TERRA INCOGNITA

A HISTORY OF IGNORANCE IN THE EIGHTEENTH AND NINETEENTH CENTURIES

ALAIN CORBIN

A History of Ignorance in the Eighteenth and Nineteenth Centuries

Alain Corbin

Translated by Susan Pickford

Originally published in French as Terra Incognita: Une histoire de l'ignorance. XVIIIe-XIXe siècle © Editions Albin Michel – Paris 2020

This English translation © Polity Press, 2021

Polity Press 65 Bridge Street Cambridge CB2 1UR, UK

Polity Press 101 Station Landing Suite 300 Medford, MA 02155, USA

All rights reserved. Except for the quotation of short passages for the purpose of criticism and review, no part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher.

ISBN-13: 978-1-5095-4625-1 – hardback ISBN-13: 978-1-5095-4626-8 – paperback

A catalogue record for this book is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Names: Corbin, Alain, author. | Pickford, Susan, translator.
Title: Terra incognita: a history of ignorance in the 18th and 19th
centuries / Alain Corbin; translated by Susan Pickford.
Other titles: Terra incognita. English
Description: Cambridge; Medford: Polity Press, [2021] | "Originally
published in French as Terra Incognita: Une histoire de l'ignorance.
XVIIIE-XIXe siècle (c) Editions Albin Michel. Paris 2020." | Include

published in French as Terra Incognita: Une historice de l'ignorance.

XVIIIe-XIXe siècle (c) Editions Albin Michel - Paris 2020." | Includes bibliographical references and index. | Summary: "A leading historian opens up a new terrain for understanding the past: the history of ignorance" -- Provided by publisher.

Identifiers: LCCN 2020055368 (print) | LCCN 2020055369 (ebook) | ISBN

9781509546251 (hardback) | ISBN 9781509546268 (paperback) | ISBN 9781509546275 (epub) | ISBN 9781509548033 (pdf)
Subjects: LCSH: Science--Social aspects--History--18th century. | Science--Social aspects--History--19th century. | Ignorance (Theory of knowledge)--Social aspects.
Classification: LCC Q175.46 .C6713 2021 (print) | LCC Q175.46 (ebook) |

DDC 303.48/309033--dc23 LC record available at https://lccn.loc.gov/2020055368 LC ebook record available at https://lccn.loc.gov/2020055369

Typeset in 11 on 13 pt Sabon by Servis Filmsetting Ltd, Stockport, Cheshire Printed and bound in Great Britain by TJ Books Ltd, Padstow, Cornwall

The publisher has used its best endeavours to ensure that the URLs for external websites referred to in this book are correct and active at the time of going to press. However, the publisher has no responsibility for the websites and can make no guarantee that a site will remain live or that the content is or will remain appropriate.

Every effort has been made to trace all copyright holders, but if any have been overlooked the publisher will be pleased to include any necessary credits in any subsequent reprint or edition.

For further information on Polity, visit our website: politybooks.com

Contents

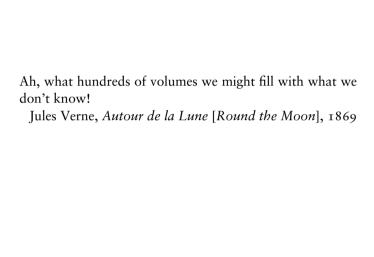
Acki	nowledgements	vii
	omprehensive History Implies the Study of orance	I
Part Eart	I Gaps in Enlightenment Knowledge of the h	
I.	The Great Lisbon Earthquake of 1755	ΙI
2.	The Age of the Earth?	22
3.	Imagining the Earth's Internal Structure	29
4.	The Mystery of the Poles	37
5.	The Unfathomable Mysteries of the Deep	44
6.	Discovering Mountains	50
7.	Mysterious Glaciers	58
8.	A Fascination with Volcanoes	62
9.	The Birth of Meteorology	73
10.	Conquering the Skies	84
II.	The State of Scientific Ignorance at the End	
	of the Age of Enlightenment	87

Contents

Part II A Gradual Decline in Ignorance (1800–1850)	
12. Understanding Glaciers13. The Birth of Geology	93 97
14. Volcanoes and the Mystery of 'Dry Fogs'15. The Ocean Depths and the Fear of the	103
Unknown	109
16. Reading Clouds and the Beaufort Scale	113
17. The Poles Remain a Mystery	121
18. The State of Scientific Ignorance in the Early	
1860s	126
Part III Shrinking the Boundaries of Ignorance (1860–1900)	
19. Exploring the Ocean Depths	131
20. The Development of Dynamic Meteorology	136
21. Manned Flight and the Discovery of the	,
Troposphere and Stratosphere	142
22. Scientific Volcanology and the Birth of	
Seismology	145
23. Measuring the Grip of Ice	150
24. Solving the Mysteries of Rivers: Fluvialism,	
Hydrology and Speleology	153
25. A New Approach to Reading the Globe	161
26. Was There Open Sea at the Poles?	166
27. The Earth Sciences Slowly Filter into	
General Knowledge	175
28. Measuring Ignorance at the Dawn of the	
Twentieth Century	188
Notes	193
Index	177

Acknowledgements

My thanks to Fabrice d'Almeida for helping me produce the book; Sylvie Le Dantec, who worked on the text; and Anouchka Vasak, who read the manuscript with an expert eye.



A Comprehensive History Implies the Study of Ignorance

The first duty of all historians is to identify lacunae and to inventory and measure gaps in the knowledge of earlier generations and, by the same token, discrepancies in the social reach of what facts were known. We cannot fully understand our forebears without some idea of what they did not know, either because no one knew it, or because they in particular were not in a position to know it. This method can be applied to a wide range of fields: think, for instance, of anatomical knowledge, diseases and treatments. It would be an impossibly vast undertaking to write a fully comprehensive history of everything humans have not known and to approach the field in overall terms. To map out what our ancestors did not know, the historian must focus on a single field of endeavour and probe its blind spots and lacunae.

This book focuses on our planet, exploring its mysteries past and present, and the intensity and eventual decline of the modes of terror and wonder it aroused. This means interpreting the history of science and discoveries by studying how the gaps in our ancestors' knowledge were filled, and consequently how the imaginaries and dreams they sparked faded away.

In studying discrepancies in the social reach of knowledge, it is important to draw a clear distinction between various types of scientific unknowns. Some things could only be dreamed of, not explored, such as the seabed and the polar ice caps. Others were observable but inexplicable, such as earthquakes, volcanoes and dry fogs. Yet others were resolved by forms of exploration that slowly restricted the boundaries of ignorance, such as the rise of mountaineering and expeditions to the unmapped hearts of certain continents.

To make my point perfectly clear, let me turn to Jean Baechler. He has argued that in small prehistoric communities, everyone knew the same things. In the village where I grew up, set in the rolling Normandy countryside, most of the country folk who gathered in the local cafés after Sunday mass could easily join in conversation, since they all knew more or less the same things: livestock farming, traditional crafts, what they had learned at primary school and, in the case of the older men, their wartime experiences. Apart from the priest, the doctor, the primary school teacher, the vet and the notary, they all had the same gaps in their knowledge – and even then, an electrician and car mechanic had recently set up shop, further stratifying the local knowledge base to a small extent.

When we read Balzac, Goethe, Dickens and Stendhal, we have to make an effort to understand and imagine the way they thought about our planet, which they saw as a mysterious place, all the more frightening for being beyond comprehension. The depictions of the earth they would have been familiar with were fundamentally shaped by the vestiges of past cultural beliefs; those with little or no schooling must have found it truly terrifying. From the eighteenth century on, knowledge had become increasingly stratified between those

The Study of Ignorance

described as 'scholars' – the term 'scientist' had not yet been coined – and the vast majority of the population in the West. In the same vein, the history of the stratification of the thirst for knowledge is a fascinating question: this is what philosophers, following Augustine, called *libido sciendi*. It is what makes Flaubert's *Bouvard et Pécuchet* such a piquant read: the novel ironically foregrounds the depth of ignorance and intense thirst for unattainable knowledge that must have tormented many a mid-nineteenth-century clerk.

Identifying gaps in the knowledge of our forebears means tracking the pace of discoveries and public access to knowledge – in other words, how scientific discoveries about the earth, geology, vulcanology, glaciology, meteorology and oceanography were transmitted down the social scale. It also means studying how the earth was illustrated, the depth of its history and geography, the gradual process of filling in the blanks, and attempts to discover the secrets of the polar regions. It is very difficult to close our own minds to the images of our planet that we carry within us. That is the aim, and the challenge, of this book.

The entire period under study was characterized by the triumph, or at least obstinate survival, of localism and restricted horizons, both literal and metaphorical, contradicting our modern perceptions of the vastness of space. This is particularly clear in the history of the perception of meteorological phenomena, recorded on a small local scale from the sixteenth century and gradually expanding to the discovery of the jet streams in the mid-twentieth century.

As I was writing this history of the developing stratification of ignorance, it came as some surprise to me to realize that such gaps were not always considered as shortcomings liable to mar human happiness. The

advances of the Enlightenment and the progressive slaking of the thirst for knowledge, libido sciendi, had their fair share of detractors, just as the Enlightenment had its own dark side. Take, for instance, Jacques-Henri Bernardin de Saint-Pierre's shrewd essay in praise of ignorance in his 1784 Études de la nature Studies of Nature. He argued that ignorance stimulated the imagination and filled the world with wonders: 'Thanks to my ignorance, I can indulge the instinct of my soul.' On his solitary rambles, he claimed to enjoy the countryside more when he had no knowledge of the chatelains who owed their reputations in large part to their châteaux: 'The ignorance of the scenery is of greater advantage to me than an acquaintance with it. I have no occasion to know that a forest belongs to the abbey, or that duchy, in order to think it majestic. Its aged trees, its deep glades, its silent solitudes, are enough for me.' Contrary to the beliefs of the apostles of the Enlightenment, 'Night gives us a much higher idea of infinity than all the brilliancy of day,'1

Secondly, Bernardin de Saint-Pierre, inspired by the natural theology that is a constant feature of this book, wrote that ignorance encourages our trust in God: 'Thanks to my ignorance, I can indulge the instinct of my soul'; 'For one pleasure which science confers and destroys in conferring, ignorance bestows on us a thousand, which are much more agreeable.' It also soothes our fears: 'How many evils ignorance conceals from us.' Paradoxically, it is 'the inexhaustible source of our pleasures'.² The same inclination towards the obscure and unknown is shared by several Romantic literary travellers, guided more in their appreciation of the world by the authors of classical Antiquity than by what contemporary science might have been able to teach them.

Researching ignorance inevitably throws up a

The Study of Ignorance

number of difficulties. The first is our modern depictions of a planet that we consider our home. The degree of responsibility we feel towards it was barely beginning to emerge in the nineteenth century. The increasing number of threats to the planet in the Anthropocene era are now understood to be a human, rather than divine, apocalypse. This process, which distances us from the understandings of the eighteenth and nineteenth centuries, has progressed at a much faster pace since the mid-twentieth century. It is likely that in times past, no single individual could ever accumulate so much knowledge in the span of their lifetime. I personally feel this very strongly, though I am no scientific expert, and I call on my contemporaries as witnesses.

On Monday, I July 1946, I was a boarder at a Catholic middle school in the small Normandy town of Flers-de-l'Orne. The headmaster, a priest, seemed very elderly to me. He had a degree in philosophy, and had in fact, I later found out, studied under Émile Durkheim in the early years of the century. That day, he came into our classroom and told us that classes were to be suspended that afternoon: we were to go to chapel to pray for the earth (*sic*), because the Americans were going to drop an atomic bomb more powerful than the ones that had destroyed Hiroshima and Nagasaki. People everywhere were asking whether this horrifying experiment would not annihilate or lay waste to the earth. We lined up, walked to the chapel and began to pray. No disaster ensued.

The reason why I am sharing this anecdote is because it is significant. The headmaster had, quite unwittingly, swept us into the Anthropocene era by teaching us that man was a terrible threat to what we call our planet.

In my mind, however, it was not as simple as that. We were not allowed to talk at the school refectory.

While we ate, one of the older pupils would read aloud from a book, and I would always listen attentively. I remember being particularly struck by three readings in the course of the years 1946 to 1948. The first was René Caillié's narrative of his travels from 1824 to 1828 to Timbuktu, in the dark heart of Africa, full of slaves but not cannibals. The second, which obsessed me for a while, was about the notebooks found on Captain Scott's body after he tragically perished on his way back from his failed attempt to be the first man to reach the South Pole. Two years later, the older boys read aloud Iules Verne's Île mystérieuse [Mysterious Island | - and by then I was one of the older boys myself. In short, while the headmaster was ushering us into the Anthropocene era, the books read to us to furnish our imaginations dated from a time when the earth was much more mysterious and frightening, and very different from the earth we were learning about in the immediate aftermath of the Second World War. In my case, the chasm widened yet further as I eagerly devoured many more of Jules Verne's novels.

I sometimes wonder about how I pictured the earth myself before 1957, before the beginning of aerospace history, which has filled our television screens with images of our entire planet seen from on high and from every angle. I find it amazing today that it was not until I was gone thirty that I heard talk of plate tectonics, explaining how earthquakes happened.

Core samples extracted from the polar ice caps are now shedding astonishing new light on our knowledge of the earth's past, while nanotechnologies are teaching us much about the temporal depth of the humans that inhabit it. In a word, the way we picture the earth, or rather the planet, is undergoing a radical upheaval, in a way that goes much further than the constant refrain

The Study of Ignorance

of climate change and the short-term threats of the Anthropocene era.

These inklings hint at the usefulness of a history of ignorance and an inventory of gaps in the knowledge of each period of history, to give a clearer picture of the humans who lived through them.

Part I

GAPS IN ENLIGHTENMENT KNOWLEDGE OF THE EARTH

The Great Lisbon Earthquake of 1755

Pinpointing and understanding the significance of the Great Lisbon Earthquake means looking back at a broad outline of how such major natural disasters impacted the way our ancestors thought, from the medieval period on. On 25 November 1348, Petrarch described watching a destructive tidal wave sweep across the Bay of Naples:¹

I had scarcely fallen asleep when not only the windows but the walls themselves, though built on solid stone, were shaken from their very foundations and the night light, which I am accustomed to keep lit while I sleep, went out. We threw off our blankets, and [...] the fear of imminent death overcame us. [...] The religious of the dwelling in which we were living [...] frightened by the unexpected danger, and bearing their crosses and their relics of saints, and invoking the mercy of God in a loud voice, all marched [...] into the bedroom I occupied. [...] What a downpour! What winds! What lightning! What deep thunder! What frightening tremors! What roaring of the sea! What shrieking of the populace!²

A century later, Bindo, the Sienese ambassador to Naples, described an earthquake that struck the city

on 4 December 1456: 'The great cries, the laments, the great wailing and shouting of men, women and children who ran naked out of their homes in the dead of night, clasping their infants to their necks ...'. Such terrifying displays of the earth's powers were experienced in a climate of fear, explored some decades ago by Jean Delumeau.³ Contemporaries read them as interventions by the hand of God, or secondarily as the work of demons. In the cultural background were episodes of Biblical violence, from the Flood (a point we will return to at length) to the destruction of Sodom and Gomorrah and, most importantly, the Apocalypse. Faced with disaster – the term 'catastrophe' was not vet in use - contemporaries influenced by sermons and other religious practices read such events as scourges intended to punish sinners. On a population level, psychological reactions were driven by the urge to save the souls not only of individuals, but of society as a whole. In a world where entering Paradise was the ultimate purpose of life, divine wrath seemed quite logical.

As Thomas Labbé points out, in this perspective, natural chaos was by no means blamed on God; a feeling that the punishment was fair and just and the need for preservation were enough to avoid such a reaction. At that point in time, events were interpreted above all on a local scale, in urban and rural areas alike. Anywhere further afield was barely taken into account, if at all. The materiality of the disaster did not become central to people's concerns until the fifteenth or even early sixteenth century, when disaster culture began to emerge.⁴

Yet there was a gradual change in perspective between the late medieval period in the fifteenth century and 1755, when this book opens. Multiple earthquakes were recorded in this period, with at least twenty-seven causing major damage between 1600 and 1800. Interpretations began to shift early in the period. Disasters were still considered to be God's work, but they were seen less as manifestations of divine wrath – and therefore as punishment – than as signs of His mercy, saving men's souls from damnation. Many prodigious events were interpreted in a similar light.⁵

A further process that helped soften the harshness of divine punishment was that second causes gradually came to be taken into account. This was the belief that God rarely intervened directly in nature, instead letting it work on its own. The seventeenth century saw the development of a reading of divine intervention crucial to understanding the period under study, which I highlighted in a previous work: the physico-theology of Oxford's Protestant scholars, underpinned by the regular Anglican practice of reading the Psalms daily. This school, known on the continent as 'natural theology', studied at length by Henri Brémond,6 considered the earth as a marvel corresponding to God's plan. It was to be exalted for its beauty, overlooking the brutality it sometimes displayed. This sense of wonderment gave rise to the Providentialism celebrated by the Abbé Pluche and Bernardin de Saint-Pierre.

Prior to the Great Lisbon Earthquake, a series of questions came to change sixteenth- and seventeenth-century images of the Flood, though it remained an accepted historical fact for everyone with the exception of Leonardo da Vinci. Questions gradually arose about how it happened and whether all the consequences associated with it were even possible. Was it one single flood, or were there several? It must be acknowledged that such questions were asked only by an elite few. This was society's solid bedrock of beliefs and questions on I November 1755, when Lisbon was struck by a catastrophe (the word was first used in French

in its modern sense in Montesquieu's *Lettres persanes* [*Persian Letters*] in 1721). My aim is not to write a history of the earthquake, but it is important to outline it in some detail to shed light on the history of the stratification of ignorance, thrown into sharp focus by the event. 8

Anne-Marie Mercier-Faivre has argued that from 1755, or roughly mid-century, on, disasters were no longer mere signs, but events in their own right: 'It progressively became a concept that made for a brand-new way of thinking about the world and about mankind.'9 Stripped of their religious frame of reference, disasters were now open to analysis. Thinking about and trying to understand catastrophes was no longer the sole preserve of the church. That said, a degree of caution was still required. The idea of divine punishment, the fear of everlasting damnation, and the primary goal of salvation had by no means faded from people's minds. Disasters may now have been considered suitable material for analysis, but they were still a reminder of the transience of life, the gift of a merciful God.

On All Saints' Day, I November 1755, Lisbon was shaken by four major tremors in nine minutes, starting at twenty to ten in the morning. Clouds of sulphurous vapour darkened the sky. A few moments later, a tidal wave – what we would now call a tsunami – five to six metres in height ploughed across the city, causing devastation in its wake. An aftershock struck at around eleven. Fire ravaged the city for five to six days. Looters caused further panic. The worst-affected areas were the low-lying neighbourhoods in the city centre. It is currently estimated that some ten thousand people died. Few of them were from the city's leading families, who were on their country estates. The king and the royal family were in residence at the Belém Palace.

Though in relative decline at the time, Lisbon was still