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# Books on Vital Issues

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## Man's Place in the Universe\*

"MAN'S Place in the Universe" is the outcome of the interest excited by an article which appeared in the English "Fortnightly Review" and the "Independent" of New York in 1903. The statements made there by Mr. Wallace called forth adverse criticism on the part of two astronomers, and the controversy demanded a fuller presentation of the argument than the limits of a magazine allowed. This is not to be regretted, for the extended work may be said to bring down to date the consideration "whether or no the logical inferences to be drawn from the various results of modern science, lend support to the view that our earth is the only inhabited planet, not only in the Solar System but in the whole stellar universe."

The question is by no means a new one. Five books at least stand out as noteworthy of such a discussion. Fontenelle, in 1686, influenced probably by the growing acceptance of the Copernican theory and by the astronomical view of Descartes, published his "*Entretiens sur la Pluralité des Mondes*," a work which was soon translated into nearly every European language and, as lately as 1794, into Modern Greek. Fontenelle held that not only were the moon and planets of this Solar System inhabited, but that other systems had similar abodes of life. In 1854, Professor Whewell, of Cambridge, England, in his "Of the Plurality of Worlds," argued against the probability of planetary life. This aroused the opposition of Sir David Brewster, who replied in his "More Worlds than One." In 1870, Mr. R. A. Proctor issued "Other Worlds than Ours," still a favorite book with those who do not attempt to keep pace with astronomical investigation. He followed this up in 1875 with "Our Place in the Infinities," and summed up his conclusions in an essay, "Life in Other Worlds." In this essay he says: "If only one in each of the million orbs is inhabited, the number of inhabited orbs is infinite."

Of these four authors, Fontenelle was in no sense a scientist; Whewell was a physicist of wide attainments; Brewster was a physicist, but of much narrower limitations; Proctor was an astronomer of considerable distinction. The question is not one of personal knowledge merely, but of weighing scientific evidence, and, as astronomy has made such marvelous strides, especially in the field of astro-physics, since Proctor's death in 1888, it is fitting that we have a modern view of the modern evidence. Mr. Wallace is not an astronomer. His capability of weighing scientific evidence, however, will scarcely be called in question. For this reason we may welcome his work, and trust that the words of Huxley are at least as true now as when he uttered them: "Men of science . . . have learned to respect nothing but evidence, and to believe that their highest duty lies in submitting to it, however it may jar against their inclinations."

It is self-evident that the question is purely a matter of science. It relates solely to cosmic laws in the material world. Ascertained truth forms the only groundwork of argument, and the argument must be weighed according to the strictest laws of logic. In this spirit only can we approach Mr. Wallace's book.

Nevertheless, the past history of astronomical research and the present phase of astro-physical investigation compel us to ask whether the present statements of science are final truth. Some, from the very nature of the case, must be so; others can have no finality until further investigation has penetrated nearer to the ultimate cause. Hence, not even Mr. Wallace's inferences can be accorded finality. They must remain subject to revision, for among the premises there are some which cannot be regarded as ascertained truth, but only hypotheses, good working-hypotheses, if you will, but hypotheses.

There is no evidence that he desires the inferences to be regarded as final. He is too scientific to dream of such a thing. He is quite within his rights, however, when he erects safeguards around his position and

\*MAN'S PLACE IN THE UNIVERSE. By Alfred Russel Wallace. McClure, Phillips & Co., New York. \$2.50.

says: "Neither the facts, nor the more obvious conclusions from the facts, are given on my own authority, but always on that of the best astronomers, mathematicians, and other men of science to whose works I have had access, and whose names, with exact references, I generally give." Mr. Wallace, therefore, has approached the subject solely from the scientific side, using the results of investigation up to date. He has no intention of overturning the faith of any one, even if it were involved in the question. No phase of spiritual life, whether of pre-existence or future existence for the human race, enters into the discussion. The point at issue is whether physical life, such as we see around us and feel within our own bodies, exists in any other sphere, no matter where that sphere may be. Is "our earth the only inhabited planet, not only in the Solar System but in the whole stellar universe?" Mr. Wallace concludes that it is.

His method of proceeding in his argument is as follows: After briefly stating the early ideas about the universe, he goes on to modern times, where he necessarily deals with the works of those of his predecessors who have already been mentioned. Then he comes to the revision of our knowledge by the New Astronomy, that marvelous mode of investigation in which the telescope, once supreme, plays a subordinate part to the spectroscope and photographic camera. This brings on a consideration of the distribution of the stars, their relative distances, motion through space, unity in a single system, evolution, number, grouping. This is followed by a study of the uniformity of matter and the laws to which it is subject, and so we are led on to a consideration of the essential characters of living organisms and the conditions essential to their existence.

After demonstrating that Earth has long afforded these conditions; that "in remote ages the climate of the earth was generally more uniform, though perhaps not warmer, than it is now"; that "the greatest phenomena of nature were but little varied from those that prevail in our own times"; that the equability of climate and other conditions extended over a much larger space than at present; that the distribution of land and water has played an important part in the evolution of life, and that the centrifugal flight of our moon from the earth had much to do with this distribution; the author is ready to discuss the question

whether Earth is the only habitable and inhabitable planet of the solar system. The evidence is clearly in favor of the view that it is. Not only does it seem probable that none are now or have been habitable, but it is probable, (for the inductions of physical science can only be "probable," but with the highest attainable probability) that none can ever be.

The argument must now advance to the stellar universe, and here again, the revelations of the spectroscope are opposed to any existence of what we recognize as life. The vast amount of non-living matter will be an obstacle to those who persist in the old question of analogy. Mr. Wallace, possibly to meet the objection of "waste," hazards the suggestion that "some of the highly complex processes that go on in plants may be helped" by radiations of energy from the stars. He acknowledges that this is "highly speculative." Why introduce it, then? It gives a weak point to the argument. Students of nature are prepared for "waste." They have learned that she is "careless of the single life,"

"that of fifty seeds

She often brings but one to bear."

Perhaps a short quotation may best show what thoughts pass through the great mind of Mr. Wallace as he contemplates his position at the end of his argument:

"Much of the wealth and luxuriance of living things, the infinite variety of form and structure, the exquisite grace and beauty in bird and insect, in foliage and flower, may have been mere by-products of the grand mechanism we call nature—the one and only method of developing humanity." And again, "The immensity of the stellar universe, with its thousand million suns, and the vast æons of time during which it has been developing—all seem only the appropriate and harmonious surroundings, the necessary supply of material, the sufficiently spacious workshop for the production of that planet which was to produce, first, the organic world, and then, Man."

Not only, then, is the earth the only abode of life in the whole universe, but Man is the highest expression of all creation. The idea is a grand one; let not any one thoughtlessly scoff at it. To compare great things with small, it takes many tons of pitchblende to produce a grain of radium, but no one thinks of doubting the result when he

sees the product, although there is certainly "waste." With all our investigation, we stand as yet but upon the threshold of na-

ture. Mr. Wallace has perhaps been granted the privilege of drawing aside the curtain for a moment.

*Robert Blight.*