



Einstein, Eddington, e o/and the Eclipse: Impressões de Viagem/Travel Impressions

Ana Simões and Ana Matilde de Sousa, Chile com Carne, 2019, 248 pp, €15,
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BOOK REVIEW

Ana Simões and Ana Matilde de Sousa, *Einstein, Eddington, e o land the Eclipse: Impressões de Viagem/Travel Impressions, Chile com Carne*, 2019, 248 pp, €15, ISBN 978-9898363411

The year 2019 marked the hundredth anniversary of the famous eclipse expedition on 29 May 1919, observations from which confirmed Einstein's general theory of relativity. The centennial brought a surge of celebratory exhibitions and conferences to mark the occasion. This book originated in one such centenary exhibition, *E3 – Einstein, Eddington, and the Eclipse*, curated by Ana Simões and hosted by the Museu Nacional de História Natural e da Ciência and the Centro Interuniversitário de História das Ciências e da Tecnologia. This unusual volume – a companion to the exhibition catalogue – includes a graphic novel and a scientific essay, each in both English and Portuguese, the main languages of the 1919 expedition.

The book focuses on the British eclipse expeditions to observe totality on 29 May 1919. Arthur Stanley Eddington, director of the Cambridge Observatory, and his collaborator Edwin T Cottingham went to the island of Príncipe off the coast of West Africa, while Royal Greenwich Observatory astronomers Andrew C C Crommelin and Charles R Davidson travelled to Sobral, Brazil. They hoped to photograph the starfield behind the Sun while it was dimmed during the eclipse. These images could then be compared with photos of the same stars, taken when the sun was no longer nearby. These two sets of photographs would then allow them to test Einstein's prediction that light rays would bend in the vicinity of large gravitational masses. They could measure the difference between the apparent position of the stars near the Sun (during the eclipse) and their position when the Sun was more distant. If it worked, this would not only validate Einstein's theory, but would also conclusively end decades of speculation about the existence of an intra-Mercurial planet and potentially displace Newton's theory of gravitation as an explanatory tool.

Late eighteenth- and early nineteenth-century observations had shown the planet Uranus increasingly deviating from its predicted orbit. Newton's theory of gravitation suggested that an unknown disturbing body might account for this perturbation. The resulting observation of the planet Neptune in 1846 thus marked a massive triumph for Newtonian gravitation. With this came hope that an as-yet-unknown celestial body could similarly account for the long-mysterious precession of the perihelion of Mercury. The latter half of the nineteenth century brought the golden age of eclipse expeditions as scientists criss-crossed the globe in quest of a few minutes of solar darkness to search the sky near the sun for an intra-Mercurial planet. Some supposed and alleged sightings of this so-called planet Vulcan remained unconfirmed and hotly debated through the latter decades of the nineteenth century. There had been a first attempt to verify Einstein's theory during a total eclipse in 1912, and again in 1914. Neither expedition succeeded.

Finally, in November 1919, after months of work and image comparisons, Eddington presented the results of both the Sobral and Príncipe parties to a joint meeting of the Royal Astronomical Society and the Royal Society of London. The resulting confirmation of the theory of general relativity catapulted Einstein to global fame. *Einstein, Eddington, e oland the Eclipse: Impressões de Viagem/Travel Impressions* combines two presentations of this narrative.

The essay that accompanies the graphic novel draws on scientific publications, newspaper reports, and personal correspondence to investigate the expedition and related publicity. In this text, Ana Simões presents an overview of the expedition and its scientific questions. She explores interactions between known scientists and anonymous actors, as well as themes of politics and religion relevant to global scientific expeditions. Simões also delves into the dynamics of science and technology in the context of geopolitical tensions and colonial empire. The 45-page essay is divided into 8 sections, which makes it easy to dip into and gives the reader thematic impressions rather than a single cohesive argument.

The graphic novel portion of the book focuses on the voyage and the experience of travel far more than the scientific project. It is a fitting addition to the Chili Com Carne publisher's travel collection of graphic novels. The text is based on Eddington's correspondence to his mother and his sister, which paint a vivid picture of the 4700-mile journey to Príncipe. Readers learn, for example, that Eddington was eating a dozen bananas a day en route (p 92). The uneasiness of postwar travel conditions occasionally surfaces, as with a mention of the remains of three submarine-torpedoed ships in Maderia harbour (p 94). Eddington also remarks on island games of tennis (p 124), the deliciousness of wild pineapple (p 128), and his first experience of roulette (p 146). The description of games of fortune – with ultimate total losses of one pound – appear only in a private letter to his sister, since their mother circulated his reports to her among their relatives. Like all eclipse observers before him, Eddington fretted throughout the trip about the prospect of clouds on eclipse day. In the end, clouds did obscure the star field photographs, and he was left to wonder how his colleagues in Sobral had fared.

This work is a novel addition to eclipse expedition literature. It joins a small handful of existing graphic novels related to the history of mathematical sciences, including *Les reveurs lunaires: quatre genies qui ont changé l'histoire* by Cédric Villani and artist Edmond Baudoin in 2015; *The Thrilling Adventures of Lovelace and Babbage: The (Mostly) True Story of the First Computer*, by Sydney Padua in 2015; and *Logicomix: An Epic Search for Truth* by Apostolos Doxiadis, Christos H Papadimitriou and illustrators Alecos Papadatos and Annie Di Donna in 2009.

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