Physics, Bible Used to Reexamine If Heaven Is Hotter Than Hell

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Citation: Physics Today **51**, 7, 96 (1998); doi: 10.1063/1.882316
View online: https://doi.org/10.1063/1.882316
View Table of Contents: https://physicstoday.scitation.org/toc/pto/51/7
Published by the American Institute of Physics

trained personnel will provide a critical jump start for the IDC, equipping it with an almost-instant monitoring capability when the CTBT enters into force—and without the delays and growing pains that have characterized past treaty-monitoring efforts.

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We have detected a long-standing error in certain calculations used in an age-old argument about whether heaven is hotter than hell.

In 1972 a letter to the editor of *Applied Optics* discussed the temperatures of heaven and hell and cited the findings of "an unnamed environmental physicist of several decades back."[1] In estimating these temperatures, the unknown physicist had taken the Bible as a source of data. Isaiah 30:26 provided a description of the luminosity of the Moon and the Sun in heaven: "Moreover the light of the moon shall be as the light of the sun, and the light of sun shall be sevenfold, as the light of seven days. . . ." (Technically, of course, the passage is a description of a hypothetical future prosperity, not of heaven as such.) Using the Stefan–Boltzmann fourth-power law for radiation, $R_T = \sigma \times T^4$, where R_T is the radiant energy of a blackbody and σ is the Stefan–Boltzmann constant, the physicist calculated the temperature of heaven, T_{heaven}, to be 798 K.

As for the temperature of hell, the physicist could not calculate it exactly and therefore set a maximum limit value on the basis of the description of hell given in Revelation (or Apocalypse) 21:8: "But the fearful, and unbelieving . . . shall have their part in the lake which burneth with fire and brimstone. . . ." This passage implies that the temperature of hell must be equal to or somewhat below the boiling point of brimstone, now better known as sulfur, which is 717.6 K, at normal pressure.

So the unknown physicist "proved" the shocking fact that heaven is hotter than hell, a finding that jolted the media enough when it was later revealed in *Applied Optics* that the matter was even commented upon in the 21 August 1972 issue of *Time*. (That same year, K. Nassau[2] did further analysis to calculate the increase of pressure needed to raise the boiling point of sulfur up to the temperature of heaven; the temperature of hell had been given at a pressure of 1 atmosphere.)

The error we have found lies in the unknown physicist's use of Isaiah 30:26, which says that heaven receives as much radiation from the Moon as Earth does from the Sun, in addition to what it receives directly from the Sun. The error occurred when the physicist took heaven's radiation from the Sun to be 7×7 times more intense than on Earth, whereas the Isaiah passage clearly states that the light of the Sun falling on heaven is only 7 times greater, not 49 times. (We have verified the accuracy of this passage in Spanish Bibles translated directly from the original manuscripts, and also have confirmed the accuracy of our reading with an accredited biblical expert—Eugenio Romero Pose, the auxiliary Catholic bishop of Madrid, to whom we are very much indebted for his help.)

Accordingly, the total radiation—from both the Moon and the Sun—falling on heaven is 8 times greater than the total falling on Earth (as the unknown physicist mentioned, the light that Earth receives from the Moon is a ten-thousandth of the light received from the Sun and can be ignored). This total radiation heats up heaven to the point where thermodynamic equilibrium is reached—that is, the heat lost by radiation is just equal to that received by radiation. Then, the Stefan–Boltzmann law applies. Taking the temperature of Earth, T_{earth}, to be 300 K, we have

$$\left(\frac{T_{heaven}}{T_{earth}}\right)^4 = 8$$

That gives us T_{heaven} = 504.5 K, which is considerably lower than the 798 K originally calculated.

So the traditional belief is correct after all; at 717.6 K, hell is indeed much hotter than heaven.

References

1. Appl. Opt. **11** (8), A14 (1972).
2. K. Nassau, Applied Optics **11** (12), A14 (1972).

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Correction

March, pages 20 and 21—Bernard Durney's name was misspelled as Bernard Gurney. And his affiliation should have included the University of Arizona. ■