

The Unification of Torah and Science: Basic Principles and a Case Study on Electromagnetism

Part 6—Spiritual Alchemy

Spiritual Alchemy

Above, we enumerated six different levels of relationship between Torah and science, of which the lowest corresponds to the level of stones and the next level corresponds to wood (trees – cross-pollination). The remaining four levels correspond to the four letters of the word iron (ברזל) which relates to the four wives of Jacob. Now, having seen that iron in fact relates to other metals too, we will continue to make relevant correspondence between the levels following the level of Bilhah to the other three important metals, copper silver and gold.

Six Levels of Correspondence between Torah and Science

	correspondence to Jacob's wives	correspondence to natural resources	level of integration
levels within sanctity	Leah	gold	"the workings of the chariot" science is revealed as the innermost secrets of the Torah
	Zilpah	silver	"the workings of creation" science reveals the secrets of the Torah
	Rachel	copper	transparency – science reflects the light of the Torah
	Bilhah	iron	science acknowledges its source in the Torah
levels not included in sanctity		wood	cross pollination between two "trees"
		stones	two inanimate "stones"

All of these six materials appear together in a single verse in Isaiah (60:17), "In place of copper I will bring gold, and in place of iron I will bring silver, and in place of trees – copper, and in place of stones – iron." From this prophecy we learn that in the future the trees will become copper and the stones will become iron. That which was previously copper will become gold and that which was previously iron will become silver. Each material will rise above its original state by two levels, meaning that eventually there will remain (in the possession of the Jewish People, i.e., Jewish consciousness) only four of the six materials enumerated: gold, silver, copper and iron.

In this verse, the first two materials appear in the plural, "stones" and "trees" while the other four materials, all metals, appear in the singular. The sages teach us the general principle that when an item appears in the plural with no specific amount stated, it should be understood as the minimum plural, which is two. This particularly suits our explanation of the various levels of connection between Torah and science in which at the stone and tree levels the two remain separate entities, whereas at the higher levels they appear together, or as one.

Similarly, the level of Bilhah, the first level at which there is true interaction between the two domains, is represented by the lowest level of iron that potentially contains the three higher levels, as we have seen in the

The fact that stones will become iron can be beautifully illustrated by the fact that the numerical value of the Hebrew word for "stone" (אבן) is 53. If we order the prime numbers (beginning from 1, according to Torah tradition), we will discover that the 53rd prime number is 239, the numerical value of the word "iron" (ברזל).

The four metals that will remain after this prophecy has been realized are called the "Chariot" of metals. These were the four metals that King David prepared for the construction of the Temple; he did not prepare tin, lead or mercury.

Whenever a model of the seven attributes is constructed, loving-kindness, might, beauty and kingdom are called the Divine "Chariot." The original Chariot was Abraham, Isaac, Jacob and David.¹ Each metal thus represents one leg, or one wheel, of the chariot. However, iron, being the metal that represents the *sefirah* of kingdom, is the most important one, corresponding to King David himself and alluding to the third Temple which, according to the Rebbe, will be made out of iron, as we shall discuss in detail shortly.

Significantly, the numerical value of the Hebrew name "David" (דוד) is equal to that of "gold" (זהב). Indeed, the sages taught that David's beard contained seven

¹ Earlier in history, before David became king of Israel, the fourth leg of the Chariot was represented by Rachel.

hues of gold. David was a physical descendant of Leah who, in our analysis, corresponds to gold. Thus iron, the metal that corresponds to the *sefirah* of kingdom, and gold, the truly "royal" metal, are most related. Indeed, in the days of King Solomon, King David's son, even silver was considered worthless and only gold was considered precious. Similarly, in times of messianic prosperity, homes built of iron will be filled with gold.²

In the terminology of Kabbalah, the construction of Kingdom, represented in this case by iron, is from Might which is represented by gold.³

Atomic Mysteries

Returning once more to observe the complete *partzuf* of seven metals,⁴ we will now take a look at their respective atomic numbers, which, although

² Maimonides states that luxuries will be as plentiful as dust. People's main occupation will be Torah study, to know G-d, and not acquisition of wealth. Just as dust is unimportant now, so will gold cease to be a value in its own right.

³ As explained above, in the innermost level of the super-conscious crown, might, on the left, becomes the ultimate power of loving-kindness, referred to as "the faithful loving-kindness of David."

Both iron (ברזל), and gold (זהב), possess the common letters *bet* (ב) and *zayin* (ז), the letters that stand for Bilhah and Zilpah, Jacob's two maidservants (corresponding to the psychological and natural sciences). When juxtaposed, these two letters mean either "booty," as used in the Bible for the booty of the Mashiach (the elevation of fallen sparks from the physical realm, a clear allusion to sparks of scientific wisdom), or "to flow" (זר), as in "a land flowing with milk and honey" (milk contains iron, while honey is like liquid gold). Together, iron, 239, and gold, 14, equal 253, the triangle of 22 (the sum of all numbers from 1 to 22), thus reflecting together the consummate power of the entire Hebrew alphabet, the 22 building blocks of creation.

⁴ What, if any, is the relationship between the 92 natural elements of modern science and the four elements of the ancients: fire and water, air and earth? There are several insightful answers to this question, one of which is that four of the elements that appear on the periodic table can indeed be seen to correspond to the four elements of the ancients. In this correspondence, air is represented by oxygen, which is the viable part of air we breathe, even though it does not comprise the maximal percentage of the atmosphere; water is represented by hydrogen (מימן), which shares the same root as the word for water (מים) (implying that H₂O is actually two parts "water" and one part "air"); fire is represented by carbon (coal) and earth is represented by nitrogen, the primary element involved in plant growth.

unknown to the general public until recent times, we now know have very great significance from a scientific perspective.⁵

Silver – 47; gold – 79; copper – 29, tin – 50; lead – 82; mercury – 80 and iron – 26.

The atomic number represents the number of electrons in the atom (which is equal to the number of protons in the nucleus of the atom); this means that the atomic number is directly connected to the electric charge within the atom. The electric charge is of vital importance in our understanding of electromagnetism, as we shall see later.

While the seven metals correspond to the seven lower *sefirot*, these four correspond to the higher *sefirot*, as illustrated in the chart below, in which each element is listed together with its atomic number:

	Crown – air Oxygen (8)	
Understanding – fire Carbon (6)		Wisdom – water Hydrogen (1)
	Knowledge – earth Nitrogen (7)	

The sum of the atomic numbers of these four equals 22, corresponding to the 22 letters of the *alef-bet*. However, the *Zohar* teaches us that the relationship between the four higher *sefirot* and the seven *sefirot* below them is that the energy level of the higher *sefirot* is ten times more than that of the lower, indicating that we must multiply this result by 10, resulting in the number 220, which is equal to the numerical value of the word, "noblewoman." Yet we noted above that the sum of the atomic numbers of the seven metals is equal to 393, the numerical value of the word, "maidservant," so here, by meditating upon the atomic numbers of these eleven elements, we have discovered a union of the maidservant of science with her noblewoman, the Torah. The sum of 220 and 393 is 613, the exact number of mitzvot in the Torah, as mentioned above.

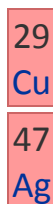
The numerical value of the names of these four elements (fire [301], air [214], water [90], earth [350]) totals 955. Here, by adding an extra unit (the *kolel*), we reach the sum of 956, which can then be divided by 4, resulting once again in the number 239. This means that the average value of these four elements together with the *kolel* is "iron." So, even though these four elements apparently have nothing to do with iron, we see that for some mysterious reason, in their original terminology, their average numerical value is equal to the numerical value for "iron."

⁵ In our current analysis, this significance is beautifully illustrated by the fact that the sum of all seven atomic numbers is 393, the numerical value of the Hebrew word for "maidservant" (שפחה), science being the maidservant in reference to the Torah.

Our first observation is that the atomic number of mercury (80) exactly equals the numerical value of the name of the *sefirah* to which it belongs, foundation (טיו'). In Rabbinic Hebrew the name for mercury is literally, "live silver," similar to its original English name, "quicksilver." Indeed, one of the explanations given in Kabbalah why the numerical value of foundation equals 80 is because this number is the product of 8 and 10, the numerical values of the two letters *chet* and *yud* of the word "live" (חי). The word "live" also refers to the letter *tzadik*, which is the eighteenth letter of the Hebrew *alef-bet*. The *tzadik*, the righteous person is also referred to as the "foundation of the world."

However, perhaps the most important observation that we can make concerning the atomic numbers of these metals, is that the atomic number of iron (26) is equal to the numerical value of the Tetragrammaton, God's Essential Name.⁶

The first three of the four metals of the Chariot, copper, silver and gold are found one beneath the other in the periodic table:



⁶ Interestingly, one of the five string theories that Witten unified in M Theory needs 26 dimensions in order to be viable.

79
Au

This is because they share the same atomic form, yet this is not the place of iron. Beneath iron is a lesser known element called ruthenium, below which comes osmium.

26
Fe
44
Ru
76
Os

The atomic number of ruthenium is 44, which is also the minimal filling of the four letters of God's Essential Name when spelled in full. This complements the fact that the atomic number of iron itself is 26, the simple numerical value of this Name. 44 is also the numerical value of the Hebrew word for "blood" (דָּם). As we mentioned earlier, iron is a vital component of blood.

Below ruthenium is osmium, with an atomic number of 76. Osmium is the heaviest form of matter, the density of which is greater than any other element in the world, implying that iron ultimately evolves to become the heaviest substance (and power) on earth.⁷ The sages actually teach us that the stones of the Land of Israel, which (as we shall see later on) are considered "iron," are much heavier

⁷ Amazingly, in the entire Tanach the word *barzel* without a prefix letter appears exactly 44 times (the atomic number of ruthenium, the element below iron on the periodic table) and with a prefix letter appears 76 times (the atomic number of osmium)!

than their counterparts in the Diaspora (picking up a stone and assessing its weight was a way by which the sages knew if they had entered Israel).