Blessings, God, Sacrifices: Possible Rational Explanations of Biblical Ideas

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Abstract In this paper, we show that many seemingly irrational Biblical ideas can actually be rationally interpreted: that God is everywhere, that we can only say what God is not, that God's name is holy, why cannot you bless as many people as you want, etc. We do not insist on our interpretations, there probably are many others, our sole objective was to show that many Biblical ideas can be rationally explained.

1 Formulation of the Problem

Many Biblical ideas look irrational. Many Biblical ideas sound irrational – at least at first glance.

This can be expected: a religion cannot be fully rational. Of course, religion, by definition, cannot be a fully rational enterprise, so some irrationality is natural.

What we do in this paper. However, what we plan to show in this paper is that many seemingly irrational ideas can have rational explanations.

How we do it. Some of our explanations come from common sense, some come from modern science – in which many seemingly counterintuitive ideas have been experimentally confirmed and have become a solid foundation of relativity and quantum physics; see, e.g., [3, 9].

Comment. We realize that from the theological viewpoint, our interpretations of Biblical ideas may be naive and oversimplified. This may be, but these interpretations

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do show that the Biblical ideas mentioned in this paper can be rationally explained – and this was exactly our objective.

2 Where Is God?

Biblical idea. While this may be not explicitly stated in the Bible, but the feeling one gets – and the feeling theologists get – is that, according to the Bible, God is (or at least can be) simultaneously at some specific place and at the same time in other places, probably even everywhere.

In the Reform Judaism prayerbook, this idea is described in the following poetic form: "Thou art as close to us as breathing and yet art farther than the farthermost star" [1].

At first glance, this sounds counterintuitive. From the viewpoint of common sense, this is not rationally possible: if an object (or a person) is located in one place, the same object or person cannot be at the same time located at some other place.

However, this is-everywhere idea is in perfect agreement with modern science. In Newtonian physics, indeed, every particle was supposed to be limited to a specific location. Not so in quantum physics, where each particle is described by a so-called *wave function* $\psi(x)$ that describes the probability with which this particle can be found at different locations. Specifically, for each spatial region S, the probability to find the particle in this region is equal to the integral $\int_S |\psi(x)|^2\,dx$ [3, 9].

The impossibility to exactly locate a particle is a part of Heisenberg's uncertainty principle, one of the main principles of quantum physics. According to this principle, the more accurately we try to measure the particle's location, the more momentum we should add to the particle, and this momentum brings the particle out of that location.

Moreover, according to quantum physics, a free particle in an empty space – which, in Newtonian physics, would just continue going in the same direction with the same speed – actually spreads out and its location becomes more and more blurred [3, 9].

In summary, from the viewpoint of modern physics, not having a specific location – i.e., in effect, being in different places at the same time – is actually a typical behavior of particle and, more generally, of all objects for which quantum effects cannot be ignored.

3 How Can We Characterize God?

Maimonides' interpretation of the Biblical idea. According to the medieval theologist Maimonides [6], we cannot claim that God has any positive quality, God can only be characterized by negative qualities: God is not finite, God is not mortal, etc.

Interestingly, similar ideas were developed by Islamic theologists as well [10].

How can we interpret this in rational terms? Maimonides's interpretation is somewhat similar to the belief of many physicists that no physical theory is perfect, that no matter what theory we propose, eventually there will be an experiment whose results would require some modification of this theory [3, 9]. In other words, whatever property the physical world satisfies – according to modern physics – this property is not universally true, be it the original Netwon's laws or the formulas of modern physics.

Thus, negative-qualities-only objects are actually very natural: the whole physical world is like that.

But how is this related to God? Interestingly (and somewhat unexpectedly), this seemingly natural physicists' belief has an important computational consequence – that if we use observations, we can drastically speed up the solution to many computational problems – to the extent that we can solve many instances of NP-hard problems (provably most complex problems, see [5, 7]) in feasible time [4]. Solving hard problems is, in a nutshell, what creativity is about – at least creativity of scientists and engineers – as opposed to routine activity of applying known algorithms to easier problems. From this viewpoint, the negative-quality-only sequence of observations and experimental results serves as a source of creativity, which fits well with the idea of God as an important source of creativity.

4 Even God's Name Is Holy: What Does This Mean?

Biblical idea. According to the Bible, not only God itself if holy, God's name is holy as well. How can this be rationally interpreted?

A person performing good deeds can be holy, a place which helps to perform good deeds can be holy, an object used in performing these deeds can be holy, but a name sounds too abstract for that.

Our interpretation. Let us show that this idea can be rational too. As an analogy, instead of performing good deeds, let us consider spreading knowledge – which, by the way, is often necessary to be able to perform good deeds.

In the modern world, most of the knowledge we get is from published papers. For a paper, a natural analogue of its name is this paper's title. And, of course, the title of the paper is often very informative by itself – moreover, e.g., in mathematics, often, the title of the paper describes the exact formulation of the statement proven in this paper, so unless one is interested in the proof itself, one does not even have to read the paper – all the needed information is in the title already.

In this example, the "name" (title) of the paper coveys the information – and thus, has the same property of conveying knowledge as the paper itself. It is therefore reasonable rational to expect that the very name of a person can similarly convey the same meaning of holiness as the person him/herself.

5 What Is a Blessing?

Biblical ideas. The Bible is full of stories related to blessings. We still use this word, but many places of the Bible shows that in the old days, this word had a different meaning. For example, in the modern interpretation, if you bless someone, this does not make it impossible for you to also bless someone else – but such an impossibility is the main plot of the Biblical story of Isaac blessing Jacob instead of Esau.

How can we rationally explain this impossibility? What is a blessing – according to the Bible? Can we interpret the Biblical understanding of this term so that the above impossibility makes rational sense?

What is a blessing: our analysis and the resulting interpretation. What is a blessing? In the Bible, a blessing somehow makes the blessed person more successful. More rain comes to his/her land, fewer diseases, etc. If we take into account that, according to modern science, these events can only be predicted with some probability, we can described the results of blessing as follows. Due to the blessing, the actual values v_i of the corresponding quantities become different from their expected mean values m_i – different in the direction that makes them more beneficial to the blessed person. In these terms, the ability to bless is the ability to change the values of these random quantities.

According to statistics (see, e.g., [8]), in general, if we have several independent random quantities v_i, then, with very high certainty, all possible combinations $v = (v_1, \ldots, v_n)$ are characterized by the inequality

$$\sum_{i=1}^{n} \frac{(v_i - m_i)^2}{\sigma_i^2} \le \chi^2, \tag{1}$$

where σ_i is the corresponding standard deviation and the exact value of $\chi^2 \approx n$ depends on the desired degree of certainty. From this viewpoint, if we make the blessed person to be very successful, i.e., if we increase some of the differences $v_i - m_i$ way beyond the random-explained standard deviation σ_i, we thus restrict the possibility to increase other differences $v_j - m_j$, since, according to the formula (1), the weighted sum of the squares of these differences is bounded from above.

In this interpretation, blessing is a kind of a new physical field that somewhat changes the probabilities of random events – and in this interpretation, the person's ability to bless is indeed limited.

This interpretation also explains the opposite of blessing – a curse, in which, vice versa, the values of the related physical quantities make the cursed person less happy.

6 Sacrificing the Best Animals vs. Darwin

Biblical idea and why it sound irrational. According to the Bible, we should sacrifice our best animals to God. This seems to be inconsistent with selection, where we constantly improve the quality of the animals by making the best ones actively reproduce.

If instead of using the best horses, the best bulls, the best sheep to actively reproduce, we sacrifice them, this can probably lead to the effect opposite to selection – namely, to the continual degradation of the stock. This cannot be what God had in mind.

This can also be rationally explained. While we do have a lot of experience with selection, we have significantly more experience with computer simulations of such a selection – namely, the experience of using genetic algorithms and, more generally, evolutionary computations, a widely used and largely successful optimization technique.

This experience has shown that one of the main problems with these algorithms – as well as with many other optimization algorithms – is that we sometimes reach a local maximum and get stuck there [2]. One of the main ideas of how to avoid getting stuck in a local maximum is that if we get stuck, we get out – worsening the quality of the current solution, but hoping this way to find solutions which are even better. (One of the main techniques for doing this is known as simulated annealing; see, e.g., [2].)

This is exactly what sacrificing the best bull achieves: deletes the local maximum and thus, allows us to potentially progress to an even better cattle.

7 Fast-and-Feast

Biblical idea. The Bible pays a lot of attention to when we should fast and when we should feast.

Taking into account that in those days, hunger was an acute problem, it seems to make more sense to equally distribute whatever we have between different days – just like those who have survived in hostile environments usually do. From this viewpoint, the Biblical recommendation seems irrational. But is it?

Our explanation. Suppose that our goal is to increase the overall people's satisfaction. Let us describe this problem in precise terms.

The overall satisfaction can be obtained by adding up all the satisfaction levels that people get every day. Let us denote:

- the overall amount of food that we have for a certain period of n days by F,
- the minimal amount of daily food needed to survive by f_0,
- the amount of food consumed on day i by f_i, and
- the satisfaction of getting the amount of food f by $s(f)$.

In these terms, the corresponding optimization problem has the following form:

- given the values F and f_0 and the function $s(f)$,
- find the values $f_1, \ldots, f_n$ that maximize the overall satisfaction $\sum_{i=1}^{n} s(f_i)$ under the constraints $\sum_{i=1}^{n} f_i = F$ and $f_i \geq f_0$ for all i.

In general, we can use the Lagrange multiplier method to deduce the above constraint satisfaction problem to the unconstrained problem of maximizing the value

$$\sum_{i=1}^{n} s(f_i) + \lambda \cdot \left(\sum_{i=1}^{n} f_i - F \right) \tag{2}$$

under the condition $f_i \geq f_0$, where λ is an appropriate constant (known as *Lagrange multiplier*).

According to calculus, if for some i, the maximum is attained inside the corresponding domain, i.e., for $f_i > f_0$, then the partial derivative of the expression (2) should be equal to 0, i.e., we should have $s'(f_i) = -\lambda$, where $s'(f)$ denotes the derivative of the function $s(f)$.

Thus, for each day, the consumption f_i should be equal either to f_0 or to the value $f_{\text{opt}} > f_0$ for which $s'(f_{\text{opt}}) = -\lambda$. With the exception of two degenerate cases when $F = n \cdot f_0$ and when $F = n \cdot f_{\text{opt}}$, the optimal solution has to include *both* "fast" days when $f_i = f_0$ and "feast" days when $f_i = f_{\text{opt}}$. And this is exactly what the Bible recommends.

Comment. So why do people surviving in the hostile environments do not follow this optimal strategy? This is easy to explain: these folks do not know how many days they will be there before they are rescued.

Similar arguments explains the emphasis on Shabbat. Similar arguments can be applied not only to the amount of food leading to the optimal overall satisfaction, but also to the amount of daily effort leading to the optimal overall productivity. In this case, the optimal strategy is to have days when we work intensely and days when we rest and do not work at all – and this is exactly the Biblical idea of the Sabbath!

8 Conclusions and Future Work

Conclusions. In this paper, we showed that many Biblical ideas make rational sense. Our objective was to provide several such examples.

Future work. There are definitely many more examples in the Bible that can be rationally explained – and probably many examples that cannot be explained rationally. It would be nice to analyze other Biblical ideas from this viewpoint.

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