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## EINSTEIN'S JEWISH SCIENCE<sup>1</sup>

**A**lbert Einstein is on most, if not all, lists of twentieth-century Jewish heroes. So is Chaim Weizmann, who was also a great scientist. Paradoxically, Weizmann is not normally celebrated for his science, but for using his scientific success to further Zionist aspirations. Einstein, who was also Zionist, is not normally celebrated for his Zionism, but for his scientific contributions. We celebrate Weizmann for being a great contributor to twentieth-century Judaism. On the other hand, why do we celebrate Einstein who contributed very little to Jewish discourses?

Do we celebrate him because he was a Jew who distinguished himself in the non-Jewish world? The case of Einstein seems different from the way many American Jews celebrate, say, Sandy Koufax. With Koufax we think, "Wow, a Jew can pitch and pitch well." But with Einstein, we don't think, "Wow, a Jew can do science and do it well."

Did Koufax enhance Jewry's understanding of itself? Perhaps, but we don't normally speak of him that way. What Einstein achieved in the non-Jewish world, on the other hand, did affect our Jewish understanding of ourselves. Perhaps the great irony is that the people who first posited the connection between his science and Judaism were the Nazis and Nazi sympathizers like Philipp Lenard who referred to Einstein's science as "Jewish science." On the one hand, we hold up Einstein the scientist as a Jewish hero, but on the other, we ridicule the claim that Einstein's science work is "Jewish Science." Could there be a sense in which the Nazi's absurd claim is correct? It depends upon what is meant by "Jewish science."

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<sup>1</sup> We thank Lawrence Baron and Lisa Portmess for their helpful comments.

While it is fairly straightforward to determine what we mean by "the theory of relativity," we examine several possible definitions of Jewish Science and consider whether the theory of relativity would fall under any of them. It turns out that in some of these senses, relativity is not as far from Jewish Science as one might think.

To answer this question of what is meant by Jewish Science, we begin by working through some background and details of Einstein's special theory of relativity, distinguish five distinct senses of what one might mean by the term "Jewish science," and examine the theory and biographical details to determine in which senses are satisfied by Einstein's theory.

The Nazi claim is, of course, ham-fisted; there is no "Jewish science" per se, but this does not mean that German Jewish themes did not on some level participate in how Einstein approached science and in how he developed his theories. While the theory of relativity is not derived from Talmud, more subtle senses of the phrase "Jewish Science" become valuable to consider and in doing so we add to our understanding why Einstein the scientist is a Jewish hero.

### *The Theory of Relativity*

The phrase "the theory of relativity" actually refers to two different theories proposed by Albert Einstein, the special theory of relativity which first appeared in his paper "On the Electrodynamics of Moving Bodies" in 1905<sup>2</sup> and the general theory of relativity which appeared in its most recognizable form in the 1916 paper "Foundation of the General Theory of Relativity."<sup>3</sup> The special theory of relativity considers the relation between mechanics (the study of objects in motion and interactions between objects that touch one another) and electromagnetism, while the general theory enlarges the reach of the special theory to include the force of gravitation. For this discussion we will only consider the special theory, although the discussions that follow could be extended more broadly to cover Einstein's later work as well.

Physicists of the generation before Einstein had good reason to believe that physics, as a science, was almost complete. Physical theory had successfully explained a huge number of phenomena and it seemed that little in its purview could not be accounted for by two theories: Isaac Newton's theory of mechanics and gravitation and James Clerk Maxwell's theory which unified electricity, magnetism, and the study of light. A couple of rogue phenomena notwithstanding, physics appeared to be on the verge of completion.

One such unresolved puzzle concerned the motion of light. According to Maxwell's extremely successful theory, light is an electromagnetic wave with a

<sup>2</sup> *Annalen der Physik*. vol. 17. pp. 891-921. Translated in *The Principle of Relativity*. (New York: Dover, 1952). pp. 35-65

<sup>3</sup> *Annalen der Physik*. vol. 49. pp. 769-822. Translated in *The Principle of Relativity*. (New York: Dover, 1952). pp. 109-164.

constant velocity. This gave rise to two concerns. First, with respect to what is the speed supposed to be constant? Secondly, waves need a medium, there cannot be waves if there is nothing to do the waving – for example, if you have no water, you get no water waves.

The medium for light waves was termed the “luminiferous ether” and it would then be assumed that this was to be the thing with respect to which the speed of the light moving through it would remain invariant. Questions arose about its properties and interaction with the rest of the natural world. One important concern was whether the medium was dragged by things moving through it (picture a fan moving the air by its motion), or whether the ether was stationary, inert with respect to the movement of objects (think of a butterfly net through the air).

Experiments were conducted and physicists were stymied when one experiment, Hippolyte Fizeau's measurement of the speed of light in flowing water, concluded that the ether is dragged,<sup>4</sup> while A.A. Michelson and Edward Morley's experiment using an interferometer showed that the ether was stationary.<sup>5</sup>

The inconsistency of the two results highlighted a further problem, the inconsistency of Newton's theory with Maxwell's. While each worked in its own realm perfectly well, the two theories had irreconcilable claims built in about the nature of space. It was widely assumed that there would be some way to “Newtonianize” Maxwell's theory, but all such attempts failed to produce empirically adequate results.

The Dutch physicist H.A. Lorentz took the opposite approach. Instead of trying to force Maxwell's theory to change in ways that made it consistent with Newton's, he instead derived the equations that would be needed to “Maxwellize” Newton's theory. These so-called Lorentz equations or Lorentz transformations not only maintain Maxwell's constancy of the speed of light, but also allowed Lorentz to account for the troublesome Michelson-Morley experiment, that is, as long as you were willing to say that a moving object shrinks in the direction of motion.<sup>6</sup>

For Lorentz, these were the result of a mere mathematical exercise, not to be taken literally. Surely, the speed of the light hitting a stationary observer looking into a flashlight would not be the same as that of a person walking towards the flashlight. And, of course, objects don't really shrink when they move. Most of all, we certainly do not want to overturn Newton's work, the most successful

<sup>4</sup> "Sur les hypotheses relatives à l'ether lumineux et sur une expérience qui paraît démontrer que le mouvement des corps change la vitesse avec laquelle la lumière se propage dans leur intérieur" *Annalen de Chimie et de Physik.* (1859). vol 57. pp. 385-404.

<sup>5</sup> "On the Relative Motion of the Earth and Luminiferous Ether" *American Journal of Science.* vol. 34. pp. 333-336.

<sup>6</sup> "Versuch einer Theorie der elektrischen und optischen Erscheinungen in bewegten Körpern" (Leiden: Brill, 1895). Translated in part in *The Principle of Relativity.* (New York: Dover, 1952). pp. 1-7.

theory in the history of science, in order to account for a technical difficulty and a strange experimental result.

Newton posited that space and time were absolute entities.<sup>7</sup> Lengths and durations were natural facts of the universe. From this view, he laid down three simple laws of motion and a law of universal gravitation that allowed for accurate descriptions of everything from falling apples near the earth, to the tides, to the planetary orbits. Newton's theory was so well-tested in terms of such an incredibly varied group of phenomena that questioning its validity would be utterly unreasonable.

Utterly unreasonable to everyone, that is, except for Albert Einstein. Einstein took the work of Lorentz seriously, but it was only when he had one additional insight to add to it that it became what we now call the theory of special relativity.

One day in 1905, Einstein was returning home from a discussion with his friend Michele Besso about the conflict between Newton and Maxwell, when, influenced by the synchronized clocks of Bern, the insight hit him: time itself would have to be frame dependent.<sup>8</sup> This insight showed him a way to augment Lorentz's work. Lorentz's equations only accounted for the way to translate the physical phenomena between moving reference frames according to Maxwell's theory in terms of lengths, they said nothing of the changes in duration. It was not only spatial, but temporal effects also that needed accounting for. Different states of motion would yield different time relations.

This addition to Lorentz's work created an entirely new approach to understanding the world, one whose results Lorentz was not willing to accept. Einstein made one addition to Lorentz' picture rendering it weirder still, and therefore even less palatable to those with an intellectually conservative disposition. The sea change was not in his insight about time, but in his attitude. It was Einstein who was willing to stand up and say it is so, Newton be damned.

Einstein's theory of special relativity is well known for its foundational axiom of the constancy of the speed of light – the speed of light is the same for all observers independent of their state of motion relative to the source – and its counter-intuitive results of length contraction – as Lorentz derived, an object moving relative to an observer will be shorter than an identical object at rest relative to the observer – and time dilation – a clock moving with respect to an observer runs slower when compared with a clock at rest relative to the observer. So when you measure moving objects they shrink and when you observe moving clocks they run slow. Contrary to Newton's view, space and time become relative to perspective.

<sup>7</sup> *Mathematical Principles of Natural Philosophy*. (Berkeley: University of California Press, 1934). pp. 6-12.

<sup>8</sup> Peter Galison. *Einstein's Clocks, Poincare's Maps: Empires of Time*. (New York: Norton, 2003). p. 253.

But it would be wrong to say that everything becomes relative on this view. Quite to the contrary, there are absolute quantities, true facts of the world that are observer independent. Take two lightning flashes. According to Einstein, observers in different reference frames, i.e., different states of motion, will assign different quantities to the distance between the points where the lightning struck and the time between the strikes. But they would agree on a mathematical construct called the space-time interval, the four-dimensional "distance" between them.

If we want to determine the distance between two points on a plane, say, between two buildings in New York City, we count the number of streets over and the number of avenues up. This creates a right triangle that lets us determine the distance using the Pythagorean theorem:  $d^2 = x^2 + y^2$ , where  $d$  is the distance between the buildings,  $x$  is the number of streets and  $y$  is the number of avenues. Now if we move to three dimensions, say we want to find the distance between an apartment on the fifth floor of one building and another on the twelfth floor of the second building, then we need to add in the extra component of height. The move from two to three dimensions is quite simple, the square of the new distance  $d^2 = x^2 + y^2 + z^2$ , where  $z$  is the difference in height. If we want to figure out the four-dimensional distance between the person calling from the first apartment and the person in the second apartment picking up the phone, then we expand our equation in a straightforward way  $s^2 = x^2 + y^2 + z^2 - c^2 t^2$ , where  $c$  is the speed of light and  $t$  is the measured time difference between then placing and answering of the call. (We can only add distances to distances, so we multiply the time by a speed to make it into a distance, but the minus sign distinguishes the space from the time components.) This new quantity  $s$ , the space-time interval, will be the same for all observers, even though the distance and the time measurements that make it up will vary between observers in different states of motion.

So what we have is the positing of an absolute truth about the universe, but one that is experienced differently by different observers. What the equations of Einstein's special theory of relativity does, is to allow us to take our measured, experienced reality – viz., temporal durations and spatial distance – and extract from it the higher general truth which is not directly experienced, but glimpsed from our experience, and then to calculate how that truth would be experienced differently from different perspectives. There are two kinds of facts here, those that are true within a reference frame and those that are true across reference frames. What Einstein's theory does is provide the means to connect all of the individual experienced relative truths with the larger absolute truths that cross contextual perspectives.

#### *Defining "Jewish Science"*

So the question then is whether there is any meaningful way to contend that this theory of space, time, and motion is Jewish science. The question is made

interesting by the fact that the phrase "Jewish science" may have a number of different meanings. We will consider five:

1. *Author-Identity Sense* – A scientific theory is Jewish if it was the scientific work of a Jew, that is, if the scientist who developed the theory is him or herself Jewish. This is clearly an extremely weak criterion that excludes questions about the residue of one's Judaism within the theory and hinges solely upon the question of Jewish identity.
2. *Strong Theological Sense* – A theory is Jewish in the strong theological sense if it is in significant ways influenced by, makes inextricable reference to, or is derived from Jewish beliefs or traditions. In this sense, a theory is Jewish if some aspect of Jewish theology is an essential characteristic, e.g., in the way that certain creationist theories are fundamentalist Christian theories.
3. *Weak Theological Sense* – Where the strong theological sense is a causal claim, that the creator's Judaism gave rise to and is a part of the theory itself, the weaker version posits merely a formal similarity to theological forms of reasoning. Since the charge that the theory of relativity is a Jewish science was most often leveled by Christians, the question becomes whether there are significant aspects of the move from the classical to the relativistic worldview which mirror formal differences between Jewish Talmudic and Christian theological foundations and methodologies. This sense is analogical rather than causal.
4. *Historical/Cultural Sense* – The label "Jewish" during the period between the World Wars had a decidedly political sense with the establishment and ultimate failure of the Weimar government. When we understand the term in its usage during the period and not in its contemporary meaning, is the claim substantiated?
5. *Community-Discourse Sense* – A scientific theory can be considered Jewish if one of its intended audiences is contemporary Jewish thinkers. Is it possible to fit the theory of relativity neatly into the train of Jewish thought of the period? Is it a reaction to, an extension of, or actively engaging with the work of other thinkers who can be identified as part of the Jewish dialogue?

Given these senses, we examine in a more rigorous way whether relativity is, in fact, "Jewish science." The answer is typically Jewish: sometimes, yes and sometimes, no.

#### *The Author-Identification Sense*

This can be seen as the weakest sense of "Jewish science" requiring only that we determine whether Albert Einstein was, in fact, Jewish. While the question of Jewish identity has been long debated and its intricacies well-mapped, this case

is of particular interest because there is not a Jew in the world who does not claim ownership of Einstein with a sense of pride. But in what senses should Einstein be considered a Jew?

By the traditional tribal definition, Einstein is Jewish because his mother was. Einstein's mother's maiden name was Pauline Koch:

Like the Einstein family, the Kochs had been part of the Württemberg Jewish community for more than a century, a family with roots more to the north – in Goppingen, Jebenhausen, and Cannstadt.<sup>9</sup>

So in this clearly insufficient sense, relativity would indeed be a Jewish science.

A second sense of the term is "practicing Jew." Except for a brief period when he was young, Einstein did not believe in the God of Abraham.

I came – despite the fact that I was the son of entirely irreligious (Jewish) parents – to a deep religiosity, which, however, found an abrupt ending at the age of 12.<sup>10</sup>

He neither attended synagogue nor partook of the standard Jewish rituals. Einstein openly disdained the idea of a personal God,

My position concerning God is that of an agnostic. I am convinced that a vivid consciousness of the primary importance of moral principles for the betterment and ennoblement of life does not need the idea of a law-giver, especially a law-giver who works on the basis of reward and punishment.<sup>11</sup>

Instead, he prescribed to what he termed his "cosmic religion" in which the universe was well-ordered according to rational laws which may be discovered by the human mind.<sup>12</sup> Since Einstein did not partake of the practice of Judaism during the period in which he developed the theory of relativity, the theory would not be considered Jewish science in this version of the author-identity sense.

But one could consider Einstein's self-identification as a Jew. A committed Zionist, actively writing and working for the creation of a Jewish state in Palestine, he loved Jewish humor and with his loud barking seal-like laugh,

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<sup>9</sup> Clark, Ronald. *Einstein: The Life and Times*. (New York: world, 1971). p. 5.

<sup>10</sup> Einstein, Albert. "Autobiographical notes" in *Albert Einstein: Philosopher-Scientist*. P.A. Schilpp (ed.) (Open Court Press: Chicago, 1949). pp. 3-4.

<sup>11</sup> Letter to M. Berkowitz, October 25, 1950. Quoted in *The Expanded Quotable Einstein*. Alice Calaprice (ed.) (Princeton: Princeton University Press, 2000). p.216.

<sup>12</sup> For an in depth discussion of Einstein's religious development and his cosmic religion, see Max Jammer's, *Einstein and Religion* (Princeton: Princeton University Press, 1999).

sought it out.<sup>13</sup> He makes this self-identification explicit in his choice of pronouns:

If we as Jews can learn anything from these politically sad times, it is the fact that destiny has bound us together, a fact which in these times of quiet and security, we so often easily and gladly forget. We are accustomed to lay too much emphasis on the differences that divide the Jews of different lands and different religious views. And we forget often that it is the concern of every Jew, when anywhere the Jew is hated and treated unjustly, when politicians with flexible consciences, set into motion against us the old prejudices, originally religious, in order to concoct political schemes at our expense.<sup>14</sup>

But, of course, the criteria that one uses in claiming membership may be flawed, making such attributions questionable.

If the claim to Einstein as a Jew is not to be found in maternal lineage, practice, or self-identification, what set of necessary and sufficient conditions should we use? Perhaps Judaism is not to be defined intrinsically, that is, based upon what it is, but rather, extrinsically, in other words, based upon what it is different from. To be Jewish, in some sense, is to be apart from.

Since Jews were not social or civic equals with non-Jews in Germany, Einstein's Judaism disqualified him from being a full member of German society. He was always an outsider that was not only part of a Jewish community, but was also locked in this community by Christian Germany. Judaism was not a choice for the Jews of Einstein's generation as was witnessed by Jews who converted to Christianity. Like the Spanish Conversos before them, most Jewish converts were still seen and treated as Jews by mainstream (non-Jewish) German society and were still perceived by many to threaten the Germanic and Christian orientation of Germany despite their conversions.<sup>15</sup>

This may shed *some* light as to why an irreligious person like Einstein strongly identified himself with the Jewish community. We are not suggesting that his Jewish identity was solely a result of German anti-Semitism, but that German anti-Semitism may have showed Einstein that he was never fully thought of as German, which most likely added to his felt sense of being Jewish and, thus, partly shaped his social identity as Jewish. In one respect, we can apply Paul Mendes-Flohr's particular insight when discussing nineteenth century German

<sup>13</sup> Abraham Pais. *Subtle is the Lord: The Science and Life of Albert Einstein*. (Oxford: Oxford University Press, 1983).

<sup>14</sup> Albert Einstein. "Let's Not Forget" quoted in *Out of My Later Years*. (Avenel: Random house, 1956). p. 256.

<sup>15</sup> Deborah Dwork, *Voice & Views: A History of the Holocaust*, New York: The Jewish Foundation for the Righteous, 2002. Pages 20-21.

Jewish intellectuals in general to Einstein in particular, in holding that Einstein is a cognitive German insider, "but, nonetheless, he remained a social outsider."<sup>16</sup>

Einstein in this way might be categorized as a social Jew<sup>17</sup>, for he accepted being Jewish and did not revolt against his social Jewish identity. To the contrary, he publicly embraced it. Einstein identified himself as a Jew and often sought out other Jews. But is this enough to make one Jewish? Einstein did not exercise normative Jewish beliefs; he was not observant, he did not believe in a personal God, he did not study God's commands and Rabbinic understanding of these commands as commented upon in the Talmud and post-Talmudic Rabbinic works. We are not saying, though, that because Einstein felt and said that he was Jewish that everything he did was Jewish. Judaism is not reducible to a felt sense. Nevertheless, we have concluded that through communing with other Jewish people, Einstein was part of a Jewish community. And Jewish worlds produce orientations that are not Christian, or secular in a neutral sense. Thus, in Einstein's Jewish community, one may not have followed the normative standards of Judaism as legislated by both texts and tradition or traditions, but one was still meaningfully considered Jewish. In fact, Einstein's Jewish posture makes a great deal of sense in a 19<sup>th</sup> and early 20<sup>th</sup> century German Jewish context.

Growing up in the shadows of liberal Jews exploring a Kantian moral substitution for the revelatory mitzvoth, Einstein was arguably a typical German Jew exercising general Jewish ideals without grounding oneself in the ritual mitzvoth exercised daily by traditional Jews. Paul Mendes-Flohr notes that "Throughout the nineteenth century, Reform and even neo-Orthodox circles in Germany endeavored to demonstrate the compatibility of Judaism with Kantianism. As a result Jewish religious thought tended to be what may be called a "theology of morality."<sup>18</sup> We're not saying Einstein was actively involved in this discussion, but suggesting that he was raised in a Jewish culture that exercised this norm. Mendes-Flohr goes onto say: "For the most part, nineteenth-century theology, especially in Jewish circles, retains Kant's critical attitude, generally treating the question of God's revelation of truth and law metaphorically or with embarrassed silence."<sup>19</sup>

This does not mean that Einstein's Judaism would be recognizable in other Jewish worlds. One finds many different people identifying themselves as Jewish, and yet one would be hard pressed to find common ways of living between them. For example, we suspect that Einstein had more cultural commonality with German Christians than with most Ethiopian Jews, and yet like Ethiopian Jews, he called himself Jewish. What binds him to the Ethiopians if he is culturally dissimilar? It cannot be the texts, for Einstein did not study them.

<sup>16</sup> Paul Mendes-Flohr, *Divided Passions*, (Wayne State University Press, 1991.) p. 42

<sup>17</sup> We choose not to use the popular term "cultural Jew" to avoid privileging one Jewish culture over another, and out of respect for the variety of Jewish cultures.

<sup>18</sup> Paul Mendes-Flohr, *Divided Passions*, (Wayne State University Press, 1991.) p. 287-288

<sup>19</sup> Paul Mendes-Flohr, *Divided Passions*, (Wayne State University Press, 1991.) p. 289.

Nor is it the rituals, for he was not ritually inclined. Again, this raises the question: If Einstein did not practice Judaism, did not study Jewish texts, nor believe in a personal God, what makes him Jewish? Einstein was socially Jewish in his particular historical circumstance that may (or does) not belong in other historical circumstances, such as those experienced by Ethiopian Jewry.

This approach, however, is undesirable in this context because the claiming of Einstein's legacy is near universal and not restricted to the Jewish context from which he came. Even in Ethiopia, Einstein is still Einstein. If we are looking for broader criteria of demarcation, however, the question remains.

Another approach, one typically Jewish, is to question the question. Finding an essential quality or essential qualities that make one Jewish is hard, if not impossible. But this lack of essence should not be seen as a negative. Michael Satlow writes that "Judaism" having "no inherent meanings is actually a strength; [Judaism] exist[s] in a dynamic intertextual world in which Jews are able link them to other practices, symbols and texts to create transient and historically contingent meanings."<sup>20</sup> Satlow's claim sheds some light on how to understand Einstein's Judaism; helping one understand that Einstein's identification with other Jews does not completely fit into an inflexible definition of Judaism that might come from the answer to "what is Judaism?" Satlow, like Einstein, would consider "Judaism" a Wittgensteinian umbrella term according to which family resemblance relations are used to determine membership.

So, like the four sons of the Hagaddah, there may be no single way to be Jewish, yet Einstein's Judaism satisfied what J.L. Mackie would call "INUS" conditions,<sup>21</sup> Insufficient but Necessary parts of Unnecessary but Sufficient conditions. While there are distinct ways of being Jewish, these ways may be explained in terms of different factors set out as necessary conditions.

Einstein sets out what he sees as two such factors this way:

'[S]erving God' was equated with 'serving the living.' The best of the Jewish people, especially the Prophets and Jesus, contended tirelessly for this. Judaism is thus no transcendental religion; it is concerned with life as we live it and as we can, to a certain extent, grasp it, and nothing else.<sup>22</sup>

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<sup>20</sup> Michael Satlow, "Defining Judaism: Accounting for "Religions" in the Study of Religion," *Journal of the American Academy of Religion*, volume 74, Number 4, December 2006, p. 853.

<sup>21</sup> Mackie, J. L. "Causes and Conditionals," *American Philosophical Quarterly*, vol. 2 (1965), pp. 245-65.

<sup>22</sup> Albert Einstein. "Is There a Jewish Point of View" in *Ideas and Opinions*. (New York: Crown, 1952). p. 186.

But the Jewish tradition also contains something else, something which finds splendid expression in the Psalms, namely an intoxicated joy and amazement at the beauty and grandeur of this world, of which man can form just a faint notion. This joy is the feeling from which true scientific research draws its spiritual sustenance, but which also seems to find expression in the songs of birds.<sup>23</sup>

By these conditions, certainly not universal, but sufficient in Einstein's social context, Einstein may be claimed as a Jew and his science deemed in the weak author-identity sense "Jewish science."

#### *Strong Theological Sense*

While this means that the community pride surrounding his achievements is not misplaced, certainly the author-identity sense is not what we usually intend by the phrase "Jewish science." The standard meaning of that phrase is one in which the theory is, in significant ways, influenced by, makes inextricable reference to, or is derived from Jewish beliefs or traditions. Is the content of the theory or biographical details about its discovery necessarily tied to the scientist's theological commitments?

We may see such a case with current day "Creation Science" that seeks to construct a working biological model of biology consistent with certain strains of literal interpretations of Scripture. One can argue that the resulting theory is not scientific for failing to meet criteria such as falsifiability, but certainly the attempt is to construct an explanatory scheme for natural phenomena that is informed by theological commitments and so the results should be characterized as purported Christian science.

But we can look to less fringe cases to find other examples. In the history of geology, for example, catastrophism, the view that geological features arise not gradually, but as the result of sudden major geo-physical events, and Neptunism, the theory according to which most major geological features are the result of higher water levels in the past were both underwritten by a desire to substantiate the story of the Flood.<sup>24</sup>

But perhaps the most prescient example for this discussion is that of Isaac Newton. While the deterministic nature of his theory was later used as support for the expressly secular mechanistic philosophers in the Cartesian school, for Newton himself, his physics was intimately tied to his theology. As he wrote in a letter to Richard Bentley in 1692,

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<sup>23</sup> Ibid.

<sup>24</sup> For an in-depth discussion see Gabriel Gohau's *A History of Geology*. (New Brunswick: Rutgers University Press, 1990), especially chapter 4, "The Work of God."

When I wrote my Treatise about our System, I had an eye upon such Principles as might work with considering Men, for the Belief in a Deity, and nothing can rejoice me more than to find it useful for that Purpose.<sup>25</sup>

Newtonian physics begins with Absolute Space, a positing of metaphysical reality to space itself. Absolute Space sits as the foundation of claims of God's omnipresence and omniscience, as he holds it to be the sensorium of God and the laws of motion and gravitation are insights into the mind of God.

[D]oes it not appear from the phenomena that there is a Being incorporeal, living, intelligent, omnipresent, who in infinite space, as it were in his sensory, sees the things themselves intimately, and thoroughly perceives them, and comprehends them wholly by their immediate presence to himself.<sup>26</sup>

As he makes clear through his thinly veiled stand-in, Samuel Clarke, in his correspondence with Friedrich Leibniz, Newton's physical theory is deeply enmeshed in his theological picture of the universe. To do physics is to inspect the mind of God.

But with regard to God, the case is quite different; because he not only composes or puts things together, but is himself the author and continual preserver of their original forces or moving powers: and consequently 'tis not a diminution, but the true glory of his workmanship, that nothing is done without his continual government and inspection.<sup>27</sup>

This is not to say that one could not accept the theory and deny the theology as so many who followed Newton, in fact, did. But to interpret the theory, to understand the formalism in the way Newton did is to see the theory as Christian science. Indeed, there are contemporary conservative Christian philosophers like William Lane Craig<sup>28</sup> who are trying to undermine Einstein's picture of space-time and replace it with good old Newtonian Absolute Space and Absolute Time in order to return to Newton's Christian picture of the universe and not what they still see as Einstein's "Jewish science."

But this sort of claim cannot be leveled at Einstein and his theory of special relativity. Not only was Einstein's picture of Judaism, as we have seen, non-doctrinal, but the spatial Lorentz equations predate Einstein's work and the insight and thought experiments that gave rise to the novel aspects are explicitly

<sup>25</sup> Reproduced in *Isaac Newton's Papers and Letters on Natural Philosophy*. I. B. Cohen (ed.) (Cambridge: Harvard University Press, 1958). p. 280.

<sup>26</sup> Isaac Newton. *Optiks*. (New York, Dover, 1953).

<sup>27</sup> From Clarke's first letter reproduced in *The Leibniz-Clarke Correspondence*. H. G. Alexander (ed.) (Manchester: Manchester University Press, 1956). p. 14.

<sup>28</sup> William Lane Craig. *Time and the Metaphysics of Relativity*. (New York: Springer, 2000).

non-religious. One such *gedanken-experiment* considers a motorcycle rider traveling the speed of light and looking in his rearview mirror. Would he see the world behind him changing in time? Would he see a frozen image? Would the mirror be blank? At another time, he was walking away from a train station and glanced around to look at the station clock for the time and realized that if he were walking away from the clock at the speed of light, the time reading of the clock would never change. These experiences clearly are not theological in any sense. Thus the standard understanding of "Jewish science" in the strong theological sense is correctly rejected.

#### *Weak Theological Sense*

The rejection of relativity as Jewish science in the strong theological sense is what accounts for our usual disdain for the claim. Of course, the theory, authored by a social Jew, with its foundational equations largely derived beforehand by a non-Jewish physicist, is not intrinsically connected to Biblical or Talmudic tenets. But a more interesting question can be framed. Was the fact that he was Jewish an operative factor behind Einstein being the one who originally put forward the theory of relativity in all its glory? There were equally brilliant non-Jewish minds of the time, Henri Poincaré and Ernst Mach are but two examples, working on the same sorts of questions, yet it was Einstein who made the turn to undermining Newton. Was Einstein's Judaism a part of the reason he was the one who first made the move to relativity theory?

Philosophers, historians, and sociologists of science spend much time during the last seventy years unearthing the ways in which social conditions and cultural perspectives have shaped the history of science and intellectual history more broadly. One may trace back to Kant the idea that observation is not a simple process, but one mediated by pre-existing categories of the mind.<sup>29</sup> But where Kant argued that the primary rational structures that allow us to turn the manifold of raw perception into meaningful observations are universal and innate, others have argued that they are at least in part culturally determined.<sup>30</sup> The idea that science is objective and independent of political, social, and cultural influence, it is argued, is itself a political construct designed to artificially privilege scientific theories.

This view was shared by advocates of "Aryan physics" including Hitler himself:

That which is called the crisis in science is nothing more than that the gentlemen are beginning to see on their own how they have gotten onto the wrong track with their objectivity and autonomy. The simple question that precedes every scientific enterprise is: who wants to know something, who is it who wants to orient himself in

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<sup>29</sup> See Kant's discussion of the Transcendental Aesthetic in *The Critique of Pure Reason*.

<sup>30</sup> E.g., see Robert K. Merton "Motive Forces of the New Science" in *Science, Technology and Society in Seventeenth-Century England*. (New York: Howard Fertig, 1938), Paul Feyerabend, *Against Method*. (New York: New Left Books, 1975).

the world around him? It follows necessarily that there can only be the science of a particular type of humanity and a particular age. There is very likely a Nordic science, and a National Socialist science, which are bound to be opposed to the Liberal-Jewish science.<sup>31</sup>

The resulting notion of "Jewish science" from pro-Nazi physicists saw the work of Jewish scientists pregnant with the cultural baggage of their community.

This exceedingly mathematical treatment of physical problems had undoubtedly arisen from the Jewish spirit. The Jew has accepted this numerical, this calculational, as a special achievement of physics everywhere he has concerned himself with physics. And just as he otherwise – as in business – always has only the numerical, the credit and debit calculation before his eyes, so it must be designated as a typically racial characteristic even in physics that he places mathematical formulation in the foreground.<sup>32</sup>

While the specific conception of "Jewish science" here is clearly burdened with the anti-Semitic notions of the time, the question itself remains an interesting one. Are there structural intellectual components, ways of thinking, that Einstein inherited from being raised in the Jewish community that were part of the causal story of his thought process in considering the nature of space and time in 1905 when he had the insights which became the theory of relativity?

Answers to this question can be speculative at best, but there is a related non-causal question that can be considered more rigorously, namely, "Is there a similarity of form between the move from the Newtonian way of seeing the world to the relativistic approach, on the one hand, and differences between the standard Christian theological viewpoint and that of Talmudic scholars, on the other?" Can we use a move from Christian to Jewish modes of thinking as an apt model for the transition from Newtonian to Einstein's relativistic picture of the universe? We contend that this, in fact, is the case.

Einstein's theory of relativity finds striking parallels in Talmudic styles of questioning and/or reasoning. The claim here is analogical, not causal. We are not asserting that Einstein's theory of relativity was directly or indirectly influenced by the thinking of other prominent Jewish thinkers of the period, nor are we asserting there is a direct, necessary causal connection linking the Talmud to his theory. However, we are in agreement with Nazi claims that there are

<sup>31</sup> Hermann Rauschning, *Gespräche mit Hitler*. (New York: Europa Verlag, 1940). pp. 210-11. Also quoted in Alan Beyerchen, *Scientists Under Hitler*. (New Haven: Yale University Press, 1977). p. 134.

<sup>32</sup> Alfons Bühl "Die Physik an den deutschen Hochschulen" in August Becker (ed.) *Naturforschung im Aufbruch: Reden und Vorträge zur Einweihungsfeier des Philipp Lenard-Instituts der Universität Heidelberg am 13. und 14. Dezember 1935*. (Munich: J.F. Lehmanns, 1936). p. 79. Also quoted in Beyerchen, p. 132.

strong structural parallels between his theory and Talmudic approaches, but we unflinchingly disagree with Nazi assertions that his science intentionally mirrors and is, thus, both caused by the Talmud and a response to it. For example, the type of claim with which we disagree is found in the Nazi periodical *Zietshcift fur die gesamte Naturwissenschaft*.

This formalistic Talmudic thinking also manifests itself in Jewish Physics. Within the theory of relativity, the principle of the constancy of the velocity of light and the principle of the general relativity of the phenomena in nature represent the "Torah"..... This analogy [between Einstein's science and the Talmud] is not accidental or artificial, it is deeply rooted in the very essence of Judaism.<sup>33</sup>

We strongly agree with Max Jammer when he writes "it is absurd to claim that Einstein was influenced by the Talmud."<sup>34</sup> If, that is, one considers only direct influence. However, we suggestively and softly disagree with Jammer's claim that

if it were true that the study of Talmud, often regarded as promoting critical thinking, had really inspired the creation of the theory of relativity, which has rightly been called "one of the great triumphs of human thought," then modern science would be deeply indebted to the Talmud.<sup>35</sup>

Our disagreement is not over whether the Talmud directly inspired Einstein's theory. It did not. However, we are suggesting that his science is loosely "indebted" to the Talmud, which is why we softly disagree instead of strongly disagree with Jammer. As Jammer notes, Einstein is not a Jewish thinker, but at the same time, we note that he is a Jewish scientist who comes out of a Jewish context, and whose way of seeing the world was inherited in part from a Jewish community.

Jewish thinkers write for a Jewish audience and Einstein's theory of relativity was not written for a Jewish audience. In other words, suggesting that his science comes from a Jewish orientation does not mean his science is for a Jewish audience. Our claim is that the Nazis were right in defining Einstein's science as Jewish in the weak theological sense, not because his work was or is identified as Jewish by Jews, but because of important formal similarities with other discussions which it is entirely uncontroversial to call "Jewish," conversations that deal with the methodological discourse(s) of Talmudic dialogue, the heart of Jewish thinking.

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<sup>33</sup> Max Jammer, *Einstein and Religion*, Princeton University Press, 1999, p. 59.

<sup>34</sup> Ibid, p. 61.

<sup>35</sup> Ibid, p. 62.

The Talmud<sup>36</sup> is the oral bible for the Jewish People. It is made up of the Mishnah and Gemmarah (commentary on the Mishnah). The Mishnah is the oral tradition that helps explain how to exercise many of the blessings or commands of the Torah. The Gemmarah is commentary upon the Mishnah; together the two make up the Talmud.

In response to the Roman expulsion of the Jews from Judea or Palestine, the Mishnah was codified in the 2<sup>nd</sup> century C.E. under the leadership of Rabbi Judah Ha-Nasi, but the groundwork was first laid by Rabbi Akiva, who systematically organized "as a whole" Jewish, legal commands, *halakhah*, "into clearly defined units."<sup>37</sup> However, like the American Constitution, Rabbis found the codified Mishnah vague and/or relating to such specific circumstances that it was too concise and not applicable to other or new situations. The Mishnah thus "requires more elucidation than it supplies, and it fails to tell how its contents might actually be put into practice."<sup>38</sup> This inspired Rabbinic discussions/commentaries, which developed into a process of searching and mining the Mishnah and Torah for meaning, over a four hundred year period.

The Talmudic or rabbinic method of reading (when I say "rabbinic" I shall always be referring to the Rabbis of the Talmud) that one may define... as a permanent internalizing of the letter of the text without abstraction: an attempt that consists in simultaneously internalizing and preserving in its integrity the content of the Scriptures, deriving teachings from their very contradictions.<sup>39</sup>

In mining the Torah, the Rabbis "destabilized" the verses just as miners destabilize the earth's surface. Emmanuel Levinas writes that "Long before the "historical method," the rabbinical dialectic had destabilized verses, words and letters."<sup>40</sup> This approach is where we find the roots to our claim that Einstein may be articulating a Jewish science.

In the Torah and Mishnah, God – as Absolute – is only understood through interpreting and performing God's words, interpretations and performances that both destabilize and enrich the words, so to speak. The words or commands are the reality of text that is contextually realized which in turn intimately connects our lives to the biblical tradition of exercising God's commands. In

<sup>36</sup> Our explanation of Talmud, Midrash or the Rabbinic traditions is largely framed by the work of Emmanuel Levinas. Levinas assumes that God is understood, traced, or glimpsed, so to speak, in responding for the Other or fulfilling one's responsibility for the Other.

<sup>37</sup> Adin Steinslatz, *THE ESSENTIAL TALMUD*, Bantam Books, 1976, p. 36.

<sup>38</sup> Robert Golden, *Talmud*, from *BACK TO THE SOURCES*, Barry W. Holtz (ed.) (New York: Touchstone, 1984), p. 134.

<sup>39</sup> Emmanuel Levinas, *Outside the Subject*, Michael B. Smith (tr.), Stanford University Press, 1993, p. 13.

<sup>40</sup> Ibid, p. 130.

other words, as Levinas writes, "It is the union of personal experience with tradition that allows the Hebrew Bible to retain its full meaning."<sup>41</sup>

But this interpretive approach most likely finds its roots in a tradition that precedes the codification of the Mishnah: Midrash. In order to both sustain tradition and disrupt the propensity of tradition to suffocate the new on behalf of the old or to maintain interpretive continuity between tradition and the novel circumstances that challenge it, a method of interpretation developed that simultaneously continues tradition while refreshing it. This method is known as Derash (literally, to seek), or Midrash. Midrash, as just said, precedes the Mishnah, was perhaps rivaled by it, but also partly shaped it and much of the commentary surrounding it. "Midrashic exposition of the Torah... seems to [interpretively] adapt the law of the Torah to a new situation which had not been provided for in the text."<sup>42</sup> The following Midrashic passage illustrates this theme:

The Talmud in Bava Metzia [86a] relates that there was a dispute between the Holy One, blessed be He, and the heavenly academy regarding a case where there is a doubt as to whether the bright spot [of a leper] preceded the white hair or the white hair preceded the bright spot. The Holy One, blessed be He, ruled: He is clean, while the heavenly academy ruled: He is unclean. And who was the arbiter? Rabbi bar Nahmani. Flesh and blood, mortal man decides between the Holy One, blessed be He, and the heavenly academy. When there was a dispute between R. Eliezer and the sages regarding the purity of the oven of Aknai, a heavenly voice declared: "Why do you disagree with R. Eliezer, seeing that in all matters, the Halakhah is in accordance with his ruling?" R. Joshua arose and said: "'It is not in heaven' (Deut. 30:12)... For the Torah has already been given from Mount Sinai and we pay no attention to a heavenly voice". "And the Holy One, blessed be He, smiled in that hour and said: 'My Children have defeated me, My children have defeated Me.'"<sup>43</sup>

Now when the biblical and Mishnaic words, commands and traditions are Midrashically mined in seeking to understand what God wants from us, we are exposed to God in the sense of an archaeologist who is exposed to an ancient culture through mining the field when a pottery shard is discovered, showing the continuity between civilizations:

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<sup>41</sup>Ibid, p. 13.

<sup>42</sup>THE MIDRASH, translated by Rabbi Dr. H. Freedman and Maurice Simon, with a forward by Rabbi Dr. I. Epstein, Soncino Press, 1961, pp. xiii-xix.

<sup>43</sup>Joseph B. Soloveitchik, *Halakhick Man*, translated by Lawrence Kaplan, Philadelphia, The Jewish Publication Society, pp. 79-80.

the assumption in rabbinic thought is always that new interpretation is implied by Torah itself.... the ideas for the rabbis is that they are only uncovering what is already there.<sup>44</sup>

Another way of saying this is that the word of the text and the performance of the commands are observed and inspired through Midrash, but the Absolute or God is not fully observed; traces are accessed or may be glimpsed through digging up the text and through one's performance for the Other, which is to experience

the presence of God through one's relation to man... My neighbor's face has an alterity which is not allergic, but opens up the beyond. The God of heaven is accessible.<sup>45</sup>

Thus, God is not present for one, but in performing God's Mitzvoth (commands) for the Other, God's immanence is understood.

"The knowledge of God comes to us like a commandment, like a *Mitzvah*. To know God is to know what must be done." The continuity of God's immanence in Jewish life is sustained through each generation exercising God's Mitzvoth or commands. Simply, "the relationship with the Divine crosses the relationship with men and coincides with social justice..."<sup>46</sup>

The Talmudic method (often imbued with Midrash) somewhat mines the text or passage for meaning, in turn inspiring performance through which God is accessed or glimpsed, which is to say in the performance of responsibility for the Other one has a vision of God. As Emmanuel Levinas wrote: "The vision of God is a moral act. This optics is an ethics."<sup>47</sup>

For example, the command thou shall not steal sounds simple, but when one digs, one finds performing this command can be quite complicated. It is not that one merely digs through the text. It is that one also uses the text to dig through a situation. What is stealing in one situation might not be stealing in another, especially if it involves what to do upon finding a 'lost' object. In the Talmud's tractate Bava Metzia, which deals with lost objects, it is written:

Which found objects are his, and which is he obliged to announce? These found objects are his: [If] he found scattered fruit, scattered coins, small sheaves in the public domain, or round cakes of pressed figs, loaves of a baker, strings of fish, or pieces of meat, or fleeces of wool that have been brought from (lit., "their") country, or stalks of

<sup>44</sup> Barry W. Holtz, *BACK TO THE SOURCES*, Barry W. Holtz (ed.) (New York: Touchstone, 1984), p. 185.

<sup>45</sup> Emmanuel Levinas, *Difficult Freedom*, Sean Hand (translator), Johns Hopkins University Press, 1997, pp. 16-18.

<sup>46</sup> Ibid. p. 19.

<sup>47</sup> Ibid. p. 275.

flax, or strips of purple wool, these are his. [These are] the words of Rabbi Meir.<sup>48</sup>

The guiding principle in each of these cases to determine if the finder may keep the object is that one may keep the found object if the original owner has given up hope of finding the lost object.

In each of the above cases, in the name of Rabbi Meir, it is asserted that the original owner has given up hope of recovering the lost objects, as we find in the commentary or Gemmarah to this passage from the Mishnah.

All these articles are the finder's to keep, because they appear identical to others of the same kind and bear no distinguishing marks by means of which their owners can identify them. We therefore assume that their owners have given up hope of getting them back and have abandoned them. The above is the opinion of Rabbi Meir.<sup>49</sup>

So, if the object has no distinguishing marks by means of which the owner can identify them, it follows the owner has no hope of recovering the item. Thus, finder may keep the item.

Perhaps a more accessible and contemporary example in which one would exercise this principle would look like the following. If I find a hundred dollar bill in a mall parking lot on December 23<sup>rd</sup> when there are thousands of cars around, is it stealing if I keep it? What if I find a hundred dollar bill in a library: is it stealing if I keep it? What about in the hallway of a house? The common denominators are the hundred dollars and the fact that it was not my hundred dollars. But the fact that it is not mine does not make it stealing if I pocket it in certain circumstances. In some circumstances it is stealing, in others it is not stealing. For example, it is not stealing if I keep it in the mall parking lot. It is most likely stealing if I pocket it in the library and it is definitely stealing if I find it and pocket it in someone's house. The command is "thou shalt not steal." But is it stealing if the owner of the hundred dollar bill has given up hope of finding it? Talmudically, it is not stealing.

As noted above, the Talmudic principle is that if the found object has no distinguishing characteristics, and it would follow that the owner has given up hope of finding the lost object, generally speaking, the finder may keep it. Thus, in the parking lot of the mall, it is easy to discern that one would immediately give up hope of finding or recovering the hundred dollars when she or he later discovers that she or he has lost the money. In a library it is likely that one might hope one turns it in, thus one might be obligated to announce the find, but it might depend upon where one finds it. In a house, there is no question. The

<sup>48</sup> Adin Steinsaltz, *THE TALMUD: VOLUME II, TRACTATE BAVA METZIA, PART II*, New York: Random House, 1990. p. 3.

<sup>49</sup> Ibid.

command not to steal is absolute as is the biblical God that commands it. But the circumstances are relative. Simply, understanding the Torah and Talmud from one's circumstances may give one a window to God's, the Absolute's, immanence in our affairs, a glimpse of God, so to speak. But the possibility for such a glimpse is relative to one's relation to the Other or in the situation in which one fulfills divine commands. As Levinas wrote: "The Justice rendered to the Other, my neighbor, gives me an unsurpassable proximity to God."<sup>50</sup> Perhaps Rabbi Joseph B. Soloveitchik put it more concretely when he wrote: "The true sanctuary [of Judaism] is the sphere of our daily, mundane activities, for it is there that realization of [justice] takes place."<sup>51</sup>

There is, therefore, a marked similarity in the differences between Christian and Jewish theological approaches and the Newtonian and relativistic physics. For Newton, reality is comprised of objects in Absolute Space and Absolute Time whose true motion was known by God and ascertained by his laws of motions. Newtonian physics is a direct line to the reality that underlies our experiences of the world. We may measure mere "common" time and distances with our human clocks and rulers, but they reveal through their causes and effects absolute truths about reality itself. These truths are extra-personal and any differences that come from experience that are relative to one's physical perspective – such as state of motion – are thereby shown to not constitute real, but fictitious effects.

Consider so-called centrifugal force. When, as a child riding in the back of your parents' car, Dad took a turn a bit quickly, you felt a force that gave rise to a sliding across the backseat. But this force, while experienced, is not real. There may seem to be a force from the perspective of a person in the car, but when the proper view is taken of the situation, a view from a privileged reference-frame, the fact is that the body in the backseat was simply trying to maintain its natural state of uniform rectilinear motion (moving in a straight line at a constant speed), but that the car in accelerating (turning) provided an external force. When you thought as a child that the car was neutral and there was a force on you – a force that you experienced – you were wrong. From the God's eye view, that is the true and privileged reference frame, the fact is that there was, in fact, a force on the car and not on your body.

Newton's laws describe an Absolute truth accessible only to a completely rational observer in the state of Absolute rest. It is the result of inviolable rules which hold between metaphysically real quantities whose values are fixed and determined in the privileged reference frame of Absolute Space.

Einstein's theory of special relativity, on the other hand, views the relation between experience and reality differently. Again, it is false to say that for

<sup>50</sup> Emmanuel Levinas, *Difficult Freedom*, Sean Hand (translator), Johns Hopkins University Press, 1997, p. 18.

<sup>51</sup> Joseph B. Soloveitchik, *Halakhick Man*, translated by Lawrence Kaplan, Philadelphia, The Jewish Publication Society, pp. 94-95.

Einstein, everything is relative. There are absolutes in the theory. For Einstein, the four-dimensional space-time interval between any two events is a real quantity with a fixed value for all observers in all reference frames. It is an absolute truth of the world.

But this four-dimensional truth is not directly accessible through experience or measurement, only through calculation. We do not live in the four-dimensional world, but in a particular individual assemblage of the three dimensional world of space and the one dimensional world of time, a construction that is the result of our view point and not shared by anyone else in a different reference frame.

But where Newton sees nothing but "relative, apparent, and common" notions to come from such a lived experience and not the "Absolute, true, and mathematical" versions which reflect the underlying Truth of the universe, for Einstein, each of these references frames, these physical contextualizations, do not deny truth, but merely give a different, equally valid expression of it. There is a four-dimensional absolute fact about the space-time distance between two points, but this is only accessible through the relativistic spatial and temporal world in which a given observer exists. A moving rod will be different lengths for different observers, but it makes no sense to ask which observer is right, who is in the privileged reference frame to determine the rod's "real" length. There is no real three-dimensional length. In the one reference frame the rod really is, say, one meter long, and in the second it really is half that length. To ask which of these seemingly competing claims is actually true is very much akin to asking whether it is Hillel or Shammai who is correct about which way to light the Chanukah candles.

As with our hundred dollar bill example, in which the answer is circumstantially relative, while the deeper truth, the command, is always absolute, so too for Einstein there are two degrees of truth. There are relative truths that are specific to a reference frame. From this perspective, one meter is the length of the rod. Such frame-dependent truths are not mere appearances, but actual truths within the reference frame. Then there are the absolute truths which are invariant under changes of reference frame, things like the four-dimensional space-time interval. These are unchanging and absolute, but they are not accessible through experience, only through interpreting the measurements of experience, each perspective providing a part of the whole picture which is too big to fit into a single observer's perspective. Indeed, it is only by considering how the frames of reference differ and relate to one another that one can have a sense of the resulting absolute truth.

Just as the style of questioning in the Talmud finds as its motor the question, "What does God require of me?" only to find the answer, "it is relative to the circumstances," so too, Einstein finds all references frames, physical circumstances, to be legitimate places from which to answer physical questions. This does not deny the existence of absolute truths that underlie the contextual truths, but to ask questions about a reference frame produces truths valid within, but peculiar to that reference frame and it is only by examining the relations

between the different answers in the different systems that we are able to intellectually and indirectly see the deeper truth. The absolute is not directly accessible, but can be glimpsed through understanding the multitude of ways it is instantiated in different contexts. This is very much like the Talmudic perspective, in that it is from the circumstances that we understand what God wants, and discussing these issues with others in turn allows a deeper multi-meaning or multi-faceted understanding to emerge.

Compare Newton, with his absolute truths about length and duration accessible only to one who sees from the God's eye point of view, contends that all others whose measured values disagree are to be deemed false, to Einstein's version wherein contrasting claims about the world from different vantage points are given equal validity and the underlying absolute truths are accessible only by understanding how we can synthesize these different context-bound interpretations. Then compare Christian literalism with Talmudic perspectivalism. The marked formal similarity between them gives us sufficient reason to argue that in the weak theological sense, Einstein's theory of relativity is Jewish science.

#### *Cultural/Historical Sense*

The meanings of utterances are, of course, context-dependent. What a phrase means at one time may be wildly different from its meaning at another time. Such is the case with the adjective "Jewish," and therefore also the phrase "Jewish science," as used between the World Wars in Germany.

The Wilhemine period, in which the young Einstein lived, was a time of power for German conservatives. They had a Kaiser who believed himself to rule by the will of the Christian God, and because of its industrial strength Germany was ascending to unrivaled dominance in Europe. Jews under Wilhelm had limited rights. Opportunities for social or professional advancement were severely proscribed. The average Jew who considered him or herself German knew him or herself to be a second-class citizen.

Then came the war, in which many German Jews fought on the side of their country. The conclusion of the war had disastrous effects for German society. Allegations of war atrocities, especially against Belgians, divided the nation, as did responsibility for starting the war. Conservatives denied that German troops committed war crimes and contended that the war was a necessary war of defense. The left argued that it had been a war of convenience, born out of a naked desire for power and from that aggression, terrible things happened.

But the biggest split was over the conclusion of the war. Nationalists refused to admit that Germany had been beaten. But if the ascending fatherland did not achieve what it should have from the war, it was because of the lack of loyalty, devotion, and effort on the part of the left, whom, they contended, undermined the war effort of true, patriotic, committed Germans. Members of the left were

not mere political opponents; they were traitors who harmed the nation at its time of greatest need.

And when the old monarchy and its institutions were replaced, the Weimer government eliminated many of the old restrictions, enabling Jews to ascend to positions they could not have previously attained. The symbol of this new place for Jews in German society was Walther Rathenau who served as foreign minister in the Weimar government, a position of great power and prestige, until his assassination. It was bad enough in the eyes of nationalists that Jews should have the power that comes from their influential wealth, but now they were being entrenched in the halls of government itself, the one place "real Germans" could be assured of controlling. Having lost a war and control of the government, Jews were seen as intricate parts and the beneficiaries of a new German order that stood in clear contrast to their days as an ascending power.

Each failure of the Weimar government and every hardship endured by the nation during that period, therefore, could be easily laid at the feet of the newly empowered Jews. If Germany was suffering from unemployment, from an ailing economy, from public health problems, or any other social ill at all, it was far too simple to ask what had changed in the intervening period and see the new-found social status of German Jews.

In this context, then, when German conservatives between the wars used the term "Jewish," they were making a derogatory reference to something being pro-Weimar, and by association, anti-German. It was accepted in many German communities that Jews were the source for Germany's problems, such as communism. Marxism and communism was seen as a Jewish political movement, not only because of Marx's Jewish origins, but because "Jews had leading roles in revolutionary communist parties." With such charges aided by the dissemination of themes of the likes found in *The Protocols of the Elders of Zion*, Jews were also attacked as "capitalist exploiters and war profiteers, as agents of Germany's enemies, and as a mortal danger to all established values – family, fatherland, traditional culture."<sup>52</sup> Thus, through the social circulation of these prejudices, Nazism easily equated Anti-Semitism with Nazi designated social diseases like capitalist exploitation, Marxism, religion that was not sanctified by God, homosexuality and so forth. But even in exercising such attitudes, why would German nationalists after the First World War have grounds to relate Einstein's scientific work to Weimer?

First, because the theory did in the realm of physics what Weimer did in the realm of politics – tear down the old ossified institutions and replace them with new, unfamiliar systems. The old arrangement connected political power to religion, which was connected to the universities and to science. The old order permeated every aspect of life, which, as said, conflated Jews with many

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<sup>52</sup> Walter Laquer, *The Changing Face of Anti-Semitism*, Oxford, New York: Oxford University Press, 2006. Page 114.

designated social diseases connected to the political system, such as monetary exploitation, Marxism, a divinely rejected religion, etc.

Newton was a Christian whose physics had Christian roots and was the sort of common sense foundation that was an unchanging part of the way things always were. But now all of that had changed and the scientific revolution of Einstein was just one part of the new order replacing the old and everything in this new order seemed somehow Jewish in origin, for Jews were ascending into positions they could not have previously attained and were committed to undermining the old ways of being, doing, and thinking. What politically motivated Jews like Rathenau were doing in government, and what the modern Jewish artists were doing to art, especially Dada – a term coined by Romanian Jew Tristan Tzara – and what modern Jewish composers like Arnold Schoenberg were doing to music, Einstein was doing to science. He was seen as part of a larger modernist movement intent upon inverting the whole of German culture and erasing traditional German concepts and values.

But Einstein's involvement was not merely intellectual and indirect; he was not only playing with abstract equations. He was overtly political and had not only had the temerity to be so during the war, but had become increasingly vocal in his explicit disdain for all things nationalistic and conservative following the war.

Einstein had left Germany as a teenager and swore never to return because of his hatred for the old order. But he had been lured back by his friend and colleague, Max Planck, who had assembled the finest physics department in the world in Berlin. The temptation of having colleagues of such quality and the ability to work with minimal requirements were so tempting that he returned to the land of his birth.

World War I for Einstein was a bad dream come true. It was death and depravity for the sake of nothing and it was why he had left in the first place. Einstein never hid his contempt during the war, but at its conclusion found a new impetus towards political speech and activity:

Neither [Fritz] Haber nor any of his other friends could restrain Einstein from new political involvements. He took his fame as a warrant to make public utterances on a number of subjects; he had come to realize during the war as well as in his scientific work that the outsider, the *Einspanner*, may intuit truths that are at odds with conventional wisdom. After the war, and in a sense justified by its end, he espoused pacifism, internationalism, Zionism, and a mild brand of socialism. These are causes that his scorn for German imperialism had taught him: they were the reverse of chauvinism and German nationalism.<sup>53</sup>

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<sup>53</sup> Fritz Stern. *Einstein's German World*. (Princeton: Princeton University Press, 1999). p. 138.

When the war ended and his general theory of relativity had been dramatically confirmed, making him an international celebrity beyond the scientific community, he became a goodwill ambassador touring the world and giving speeches. The spectacle of Einstein on the world stage, being presented as the face of Germany, infuriated conservatives to no end. Here was a socialist, pacifist, internationalist Jew who actively stood against the war effort and everything that nationalists held to be authentically German, giving speeches in the name of Germany while representing the opposite of what "German" stood for.

Almost overnight Einstein became a celebrated hero: the German press, or at least its liberal-democratic segment, featured him prominently, and his picture, often reproduced, became familiar. The new cult of the tousled genius was symptomatic of a deeper change: once dignitaries of the old order, preferably bemedaled and in uniform, had appeared; now appeared the picture of this solitary sage in his meticulously cultivated informality.<sup>54</sup>

Add to this the fact that scientists who had been loyal patriots to the cause during the war were suffering intellectual exile and that Einstein selected Allied countries in which to give speeches – the Allies considering him the leading edge of "rehabilitated" Germans – it was a constant source of antagonism to his political enemies.

And it was not mere symbolism. Einstein engaged in dog-whistle politics, intentionally including phrases and references in his speeches in other nations that would make little sense to those hearing them, but were designed to intentionally rattle nationalists at home.

[H]e gave speeches and wrote articles and did so in his curious philosophical-polemical style, with its ironic regret at the folly and frailty of man, especially of Germans. He knew how to wound the German soul and encountered enough provocation to practice his skill.<sup>55</sup>

He stuck his finger in their collective eye with a sense of arrogance that only deepened their hatred.

Seeing his physics as he did, part of his larger view of the world, as the work of an *Einspanner* bent on overthrowing the old ways, Einstein was the epitome, both intellectually and politically, of what German nationalists despised. Hence, their label of his physics "Jewish science" was not only accurate in this sense, but indeed one of the more polite things they said about him.

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<sup>54</sup> *Ibid.* p. 128.

<sup>55</sup> *Ibid.* p. 138.

So deep was this loathing of Einstein by National Socialist sympathizers that there arose a movement led by physicists Philip Lenard and Johannes Stark to differentiate German physics from Jewish physics, typified by the theory of relativity, but also including quantum mechanics.<sup>56</sup> Where German science places a premium on observation, they argued, Jewish physics puts theorizing before observation, relying heavily on mathematical abstraction and formalism, even in cases where observations are practically or in principle impossible.<sup>57</sup> German physics generated a materialistic/deterministic picture of the world where all was explainable by human reason whereas Jewish physics found room for the romantic conceptions of mystery, spirit, and a limit to rationality.<sup>58</sup> Most of all, German science insisted on an imprimatur of objectivity and universality in an attempt to discredit other approaches to nature, particularly that deriving from Jewish culture.<sup>59</sup> By this definition, the theory of relativity was tautologically Jewish science as the entire definition is predicated on considering relativity to be the archetype of Jewish science and Einstein, the model of the Jewish scientist.

#### *Community Discourse Sense*

In the final sense, the question is whether Einstein's intended audience specifically included contemporary Jewish thinkers. Does the theory of relativity fit neatly into the train of Jewish thought of the period? Is it a reaction to, an extension of, or actively engaging the work of other thinkers who can be identified as part of the Jewish dialogue?

The works of other German Jewish thinkers of Einstein's period, such as Herman Cohen, Franz Rosenzweig, Martin Buber, certainly transcend a Jewish context and are right to be considered, discussed, and interpreted by the broader intellectual community. But, their work was, and remains, also for Jews in particular. Their thought partly derives from the Talmudic and/or Rabbinic traditions, and while also part of the larger conversation amongst contemporary intellectuals writ large, they are rightly conceived of as part of the Jewish contribution to the scholarly climate. Should Einstein's work also be so categorized?

One of the problems, of course, is that identifying the community in "community discourse" presents the same difficulty as that of Jewish identity considered above. Again, our understanding of the meaning of "Judaism" here is framed by Michael Satlow's insight that "Judaism" is a dynamic term having "no inherent meaning" and so must examine both the explicitly Jewish intellectuals and the central European secular Jewish community of the time.

<sup>56</sup> For a fuller discussion of the perceived differences between Aryan and Jewish science, see Alan Beyerchen's *Scientists Under Hitler*.

<sup>57</sup> Beyerchen, p. 127.

<sup>58</sup> Ibid., p. 136.

<sup>59</sup> Ibid., pp. 134-5.

If we look at those people whom Einstein specifically cites as influences on his discovery, names like Ernst Mach, Henri Poincare, and David Hume appear, but no one who would be categorized as a specifically Jewish thinker. While he would later write about Moses Maimonides and extensively consider questions surrounding Zionism, the younger Einstein of 1905, a figure desperate to leave the patent office in Bern for an academic post, is not occupied intellectually with the dialogue among Jewish thinkers concerning Jewish issues. So, it can be uncontroversibly asserted that Einstein's special theory of relativity is not a response to contemporary Jewish thought.

But Jewish secularists like Einstein in the mid to late nineteenth- and early-twentieth century Germany would understand secularism as a Jew and not from a neutral position, or even a secular position. Secularism was still relatively new and was naively hoped to safeguard Jewish civil rights. As such, portions of the secular world would still be meaningfully considered to be within the bounds of the Jewish community. Was he explicitly engaging the significant discourse in this group?

Again, relativity theory is sometimes placed beside dada, Bauhaus, atonal music, and other movements at the time that were intentionally self-reflective on the nature of the endeavor, and challenging of those elements thought to be absolute and inviolable.<sup>60</sup> In this way, it would not be outrageous to say that Einstein's contribution was part of a larger modernist backlash against the foundations of Western thought at the time, a conversation that was clearly alive within the Jewish secular community of which Einstein was a part.

The secular Jewish community from which Einstein came still lived in the shadows of the Talmud. In other words, assimilated Jews of that era had not completely moved beyond the Talmudic shadows cast by edifices of traditional Jewish learning. The emergence of Reform Judaism in early nineteenth century Germany may have taken many Jews beyond traditional Judaism into the world of secularism, but it would be misleading to assert that Reform Judaism had completely abandoned traditional Judaism, not to mention it would be odd if there was a clean historical break with traditional Judaism. Stylistic remnants from traditional Judaism were and are traceable in Reform Judaism. For many Reform and Secular Jews emerging from the Enlightenment, most notably for Einstein, we are suggesting that one finds traces of traditional ways of Jewish inquiry, Talmudic ways, so to speak. There certainly seem to be non-trivial parallels between Talmudic approaches or orientations and Einstein's theory of relativity, but this is a claim we will leave others to debate.

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<sup>60</sup> See Arthur I. Miller's *Einstein, Picasso: Space, Time, and the Beauty that Causes Havoc*. (New York: Basic, 2002), Leonard Schlein's *Art and Physics: Parallel Visions in Space, Time, and Light*. (New York: William Morrow, 1991), and Lawrence Leshan and Henry Margeneau's *Einstein's Space and Van Gogh's Sky: Physical Reality and Beyond*. (New York: MacMillan, 1983).

*How Right Were the Nazis?*

If Einstein's science is Jewish science, it is not because of the resulting theory, but because of the questions Einstein asked and the approach he took in answering them. In the Talmud, the questions expose the proper course of action, or Jewish existential, ethical truth. In science, questions also expose the truth and those questions do not emerge in a vacuum. They are responses to something other. In Judaism, it is the bible and God. For Einstein, it is the scientific community and physical laws.

Of course, the answer may also approach the question, which is where we partially produce our suggestion that the Nazis were right in claiming Einstein's science as Jewish, which is not necessarily contingent upon a racial notion of Judaism, especially when one considers Hitler as the catalytic ideologue of Nazism.

Contrary to conventional understandings in which Hitler's anti-Semitism was and is understood as race based, at times it is more in line with explanations of Jewish identity presented here. Hitler certainly spoke of Jews as a biological race that polluted pure Aryan blood and raced based anti-Semitism is manifest in Nazi anti-Jewish propaganda. In other words, the Nazis – like Hitler – based their political anti-Semitism on race, but at times Hitler revealed that there was a motive for doing so.

I know perfectly well... that in the scientific sense there is no such thing as race... I as a politician need a conception which enables the order which has hitherto existed on a historic basis to be abolished and an entirely new and anti-historic order enforced and given an intellectual basis.<sup>61</sup>

No one, not even Hitler at times, denies that the notion of Jewish race is a social construction. But even so, we are justified in celebrating Einstein as a Jewish man by showing the value of his science, the value of Modern German Jewish themes and the value of our characterization of Talmudic approaches and how these worlds possibly dovetail.

In conclusion, Albert Einstein's theory of relativity threatened and resisted the existing order of Newtonian physics, just as the Talmudic roots threatened the Sadducean biblical perspective and the Talmud later threatened and resisted the order established by Constantine's Christ. From the perspective of the order, the status quo, Einstein and Talmud brought chaos to order. But what was perceived as disorder in Physics quickly became the order, just as the perceived disorder of Talmudic commentary is now understood (outside of Jewish communities) to bring understanding out of social confusion, and perhaps as far as we're concerned, ethical order to Hitlerian violence in continually reminding one that

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<sup>61</sup> Leni Yahil, *The Holocaust: The Fate of European Jewry*, New York, Oxford: Oxford University Press, 1990. Page 37.

the other who breathes transcends or is more than a racial and theoretical category. In this respect, and somewhat in the spirit of Talmudic commentary, Einstein the man is more than Einstein as a Jew. It is too bad the Nazis and those around them did not understand this, and sadly, were also unable to hear wisdom found in the ancient Talmudic spirit(s) traced in Einstein and his science.

Although Einstein did not intend his science to be Jewish, Jews cannot but hear his presence in the world Judaically. However, it is not the fact that Einstein was a Jew that makes him a Jewish hero. It is his science. Without it, would we celebrate him as a Jewish hero?

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