

final Thoughts

final Thoughts

Henri Poincare



DD BOOKS

Publishers for New Generations

This book is an Illustration, although the publisher has made every effort to Illustrate this book but there may still be some grammatical errors in it. If any such thing is found please contact us at the email below.

Every effort has been made to ensure the accuracy of this book's content. However, the publisher assumes no legal liability for errors or omissions. It is not the publisher's intention to offend any reader.

All Rights Reserved including Right of reproduction in whole or in part in any form. This edition is published by **DD BOOKS**. The text of this publication or any part thereof may not be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording. Storage in an information retrieval system, or otherwise, without the written permission of the publisher.

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, resold, hired out or otherwise circulated without the prior consent of the publisher in any form of binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

First Published: 2024

Book Name: Final Thoughts (Illustrated)

Author: Henri Poincaré

Illustrated by **DD Books**

Price: 250/-

ISBN: 978-93-5957-188-1

Published by **DD BOOKS**

Email: ddsalesglobal@gmail.com

Copyright @ 2024, All Rights Reserved

Table of Content

1) Chapter I	
The Evolution of Laws	9
2) Chapter II	
Space and Time	26
3) Chapter III	
Why Three-Dimensional Space	41
4) Chapter IV	
The Logic of Infinity	58
5) Chapter V	
Mathematics and Logic	72
6) Chapter VI	
The Hypothesis of Quanta	85
7) Chapter VII	
The Relations of Matter and Either	100
8) Chapter VIII	
Morality and Science	111
9) Chapter IX	
Moral Union	121

Under the title "Final Thoughts," we gather here various articles and conferences that Mr. Henri Poincaré himself intended to comprise the fourth volume of his works on scientific philosophy. All the previous volumes had already been published in this collection.

It's unnecessary to remind anyone of their remarkable success. The most eminent of modern mathematicians revealed himself to be a distinguished philosopher, one whose books profoundly influence human thought.

It's likely that if Henri Poincaré himself had published this volume, he would have made certain adjustments and eliminated some repetitions. However, we felt that respect for the memory of this great man prohibited any alteration of his text.

Furthermore, it seemed unnecessary to precede this volume with any study of Henri Poincaré's work. It has been evaluated by all scholars, and no commentary could augment the glory of this exceptional genius.

— G. L. B

Chapter I

The Evolution of Laws

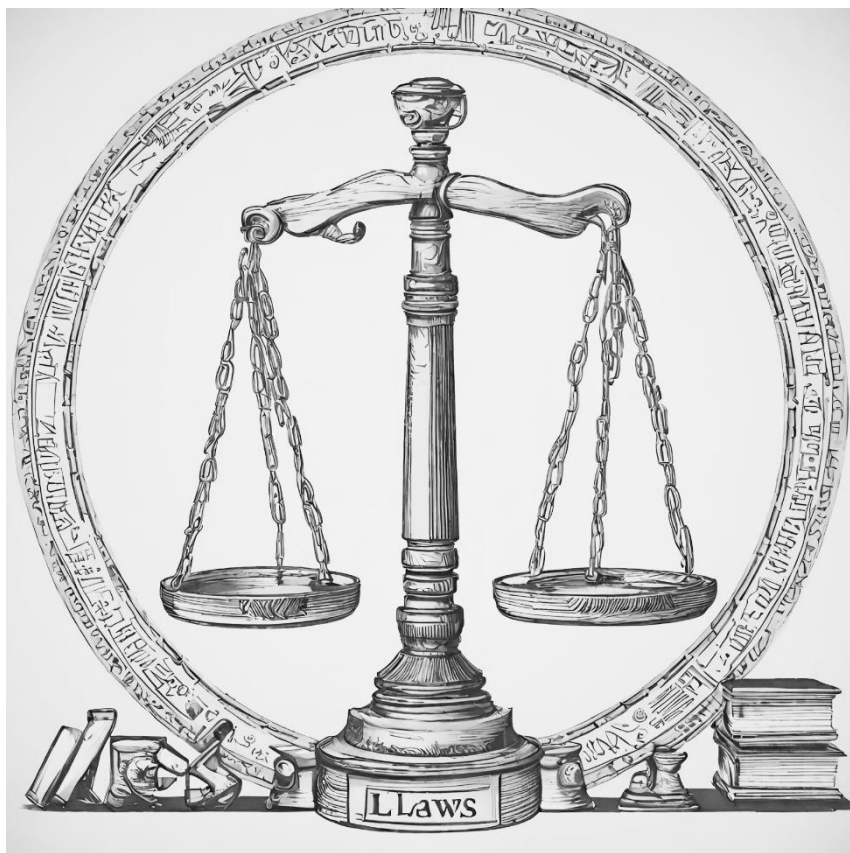
This chapter explores the concept of the evolution of natural laws. It begins with a discussion on whether natural laws, which govern the world's evolution, remain constant or are susceptible to change. The author suggests that while scientists may reject the idea of evolving laws, philosophers have the liberty to explore this concept.

The chapter then delves into the perspective of a mathematician, considering the possibility of physical laws changing over time. It discusses the concept of laws as consistent connections between cause and effect, and how these laws can be represented as a system of differential equations. The author argues that we can only know about the past by assuming the laws haven't changed. If we don't make this assumption, questions about the past become unsolvable.

The chapter also explores the possibility of contradictions arising from the application of these laws, leading to the conclusion that the world must either perish or change its laws. It suggests that we can only avoid contradictions by choosing among an infinite number of possibilities that exclude physically impossible states.

Finally, the chapter discusses the concept of laws from the perspective of different observers. It suggests that while two observers might construct different systems of laws at different times, a more advanced intelligence could synthesize these into a

single, coherent formula. Thus, for this advanced observer, the laws would not have changed; it would only be the scientists who were imperfectly informed.



In essence, this chapter presents a thought-provoking exploration of the nature and evolution of laws, offering unique and meaningful insights into our understanding of the universe.

In his work on the contingency of the laws of nature, M. Boutroux pondered whether natural laws are susceptible to change. He questioned whether, as the world evolves, the laws themselves, which dictate this evolution, remain constant. Such a notion is unlikely to be embraced by scholars. From their perspective, accepting it would mean denying the legitimacy and possibility of Science. However, philosophers retain the right to

pose such questions, explore the various solutions they entail, examine their consequences, and seek to reconcile them with the legitimate demands of scientists. Let's delve into some aspects of this problem, leading us not to strict conclusions but to diverse reflections that may prove interesting. If, along the way, I delve into certain related issues at length, I hope for your forgiveness.

1

Let's first adopt the perspective of a mathematician. Let's entertain, for a moment, the idea that physical laws have undergone changes over time and consider whether we would have the means to detect this. Firstly, let's not forget that the few centuries of human existence and thought were preceded by immensely longer periods when humankind did not yet exist. Similarly, there will undoubtedly be future epochs after our species has vanished. If we entertain the idea of evolving laws, this process must be exceedingly slow. Thus, during the brief span of human thought, the laws of nature could only undergo insignificant alterations. If indeed they evolved in the past, it must have been in the geological past. Were the laws the same in the past as they are today? Will they remain the same in the future? When we pose such questions, we must contemplate what "formerly," "today," and "tomorrow" mean. Today signifies the times recorded in history; formerly refers to the millions of years preceding recorded history, inhabited by creatures like the ichthyosaurs; tomorrow signifies the millions of years following, when Earth will be cold and devoid of life.

With that said, what exactly is a law? It is a consistent connection between cause and effect, between the present state of the world and its immediate subsequent state. If we know the current state of every part of the universe, an ideal scientist possessing knowledge of all natural laws could deduce the future state of these parts with fixed rules. We can envisage this process

continuing indefinitely. From the state of the world on Monday, we deduce that of Tuesday; knowing Tuesday's state, we deduce Wednesday's, and so on. But it doesn't end there. If there's a constant link between Monday and Tuesday, we can deduce Tuesday from Monday. This process is essentially reversible.

Since we're adopting the perspective of a mathematician here, it's pertinent to provide this conception with the precision it warrants, even if it involves using mathematical language. We can say that all laws are equivalent to a system of differential equations linking the rates of change of various elements of the universe to their current values.

Such a system, as we know, has an infinite number of solutions. However, if we know the initial values of all elements—their values at the present moment—the solution becomes entirely determined. This allows us to calculate the values of all elements at any time, whether in the future or in the past. The crucial point to grasp is that the process of deducing the past from the present is no different from deducing the future.

What means, then, do we have of knowing the geological past—the history of times when laws might have varied? We cannot directly observe this past; we only know it through the traces it has left behind. We know it through the present, and we can only deduce it using the process just described, which also allows us to deduce the future. However, is this process capable of revealing changes in laws? Obviously not. We can only apply it precisely by assuming that the laws have remained constant. We only know the state of Monday, for instance, and the rules linking Sunday's state to Monday's. Applying these rules lets us know Sunday's state. But to deduce Saturday's state, we must assume that the same rules, which allowed us to go from Monday to Sunday, are still valid between Sunday and Saturday. Without this assumption, the only conclusion we can draw is that it's impossible to know what happened on Saturday. Therefore, if the