Notes

Abbreviations Used

AB: Alan Bean

AC: Andrew Chaikin

AF: Arthur Frame

ALSJ: Apollo Lunar Surface Journal

ALSK: Alma Lou Shaw-Kuffner

ATEOS: At the Edge of Space (Thompson)

BA: Buzz Aldrin

BAP: Bruce A. Peterson

BEC: Bruce E. Clingan

BG: Bob Gustafson

BJC: Bruce J. Clingan

BL: Betty Love

CCK: Christopher C. Kraft Jr.

CDF: Charles D. Friedlander Jr.

CE: Cincinnati Enquirer

CKA: Carol Knight Armstrong

CP: Cincinnati Post

CPD: Cleveland Plain Dealer

CSM: Charles S. Mechem

CTF: Carrying the Fire (Collins)

DAA: Dean Alan Armstrong

DAG: Donald A. Gardner

DJH: Dora Jane Hamblin

DS: Dudley Schuler

DSS: Donald S. Stephenson

EC: Eugene Cernan

EFK: Eugene F. Kranz

EMB: Ernest M. Beauchamp

FB: Frank Borman

FOM: First on the Moon (Gene Farmer and Dora Jane Hamblin)

GER: George E. "Ernie" Russell

GJM: Gene J. Matranga

GLW: Gene L. Waltman

GWW: Grace Walker-Wiesmann

HAG: Herbert A. Graham

HCS: Harold C. Schwan

HG: Herschel Gott

HSC: Harry S. Combs

JAH: June Armstrong Hoffman

JBB: John "Bud" Blackford

JEL: James E. Lovell

JG: John Glenn Jr.

JGM: John G. McTigue

JM: John Moore

JSA: Janet Shearon Armstrong

JZ: Jacob Zint

KCK: Ken C. Kramer

KKS: K. K. "Kotcho" Solacoff

L: *Life* magazine

LBJ: Lyndon Baines Johnson

LN: Lima News (Ohio)

MC: Michael Collins

MOT: Milton O. Thompson

MSC: Manned Spacecraft Center

NAA: Neil Alden Armstrong

NK: Ned Keiber

NM: Norman Mailer

NO: The National Observer

NPRC: National Personnel Records Center (St. Louis, MO)

NYT: New York Times

OBR: Onboard Recorder

OFM: Of a Fire on the Moon (Mailer)

PFB: Paul F. Bikle

PJK: Peter J. Karnoski

RED: Richard E. Day

RFG: Richard F. Gordon Jr.

RJB: Roger J. Barnicki

RMW: Robert M. White

RTE: Return to Earth (Aldrin)

SA&DB: Stephen Ambrose and Douglas Brinkley (Profiles of Armstrong, Ambrose)

SKA: Stephen K. Armstrong

SMEL: St. Marys Evening Leader (Ohio)

SPB: Stanley P. Butchart

TB: Toledo Blade

TLA: Time-Life Archives

TS: Tom Stafford

TT: Tom Thompson

VEA: Viola Engel Armstrong

VEAP: Viola Engel Armstrong Papers

VAK: Vincent Aubrey Knudegaard

WAA: William A. Anders

WAB: William A. Bowers

WAM: William A. Mackey

WDN: Wapakoneta Daily News (Ohio)

WHC: We Have Capture (Stafford, Cassutt)

WHD: William H. Dana

WJK: William J. "Pete" Knight

WMS: Walter M. Schirra Jr.

WOL: *Wingless on Luna* (Documents, NAA)

Y&J: Chuck Yeager and Leo Janos

Prologue

1 *"Neil, we missed the whole thing":* BA quoted in AC, *Man on the Moon,* p. 227.

1 "numero uno *spot":* JSA to author, Park City, UT, Sept. 11, 2004 (morning), p. 27.

2 *"lunar-crazy":* Dutch comment quoted in "Europe, Too, Is Awaiting the Launch of Apollo 11," *NYT,* July 16, 1969.

2 *"This is the America we love":* Czech comment quoted in ibid.

2 *"12 percent of the entire Moon output":* German comment quoted in ibid.

2 *"the greatest adventure in the history of humanity":* French comment quoted in "Foreign Press Hails Apollo Mission," *TB,* July 17, 1969.

3 *"in a country whose people are so tired of politics":* French comment quoted in "Europe, Too, Is Awaiting," *NYT,* July 16, 1969.

3 *"these three courageous men": Pravda* comment quoted in "Foreign Press Hails Apollo Mission."

3 *"extend imperialism into space":* Communist newspaper comment from Hong Kong quoted in ibid.

3 *"What is there in thee, moon":* John Keats quoted in Wilford, *We Reach the Moon,* p. 17.

4 *"I'm shaky. I'm tearful":* Quoted in Bernard Weinraub, "Some Applaud as Rocket Lifts, But Rest Just Stare," *NYT,* July 17, 1969.

4 *"It's like mankind has":* Ibid.

4 *"How beautiful it is!":* R. Sargent Shriver quoted in "The VIP Guests Can Hardly Find Words," *NYT,* July 17, 1969.

4 *"At a tennis match":* Heywood Hale Broun quoted in CBS, *10:56:20 P.M.,* p. 21.

4 *"We are protesting America's inability":* Hosea Williams quoted in " 'Priorities' Under Fire," *LN,* July 15, 1969.

4 *"I was one of the proudest":* Reverend Abernathy quoted in CBS, *10:56:20 P.M.,* pp. 15–16.

4 *"There's so much that we have yet to do":* LBJ quoted in "Johnson Hails National Effort Behind Apollo 11," *NYT,* July 17, 1969. A fuller citation of LBJ's remarks can be found in CBS, *10:56:20 P.M.,* pp. 19–20.

5 *"when the van carrying":* Sevareid quoted in CBS, *10:56:20 P.M.,* pp. 13–14.

5 *"pressure might be too great":* VEAP, "Apollo 11, 1969," Part 3:1.

Part One: Boy Pilot

Chapter 1: An American Genesis

10 *The Armstrong name began illustriously:* The primary source used for the early history of the Armstrongs in Scotland is James L. Armstrong, *Chronicles of the Armstrongs* (Salem, MA: Higginson Book Co., 1902).

10 *emerged as a powerful force:* Technically, it is inaccurate to call the Armstrongs a "clan," a designation reserved for Gaels from the Gaeltacht, that is, Highlanders, with a recognized chieftain-based dynasty thought to be descended from the heroes of the Celtic past and with customs and traditions of governance, law, and society all of their own.

By contrast the "Names" of the Lowlands, like the Armstrongs, were more volatile associations, with few permanently recognized chieftain dynasties, which were organized on a feudal and personal basis rather than on the Gaeltacht's mix of custom and myths of common ancestry.

Unfortunately, this has not stopped modern descendants of these families from calling themselves a "clan." In fact, members of the Armstrong family—most all of them American tourists—took advantage of the occasion of Neil Armstrong's Moon landing in July 1969 to establish an organization at Mangerton in Liddesdale, Scotland, known as the Armstrong Clan Society. Spinning off from this organization in the past thirty-plus years has been an Armstrong Genealogy and History Center, Clan Armstrong Trust, and a number of dedicated Internet Web sites.

10 *Scott identified:* The entirety of Sir Walter Scott's "Minstrelsy of the Scottish Border" is available online at the Web site of the Edinburgh University Library: www.walterscott.lib.ed.ac.uk/works/poetry/minstrelsy.htm. Regarding Christie's Will, see also VEAP: Letter, Historical Research Associates, Co. Antrim, N. Ireland, to Mrs. Stephen Armstrong, Wapakoneta, OH, Feb. 3, 1986. This letter is part of a correspondence sequence between Historical Research Associates

and Viola Armstrong. Finally, see "Fermanagh Muster Rolls c. 1630," part of an Irish genealogy Web site called "From Ireland," administered by Jane Lyons, Dublin, Ireland: www.from-ireland.net/censussubs/fermanmust1630.htm, and "Ulster Ancestry: From the Muster Rolls of the County of Fermanagh, 1631," at www.ulsterancestry.com/muster-roll1663.html.

10 *married Mary Forster:* Forster (Forrester, Foster) was another one of the large Borderland reiver families. Although found more often on the English than the Scottish side, Forsters from both sides of the boundary intermarried. Sir John Forster (d. 1602) served more than nearly four decades as the warden of the Middle March. The dates here are correct: he lived to be over one hundred years old. The lineage between Sir John Foster and Adam Armstrong's wife Mary Forster (b. 1685) is unknown. Perhaps she was a granddaughter. If so, it would suggest a significant linkage between the Forster and Armstrong families.

11 *Jacobus Van Nuys:* Following the Civil War, one of the descendants of the Van Nuys family, Isaac Van Nuys, helped lay the foundation for what became the town of Van Nuys, California, north of Los Angeles. Members of today's Armstrong family believe, based on their genealogical research, that Isaac (1826–1884) may be directly related to Jacobus Van Nuys, the grandfather of Margaret Van Nuys's Stephen Armstrong. In his last will and testament, dated March 28, 1834, Jacobus Van Nuys ordered "the sum of one hundred dollars . . . payable to my Grandson Stephen Armstrong . . . be invested in land in the name and for the use of said Stephen Armstrong." Also in the will Jacobus bequeathed "to my grandson Stephen when he shall have arrived at the age of twenty-one years one horse, saddle and bridle and a suit of new clothing of at least the value of one hundred dollars in all, and desire that he may stay in my family during his minority and receive an education sufficient to enable him to transact business with facility." See VEAP: "Our Armstrong Family," pp. 8–9.

11 *How the Civil War affected:* A Stephen Armstrong did fight in the Civil War, but his full identity is unknown. He served as a private in Company A of the 53rd Regiment of Ohio Infantry. This regiment was organized at Jackson, OH, from September 1861 to February 1862, when it was ordered to Paducah, KY. Under the direction of General William T. Sherman, an Ohio native, the 53rd participated in the Battle of Shiloh and the sieges of Corinth and Vicksburg.

11 *married Martha Watkins Badgley:* The children of Martha Watkins Badgley seem to have left the River Road farm even before Stephen Armstrong's death. In 1871, seventeen-year-old Charles Aaron Badgley went off to study dentistry—his father's own ambition—with an uncle, Aaron E. Badgley, in Winona, IL. Charles finished school, went into practice with his uncle, and eventually became a doctor of

dental surgery in Greenfield, MO. Willis's half-sister Hettie also moved away, marrying a man from Springfield, IL, in 1877. What happened to George and Mary Jane is unknown.

12 *half-brothers Guy and Ray:* Ray Armstrong (b. 1895) and his first wife, whose name is not known, eventually divorced. He then married Leota Longmore Blything and lived in Pasadena, where he set up a successful electrical shop that eventually serviced the nascent motion picture industry. Upon retirement, he and Leota ("Lee") moved to Joshua Tree, CA. He died there in his late eighties. Stephen's half-sister Grace (1887–1969) married Ralph Koons in 1920, giving birth to three children: John, George, and Martha. The family stayed in the St. Marys area as farmers. Half-sister Bernice (1890–1971) became a teacher in the Cleveland school district. She married a Canadian man by the name of George Wilmer. Together they had one child, Marjorie.

13 *passage to America:* "Armstrongs Urgrossvater stammt aus Ladbergen," *Münsterländishe Tageszeitung,* Sept. 12, 1969.

13 *St. Paul Reformed Church:* "The Reformed Church in the U.S.," in *Handbook of Denominations in the United States, New Tenth Edition,* Frank S. Mead, rev. Samuel S. Hill (Nashville, TN: Abingdon Press, 2001), pp. 297–99.

13 *William Ernst Korspeter:* VEAP: "The Ernst Korspeter Family." Viola wrote this seven-page family history of the Korspeters in February 1977. According to a postscript, the account was given to her orally by her stepfather, William Ernst Korspeter, before he died in 1969.

13 *as a missionary:* VEAP: Letter to Reverend Charles Sloca PhD, Fairfield, IA, Oct. 27, 1969, p. 2.

14 *"thrilled beyond words":* VEAP: "The Willis Armstrong Family," p. 13.

14 *"baby boy was born":* Viola's delivery of baby Neil was extremely difficult. Her due date had been set by the doctor as August 4. The evening of August 4, 1930, found Viola sitting at the kitchen table writing a letter to Stephen, who was away on business in Lisbon, OH, some eighty-five miles to the southeast of the Korspeter farm: "The baby and I will be all right—you know, honey, if it's God's will. Today is the fourth and we haven't any little Teddy yet—but the day isn't up yet." As she closed the letter, a severe pain overcame her and a gush of amniotic fluid ran down her leg. Dr. Vernon Noble, who had was called in, said, "Well, I cannot save the child, but we will try to save the mother." Finally, at 12:31:30 on August 5, he managed to deliver the baby with the assistance of Stephen's sister Mary Barbara. Caroline Korspeter, Viola's mother, who was there, then finished her daughter's letter: "Papa Stephen. Baby weighs 8¾ lb. Viola was very sick from 9:30 P.M. to 12:31 A.M. Dr. had to take the baby with instruments. But

Viola seems to be getting along fine, but she is weak and sore. Baby is very pretty. Don't worry about Viola. If she takes worse we will let you know. Will write more tomorrow. Viola sent her love to you." VEAP: Letter to husband Stephen Armstrong, "Monday evening," Aug. 4, 1930; and VEAP: "The Willis Armstrong Family and the Stephen Armstrong Family," p. 15.

Chapter 2: Smallville

15 *would make* sixteen *moves:* NAA to author, Aug. 13, 2002, p. 8. In the view of his future wife, Janet Shearon, so much moving around from town to town as a boy did have a damaging effect on the formation of Neil's personality: "He didn't have the opportunity to develop the kind of friendships with pals like I and most children did. . . . Every place was a new place. I'm sure it had an effect on the development of his social abilities." JSA to author, Sept. 11, 2004 (afternoon), p. 28.

15 *read street signs by age three:* JAH: email to author, Sept. 11, 2003.

15 *"When it was time":* JAH to author, Aug. 14, 2002, p. 13.

16 *"He never* did *anything wrong":* Ibid.

16 *"definitely a caretaker":* Ibid., p. 16.

16 *"I never violated Neil's space":* DAA to author, Nov. 14, 2002, p. 11.

16 *"consumed by learning":* Ibid., p. 2.

16 *"He has a truthfulness about him":* VEA to DJH, May 9, 1969, tape 1B, p. 10.

16 *"My father's job kept him":* NAA: email to author, July 23, 2003.

16 *"Neil probably was never hugged":* JAH to author, Aug. 14, 2002, pp. 12–13.

16 *"Dear Mom and Family":* VEAP: NAA letter, 400 Salisbury, West Lafayette, IN, to Mrs. S. K. Armstrong, May 3, 1948.

17 *"Growing up in a small town":* JG to author, Sept. 23, 2003, p. 11.

17 *"The small towns, the ones I grew up in":* NAA to DJH, quoted in *FOM,* 112.

18 *"I probably got the job":* NAA: email to author, June 27, 2005.

18 *"save a substantial part of it for college":* NAA to author, Aug. 13, 2002, p. 10.

18 *"was around us all the time":* Ibid., pp. 11–12.

18 *"A new troop":* Tape-recorded letter, JBB, Concord, NH, to author, July 25, 2003, p. 3.

18 *"less of a disciplinarian":* Ibid.

18 *"I said, 'Here Neil, try some' ":* Ibid., p. 5.

19 *"thought he might get drafted":* NAA to author, Aug. 13, 2002, p. 12.

19 *"We double-dated":* ALSK to author, Aug. 15, 2002, pp. 2–16.

20 *"He thinks, he acts":* Copy of the Blume High School yearbook for the school year 1946–1947 can be reviewed at the Auglaize County Library, Wapakoneta, OH. Another copy of the yearbook is on display in Wapakoneta's Neil Armstrong Air and Space Museum.

Chapter 3: Truth in the Air

21 *"seemed to be Neil's main interest":* JZ quoted in Lawrence Mosher, "Neil Armstrong: Man for the Moon: History Waits for Him," *NO,* July 7, 1969.

21 *"the possibility of life on other planets":* JZ quoted in Boothe, "Neil Dreamed of Landing on Moon Someday," *WDN,* June 27, 1969.

22 *"The first thing he's going to do":* JZ quoted in Mosher, "Man for the Moon."

22 *picture of a smiling Zint:* Dallas Boothe, "Neil Dreamed," *WDN,* June 27, 1969; "Astronomer Jakob Zint Provided Neil A. Armstrong's First Close-Up Look at the Moon," *SMEL,* June 27, 1969; Mosher, "Man for the Moon"; Al Kattman, "Astronaut Realizing Teen-Age Dream: From Auglaize Farm Home to Trip and Walk in Moon," *LN,* July 9, 1969; "Moon Was a Dream," *Dayton Journal Herald,* July 11, 1969; "Jakob Zint, Wapakoneta Astronomer, Says 'Neil's Dream Has Come True,' " *SMEL,* July 21, 1969.

22 *"At 2:17 A.M. on July 21, Jacob Zint":* Mosher, "Man for the Moon."

22 *"It's unbelievable, when I think":* JZ quoted in "Jakob Zint, Wapakoneta Astronomer."

22 *"To the best of my recollection":* NAA: email to author, July 12, 2003.

22 *"I was only at Jake Zint's":* Ibid.

23 *"Almost Too Logical to Be True":* Photo caption to Mosher, "Man for the Moon."

23 *"Someday, I'd like to meet the man up there":* Crites quoted in Kattman, "Astronaut Realizing Teen-Age Dream," and in Mosher, "Man for the Moon."

23 *"That's fiction":* NAA: email to author, Sept. 15, 2003.

23 *"When Neil was approximately two or three":* SKA: exhibit recording at Neil Armstrong Air and Space Museum, Wapakoneta, OH, ca. June 1969.

23 *"I don't know what's true":* NAA to author, Cincinnati, OH, Aug. 13, 2002, p. 5.

23 *"One time we were headed":* SKA: exhibit recording at Neil Armstrong Air and Space Museum, Wapakoneta, OH, ca. June 1969.

23 *"I could, by holding my breath":* NAA to DJH, quoted in *FOM,* p. 19. See also NAA to author, Aug. 13, 2002, p. 8.

23 *"I began to focus on aviation":* NAA to author, Aug. 13, 2002, p. 5.

24 *"It never occurred to me":* NAA to DJH, quoted in *FOM,* p. 114.

24 *sometimes in flames:* DAA to author, Nov. 14, 2002, p. 4.

24 *"five or six at least":* JAH to author, Aug. 4, 2003, pp. 18–19.

24 *"I usually hung my models":* NAA: email to author, July 23, 2003.

24 *"While I was still in elementary school":* NAA to SA&DB, in *Quest: The History of Spaceflight Quarterly* 10 (2003), pp. 6–7.

24 *"I read a lot of aviation magazines":* Ibid., p. 7.

24 *"I won a number of events":* NAA to author, Aug. 13, 2002, p. 7.

24 *"gasoline-powered 'control-line' models":* Ibid., p. 6.

24 *"I absorbed a lot of new knowledge":* Ibid.

24 *"rode a bike with no fenders":* Jerre Maxson quoted in "Astronaut's Home Town Swept by 'Moon Craze,' " *Syracuse* (NY) *Post-Standard,* July 4, 1969.

24 *"They did what they called":* NAA to author, Aug. 13, 2002, p. 19.

25 *"He never had a girl":* SKA quoted in Mosher, "Man for the Moon."

25 *"I believe you could solo in a glider":* NAA to SA&DB, in *Quest,* p. 8.

25 *"You just heard the instructor":* NK to author, Aug. 15, 2002, p. 11.

25 *"never expressed any fear":* JAH to author, Aug. 14, 2002, p. 21.

25 *"The first time you solo any airplane":* NAA to author, Aug. 13, 2002, p. 20.

26 *"We saw the plane go down":* DAA to author, Nov. 14, 2002, p. 16.

26 *Lange died in Neil's arms:* "Frederick C. Lange Victim of Accident," *LN,* July 28, 1947; "Flying Student Killed in Plane Accident Saturday," *WDN,* July 28, 1947.

26 *pondering whether he should keep flying:* Mrs. Stephen Armstrong as told to Lorraine Wetzel, "Neil Armstrong's Boyhood Crisis," *Guideposts* (Feb. 1970): 3–7. In *FOM,* Farmer and Hamblin wrote: "[Neil's] mother thought that he might give up flying after he saw one of his fellow students die in a plane crash. . . . Neil spent most of the next two days in his room, his mother remembered, but he did not give up flying" (p. 114). I have not been able to locate the interview in which Viola suggested this to the *Life*

magazine writers, but the comments seem in character, even if it is not an accurate reflection of Neil's reaction to Carl Lange's tragic death.

26 *"I never felt he was affected by it in any way":* JAH to author, Aug. 14, 2002, p. 21.

Chapter 4: Aeronautical Engineering 101

27 *"shattering the sonic wall":* These were the words of Air Force Secretary Stuart Symington when he confirmed on June 10, 1948, that the Bell X-1 had broken the sound barrier. See Hansen, *Bird Is on the Wing,* p. 102. For a thorough history of the X-1 program, see Hallion, *Supersonic Flight*.

27 *"By the time I was old enough":* NAA: email to author, Oct. 14, 2003.

29 *medical examination recorded* "Physical Examination for Flying," Form NAVMED AV-1 (1943), dated Mar. 7, 1947, copy in Armstrong's military records file, NPRC.

30 *"an astronomical amount of money":* NAA to author, Aug. 13, 2002, p. 17.

30 *"great jubilation that I had been accepted":* Ibid., p. 22. In 1947, Armstrong's primary costs at Purdue University, all of which were covered by his navy scholarship, probably ran no higher than about $400 for the academic year. For college tuition in 1945, the GI Bill provided veterans with a maximum of $500 per academic year and out of that money the student had to pay for course fees, books, and supplies, estimated by the university at $40 to $50 per semester.

30 *navy appointment letter:* L. C. Conwell, Commander, USN, Officer Procurement Division, to Mr. Neil Alden Armstrong, 601 West Benton, Wapakoneta, OH, May 14, 1947, copy in Armstrong's military records file, NPRC.

30 *"Dear Mom & Family":* VEAP: NAA, 400 Salisbury, W. Lafayette, IN, to Mrs. S. K. Armstrong, 601 W. Benton, Wapakoneta, OH, May 3, 1948.

31 *"I was really getting old":* NAA to SA&DB, in *Quest,* p. 14.

31 *"maybe there was a way to find":* NAA to author, Aug. 13, 2002, p. 45.

31 "The *Land of Egelloc":* VEAP: Copies of show programs for "Student Union Presents 'Varsity Varieties,' " Nov. 19, 1952, and Nov. 20, 1953.

32 *party cohosted by Janet's sorority:* JSA to author, Sept. 10, 2004 (morning), transcript, p. 19.

32 *"damage sufficient to prevent flying it back":* NAA: email to author, Dec. 3, 2002.

Part Two: Naval Aviator

33 *"I'll always remember him":* Letter, Peter J. Karnoski, Las Vegas, NV, to author, Nov. 17, 2002, p. 3.

Chapter 5: Wings of Gold

36 *"NavCads":* "The NavCads were more expendable," recalled Tommy Thompson of Class 5-49. "The navy had very little invested in them as compared to having paid for two years of college for the midshipmen."

37 *Armstrong's marks averaged 3.27:* Grade reporting sheet, Navy Department, Bureau of Naval Personnel, Washington, DC, n.d., copy in Armstrong's military records file, NPRC.

37 *"The SNJ was a big step up":* NAA: email to author, Nov. 11, 2003.

39 *"The LSO had a paddle in each hand":* NAA to author, Aug. 13, 2002, p. 28.

39 *"even if you had thirty knots":* Ibid.

39 *"very emotional achievement":* Ibid., p. 27.

39 *"It is certainly a highly precise kind of flying":* Ibid., p. 28.

39 *"The fighter pilots always said":* NAA to SA&DB, in *Quest,* p. 9.

40 *"Typically you're going to ask":* NAA to author, Aug. 13, 2002, p. 31.

42 *eleven additional "nuggets":* EMB: letter to author, Nov. 12, 2002, p. 2.

42 *"like switching from a high-powered race car":* HAG: email to author, Oct. 20, 2002.

42 *"one of those magic moments":* NAA to author, Aug. 13, 2002, p. 31.

42 *"very serious and very dedicated":* WAM to author, Sept. 21, 2002, p. 13.

43 *flying was . . . "a bit scarce":* NAA: email to author, Nov. 14, 2002.

43 *"We felt that we would possibly":* HAG: email to author, Oct. 20, 2002.

43 *"We didn't know to what extent":* NAA to SA&DB, in *Quest,* p. 10.

43 *"The speeds tended to be higher on the jet":* NAA to author, Aug. 13, 2002, p. 32.

43 *"I happened to be a day fighter pilot":* NAA to SA&DB, in *Quest,* p. 10.

44 *"Ensign ARMSTRONG is an intelligent":* Officer's Fitness Report signed by Capt. Austin W. Wheelock, Commanding Officer, USS *Essex,* June 30, 1951, copy in Armstrong's military records file, NPRC.

44 *"a big letdown for us":* KCK: email to author, July 3, 2003.

Chapter 6: Fighter Squadron 51

46 *great adventures of their lives:* GER to William Holloway, Cincinnati, OH, Mar. 17, 1999, communicated to author in email from Holloway, Dec. 3, 2003.

46 *the first time navy fighters escorted:* On the Rashin raid on Aug. 25, 1951, see Hallion, *The Naval Air War in Korea,* pp. 181–85.

46 *"The four-plane division":* NAA: email to author, Nov. 25, 2003.

47 *"I would have appreciated":* NAA: email to author, Dec. 21, 2003.

47 *"We did that by blowing up trains":* Ibid., p. 35.

48 *"We really ran into a terrific concentration":* Rickelton diary, entry for Sept. 3, 1951. A copy of the Rickelton diary can be found in the author's *First Man* papers within the Neil Armstrong Collection at Purdue University Archives.

48 *"intended to come down in the water":* NAA to author, Aug. 13, 2002, p. 36.

49 *"received a lot of favorable notice":* HAG: email to author, Oct. 23, 2002.

49 *"Bailed out over Pohang":* Armstrong logbook, original in the Purdue University Archives.

49 *The Air Group had destroyed":* Commander, Carrier Air Group Five to Commanding Officer, USS *Essex,* "Action Report of Carrie Air Group FIVE (18 August 1951–19 September 1951," Sept. 22, 1951, p. 5.

49 *"They never missed an opportunity to shoot":* NAA to author, Aug. 13, 2002, p. 38.

52 *"The admiral came down":* WAM to author, Sept. 21, 2002, p. 19.

Part Three: Research Pilot

55 *"In the end the accuracy of the results":* Captain Henry T. Tizard, pilot in the Testing Squadron of the British Royal Flying Corps during World War I, and later the chair of the Royal Air Force's Committee for the Scientific Survey of Air Defense, Aeronautical Society of Great Britain, *Aeronautical Journal,* no. 82 (Apr.–June 1917)

Chapter 7: Above the High Desert

57 *"My options were either to extend my time":* NAA to SA&DB, in *Quest,* p. 13.

58 *"asked if he could come down":* NAA to author, Nov. 26, 2002, p. 1.

58 *post at Lewis laboratory:* While working in Cleveland, Armstrong lived sixteen miles southeast of downtown at 424 Fair Street, Berea, OH.

58 *"Piloting of aircraft for research projects":* Annual Qualifications Questionnaire, Inactive Reserve, USN-R, "Armstrong, Neil Alden," June 30, 1954, copy in Armstrong's military records file, NPRC.

58 *"the scientific study of the problems of flight":* Public Law 271, 63d Congress, approved Mar. 3, 1915. The complete text of the NACA's charter appears as Appendix A in Hansen, *Engineer in Charge,* p. 399.

59 *"NACA flew successfully an instrumented vehicle":* This sentence is from the following NASA memorandum: John H. Disher, Deputy Director, Apollo Applications Program, NASA Headquarters, to Joseph E. Robbins, Administrative Officer, NASA Wallops Station, Wallops Island, VA, Aug. 1, 1969, copy provided to author by G. Merritt Preston, a former NACA Lewis engineer, copy in author's Preston file. Disher's memo informed former Wallops Island director Joseph A. Shortal's *A New Dimension. Wallops Flight Test Range: The First Fifteen Years* (Washington DC: NASA RP-1028, 1978). A shorter but more comprehensive survey is provided in Wallace, *Wallops Station and the Creation of an American Space Program.*

59 *"did a lot of analyzing data":* NAA to SA&DB, in *Quest,* p. 15.

59 *"it was the right one":* Ibid.

59 *"The only product of the NACA was research reports":* Ibid.

59 *"So when you prepared something for publication":* NAA to author, Nov. 26, 2002, p. 2.

60 *"I walked over to his office":* Ibid., p. 1.

61 *"Neil knew me for three years":* JSA essay for DJH, "People Are Always Asking Me," n.d. (ca. June 1969), p. 2.

61 *Janet was "as strong as horseradish":* DAA to author, Nov, 14, 2002, p. 24.

61 *"We never really dated":* JSA to author, Sept. 10, 2004 (morning), p. 22.

61 *"It shocked the heck out of me":* DAA to author, p. 24.

61 *"that was for one semester":* NAA to author, Nov. 26, 2002, p. 43.

62 *total relaxation away from everything:* DJH interview with JSA, El Lago, TX, n.d. (ca. June 1969), p. 17. Copy in TLA.

62 *"some fifty miles but only one stop sign away":* Ibid., p. 1.

62 *"He wasn't very reliable":* BL to Christian Gelzer, Edwards, CA, Jan. 30, 2003, p. 7.

62 *"Then a fellow at the High-Speed Flight Station":* NAA to author, Nov. 26, 2002, p. 44.

62 *"I don't know if you could say":* BL to Gelzer, Jan. 30, 2003, p. 11.

63 *ran the truck into a ditch:* Ibid.

63 *"nobody wanted to ride with Neil":* Ibid., p. 12.

65 *flew a B-29 Superfortress:* At Edwards, the NACA flew two B-29s. One was a P2B-1S, a navy version of the B-29A (serial number 45-21787) designated as NACA 137; the other was a JTB-29A (serial number 45-21800), with no NACA number. The P2B-1S, flown from 1951 to 1959, served primarily as the D-558-2 mother ship, and the JTB-29A, flown from 1955 to 1958, as the mother ship for the X-1 series. The NACA's B-47A (serial number 49-1900), designated as NACA 150, flew from 1953 to 1957. The NACA also flew a B-50 as a launch aircraft.

65 *"Boy, this kid is not even out of high school yet!":* SPB to author, Dec. 15, 2002, Lancaster, CA, p. 8. Butchart thought so highly of Neil Armstrong that he insisted on participating in this interview even though the funeral for his wife of fifty-seven years, Miriam, had been only five days earlier.

65 *"I was in a learning mode":* NAA to SA&DB, in *Quest,* p. 15.

65 *"As they became more confident in my abilities":* Ibid.

65 *"Generally, the person in the left seat":* NAA to author, Nov. 26, 2002, p. 5.

66 *"I thought we'd hit another airplane":* SPB to author, Dec. 15, 2002, p. 7.

66 *"Armstrong was flying off our wing":* Ibid.

66 *"I wasn't too concerned":* SPB to Curt Asher, Lancaster, CA, Sept. 15, 1997, p. 26. Copy in the Historical Archives, NASA Dryden Flight Research Center, Edwards, CA.

66 *"try to slow down and hope":* Ibid., p. 31.

67 *"Jack, I've got to drop you!":* Ibid., p. 13.

67 *"Neil, you got control?":* Ibid., p. 14.

67 *"Neil kept saying, 'Get your gear down!' ":* Ibid.

68 *"We were very fortunate":* NAA to author, Nov. 26, 2002, p. 31.

68 *"I don't think I could ever get it supersonic":* Ibid., p. 8.

68 *"did a lot of landing work":* Ibid.

69 *"Our principal responsibility was engineering work":* NAA to SA&DB, in *Quest,* p. 18.

69 *"the most technically capable of the early X-15 pilots":* MOT, *ATEOS,* pp. 2, 16.

69 *"He understood what contributed":* WHD to author, Dec. 9, 2002, p. 7.

69 *"Neil ran circles around many test pilots":* GJM to author, Dec. 12, 2002, p. 21.

70 *"Neil did not have that bias":* Ibid., p. 7.

70 *"I was prejudiced for the fact":* CCK to author, Feb, 7, 2003, p. 7.

70 *"Neil was about as good as you could come by":* Ibid.

Chapter 8: At the Edge of Space

72 *"developing the first techniques":* This claim is made, for example, in the caption to a photograph showing Yeager in the F-104 available at http://mach1collectibles.com.

73 *"inadvertently touched down at 170 KIAS":* NAA, Aeronautical Research Engineer and Pilot, memorandum for record, "Pilot Familiarization; X-1B #385; Flight No. 14," Aug. 15, 1957, NASA Dryden Historical Archives.

73 *"It didn't really* fail . . . *I broke it":* NAA to author, Nov. 26, 2002, p. 13.

75 *"We used airplanes like the mathematician":* Ibid., pp. 39–40.

75 *"that there were many ways to induce":* Ibid.

76 *"We hypothesized that it would be possible":* Ibid., p. 34.

76 *"We persuaded ourselves":* Ibid.

77 *"probably the best simulator":* Ibid., p. 25.

77 *"The actual X-15 flights were":* Ibid., pp. 25–26.

77 *"various and sundry combinations":* GJM to author, p. 5.

77 *"Our technique involved a 360-degree":* Ibid.

78 *"We tried to work mathematical models":* Ibid., p. 6.

79 *"When you're dressed up in that pressure suit":* Ibid., p. 35.

79 *"Go ahead and proceed":* Radio "X-15-1 #670, Flight 1-18-31," Nov. 30, 1960, p. 1, History Archives, NASA Dryden.

Chapter 9: The Worst Loss

81 *"He didn't know anything about it":* JSA to DJH, El Lago, TX, n.d. (ca. summer 1969), p. 5.

82 *"They immediately started X-ray treatment":* Ibid.

82 *"She made it through Christmas":* Ibid., p. 6.

83 *"Just a short visit on a Sunday":* Ibid., p. 12.

83 *"I think he always felt":* GWW to author, Dec. 14, 2002, p. 12.

83 *"It hurt Jan a lot":* Ibid.

83 *"Jan was angry for a very long time":* Ibid.

83 *"It was a terrible time":* JAH to author, Aug. 14, 2002, p. 26.

84 *"A baby sheep had died":* Ibid., p. 27.

84 *"But it was a tiny girl":* UPI wire story, John L. Michael, "2-Year-Old Girl Bussed by Neil," Oct. 23, 1969. A copy of this article can be found in the archives of the *WDN*.

84 *"I never asked him . . . I couldn't":* JAH to author, Aug. 14, 2002, p. 27.

Chapter 10: Higher Resolve

85 *"It was a hard decision for me":* NAA to DJH, n.d. (ca. spring 1969), p. 8. Copy in TLA.

85 *"we were far more involved in spaceflight":* NAA quoted in *FOM,* p. 19.

85 *"I always felt that the risks":* NAA to SA&DB, in *Quest,* p. 17.

87 *"I could have kept flying the X-15":* Ibid.

87 *"I was also working on the Dyna-Soar":* Ibid., p. 19.

87 *"Apollo was just so overpowering":* NAA to author, Nov. 26, 2002, p. 59.

89 *"a severe right roll occurred":* NAA, "Pilots Flight Notes," Dec. 20, 1961, p. 1, copy in NASA Dryden Historical Archives.

89 *"One of the aspects of the MH-96":* NAA to author, Nov. 26, 2002, p. 41.

89 *"sure seem[ed] like a long time":* Ibid.

90 *"It was the highest I'd ever gone":* Ibid., p. 48.

90 *"I thought I got the g's high enough":* Ibid.

90 *"We show you ballooning":* Transcript of radio voice communications, "X-15-2; Flight 3-4-8; April 20, 1962," p. 5, copy in NASA Dryden Historical Archives.

90 *"Of course I'm trying to turn":* NAA to author, Nov. 26, 2002, p. 49.

90 *"I had no reason to suspect that ballooning":* Ibid., p. 50.

91 *"sailing merrily by the field":* NAA, "Pilots Comments, Flight 3-4-8," Apr. 21, 1962, p. 2, copy in NASA Dryden Historical Archives.

91 *"It wasn't clear at the time":* NAA to SA&DB, in *Quest,* p. 17.

91 *"Neil was supposed to land":* BAP to author, Dec. 9, 2002, p. 7.

91 *"I heard about it when fellow pilots":* WJK to author, Dec. 15, 2002, p. 9.

91 *"kind of giggled over it a little bit":* RMW to author, Nov. 12, 2002, p. 12.

92 *sounded like a "screw-up": to NASA officials:* NAA to author, Nov. 26, 2002, p. 51.

92 *"a learning thing":* Ibid., p. 52.

93 *"We went up there and looked it over":* Ibid., p. 22.

93 *"Let's go back and try it again":* Ibid.

93 *"Chuck started to chuckle":* Ibid.

93 *"The driver came out and he had a chain":* Ibid.

93 *"Any ideas?":* Y&J, *Yeager,* p. 182.

93 *"did not rise to the bait":* Email, Christian Gelzer, NASA Dryden Research Center, to author, "Re: Bill Dana," Feb. 27, 2004. This email communicated responses to questions posed to WHD by Dr. Gelzer, a NASA Dryden historian, on behalf of the author.

93 *"Yeager took delight in Neil's embarrassment":* Gelzer email to author, "Re: Bill WHD," Feb. 27, 2004.

93 *"Neil Armstrong may have been":* Y&J, *Yeager,* p. 181.

93 *"On this occasion at Smith Ranch":* NAA to author, Nov. 26, 2002, p. 23.

94 *"I did it just like we always did":* Ibid., p. 45.

94 *"So I lost hydraulic pressure":* Ibid.

94 *"So I had to make a no-radio approach":* Ibid., pp. 45–46.

94 *"There was a good jolt when I hit it":* Ibid., p. 46.

95 *"Oh no, not again!":* Ibid., p. 116.

95 *NASA formally announced:* Memo, Brainerd Holmes to Webb, Dryden, and Seamans, "Subj: Selection of Additional Astronauts," Apr. 28, 1962, with enclosure, "Gemini and Apollo Astronaut Selection." Also, Manned Spacecraft Center, "Space News Roundup*,"* May 2, 1962, p. 1; *Astronautical and Aeronautical Events of 1962,* p. 56.

97 *"There were several people from Edwards":* RED to author, Dec. 11, 2003, p. 10.

97 *"Charles Donlan was in charge":* CCK to author, Feb. 7, 2003, p. 2.

98 *"I didn't know about his daughter's death":* Ibid.

Chapter 11: I've Got a Secret

99 *"I was happy to get that call":* NAA to author, June 2, 2003, p. 5.

100 *"definitely on the list":* "NASA Test Pilot Named First Civilian Astronaut," *Washington Evening Star,* July 18, 1962, p. 1.

100 *"A number of us had combat experience":* Ibid.

100 *"there were some painful experiences":* NAA to author, June 2, 2003, p. 3.

101 *"There was one where they syringed":* Ibid.

101 *"They put you in a black room":* Ibid.

101 *"I didn't find it at all difficult":* Ibid.

101 *All thirty-two of the finalists:* Ibid., p. 5.

101 *"It was completely quiet":* Ibid., p. 7.

102 *the code name "Max Peck":* Ibid., p. 8.

102 *"There'll be plenty of missions for all of you":* Gilruth quoted in TS, *WHC,* p. 40.

102 *truly remarkable group of men:* A few women did apply for astronaut selection in 1962, but as Bob Gilruth explained at the Sept. 17, 1962, press conference, "none qualified." The other four civilian finalists for the second class of astronauts were Thomas E. Edmonds, John M. Fritz, Orville C. Johnson, and John L. Swigert. Of these, only Jack Swigert ever became an astronaut, as part of NASA's fifth class, chosen in 1966. Swigert, the first—and for many years—only unmarried astronaut ever accepted into NASA's astronaut corps, journeyed to the Moon as part of Apollo 13, replacing Thomas K. "Ken" Mattingly on the crew after he was grounded for being exposed to the German measles.

103 *"that the questions at the press conference":* NAA to author, June 2, 2003, p. 8.

Part Four: Astronaut

105 *"They say 'no man is an island'":* MC to author, Mar. 25, 2003, p. 20.

Chapter 12: Training Days

108 *first in a series of contractor tours:* Armstrong's itinerary has been reconstructed from his Travel Request and Authorization forms for the Manned Spacecraft Center in Houston, in Neil Armstrong

Collection, Purdue University Archives. Signing the forms at MSC were Donald K. Slayton, the "approving official," and Paul E. Purser, the "authorizing official."

108 *"They laid out lots of food":* TS, *WHC,* p. 42.

109 *"There wasn't anybody that had done this":* NAA to author, June 2, 2003, p. 11.

109 *"Vomit Comet":* Flight Crew Training Report No. 27, "Period: April 22–27, 1963," in NAA's personal papers.

110 *Dilbert Dunker:* Flight Crew Training Report No. 49, "Period: September 23–28, 1963," in NAA's personal papers.

110 *"If you can get up to twenty g's":* Faget quoted in WMS, "Our Cozy Cocoon," in Carpenter, et al., *We Seven,* p. 146.

110 *eight "dynamic runs":* Flight Crew Training Report No. 40, "Period: July 22–27, 1963," in NAA's personal papers.

110 *helicopter flight to preparations:* Flight Crew Training Report No. 457, "Period: November 18–23, 1963," in NAA's personal papers.

111 *"One of the things that I particularly did":* NAA to author, June 2, 2003, p. 16.

111 *"The guys who were mechanizing the equations":* Ibid.

111 *"the week in the barrel":* Armstrong's "week in the barrel" is laid out in Fred Asselin, Astronaut Affairs Coordinator, Office of Public Affairs, MSC, to Neil Armstrong, Astronaut Office, MSC, June 16, 1964, in NAA's personal papers.

112 *"Neil was a very reserved individual":* Ibid., p. 6.

112 *"Neil wasn't an expansive guy":* WAA to author, Sept. 8, 2003, p. 35.

112 *"Neil is as friendly as you can get":* JG to author, The John Glenn Institute for Public Service & Public Policy, Ohio State University, Columbus, OH, Sept. 23, 2003, p. 5.

113 *"I always got a kick":* JG, *Glenn: A Memoir,* pp. 391–92. According to Armstrong, this story about his theory on exercise, which has been often told over the years, is false. Neil denied ever having said it.

113 *"That a boy, Dave!":* David Scott to author, Atlanta, GA, Feb. 1, 2003, transcript, p. 22. I interviewed Scott the afternoon of the Space Shuttle *Columbia* accident.

113 *"He was very easy to work with":* Ibid., p. 31.

113 *"Neil was not the boisterous":* BA to author, Mar. 17, 2003, p. 6.

Chapter 13: In Line for Command

114 *"I had no expectation of getting it":* NAA to author, June 2, 2003, p. 18.

114 *"I have my own ideas":* Ibid., pp. 18–19.

115 *"One rule we had . . . was a guy could not be":* Ibid., p. 20.

116 *"Deke gave me the assignment":* Ibid., p. 21.

117 *"really pleased to be assigned":* NAA to SA&DB, in *Quest,* p. 23.

117 *"thousands of hours in the labs":* Ibid., p. 21.

117 *"A lot of the testing":* Ibid., p. 24.

118 *"a good visual representation":* NAA to author, June 2, 2003, p. 2.

119 *"We would be flying at a high altitude":* Ibid.

119 *"Ours was the first spacecraft":* Cooper, *Leap of Faith,* p. 135.

119 *"we'd released a rendezvous pod":* Ibid.

Chapter 14: Gemini VIII

122 *"In ancient Greek mythology":* NAA to author, June 2, 2003, p. 35.

122 *"Just after Dave and I slid":* Ibid., p. 37.

122 *"most times in airplanes":* Ibid., p. 36.

123 *"The Titan II was a pretty smooth ride":* Ibid., p. 37–38.

123 *"First, all you see is blue":* NAA to author, June 2, 2003, p. 37.

123 *"worried about the engine keeping running":* Ibid., p. 38.

124 *"A fundamental requirement of rendezvous":* Ibid., p. 40.

124 *"This was a teeny-tiny computer":* Ibid., p. 38.

124 *"What our mission planners worked out":* Ibid., p. 41.

126 *"At some point we knew":* Ibid., p. 42.

126 *"Once we completed our transfer arc":* Ibid.

128 *"We had gone into night":* Ibid., p. 44.

129 *"I really believed that we wouldn't":* NAA to SA&DB, in *Quest,* p. 26.

129 *"We had a couple of flights":* NAA to author, June 2, 2003, p. 34.

129 *"We disengaged successfully":* Ibid., p. 46.

130 *"I didn't know at the time":* NAA to SA&DB, in *Quest,* p. 26.

130 *"Our spacecraft turned into a tumbling gyro":* NAA to author, June 2, 2003, p. 45.

130 *"I became very concerned that we might":* Ibid.

130 *"to stabilize the spacecraft":* Ibid., p. 46.

131 *"We found the culprit":* Ibid., p. 47.

131 *"Murphy's law says bad things always happen":* NAA to SA&DB, in *Quest,* p. 27.

131 *"I knew what the mission rules were":* NAA to author, June 2, 2003, p. 46.

131 *"I had to go back to the foundation instincts":* NAA to SA&DB, in *Quest,* p. 26.

131 *"Dave and I understood":* NAA to author, June 2, 2003, p. 49.

132 *"We appeared to be dropping at a prodigious rate":* Ibid.

132 *"Being an old navy guy":* NAA to SA&DB, in *Quest,* p. 27.

132 *"We assumed it was friendly":* Ibid.

132 *"The Gemini was a terrible boat":* NAA to author, June 2, 2003, p. 35.

132 *"I was very depressed":* Ibid., p. 50.

133 *"I JUST HAD A PHONE CALL FROM NEIL ARMSTRONG":* Telegram, Hank Suydam, Houston, to Dave Snell, New York City, "RUSH PERSONAL," Mar. 29, 1966, copy in Neil Armstrong Collection, Purdue University Archives.

133 Life *continued to run articles on Gemini VIII:* In *Life,* Mar. 25, 1966, and Apr. 1, 1966.

133 *"I think we'd put this almost identically":* The contributions to the *Life* article entitled "A Case of 'Constructive Alarm,' " published in the Apr. 1, 1966, issue, were sent from Houston to New York by Teletype: Hank Suydam to Time, Inc., New York City, Mar. 28, 1966, copy in NAA personal files.

133 *"It didn't take long":* EC, *Last Man on the Moon,* p. 101.

134 *"Everybody second-guessed everybody":* AB to author, Houston, TX, Feb. 7, 2003, pp. 36–37.

134 *"I think there may have been":* BA to author, Albuquerque, NM, Mar. 17, 2003, p. 15.

134 *"I didn't hear any of the criticism":* FB to author, Las Cruces, NM, Mar. 15, 2003, p. 10.

134 *"I was damn impressed with Neil":* EFK to author, Dickinson, TX, Feb. 6, 2003, p. 5.

134 *"The crew reacted as they were trained":* EFK, *Failure Is Not an Option,* p. 174.

135 *"We tricked the astronauts on that one":* CKK to author, Feb. 7, 2003, p. 9.

135 *"I always felt as though":* NAA to author, June 2, 2003, p. 48.

135 *"So my guess . . . was that":* Ibid.

135 *"There was never any doubt":* Scott and Leonov, *Two Sides of the Moon,* p. 181.

135 *"It's conceivable that what happened":* NAA to author, June 2, 2003, p. 48.

135 *"They wouldn't have known what happened":* Dave Scott to author, Atlanta, GA, Feb. 1, 2003, p. 37.

135 *"would have caused a big glitch":* CKK to author, Feb. 7, 2003, p. 10.

136 *"If we had not recovered":* Scott and Leonov, *Two Sides of the Moon,* p. 180.

136 *"There was certainly nothing in the aftermath":* MC to author, Mar. 25, 2003, p. 11.

136 *"Not only was Neil quick-thinking":* WAA to author, San Diego, CA, Sept. 8, 2003, p. 10.

136 *"even greater confidence in Neil's abilities":* CKK to author, Feb. 7, 2003, p. 12.

136 *"In fact, the crew demonstrated remarkable":* Gilruth quoted in MSC, "Mission Evaluation Team Lauds Quick-Thinking Gemini VIII Crew," *Space News Roundup,* Apr. 1, 1966, p. 1.

Chapter 15: The Astronaut's Wife

137 *"space hero":* "Wapak Awaits Celebration for Hometown Spaceman," *LN,* Apr. 10, 1966.

137 *"Wapakoneta made the request":* NAA to author, June 2, 2003, pp. 53–54.

137 *"You are my people":* Carolyn Focht, " 'More Than I Deserve,' " *Columbus* (OH) *Dispatch,* Apr. 14, 1966; Al Kattman, "Proud Hometown Greets Astronaut," *LN,* Apr. 14, 1966.

137 *"more than I deserve":* Focht, " 'More Than I Deserve.' "

138 *"When the men a preparing for a flight":* JSA to DJH, Mar. 12, 1969, p. 2.

138 *"Certainly I realize that there are risks":* Ibid., p. 1.

138 *Janet was understandably furious:* See JSA to author, Sept. 10, 2004, p. 19.

139 *"Don't you ever do that to me again!":* Ibid., p. 20.

139 *"listening but not watching":* "High Tension over the Astronauts," *Life,* Mar. 25, 1966.

139 *"I simply know they were":* Ibid.

139 *"The picture published in* Life*":* JSA to author, Sept. 10, 2004 (afternoon), p. 19.

139 *"Elliot was a hard worker, diligent":* NAA to author, June 2, 2003, p. 29.

141 *"The reason the children weren't asphyxiated":* JSA to DJH, El Lago, TX, n.d. (ca. March 1969), *Life* interview, transcript, p. 10.

141 *"The first time I just held my breath":* NAA to author, June 2, 2002, p. 25.

141 *"the longest journey": he ever made* JSA to DJH, n.d. (ca. summer 1969), p. 13.

142 *"We could have easily all been":* Ibid.

142 *"It could have been catastrophic":* NAA to author, June 2, 2003, p. 27.

142 *"People are always asking me":* JSA tape-recording for DJH, transcribed Apr. 2, 1969, p. 5.

142 *"It never, never shows in Neil":* Ibid., p. 3.

142 *"I don't like to ask him questions":* JSA to DJH, Mar. 12, 1969, p. 2.

142 *"You don't want your children":* Ibid., pp. 7–8.

143 *"Living in the present is most important":* Ibid., p. 2.

143 *"our lives were dedicated":* JSA to author, Sept. 10, 2004 (afternoon), p. 28.

Chapter 16: For All America

144 *third run-through:* NAA to author, June 3, 2003, p. 1.

145 *"find out if you could keep":* Ibid., p. 2.

145 *"We'd go out on the beach":* Ibid., pp. 1–2.

147 *"All my adult life":* NAA: email to author, July 24, 2004.

147 *"spontaneous, friendly, and extremely warm":* George Low, *Latin American Tour With Astronauts Armstrong and Gordon, October 7–31, 1966,* unpublished manuscript, Nov. 16, 1966, p. iii.

148 *"Whenever possible . . . Neil and Dick were out of their cars":* Ibid., p. 58.

148 *"Neil had a knack of making short little speeches":* Ibid., pp. 61–62.

Part Five: Apollo Commander

149 *"As the day clock was ticking":* NAA to SA&DB, in *Quest,* p. 33.

Chapter 17: Out of the Ashes

152 *"non-staking-a-claim treaty":* NAA to SA&DB, in *Quest,* p. 29.

152 *a reception in the Green Room:* The astronaut who best recollects the details of the White House reception for the Outer Space Treaty that took place simultaneously with the Apollo fire is Jim Lovell. See Lovell and Kluger, *Lost Moon,* pp. 7–12 and 21–22.

152 *not to leave the hotel:* Quoted in ibid., p. 23.

153 *"did not know anything":* JSA to author, Sept. 11, 2004 (morning), p. 1.

153 *"from concern for the future":* Quoted in Lovell and Kluger, *Lost Moon,* p. 24.

153 *"I don't blame people for anything":* NAA to author, June 3, 2003, p. 6.

153 *"I suppose you're much more likely":* NAA to SA&DB, in *Quest,* p. 28.

153 *"that was an indictment of ourselves":* NAA to author, June 3, 2003, p. 6.

154 *Pat White:* For a discussion of Pat White and the effects of her husband's tragic death on her and her family, see Koppel, *Astronaut Wives Club*, p. 170 and pp. 185–87.

Chapter 18: Wingless on Luna

157 *Wingless on Luna:* Neil used this phrase as the title of the speech he gave before the Wings Club at the Inter-Continental Hotel in New York City on May 20, 1988, "Wingless on Luna," Twenty-fifth Wings Club, General Harold R. Harris Sight Lecture. Armstrong's lecture was published as a small book later that year, with Armstrong holding the copyright.

157 *"We knew that the lunar gravity":* NAA to author, Cincinnati, OH, June 3, 2004, p. 24.

157 *"That was a natural thing for us":* Ibid., p. 7.

158 *VTOL:* NAA, *WOL,* p. 6.

158 *"It looked like a big Campbell Soup can":* NAA to SA&DB, in *Quest,* p. 31.

161 *"Traversing large pitch or roll":* NAA, *WOL,* p. 6.

162 *"It worked surprisingly well":* Ibid., p. 9.

162 *"excessively sluggish":* Ibid.

162 *"The LLRF was a clever device":* NAA to author, June 3, 2003, p. 30.

162 *"Having no flying machines to simulate":* Ibid., p. 7.

165 *"Without wings . . . it could not glide":* BA and McConnell, *Men from Earth,* p. 187.

165 *"I wouldn't call it routine":* NAA to author, June 3, 2003, p. 27.

166 *"I'm saying, 'What happened!' ":* AB to author, Houston, TX, Feb. 7, 2003, pp. 23–24.

167 *"Gilruth and I were ready":* CCK, *Flight,* p. 312.

167 *"grilled every returning astronaut":* Ibid.

Chapter 19: Amiable Strangers

170 *"Deke laid out his thinking":* NAA to author, Cincinnati, OH, June 3, 2003, p. 17.

170 *"Jim had already been commander":* Ibid.

171 *"Deke didn't think that Fred":* Ibid., p. 18.

172 *"conceivable and may work out":* Ibid.

173 *"Moon Team Is Named": CPD,* Jan. 10, 1969.

173 *"amiable strangers":* MC, *CTF,* p. 442.

174 *"A closer relationship, while certainly":* MC to author, Marco Island, FL, Mar. 25, 2003, p. 15.

176 *"Charlie felt you should have been in it all along":* BA, *RTE,* p. 166.

176 *"I'm not sure I recognized":* NAA to author, June 3, 2003, p. 12.

176 *"didn't seem to gel":* Wendt and Still, *Unbroken Chain,* p. 129.

Chapter 20: First Out

177 *"Aldrin to Be First Man on the Moon":* New Orleans *Times-Picayune,* Feb. 27, 1969.

178 *"the subject was potentially too explosive":* BA, *RTE*, p. 205.

178 *"Clearly, the matter was weighing on him as well":* Ibid., p. 206.

178 *"equivocated a minute or so":* Ibid.

178 *"all the time struggling not to be angry with Neil":* Ibid.

178 *"it took a great deal of persuasion":* Ibid.

178 *"worked himself into a frenzy":* EC, *Last Man on the Moon,* p. 231.

179 *"I didn't really want to be first":* BA to author, Mar. 17, 2003, p. 23.

179 *"Neil was a member of the second group":* Ibid., p. 11. See also BA, *RTE,* p. 206.

179 *"the larger share of acclaim":* BA to author, p. 11.

180 *"the decision was stalled and stalled":* Ibid., pp. 206–7.

180 *"I went finally to George Low":* Ibid., p. 207.

180 *"plans called for Mr. Armstrong": Aeronautics and Astronautics Chronology on Science, Technology, and Policy, 1969,* (NASA, 1970), p. 108.

180 *"Our conclusion . . . was that the decision":* BA, *RTE,* p. 207.

180 *"Buzz's attitude took a noticeable turn":* MC, *CTF,* p. 352.

180 *"Buzz had it in mind":* Wendt and Still, *Unbroken Chain,* p. 129.

181 *"I can't remember the exact conversation":* NAA to author, June 4, 2003, p. 15.

181 *"In the Gemini program . . . the copilot":* NAA to author, June 3, 2003, p. 15.

181 *"I think that most people felt":* Ibid., p. 15.

182 *"Here's what you could have done":* AB to author, Houston, TX, Feb. 7, 2003, p. 11.

182 *"Right around the time of Apollo 9":* CCK to author, Houston, TX., Feb. 7, 2003, p. 16.

183 *"It should be Neil Armstrong":* CCK, Flight, p. 323.

183 *"Aldrin desperately wanted the honor":* Ibid.

183 *"It was unanimous. Collectively, we said, 'Change it' ":* Ibid., p. 17.

183 *"Buzz Aldrin was crushed":* Ibid., p. 323.

184 *"That was Deke":* Ibid., p. 16.

184 *"Aldrin asked me whether the decision":* George M. Low, Memorandum for Record, "Meeting with Buzz Aldrin," Sept. 14, 1972, copy in George M. Low Papers, Box 35, RPI Archives, Renssalaer Polytechnic Institute, Troy, NY.

184 *"It just seems to me":* NAA to author, June 3, 2003, p. 16.

Chapter 21: Dialectics of a Moon Mission

185 *"Neil would have regarded":* MC to author, Mar. 25, 2003, p. 15.

186 *"We practiced the lunar surface work":* NAA to author, June 4, 2003, p. 9.

186 *"All of us were exposed":* Ibid., p. 11.

187 *"That was principally dictated":* Ibid., p. 10.

187 *"the best that anybody did on the Moon":* Harrison Schmitt to author, Mar. 16, 2003, p. 3.

188 *"You are trying to build simulators":* Ibid.

188 *"Neil and Buzz has been descending":* MC, *CTF,* p. 352.

189 *"The three of us often ate dinner":* BA to author, Mar. 17, 2003, p. 20.

190 *"I don't recall that Buzz asked me to abort—ever":* NAA to author, June 4, 2003, p. 2.

190 *"I don't really remember":* Ibid.

190 *"I'm sure they improved their approach":* Ibid., p. 4.

191 *"There was the matter of lunar module":* Ibid., p. 13.

191 *"As a result of all the fine photographs":* Ibid.

192 *"Well, Deke, it would be nice":* Ibid., p. 19.

192 *"mission rules":* CCK, *Flight,* p. 117.

194 *"To get a handshake on the unwritten rules":* Ibid., p. 262.

194 *"I had high respect for mission rules":* NAA to author, June 4, 2003, p. 5.

195 *"In the last month, we had Neil":* CCK, *Flight,* p. 314.

195 *"Those conversations came back to me":* NAA quoted in ibid.

197 *"ill at ease":* NM, *OFM*, p. 26.

197 *"We're here today to talk":* NAA, Apollo 11 Crew Press Conference, MSC, July 5, 1969, 4A/2.

198 *"The most important part of the flight":* NAA to author, Sept. 19, 2003, p. 6.

199 *"What would, according to you, be the most dangerous":* Ibid., 4E/2.

200 *"surrendered words about as happily":* NM, *OFM,* p. 31.

200 *"answered with his characteristic mixture":* Ibid., p. 32.

200 *"the sly privacy of a man whose thoughts":* Ibid., p. 31.

200 *"a way to drift clear of any room":* Ibid., p. 34.

200 *"learned how to contend in a practical way":* Ibid.

200 *"extraordinarily remote":* Ibid., p. 27.

200 *"He was a presence in the room":* Ibid., p. 33.

201 *"the man nearest to being saintly":* Ibid.

201 *"Certainly the knowledge he was an astronaut":* Ibid., p. 27.

201 *"a shining knight of technology":* Ibid., p. 40.

201 *"interpret it properly, then attack it":* NAA quoted in ibid.

201 *"computerese":* NM, *OFM,* p. 41.

201 *"the more natural forms of English":* Ibid., p. 40.

201 *"large reactions, large ideas":* Ibid.

202 *"It's their success more than ours":* NAA quoted in ibid.

202 *"If they would insist on making":* NM, *OFM,* p. 40.

202 *"If I had a choice, I would take more fuel":* NAA quoted in ibid.

202 *"I think a private life is possible":* Ibid., p. 46.

202 *"I think we're going to the Moon":* NAA quoted in NM, *OFM,* pp. 43–44.

203 *"It was beautiful because it might":* NM, *OFM,* pp. 46–47.

203 *"It was therefore a dream":* Ibid., p. 47.

203 *"center of the suburban middle class":* Ibid.

204 *"enterprising beyond the limits of the imagination":* Ibid.

204 *"a new psychological constitution to man":* Ibid.

204 *a century that sought "to dominate nature":* Ibid., p. 48.

Part Six: Moonwalker

205 *"We were told: Save the Moon rocks first":* Mike Mallory, lecture on the Apollo 11 recovery operation, NASA Armstrong Museum, Wapakoneta, OH, July 21, 2017.

Chapter 22: Outward Bound

207 *"It was certainly a very high-performance machine":* NAA to author, Sept. 18, 2004, p. 2.

208 *"it's a key to the Moon":* Wendt and Still, *Unbroken Chain,* p. 132.

209 *"You could not fly the earlier models":* NAA to author, Sept. 18, 2004, p. 3.

209 *"It was a complete concentration":* Ibid., p. 4.

210 *"We couldn't see the rocket":* Rick Armstrong quoted in "Neil Armstrong's Wife Returns to Home in Texas," *SMEL,* July 17, 1969.

210 *"This, too, shall pass":* JSA to author, Sept. 11, 2004 (morning), p. 6.

210 *The "go" for TLI:* At 00:02:26:38 mission elapsed time, CapCom Bruce McCandless told the Apollo 11 crew, "You are Go for TLI." All quotations involving communications between Mission Control and the Apollo 11 spacecraft come from *Apollo 11 Technical Air-to-Ground Transcription,* prepared during the course of the mission by MSC's Apollo Spacecraft Program Office. A copy of the transcript is available in the historical archives at the University of Houston–Clear Lake. On board Apollo 11, a voice recorder captured what the astronauts said to one another when they were not in communication with the ground. This transcript, *Apollo 11 Onboard Voice Transcription, Recorded on the Command Module Onboard Recorder Data Storage Equipment,* was produced after *Columbia*'s return to Earth. This transcript, too, can be found in its entirety in the archives at UHCL. Regrettably, there is a major gap in the onboard voice recording. All voice data between 00:03:29:21 and 03:03:39:38—three days, ten minutes, and seventeen seconds' worth—was somehow erased during the flight, so there is no record of what the astronauts said

to one another during this lengthy period of time. In the following source notes, it is noted when the quotation comes from the Onboard Recorder (OBR).

210 *"In the first stage, the Saturn V":* NAA to author, Sept. 18, 2004, p. 3.

211 *"It was like a nervous novice":* MC, *Liftoff,* p. 2.

211 *"a small patch of blue sky":* Ibid., p. 3.

211 *"The purpose of doing the orbit":* NAA to author, Sept. 18, 2004, p. 4.

212 *"How does zero g feel?":* NAA at 00:01:17:41, OBR.

212 *"We were very fortunate":* NAA to author, Sept. 18, 2004, p. 5.

212 *"The problem with that thinking":* MC, *Liftoff,* pp. 3–4.

213 *"If the separation and docking did not work":* BA, *RTE,* p. 221.

213 *"Mike did this docking maneuver":* NAA: email to author, Oct. 25, 2004.

214 *"a great deal of confusion":* BA, *RTE,* p. 221.

214 "*three albino whales inside a small tank":* MC, *Liftoff,* p. 4.

214 *"Unlike the roller-coaster ride":* Ibid.

214 *"It was a slowly changing panorama":* NAA to author, Sept. 18, 2004, p. 9.

215 *"You might be interested":* NAA at 00:03:53:05, mission elapsed time.

215 *"We were like a chicken on a barbecue spit":* MC, *Liftoff,* p. 4.

215 *"We could see the continents":* NAA to SA&DB, in *Quest,* p. 38.

215 *"I don't know why you have":* Ibid.

216 *"From space it has an almost benign quality":* BA, *RTE,* p. 220.

216 *The juice was* not *Tang:* Ibid., p. 223.

216 *"we could have shut down":* Ibid.

216 *"Gee, I almost went to sleep then":* NAA at 00:02:09:38, OBR.

217 *"suspended by a cobweb's light touch":* MC, *Liftoff,* p. 5.

217 *"The best thing to do is just ask 'em":* FB, *Countdown,* p. 240.

218 *Luna 15's orbit:* Keldysh memo quoted in ibid.

219 *"The flight plan to the Moon":* BA, *RTE,* p. 224.

219 *"just a little more than a half Earth":* NAA at 01:10:01:31.

220 *"As we pan back out to the distance":* MC at 01:10:34:35.

220 *"the crew slept rather well all night":* Reported to the press by an unidentified NASA public affairs officer on the morning of July 18, 1969, at 7:00 CDT and included in the Apollo 11 Spacecraft

Commentary, July 16–24, 1969, produced concurrently with the mission by MSC. This transcript is available in the UHCL archives.

221 *saw the flashes "at least two or three different times":* BA to author, Albuquerque, NM, Mar. 17, 2003, tape 2, p. 3.

221 *"Guess what? We see them with our eyes closed!":* Ibid., p. 4.

221 *"I found myself idly starring out of the window":* BA, *RTE,* p. 224.

222 *"We sure as hell were not":* BA to author, Mar. 17, 2003, tape 2, p. 3. In a July 1977 issue of *Science Digest,* James Mullaney, a former contributing editor to *Astronomy* magazine, authored an article in which he wrote, "The crew of Apollo 11, during the first moon landing, reported that their capsule was paced by what appeared to be a mass of intelligent energy." The previous year, 1976, Michael Harvey authored a book in which he asserted that Buzz Aldrin while on the way to the Moon had his attention "suddenly drawn to a bright object resembling a snowman traveling from west to east in the sky." Stories that Aldrin saw a UFO persist to this day, without taking the actual circumstances of what he saw, and what the object mostly likely was, into consideration. For a comprehensive critique and rebuttal of Apollo 11's supposed UFO sighting, see Oberg, *UFOs and Outer Space Mysteries,* chap. 3.

222 *S-IVB was about six thousand nautical miles away:* CapCom (Charlie Duke) at 02:12:49:02.

222 *"Even* Pravda *in Russia":* CapCom (McCandless) at 03:00:29:46.

222 *"The first thing that springs to mind":* MC, *Liftoff,* p. 7.

223 *"If just one digit slips in our computer":* Ibid., p. 6.

223 *"We don't know if all is going well":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 43.

223 *"It's quiet around the world":* Ibid., p. 44.

224 *"It was like—like perfect!":* NAA at 03:04:21:56.

225 *"Plaster of Paris gray to me":* MC at 03:03:49:32, OBR.

225 *"Well, I have to vote with the 10 crew":* BA at 03:03:58:14, OBR.

225 *"Looks tan to me":* NAA at 03:03:58:21, OBR.

226 *"This time we are going over":* NAA at 03:04:34:34.

227 *"It is just past dawn":* MC, *Liftoff,* p. 7.

227 *"And as the Moon sinks slowly in the west":* MC at 03:06:57:45.

227 *"If we over-burned":* BA, *RTE,* p. 226.

228 *"Well, I thought today went pretty well":* MC at 03:14:02:08, OBR.

228 *"The Apollo 11 crew is currently in their rest period":* Apollo 11 Spacecraft Commentary, July 16–24, 1969, CDT 00:03, July 20, Release 270/1. Following the sleep period prior to the day of the landing, NASA reported that Collins had slept six hours, Armstrong five and a half, and Aldrin five.

Chapter 23: The Landing

229 *One statement covered:* Bill Safire to H. R. Haldeman, "In Event of Moon Disaster," July 18, 1969; Jim Keogh, The White House, "Memorandum for Bob Haldeman, July 19, 1969. Copies in NASA History Office, Washington, DC.

229 *"Kuralt followed":* Kuralt's piece quoted in CBS, *10:56:20 P.M.,* pp. 49–50.

230 *referred to the upcoming Moon landing as "a giant step":* Ibid., p. 52.

230 *"The activity of three men in space":* BA, *RTE,* p. 227.

235 *"The way we did that":* NAA to author, Sept. 18, 2003, pp. 14–15.

235 *"We couldn't land on AGS":* Ibid., p. 24.

235 *The altitude limits . . . "must have been":* Ibid., p. 17.

236 *"barnyard math":* Ibid., pp. 16–17.

237 *"We had a small dish antenna":* NAA: email to author, Nov. 24, 2004.

237 *"We had to get the computer":* NAA to author, Sept. 18, 2003, p. 20.

237 *"One minute to ignition":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 74.

237 *"Basically, you'd like to be":* NAA to author, Sept. 18, 2003, p. 21.

238 *"like a magpie":* BA, *RTE,* p. 229.

238 *"Whenever I wanted to talk":* NAA to author, Sept. 18, 2003, p. 18.

239 *"I did not accurately catch the ignition point":* Ibid., pp. 19–20.

239 *"The fact that throttle-down":* NAA, from the 1969 Technical Debrief, quoted in *ALSJ*, "The First Lunar Landing," p. 12.

239 *"It wasn't a sure thing":* NAA to author, Sept. 18, 2003, p. 20.

240 *"We needed to get landing radar":* Ibid., p. 21.

240 *"We got the Earth right out our front window":* BA, 04:06:38:20 mission elapsed time.

240 *"We had gone that far":* NAA to author, Sept. 18, 2003, p. 22.

241 *"These are space communications":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 76.

241 *"We were getting good velocities":* NAA to author, Sept. 18, 2003, p. 22.

242 *"Okay, everyone on your toes":* Koos quoted in EFK, *Failure Is Not an Option,* p. 268.

243 *"Bales had no mission rules":* Ibid., p. 269.

243 *"THIS WAS NOT AN ABORT":* Ibid., p. 270.

244 *"It is the same one we had in training":* Duke quoted in EFK, *Failure Is Not an Option,* p. 288.

245 *"We did have some computer alarms":* NAA to author, June 4, 2003, p. 8.

245 *"Well, it would have been helpful":* Ibid.

245 *"I didn't know anything about it":* BA to author, Mar. 17, 2003, p. 20.

246 *"I had the obligation":* NAA to author, June 4, 2003, p. 8.

247 *"The landmarks that I was looking at":* NAA to author, Sept. 18, 2003, p. 23.

247 "Initially, I felt that it might be a good": Ibid.

248 *"It was a great concern":* Ibid., p. 10.

248 *"In the Lunar Landing Training Vehicle":* Ibid., p. 24.

249 *"If you don't like what you see":* BA quoted in *ALSJ,* "The First Lunar Landing," p. 21.

249 *"Extend it":* NAA quoted in *ALSJ,* "The First Lunar Landing," p. 21.

249 *"I would have thought that":* BA, from 1969 Technical Debrief, quoted in *ALSJ,* "The First Lunar Landing," p. 24.

250 *"We started losing visibility":* NAA to author, Sept. 18, 2003, p. 24.

250 *"As we got lower":* NAA, from 1969 Technical Debrief, quoted in *ALSJ,* "The First Lunar Landing," p. 25.

251 *"How's the fuel?* NAA, 04:06:43:57 mission elapsed time.

251 *"I never dreamed we could be flying":* EFK, *Failure Is Not an Option,* p. 291.

251 *"There was no response from the crew":* Ibid.

251 *"If we were still at a hundred feet":* NAA to author, Sept. 18, 2003, pp. 25–26.

251 *"All the way through the final approach":* Ibid., p. 27.

252 *"Typically in the LLTV":* Ibid., p. 26.

252 *"I heard Buzz say something":* Ibid, p. 25.

253 *"You always try to make a soft":* Ibid.

253 *"The important thing was that":* Ibid.

254 *"Whew, boy! Man on the Moon!":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 77.

254 *"Okay, let's get on with it":* NAA, 04:06:46:23 mission elapsed time.

Chapter 24: One Small Step

255 *"If I told you that I could feel":* VEAP essay, "Apollo 11," p. 7. Copy provided to author by JAH.

255 *"I had the same feeling":* SKA, quoted in CBS, *10:56:20 P.M.,* p. 104.

256 *The speculation by the TV commentators:* JSA to author, Sept. 11, 2004 (morning), p. 33.

256 *"I was paying attention":* Ibid.

256 *"My daddy's going to the Moon":* Mark Armstrong quoted in *FOM,* p. 46.

256 *"talking to Neil just before":* JSA to author, Sept. 11, 2004 (morning), p. 33.

257 *"I had people in the house":* Ibid., p. 34.

257 *"That must be Daddy right there":* JSA quoted in *FOM,* p. 134.

257 *"One would have thought":* NAA to author, Sept. 18, 2003, p. 30.

258 *"Tranquility Base, it sure sounded":* MC, 04:06:58:40 mission elapsed time.

258 *"miniscule dot":* MC, *CTF,* p. 405.

258 *"I can't see a darn thing but craters":* Ibid., p. 410.

259 *"They just wanted us to get out there":* NAA to author, Sept. 18, 2003, p. 31.

259 *"trying to reduce the error":* NAA quoted in *ALSJ,* "Post-landing activities," p. 30.

259 *"If we had problems that indicated":* NAA to author, Sept. 18, 2003, p. 29.

260 *"Those fuel lines were not a new subject":* Ibid.

260 *"Within two minutes after landing":* Ibid. For additional comments by Armstrong on the concern about tank overpressurization right after the landing, see *ALSJ,* "The First Lunar Landing," pp. 31–32.

261 *"The intention was to go through":* NAA to author, Sept. 18, 2003, p. 29.

262 *"I'd say the color of the local surface":* Ibid., p. 23.

262 *"It was called a rest period":* BA, *RTE,* p. 232.

262 *"From our early discussions":* NAA to author, Sept. 19, 2003, p. 1.

263 *"Buzz Aldrin did take something":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 85.

263 *"He had told me he planned":* NAA to author, Sept. 18, 2003, p. 31.

264 *"When you do simulations of EVA Prep":* NAA, from 1969 Technical Debrief, quoted in *ALSJ,* "The First Lunar Landing," p. 2.

264 *"We felt like two fullbacks":* BA, *RTE,* p. 233.

264 *"It was pretty close in there":* NAA to author, Sept. 19, 2003, p. 3.

264 *"We had to depressurize the cabin":* Ibid., p. 4.

265 *"It was an effort in patience":* Ibid.

265 *"Egress required you go through":* Ibid., p. 6.

266 *"When I first exited the lunar module":* Ibid., p. 2.

266 *"You are so light up there":* Ibid., p. 6.

267 *"Armstrong is on the Moon!":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 96.

267 *"The pictures were surreal":* NAA to author, Sept. 19, 2003, p. 2.

267 "*On the way to the Moon":* BA, *RTE,* p. 233.

268 *"I can't believe it's really happening":* JSA quoted in *FOM,* p. 268.

268 *"It's taking them so long":* Ibid., p. 258.

268 *"Once on the surface":* NAA to author, Sept. 19, 2003, p. 6.

268 *"I can't recapture it":* Ibid., p. 7.

268 *"They can put it in parentheses":* Ibid., p. 8.

269 *Neil came across the idea:* As to what might have triggered the now immortal phrases "one small step" and "one giant leap," over the years since Apollo 11 people have expressed numerous theories, some of them tangible, a few quite fanciful. One theory, inspired by a comment Neil made in 1971 to NASA public affairs officer Robert Sherrod, suggests that the phrases derived from a children's game called Mother, May I? that Neil occasionally played outdoors with siblings and friends during his Ohio boyhood (NAA to Robert Sherrod, Washington DC, Sept. 23, 1971, p. 6, copy in NASA History Office Archives). If the player takes the allotted "small steps" or "giant steps" before first saying, "Mother, May I," he or she has to return to the starting line. Today, though Neil vaguely remembers playing the game, he does not recall talking about it to Sherrod or anyone else. "I think if I said that, that it would have been more in jest than if that actually contributed" (NAA to author, Sept. 19, 2003, p. 8).

270 *"We had done some practice sessions":* NAA to author, Sept. 19, 2003, p. 5.

270 *"It was going to take":* Ibid., p. 9.

271 *"It has a stark beauty of its own":* NAA, 04:13:34:56 mission elapsed time.

272 *"Did we really ever investigate":* BA quoted in *ALSJ*, "One Small Step," p. 16.

272 *"a pretty good appreciation":* NAA to author, Sept. 19, 2003, p. 19.

272 *"You were suspended sideways":* Ibid.

273 *"On Earth, you only worry":* BA, *Men from Earth,* p. 241. See also BA, *RTE,* p. 235.

273 *"One time I came close to falling":* NAA: email to author, May 20, 2005, comments on chap. 29.

274 *"I thought the flag should just be draped":* NAA to author, Sept. 19, 2003, p. 12.

274 *"a unique permanent wave":* BA, *RTE,* p. 237.

274 *"We had trouble getting it into the surface":* NAA to author, Sept. 19, 2003, p. 12.

275 *"Deke had told me shortly before":* Ibid., p. 13.

276 *"As the sequence of lunar operations":* BA, *RTE,* p. 236.

276 *"We didn't spend any time":* NAA: email to author, Dec. 1, 2004.

277 *"We always had a plan":* Ibid.

277 Even those who realized it at the time of Apollo have misunderstood why the omission occurred. "It's a real anomaly," Apollo 12 astronaut Dick Gordon has stated. For years Gordon believed that Buzz never had a chance to take any pictures: "Neil had the camera; Buzz didn't have the mount. The only picture Buzz took was a stereoscopic picture of the footprints" (Dick Gordon to author, Apr. 12, 2003, p. 17). Apollo 9 commander Jim McDivitt has held the same mistaken views. *"Why are there no pictures of Neil on the surface, Jim?"* "That's easy." *"Is it?"* "Yes, the only camera they had, Neil had." *"So you are saying Buzz took no pictures?"* "Yes, I think that's right. There was only one camera, and I don't think Buzz took any pictures" (McDivitt to author, Apr. 17, 2003, p. 18). Apollo 10 and Apollo 17 astronaut Gene Cernan saw it the same way. "They took only one camera and it was on Neil's suit, and I guess Neil never handed the camera over to Buzz to take a picture. It's a tragedy" (EC to author, Feb. 10, 2003, p. 12). Same with George Franklin, the lead engineer in the Flight Crew Support Division at the MSC who was responsible for preparing the LM crew for many of their surface activities. Franklin believes that "Buzz never took a picture." *"How do you explain that?"* "Because of who had the camera." *"Was it too hard for Neil to get it off his chest bracket?"* "No, we don't know why. In the procedures, Neil was supposed to change out and he didn't. Why? I can't answer that question, why the camera was never changed over" (Franklin to author, Feb. 5, 2003, p. 7).

277 *"I don't have an explanation":* EFK to author, Feb. 8, 2003, p. 28.

277 *"There were all kinds of scientific reasons":* CCK to author, Feb. 7, 2003, p. 20.

278 *"Certainly Neil realized":* EC to author, Feb. 10, 2003, p. 12.

278 *"I am persuaded":* NAA: email to author, Dec. 23, 2004.

280 *"We wanted to make sure":* NAA to author, Sept. 19, 2003, p. 18.

281 *"It was really fun":* Ibid.

281 *"We had a plan":* Ibid., p. 15.

281 *"In fact, I had some personal":* Ibid., p. 20.

282 *"There was just far too little time":* NAA, from post-mission press conference, quoted in *ALSJ,* "EASEP Deployment and Close-out," p. 15.

282 *"It would have been nice":* NAA to author, Sept. 19, 2003, p. 15.

282 *"The dust was so fine":* Ibid., p. 22.

283 *"inordinate amount of force":* NAA, from 1969 Technical Debrief, quoted in *ALSJ,* "EASEP Deployment and Close-out," p. 19.

284 *"We were so busy":* BA, *RTE,* p. 238.

285 *"The technique I used":* NAA to author, Sept. 19, 2003, p. 23.

285 *"It was just curiosity":* Ibid.

286 *"Like colts almost":* Cronkite to Sevareid, quoted in CBS, *10:56:20 P.M.,* p. 103.

286 *personal items and mementoes:* Anonymous NASA MSC official cited in Nicholas C. Chriss, "Astros Take Secrets, But They're Personal," *New York Post,* May 22, 1969. See also Donald K. Slayton, director of Flight Crew Operations to NASA Headquarters, Attn: Mr. Julian Scheer, "Astronaut PPKs," Oct. 22, 1968, NARA Fort Worth, RG 255.

287 *"the total weight of this kit shall not exceed":* See "Astronaut Preference Kit Policy," n.d., at www.collectspace.com/resources/flown_apollo_apk.html.

289 *"In my PPK":* NAA: email to author, Dec. 22, 2004.

289 *"I didn't bring anything else for myself":* NAA to author, Sept. 19, 2003, p. 23.

289 *"He didn't ask me if I wanted to send anything":* JSA to author, Sept. 11, 2004 (morning), p. 39.

Chapter 25: Return to Earth

291 *"The unknowns were rampant":* NAA quoted in *Quest,* p. 38.

291 *"Walking around on the surface":* Ibid.

293 *"We were aware of a new scent":* NAA, from the 1969 Technical Debrief, quoted in *ALSJ,* "The First Lunar Landing," p. 16.

293 *"We'll postpone our answer":* NAA, 04:18:44:01 mission elapsed time.

293 *"There are always some regrets":* NAA, from the 1969 Technical Debrief, quoted in ALSJ, "The First Lunar Landing," p. 24.

293 *"The floor was adequate":* Ibid. See also *ALSJ,* "Trying to Rest," pp. 22–26.

293 *"When we put the window covers": ALSJ, "*Trying to Rest," p. 24.

294 *"One night. Most people can get by":* NAA to author, Sept. 19, 2003, p. 25.

294 *"We think that this will take":* Ron Evans, 05:01:41:14 mission elapsed time.

294 *"I don't remember writing notes":* NAA to author, Sept. 19, 2003, p. 26.

294 *"Houston, Tranquility Base is":* NAA, 05:03:10:32 mission elapsed time.

295 *"The LM's ascent engine was":* NAA to author, Sept. 19, 2003, p. 26.

296 *"I don't suppose we've been":* Cronkite to Schirra, quoted in CBS, *10:56:20 P.M.,* p. 123.

297 *"There was no time to sightsee":* BA, *RTE,* p. 239.

297 *"Oh, boy! Their words 'beautiful' ":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 124.

297 "Columbia *has no landing gear*": MC, *Liftoff,* p. 10.

298 *"eight hundred and fifty chances":* MC, *CTF,* p. 417.

298 *"One little hiccup and they are dead men":* Ibid., p. 418.

298 *"That was one of the main reasons":* NAA to author, Sept. 19, 2003, p. 27.

298 *"Yes, we were looking at it":* Ibid., p. 28.

299 *"We were going right down U.S. 1":* NAA, 05:04:25:35 mission elapsed time.

299 *"It's a pretty spectacular ride":* NAA, 05:24:27:17 mission elapsed time.

299 *"Three hours may seem like a long time":* BA, *RTE,* p. 340.

299 *"arcane, almost black-magical manipulations":* MC, *CTF,* p. 419.

299 *"The LM is fifteen miles":* Ibid., pp. 420–21.

300 *"All that remains . . . was for them":* Ibid., p. 421.

301 *"For the first time since":* Ibid., pp. 421–22.

303 *"In trying to achieve the best":* NAA to author, Sept. 19, 2003, p. 29.

303 *"the surprise of my life":* MC, *CTF,* p. 423.

303 *"All I can hope for is no damage":* Ibid.

304 *"The first one through is Buzz":* MC, *CTF,* p. 423.

304 *"Man has finally visited the Moon":* Cronkite quoted in CBS, *10:56:20 P.M.,* p. 131.

305 *"The vacuum didn't take off much":* BA, *RTE,* p. 240.

306 *Collins started throwing question after question:* See also MC, *CTF,* p. 424.

306 *"the get us out of here, we don't want to be":* MC, *Liftoff,* p. 10.

306 *"we would have been in for a long, lonely ride":* NAA to author, Sept. 19, 2003, p. 33.

306 *"I wouldn't put it at zero":* Ibid.

307 *"The Moon from this side":* MC, *Liftoff,* p. 11.

309 *"a heartwarming vote of appreciation":* Cronkite quoted in CBS, *10:56:20 P.M.,* pp. 144–45.

310 *"beautiful orange-and-white blossoms":* MC, *Liftoff,* p. 13. See also MC, *CTF,* p. 448

311 *"It was unusual being upside down":* NAA to author, Sept. 19, 2001, p. 34.

311 *"It was one thing to land upside down":* BA, *RTE,* p. 4.

311 *Neil came out last:* After the 2018 edition of this book went to press, I learned that I was mistaken about the order of the Apollo 11 crew into their lifeboat. In the post-mission debrief, Mike Collins stated that the order out of the capsule was, first, Armstrong, second, Collins, and last, Aldrin. See Section 16.16 of the Apollo 11 Technical Crew Debriefing, July 31, 1969 (NASA: MSC, Houston, TX), which can be found online at https://www.hq.nasa.gov/alsj/a11/a11tecdbrf.html#OrigPDF. Here is what Collins said about it: "The swimmer threw in the BIGs into us. We put the BIGs on inside the spacecraft. We put them on in the lower equipment bay. Neil did first, then I did after him. Buzz put his on in the right-hand seat. We went out: Neil, first, then me, and then Buzz. It's necessary, at least the way we had practiced it, for us to help one another in sealing the BIGs around the head to make sure the zipper was fully closed." The author apologizes to the reader for making such a basic mistake.

312 *"We all felt pretty good":* NAA to author, Sept. 19, 2003, p. 35.

312 *"We needed to do [that]":* Ibid., p. 36.

312 *"It was an exciting time":* Ibid.

312 *"We thank you for everything":* JSA quoted in "Apollo Crew's Families Also in World Spotlight," *TB,* July 25, 1969.

313 *"And now it begins":* Quoted in BA, *RTE*, p. 12.

313 *"We weren't in a very good position":* NAA to author, Sept. 19, 2003, p. 36.

314 *"It was pretty much like everything else":* Ibid.

314 *"They can send men safely":* Carpentier quoted in BA, *RTE*, p. 14.

314 *"Everyone was assembled to greet us":* NAA to author, Sept. 19, 2003, p. 37.

315 *"We really needed that time":* Ibid.

315 *"Those were dribbling in to us":* Ibid., p. 38.

316 *"Backup crew is still standing by":* Lovell, 08:01:02:32 mission elapsed time.

316 *"We were not naïve":* NAA to author, Sept. 19, 2003, p. 35.

Chapter 26: For All Mankind

317 *"never comfortable speaking":* JSA to author, Sept. 11, 2004 (morning), p. 50.

318 *"We had the problems of a five-year-old boy":* NAA, from Aug. 12, 1969, press conference in Houston, quoted in "Problems of a 5-Year-Old Boy in a Candy Store," *National Observer* [Silver Springs, MD], Aug. 18, 1969.

318 *"Certainly the last thing we're prepared for":* NAA quoted in "Millions See Two Parades," *LN,* Aug. 13, 1969.

318 *"We were advised not to reach out":* BA, *RTE,* p. 30.

318 *"I had never seen so many people":* JSA to author, Sept. 11, 2004 (morning), p. 44.

318 *"They also threw out IBM punch cards":* NAA to author, Sept. 19, 2003, p. 35.

318 *"We were covered with confetti":* BA, *RTE,* p. 33.

319 *"It was exciting to be in those cities":* JSA to author, Sept. 11, 2004 (morning), p. 44.

319 *"That's probably the first time":* NAA to author, Sept. 19, 2003, p. 38.

320 *"a uniquely and profoundly important adventure":* Agnew quoted in John C. Waugh, "A Grateful Nation Acclaims Its Space Heroes," *Christian Science Monitor,* Aug. 15, 1969.

320 *"Neil Armstrong choked back tears":* UPI, "49-Day World Trip Awaits Astronauts," *LN,* Aug. 14, 1969.

320 *"Neil Armstrong's words":* "Homage to the Men from the Moon," *Time,* Aug. 22, 1969.

321 *"My parents were there as guests":* NAA to author, Sept. 19, 2003, p. 39.

321 *The ultimate Texas barbecue* Bernard Weinraub, "Houston Parade Honors Apollo 11 Crew in Finale of U.S. Fetes," *NYT,* Aug. 17, 1969.

321 *"We can do much more in ten years":* NAA, official CBS transcript of *Face the Nation,* Aug. 17, 1979.

322 *looking for a place to get away:* NAA to author, Sept. 22, 2003, p. 32.

322 *"I think you know better now":* NAA quoted in Al Kattman, "Neil Armstrong Returns Home for Hero's Welcome," *LN,* Sept. 7, 1969.

323 *"We raised hell":* BA, *RTE,* p. 51.

323 *"We would take care of Americans in America":* Ibid., p. 55.

324 *tape-record a travelogue:* Transcript of Neil's travelogue in NAA's personal papers, "Giant Step" file.

324 *"That was really something":* JSA to author, Sept. 11, 2004 (morning), p. 46.

324 *"I think I broke my goddamn ankle!":* MC quoted in BA, *RTE,* p. 65.

325 *"There was liquor everywhere":* BA, *RTE,* p. 74.

325 *"The trip produced some disturbing symptoms":* MC, *CTF,* p. 465.

325 *"wasn't smart enough to recognize":* NAA to author, Sept. 19, 2003, p. 44.

325 *"Lord knows what prompted":* BA, *RTE,* p. 47.

325 *"It was hard to follow Neil":* JSA to author, Sept. 11, 2004 (morning), p. 50.

326 *"The president was quite nice":* NAA to author, Sept. 19, 2003, p. 45.

326 *"More can be gained from friendship":* NAA, commencement speech, Wittenberg College, Nov. 1969, copy in NAA's personal papers. See also "Wittenberg Honors Armstrong," *Akron Beacon Journal,* Nov. 24, 1969.

327 *Armstrong had a serious message for the soldiers:* A four-page typescript copy of the section in Bob Hope's *The Last Christmas Show* was found in VEAP.

327 *"I tried to use the occasion":* NAA to author, Sept. 22, 2003, p. 2.

327 *"any [enemy] fire":* Ibid.

328 *"I was invited to give a paper":* Ibid., pp. 6–7. On Neil's visit to Russia, see "Wild Applause Welcomes Armstrong in Leningrad," *CPD,* May 26, 1970; NAA to author, Sept. 22, 2003, pp. 2–3; and "Kosygin 'Sees' Moon with Armstrong's Aid," *CPD,* June 3, 1970.

Part Seven: Icon

331 *"I think the people should be":* NAA to author, Cincinnati, OH, June 2, 2004, p. 10.

Chapter 27: Standing Ground

333 *"I never asked the question":* NAA to author, Sept. 22, 2003, p. 5.

333 *"Thinking it over":* Ibid.

333 *"He was a pilot":* JSA to author, Sept. 11, 2004 (afternoon), p. 3.

334 *"To their surprise, Armstrong":* Gorn, *Expanding the Envelope,* pp. 322–23.

334 *"a real burden":* NAA to author, Sept. 22, 2003, p. 1.

334 *"We were able to meet":* JSA to author, Sept. 11, 2004 (afternoon), p. 3.

334 *"I was able to maintain my flight currency":* NAA to author, Sept. 22, 2003, p. 6.

335 *"I had always told people":* Ibid., p. 13. See James C. Fletcher quoted in "Neil Armstrong to Leave NASA," NASA Flight Research Center *Express* 14 (Aug. 28, 1971); also "Armstrong Quitting NASA to Be Cincy U Professor," *Akron Beacon Journal,* Aug. 26, 1971.

335 *"Returning to Ohio wasn't a consideration":* NAA to author, Sept. 22, 2003, p. 15.

335 *"I thought Cincinnati's was a pretty good department":* Ibid., p. 14.

335 *taught three quarters a year:* Ibid., p. 16. On Neil's first day as a professor, see Dave Burrus email to author, Mar. 15, 2003, and Burrus quoted in "Armstrong Holds 1st UC Class; Former Astronaut Shuns Press," *Akron Beacon Journal,* Jan. 4, 1972. Burrus was a student in Neil's first class.

336 *"She came to town ostensibly":* NAA to author, Sept. 22, 2003, p. 17.

336 *"I really couldn't work the system":* Ibid., p. 18.

336 *"It was burdened with lots of new rules":* Ibid., p. 21.

337 *"I could not expect the volume":* Ibid., p. 23.

337 *"just irritating":* Ibid., p. 24. For a representative story in the local Cincinnati media about Armstrong's resignation from the university, see Kathleen Haddad, "Neil Armstrong Resigns; Plans Unknown," *Cincinnati News Record,* Jan. 23, 1980.

337 *"In the Chrysler case":* NAA to author, Sept. 22, 2003, p. 30.

338 *oil industry supplier* See Dan Bearth, "Moon Walker Joins Oil Rig Firm," *Wichita Eagle and Beacon,* Mar. 15, 1980. See also "Armstrongs Launch Own Firm," *Anderson* [IN] *Herald,* Jan. 26, 1980; "Oil Drilling Rig Firm Hires Armstrong to Promote Sales," *CPD,* Mar. 16, 1980; and "Armstrong Takes Oil Job," *Virginia-Pilot,* Mar. 17, 1980.

338 *"I think some people wanted me":* NAA to author, Sept. 22, 2003, p. 31.

339 *"one of the seven or eight":* Ibid.

339 *"Typically you ask somebody":* CSM to author, June 25, 2003, p. 1.

340 *"His name gave us instant credibility":* Devere Burt to author, June 3, 2003, p. 6.

340 *"Neil was really the PR piece of it":* Stephen Beering to author, May 30, 2003, p. 11.

341 *"I don't think I would agree":* NAA to author, June 2, 2004, p. 4. Neil was approached by both parties to run for various political offices, but he was never interested in any of them. For interest in Neil's

political potential, see Joe Rice, "Armstrong Possible Chief of Nixon's Ohio Race," *Akron Beacon Journal,* Apr. 16, 1972.

341 *"I tend to be more in favor":* NAA to author, June 2, 2004, p. 5.

Chapter 28: To Engineer Is Human

342 *"I am, and ever will be":* NAA address to National Press Club, Feb. 22, 2000, Washington DC, quoted in Paul Hoversten, "Neil Armstrong: Basically a 'Nerdy Engineer,' " accessed at space.com. See also the Reuters story, "One Small Step, One Small Click," from Wired News, accessed at https://www.wired.com/2000/02/one-small-step-one-small-click/.

343 *"was not the result of a chance":* See the conclusions of NASA's *Report of Apollo 13 Review Board,* June 15, 1970, copy in Record Group 255, Box 10, NARA Fort Worth.

343 *"a stupid and preventable accident":* CCK, *Flight,* p. 339.

343 *"I was released from active investigation":* NAA: email to author, Jan. 19, 2005.

343 *"To stand on the surface of the Moon":* NAA quoted in "Armstrong: Don't Neglect Space Effort," *NYT*, June 12, 1971.

343 *"The very success of the human species":* NAA quoted in "Armstrong Warns of Man's Extinction," *CPD,* June 12, 1971.

344 *"Armstrong Has No Comment for Last Shot":* Bill Sloat, *"Armstrong Has No Comment for Last Shot," Florida Today,* Dec. 7, 1972.

344 *"Mr. Armstrong does not wish":* Ruta Bankovikis quoted in ibid.

344 *"Sometimes I chastise Neil for being too Lindbergh-like":* JEL to author, July 17, 2004, p. 20.

344 *"I've given a large number of press conferences":* NAA to author, Sept. 22, 2003, p. 29.

345 *only rarely agreed to be interviewed:* Any number of stories were published about Neil's unwillingness to do interviews and about his apparent reclusive life story, for example, from 1979 alone: "A Giant Leap for the Press," *Philadelphia Inquirer*, May 26, 1979; "First Person on Moon Will Step Out of Anonymity" *Milwaukee Journal*, Feb. 7, 1979; "Armstrong Reticent Talking of Moon Walk 10 Years Later" *CP*, Apr. 1, 1979; "The Search Goes On" "People Today" section, *CE*, Mar. 4, 1979; and "Speak to Us, Neil," *CE*, May 26, 1979.

345 *severed the ring finger:* On Armstrong's accident leading to surgery to restore part of his finger, see "First Moon Man Hurt on Barn Door," *Sacramento Bee*, Nov. 12, 1978; "Louisville Surgery Team

Rejoins Armstrong's Finger," *CP*, Nov. 13, 1978; Michael Marriott, "From Moon Walk to Microsurgery" *Louisville Courier-Journal*, Nov. 17, 1978; Jon Clemens, "Armstrong Blasts Off After Touchy Operation" *Louisville Courier-Journal*, Nov. 15, 1978; "One Small Tip: Moon Walker Leaves City with a Restored Finger" *Louisville Courier-Journal*, Nov. 15, 1978; and "Armstrong Heads Home, May Leave Ring," *CPD*, Nov. 17, 1978.

345 *trip to the North Pole:* NAA to author, June 2, 2004, pp. 21–22. Neil's personal files contain correspondence and notes pertinent to the polar expedition, including a signed certificate from the Polar Bear Chapter of the Order of Arctic Adventurers, substantiating that Armstrong crossed the Arctic Circle and reached 90 degrees North.

345 *"devise an aggressive civilian space agenda":* See *Pioneering the Space Frontier: The Report of the National Commission on Space* (Toronto and New York: Bantam Books, 1986).

345 *"We worked off and on":* NAA to author, June 2, 2004 (afternoon), p. 1.

346 *"The morning after the accident":* Ibid.

346 *"As it happened":* NAA to author, June 2, 2004 (morning), p. 3.

346 *"At the start Bill talked to all":* Ibid.

346 *"He was of a firm opinion":* Ibid., p. 4.

346 *"So our compromise was that we":* Ibid.

347 *"I probably spent the most time":* Ibid., p. 15.

347 *"On occasion I would talk":* Ibid., p. 9.

347 *"I think we pretty much":* Ibid.

347 The transcripts of the Rogers Commission hearings can be accessed through http://history.nasa.gov.

347 *"I think the conclusions":* NAA to author, June 2, 2004 (morning), p. 10.

348 *"I made the case to fellow commissioners":* Ibid., p. 11.

348 *"For a successful technology":* For Feynman's discussion of his minority report, see Richard Feynman and Ralph Leighton, *What Do* You *Care What Other People Think? Further Adventures of a Curious Character* (New York: W. W. Norton, 1988).

349 *"What I attended to":* Ibid., p. 23.

Chapter 29: Dark Side of the Moon

350 *"I was given the job":* NAA to author, June 4, 2003, p. 32.

350 *"We both went to the Society":* Ibid., p. 33.

350 *"I wonder if you felt":* Lindbergh quoted in Berg, *Lindbergh,* p. 537.

350 *"He told me never to sign autographs":* NAA to author, June 4, p. 33.

351 *"For the first twelve to fifteen years":* Ibid., p. 6.

352 *"write out his answer":* Ibid., p. 5.

352 *"We never answer personal questions":* Ibid., p. 3.

352 *"hello to all my fellow Scouts":* NAA, 02:08:42:31 mission elapsed time. See also "Armstrong Likens Eagle Scout to Astronaut,": *CPD,* Feb. 7, 1972.

353 *"I should have been asked":* NAA to author, Sept. 22, 2003, p. 37.

354 *"The Hallmark case was simple":* NAA to author, June 2, 2004 (afternoon), p. 12.

354 *"NASA hadn't been very careful":* Ibid.

355 *their belief system:* For insights into how the Christian faithful projected religious meanings onto the Moon landings, see, for example: Wernher von Braun quoted in George W. Cornell, "Space Expert Sees New Awareness of God," *CPD,* July 19, 1969; Pope Paul VI quoted in *Baltimore Sun,* July 21, 1969, A4; "Pope Praises Plans for Moon Landing," *NYT,* July 14, 1969; Reverend Herman Weber quoted in "St. Paul United Church of Christ Pastor Offers Prayer," *WDN,* July 16, 1969; sermon by Reverend Charles Sloca, Fairfield, IA, "Vision Via Television," copy in VEAP; Dan L. Thrapp [Los Angeles Times/Washington Post Service], "Moon Walk to Shift Man-God Views," *Dayton Journal Herald,* July 19, 1969; Ming Zhen Shakya, "A Nobel Prize, Lunar Communion, the Beatitudes, and a Song of David's," n.d., accessed at www.hsuyun.org/Dharma/zbohy/Literature/essay/mzs/beatitudes.html (Ms. Ming Shen identified herself as belonging to the Zen Buddhist order of Hsu Yun); James Irwin quoted in Charles W. Colson, "Astronauts Who Found God: A Spiritual View of Space," Nov. 5, 1998, accessed at www.fuw.edu.pl/~pniez/breakpoint.html; "Onward Christian Spacemen," anonymous essay, n.d., accessed at www.graceunknown.com/Scholastica/OnwardChristianSpacemen.html; Gillies Macbain, "Pilgrimage to the Moon," n.d., accessed at www.aislingmagazine.com/Anu/articles/TAM17/Moon.html.

355 *The U.S. State Department:* Secretary of State, U.S. Department of State, Washington, DC, to Middle Eastern and Pacific Diplomatic Posts, "Subject: Alleged Conversion of Neil Armstrong," Mar. 2, 1983, copy in Neil Armstrong Papers at Purdue University Archives. In this collection there is a very large file pertaining to this subject, as well as to Neil's attempts to dispel the rumor. Some of the contents involve messages circulated worldwide within the United States Information Agency (USIA). The following is a

sampling of headlines from articles published in the Islamic world about Armstrong's alleged conversion: "American Astronaut Embraces Islam," *Radiance Delhi,* Mar. 20, 1983; "Did Armstrong Hear Azan on the Moon?" *Gulf News,* Apr. 2, 1983; and "Neil Armstrong Embraces Islam," *Yaqeen International,* Apr. 22, 1983. Among the many letters written to Armstrong from people around the world about his alleged conversion, as many came from Christians hoping that the rumors were not true as from Muslims hoping that they were.

356 *"Just how much that helped":* NAA to author, June 2, 2004 (afternoon), p. 9. Neil's teleconference took place on May 23, 1983. See USIA, Satellite Speakers Staff, "Subject: TelePress Conference: Neil Armstrong/Cairo; Topic: Disinformation in Egypt on Armstrong's Supposed Conversion to Islam," May 20, 1983, copy in NAA's personal files.

356 *Mecca is "the center of the world":* "Islamic Science: Neil Armstrong Proved Mecca Is the Center of the World" (interview with Dr. Abd Al-Baset of the Egyptian National Research Center), Clip No. 545, Jan. 16, 2005, accessed at www.memrity.org/Transcript.asp?P1=545.

357 *"expedition cannot possibly have been to my cave":* Erich von Däniken, Bonstetten (Zürich), Switzerland, to NAA, Feb. 18, 1977, in NAA's personal files.

357 *"Because of my Scottish ancestry":* NAA to Erich von Däniken, Feb. 24, 1977, in NAA's personal files.

358 *"There is absolutely no truth to it":* Private conversation, NAA to author, June 2, 2004.

359 *"People love conspiracy theories":* NAA to author, June 2, 2004, p. 7.

360 *"This guy shows up with a Bible":* James Smith to author, July 17, 2003, p. 14.

360 *"Had I the opportunity to run that episode":* NAA to author, June 2, 2004 (afternoon), p. 8.

360 *confronted Buzz Aldrin:* See Sheila Burke, "Nashville Filmmaker Confronts Former Astronaut Buzz Aldrin," Feb. 9, 2002, accessed at www.tennessean.com.

360 *"Neil was at the office":* CKA to author, June 3, 2004, p. 12.

Chapter 30: Into the Heartland

363 *"Neil has had a heart attack":* KKS in letter to author, May 16, 2003.

364 *"My husband's job was there":* JSA to author, Sept. 11, 2004 (afternoon), p. 6.

364 *"I had never lived in a small town":* Ibid., p. 9.

364 *"It was easier for Mark than it was for Rick":* Ibid., p. 7.

364 *"It was rough, but I learned to ignore it":* Rick Armstrong to author, Sept. 22, 2003, p. 18.

365 *"It took me a couple of years":* JSA to author, Sept. 11, 2004 (afternoon), p. 8.

365 *"It was something that had to be done":* Ibid., p. 13.

365 *"shovel poop during the day":* Ibid.

365 *"The kids have gone":* Ibid., p. 20.

365 *"got tired of all this":* Ibid., p. 19.

365 *"He had so many requests":* Ibid., p. 23.

365 *"I could not continue to live like that":* Ibid., p. 24.

366 *"The fact was, it took a whole year":* Ibid., p. 25.

366 *"We had family":* Ibid.

366 *"I realized the personality":* Ibid.

366 *"He was in the deepest depression":* HSC to author, Oct. 7, 2003, p. 8.

366 *"He begged her for a long time to come back":* DAA to author, Nov. 14, 2002, p. 31.

366 *"Dad sat straight up in bed":* JAH to author, Apr. 5, 2003, author's notes, p. 1.

367 *"I'm not sure there really is a God":* Ibid., p. 2.

367 *"A couple of weeks later":* CKA to author, June 3, 2004, p. 3.

368 *"We talked about whether":* Ibid., p. 6.

368 *"I'm sure the attention":* Ibid.

368 *"Neil and I are a good balance":* Ibid., p. 13.

369 *"Yes, but look what it's done to him inside":* JSA to author, Park City, UT, Sept. 11, 2004, p. 28.

369 *"He's certainly led an interesting life":* Ibid., p. 34.

370 *"He was always a natural at that":* Ibid., p. 36.

371 *CBS newsmagazine* 60 Minutes*:* See Leonard David, "Neil Armstrong Steps into '60 Minutes' Spotlight," space.com, accessed at https://www.space.com/1754-neil-armstrong-steps-60-minutes-spotlight.html. The entirety of the *60 Minutes* story can be viewed online at https://www.youtube.com/watch?v=O3h1V3nzn0A.

372 "*Legends of Aerospace" tours:* For insights and perspectives on the "Legends of Aerospace" tour to the Middle East in the spring of 2010, see http://www.collectspace.com/ubb/Forum23/HTML/002531.html.

373 *speaking out against the cancellation of Constellation:* See Jordan Fabian, "Neil Armstrong criticizes Obama's space plan," The Hill, Apr. 13, 2010, accessed at http://thehill.com/blogs/blog-briefing-room/news/92035-neil-armstrong-criticizes-obamas-space-plan; "Armstrong: Obama NASA plan 'devastating,' " Apr. 13, 2010, accessed at http://www.nbcnews.com/id/36470363/ns/nbc_nightly_news_with_brian_williams/t/armstrong-obama-nasa-plan-devastating/; Jeremy A. Kaplan, "Star Wars: Neil Armstrong, Obama Spar over NASA's Future," Apr. 14, 2010, accessed at http://www.foxnews.com/tech/2010/04/14/obama-vs-neil-armstrong-nasa-constellation.html.

373 *"The President could not be expected to know":* See the "Open Letter" to President Obama penned by Armstrong, James Lovell, and Eugene Cernan, Apr. 15, 2010. The letter was published by various media; see, for example, "Obama's devastating NASA cuts," accessed at https://www.theguardian.com/commentisfree/cifamerica/2010/apr/15/obama-nasa-space-neil-armstrong.

374 *grew upset about a* 60 Minutes *story:* The correspondence between Armstrong and CBS's Scott Pelley over the *60 Minutes* story can be found in the Neil Armstrong Papers within the Purdue University Archives. For Elon Musk's reaction to CBS's presentation of Armstrong's alleged point of view about the "privatization" of space exploration, see space.com Staff, "Private Space Pioneer Elon Musk Counters Neil Armstrong Critics on '60 Minutes,' " Mar. 16, 2012, accessed at https://www.space.com/14936-spacex-ceo-elon-musk-60-minutes-interview.html.

376 *traveling Down Under:* On Armstrong's visit to Australia in 2012 and his presentation to the Certified Accountants of Australia, see "Small step for a man, great get for accountants," *Sydney Morning Herald*, May 24, 2012, accessed at https://www.smh.com.au/business/small-business/small-step-for-a-man-great-get-for-accountants-20120524-1z6cn.html; "Neil Armstrong grants rare interview—to Australian accountant," *The Telegraph*, May 24, 2012, accessed at https://www.telegraph.co.uk/news/science/space/9286987/Neil-Armstrong-grants-rare-interview-to-Australian-accountant.html.

377 *"I have to tell you that":* Len Halprin, email to author, June 14, 2017. Attached to Mr. Halprin's email was a copy of an email from Armstrong to Halprin dated May 28, 2012.

377 *tried to continue hawking Neil Armstrong's name:* CKA, emails to author, June 4 and 13, 2017.

377 *blow-by-blow commentary:* See Randy Wilson, "One Giant Leap," *Arizona Daily Sun*, July 21, 2012, accessed at http://azdailysun.com/news/local/one-giant-leap/article_782390cf-daf6-5d9d-b8f2-ab042bc94991.html. See also "First Light" on the Lowell Observatory website at https://lowell.edu/research/research-facilities/4-3-meter-dct/first-light/.

380 *The news of his death:* Neil's death made urgent, international news, with tributes to him published for many days thereafter. Two of the more notable published tributes came from Jeffrey Kluger, "Remembering Neil Armstrong, a Man of Profound Skill and Preternatural Calm," *Time*, Aug. 25, 2012, accessed at http://science.time.com/2012/08/25/remembering-neil-armstrong-a-man-of-profound-skill-and-preternatural-calm/, and Marsha Freeman, "Neil Armstrong: 1930–2012, The Mission and the Man," *21st Century* (Spring/Summer 2012): 85–86.

382 *Washington National Cathedral:* See Robert Z. Pearlman, "First Moonwalker Neil Armstrong Mourned at Washington's National Cathedral," space.com, Sept. 13, 2012, accessed at https://www.space.com/17585-neil-armstrong-mourned-national-cathedral-memorial.html.

382 *burial-at-sea ceremony:* See "Farewell, Neil Armstrong: 1st Moonwalker Buried at Sea," space.com, Sept. 14, 2012, accessed at https://www.space.com/17614-neil-armstrong-remains-buried-at-sea.html.

383 *"I don't envy many people":* John Glenn quoted in transcript of "Neil Armstrong Ambassador of Exploration Award Ceremony, Cincinnati Museum Center, Apr. 18, 2006," p. 4, accessed at https://www.nasa.gov/pdf/147230main_armstrong_ambassador_trans.pdf.

383 *which Neil dubbed "Bok":* See ibid for Neil's remarks at the Ambassador of Exploration Award Ceremony. It was at this event that Neil first told his story of "Bok," the Moon rock. One can access a complete video at https://www.youtube.com/watch?v=KOFMwX38_Xs.

384 *Dr. Margaret Weitekamp:* Email from Dr. Margaret Weitekamp to author, July 12, 2017.

388 *Congressional Gold Medal:* See "Congressional Gold Medal Presented to Apollo 11 Astronauts and First American to Orbit the Earth," accessed at https://www.usmint.gov/news/press-releases/20111116-congressional-gold-medal-presented-to-apollo-11-astronauts-and-first-american-to-orbit-the-earth.

385 *James E. Hill Lifetime Space Achievement:* See "Neil Armstrong, Sally Ride Named 2013 General James E. Hill Lifetime Space Achievement Award Honorees," Space Foundation, Jan. 8. 2013, accessed at https://www.spacefoundation.org/news/neil-armstrong-sally-ride-named-2013-general-james-

e-hill-lifetime-space-achievement-award. The award was presented posthumously to Armstrong at the 29th National Space Symposium, held in Colorado Springs, in April 2013.

386 *R/V* Neil Armstrong*:* See "R/V *Neil Armstrong*" at the website for the Woods Hole Oceanographic Institution, accessed at https://www.whoi.edu/main/ships/neil-armstrong.

387 *NASA Armstrong Research Center:* See "NASA Center Redesignated for Neil Armstrong; Test Range for Hugh Dryden," nasa.gov, Jan. 16, 2014, accessed at https://www.nasa.gov/centers/dryden/Features/nasa-dryden-to-be-renamed-for-neil-armstrong_1.html.

388 *"Reboot the Suit":* See Jenny Arena, "Reboot the Suit: Neil Armstrong's Spacesuit and Kickstarter," *Smithsonian/National Air and Space Museum*, July 20, 2015, accessed at https://airandspace.si.edu/stories/editorial/armstrong-spacesuit-and-kickstarter.

388 "I want to show you a secret": KKS in letter to author, May 16, 2003.