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David H. Levy

# The Starlight Night

## The Sky in the Writings of Shakespeare, Tennyson, and Hopkins

Second Edition

Springer

David H. Levy
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Vail, AZ, USA

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*For Wendee. May you always reach for the stars with me.*

# Preface

This investigation is a two-part study of allusions to events in the sky in English writing from 1572, the year of Tycho Brahe's great supernova, to a time shortly after the first use of the telescope in astronomy in 1610, and during the Victorian period featuring Tennyson and Hopkins. The early modern period is a time during which specific phenomena of the night sky increasingly appear in early modern English Literature, and the mid-nineteenth century era of Tennyson and Hopkins is a time featuring seismic changes in humanity's understanding of the Universe.

Although much has been written about the changing cosmic philosophies of the Renaissance, I will explore a different line of inquiry—a selection of actual events in the sky as they appear in the literature of that time and of the mid-Victorian period. This text emphasizes a selection of events, like new stars or supernovae, comets, meteors, and eclipses, which took place between the autumn of 1572, when the first "blazing starre" in over 500 years thrilled viewers of the night sky, and Galileo's discoveries with his telescope in 1610; and later celestial events. I chose these periods because they offered an unusually large number of such events, specifically two supernovae within our home galaxy and 20 comets, whereas during the last 30 years of our own time—a more typical period—there were seven bright comets and no supernovae within our galaxy. These unusual events are referred to amid a rich background of allusions to more common events like sunrises, sunsets, and meteors.

I will approach this topic by selecting passages in works of literature that might correspond to specific events. This study will take advantage of recent technological advances that have given us a much clearer understanding of what events actually took place in the sky and how they were exploited by contemporary authors. Computer programs have recently become quite sophisticated in taking us back into time to show us the positions and magnitudes (brightnesses) of supernovae, the paths of comets as they crossed the sky, and where, when, and to what extent eclipses were visible over specific cities. I use this information in my discussion of well-known references to eclipses such as Shakespeare's *King Lear*, but also in little-known writings like Thomas Nashe's *A Wonderful, strange, and miraculous, Astrological Prognostication for this year of our Lord God, 1591*, in which an

eclipse of the Moon that December is described. As a specific study in English literature, this research might appear to begin as an exercise in annotation; i.e. a series of explanations of the astronomical references that appear in the literature of these two periods. But it offers much more: When seen in the context of literature *and* the night sky, the connections between literature and the sky that it reveals will open the offerings of the night sky of those eras to the people of our own time.

The relationship between literature and science is an increasingly robust field of enquiry. As part of my research for this dissertation, in the spring of 2004 I offered a course in astronomy and literature at Arizona State University where, for one semester, I worked closely with a group of undergraduate students studying ideas in this field. The course was called "From Shakespeare to Space" and took a broad look at how different writers used the ideas of astronomy. For example, did Shakespeare have specific celestial events in mind when he wrote *King Lear*? Was Van Gogh's *Starry Night* inspired by a scientific observation of a distant galaxy by the Third Earl of Rosse using his giant reflector, then the largest telescope in the world? This course explored the union of two of the most basic areas of study that a university can offer in the arts and the sciences through a discussion of specific instances in astronomy and literature. The course also included seminar presentations by each student. I was impressed at how adept these students were in linking their own studies to discrete arenas in English Literature. By bringing together the arts and sciences, this course tried to inspire its students to see a vast picture in planning their future, whether that future is to be in arts, science, or in teaching youngsters to live creatively in our complex world.

The course I gave helped to inspire my students to probe more deeply into the broader interpretations that are possible when English Literature is related to some other field, particularly a scientific one. Astronomy is a broad field, but the night sky subset is narrow enough to provide a benchmark to focus these interpretations. At the undergraduate level, I encouraged my students to let their minds wander, focusing as far afield as the Victorian and modern periods. The frequent references to the Moon in Charlotte Bronte's novel *Jane Eyre*, as well as similar references in Tolkien's *The Two Towers*, provided a good sense of thematically relevant coloring to those narratives. Most students chose a specific period of literature on which to prepare a seminar, although some students went even farther afield, relating the literature to painting or music.

This course was complemented by a public lecture I gave as part of my role as John Rhodes Chair in Public Policy and American Institutions at ASU. My topic, "Space Policy and America's Future: Igniting the Imagination" was designed to show how literature relates to scientific endeavors like the night sky, and even to space travel. The lecture was structured to show that, as the United States pondered its future in space after the loss of the space shuttle Columbia in 2003, it would be advantageous to take a broad view of what typical Americans are interested in. The result of that process was the beginning of the program to retire the space shuttle completely, then replace it with fresh vehicles and rockets designed to return humans to the Moon and to send them further into space, perhaps to Mars, or to a nearby asteroid that, though it orbits the Sun, could someday collide with Earth.

The dream of going to visit other worlds lies deep in human literary history. It takes us back in time to the ideas expressed by writers and scientists dating at least as far back as the Roman author Lucretius, whose *De Rerum Natura* was a guide to how the natural world works, and an anthem on why it is important to explore that world. In the world of politics, that means a physical exploration, using vehicles and other technology to whisk humans from the Earth to the Moon and Mars. But there are other ways to conduct that explorative journey.

In 1970, as an undergraduate at Acadia University, I was inspired by Roger Lewis to seek out a connection between the night sky and poetry through an essay "Elements of Science in Tennyson's In Memoriam." Years later, Norman MacKenzie, at Queens University, directed me to Gerard Manley Hopkins's small poem about a comet that formed the basis of my Master's thesis "The Starlight Night: Hopkins and Astronomy," a project that now forms several chapters of this book, which has expanded those earlier studies to include a broader array of English authors from the pre-modern era. While *In Memoriam* directs us specifically to the discovery of Neptune, and to the then-popular nebular hypothesis of the formation of our solar system, generally the allusions in the early modern period are less specific.

I began this journey in a spirit of learning and fun, with the obvious references to "these late eclipses" of the Moon and Sun in 1605. I quickly found a confirming letter from King James to his close friend and advisor, Sir Robert Cecil, in which he playfully discussed the effects of the eclipse as seen in England. King James had a serious policy against the practice of astrology. The Stuart King also presided over two of the most important books ever published in the English language, the translation of the Bible into English in 1611, and the First Folio edition of Shakespeare's works in 1623. In a sense, these two books testified to the emergence of England's leadership in the arts and in religion that helped to cement the nation as a global power.

I shared these ideas as a guest lecturer in astronomy and literature at other universities, notably Southern Illinois University at Carbondale, Mount Allison in Canada, and at a return visit to Acadia University. Those three institutions afforded me the opportunity to share my passion for literature and the night sky with students who were just starting their own career paths. Those lectures differed in some fundamental respects. At SIUC, I interacted with students throughout their honors program, tried to connect literature and the night sky in the early modern period to the areas in which they were interested. At Mount Allison and at Acadia, where the students were specifically studying science and literature, I brought my perspective to them. In this context, I admit that this perspective was more personal than scholarly, and it did trace my early attempts at a union of literature and astronomy.

Vail, AZ, USA David H. Levy

# Acknowledgements

In November 2013, while attending an astronomy conference in Tucson, I stopped by the Springer exhibit and met Nora Rawn, one of the editors at Springer. We started talking, about nothing in particular at first, then I mentioned that Springer had published *The Sky in Early Modern English Literature*, based on the Ph.D. I had completed in 2010 at the Hebrew University. Before I knew what I was saying I opened my big mouth and suggested a second edition, and before I left the convention center I decided that somehow I was going to add the MA thesis on the same topic but featuring the Victorian poet Gerard Manley Hopkins. I knew later that day that I'd have to come up with some writing that connects the two far-flung eras of literature. And before I fell asleep that night, I decided to add also a chapter on Tennyson. I loved doing the thesis, which took as long to propose as it did to write. I loved turning the thesis into a book, and I've loved every minute of preparing this new edition. Perhaps the idea to produce this book evolved from an essay I wrote for a University of Tampa project about Literature and Science, edited by Dr. Judy Hayden. During that process several improvements were made that increased my motivation to pursue a new edition. As this new book comes to fruition, I doubt I'll ever fall out of love with its subject.

The idea of relating astronomy to literature has been in my mind for almost as long as my interest in astronomy. I owe that happenstance first to my brother Richard, with whom I lost an argument back in 1957 when I was 9 years old. My response was to pick up a copy of the nearest book I could find, which happened to be the beautiful blue-covered Yale Shakespeare copy of *Hamlet*, and throw it at him. If my father hadn't walked in at just that moment, the incident would likely have ended there. Dad calmly picked up the small book from the floor, handed it to me, and said, "David, I know you're going to have arguments with your brother. You'll even throw things at him sometimes. You can even throw a stone at him. But don't ever throw a book at him or anyone."

Smarting from this putdown, I challenged my father. "Why not?" I will never forget his carefully phrased answer: "Because books are friends. It is as if this author invited you into his living room, ushering you into a far-off time and place; as if the author tells you that through his book you will learn about what it was like

to be alive in his time." When I began this project I stepped back into time, under the sky of early modern England, just as Dad had suggested so long ago.

After a long period of doing nothing about this curiosity, I found it resurging to life on the night of April 23, 1976. With a group of friends at the Montreal Centre's observatory of the Royal Astronomical Society of Canada, I was observing the maximum of the Lyrid Meteor shower during Session 2887M (each one recorded in sequence in my observing logs). I saw perhaps 15 meteors that night, and I got the idea that, as I prepared to enter graduate school at Queen's University, I might want to write a thesis about how one of these poets read the night sky.

The next day, I met Dr. Norman MacKenzie at his English Department office in Watson Hall at Queen's University. On that spring Saturday in Kingston, Ontario, as we prepared to discuss my future in his department, I mentioned my "newfound" interest. Immediately he uttered a single word, "Hopkins." He explained how his favorite poet had a passion for the sky, and then he called to my attention one of his early poems, a fragment called "I am like a slip of comet." I devoured that poem like a hungry animal. I wasn't sure at that early time how I could make it work, but I loved the poem. Years after I had completed my M.A., he said in a lecture that he never witnessed anyone get as excited about a work of literature as I did about the Hopkins comet poem.

All these decades later, Hopkins's comet poem still calls to me just the way it did in the spring of 1976. I enjoy reading it over and over, and have developed a way to read it while watching a film showing Comet Hyakutake, one of the best comets of the last century, as it crosses across the northern sky.

Comets, and Hopkins's poem about one particular comet, evolved into a successful MA thesis at Queen's. After that I decided to delay proceeding to my Ph.D. About 5 years after graduation the idea resurfaced and I quickly buried it. It arrived while I was driving Brian Marsden, the longtime director of the International Astronomical Union's Central Bureau for Astronomical Telegrams, home from an evening at Kitt Peak National Observatory. Five years later the idea surfaced again and I quickly buried it. When it surfaced a third time I was probably observing with the Shoemakers at Palomar Observatory. At two additional 5-year intervals the idea returned, and each time I rejected it. The fifth time this happened I was freshly married to Wendee. I mentioned it to her and quickly added that I would bury it as always. "Before you reject it this time," Wendee responded, "let's discuss this. Maybe you keep thinking about it because you want to finish what you began so long ago." That conversation matured into letters, into my choice to write a dissertation on the night sky in the early modern period, and into my selection of Dr. Lawrence Besserman as my thesis director at the Hebrew University of Jerusalem. Dr. Besserman was extraordinarily helpful throughout the long and challenging proposal process and even more so during its research and writing phases. Working with him was a sheer pleasure. During the difficult proposal process, my committee soundly killed the plan, but when I suggested that we form an international committee consisting of scholars I respected throughout the world, the Hebrew University approved enthusiastically. These people have taken time off their own busy lives to help move my project along. Specifically, Frederick Williams of Southern Illinois University of Carbondale did a

superb job as associate dissertation director. I also wish to thank Janine Rogers of Mount Allison University, Karen Bamford and Robert Lapp also of Mount Allison, Larry Lebofsky of the University of Arizona, Martin Rice of the University of Pittsburgh at Johnstown, Eli Maor of Loyola University in Chicago, David Mowry of the State University College at Plattsburgh, Allan Chapman of Wadham College, Oxford University, David DeVorkin of the National Air and Space Museum, and Ilan Manulis from Israel's Weizmann Institute of Science, all of whom provided copious amounts of valuable help and advice. And they all encouraged me to keep going even as I slowly recovered from a stroke early in 2007.

For my earlier work on Hopkins, specially revised for this new edition, Dr. Norman MacKenzie of Queen's University acted splendidly as supervisor. His patience and understanding were as invaluable to me as the depth of his knowledge on both Hopkins and the astronomy of his age helped transform that part of the project into a worthwhile addition to this edition. His passing in 2004 remains a deep loss. It was a special honor to have Dr. A. Vibert Douglas, one of Canada's most famous astronomers, as a reader for the Hopkins section. Her suggestions went far beyond her formal interest in astronomy, and the lively interest and care that she projected helped make it an experience to be treasured. Dr. Joseph Ashbrook of *Sky & Telescope* magazine prepared an ephemeris of the nonperiodic Comet Tempel (C/1861 N4 according to the new reckoning begun in 1995) which added important evidence that it did play a role in Hopkins's comet poetic fragment. Michel and Lorraine Payette helped with the calculations for the planetary positions that appear frequently in the Hopkins section. The staffs of the Libraries at both Queen's, where I completed the Hopkins M.A., and the Hebrew University where I completed my Ph.D., both provided first class assistance in the special needs both these projects demanded. An unusually obliging librarian at the University of British Columbia confirmed a comet reference while I waited patiently over the telephone during an expensive person-to-person long distance call in the autumn of 1979.

Three people deserve special thanks. Eli Maor expertly translated the opening pages of the thesis into Hebrew, and Roger Lewis, now professor emeritus at Acadia University's Department of English, gave detailed help and guidance at every stage and was particularly helpful with the chapter on Tennyson, which began as an essay in his Victorian poetry class at Acadia in late 1969 and 1970. (It was wonderful to observe how the original essay, which he graded as an A minus, surged to an A when he graded the most recent version. He also added that with my additional experience over the years, it was to be expected that the grade would increase.) Finally, this project would never have been started, let alone completed, had it not been for my wife Wendee's constant encouragement throughout the years and active assistance in formatting and in catching typing errors and inconsistencies. Without her critical eye, the book simply could not have been completed.

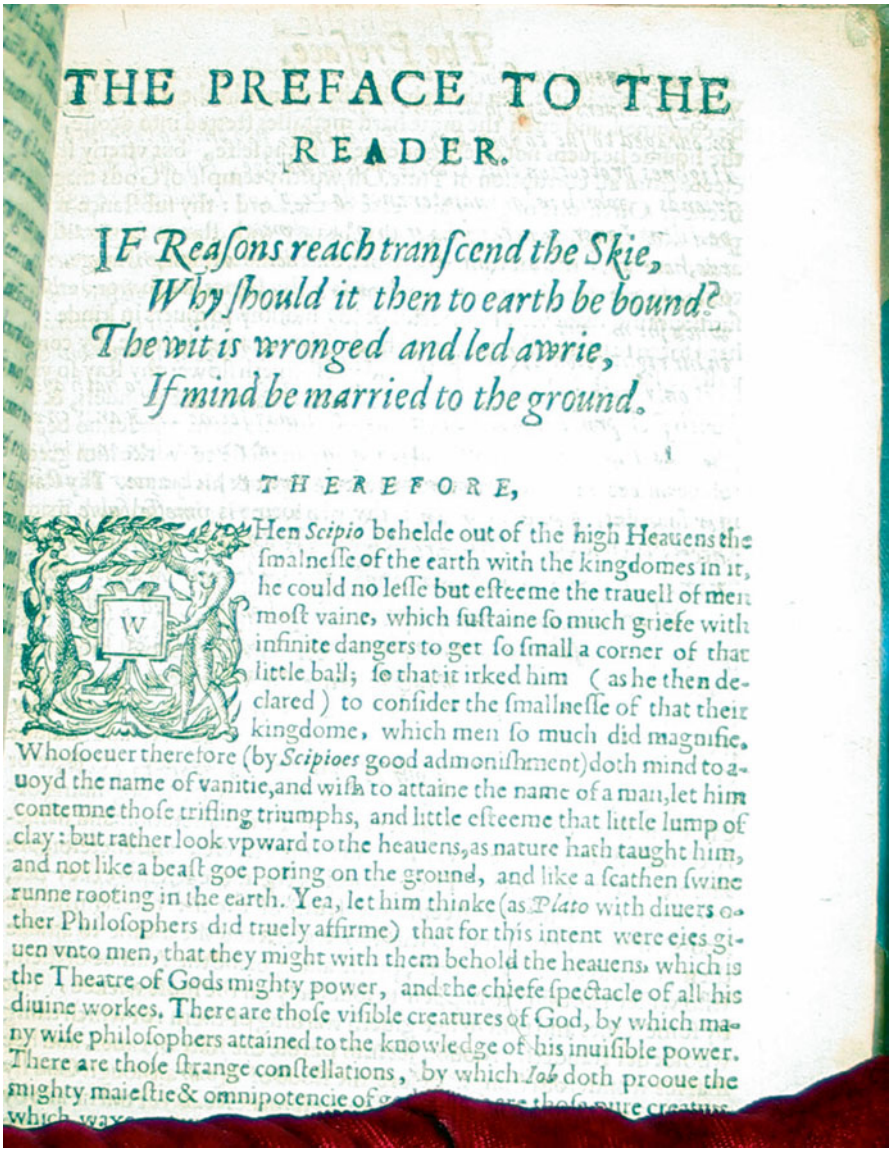
# Contents

# Introduction

Imagine a mostly cloudy October morning in southern England. In busy London, people were going about their daily business, and far out of town, James I, King of England, was probably enjoying a hunt (Jeayes 161–62, Harrison 235). A slight lessening of sunlight began in the late morning, but it did not attract much notice until noon when the sky began to darken noticeably and rapidly, much more deeply and rapidly than it would have from the onset of clouds. Between 12:40 and 1:00 p.m. the land was bathed in a twilight hue. Through breaks in the clouds, the Sun peeked through not as a bright yellow ball, but as a thin curved line of light. The date, according to the Julian calendar then used in England, was 2 October 1605 (12 October by the then-new Gregorian Calendar, not yet in use in England), and southern England was experiencing a solar eclipse. As the Moon continued moving eastward across the Sun, it lessened and then abandoned its apparent grip on the Sun just after 2:00 p.m. (Espenak, Pingre). Many Londoners were not surprised at the occurrence of this near-total solar eclipse over their city; they might have read of it in Dade's Almanac (n.p.). It is also possible that some Londoners realized that the event was coming after watching a performance of *King Lear*, complete with a remark about "these late eclipses in the sun and moon," earlier that year in the Globe Theatre (Schoenbaum 253).

The October eclipse was the last of a series of three eclipses, two lunar and one solar, to occur over London in 1605, and it offers a focus point for this investigation of convergence between the two fields of endeavor of English literature and the study of the night sky. That eclipse also provides an impetus to follow Recorde's advice from 1552 to understand the sky: If Reasons reach transcend the Skie, Why should it then to earth be bound? The wit is wronged and led awrie, If mind be married to the ground. (Recorde, 3)

This eclipse represents one of those rare times in history when literature, culture, and science come together. It allows a reconstruction of a few hours of time almost 400 years ago with the help of a variety of scientific and literary sources. The solar eclipse did happen at the time specified. Whether *King Lear*, with its ominous debate about the predictive value of eclipses, had already been completed and performed in London, or whether Shakespeare was completing its composition at the time, is less certain.



THE PREFACE TO THE READER.

*IF Reaſons reach tranſcend the Skie,*
*Why ſhould it then to earth be bound?*
*The wit is wronged and led awrie,*
*If mind be married to the ground.*

THEREFORE,

WHen *Scipio* behelde out of the high Heauens the ſmalneſſe of the earth with the kingdomes in it, he could no leſſe but eſteeme the trauell of men moſt vaine, which ſuſtaine ſo much griefe with infinite dangers to get ſo ſmall a corner of that little ball; ſo that it irked him (as he then declared) to conſider the ſmallneſſe of that their kingdome, which men ſo much did magnifie. Whoſoeuer therefore (by *Scipioes* good admoniſhment) doth mind to auoyd the name of vanitie, and wiſh to attaine the name of a man, let him contemne thoſe trifling triumphs, and little eſteeme that little lump of clay: but rather look vpward to the heauens, as nature hath taught him, and not like a beaſt goe poring on the ground, and like a ſcathen ſwine runne rooting in the earth. Yea, let him thinke (as *Plato* with diuers other Philoſophers did truely affirme) that for this intent were eies giuen vnto men, that they might with them behold the heauens, which is the Theatre of Gods mighty power, and the chiefe ſpectacle of all his diuine workes. There are thoſe viſible creatures of God, by which many wiſe philoſophers attained to the knowledge of his inuiſible power. There are thoſe ſtrange conſtellations, by which *Iob* doth prooue the mighty maieſtie & omnipotencie of [illegible] thoſe pure creatures, which [illegible]

**Fig. 1** This photograph shows Robert Recorde's advice that the value of reason is so great that it can transcend the sky. Photograph by the author

Literature and events in the sky are subjects not normally studied together in university programs, but their occasional linking together offers a unique investigative opportunity. We can begin to imagine the person watching *King Lear* suddenly being drawn by its references to celestial events to talk of eclipses and memories of new stars he or she has seen in the sky.

In examining the extent to which the phenomena of the night sky between 1572 and 1620 appear in early modern English Literature, I am guided by an axiom that events in the sky, like comets, novae, and eclipses, can help us understand the literature of the time, and that conversely, the literature of the time can aid in our understanding the events of the sky. Literature and the sky complement each other. This investigation is not, however, specifically about the changing cosmic philosophies of the time, a subject that has been covered well by critics since Marjorie Hope Nicolson and Cumberland Clark.

From an interest based on astronomical observation more than philosophy, I will explore a different line of inquiry—a selection of actual events in the sky as they appear in the literature of the time, with a view to studying them in order to shed light on both fields. The events chosen took place between the autumn of 1572, when the first "blazing starre" in over 500 years exploded into the night sky, and the early telescopic discoveries in 1610.

I chose this period because it offered an unusually large number of such events, specifically two supernovae, twenty comets, and several well-observed eclipses, whereas during the last 30 years of our own time—a more typical period—there were only seven comets and no galactic supernovae. These unusual events are recognized by English writers of the early modern period amid a rich background of allusions to common events like dawn, meteors, and the general appearance of the night sky. Frequent notice of celestial events by pre-modern English writers resonates with my own long career as a "night watchman," a searcher of the night sky.

## Opening Thoughts

Four hundred years after the Shakespeare family celebrated William's first birthday in England, on September 18, 1965, Kaoru Ikeya was peering through the eyepiece of his homemade 8-inch diameter reflector. A worker in a piano factory in Japan, he was enjoying some free time with his telescope, searching for comets. He had already discovered two, his first in January 1963 and his second in the late summer of 1964. On this late summer morning of September 18, 1965, he spotted a little spot of haze in its field of view. Ikeya knew the sky, and he was fairly certain that the object was an anomaly, that it was not permanently in that position. His star atlas showed nothing, and a look through the eyepiece a short while later convinced him that he really was looking at a comet, for the fuzzy patch of light had moved a barely detectable distance in the time since he had first spotted it. Ikeya correctly identified this new object as a comet, and lost little time in sending a telegram to Japan's Tokyo Observatory. Just 1 hour later, Tsutomu Seki, a guitar instructor at the time, found the same object.

Comets were arguably as important to Shakespeare four centuries ago as they were in 1965 to amateur astronomers like Ikeya and Seki. We know this because of the number of times he mentioned comets; for example, during the summer of 1596, Shakespeare might have observed a bright comet himself. First seen on July 11, this comet was as bright as some of the brightest stars in the sky. In any event, he composed these words to be spoken by Caesar's wife Calpurnia in *Julius Caesar*:

> When beggars die, there are no comets seen
> The heavens themselves blaze forth the death of princes.
> (*Julius Caesar*.2.2.30–31).

One of Shakespeare's most famous references to comets, this particular couplet is historically significant because during the Octavian games in the summer of 44 BC, held in memory of the assassinated Caesar, a bright comet did indeed track through the northern sky and was widely believed at the time to represent the soul of the assassinated Caesar on its way to heaven. The comets of Calpurnia's dream were premonitions that appeared before her husband's assassination, but the historical comet was reported to have appeared (although there is some doubt that it appeared at all) 2 months *afterwards*, with a tail perhaps half the length of the Big Dipper, as the comet crept through the northern sky. The opening three lines of *1 Henry VI* summon his audiences to remember the great comets that have visited the region of space, including one that rounded the Sun in April, 1590. Discovered by Tycho Brahe, that particular comet became as bright as the star Capella (G. Kronk, 9). Alternatively, there might have been an outburst of Comet 17P/Holmes on February 10, 1591, a week before its perihelion passage (Z. Sekanina 4–17). The comet was definitely there, but it is not known whether it was bright enough to be visible. This particular comet has undergone at least two major outbursts in historic times, one around the time of its discovery by Holmes in 1892, and again in 2007. Either way, the three opening lines of *I Henry VI*, dated 1591, expressed the idea of comets as omens:

> Hung be the heavens with black! Yield, day, to night!
> Comets, importing change of times and states,
> Brandish your crystal tresses in the sky…(*I Henry 6*.1.1.1–3)

(The Oxford editors suggest the possibility that Shakespeare collaborated with other writers on this play, and that the opening might have been composed by Nashe. I do not subscribe to this interpretation, but even if Nashe did write the opening lines of *1 Henry VI* the comet allusion remains valid, since Nashe also had an interest in comets.)

Neither Shakespeare nor Nashe was the first writer to express an interest in the night sky; this tradition goes back much farther than Dante, whose *La Vita Nuova* (*The New Life*) explores how

> The sun ceased, and the stars began to gather,
> And birds dropped in mid-flight out of the sky;
> And earth shook suddenly; …

One of the earliest known writers, Enheduanna, who lived 4200 years ago (2285–2250 BCE) as the daughter of King Sargon of Akkad, alluded to the sky frequently in her writings:

Inside the light is dim
Even moonlight (Nanna's light) does not enter
(*Temple Hymn 7*, 10–11).

In her *Temple Hymn 42*, Enheduanna metaphorically speaks to the temple itself as she summons

This shining house of stars bright with lapis stones
Has opened itself to all lands (1–2).

In her *Exaltation of Inana*, Enheduanna designates Inana as "powerful one of heaven and earth, you are their Inana…" (11–12).

What comets did Enheduanna witness during her lifetime? If our understanding of its orbit is just slightly off, it is not outside the realm of possibility that the Akkadian princess observed Comet Hale-Bopp at its last return before its modern visit in 1997. No doubt, she did see eclipses of the Moon and the Sun, and possibly at least one bright comet.

As long ago as Enheduanna lived and composed, the wisdom of her writing probably was not a factor to the two young cometeers from Japan who discovered the comet of 1965. At discovery, its brightness was about six times fainter than the faintest star one can normally see without a telescope. Its motion gave the first clue of what was to come; it was moving almost directly toward the Sun. Within a few weeks, this visitor from space rounded the Sun, become brighter than the full Moon, displayed a beautiful tail 70 million miles long, and started to move back away toward the dark void of interplanetary space from where it came. It was probably the brightest comet of the twentieth century.

In the sense that the Great Comet of 1965 and the several bright comets of Shakespeare's time all passed close to the Sun, these mighty comets were similar. Ikeya's and Seki's prompt reporting of it continued a tradition that has persisted as far back as Shakespeare's time during which it was still not completely known whether comets flew within our solar system or were merely appearances in our atmosphere. Tycho Brahe, who independently discovered the comet of 1577 and who probably did discover the comets of 1582 and 1590 (Kronk, 9), concluded from observations sent to him from observers across Europe that these comets were farther from Earth than the Moon.

Over the centuries, astronomy has evolved to the point that professional astronomers and many amateur astronomers as well have so narrowed their own fields of inquiry that they no longer directly look at the sky at all. In the sixteenth century, an era without electricity and light pollution, television, and computers, skywatching was more common and democratic. Educated people were expected to learn something of the night sky, and Bacon's *Advancement of Learning* (125, 141, 158) was encouraging them to do so. Writers might include routine sky events, like a meteor or a bright planet in the evening sky, even a sunset, in their writings, and they could expect their readers to enjoy and understand these references.

This topic is approached through select passages in works of literature that allude or refer to specific events. The study takes advantage of recent technological advances that have given a much clearer understanding of what events actually took place in the sky and how they were exploited by contemporary authors. Computer

programs have recently become quite sophisticated in taking us back in time to show us the positions and magnitudes of supernovae, the paths of comets as they crossed the sky, and where, when, and to what extent eclipses were visible over specific cities. This information will be used to discuss well-known references to eclipses as well as those in lesser-known writings. For example, the "late eclipses in the sun and moon" in Shakespeare's *King Lear* should be better known to most high school students than Thomas Nashe's *A Wonderful, strange, and miraculous, Astrological Prognostication for this year of our Lord God, 1591*, in which a rare total eclipse of the Moon that December is described. That particular event turns out to involve a rare coincidence; in addition to entering the shadow of the Earth, the Moon also passed in front of the planet Saturn, resulting in an occultation, at the same time.

This book offers more than a series of explanations and interpretations of the astronomical references that appear in the literature. When seen in the context of literature *and* astronomy, the connections between literature and the sky that it reveals will open the night sky of that period to the people of our own time, and broaden our understanding of the literary works studied as well.

Examples of the primary sources used in Part I focus mainly on Shakespeare, whose celestial references surpass all the other authors put together; in fact by one count there were at least 205 separate allusions to the sky, or to a celestial object, in his canon. Nowhere do we find a statement by Shakespeare that he enjoyed observing the night sky, but his works undeniably testify to a passionate interest. For example, *King Lear's* discussion of eclipses could refer to the extraordinary pair of eclipses that occurred in the early autumn of 1605. Eclipses are referred to explicitly in the play (*KL* 1.2.99–127), and although some critics propose that he had no particular eclipses in mind, I will provide evidence that he did mean the two in 1605.

With these events as a basis, Shakespeare proposes the idea that humanity has a cosmic relation. Part of that relation involves the public debate between astronomy, the study of the stars, and astrology, which was defined as the use of the stars to predict human events. Since Shakespeare intended his plays, and the ideas contained within them, to be presented before wide and diverse audiences, he not only spoke to his time but also helped to shape it. Shakespeare's plays were to his time as the most popular television shows are to ours. Thus, in *King Lear* Shakespeare took advantage of his viewers' familiarity with the eclipses and two new stars to debate their possible effects on humanity and the affairs of state.

This book aims to uncover a cultural interest in the night sky that was integral to the culture of the day in early modern English literature. To accomplish this I explore passages involving the night sky by both canonical and obscure writers, with an aim to recontextualizing those passages as they relate to astronomical events and objects. Ultimately, these passages illustrate how the literature of the time acts as a mirror that reflects the interest of the people of that time in the sky and its special events; also they will help show how an understanding of cosmic events can lead to a better appreciation of the literature that uses them.

This is a study of historical genesis that fits into the two disciplines of literature and astronomy in several ways. One involves using the literature to help us see the sky through the eyes of the people who lived under it. Another involves dating. In writing about the influence of external factors upon the creation of literature, much has been

noted about underlying political and social conditions. These circumstances can be used to help date plays in the same sense that the Porter's speech in *Macbeth* (2.3.1–20) alludes to the trial of Guy Fawkes in 1606 and therefore can better determine the play's date of composition. However, thus far much less attention has been paid to the influence of natural events that can be pegged to a specific time just as accurately, like the two eclipses in the fall of 1605 that help date *King Lear*.

Beyond dating, events in the sky can help us interpret specific passages of literature and help us to a clearer understanding of what was in the creator's mind. As an example, Shakespeare's vivid description at the opening of *Hamlet* of a "star that's westward from the pole …" (1.1.35–38) is consistent with the appearance of the very bright *stella nova* that appeared in November 1572. In this sense, this research will enable students of the period to see the literature in the context of actual events in the night sky.

In the world of astronomy, English literature can function as a window that allows those of us familiar with the sky of our own time to visit and understand the sky of an earlier time. While it is possible to build a comprehension of the details of an event by looking it up in a contemporary almanac, one gains a coherent sense of how these events were perceived by the general population through its literature. The eclipse scene in *King Lear* (1.2.99–127), together with King James's Letter to Robert Cecil about the 1605 solar eclipse (Akrigg 264–66), provides such insights.

Using this approach, I discuss various works of literature in which references to the sky appear. In some cases (i.e. the lunar eclipse of 1591), I show how a particular reference sheds light on how a particular aspect of the sky was perceived; in others (*King Lear's* eclipses), I show how events in the sky are a major factor in character and plot development. In both senses, this adds to our understanding of the night sky, through the literature that references it, at a time when an impressive series of comets, new stars, and eclipses were drawing attention to its physical nature.

## Structure

The astronomical timeline in the period 1572–1620 is the foundation for Part I. The chapters are organized according to type of event (stellar explosions, comets and meteors, eclipses, conjunctions, and the telescope) and within each chapter the references generally begin with Shakespeare, whose work consistently points to nature in general and the night sky in particular, and then proceeds to the works of his contemporaries.

(A) General Description. This section outlines the idea of how two subjects—English literature and the night sky—can be merged into a single thesis to produce results that would be useful to other researchers.

(B) Approach. I approach this topic by selecting passages in works of literature that respond to specific events in the sky. My primary sources include such astronomical works as Abraham Fleming's *Prognostication of Blazing Starres*, a creative translation of a Pontanus poem that emphasizes the differences between stars that "offer not to change" their positions in the sky (novae) and those that "take their course unto the east" (comets) (Nausea A.v.). I will dem-

onstrate that Fleming's work appears to follow directly a series of comets that appeared in the sky between 1577 and 1602. Other sources include Tycho Brahe's treatise on the Supernova of 1572, Shakelton's treatise about the comet of 1577 and its significance, Nausea's discourse on comets, and Bainbridge's thesis on comets. These sources are wonderful examples of writers who have tried, in ages past, to inspire their readers to dig more deeply into the unusual events occurring at the time, they have rarely been cited in earlier documents on science and literature, but they were important contributors to this literary culture of thinking about the sky.

My literary sources begin with Shakespeare as the keystone author. *King Lear*, to cite an important example, contains passages that appear to respond to a series of three specific eclipses in 1605 (*KL* 1.2.99–127). The series included a near-total eclipse of the Moon (more than 99 % of the Moon was covered in the Earth's shadow) in the after-dinner hours of 24 March (O.S.), a partial eclipse before dawn on 27 September, and a partial eclipse of the Sun only 2 weeks later on 12 October during which most of the Sun was covered by the Moon as seen from London (Espenak, Eclipse Home Page). I will provide fresh evidence that these eclipses are referred to explicitly in the play (99–127). In addressing these events, Shakespeare helped open the minds of his audience to new ideas about humanity's relation to the cosmos. As a shareholder in his company, Shakespeare most likely intended his plays, and the ideas contained within them, to be presented before wide and diverse audiences; he not only spoke to his time but also helped to shape it. Thus in *King Lear* Shakespeare took advantage of his viewers' puzzlement over the eclipses to consider that *Lear*, as John Danby suggested years ago, is a drama of ideas, a play specifically dramatizing possible effects on humanity and the affairs of state.

In *King Lear* the meaning of the word "Nature" evolves to a Baconian *Novum Organum* of Elizabethan thought brought to life through drama (Danby 15). Danby is outdated by today's standards, but some of his ideas have become current again. Edmund is animated by the idea of nature as he announces

> Thou, Nature, art my goddess; to thy Law
> My services are bound (1.2.1–2).

In this early moment of the play, notes Dan Brayton more recently, "what Lear cannot see, and what is perhaps glimpsed by Cordelia and Kent in their reactions to Lear's living will, is that the process of division initiated with the display of the map will become uncontrollable, as the play proceeds to leave nearly all of its major characters propertyless, bereft, or dead" (Brayton, 402–403).

Soon after, the eclipses are invoked, and in a speech filled with concern for the future, the Earl of Gloucester argues: "These late eclipses in the Sun and Moon portend no good to us. Though the wisdom of nature can reason it thus and thus, yet nature finds itself scourged by the sequent effects. Love cools, friendship falls off, brothers divide" (1.2.101). As soon as Gloucester exits, Edmund mocks his father's reasoning: "This is the excellent foppery of the world, that when we are sick in fortune, often the surfeits of our own behavior, we make guilty of our disasters the sun, the moon, and stars, as if we were villains on necessity" (1.2.115–127).

Edmund's speech, with its skeptical-rationalist perspective, introduces a central issue in *King Lear*, a theme that reached an audience that had the eclipses in mind. "Nature" in this play is painted with a broad and all-inclusive brush, including events in the natural world as well as actual natural events happening in the world of Shakespeare's time. Danby's great contribution was to consider Shakespeare's interest in Nature in light of the words spoken by characters such as Edmund. I believe that Danby's theme is as relevant in today's world as it was when he first proposed this idea in 1948. The fact that we now know more about Shakespeare's interest in natural phenomena than we did then serves to support my point. Even the names of *King Lear*'s major characters—Albany, Gloucester, Cornwall, France, Burgundy, and Kent are all named for specific geographical places—display a sharp Shakespearean focus on the physical map of Europe, not unlike the map that Lear presents ("Give me the map there") at the play's opening (*KL*.1.1.36).

The eclipses were not the only extraordinary celestial events taking place in 1605. A "blazing starre" or *stella nova* that appeared in the constellation of Ophiuchus in 1604 was still bright in 1605 and was referred to specifically by Jonson in a passage outlining a series of unusual (and real) contemporary events used as omens in *Volpone* (2.1.47–50).

We now know that Kepler's star, as it is now called, was a supernova, the result of a star whose central core collapsed, sending the rest of its matter hurtling into space and shining as brightly as the combined light of all the other stars in our galaxy combined. Although no one was aware of the true nature of the star at the time, it was easy to be aware of its presence as it shone brightly enough to be visible "like a burning light" (Christianson, 275). It is a further contention of this dissertation that the two fields relating to the stars, what we now refer to as astronomy and astrology, became recognized as different fields during Shakespeare's time, partly because of the unusual celestial events going on. There were two ways of studying and interpreting these events, that of *astrologia naturalis* and the other of *astrologia judicialis*. The former holds that heavenly bodies have influence on physical manifestations of our lives, like weather and physical matter. The latter suggests that these bodies influence human destiny (Sondheim, 243–259).

## The Major Celestial Events of the Period

That this period is a rich one for the sky is evidenced by the following parade of celestial events:

1. The supernova of 1572: We now know that Tycho's star, as it is called, was the first supernova visible from the Earth in almost 400 years, the result of a star whose central core collapsed, sending the rest of its matter hurtling into space and shining as brightly as the combined light of 200 billion suns.
2. Tycho's comet of 1577: Discovered by Tycho Brahe (among others) on 13 November 1577, this comet was brighter than any seen in the previous century.

The comet was followed by a procession of 20 other comets, all visible to the unaided eye in this pre-telescopic era.

3. The Great Conjunction of 1583: This event occurring once every 20 years is a closing together of Jupiter and Saturn.
4. The Lunar Eclipse of December 1591: While the eastward-moving Moon was still in partial eclipse, it passed in front of Saturn, an event which has not occurred since then.
5. Eclipses, particularly in 1598 and 1605: While clouded out in London, the effects of the darkening of the sky during the 1598 eclipse were recorded by Queen Elizabeth I's aide John Dee. More than 99 % of the Sun was covered at maximum eclipse; it was even closer to total in Stratford, and was total 160 miles away near Neath, England. From London, Dee wrote: "Feb. 25th, the eclips. A clowdy day, but great darkness abowt 9½ mane" (Dee 61). There were actually three eclipses in 1605: a total lunar eclipse on the evening of April 3, a partial lunar eclipse on September 27, and a near-total solar eclipse on October 12.
6. A heavy shower of meteors in November 1602: The Chinese text *ThienWen-Chih* records that on November 6, "Hundreds of large and small stars flew, crossing each other." The Korean text *Munhon-Piko* records that on November 11, "Many stars flew in all directions." (http://www.amsmeteors.org/comets/meteors.showers/leonidancient.htm, Levy, 12) Although this was a significant event in some parts of the world, it was not visible to as great an extent over England. It is possible that the shower was also seen from England, in much the same way as the 1998 Leonid meteor shower was intense, for more than 36 hours, all over the world. (It is also obvious that one of these two references has an incorrect date.)
7. A second supernova in 1604: This *stella nova* in Ophiuchus outshone every other star in the sky and was brighter even than the planet Jupiter. It remained bright throughout 1605. The appearances of two observable supernovae in our own galaxy within a single human lifetime are unprecedented; no supernova event visible to the naked eye has appeared since.
8. The Telescope, 1608: Although there is controversy over who actually was the first to point a telescope to the sky, no doubt exists that Galileo was the first to observe the Moon, Jupiter, Venus, and the Sun, to record carefully these observations, and then to publish them widely. Galileo made the sky more democratic; anyone with a telescope could see what he saw. But he also started astronomy's road to where it is now, where a class of professional astronomers no longer "looks" at the sky but digests it in the form of computerized data.

## The Emerging Role of Compilatio

In her article "Lover, Poet, or Astronomer: Collecting Stars and Poems with David H. Levy," Janine Rogers of Mount Allison University posits that literature can influence the way the night sky is read. Building on philosophers like Plotinus and

Marsilio Ficino, who wrote that "The celestial configurations are like the letters in a book which explain the divine concepts" (Garin, 67) she expanded on the idea of "reading" the night sky as a book, for it provides a rallying point for the ideas of observation, and supports my rationale for interpreting appropriate fragments of literature that help us "read" a particular aspect of the contemporary night sky.

Rogers introduces the term *compilatio*; a relative of *complication* which represents "the action of folding together" (OED), this refers to bringing together two disparate fields of study that would, on each surface, appear to have little in common. *Compilatio* is seen as a way of "building a greater understanding of the world through layering of several texts together." As a specific medieval concept, the term invites a collection of material from different sources, and then reassembles them in a new and different framework. (Rogers, personal communication, January 2008, 13 July 2008, 16 July 2008)

Benefits from this research work both ways; sky references reveal new meanings in the literature, and they also help us understand the sky as it appeared at the time of writing.

Was Shakespeare interested in the night sky? The frequency and depth of his references make it virtually impossible to argue that he was not. In attempting to interpret these references, I suggest contexts that complement more traditional approaches; in some cases it is even possible to point to a specific sky event, like an appearance of Venus in the evening sky that follows or precedes the accepted date of composition. Besides helping to interpret the works themselves, these interpretations are designed to nurture comparisons between literary passages and night sky objects or events.

*Compilatio* can be seen as a creative act of interpretation. As annotative as it appears, it is more than a passive collection of historical and literary facts, but is instead a recompilation of a series of experiences that the writers of that distant time shared with their readers.

## Spiritus Mundi

> From four centuries in the future comes a hazy image of
> A shape with lion body and the head of a man,
> A gaze blank and pitiless as the sun …
> (Yeats, "The Second Coming", ll. 14–16).

The idea of *Spiritus Mundi* emerging from Yeats's "The Second Coming" is intended as a "universal subconscious" or source of meaningful images or poetry. Although it is a twentieth century term, the idea is forged from the past, where common images used in plays and poetry have a shared provenance. The eclipses and storm in *King Lear* (1.2.101), the star "westward from the pole" at the opening of *Hamlet* (1.1.35–38), the image of Romeo cut into little stars in *Romeo and Juliet*

(3.3.21–25), and even the "rotten humidity" of *Timon of Athens* (4.2.1–2) are all natural images apparently emerging from nature's grand repository. They are not personal, nor are they specific to a single writer; they appear to be available to anyone with the temerity to explore the natural world. Shakespeare, Spenser, Sidney, Jonson, and Fletcher all possessed this skill, as did writers in later eras, like Wordsworth, Byron, Keats, Tennyson, Hopkins, and Yeats.

## Sky-Related Writings at This Time

It seems likely that specific major events in the sky, like blazing stars and eclipses, generated an increased interest in other, less important events in the sky. Sidney's *Countess of Pembroke's Arcadia*, completed around 1580, contains Klaius's hymn to the planet Mercury as seen at different times in the evening and in the morning (Sidney, *OA*.4.7–10). The celestial clock is used in the literature of the time, and examples of it, as well as their significance, are part of this dissertation. One particular example is Spenser's use of lunar phases as a clock in *The Faerie Queene*:

> Now haue three Moones with borrow'd brothers light,
> Thrice shined faire, and thrice seem'd dim and wan (*FQ* 3.3.16); again in Book 4: "But till the horned moone three courses did expire" (4.6.43); and once more in Book 5: "As the faire Moone in her most full aspect" (5.5.3). Since Virgo rises at dawn only at one particular time in the year, it is useful as an indicator of the time of year of a particular incident. The Moon's orbit around the Earth, on the other hand, is a timepiece that measures either the passage of months (three courses) or the particular time of a month (most full aspect).

(C) Discussion.

Although general discussions of the use of astronomical references in Shakespeare and his contemporaries have appeared from time to time, it is far less common to find investigations that emphasize the literary reaction to actual events in the sky as opposed to theories about it. Discussion about astronomy in Shakespeare seems to occur in cycles; in the 1930s a series of letters to the *Times Literary Supplement* considered the eclipses in King Lear, but the subject has not been considered actively since then despite the recent advent of far more accurate maps showing precisely how the eclipses were viewed from London. One of the *TLS* letters, for example, diminishes the importance of the October 1605 solar eclipse as a small partial eclipse (Harrison et al. 836, 78, 96). We now know (Espenak) that the event was a major eclipse in which almost the entire Sun was covered by the Moon, and that the lunar eclipse that preceded it was a deep partial eclipse which, at maximum, covered the entire Moon in either the Earth's umbral or penumbral shadow. A new look at these early modern celestial events would benefit from the more precise models that are available today.

In his 1922 study on astronomy and poetry, Cumberland Clark's *Astronomy in the Poets* does go beyond traditional references to stars and astral influence, pointing out less obvious but important references to the night sky. "Galileo read the

open volume of the sky," wrote Clark, "while Shakespeare described its beauties to enrich his verse." These references include some of the celestial moods that are so evocative, including the many descriptions of dawn and sunrise that appear throughout Shakespeare (*Hamlet* 1.1.166–167, *Romeo and Juliet* 1.1.116, 130–134, 2.1.1–6, *Venus and Adonis* 1–2, 856). These poetic allusions cover a broad range of seasons and weather patterns, and offer the casual reader a way to relate to the sky of the time.

If Bacon's 1605 treatise *The Advancement of Learning* was a call to arms to learn about nature through direct observation, the invention of the telescope, and its use as a tool to increase humanity's appreciation of nature, fortified that call. The use of the telescope to study the sky, and its immediate consequences during the following decade, are events that delimit the terminal point of this study. This book expands on the general references provided by reviewers like Albanese, who painted a picture of humanity's appreciation of the sky from that time and how it led to the creation of new interests in extant forms of literature.

Studies about conditions, appearances, or events in the sky as described in the literature of the time seem relatively sparse in comparison to research about the astrology of the time. Garin's *Astrology in the Renaissance*, Grant's *Planets, Stars, and Orbs,* Meadows' *The High Firmament*, Russell's *The Copernican System in Great Britain*, and Alan Weber's dissertation *Shakespeare's Cosmology* are among the sources available. "Shakespeare—for or against astrology" (Whitfield 178–79) notes that Shakespeare, though not a fatalist, suggested that "the rise and fall of great men was subject to some external power." Whether he actually believed that is unknown, but what is important is that he respected the fact that his audiences did. The result is a richer collection of allusions to the night sky.

In relating the astronomical events to the literary works of this period, I intend to use both astronomical and literary sources. Astronomical sources will include works dating from both recent and Shakespearean times, plus letters, diary entries, and other evidence that astronomical events taking place in the early years of the seventeenth century were noticed and commented upon by the population, from James I down to his lowliest subjects.

(D) Basic plan. This section outlines the six chapters of this dissertation:

Preface
General Introduction
(1) The *stella novae* of 1572 and 1604
(2) A rich harvest of comets from 1576 to 1607, as well as possible meteor showers and storms around the turn of the century
(3) The eclipses
(4) The "great conjunctions" of 1583 and 1603
(5) The telescope
Appendix: A selection of references to the sky in writings from 1572 to 1620
Conclusion
Works Cited

(E) *Criteria for identification of astronomical references or allusions*. My method for identifying astronomical references or allusions will subject them to the following criteria:

1. Can the reference be connected to:
   (a) a specific event in the sky? or
   (b) a kind of event in the sky (like an eclipse) with which readers would be familiar? or
   (c) a more general cultural belief about the sky?
2. How can the reference help us to understand an aspect of the contemporary night sky?
3. Can the reference help us to appreciate the author's intent within a particular passage?
4. How does the reference function within the context of the writing?

## A Personal Note

If one must choose a different sky from that of our era to pursue, why this particular one? It is the height of good fortune that two supernova events—those of 1572 and 1604—and a string of comets dotted the sky during the same period that produced the works of Shakespeare and Marlowe, even more so considering there had not been a similar nova since 1054, nor has one been so brightly visible in our own Milky Way galaxy since then; that of 1181 was less widely observed, with only Asian mentions in the historical record. What was the effect that these stars had on contemporary creative literature? In 1605, the year of the three eclipses, the 1604 supernova in Ophiuchus was still bright in the night sky, and Galileo's first use of the telescope was but 5 years away. Who would the observing partners of the time have been? I had always thought that Francis Bacon would have been one of them, but he spent almost of all the leisurely months before Parliament opened on 5 November 1605 (in the shadow of Guy Fawkes) writing *The Advancement of Learning*. Considering that Bacon is almost universally credited with developing the scientific method with its emphasis on rigorous observation and experimentation, I was surprised to find no reference to the rare series of eclipses during the year of its writing, or to the 1604 supernova, which both offered evidence of knowledge that could be gleaned from direct observation; instead I found only Bacon's general statement that "The astronomer hath his predictions, as of conjunctions, aspects, eclipses, and the like" (Bacon 112).

Other authors in 1605 did, however, refer to these events. While Samuel Rowlands joked over how seriously some people took the unusual astronomical events, I suspect he would have made an excellent observing partner in those last

exciting years between the supernova of 1572 and the first turning of a telescope to the sky in 1610:

> His dinner he will not presume to take
> Ere he aske counsell of Almanacke
> Perhaps he spake it when the Moone did change
> And thereupon no doubt th'occasion sprung
> Unconstant *Luna* over-rul'd his tongue.
> Astronomers that traffique with the skie
> By common censure sometime meet the lie;
> Although, indeed, the blame is not so much
> Where Stars and Planets fail, and keep not tutch. (Rowlands, n.p.)

By taking this relatively new interdisciplinary field as its topic, this dissertation departs from deep interpretation in a narrow branch of English literature to a more overarching set of insights spread over a broad segment. It is my hope that these pages will help inspire students to explore more fully these ideas.

Today we are still debating the relationship that humanity has with the cosmos, though at a different level. Eclipses do not affect our futures, to be sure, but comets colliding with the Earth might well have brought the building blocks of life—the carbon, hydrogen, oxygen, and nitrogen that have been called the "simple alphabet of life." If that is true, then humanity indeed has extraterrestrial origins. As a practitioner of science in a time of deeply rooted beliefs in the power of cosmic forces, Kepler was a pivotal figure in defining the role of astrology at that time; he prepared horoscopes at the same time that his observations of the supernova of 1604 and his development of the laws of planetary motion were being taken seriously throughout England and Europe. Kepler accepted the prevailing ideas of judicial astrology and the idea that some events had metaphysical causes. His vision of astrology, however, had less room for the idea of signs than for the simplicity and elegance of the solar system (North 313, 318). He also objected strongly to the spiritualism and demonic magic that was practiced at the time by John Dee (Casaubon 22, Woolley 1) and by Lewes Lauaterus (83) in his 1572 book *Of Ghosts and Spirits Walking by Night*.

This is the study of a time, not of a specific author; it is an investigation of the relationship of two fields of endeavor, and not of a single aspect of literature. It focuses on how a series of actual events in the sky, rather than theories about the Universe, was an important motivating factor in the creation of new literature, and explores these celestial events as they are described, alluded to, or imagined, in different texts by different authors. The extent to which there are accurate representations of celestial phenomena in early modern English Literature has hitherto been underestimated (Figs. 1 and 2).

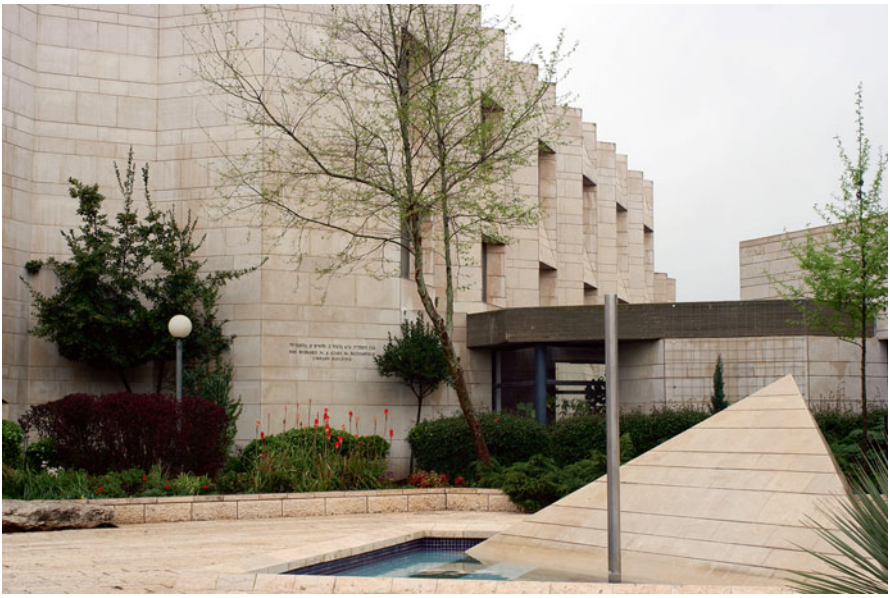


**Fig. 2** The Bloomberg Library of the Hebrew University of Jerusalem, where the author received his Ph.D. in 2010, is one of the best research libraries in the world. Photograph by the author