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# Astronomy and Cosmogony

JAMES JEANS



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Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,  
São Paulo, Delhi, Dubai, Tokyo

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9781108005623](http://www.cambridge.org/9781108005623)

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This edition first published 1928  
This digitally printed version 2009

ISBN 978-1-108-00562-3

This book reproduces the text of the original edition. The content and language reflect the beliefs, practices and terminology of their time, and have not been updated.

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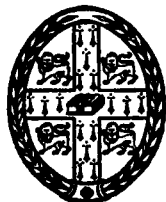
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# ASTRONOMY AND COSMOGONY

BY

**SIR JAMES H. JEANS, M.A., D.Sc., LL.D., F.R.S.**

SECRETARY OF THE ROYAL SOCIETY, AND RESEARCH  
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Cambridge University Press  
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CAMBRIDGE UNIVERSITY PRESS  
Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi

Cambridge University Press  
The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)  
Information on this title: [www.cambridge.org/9780521744706](http://www.cambridge.org/9780521744706)

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First edition 1928  
Second edition 1929  
This digitally printed version 2008

*A catalogue record for this publication is available from the British Library*

ISBN 978-0-521-74470-6 paperback

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## PREFACE

**M**Y book attempts to describe the present position of Cosmogony and of various closely associated problems of Astronomy, as, for instance, the physical state of astronomical matter, the structure of the stars, the origin of their radiation, their ages and the course of their evolution.

In a subject which is developing so rapidly, few problems can be discussed with any approach to finality, but this did not seem to be a reason against writing the book. Many years have elapsed since the last book on general Cosmogony appeared, and the interval has seen the whole subject transformed by new knowledge imported from observational astronomy and atomic physics. It has also witnessed the growth of an interest in the results of Cosmogony, which now extends far beyond the ranks of professional astronomers, and indeed beyond scientific circles altogether.

With this in my mind, I have tried to depict the present situation in the simplest language consistent with scientific accuracy, avoiding technicalities where possible, and otherwise explaining them. As the book is intended to be, first and foremost, a rigorously argued scientific treatise, the inclusion of a substantial amount of mathematical analysis was inevitable, but every effort has been made to render the results intelligible to readers with no mathematical knowledge, of whom I hope the book may have many.

In a sense the book constitutes a sequel to my *Problems of Cosmogony and Stellar Dynamics* of ten years ago. So much has happened in the intervening decade that a new book seemed to be called for, rather than a new edition of the old. At any rate I allowed myself to be attracted by the idea of a big clean canvas on which I could paint a picture on a more comprehensive scale than had originally been possible in the publication of a Prize Essay. A considerable part of the present book is devoted to examining the consequences of the hypothesis, first put forward in the closing pages of the earlier book, that the energy of stellar radiation arises out of the annihilation of stellar matter. The calculations of stellar ages given in the present book seem to shew that this is the only possible source of stellar energy, since nothing short of the complete annihilation of matter can give an adequate life to the stars. I have, however, tried to explain and discuss all reasonable hypotheses at present in the field, both on this and other subjects,

*Preface*

and hope I have been fair and courteous to those whose views I cannot accept. My own personal contributions to the subject represent the outcome of twenty-five years of fairly continuous thought and work, and a considerable number of my results are published for the first time in the present book.

I have to thank many friends for help and courtesies of various kinds, and particularly Dr W. S. Adams, Director of Mount Wilson Observatory, for permission to reproduce a large number of photographs. My thanks are again due to the officials and staff of the Cambridge University Press for extending to the present book the consummate skill and unremitting care by which they transform a mass of muddled manuscript into a masterpiece of typography.

J. H. JEANS

DORKING,  
*January 25, 1928.*

**PREFACE TO SECOND EDITION**

**A**S the first edition had the good fortune to be rather speedily exhausted, the preparation of a second edition has been a pleasant and comparatively light task.

I have expanded the book by references to various observational and theoretical results which have appeared since the first edition was written, and have allotted space more liberally to certain problems and investigations which friendly critics thought I had dismissed too briefly in the original book. Finally I have corrected a number of minor errors and misprints, and have to thank many friends and correspondents for bringing these to my notice.

J. H. JEANS

DORKING,  
*November 14, 1928.*