proper amount of atmosphere at the proper
greatly different, it could not retain the
on the surface of this planet must be
same as we find it, because, were it
rounded by an atmosphere formed of a
pressure. Aqueous vapor must be present
and heat that ours does.

It shall receive exactly the amount of light
that sun except the one on which we
orbit at such a distance from the sun that
planet must revolve in a nearly circular
part of the universe than its centre, nor
concurrence of a great multitude
in the neighborhood of any star but our
system of planets revolving around it in

It is an attempt to prove
that the orbits, so far as developed, show
degrees of eccentricity quite incompatible
with the regular round of conditions which
prevail on the earth.

As a piece of analytical reasoning, in
which a vast variety of facts are, with
artistic logic, arrayed in support of the
conclusion, the book is well worthy of its
distinguished author; and yet we doubt if
many readers will accept his conclusions.

The web of his argument is woven accord­
ing to all the rules of art, but its texture
is too finespun to bear the weight it is ex­
pected to carry. It is an attempt to prove
a negative in a case where no such proof
is possible. Wide though our knowledge of
the universe has become, it is infinitesimal
when compared with the range it will have
to include before anything positive can be
said on the subject of life in other worlds.

There are probably more than a hundred
million stars in the heavens. Of these we
know that one—our sun—has an orderly
structure which the greatest variety of
conditions are, with natural science generally.
The conditions of organic life are next
demonstrated. Not until the end is approach­
ed, and the reader has had time to ar­
range his ideas, do the logical order of
presentation and the unity of the theme
become apparent. Then the conclusions
are moulded into a well ordered system
well calculated to excite attention even on
the part of those who cannot accept them
in their entirety: The universe is a rounded
whole; our solar system is situated in its
centre. Of the eight planets revolving
around our sun, the third occupies a pe­
culiar position. Organic life requires the
concurrency of a great multitude of
conditions which exist on our particular
planet, but cannot well be fulfilled in any other
part of the universe than its centre, nor
in the neighborhood of any star but our
sun, nor on any planet revolving round
that sun except the one on which we
shall have a seat of life, a
planet must revolve in a nearly circular
orbit at such a distance from the sun that
it shall receive exactly the amount of light
and heat that ours does. It must be sur­
rounded by an atmosphere formed of a
combination of nitrogen and oxygen in the
proper proportion. The force of gravity
on the surface of this planet must be
the same as we find it, because, were it
greatly different, it could not retain the
proper amount of atmosphere at the proper
pressure. Aqueous vapor must be present
in sufficient quantities to produce the right
amount of rain. But we need not go farther
into details. They may be summed up by saying that the planet must cor­
correspond so closely to ours in almost every
important particular that, accepting the
conditions, the author may be quite right
in his estimate of the improbability that
they are all combined on any other body.

This doctrine is certainly an extreme
case of reaction against the popular
ideas which prevailed two or three gen­
erations ago, when men like Sir David
Brewster and Thomas Dick pointed out to
admirers the adaptability of other
worlds to become the abode of human
beings, and even calculated the possible
number of inhabitants who might derive
their sustenance from the ample acres of
Mars and Jupiter. It must be confessed
that the general trend of the discoveries
of modern science has been in the direction
of the reaction which Mr. Wallace car­
ties to so extreme a point. It cannot be
denied that the conditions of organic life
on our globe seem to be of a very ex­
ceptional character; and that, so far as re­
search has yet gone, these conditions are
not likely to exist on any other planet of
our system except, perhaps, Mars. We
have no evidence of the existence else­
where of solar systems like ours. Revolv­
ing double stars have been known ever
since the time of the elder Herschel, and
the spectroscope is now making known
to astronomers the existence of great plan­
ets revolving around many of the stars;
but the general rule in all these cases is
that the orbits, so far as developed, show
degrees of eccentricity quite incompatible
with the regular round of conditions which
prevail on the earth.

WALLACE ON LIFE IN THE UNIVERSE.
Man's Place in the Universe: A Study of the
Results of Scientific Research in Relation
to the Unity or Plurality of Worlds. By
Alfred R. Wallace, LL.D., D.C.L., F.R.S.
McClure, Phillips & Co. 1903.

This latest work of the Nestor of scien­
tific authors is so far unique in spirit
and purpose that the critical reader may
fail to grasp its underlying idea without
some study. In reading it through, the
first impression would be that of a ra­
techless treatise on astronomy, in
which the structure of the universe is
set forth with some detail, but without any
apparent relation to humanity. After this
flight through the more distant regions of
space, the reader is brought homeward, and
proceeds to a survey of the planets. Then
he lands on solid earth, and passes in
review the main facts of meteorology, geol­
y, and natural science generally. The
conditions of organic life are next

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of probabilities, the chances are very much against Mr. Wallace's theory.

Perhaps the weakest point of the whole argument is the extent to which it rests on the idea of our sun occupying a central position in the universe. It is quite true that, to all appearance, our position does not deviate from the centre to an extent that can be determined by any methods yet known. But in such a case the very word 'centre' must be somewhat indefinite. It is not a point, only a region, and a region which is very wide and ill-defined. The idea is also open to the objection that, even if our sun is, in our age, in the centre, it could not have been so in past geological ages. It is moving through space at the rate of some ten miles a second—a motion so rapid and so little subject to change that it must have been following its present course for millions of years. It is as certain as anything in such a subject can be, that our system did not occupy the central position when life commenced on the earth, and will cease to occupy it in the future.

Another consideration will not fail to occur to the thinking reader, which he will hesitate in bringing to bear only because the author of "Natural Selection" is perhaps as eminent an authority as any other on the subject. That the life which has developed on the earth in the course of ages must be such as the conditions prevailing on our planet made possible, follows as a matter of course, because otherwise it would never have existed at all. We may also admit that these particular forms of life could never have been evolved under any other conditions. But does it therefore follow that no life whatever could have been evolved except that which we have on earth? The fish we find in the ocean are suitable to their environment and could not live in any other. Does it follow that in an ocean of some other substance no animated creature would ever have come into existence? Such questions can be answered with certainty only by experiment, but the opportunity for trying the experiment is wanting. Such observations as we can make of the surface of the earth do give color to the view that life cannot be evolved except at certain temperatures. There is little living matter at the two poles. But, at the other extreme, we find that the warmer the climate the more abundant the life which it supports. Granting a due amount of moisture, no part of the world is so hot that plants, animals, and even men do not thrive. So far as we can judge, an earth yet hotter than ours would have been yet more fertile in life—perhaps almost up to the boiling point of water. Below this point there is a range of tempera-

ature wide enough to include countless planets among the many millions which may form other solar systems. Taken altogether, the author's argument seems as inconclusive as it is ingenious and comprehensive.