READ ONLINE TAMBORA THE ERUPTION THAT CHANGED THE WORLD

Tambora

A global history of the climate catastrophe caused by the Tambora eruption When Indonesia's Mount Tambora erupted in 1815, it unleashed the most destructive wave of extreme weather the world has witnessed in thousands of years. The volcano’s massive sulfate dust cloud enveloped the Earth, cooling temperatures and disrupting major weather systems for more than three years. Communities worldwide endured famine, disease, and civil unrest on a catastrophic scale. Here, Gillen D’Arcy Wood traces Tambora’s global and historical reach: how the volcano’s three-year climate change regime initiated the first worldwide cholera pandemic, expanded opium markets in China, and plunged the United States into its first economic depression. Bringing the history of this planetary emergency to life, Tambora sheds light on the fragile interdependence of climate and human societies to offer a cautionary tale about the potential tragic impacts of drastic climate change in our own century.

Tambora

In the best tradition of Paul Theroux and J. Maarten Troost, comes Derek Pugh's torrid tale of Sumbawa, and his ascent of the iconic volcano Mt. Tambora, whose 1815 eruption did indeed change the world. Pugh's account of the eruption and its aftermath is masterfully done - clearly the product of much dogged research through archives, scientific journals, as well as conversations with Indonesians lasting long into the steamy night. Himself a long-time resident of the neighboring Indonesian island of Lombok, Pugh is a well-qualified tourist who also brings a wry and rollicking insider's account of local and ex-pat life along the volcanic chain of islands. The reader meets a wonderfully diverse cast of characters, from pre-schooler jockeys, to an ancient princess alone in her decaying Sultan's palace, to brainless Western surfer dudes and their chicks who have no clue about the history of the slacker's paradise they've stumbled upon. Pugh does a sterling job of filling that gap in Asian travel writing, as the many-layered dimensions of Sumbawan culture - their strict Islamism, great friendliness, and intermittent traumas, with the colossal Tambora looming across every page - unfold to the reader like layers of volcanic earth from a hidden Pompeii. Gillen D'Arcy Wood, author of Tambora: The Eruption that Changed the World (Princeton University Press, 2014)

Tambora and the Year without a Summer

In 1816, the climate went berserk. The winter brought extreme cold, and torrential rains unleashed massive flooding in Asia. Western Europe and North America experienced a ‘year without a summer’, while failed harvests in 1817 led to the ‘year of famine’. At the time, nobody knew that all these disturbances were the result of a single event: the eruption of Mount Tambora in what is now Indonesia – the greatest volcanic eruption in recorded history. In this book, leading climate historian Wolfgang Behringer provides the first globally comprehensive account of a climate catastrophe that would cast the world into political and social crises for years to come. Concentrating on the period between 1815 and 1820, Behringer shows how this natural occurrence led to worldwide unrest. Analysing events as diverse as the persecution of Jews in Germany, the Peterloo Massacre in the United Kingdom, witch hunts in South Africa and anti-colonial uprisings in Asia, Behringer demonstrates that no region on earth was untouched by the effects of the eruption. Drawing parallels with our world today, Tambora and its aftermath become a case study for how societies and individuals respond to climate change, what risks emerge and how they might be overcome. This comprehensive account of the impact of one of the greatest environmental disasters in human history

will be of interest to a wide readership and to anyone seeking to understand better how we might mitigate the effects of climate change.

The Year Without Summer

Like Winchester's Krakatoa, The Year Without Summer reveals a year of dramatic global change long forgotten by history In the tradition of Krakatoa, The World Without Us, and Guns, Germs and Steel comes a sweeping history of the year that became known as 18-hundred-and-froze-to-death. 1816 was a remarkable year—mostly for the fact that there was no summer. As a result of a volcanic eruption in Indonesia, weather patterns were disrupted worldwide for months, allowing for excessive rain, frost, and snowfall through much of the Northeastern U.S. and Europe in the summer of 1816. In the U.S., the extraordinary weather produced food shortages, religious revivals, and extensive migration from New England to the Midwest. In Europe, the cold and wet summer led to famine, food riots, the transformation of stable communities into wandering beggars, and one of the worst typhus epidemics in history. 1816 was the year Frankenstein was written. It was also the year Turner painted his fiery sunsets. All of these things are linked to global climate change—something we are quite aware of now, but that was utterly mysterious to people in the nineteenth century, who concocted all sorts of reasons for such an ungenial season. Making use of a wealth of source material and employing a compelling narrative approach featuring peasants and royalty, politicians, writers, and scientists, The Year Without Summer by William K. Klingaman and Nicholas P. Klingaman examines not only the climate change engendered by this event, but also its effects on politics, the economy, the arts, and social structures.

Island on Fire

Laki is Iceland's largest volcano. Its eruption in 1783 is one of history's great, untold natural disasters. Spewing out sun-blocking ash and then a poisonous fog for eight long months, the effects of the eruption lingered across the world for years. It caused the deaths of people as far away as the Nile and created catastrophic conditions throughout Europe. Island on Fire is the story not only of a single eruption but the people whose lives it changed, the dawn of modern volcanology, as well as the history and potential of other super-volcanoes like Laki around the world. And perhaps most pertinently, in the wake of the eruption of another Icelandic volcano, Eyjafjallajokull, which closed European air space in 2010, acclaimed science writers Witze and Kanipe look at what might transpire should Laki erupt again in our lifetime.

Volcanoes in Human History

Beginning with the Bronze Age eruption that caused the demise of Minoan Crete, this book shows how volcanism shaped religion in Hawaii, permeated Icelandic mythology and literature, caused widespread population migrations, and spurred scientific discovery. 18 halftones. Illustrations & maps.

Eruptions that Shook the World

What does it take for a volcanic eruption to really shake the world? Did volcanic eruptions extinguish the dinosaurs, or help humans to evolve, only to decimate their populations with a super-eruption 73,000 years ago? Did they contribute to the ebb and flow of ancient empires, the French Revolution and the rise of fascism in Europe in the 19th century? These are some of the claims made for volcanic cataclysm. Volcanologist Clive Oppenheimer explores rich geological, historical, archaeological and palaeoenvironmental records (such as ice cores and tree rings) to tell the stories behind some of the greatest volcanic events of the past quarter of a billion years. He shows how a forensic approach to volcanology reveals the richness and complexity behind cause and effect, and argues that important lessons for future catastrophe risk management can be drawn from understanding events that took place even at the dawn of human origins.

The Year Without Summer

LONGLISTED FOR THE WALTER SCOTT HISTORICAL FICTION PRIZE 2021 SHORTLISTED FOR THE HWA GOLD CROWN AWARD 2020 'A STRIKINGLY SHARP AND SUBTLE WRITER' Guardian 'SUPERB...BEAUTIFULLY WRITTEN...UNFORGETTABLE' FT Weekend 'SKILFUL' Sunday Times 'RICH, INTRICATE, IMPRESSIVELY REALISED' Observer 'VIVIDLY REALISED' The Times 'A VISION OF THE PAST AND A VISION OF THE FUTURE' Irish Times 'A VIVID SLICE OF HISTORICAL FICTION' Sunday Express 1815, Sumbawa Island, Indonesia Mount Tambora explodes in a cataclysmic eruption, killing thousands. Sent to investigate, ship surgeon Henry Hoggcan barely believe his eyes. Once a paradise, the island is now solid ash, the surrounding sea turned to stone. But worse is yet to come: as the ash cloud rises and covers the sun, the seasons will fail. 1816 In Switzerland, Mary Shelley finds dark inspiration. Confined inside by the unseasonable weather, thousands of famine refugees stream past her door. In Vermont, preacher Charles Whitlock begs his followers to keep faith as drought dries their wells and their livestock starve. In Suffolk, the ambitious and lovesick painter John Constable struggles to reconcile the idyllic England he paints with the misery that surrounds him. In the Fens, farm labourer Sarah Hobbs has had enough of going hungry while the farmers flaunt their wealth. And Hope Peter, returned from the Napoleonic wars, finds his family home demolished and a fence gone up in its place. He flees to London, where he falls in with a group of revolutionaries who speak of a better life, whatever the cost. As desperation sets in, Britain becomes beset by riots - rebellion is in the air. The Year Without Summer is the story of the books written, the art made; of the journeys taken, of the love longed for and the lives lost during that fateful year. Six separate lives, connected only by an event many thousands of miles away. Few had heard of Tambora - but none could escape its effects. 'VIVID, VIBRANT, HARD TO PUT DOWN' Hilary Spurling 'THOUGHT-PROVOKING, BEAUTIFULLY WRITTEN AND VERY COMPELLING' Harriet Tyce 'INGENIOUS AND ABSORBING' Kirsty Wark 'ASTONISHING, RIVETING, MASTERFUL, POETIC' Emily Rapp Black 'A WORLDWIDE CANVAS BROUGHT TO LIFE IN VIVID, HEARTBREAKING DETAIL' Marianne Kavanagh

Land of Wondrous Cold

A gripping history of the polar continent, from the great discoveries of the nineteenth century to modern scientific breakthroughs Antarctica, the ice kingdom hosting the South Pole, looms large in the human imagination. The secrets of this vast frozen desert have long tempted explorers, but its brutal climate and glacial shores notoriously resist human intrusion. Land of Wondrous Cold tells a gripping story of the pioneering nineteenth-century voyages, when British, French, and American commanders raced to penetrate Antarctica’s glacial rim for unknown lands beyond. These intrepid Victorian explorers—James Ross, Dumont D’Urville, and Charles Wilkes—laid the foundation for our current understanding of Terra Australis Incognita. Today, the white continent poses new challenges, as scientists race to uncover Earth’s climate history, which is recorded in the south polar ice and ocean floor, and to monitor the increasing instability of the Antarctic ice cap, which threatens to inundate coastal cities worldwide. Interweaving the breakthrough research of the modern Ocean Drilling Program with the dramatic discovery tales of its Victorian forerunners, Gillen D’Arcy Wood describes Antarctica’s role in a planetary drama of plate tectonics, climate change, and species evolution stretching back more than thirty million years. An original, multifaceted portrait of the polar continent emerges, illuminating our profound connection to Antarctica in its past, present, and future incarnations. A deep-time history of monumental scale, Land of Wondrous Cold brings the remotest of worlds within close reach—an Antarctica vital to both planetary history and human fortunes.

When Humans Nearly Vanished

The fascinating true story of the explosion of the Mount Toba supervolcano--the Earth's largest eruption in the past 28 million years--and its lasting impact on Earth and human evolution Some 73,000 years ago, the huge dome of Mount Toba, in today's Sumatra, Indonesia, began to rumble. A deep vibration shook the entire island. Jets of steam and ash emanated from the summit, followed by an explosion louder than any sound heard by Homo sapiens since our species evolved on Earth. The eruption of the Toba supervolcano released

the energy of a million tons of explosives; seven hundred cubic miles of magma spewed outward in an explosion forty times larger than the largest hydrogen bomb and more than a thousand times as powerful as the Krakatau eruption in 1883. So much ash and debris was injected into the stratosphere that it partially blocked the sun's radiation and caused global temperatures to drop by five to nine degrees. It took a full decade for Earth to recover to its pre-eruption temperatures. When Humans Nearly Vanished presents the controversial argument that the Toba catastrophe nearly wiped out the human race, leaving only about a thousand to ten thousand breeding pairs of humans worldwide. Human genes today show evidence of a \"genetic bottleneck,\" an effect seen when a population of organisms becomes so small that their genetic diversity is greatly reduced. This group of survivors could be the ancestors of all humans alive today. Donald R. Prothero explores the geological and biological evidence supporting the Toba bottleneck theory; reveals how the explosion itself was discovered; and offers insight into how the world changed afterward and what might happen if such an eruption occurred today. Prothero's riveting account of this calamitous supervolcanic explosion is not to be missed.

The Attacking Ocean

The past fifteen thousand years - the entire span of human civilization - have witnessed dramatic sea level changes, which began with rapid global warming at the end of the Ice Age, when sea levels were more than 700 feet below modern levels. Over the next eleven millennia, the oceans climbed in fits and starts. These rapid changes had little effect on those humans who experienced them, partly because there were so few people on earth, and also because they were able to adjust readily to new coastlines. Global sea levels stabilised about six thousand years ago except for local adjustments that caused often quite significant changes to places like the Nile Delta. So the curve of inexorably rising seas flattened out as urban civilizations developed in Egypt, Mesopotamia, and South Asia. The earth's population boomed, quintupling from the time of Christ to the Industrial Revolution. The threat from the oceans increased with our crowding along shores to live, fish, and trade. Since 1860, the world has warmed significantly and the ocean's climb has speeded. The sea level changes are cumulative and gradual; no one knows when they will end. The Attacking Ocean tells a tale of the rising complexity of the relationship between humans and the sea at their doorsteps, a complexity created not by the oceans, which have changed but little. What has changed is us, and the number of us on earth.

The Year Without a Summer

*Includes pictures *Includes contemporary accounts of the eruption and the environmental effects *Includes online resources and a bibliography for further reading \"On my trip towards the western part of the island, I passed through nearly the whole of Dompo and a considerable part of Bima. The extreme misery to which the inhabitants have been reduced is shocking to behold. There were still on the road side the remains of several corpses, and the marks of where many others had been interred: the villages almost entirely deserted and the houses fallen down, the surviving inhabitants having dispersed in search of food.\" - Lt. Philips at Sumbawa In many ways history is the story of human beings trying to control their destinies by overcoming the effects of their physical surroundings. As too many have learned, the best they could often do was cope with nature, and the various natural disasters produced around the globe. Consider, for example, the year 1816, known as the \"Year Without a Summer,\" which found the working poor in both Europe and America facing starvation caused by factors that few, if any, of them understood. They only knew that the time for planting, the longed for and planned for last days of winter, never came. Farmers who had been growing the same crops for decades began to be curious when, in April of that year, the snow still fell. By the first of May, they were outright concerned. In the weeks that followed, each faced a critical decision: go forward and plant as usual, trusting that the sun would again warm the earth, or continue to wait. In the end, their decisions made little difference, except perhaps that those who waited could survive a little longer by eating the seeds they had been saving. For in 1816, the seeds planted in the ground to sprout and grow usually did neither, because temperatures were never warm enough to nurture their progress. Instead, most lay dormant, while those hardier varieties did finally push their ways to the earth's surface, only to have the life frozen out

of them by cold winds unabated by the sun's warmth. As the prolonged crisis went on, people around the planet tried to come to grips with what was happening. Preachers spoke of God's judgment, while farmers stood and prayed for relief, but neither group knew the truth: the cause of their misfortune lay not at their own doorsteps but thousands of miles away on an island they had never heard of. In this case, their destiny had been decided on the island of Sumbawa in Indonesia, thanks to a big volcano known as Mount Tambora. In one of the strongest volcanic explosions in recorded history, Mount Tambora in April 1815 and sent enough ash and dust into the air to block out some of the sun's warmth around the globe for nearly the next two years. In the aftermath of the April 1815 explosion, the summer of 1816 witnessed crops freeze in the fields and be buried under snow. Indian corn, a hardy staple of the early American diet, barely produced, and hay and wheat failed to grow. Traditional summer vegetables, such as cucumbers and tomatoes, failed to grow at all, leaving people severely deficient in the vitamins they produced. Animals and humans alike would go hungry, as there was less food for each. Ultimately, those who survived would tell stories of the desperate time, and speak with wonder about the fact that they had survived at all to tell their tales. The Year Without a Summer: The History and Legacy of the 1815 Eruption of Mount Tambora chronicles the immediate and long term effects of one of history's most important volcanic eruptions. Along with pictures of important people, places, and events, you will learn about the Year Without a Summer like never before.

Krakatoa

In August 1883 there was a series of volcanic eruptions on the island of Krakatoa - these were so extreme that the effects were heard and felt over ten per cent of the Earth's surface. This text uses contemporary reports to recount the events leading up to and following the cataclysm.

Volcano Weather

Examines the influence of the eruption of the Indonesian volcano, Mount Tambora, on the weather conditions in Europe and New England.

Volcanoes

Whenever a volcano threatens to erupt, scientists and adventurers from around the world flock to the site in response to the irresistible allure of one of nature's most dangerous and unpredictable phenomena. In a unique book probing the science and mystery of these fiery features, the authors chronicle not only their geologic behavior but also their profound effect on human life. From Mount Vesuvius to Mount St. Helens, the book covers the surprisingly large variety of volcanoes, the subtle to conspicuous signs preceding their eruptions, and their far-reaching atmospheric consequences. Here scientific facts take on a very human dimension, as the authors draw upon actual encounters with volcanoes, often through firsthand accounts of those who have witnessed eruptions and miraculously survived the aftermath. The book begins with a description of the lethal May 1980 eruption of Mount St. Helens--complete with an explanation of how safety officials and scientists tried to predict events, and how unsuspecting campers and loggers miles away struggled against terrifying blasts of ash, stone, and heat. The story moves quickly to the ways volcanoes have enhanced our lives, creating mineral-rich land, clean thermal energy, and haunting landscapes that in turn benefit agriculture, recreation, mining, and commerce. Religion and psychology embroider the account, as the authors explore the impact of volcanoes on the human psyche through tales of the capricious volcano gods and attempts to appease them, ranging from simple homage to horrific ritual sacrifice. Volcanoes concludes by assisting readers in experiencing these geological phenomena for themselves. An unprecedented \"tourist guide to volcanoes\" outlines over forty sites throughout the world. Not only will travelers find information on where to go and how to get there, they will also learn what precautions to take at each volcano. Tourists, amateur naturalists, and armchair travelers alike will find their scientific curiosity whetted by this informative and entertaining book.

Waking the Giant

Argues that the rapid climate change will provoke geophysical events, such as earthquakes, tsunamis, and volcanic eruptions.

Fundamentals of Physical Volcanology

Fundamentals of Physical Volcanology is a comprehensive overview ofthe processes that control when and how volcanoes erupt.Understanding these processes involves bringing together ideas froma number of disciplines, including branches of geology, such aspetrology and geochemistry; and aspects of physics, such as fluiddynamics and thermodynamics. This book explains in accessible terms how different areas ofscience have been combined to reach our current level of knowledgeof volcanic systems. It includes an introduction to eruption types,an outline of the development of physical volcanology, acomprehensive overview of subsurface processes, eruptionmechanisms, the nature of volcanic eruptions and their products,and a review of how volcanoes affect the environment. Fundamentals of Physical Volcanology is essential reading forundergraduate students in earth science.

Fixing the Sky

Weaving together stories from elite science, cutting-edge technology, and popular culture, Fleming examines issues of health and navigation in the 1830s, drought in the 1890s, aircraft safety in the 1930s, and world conflict since the 1940s.

Surviving Galeras

This true, up-close account of a volcano’s eruption “artfully blends science writing and history with pure, heart-pounding action” (Mark Bowden, bestselling author of Black Hawk Down). In 1993, Stanley Williams, an eminent volcanologist, was standing on top of a Colombian volcano called Galeras when it erupted, killing six of his colleagues instantly. As Williams tried to escape the blast, he was pelted with white-hot projectiles traveling faster than bullets. Within seconds he was cut down, his skull fractured, his right leg almost severed, his backpack aflame. Williams lay helpless and near death on Galeras’s flank until two brave women—friends and fellow volcanologists—mounted an astonishing rescue effort to carry him safely off the mountain. Surviving Galeras is both a harrowing first-person account of an eruption and its aftermath, and a look at the fascinating, high-risk world of volcanology, exploring the profound impact volcanoes have had on the earth’s landscapes and civilizations. Even with improved, highly-sensitive measuring tools and protective equipment, at least one volcanologist, on average, dies each year. This book reveals how Williams and his fellow scientist-adventurers continue to unveil the enigmatic and miraculous workings of volcanoes and piece together methods to predict their actions—potentially saving many human lives. “I thoroughly enjoyed this excellent book . . . [A] riveting story.” —Dava Sobel, author of The Glass Universe “Popular science at its best.” —The New York Times “[A] page-turner.” —Booklist

The Year Without Summer the New Novel from the Author of the Words in My Hand

In 1815, a supervolcanic eruption led to the extraordinary 'Year Without Summer' in 1816: a massive climate disruption causing famine, poverty and riots. Snow fell in August. Lives, both ordinary and privileged, changed forever. Mary Shelley wrote Frankenstein. The artist, John Constable, sought refuge in Suffolk. As crops failed, the dispossessed rose up in rebellion, threatening to burn the old order to the ground.1815, Sumbawa Island, IndonesiaMount Tambora explodes in a cataclysmic eruption, killing thousands. Sent to investigate, ship surgeon Henry Hogg can barely believe his eyes. Once a paradise, the island is now solid ash, the surrounding sea turned to stone. But worse is yet to come as the ash cloud rises and covers the sun, the seasons will fail.1816.In Switzerland, Mary Shelley finds dark inspiration. Confined inside by the unseasonable weather, thousands of famine refugees stream past her door. In Vermont, preacher Charles

Whitlock begs his followers to keep faith as drought dries their wells and their livestock starve. In Britain, the ambitious and lovesick painter John Constable struggles to reconcile the idyllic England he paints with the misery that surrounds him. In the Fens, farm labourer Sarah Hobbs has had enough of going hungry while the farmers flaunt their wealth. And Hope Peter, returned from the Napoleonic wars, finds his family home demolished and a fence gone up in its place. He flees to London, where he falls in with a group of revolutionaries who speak of a better life, whatever the cost. As desperation sets in, Britain becomes racked with riots - rebellion is in the air.For fans of David Mitchell and Andrew Miller, THE YEAR WITHOUT SUMMER tells the story of a fateful year when temperatures fell and the summer failed to arrive. It is a story of the books written, the art made; of the journeys taken, of the love longed for and the lives lost. Six separate lives, connected only by an event many thousands of miles away. Few had heard of Tambora - but none could escape its effects.

Volcanic Eruptions and Their Repose, Unrest, Precursors, and Timing

Volcanic eruptions are common, with more than 50 volcanic eruptions in the United States alone in the past 31 years. These eruptions can have devastating economic and social consequences, even at great distances from the volcano. Fortunately many eruptions are preceded by unrest that can be detected using ground, airborne, and spaceborne instruments. Data from these instruments, combined with basic understanding of how volcanoes work, form the basis for forecasting eruptionsâ€\"where, when, how big, how long, and the consequences. Accurate forecasts of the likelihood and magnitude of an eruption in a specified timeframe are rooted in a scientific understanding of the processes that govern the storage, ascent, and eruption of magma. Yet our understanding of volcanic systems is incomplete and biased by the limited number of volcanoes and eruption styles observed with advanced instrumentation. Volcanic Eruptions and Their Repose, Unrest, Precursors, and Timing identifies key science questions, research and observation priorities, and approaches for building a volcano science community capable of tackling them. This report presents goals for making major advances in volcano science.

Volcanoes

For centuries, volcanic eruptions have captured our imaginations. Whether as signposts to an underworld, beacons to ancient mariners, or as an extraordinary manifestation of the natural world, volcanoes have intrigued many people, who have left records of their encounters in letters, reports and diaries and through sketches and illustrations. This book tells the stories of volcanic eruptions around the world, using original illustrations and first-hand accounts to explore how our understanding of volcanoes has evolved through time. Written accounts include Pliny's description of the 79 CE eruption of Vesuvius, stories recounted by seventeenth-century sea-farers, and reports of expeditions made by eighteenth- and nineteenth-century natural historians, including Alexander von Humboldt and Charles Darwin. Illustrations range from fragments of scrolls, buried in the great eruption of Vesuvius that destroyed Pompeii, to Athanasius Kircher's extraordinarily detailed sketches, made in the seventeenth century, to the spectacular London sunsets caused by Krakatoa's eruption in 1883. They also include the first photograph of a volcanic eruption and twenty-first-century imaging of Santorini.These varied and compelling accounts enrich our perspective on current studies of volcanoes and challenge us to think about how we might use our contemporary understanding of volcanology to prepare for the next big eruption.

A Year Without Summer

Explains why an awareness of Earth's temporal rhythms is critical to planetary survival and offers suggestions for how to create a more time-literate society.

Timefulness

Summer, 1816. Glamourists Jane and David Vincent return home to an unseasonably cold Long Parkmeade.

Cooped up inside with Jane's fretful sister and father, they soon become restless, so when they receive a commission from a prominent family in London, they decide to go - taking Melody with them. Perhaps the change of scenery will brighten their moods (and Melody's marriage prospects). The capital is fizzing with talk of crop failures and unemployment riots in the north. Finding it difficult to avoid getting embroiled in the intrigue, it's not long before Jane and David realise they must use their magic to solve a crisis of international proportions . . . and get Melody to the church on time.

Without A Summer

The first comprehensive assessment of global volcanic hazards and risk, with detailed regional profiles, for the disaster risk reduction community. Also available as Open Access.

Global Volcanic Hazards and Risk

When we think of \"climate change,\" we think of man-made global warming, caused by greenhouse gas emissions. But natural climate change has occurred throughout human history, and populations have had to adapt to the climate's vicissitudes. Anthony J. McMichael, a renowned epidemiologist and a pioneer in the field of how human health relates to climate change, is the ideal person to tell this story. Climate Change and the Health of Nations shows how the natural environment has vast direct and indirect repercussions for human health and welfare. McMichael takes us on a tour of human history through the lens of major transformations in climate. From the very beginning of our species some five million years ago, human biology has evolved in response to cooling temperatures, new food sources, and changing geography. As societies began to form, they too adapted in relation to their environments, most notably with the development of agriculture eleven thousand years ago. Agricultural civilization was a Faustian bargain, however: the prosperity and comfort that an agrarian society provides relies on the assumption that the environment will largely remain stable. Indeed, for agriculture to succeed, environmental conditions must be just right, which McMichael refers to as the \"Goldilocks phenomenon.\" Global warming is disrupting this balance, just as other climate-related upheavals have tested human societies throughout history. As McMichael shows, the break-up of the Roman Empire, the bubonic Plague of Justinian, and the mysterious collapse of Mayan civilization all have roots in climate change. Why devote so much analysis to the past, when the daunting future of climate change is already here? Because the story of mankind?s previous survival in the face of an unpredictable and unstable climate, and of the terrible toll that climate change can take, could not be more important as we face the realities of a warming planet. This sweeping magnum opus is not only a rigorous, innovative, and fascinating exploration of how the climate affects the human condition, but also an urgent call to recognize our species' utter reliance on the earth as it is.

Climate Change and the Health of Nations

*Includes pictures *Includes contemporary accounts of the eruption and the environmental effects *Includes online resources and a bibliography for further reading \"On my trip towards the western part of the island, I passed through nearly the whole of Dompo and a considerable part of Bima. The extreme misery to which the inhabitants have been reduced is shocking to behold. There were still on the road side the remains of several corpses, and the marks of where many others had been interred: the villages almost entirely deserted and the houses fallen down, the surviving inhabitants having dispersed in search of food.\" - Lt. Philips at Sumbawa In many ways history is the story of human beings trying to control their destinies by overcoming the effects of their physical surroundings. As too many have learned, the best they could often do was cope with nature, and the various natural disasters produced around the globe. Consider, for example, the year 1816, known as the \"Year Without a Summer,\" which found the working poor in both Europe and America facing starvation caused by factors that few, if any, of them understood. They only knew that the time for planting, the longed for and planned for last days of winter, never came. Farmers who had been growing the same crops for decades began to be curious when, in April of that year, the snow still fell. By the first of May, they were outright concerned. In the weeks that followed, each faced a critical decision: go forward and

plant as usual, trusting that the sun would again warm the earth, or continue to wait. In the end, their decisions made little difference, except perhaps that those who waited could survive a little longer by eating the seeds they had been saving. For in 1816, the seeds planted in the ground to sprout and grow usually did neither, because temperatures were never warm enough to nurture their progress. Instead, most lay dormant, while those hardier varieties did finally push their ways to the earth's surface, only to have the life frozen out of them by cold winds unabated by the sun's warmth. As the prolonged crisis went on, people around the planet tried to come to grips with what was happening. Preachers spoke of God's judgment, while farmers stood and prayed for relief, but neither group knew the truth: the cause of their misfortune lay not at their own doorsteps but thousands of miles away on an island they had never heard of. In this case, their destiny had been decided on the island of Sumbawa in Indonesia, thanks to a big volcano known as Mount Tambora. In one of the strongest volcanic explosions in recorded history, Mount Tambora in April 1815 and sent enough ash and dust into the air to block out some of the sun's warmth around the globe for nearly the next two years. In the aftermath of the April 1815 explosion, the summer of 1816 witnessed crops freeze in the fields and be buried under snow. Indian corn, a hardy staple of the early American diet, barely produced, and hay and wheat failed to grow. Traditional summer vegetables, such as cucumbers and tomatoes, failed to grow at all, leaving people severely deficient in the vitamins they produced. Animals and humans alike would go hungry, as there was less food for each. Ultimately, those who survived would tell stories of the desperate time, and speak with wonder about the fact that they had survived at all to tell their tales. The Year Without a Summer: The History and Legacy of the 1815 Eruption of Mount Tambora chronicles the immediate and long term effects of one of history's most important volcanic eruptions. Along with pictures of important people, places, and events, you will learn about the Year Without a Summer like never before.

The Year Without a Summer

It was a catastrophe without precedent in recorded history: for months on end, starting in A.D. 535, a strange, dusky haze robbed much of the earth of normal sunlight. Crops failed in Asia and the Middle East as global weather patterns radically altered. Bubonic plague, exploding out of Africa, wiped out entire populations in Europe. Flood and drought brought ancient cultures to the brink of collapse. In a matter of decades, the old order died and a new world—essentially the modern world as we know it today—began to emerge. In this fascinating, groundbreaking, totally accessible book, archaeological journalist David Keys dramatically reconstructs the global chain of revolutions that began in the catastrophe of A.D. 535, then offers a definitive explanation of how and why this cataclysm occurred on that momentous day centuries ago. The Roman Empire, the greatest power in Europe and the Middle East for centuries, lost half its territory in the century following the catastrophe. During the exact same period, the ancient southern Chinese state, weakened by economic turmoil, succumbed to invaders from the north, and a single unified China was born. Meanwhile, as restless tribes swept down from the central Asian steppes, a new religion known as Islam spread through the Middle East. As Keys demonstrates with compelling originality and authoritative research, these were not isolated upheavals but linked events arising from the same cause and rippling around the world like an enormous tidal wave. Keys's narrative circles the globe as he identifies the eerie fallout from the months of darkness: unprecedented drought in Central America, a strange yellow dust drifting like snow over eastern Asia, prolonged famine, and the hideous pandemic of the bubonic plague. With a superb command of ancient literatures and historical records, Keys makes hitherto unrecognized connections between the \"wasteland\" that overspread the British countryside and the fall of the great pyramid-building Teotihuacan civilization in Mexico, between a little-known \"Jewish empire\" in Eastern Europe and the rise of the Japanese nation-state, between storms in France and pestilence in Ireland. In the book's final chapters, Keys delves into the mystery at the heart of this global catastrophe: Why did it happen? The answer, at once surprising and definitive, holds chilling implications for our own precarious geopolitical future. Wide-ranging in its scholarship, written with flair and passion, filled with original insights, Catastrophe is a superb synthesis of history, science, and cultural interpretation.

Catastrophe

The first field guide that allows amateur rock enthusiasts to identify basic rocks and rock formations in a systematic way Many of us are fascinated by rocks—but identifying them can seem daunting. It’s often tricky even for geologists, who rely on experience, intuition, and in-depth familiarity with rock-forming components. Rocks and Rock Formations allows everyone, amateur or professional, to successfully distinguish these amazing masses of minerals, using only careful observation, a magnifying glass, a pocket knife—and a bit of patience. Jürg Meyer provides a structured approach to the identification of all rocks within the three groups: sedimentary, igneous, and metamorphic. Bringing together more than 530 diagrams and photographs to illustrate essential characteristics, Meyer highlights some basics on rocks—their mineral constituents, structures, textures, fossils, weathering patterns, and more—which are important for a determination. The main part of the book is a handy and thorough identification key, which takes into account all possible rock variations, mixtures, and structural differences. The concluding section of the guide delves into rock systematics. Assuming little prior experience or knowledge, Rocks and Rock Formations is an invaluable resource for rock enthusiasts everywhere. Suitable for beginners and amateurs Helpful, systematic identification key Exploration of all types of rocks More than 530 diagrams and photographs

The Eruption of Krakatoa

In this urgent, authoritative book, Bill Gates sets out a wide-ranging, practical - and accessible - plan for how the world can get to zero greenhouse gas emissions in time to avoid a climate catastrophe. Bill Gates has spent a decade investigating the causes and effects of climate change. With the help of experts in the fields of physics, chemistry, biology, engineering, political science, and finance, he has focused on what must be done in order to stop the planet's slide toward certain environmental disaster. In this book, he not only explains why we need to work toward net-zero emissions of greenhouse gases, but also details what we need to do to achieve this profoundly important goal. He gives us a clear-eyed description of the challenges we face. Drawing on his understanding of innovation and what it takes to get new ideas into the market, he describes the areas in which technology is already helping to reduce emissions, where and how the current technology can be made to function more effectively, where breakthrough technologies are needed, and who is working on these essential innovations. Finally, he lays out a concrete, practical plan for achieving the goal of zero emissions-suggesting not only policies that governments should adopt, but what we as individuals can do to keep our government, our employers, and ourselves accountable in this crucial enterprise. As Bill Gates makes clear, achieving zero emissions will not be simple or easy to do, but if we follow the plan he sets out here, it is a goal firmly within our reach.

Rocks and Rock Formations

A valuable synthesis of the physics of magmatism for students and scholars Magma genesis and segregation have shaped Earth since its formation more than 4.5 billion years ago. Now, for the first time, the mathematical theory describing the physics of magmatism is presented in a single volume. The Dynamics of Partially Molten Rock offers a detailed overview that emphasizes the fundamental physical insights gained through an analysis of simplified problems. This textbook brings together such topics as fluid dynamics, rock mechanics, thermodynamics and petrology, geochemical transport, plate tectonics, and numerical modeling. End-of-chapter exercises and solutions as well as online Python notebooks provide material for courses at the advanced undergraduate or graduate level. This book focuses on the partial melting of Earth’s asthenosphere, but the theory presented is also more broadly relevant to natural systems where partial melting occurs, including ice sheets and the deep crust, mantle, and core of Earth and other planetary bodies, as well as to rock-deformation experiments conducted in the laboratory. For students and researchers aiming to understand and advance the cutting edge, the work serves as an entrée into the field and a convenient means to access the research literature. Notes in each chapter reference both classic papers that shaped the field and newer ones that point the way forward. The Dynamics of Partially Molten Rock requires a working knowledge of fluid mechanics and calculus, and for some chapters, readers will benefit from prior exposure to thermodynamics and igneous petrology. The first book to bring together in a unified way the theory for partially molten rocks End-of-chapter exercises with solutions and an online supplement of Jupyter notebooks Coverage of the

mechanics, thermodynamics, and chemistry of magmatism, and their coupling in the context of plate tectonics and mantle convection Notes at the end of each chapter highlight key papers for further reading

How to Avoid a Climate Disaster

The power of a volcanic eruption is one of nature's most dangerous forces. From the beginning of recorded time, volcanoes have continually changed Earth's surface and weather patterns. Each of these books, which are written to accompany and enhance an earth science curriculum, describes the composition of planet Earth, the different types of volcanoes, and the geologic events that bring about an eruption. This dynamic series takes a look at six of the most important active volcanoes on Earth and the big blasts that have altered the history of humankind.The 1815 eruption of this volcano was the most deadly explosion of any volcano in recent history. Nearly 92,000 human deaths were attributed to the blast from this Indonesian volcano.

The Dynamics of Partially Molten Rock

Ash spewed into the sky. All eyes were on Vesuvius. Pliny the Elder sailed towards the phenomenon. A teenage Pliny the Younger waited. His uncle did not come back. In a dazzling new literary biography, Daisy Dunn introduces Pliny the Younger, the survivor who became a Roman lawyer, senator, poet, collector of villas, curator of drains, and representative of the Emperor. He was confidant and friend to the great and good, an unparalleled chronicler of the Vesuvius catastrophe, and eyewitness to the terror of Emperor Domitian. The younger Pliny was adopted by his uncle, admiral of the fleet and author of the Natural History, an extraordinary compendium of knowledge and the world's first full-length encyclopaedia. The younger Pliny inherited his uncle's notebooks and carried their pearls of wisdom with him down the years. Daisy Dunn breathes vivid life back into the Plinys. Reading from the Natural History and the Younger Pliny's Letters, she resurrects the relationship between the two men to expose their beliefs on life, death and the natural world in the first century. Interweaving their work, and positioning the Plinys in relation to the devastating eruption, Dunn's biography is a celebration of two outstanding minds of the Roman Empire, and their lasting influence on the world thereafter.

Tambora: A Killer Volcano from Indonesia

The proposed book is not only a tribute to the work of Brückner (and indeed also a personal tribute, since Brückner wrote his book at the Institute of Geography of the University of Bern), but references to Brückner’s book are also a conceptual tool in the proposed book, though used sparingly and thoughtfully. Apart from providing historical context, references may facilitate introducing some complex topics, for instance by first presenting Brückner’s view and then complementing the picture with today’s understanding. References can be used for contrast: Comparing Brückner’s methods and data with today’s research concepts makes the progress in the field easily understandable. The enormous growth of information since Brükner’s time allows a much more detailed perspective on some scientific problems. Or references can be used to highlight similarity. Some aspects have not changed over time. Finally, the book complements Brückner’s studies by adding the arguably most interesting and certainly most relevant period, the past 120 years.

Pliny's Oyster

In 1816, the climate went berserk. The winter brought extreme cold, and torrential rains unleashed massive flooding in Asia. Western Europe and North America experienced a ‘year without a summer’, while failed harvests in 1817 led to the ‘year of famine’. At the time, nobody knew that all these disturbances were the result of a single event: the eruption of Mount Tambora in what is now Indonesia – the greatest volcanic eruption in recorded history. In this book, leading climate historian Wolfgang Behringer provides the first globally comprehensive account of a climate catastrophe that would cast the world into political and social crises for years to come. Concentrating on the period between 1815 and 1820, Behringer shows how this natural occurrence led to worldwide unrest. Analysing events as diverse as the persecution of Jews in

Germany, the Peterloo Massacre in the United Kingdom, witch hunts in South Africa and anti-colonial uprisings in Asia, Behringer demonstrates that no region on earth was untouched by the effects of the eruption. Drawing parallels with our world today, Tambora and its aftermath become a case study for how societies and individuals respond to climate change, what risks emerge and how they might be overcome. This comprehensive account of the impact of one of the greatest environmental disasters in human history will be of interest to a wide readership and to anyone seeking to understand better how we might mitigate the effects of climate change.

Climatic Changes Since 1700

This book is the first major ecocritical study of the relationship between British Romanticism and climate change. It analyses a wide range of texts – by authors including Lord Byron, William Cobbett, Sir Stamford Raffles, Mary Shelley, and Percy Shelley – in relation to the global crisis produced by the eruption of Mount Tambora in 1815. By connecting these texts to current debates in the environmental humanities, it reveals the value of a historicized approach to the Anthropocene. British Romanticism, Climate Change, and the Anthropocene examines how Romantic texts affirm the human capacity to shape and make sense of a world with which we are profoundly entangled and at the same time represent our humiliation by powerful elemental forces that we do not fully comprehend. It will appeal not only to scholars of British Romanticism, but to anyone interested in the relationship between culture and climate change.

Tambora and the Year without a Summer

A groundbreaking exploration of the relationship between capitalism, communism, and Arctic ecology since the dawn of the industrial age. Whales and walruses, caribou and fox, gold and oil: through the stories of these animals and resources, Bathsheba Demuth reveals how people have turned ecological wealth in a remote region into economic growth and state power for more than 150 years. The first-ever comprehensive history of Beringia, the Arctic land and waters stretching from Russia to Canada, Floating Coast breaks away from familiar narratives to provide a fresh and fascinating perspective on an overlooked landscape. The unforgiving territory along the Bering Strait had long been home to humans—the Inupiat and Yupik in Alaska, and the Yupik and Chukchi in Russia—before Americans and Europeans arrived with revolutionary ideas for progress. Rapidly, these frigid lands and waters became the site of an ongoing experiment: How, under conditions of extreme scarcity, would the great modern ideologies of capitalism and communism control and manage the resources they craved? Drawing on her own experience living with and interviewing indigenous people in the region, as well as from archival sources, Demuth shows how the social, the political, and the environmental clashed in this liminal space. Through the lens of the natural world, she views human life and economics as fundamentally about cycles of energy, bringing a fresh and visionary spin to the writing of human history. Floating Coast is a profoundly resonant tale of the dynamic changes and unforeseen consequences that immense human needs and ambitions have brought, and will continue to bring, to a finite planet.

British Romanticism, Climate Change, and the Anthropocene

This book surveys the role of music in British culture throughout the long Romantic period.

Floating Coast: An Environmental History of the Bering Strait

Romanticism and Music Culture in Britain, 1770-1840

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