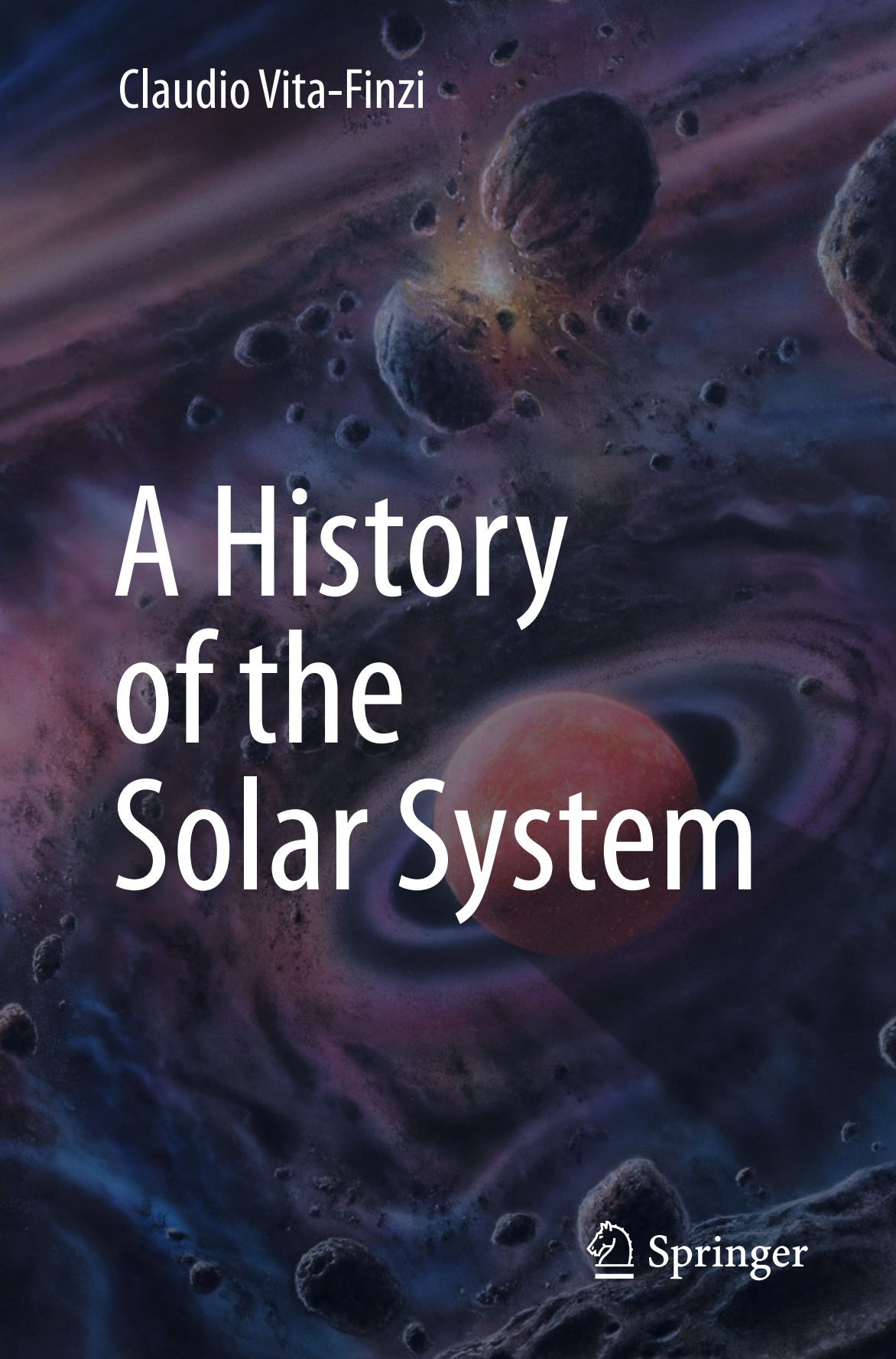
Claudio Vita-Finzi
A History of the Solar System
Springer

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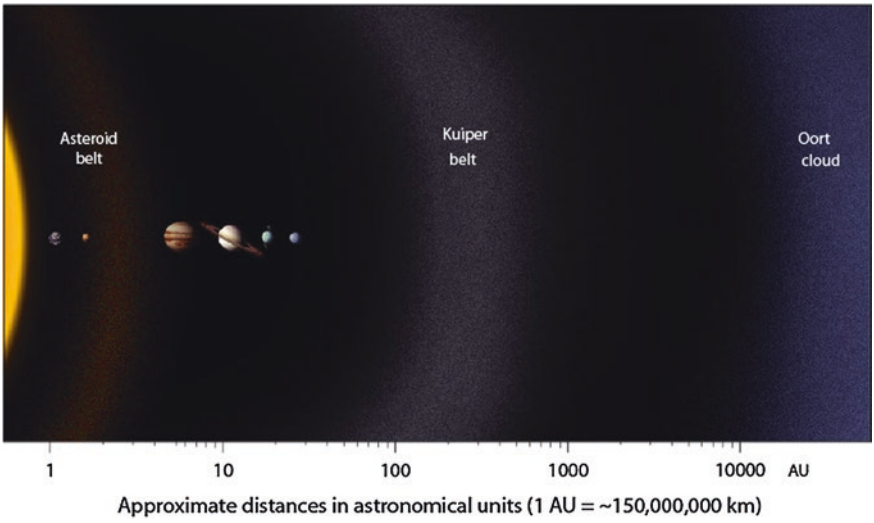

The Oort Cloud, a hypothetical spherical reservoir at 10^3–10^5 AU, contains 10^{11} to perhaps 10^{12} comets; the disk-like Kuiper Belt, at 30–1000 AU, contains 10^8–10^9 comets; the asteroid belt contains 10^9–10^{12} asteroids

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Damn the Solar System! bad light—planets too distant—pestered with comets—feeble contrivance; —could make a better with great ease

Lord Francis Jeffrey (1773–1850) according to the Rev. Sydney Smith

For Alexandre

Preface

As we move with ever greater confidence between the planets, their moons, a few comets and asteroids, and some grains of dust, and prepare to enter interstellar space almost 20 billion km from Earth after a journey of 36 years at 61,000 km/hr, it seems a good moment to consider the history of the only planetary system we are currently capable of exploring in any detail. But the discovery of over two thousand planets which are orbiting stars other than our own Sun will undoubtedly spur humanity before long to find ways of visiting those alien worlds in one way or another.

This short book outlines a story which spans 4.5 billion years and which is the fruit of a few millennia of naked eye observation, four centuries of squinting through telescopes, and sixty years informed by orbiting satellites and manned and unmanned probes and landers, profound laboratory studies, and imaginative hypotheses.

My principal aim is to link events dating back billions of years which we can glimpse among the stars with our everyday concerns on Earth and to demonstrate that the solar system continues to evolve and diversify. Although the chapters are broadly in chronological order, I have tried to get away from the 'one era after another' scheme by devoting successive chapters to a brief history of ideas about the solar system; the raw materials of which the solar system is constructed; their assembly into solid, gaseous, and icy bodies; the evolution of the solar system's key player, the Sun; the major changes undergone by the planets and moons after they had formed; the emergence of life; and some of the current changes that help us understand the solar system's past. Some of the material is difficult but so is the subject matter, and the drift will usually be clear from the context. Above all, I hope to have conveyed the excitement and wonder that comes from looking up—at the sky and in the library.

Every one of these themes draws on advances in geochemistry, biology, and computing as much as to targeted space missions and ground-based observation, and to the work of individuals, teams, and space agencies, in particular the ever generous NASA, debts I try to acknowledge in the references and captions.

I am grateful to Paul Henderson and his successors in London's Natural History Museum for hospitality, to Mark Biddiss, Ken Blyth, Louis Butler, Ian Crawford, Dominic Fortes, Kenneth Phillips, Michael Russell, Sara Russell, Fred Taylor, Leo Vita-Finzi, and Michael Woolfson for their searching but kindly comments on parts of the text; to Simon Tapper for help with the figures; to Don Dixon for the cover image; and to Petra van Steenbergen and Hermine Vloemans at Springer for support.

Ferrara, March 2016 Claudio Vita-Finzi

Note: Myr is used throughout for million (10^6) years and Gyr for billion (giga,10^9) years

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