

## BURNING PLANET – THE STORY OF FIRE THROUGH TIME

By Andrew C. Scott

2018, Oxford University Press, 231pp., ISBN: 9780198734840

In *Burning Planet*, Andrew C. Scott takes us on a journey through the Earth's fire history. His narrative style, frequently in first person, can surprise at the beginning, but by sharing stories from his long and fruitful academic life, the author brings the topic closer to the reader. He shows us how even the most senior professors can be surprised, excited and, sometimes, mistaken. The book is primarily focused on the author's biggest passion: charcoal. This black material, the result of incomplete burning of fuels (mostly plants), may not seem very special at first sight but it is actually an amazing storyteller. By looking at charcoal in the paleorecord, we can learn about the evolution of terrestrial plants, how and when surface fires changed to crown fires, how much oxygen was in the atmosphere at a given point in time, or even why all the fish in an estuary were killed 28 million years ago. *Burning Planet* unravels the story of fire through time with charcoal as protagonist. It is thus an excellent read for those interested in 'deep time' and the paleorecord, as well as those of us who find charred materials exciting. I would also recommend it for people who already have a good understanding of wildfire and want to learn about it from a different perspective. However, for getting a more general and basic knowledge of fire, readers may find other books better suited, such as the excellent must-have *Fire on Earth: An Introduction* (Wiley, 2014), led by the same author.

The first chapter of *Burning Planet* starts by briefly introducing the fire phenomenon and its current impacts. The main body of the text (chapters 2–6) describes charcoal as a tool for tracing past fires. In Chapter 2, Scott explains how the concept of fossil charcoal was coined a couple of centuries ago but a 'wrong' translation from French to English (*fusain*) caused its pyrogenic origin to be disputed. Chapter 3 explores the concept of fire triangles and how fire history on Earth is closely linked to the emergence and evolution of terrestrial plants, which serve as fire kindling. It also describes how fire is dependent on oxygen concentrations in the atmosphere and how charcoal in coal has proved to be an exceptionally valuable tool to model past oxygen concentrations. In Chapter 4, we learn how, through the presence of charcoal in rocks and sediments, fire occurrence

has been traced to the Devonian Period, 400 million years ago. Fire has been present since then but with varying prevalence, peaking at times where oxygen levels were higher, such as during the Carboniferous Period (359–299 million years ago). In Chapter 5, Scott discusses how fire may have helped the evolution of flowering plants (angiosperms) during the Cretaceous Period (145–66 million years ago). The author also debates the role of fire in the extinction of dinosaurs, arguing against the so-called 'global fire' at the Cretaceous–Paleogene boundary. Chapter 6 explains how, by the end of the Paleogene Period (63–23 million years ago) and beginning of the Eocene Period (56–34 million years ago), atmospheric oxygen levels became similar to the current levels, and thus fire started to be controlled by the same factors as it is now, mostly fuel moisture and fuel availability. Approximately 45–50 million years ago we reached the 'low fire' world we still live in, and approximately 30 million years ago, fire played a major role in the expansion of grasslands, which in turn have been key for human evolution. In the last two chapters (7 and 8), the author describes the interaction of humans with fire, which started approximately 1.5 million years ago, probably in the form of opportunistic encounters, and evolved into a more controlled use of fire by Neanderthals approximately 40 000 years ago. Here again, Scott shows the usefulness of studying charcoal, with charcoalified grains helping to trace the spread of agriculture into Europe approximately 5000–7000 years ago.

We humans are, undoubtedly, fire creatures, but we are not masters of fire. The book ends by looking at the future, and speculating on what the future interaction of humans and fire will bring. Scott argues that is not going to be easy, with human actions such as climate change, invasive plants and increasing population in the wildland–urban interface fanning the flames. So, on the last page, he sends his warning: 'we need to be prepared [...] to face the future, we must recognize that fire is a natural and important part of how the planet works, and that we have much to learn from the 400-million-year history of fire on Earth.' Without a doubt, with this book, Scott is helping us to do so.

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