The Concept of Nature

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The Tarner Lectures
Delivered in Trinity College
November 1919

ALFRED NORTH WHITEHEAD

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314-321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi - 110025, India

103 Penang Road, #05-06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of the University of Cambridge.

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www.cambridge.org
Information on this title: www.cambridge.org/9781107113732

First published 1920
Reprinted 1926, 1930, 1955
First paperback edition 1964
Reprinted 1971, 1978, 1982, 1986, 1990, 1993, 1995
Cambridge Philosophy Classics edition 2015

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

Library of Congress Cataloging in Publication data
Whitehead, Alfred North, 1861–1947.
The concept of nature : the Tarner lectures delivered in Trinity College, November 1919 / Alfred North Whitehead. – Cambridge Philosophy Classics edition.
pages cm. – (Tarner lectures)
Preface to Cambridge philosophy classics edition by Michael Hampe.
"First published 1920."
Includes bibliographical references and index.
ISBN 978-1-107-11373-2 (Hardback : alk. paper) –
ISBN 978-1-107-53431-5 (Paperback : alk. paper)
1. Nature. 2. Science–Philosophy. 3. Knowledge, Theory of. I. Title.
Q175.W58 2015
501–dc23 2015017429

ISBN 978-1-107-11373-2 Hardback
ISBN 978-1-107-53431-5 Paperback

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Preface to this edition

MICHAEL HAMPE

The first three decades of the twentieth century saw dramatic changes in science and philosophy. In 1905 Einstein published his special and, in 1919, his general relativity theory, and in 1924 De Broglie formulated the wave-particle dualism for matter – the beginning of quantum theory. At the same time the idealism of the Neo-Hegelian schools, of Bradley, McTaggart, Royce and others, lost its credibility. The idea that the distinction between appearance and reality was philosophically fundamental, the claim that space and time are not real, but a mere appearance, and the associated degradation of all scientific knowledge to knowledge of appearances only, the view that philosophy could deal with a purported reality behind appearances – all these assumptions lost their grip on the minds of philosophers, who instead began once again to recognise the relevance of the empirical sciences.

A. N. Whitehead worked at this time as a philosophically minded Professor of Applied Mathematics at Imperial College London. He reacted very quickly to the scientific developments that he took to require nothing less than a radically new way of understanding nature itself. This book—together with his more technical *Enquiry concerning the Principles of Natural Knowledge* from 1919—is his attempt to formulate such a new concept of nature against the background of post-Newtonian science and in the spirit of the post-Kantian and post-Hegelian New Realism.

For Whitehead, natural scientists were not being naïve when they took their objects of study to exist independently from thought. But natural scientists do not argue for their realism. It is self-evident, for a physicist who studies the sun or a palaeontologist who investigates a fossil, that they do not *create* these objects that existed millions of years before any human enquiry was possible. Whitehead tried to take this realism seriously because he accepted the temporal dimensions in which science placed its objects. Thus, the nature that science investigates cannot be just the totality of human experience, organised by laws, as Kant thought. It is more. The fact that the different natural sciences can work together was of great importance for Whitehead, and he thought it set him a philosophical task, that of formulating a generalised and realistic concept of nature. His

conclusion was that nature is a '*self-contained*" totality that is 'closed to mind.'

But Whitehead also rejected the idea that this leads to a bifurcation of a material nature from non-material minds. Thoughts, emotions and values take place in the same world as everything that the natural sciences study. Colours are as real as photons. But to relate scientific objects to processes of experience is a much more ambitious, a *metaphysical* task. Whitehead tackled it 1929 in his *Process and Reality*, and the realistic double-aspect theory of that book is prepared for in the lectures that form *The Concept of Nature*. Now that metaphysics' fixation with purely linguistic problems has passed, the position that he takes has become, and continues to be, increasingly plausible and important to analytic metaphysicians.

Preface

The contents of this book were originally delivered at Trinity College in the autumn of 1919 as the inaugural course of Tarner lectures. The Tarner lectureship is an occasional office founded by the liberality of Mr Edward Tarner. The duty of each of the successive holders of the post will be to deliver a course on 'the Philosophy of the Sciences and the Relations or Want of Relations between the different Departments of Knowledge.' The present book embodies the endeavour of the first lecturer of the series to fulfil his task.

The chapters retain their original lecture form and remain as delivered with the exception of minor changes designed to remove obscurities of expression. The lecture form has the advantage of suggesting an audience with a definite mental background which it is the purpose of the lecture to modify in a specific way. In the presentation of a novel outlook with wide ramifications a single line of communications from premises to conclusions is not sufficient for intelligibility. Your audience will construe whatever you say into conformity with their pre-existing outlook. For this reason the first two chapters and the last two chapters are essential for intelligibility, though they hardly add to the formal completeness of the exposition. Their function is to prevent the reader from bolting up side tracks in pursuit of misunderstandings. The same reason dictates my avoidance of the existing technical terminology of philosophy. The modern natural philosophy is shot through and through with the fallacy of bifurcation which is discussed in the second chapter of this work. Accordingly all its technical terms in some subtle way presuppose a misunderstanding of my thesis. It is perhaps as well to state explicitly that if the reader indulges in the facile vice of bifurcation not a word of what I have here written will be intelligible.

The last two chapters do not properly belong to the special course. Chapter 8 is a lecture delivered in the spring of 1920 before the Chemical Society of the students of the Imperial College of Science and Technology. It has been appended here as conveniently summing up and applying the doctrine of the book for an audience with one definite type of outlook.

This volume on 'the Concept of Nature' forms a companion book to my previous work *An Enquiry concerning the Principles of Natural Knowledge.* Either book can be read independently, but they supplement each other. In part the present book supplies points of view which were omitted from its predecessor; in part it traverses the same ground with an alternative exposition. For one thing, mathematical notation has been carefully avoided, and the results of mathematical deductions are assumed. Some of the explanations have been improved and others have been set in a new light. On the other hand important points of the previous work have been omitted where I have had nothing fresh to say about them. On the whole, whereas the former work based itself chiefly on ideas directly drawn from mathematical physics, the present book keeps closer to certain fields of philosophy and physics to the exclusion of mathematics. The two works meet in their discussions of some details of space and time.

I am not conscious that I have in any way altered my views. Some developments have been made. Those that are capable of a non-mathematical exposition have been incorporated in the text. The mathematical developments are alluded to in the last two chapters. They concern the adaptation of the principles of mathematical physics to the form of the relativity principle which is here maintained. Einstein's method of using the theory of tensors is adopted, but the application is worked out on different lines and from different assumptions. Those of his results which have been verified by experience are obtained also by my methods. The divergence chiefly arises from the fact that I do not accept his theory of non-uniform space or his assumption as to the peculiar fundamental character of light signals. I would not however be misunderstood to be lacking in appreciation of the value of his recent work on general relativity which has the high merit of first disclosing the way in which mathematical physics should proceed in the light of the principle of relativity. But in my judgment he has cramped the development of his brilliant mathematical method in the narrow bounds of a very doubtful philosophy.

The object of the present volume and of its predecessor is to lay the basis of a natural philosophy which is the necessary presupposition of a reorganised speculative physics. The general assimilation of space and time which dominates the constructive thought can claim the independent support of Minkowski from the side of science and also of succeeding relativists, while on the side of philosophers it was, I believe, one theme of Prof. Alexander's Gifford lectures delivered some few years ago but not yet published. He also summarised his conclusions on this question in a

lecture to the Aristotelian Society in the July of 1918. Since the publication of *An Enquiry concerning the Principles of Natural Knowledge* I have had the advantage of reading Mr C. D. Broad's *Perception, Physics, and Reality* (Cambridge University Press, 1914). This valuable book has assisted me in my discussion in Chapter 2, though I am unaware as to how far Mr Broad would assent to any of my arguments as there stated.

It remains for me to thank the staff of the University Press, its compositors, its proof-readers, its clerks, and its managing officials, not only for the technical excellence of their work, but for the way they have co-operated so as to secure my convenience.

A. N. W.
Imperial College of Science and Technology
April, 1920