it cannot be utilized fully in our present state without first being converted to fear of God, corresponding to red wavelength photons. Just as the higher excited energy state induced by blue photons must decay to the lower excited energy state induced by red photons, so inspired love of God must first reduce, as it were, to a state of fear of God to provide us with energy. Still, that we are promised that in the future, pure Divinely inspired love of God will be translatable

8. Jeremiah 23:5.

9. See in length *Tanya*, chapters 18 and 41.

10. *Ibid.*

11. Exodus 20:15-17.

into sustenance suggests that though we cannot, as it were, survive on love alone, in the future this will be possible.

But the analogy carries even further. Chlorophyll absorbs blue and red wavelength photons, but reflects green photons, which in our model correspond to the *sefirah* of foundation, whose inner experiential counterpart is self-fulfillment. As the *tzaddik* absorbs love and fear of God and transforms it into sustenance, he also reflects to those around him true self-fulfillment, encouraging others to strive for the highest level of fulfilling their destiny in life.

The purpose of every righteous individual is to be a living example for the people of his generation. In the *Zohar*,[12] Rabbi Shimon bar Yochai is quoted as saying, "I am a sign in the world," meaning that he exists only to be like a signpost for others, pointing them in God's direction (one might say that the *tzaddik*, the righteous individual, is like a green light, encouraging others to move forward). Some righteous individuals (like Rabbi Nachman of Breslov) felt that anyone who wished to do so, could attain his level. Still, Rabbi Shimon bar Yochai was of the opinion that few can attain his own level.[13]

12. 1:225a.
13. *Sukkah* 45b.



From left to right: Prof. Zeiger, David Suissa, HaRav Ginsburgh, and R. Shlomo Schwartz (Schwartzie)

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