CHAPTER

Introduct

Why Eclipse Exp

This book is about the practice and e
torian era. It focuses on solar eclipse exp
carried telescopes and spectroscopes to r
of Africa, the mountains of Japan, the C
and islands in the Caribbean and the Pa
by the moon for as long as seven minute
considerable scientific importance, but t
of-the-mill astronomy, which is usually
observatory, at the blackboard, or mor
station. Still, some Victorian astronomer
is to explain why a reader might share t
way I follow a long tradition, for books
with an apologia. Almost exactly a centu
felt obliged to defend his book *Remarkab*
ined, "someone will exclaim, 'What, a
there not enough already?' The author ca
one?'"[1]

There are fewer books written about e
is not so little. It is my aim in this chapt
science can learn from this topic. Certa
received more notice in their day, and to
of geographers like Sir Richard Burton,
win and Henry Walter Bates, are better
acters in my story. Compared to these e
and whose impact was measured over
lives, as so often happened), eclipse exp
tronomers put up with sleepless nights
ments, problems with assistants, nightma
ties getting good food in the field, but
animals and disease, and none with death

Eclipses Observed by British

Year	Area visible
1842	Scandinavia
1851	Europe
1860	Spain
1868	India
1870	Spain and Mediterranean
1871	India, Ceylon, Australia
1875	Far East
1878	United States
1882	Egypt
1883	South Pacific
1886	Caribbean
1889	South America, West Africa
1893	West Africa
1896	Scandinavia, Russia, Japan
1898	India
1900	United States, Southern Europe
1901	Sumatra
1905	Spain, Egypt

But these events still have the power
even if they are not so well known or
experience. Eclipse expeditions produce
and artifacts, making it possible to reco
tions, life in the field, observational prac
of fieldwork in considerable detail. P
agendas, minutes of meetings, correspo
and foreign governments, observing note
transcripts of speeches, drafts of repo
newspapers, popular magazines, scientif
ographies; drawings of eclipses; and ph
ments, scientists and assistants at work,
around the sun—these materials fill file
in detail every aspect of expeditionary w
ditions were so heavily documented was
rian astronomy they were a big deal. As
portant part of Victorian science, so thi
was also a highly organized one. By wat

parties, and send expeditions out into
about its structure and behavior, and im
organization and politics of Victorian sci

Eclipse expeditions are also interestin
torian imperial culture and values, and
rian field sciences. Planners used eclipse
and science to imperialism, and our cu
such connections should make us keenly
articulated in earlier times. But reports f
peditions, and memoirs also lay bare d
ence and colonial culture that either wer
monly known as to be overlooked. The
so different from the grand expeditions
in their duration, size, funding—also is a
our understanding of what scientific fiel
new light on those kinds of better-known

Most of my story deals with expeditio
British scientific societies, the Royal Astr
of London, and British Association for th
casionally I will mention amateur scienti
but I spend little time on them for sever
expeditions were more important scienti
rious and advanced observers, and had ac
money, official favors, and all the other
easier. Sources also dictate this focus: of
half a dozen archives, while independent
a handful of published memoirs. For sim
about the role of women on expeditions.
in eclipse fieldwork, but they did appea
serve some discussion; however, British
steadfast silence on the roles women pl
couple of diary entries and brief recoll
document the experiences of natives, sa
listed as assistants or guards. As for indig
much derision and fear on the part of B
sources that describe the experience of ec
of view. This is especially unfortunate,
ences of watching an eclipse—and of wa
ture watch an eclipse—would have been
only one way, from European to native.

time discussing spectroscopic observation
tution, as these subjects have been dealt w
Instead, I have chosen to concentrate on
strategies and technologies astronomers
and photographs of eclipses.

Historiographic

Three scholarly literatures constitute
this book: the diverse body of work refe
ogy studies (STS); the no less varied lite
and science; and the more focused and u
and empire.

SCIENCE AND TECHNOLOGY STU

Science and technology studies is a lo
articles unified by the contention that s
is a process of "social construction" inf
cultural forces—traditionally considered
evidence, logic, and theories—factors t
nal" to science.[4] One strand of this lite
studies of scientific work, which set o
world of the laboratory is quite differen
losophers. Those differences are often m
by scientific controversies, during which
tacit assumptions, wrangle over metho
the rules by which arguments will be s
sented most famously by members of t
oped historical and contemporary stud
Thomas Kuhn, Robert Merton, and oth
Their most notable achievement has b
nomic, and cultural "interests" play a r
and bad science. In the mid-1980s, Steve
Leviathan and the air-pump and Martin
controversy announced a synthesis of
emergence of a new style of scholarship
since, the field has continued to diversify
plied and subjects opened up for investig
has been more influential than the emer
research area, and the reconstruction in

science.[6] These studies often emphasize t
work over the social or cognitive. Labo
have both received attention on these gr
stripped by instruments—the subject of
the producers of scientific data, the grou
periment meet. Studies of practice have
technicians, assistants, artists, and adm
sential members of the research enterpri
the background.[7] Another group has app
and literary theory to science, arguing (o
and discourse are of overriding importa
ment of scientific ideas. More recently,
constructivist tradition, the overtones of
have changed in yet a different way. The
to the "construction" side of the phrase
factured and negotiated through practice
defined by interests and ideologies.[8] Thi
was debated in the 1970s and 1980s—
scientific ideas—and sets out instead to
works: how people work through episte
cal difficulties, and theoretical conundru
seems trustworthy. It also pays greater
posed by nature on scientific practice ar
and use of the term "constraint" is still a

This book is part of the emerging "p
ence studies.[10] Its desire to recapture th
along with the messy details of its practi
ditional social constructivism. In their q
social interests on science, the Edinburgh
the task of reconstructing the emotiona
and discovery. Perhaps, in order to estab
program, it seemed as necessary to move
turned science into an adventure as it w
accounts that reduced it to an exercise in
tive voice with a more rigorously anal
critics, who protest that "externalist"
downplay the difficulty with which new
Some have gone even further and argue
science make forces like ideology and po

than the ordinary work that scientists
The social constructivist program's not
about nature to social order and ideol
bought by sacrificing a sense of what it
dle a new instrument in the observatory
in the field, master a difficult techniqu
failure. Carefully crafted microstudies ha
struct the emotional or psychological dir
tioners. My own feelings about doing r
we ignore this aspect of science at our ov
ance I feel in libraries and archives, the
tions and diversions to work, the agony
ing, and the pleasure I enjoy after solving
lem all explain why I became a scholar,
life of the mind in the face of mixed prof
is an addiction, not just a job. I'm cer
would have understood my feelings.

Passions, like social interests, are hard
to link to intellectual commitments or r
strument or technique. Popular accounts
moments, the excitement of the experi
discovery show that this can be done b
Ginzburg, Joan Scott, and others suggest
mentalites might reveal links between sc
titioners' worlds. The effort to uncover
giances, politics, and scientific ideas req
cal and emotional considerations. Now t
tors in shaping science has been establish
our accounts the feeling and flavor of
passion, and worry that scientists feel a
taken seriously, because they offer clues
and the relationship between identity an
ing "actants" with living and feeling pe
tween social life, culture, and work that
build a richer and more complete picture

VISUAL REPRESENTATION IN SCI

The literature on visual representatio
book. The subject of visual representat

upstage in popularity in the last decade.
to the study of instruments and practices
ten designed to generate visual records
practice underwrote a broad view of s
analysis of a wide range of visual mate
practitioners.[13] Visual records have also
seem well suited to revealing the constr
entific knowledge. Visual representations
are "ordered, shaped, and filtered . . . a
social actions" expressing a relationship
server and nature, between instruments
tions. The process of making pictures inv
of the world" in which social interests ca

The importance of imaging technique
of eclipse expeditions is obvious. One o
observers was to record the appearance
had to be done amid the many distractio
an eclipse. Much of my analysis follow
ture on visual representation; there are tw
sue with special vigor, and that define wh
First, the late nineteenth century is the
from drawing to photographing many n
to machines the observing and recordi
story is not a simple one: the virtues of
were not as clear during the shift as they
structing the details of this shift in eclips
how scientists weighed the merits of di
niques, and how the gulf between huma
developed. Second, I argue for the impor
rial life of pictures. Contrary to the ten
visual equivalent of words or ideas, sepa
they appear, this book argues that one n
studio, the lithographer's stone, and th
how images take their shape. Followin
that we leave the field, and follow pictu
bled into composites, and printed. It als
play between printing technologies and
velopments in the printer's shop coul
thought about and used instruments in th

The relationship between science and
been the subject of rich studies in the la
teenth century saw the development of t
vided into disciplines, conducted in uni
servatories, supported by governments
and publicized by scientific societies ar
also saw the dramatic expansion of Euro
ration of most of Africa, India, and As
London, Paris, Berlin, Brussels, or Was
ence and imperialism asks how these two
scientists put knowledge at the service o
opportunities created by imperial policie
rick's *The Tools of Empire* argued conv
nology were essential resources for Eu
possible expansion into Africa and Asia.
variety of scholars have explored the pu
context. Some of this work was patterne
British and European science, and exami
careers in the colonies, developed rese
ticulated service roles for science in the c
tutions.[16] Others studied disciplines, such
ogy, that were not transplants from the
sponse to local needs.[17] Edward Said'
work in cultural studies and subaltern st
ers) to probe the ways in which fields su
lonial peoples and territories.[18] Finally,
tables and examined non-Westerners' res

Victorian eclipse expeditions traveled
dered by British imperialism, the expan
systems and economies, and the diffusion
expeditions thus provide excellent oppo
in which scientists forged connections be
rial interests, and used colonial resources
studying the two issues in depth. First, th
colonial culture intersected, and the w
social lives of British colonial administra
ers affected life in the field. The docum
with vivid comparisons of British and i

which highlight the perceived (or assu
pean and non-European peoples. Secon
work provides us with an opportunity t
between the expansion of railroad and te
tary jurisdictions, colonial economic an
practice of science in the field. Indeed, th
made it possible for astrophysical fieldw
nections between science and imperialism
alignment of political programs, the struc
ideas that define the European self and c
traced into instruments, and mapped into

Organizati

The book is organized as follows. Cha
of eclipse expedition planning and organ
and cultural context in which that work
about observing methods and instrumen
fore parties set sail that we cannot under
tion from eclipse planning. Further, th
transformed Victorian science also sha
professionalization and specialization of
new disciplines, the growth of service ro
importance of government funding for t
the composition of planning bodies, the
peditions they assemble.

Chapter 3 follows expeditions into
about eclipse expeditions, and the liter
pressures that shaped them, but its mai
experience of fieldwork. This method is
tour's notion of "following the actors a
and live. Here we follow eclipse parties
tions and prepare themselves for the grea
field sites, setting up camp, preparing
training volunteers and assistants was
nately, it was all described in great de
tions. No study of eclipse expeditions w
scription of what it was like to stand in
most dramatic events, and to make obs
prevented from seeing it by clouds or rai

Chapter 4 examines the history of vi
tions of the solar corona. The invention
one of the most important events in the
tury; certainly this common reference po
one of the things that make the Victo
Eclipse observation taxed both astronom
and raised questions about the trustwor
that didn't exist in many fields. It is als
reproducing photographs and drawings
almost as important as producing them i
tween original and reproduced images is
tention in the history of science, but I h
importance.

Chapter 5 explores the deep links be
and the material culture of British impe
an exceptional bricolage with countless
significant portion of the globe, conn
steamships, railroads, canals, telegraph
tation systems. If Waterloo was won on
might say that India, South Africa, China
in the machine shops of Lambeth, the
physics laboratories of Cambridge and
tems shaped and bound the empire toge
only beginning to catalog and understan
of the late Victorian empire also allowed
sessions and protectorates into spaces
quiry. This is nowhere better revealed t
material culture of empire determined t
into the field and study the sun—to turn
tory.