

QUEST

Volume 21, Number 4

2014

www.spacehistory101.com

THE HISTORY OF SPACEFLIGHT

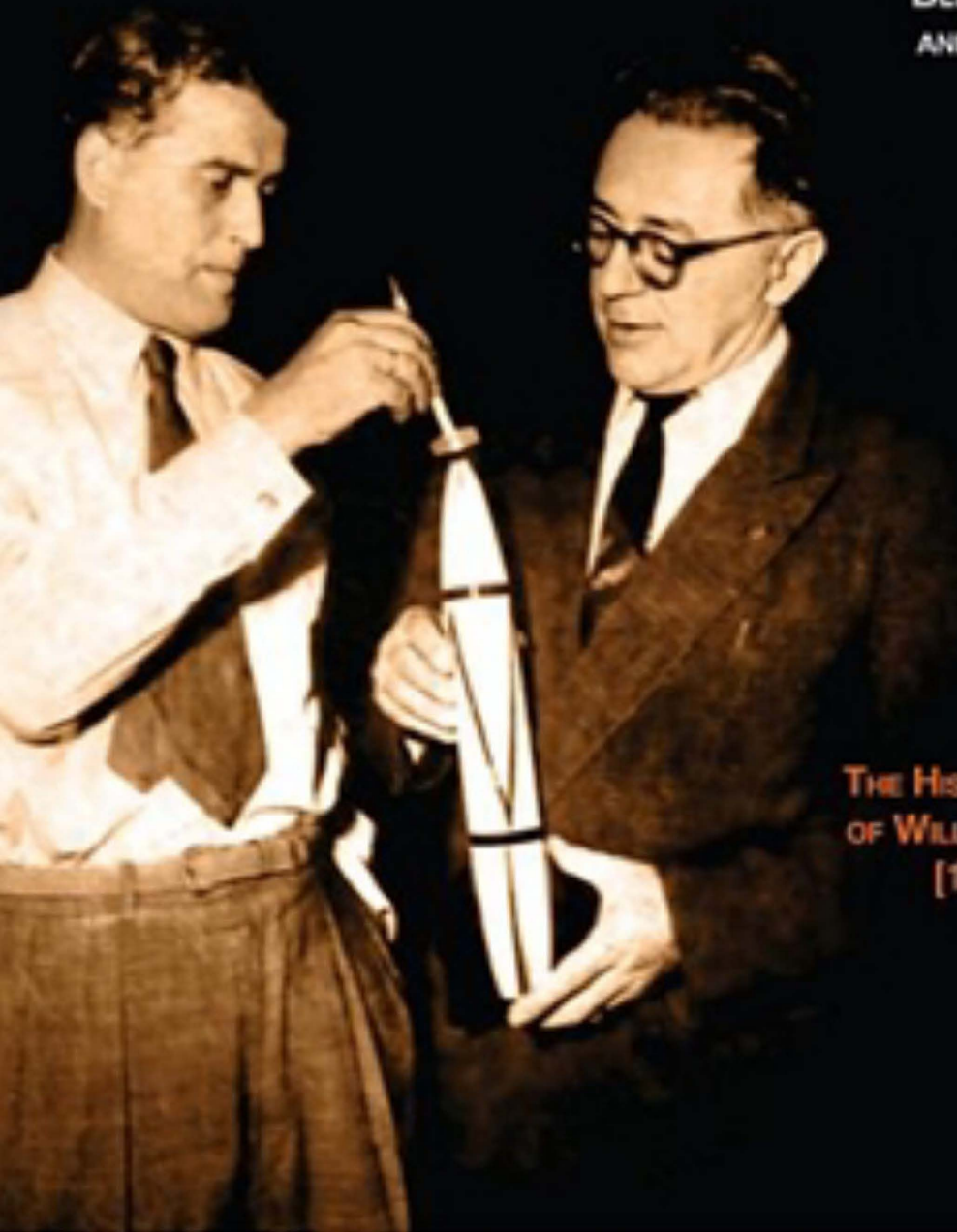
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THE HISTORY AND LEGACY
OF WILLY LEY'S ROCKETS
[1944-1968]





THE HISTORY AND LEGACY OF WILLY LEY'S ROCKETS, 1944-1968

By Jared S. Buss

Abstract:

This article examines the history of science writer/historian Willy Ley's seminal classic, *Rockets, Missiles, and Space Travel*. By exploring the origins, publication, and revisions of the book, it will analyze Ley's changing perspectives on rockets. This task showcases several tensions at play, from Ley's attitude toward "war rockets" to his status as an "outsider," relying on the ex-Peenemünders for information. Overall, this article puts the book into a historical context that enriches our understanding of Ley's influence on both the public and the field of spaceflight history.

If one person deserves the title of chief publicist of the "Space Age," it was science writer Willy Ley. Not only influential in Weimar Germany, he also became one of the most famous space advocates in the United States. His best-selling *The Conquest of Space* (1949) created an international sensation, due to its educational text and beautiful illustrations by artist Chesley Bonestell. Ley produced many similar books for adult and juvenile audiences. Yet, unlike *Conquest* and other books, there is one work that Ley constantly edited and revised: his classic *Rockets*, later expanded to *Rockets, Missiles, and Space Travel* and other variations. From its initial publication in 1944, *Rockets* went through 21 printings and 4 significant revisions. Historian Roger D. Launius labeled the book as "one of the most significant textbooks available...on the possibility of space travel."¹ Indeed, it was "the" book on rockets in English. In readable prose, *Rockets* educated readers about the history of rockets, the present "state" of the "field," and the future.

Ley's *Rockets* also had a lasting impact on spaceflight history. As historian Michael J. Neufeld has argued, "Ley...

more than anyone else founded space history in the English-speaking world."² *Rockets* was his "opus." Its narrative and perspective influenced much secondary literature. For example, as scholar Asif S. Siddiqi has noted, Ley's representations of key visionaries and their accomplishments privileged the role of individual genius over states and institutions. His synthesis of "prophets with some honor," with their "steps" in the right direction had a lasting impact on the field. Siddiqi argued: "So powerful was this synthesis that to this day, almost all history books on space exploration begin by invoking Tsiolkovsky, Oberth, and Goddard—and then move to von Braun's team." Although Ley's use of "TGO" narratives can be exaggerated, Siddiqi is right to point to Ley's synthetic approach.³

Ley's work also had a darker legacy. Ley fled Germany in early 1935. His post-war revisions of *Rockets* aimed to tell the "full story" of the Nazi V-2 rocket. He relied on information provided by ex-Peenemünders, especially Walter Dornberger and Wernher von Braun. With the primary goal of exciting and educating readers, Ley popularized a glorified and incomplete history of the V-2. As Neufeld explains, Ley provided "a sanitized history of Nazi rocket activities palatable to Western audiences during the Cold War."⁴ Historians have struggled to uncover the truth behind the stories told to Ley. They can still do more to verify Ley's memoirs, which offered a self-serving account of his activities as an anti-Nazi advocate, opposed to the militarization of rocketry. For example, German editor of science fiction and utopian novels Dr. Wolfgang Both discovered that Ley joined the Nazi Party in 1925 before becoming either disillusioned or disinterested in 1928. After 1928, Ley's ties to leftist, anti-Nazi publications increased.⁵

Historians may be tempted to keep a cool distance from their founding fathers. Often, founding fathers wrote history

backward. Their arguments now reek of teleology and "Whig history." Many historians are wary of narratives of heroes and villains, as well as glorified accounts of the "steps" in the right direction. For example, scholar De Witt Douglas Kilgore critiques the "public apologists for the value of science," along with their technological notions of progress.⁶ For Kilgore, Ley is an example of an "astrofuturist" who blended manifest destiny, teleological arguments, and faith in technoscience. Thus, there are many reasons to be wary of Ley's *Rockets*. The book was an influential, albeit flawed historical account. Yet, as this article will demonstrate, there are also good reasons to explore and historicize Ley's contributions. This article takes a closer look at the work, its evolution, and its legacy. By exploring the origins, publication, and revisions of the book, we can examine Ley's changing perspectives on rockets and space travel. This task highlights the tensions at play, from Ley's attitude toward "war rockets" to his status as an "outsider," relying on the ex-Peenemünders for information. Overall, this article puts the book into a historical context that enriches our understanding of Ley's influence on both the public and the field of spaceflight history. It will demonstrate that Ley's *Rockets* was the most influential book in spreading the "gospel" of spaceflight. The book also put forth narrative tropes that would influence the field of space history for decades. From the conflation of missiles and spaceships to the glorification of engineers and explorers, these tropes influenced the field. Historians have long recognized these tropes. By identifying *Rockets* as a key source of influence, historians can further overcome clichés and problematic narratives.

The Origins of Rockets

In 1927, prior to the founding of German Society for Space Travel (Verein für Raumschiffahrt or VfR), Ley dined

with spaceflight advocate Max Valier. Ley remembered, "Valier suggested that I might check whether rockets had a use in history other than as mere fireworks... [which was] a fact scarcely suspected before."⁷ This challenge intrigued Ley. He had already published *Die Fahrt ins Weltall* (*Journey into Space*, 1926), which popularized the theories of Hermann Oberth.⁸ Ley then ventured into Berlin libraries to research the history of powder rockets. Additionally, Ley began writing other historical works, after editing a collection of essays. With the goal of combining history and prophecy, Ley revised *Die Fahrt ins Weltall* in 1929. The new edition put the rocket into a historical context. In fact, the history of the rocket was "a story all its own."⁹ Although the text still made a case for Oberth's theories and importance, it also showcased an international set of founding fathers. Whereas Ley's 1928 edited collection expressed a nationalistic hope "that from this German rocket book a German space ship will emerge," his 1929 book presented an international history of progress, before the scientific scene was torn to shreds by the Great War.¹⁰ For Ley, it was time to rebuild networks. While nationalism and futurism came together during the "rocketry fad," Ley fostered scientific internationalism through correspondence and publications. He was also reaching a larger audience, particularly with the premiere of the film *Frau im Mond* (*The Woman in the Moon*, 1929). Both Ley and Oberth served as consultants. Evidence suggests that Ley greatly influenced director Fritz Lang, while Oberth was contracted for his name and a publicity rocket.¹¹

Ley continued to research the history of rocketry in the early 1930s, a period of "success, failure, and politics." On the one hand, there were hopeful signs. With the establishment of "Raketenflugplatz Berlin" as a site of experimentation, rocketry progressed. Overall, 1931 was a year of progress. Ley remembered, "everything, or most everything, went fine." Allegedly, the site produced 87 rocket flights and more than 270 static tests. On the other hand, the scene had been deteriorating for some time. Valier had almost sabotaged the cause through publicity stunts with rocket cars. The VfR's publication, *Die Rakete*, could not continue.

Publicity from the movie had been short-lived. Additionally, Oberth resigned his presidency of the Society, and Major Hans-Wolf von Dickhuth-Harrach accepted the job. Ley later expressed anger about military leadership, stating that it "produced all the groundwork for a psychological explosion which I postponed as long as possible."¹²

Additionally, engineer Rudolf Nebel became the "de facto" leader. Ley despised his tactics and personality. His negative view of Nebel is reflected consistently in his first autobiographical articles. Ley perceived Nebel as a master manipulator who disrupted meetings with "politics." Nebel was also "a professed militarist" who "suffered from an inferiority complex of great magnitude." Nebel criticized Ley for sharing information with the American Rocket Society. He also attempted to militarize the agenda, while donning a swastika. Nebel either "sulked or dominated the meeting... in a loud and accented voice, surprisingly like Hitler's." Nebel also "discredited himself and the whole society by making untenable assertions." There were serious consequences to Nebel's attempts to militarize the agenda. Ley recalled: "And then I saw that we were no longer 'in all the rooms.' Somebody else was there: the busily plotting German army...and some of Oberth's and Nebel's claims worked nicely into their hands." He added, "Both had talked and written a lot about war rockets, and many people had believed." Ley remembered, "everything collapsed at once." Nebel had betrayed the cause: "The program of the VfR had been entirely different...aimed at the creation of the space-ship as the ultimate goal."¹³

Prior to the collapse of the group, Ley fought these developments. During the early half of 1932, he spent much time studying ballistics, trajectories, and weapons. He was on a newfound quest to scientifically debunk the "war rocket" as promoted by Oberth and Nebel. His "long study" convinced him that "rockets in battle can never be as efficient as guns in battle...[while] the bombing airplane can carry an immensely superior load." In Ley's view, war rockets had always been ineffective weapons of war, compared to traditional tactics.¹⁴ Yet, at the moment when Ley stood ready to debunk war rockets, the situation deteriorated further. Ley

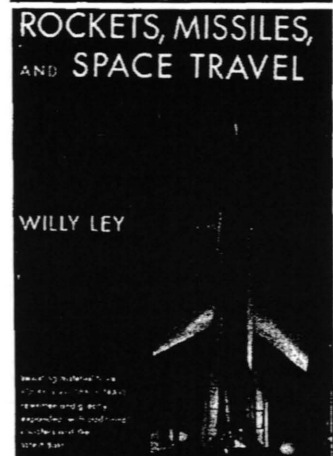
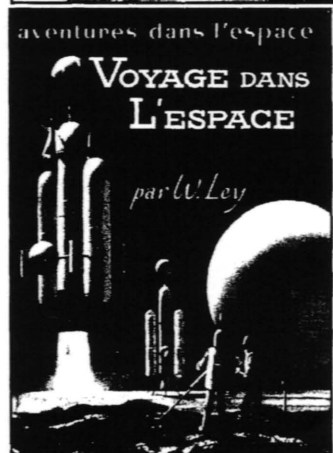
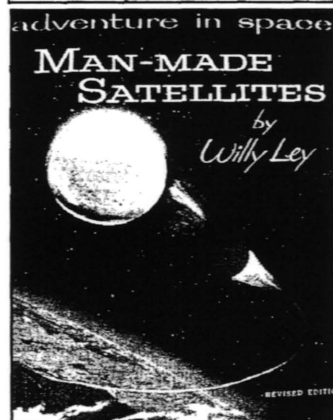


Willy Ley.

Credit: National Air and Space Museum

recalled: "everything...was rapid decline." Progress had stalled. Several individuals had almost disappeared from the scene. The Nazi seizure of power in early 1933 also dramatically altered the situation. From a Gestapo raid on the Raketenflugplatz in late 1933 to an April 1934 censorship decree by the Propaganda Ministry, the situation became untenable for amateur experimenters or publicists. Some individuals, including Nebel and a younger popularizer named Werner Brügel, were arrested for publicity-related activities. The group of amateur experimenters was forcefully silenced. Publicity became impossible. As Neufeld summarized, "From the standpoint of the public, rocketry disappeared in 1934 because of the imposition of censorship." Experimenters "found themselves under subtle or blatant pressure from the new police state."¹⁵

In Ley's perspective, totalitarianism demanded secrecy, state control, and the persecution of scientists and engineers. Thus, Ley viewed the state as detrimental to a scientific cause, which required international cooperation and publicity. If his later articles are accurate, he also associated the rise of Nazism with the rise of pseudoscience.¹⁶ Nazism, irrational politics, and cultist "nonsense" poisoned Germany's scientific well. The situation became desperate. Scientific internationalism became dangerous. Ley believed that his correspondence with the foreign rocket societies was being monitored.¹⁷ Carefully and cryptically, he coordinated



his escape with the help of foreign rocket societies. Using the disguise of a journalistic trip, Ley departed for a brief stay in Liverpool and London, before sailing for New York City in February 1935. He planned to continue his activities in a new country.

Initially, it was difficult to excite the American public about a future of interplanetary travel. After unspectacular stunts with a mail-rocket-plane, Ley hunted for a new investor.¹⁸ An article also claimed that Ley had just finished writing his first book in English, called *The Attack on the Stratosphere*. Although this manuscript remained unpublished, Ley established himself as a rocket expert by earning a “precarious living” as a freelance writer of science fiction and “science fact.” Very quickly, the pulps labeled him “the foremost authority on rocketry in America.” His role as a technology expert increased during the war, when he served as a science editor for the leftist “picture magazine” *PM*. His “war weapons” articles often attempted to debunk rockets as potential “wonder weapons.” At best, war rockets would be tools of “propaganda” or “super mine throwers.” Rockets could, however, be effective spaceships.¹⁹

Rockets: The Future of Travel Beyond the Stratosphere (1944)

In 1943, Ley wrote “The End of the Rocket Society,” a two-part article for *Astounding Science Fiction*. By the spring of 1944, this autobiographical account had grown into a book: *Rockets: The Future of Travel Beyond the Stratosphere*.²⁰ *Rockets* framed the history of rocketry from early theories of a plurality of worlds to recent engineering accomplishments. Ley wrote,

It is the story of a great dream, if you wish, which probably began many centuries ago on the islands off the coast of Greece. It has been dreamt again and again ever since...It has been dreamt all over the earth, in places ranging from quiet libraries to noisy machine shops. And everyone who thought about that dream added a little knowledge.

Ley added, “It is also a story of continuous progress, one small step here and another one there.” Not only was it a story of a dream, but also it was the history of a technology that “evoked different ideas in the minds of people at different times.” The rocket had long fluctuated between two extremes: “the grim weapon of war and the instrument of amusement in a carefree period.” Yet, this dual identity was suddenly

“unimportant” for Ley. Although “there will be war rockets and amusement rockets in the future too,” he argued, “there will be bigger and more important applications than either of these two.” Writing many months before the V-2 rockets fell on London, Ley predicted, “And as for war rockets, in spite of some spectacular applications in the present war most of their story lies in the past.” Ley concluded, “I’m going to speak about spaceships....they’ll exist.”²¹

An entertaining and popular history of science follows. For example, Ley depicted the “Dark Ages” as a time of intellectual stagnation. Ley wrote,

It literally came to a point where thinkers set out with the notion that all wisdom could be found in the Bible, all astronomy in the *Almagest*, and all science in the writings of Aristotle. Not only was it simply forbidden to teach anything that contradicted or diverged from Aristotle’s statements, it was also denied that there was anything that Aristotle had not known.

Due to close-minded deference to an authority or institution, science was at a standstill. It would remain stagnant until “the astronomical revolution” of Copernicus, who created “a new picture of the world,” further developed by Galileo and Kepler. Ley caricatured “the” Scientific Revolution as an age of bold experimentation, fearless explorers, and anti-authoritarian scientists who spoke truth to power. It was also a new age of fantasy and imagination, which are vital components to scientific progress.²²

This combination of science and pure imagination takes the narrative quickly into the nineteenth-century “decades of great dreams.” Ley explores the cultural history of hoaxes, particularly Sir John Herschel’s alleged discovery of vegetation, unicorns, and “bat-men and bat-women” on the Moon. Then came the actual astronomical discoveries of the late nineteenth century: a primordial Venus and an advanced Mars, crisscrossed by strange “canals.” Suddenly, “the nineteenth century became the era of the greatest astronomical dreams.” Popular science and popular literature complemented each other. Science, imagination, and media had each contributed a new age of telescopic exploration. It was almost incidental that flourishing and cosmopolitan media thrived on controversies and hoaxes. Science, in the end, was self-correcting. What mattered most was public support for exploration. Science flourished in an open, cosmopolitan, and free public sphere, in

spite of opportunities for “cranks.” So long as an institution or the state did not enforce “dogma,” the scientist could explore and the public could consume.²³

The subsequent chapters presented a detailed history and discussion of rockets. In clear and direct language, Ley explained the how, why, and when of rockets. He also evaluated the contributions of different theorists and engineers, with the aim of establishing a clear chain of events regarding the development and progression of the “science.” The most dramatic chapters are called “The Battle of the Formulae” and “Success, Failure, and Politics,” which read like a tell-all history of the VfR and Rakettenflugplatz Berlin. In addition to depicting Nebel as the villain of the story, Ley depicted Oberth as a brilliant, yet occult-minded proto-Nazi. His “mystic inclination naturally transformed Oberth into a Nazi.” Ley even claimed, “I have it in writing from his own hand that... [Oberth] denounced me to his Nazi superior.” The text also indicates just how little Ley knew of von Braun’s activities. The book contains only one passing mention of a “Count von Braun” as a “member of the board of directors.” Ley believed most of von Braun’s “tale, pieced together and condensed.” The Army “had stopped research completely and given him a dull routine job.” The moral of the story was rather simple. Nationalism and politics had intervened and stunted scientific progress. For future innovation in spaceflight, politics had to get out of the way. Rocketry must flourish in an open, cosmopolitan, and international scene.²⁴

The concluding chapters of the book discuss possible future innovations, from meteorological instruments to cosmic voyages. Ley pleaded for a patron in the United States to fund experimentation. He even outlined a budget of “\$2000-\$3000 per month for a period of not less than two but not more than three years” for a meteorological rocket to be “realized.” Ley also campaigned for a “rocket into cosmic space.” He argued, “the problem, while difficult, is not even half as difficult as most people imagine.” There would be a relatively easy progression from a meteorological rocket to a spaceship and a “terminal in space.” He argued, “The idea of space travel has by now reached a rather high state of perfection... It looks as if that

great old dream is not a dream after all. It is something that can be done.” Lastly, the book answered the question of “Why should we try for space travel?” A “simple answer” is presented: “Somebody has got to start at some time, and we may as well get the glory for our own century.” Ley also stressed that the costs of the first voyages would be offset. “Anything lunar,” he predicted, “will bring fabulous prices.” While the ultimate payout was knowledge, Ley predicted that the discoveries made on a station could possibly “pay for everything.” The text implied that further “decades of great dreams” would ensure tremendous scientific discoveries and technological breakthroughs.²⁵

Howard E. McCurdy asserts that Ley’s *Rockets* “was an instant success,” but this claim overestimates the success of the first edition.²⁶ Viking Press did not heavily promote it. The book met with an enthusiastic, albeit limited reception. A reviewer for *The Scientific Monthly* stated, “He has written a good book.” Science writer Waldemar Kaempffert reviewed it for the *New York Times*. “Though the head of Willy Ley may be somewhere in interstellar space,” Kaempffert asserted, “his feet are on the Earth.” Kaempffert commended the thoroughness of the book, before he criticized Ley’s optimism. Kaempffert also critiqued Ley’s portrait of the “Dark Ages.” Nevertheless, Kaempffert reviewed the merits of the text, while expressing excitement for the future. *Newsweek* also remarked on Ley’s obsession with rockets: “Scoffing didn’t bother Ley. His thinking was miles ahead of actual rocket development then or now, but his predictions were sublimely confident.” A reviewer for *Science News Letter* called Ley “an excellent master of written words...[who] is tempering his dreams, however, fiery, with the solid facts of physics and the cold restraint of mathematics.” Astronomer Robert S. Richardson called it “a masterful and fascinating account of fact more exciting than fiction.” The technology inspired awe and wonder. The rocket of the future would be a spaceship.²⁷

The Shock of V-2

Nearly four months after the publication of *Rockets*, a mysterious weapon hit London. Ley received a visit from aero-

nautical engineer A. V. Cleaver, who had inside knowledge of the large rocket missiles, then still classified. Ley dismissed the rumors entirely. Cleaver recalled,

I was astonished to find that, for some reason, he had decided that the rumours were a lot of nonsense. He spent much time and effort assuring me that his ex-countrymen were most unlikely to have developed such a weapon...I argued weakly against these conclusions...I forbore to tell him that...I could describe the rocket to him if he would only listen!²⁸

Other accounts claim: “[Ley] then said that, if the rumors were true, ‘a young man called von Braun’ might be responsible.”²⁹ Ley did not believe reports until November when both Churchill and Hitler spoke publicly.³⁰ Still, Ley had doubts about conflicting reports. As an expert on weapons, Ley had legitimate reasons to doubt the military value of a long-range missile. Why would the Nazis turn to fire arrows amid fire bombings? In Ley’s perspective, no known payload justified the military value of war rockets.³¹

In a January 1945 article, Ley argued, “The military value of this weapon is small...any hit scored by the V-2 is purely accidental and completely unpredictable.”³² He concluded: “V-2, therefore can be characterized as an extraordinary example of engineering and research but also as a military flop...V-2 lacks accuracy, completely.” Aside from this short article, Ley was reluctant to comment. Ley spent many weeks collecting information. Then, he wrote an exclusive article for *Astounding Science Fiction*. The editor introduced the article, “V-2 Rocket Cargo Ship,” by claiming, “Willy Ley knows rockets—and German rocket engineers. He can, and does, identify the man who designed V-2.” Ley asserted, “The full story of the German rocket research laboratory near Peenemünde...will never be written. There will be nobody alive who can write it.” Despite the unknowns, Ley asserted, “Everything about it spells out OBERTH in capital letters.” The article added, “We cannot hope to take Peenemünde... The Nazis will see to it that everything will be utterly destroyed.” Ley argued, “Barring miracles we will not be

able to continue for peaceful purposes what the Germans started with war in mind. But...Peenemünde proved that it can be done."³³

The United States needed a rocket expert, and Ley spent much time in 1945 and early 1946 trying to establish himself as an engineer of the Washington Institute of Technology. When he learned that many V-2 "scientists" had been relocated under "Project Paperclip," Ley was attempting to get a Navy contract for meteorological rockets. He found military bureaucracy maddening. On 5 May 1946, he received a letter from Col. Cal Lanning, which read "Dear Willy, we aren't having much luck getting you into the Navy rocket picture." Ley voiced his anger to his closest Navy-insider/friend, author Robert A. Heinlein: "So far, unfortunately, nothing has worked out...I was supposed to interrogate the captured German rocket experts—impossible. I am not invited anywhere for anything." He added: "Apparently there is some higher-up bozo somewhere who...prefers to deal with genuine captured Nazis instead."³⁴ In a later letter, he added, "I only hope that the U.S. Army will not suddenly find him [von Braun] 'charming' in addition to being useful."³⁵

Throughout 1946, Ley collected more information as he revised *Rockets*. He expressed his frustrations to Heinlein: "I am writing only one single damn thing these days, the revisions of *ROCKETS* [sic] for the fourth printing. Every time I have a chapter done somebody releases something and I have to start over again."³⁶ By December, most of the revisions were finished, before a reunion with Wernher von Braun changed the situation. They met for an evening of wine and shoptalk. In a letter to a friend, Ley spoke of the tension in the room: "I intentionally took no notes during the conversation, so that it did not seem like an interrogation."³⁷ Yet, Ley memorized von Braun's comments. Aside from learning as much as possible about the V-2, Ley learned other facts. Most noteworthy was Ley's judgment: "I found no reason to regard v.B. as an outspoken anti-Nazi. But just as little, if not even less, did I find him to be a Nazi. In my opinion, the man simply wanted to build rockets. Period."³⁸ It was time to revise history.

Rockets and Space Travel (1947)

In February 1947, Viking published a revised and expanded edition of *Rockets*, now titled *Rockets and Space Travel: The Future of Flight Beyond the Stratosphere*.³⁹ In a new foreword, Ley explained the new title: "This is a book about rockets and about the idea of interplanetary travel, and I wish to emphasize that these two things belong together." He also stated, "Because it is my firm conviction that rocket research will lead to the realization of that great old dream and because I see little value in any rocket research which states that it is not supposed to lead to that goal, I have written this book." On the one hand, Ley still downplayed the evolution of "war rockets" by arguing that space travel was the goal. He presented the V-2 as "merely the beginning." Soon, "the spaceship will follow... one day in the future. Possibly in a future not too distant." On the other hand, he removed the passage that claimed that the story of the war rocket "lies in the past." He also removed a passage that stated, "The modern war rockets do not replace artillery in any way; they merely augment it."⁴⁰

Ley made several small revisions to the existing chapters. The organization of the book remained the same, apart from the inclusion of two new chapters called "The Rockets of the Second World War" and "Peenemünde!" Ley's narrative surrounding the V-2 is interesting and revealing. Mostly, it indicates what he did not know about the production and technical details. Instead, the chapter illustrates a science writer's catalogue of all known facts, told from the perspective of the Allies. Ley did not evaluate the V-2 in kind terms, although he glorified the broader implications. The V-2 was "not fully developed" and "showed a number of glaring imperfections." He added, "A 'usable state' was good enough for the hard-pressed Germans." Nevertheless, the V-2, in spite of its failure to alter the course of the Second World War, "transformed the face of war for all time to come."⁴¹

Ley's "knowledge of the people who worked at Peenemünde [and] the background of the V-2 project" became a key selling point.⁴² In retrospect, his knowledge in 1947 was minimal. However, there are a few passages that indicate last-minute revisions of the text, likely based on his 6 December 1946 meeting with von Braun.

As one would expect, von Braun's role in the days of early experimentation is bolstered. Ley described him as "a young man who showed great promise." Ley also depicted the elevation of von Braun to the board of directors as a scheme by Nebel "to gain access to army circles." Ley casually grouped von Braun with Nebel as preferring long-distance rockets "(for military purposes)." Additionally, Ley removed von Braun's "tale" about having a routine job. Instead, von Braun accepted a commission that "in the end led to the design of the V-2." He also doubted one of von Braun's claims about quickly converting the German Army to liquid fuels. Ley attributed this claim to "a certain amount of self-glorification." Nevertheless, von Braun is described as "the man actually in charge of the construction of V-2." He added, "von Braun went in for experimentation on a large scale, against the wishes of the Nazis and even of Hitler himself." Ley also told this story:

During 1943 Count von Braun went to see Hitler at his headquarters at the eastern front. With him he had rolls of film, documenting the research work done. Apparently both von Braun (who happens to look like the picture of the "perfect Aryan Nordic" invented by the Nazis) and his films impressed Hitler sufficiently to make him change his mind. He ordered mass production.

Otherwise, Ley relied more heavily on newspaper accounts than information from the ex-Peenemünders. Yet, his narrative was the first step toward a "sanitized history of Nazi rocket activities."⁴² As Neufeld argues, Ley knew little about the atrocities "due to a deliberate policy of silence by the ex-Peenemünders and the U.S. government."⁴⁴ Ley was trying to be objective, yet, he inadvertently crafted a narrative that served von Braun's interests. For example, the text assumed that the development of the V-2 occurred at the isolated research center and moved into mass production "throughout Germany" after the RAF bombing of Peenemünde.⁴⁴ The text displays no awareness of the use of concentration camp labor in the production of V-2s.

Other changes to the text indicate Ley's increasing focus on the application of atomic power to rocketry, as well as the future uses of war rockets. Here, the text

reflected an enormous change in Ley's evaluation of missile weapons. Prior to the atomic bomb, he told the public to "KEEP CALM!" due to the balance between offensive and defensive weaponry. Now, Ley could offer no valid counterargument to the "prophets of doom." The atomic bomb had altered his perceptions of the ballistic missile. As early as February 1946, he argued, "Couple V-2 and the atomic bomb (it can be done today) and you have a destroyer of cities against which there is no defense." In the new edition of *Rockets*, Ley admitted, "But all these arguments pro and con are invalid now; they have been cut short by the atomic bomb." Although the V-2 remained inaccurate, "it becomes the final weapon if it carries an atomic bomb...there is no defense."⁴⁵

The revised text also began to reflect the broader context of the Cold War. Although Ley mostly avoided discussing the military applications of space technologies, the implications of the text were obvious. In fact, science writer Martin Gardner reflected on the book in *The Scientific Monthly*. He wrote, "Now...it is evident that space travel is only a few years away and that the first nation to establish a military base on the Moon will dominate the Earth."⁴⁶ For the most part, Ley did not use this Cold War rhetoric until later. Yet, his *Rockets* encouraged this type of thinking with extremely optimistic accounts of the pay-offs for the first nation that constructed a space station.⁴⁷ Other reviewers praised the book, while reaffirming Ley's unique status as a foremost rocket expert. In fact, the *Field Artillery Journal* claimed, "This is the book on rockets and space travel." Other reviewers did not dispute Viking's promotional claim that Ley's book represented "the authoritative story of rockets and how they may take us to the Moon."⁴⁸

Meanwhile, Ley likely grew disturbed by the rising anti-German sentiment regarding the U.S. military's employment of the ex-Peenemünders. Although Ley would later defend this group publicly, he remained silent during 1947. If he had known the truth, Ley might have severed his ties. Yet, he viewed the ex-Peenemünders as apolitical engineers, who were forced to work for the Nazis. Additionally, Ley was now dependent on

this group for insider information on the history of the V-2. His reputation, as well as his family's livelihood, depended upon his success as a freelance writer. The Peenemünders would become indispensable sources of information.

Rockets, Missiles, and Space Travel (1951)

Between the 1947 edition and the 1951 revision of *Rockets*, Ley's status as a scientific celebrity rose. His 1949 collaboration with artist Chesley Bonestell produced a best-selling coffee-table book, *The Conquest of Space*. As spaceflight media exploded in popular culture, Ley was ever-present, giving dozens of lectures and interviews. Throughout the early 1950s, Ley wrote hundreds of articles for magazines, newspapers, and nonfiction sections of science fiction pulps. Additionally, Ley served as a consultant to TV's *Tom Corbett, Space Cadet*, along with its corresponding novels, comics, and publicity tours. Ley was also writing books and articles on natural history that reached wide audiences.⁴⁹ Amid this flurry of activity, he revised *Rockets*. He informed Heinlein, "we have just decided to do it over from cover to cover."⁵⁰

In June 1951, Viking Press published a new edition of *Rockets*, now titled *Rockets, Missiles, and Space Travel*. In Ley's perspective, it was a new book, extensively rewritten and revised.⁵¹ Ley told a reporter, "The new book is essentially a history of the development of rockets from the beginning to the future, to the moonship, to landing on the moon and building a base there...It is a history up to the present. After that it is prophecy."⁵² The book's foreword also commented on the "almost incredible" advances in the field, which have "lived up to prediction in a manner virtually without equal in the history of engineering."⁵³ In an interesting passage, Ley reflected,

Naturally the fact that so much that was theory is now reality has changed the public attitude. When I wrote about the ideas of space travel in 1944...I wanted to impress upon the reader that the people who had thought about space travel were people who knew how to think. This is now generally taken for granted. The question is no longer whether

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Advertisement which appeared in *Boys' Life* magazine, 1960.

space-travel theory is serious, or whether it is correct...If...my book again becomes obsolete a few years hence, I shall be very happy indeed.

Because Ley was now relying on the ex-Peenemünders as sources, one might expect the book to contain "a romanticization of the Nazi rocket center...as fundamentally aimed at space travel, rather than weapons development for Hitler."⁵⁴ This romanticization creeps into the text slightly. Ley described the initial site as "strung



Left to right: Heinz Haber (German physicist), Wernher von Braun, Willy Ley [1954].
Credit: NASA Marshall Space Flight Center

along the seashore, with laboratories, workshops, test stands, etc.” Ley even asked if the site should be thought of as “a research engineer’s paradise,” even though the engineers were “operating for the wrong cause.” Ley’s book also included dramatic countdowns of V-2 launches, which conflated the missile with an imagined spaceship of the future. In some ways, Ley’s *Rockets* now attempted to conflate the history of missiles and the future of space travel. Nevertheless, the text is very clear about the V-2 rocket being a weapon of war, commissioned for only one purpose: as a missile. It is also interesting that Ley wrote very little about the motivations of von Braun and others. Additionally, for unknown reasons, Ley removed the passage regarding von Braun’s conversion of Hitler through a dramatic film presentation. The text presents von Braun as a scientist and engineer, who “was able to answer the precise questions of the Führer tersely and clearly,” according to a Gestapo report. The book also updated readers with a new chapter called “White Sands,” which presented recent V-2 launches in the United States as vital contributions “to a variety of different sciences.” The book quickly transitions from a discussion of missiles to the next step: “The Rocket into Cosmic Space.” Ley argued, “Man took his first step into space,” with the launch of a “modified V-2” on 24 February 1949. Ley

confidently concluded, “In time...space rockets will be manned.” The book also stated, “There is no other science which has such a magnificent record of living up to its own predictions as the complex of applied sciences which is rocket research.”⁵⁵

By this point, Ley’s *Rockets* had grown to 436 pages. His agenda had changed. Whereas his 1944 edition tried to persuade the public “that he was serious,” Ley now asserted, “The question now is simply how soon engineering practice will catch up with existing theory.” The text became far more complicated and technical. Ley was trying to write for both laymen and specialists. He struggled to balance a readable text with technical diagrams and appendixes. Consequently, many reviewers saw the book as “more imposing” than earlier editions. This complexity led critic Lewis Gannet to state, “If you find these suggestions [of space travel] a little dizzying, other pages of Mr. Ley’s text...may dizzy you still further. He writes as a rocket scientist, with a kind of mathematical fury which may baffle well meaning laymen.” Yet, even this critical reviewer admitted, “Mr. Ley can be technical, but he has an appealing sense of wonder and a wonderful sense of curiosity.”⁵⁶ Other reviewers could be far more critical.⁵⁷

Despite these critical reviews, the book sold well. In November 1951, Ley even boasted of the sales to Heinlein, stating, “Seriously now, *Rockets, Missiles, and Space Travel* just moved into third printing. Which, with a royalty of close to a dollar a copy, is an uplift to the spirit.”⁵⁸

Incidentally, the “Natural History Book Club” heavily promoted it by gifting it to new members. They downplayed the technicalities of the book, announcing, “Here is the story of the rocket from its beginning. And here is a simplified account of present-day developments along with the thrilling story of the triumph over space that is soon to come.”⁵⁹ Ley’s book was read as prophecy that would become reality. It also served as a technical “bible” for science fiction authors and curious students. It was at this point that the text essentially served as a “textbook.” As the space age flourished in popular culture, *Rockets* became “the” book to read, for both laymen and an increasing number of specialized engineers. Along with many other books, it contributed to expectations of an immediate American conquest of space.

***Rockets, Missiles, and Space Travel* (1957)**

By 1957, Ley’s status as a rocket expert and scientific celebrity had peaked. In addition to publishing other collaborative books, such as *The Exploration of Mars* (1956), he continued to popularize rockets as the means of space travel. Ley gave many public lectures and interviews, while writing scores of articles for newspapers and magazines. He served as science editor for *Galaxy Science Fiction*, which printed a nonfiction article by Ley in every issue since 1953. Ley’s media presence also increased, particularly with Disney’s *Man in Space* TV special in March 1955. Along with von Braun and Fritz Haber, Ley educated Americans by explaining scientific facts in unimposing, comprehensible language. Millions of Americans watched this brief and informative lecture. Ley and von Braun also influenced the design and content of Disneyland’s “Tomorrowland” theme park. Additionally, Ley spent much time writing books that “adapted” the TV program for school use. He also appeared on news programs, such as *Face the Nation* in 1955. After a panel asked Ley to evaluate Soviet competition in satellite development, Ley answered, “In general, my feeling is, here, that the Russians can do it as well as we can, but that we can do it earlier, or faster or better, or all three.”⁶⁰ Ley then voiced his skepticism regarding Russian announcements:

“Well, there is one thing with announcements coming out of Russia: You never know whether they are announcements, propaganda gestures, tests of public opinion, or whatever.”⁶¹ Throughout 1956 and 1957, Ley excited the American public about the impending launch of an American satellite. His efforts included an exclusive contract with General Mills, which released several juvenile books obtained through the purchase of “Sugar Jets” cereal. In particular, his *Man-Made Satellites* (1957) praised the accomplishment of Patrick Air Force Base in Florida, which would launch “Earth’s first artificial satellite.”⁶²

His activities also included a 1957 interview with Mike Wallace, who asked repeatedly about the Germans who “switched” sides.⁶³ Ley offered his most direct defense of the ex-Peenemünders who “feel themselves as Westerners” in a divided world. Wallace responded, “How do these men reconcile having worked for Nazi Germany, building rockets against the Allies, and then turning around to serve their former enemies?” “You might say,” Ley responded, “that they didn’t consider the Western powers so much as enemies, personally.” Then Wallace asked if Americans should be confident that these scientists would not switch sides after an American war with Russia. In a frustrated tone, Ley argued, “How do we know anybody wouldn’t pull the same switch?” “Would they?” Wallace pressed. “Personally,” Ley countered, “I doubt it, but who can predict the future when it comes to people? I can predict the future when it comes to machinery, but not when it comes to people.”

The year 1957 also marked the most extensive revision to date of *Rockets*.⁶⁴ By this point, the book was selling quite well as it grew to 528 pages. Ley’s changes to the text are telling. He expanded his discussion of “The Return of the War Rocket” to bolster the connections between missile developments and space travel. He also revised his chapter on Peenemünde to incorporate the information and perspective of Walter Dornberger’s recently published memoir, *V-2*.⁶⁵ Ley’s foreword to the English translation stressed that rocketry had progressed as far as the Society could take it. He added, “All the real work was still ahead—mountains of work,

which needed an army of qualified experts and, it may be added, also mountains of money.” The German Army is presented as the successor, carrying on research and development. As one would expect, Ley’s revised edition of *Rockets* takes the case further, by depicting Col. Dornberger as a significant figure, while von Braun is still presented as the “first civilian employee.”⁶⁶ Ley also depicted the German Army as “soldiers,” rather than enthusiastic supporters of the Third Reich. Additionally, the book reintroduced the dramatic conversion of Hitler, without privileging von Braun as the key actor. For the first time, Ley presented an account of von Braun’s arrest by the Gestapo, after the team admitted that “their real object was space travel.” The text then supplied dramatic accounts of V-2 launches that included announcements of “Ignition! Preliminary stage! Main stage on!” Thus, not only did the book present the ex-Peenemünders as apolitical engineers who simply wanted to build space rockets, but also the text represented the V-2 rocket as a dramatic step toward the conquest of space.⁶⁷

Other changes to the book are interesting. Ley entirely removed the chapter “Terminal in Space.” Mostly likely, he did this to make room for a new chapter on satellites, titled “The Shot Around the World.” This addition illustrates how Ley catered a new chapter to provide the public with answers about pressing questions. The chapter began, in part, with a reassurance regarding predictions. Ley wrote, “I have repeatedly said that I know of no other science which has such a magnificent record of living up to its own predictions as rocket research has had.” The book reflected on the broader scene. Suddenly, newspapers and magazines buzzed with talk of satellites and space travel. Here, Ley spoke directly to future historians:

It would not surprise me too much if somebody in the future tried to make out a case that during the years 1953 and 1954 a number of “space-happy” scientists (to use a term coined by Robert A. Heinlein) carried out a conspiracy to talk their government out of tax money for their wild schemes. Scientific institutions, public lecture halls, the magazines, the newspapers, the radio waves, and the television channels were full of

space-travel and satellite talk. To discourage a possible future compiler of such a story at the very outset I can tell him that it all more or less just happened. The dozen or so men who talked space travel had talked space travel all their adult lives, but the time was ripe and they had, quite literally, bigger and bigger opportunities for talking.

Ley added, “One thing had simply led to another.” Public excitement for American spaceflight had intensified. Adults and children clamored for information. Ley’s new edition of *Rockets* went through six printings by the fall of 1958. Reviewers and advertisements continued to call it “the” definitive book.⁶⁸

Into the Space Race

After the “shock” of *Sputnik*, Ley launched an intense media campaign, not only to educate Americans about the “space race,” but also to relentlessly promote Wernher von Braun, who became an American hero after the 1958 launch of *Explorer I*. For his part, Ley celebrated von Braun in syndicated *Chicago Sun-Times* columns, which were reprinted in many regional newspapers across the United States. New American Library also distributed many of his articles in mass paperback. Through his articles, Ley became a prominent critic of a “missile gap” with the Soviet Union. In town halls, televised youth forums, and other venues, Ley spoke of the need to “catch up.” It would not be long before Ley provided Cold War justifications for spaceflight while he predicted a coming “space war.”⁶⁹ Throughout the 1960s, Ley continued to publish many other books on spaceflight, while promoting his Monogram space models.⁷⁰

Ley also continued to revise and expand *Rockets*. Keeping the text up-to-date was a major challenge. In the 1961 edition “revised for the 1960s,” Ley recalled Arthur C. Clarke joking, “Willy Ley will be condemned for the rest of his life to bringing his book up to date.”⁷¹ Ley admitted, “Except for the fact that I don’t feel in the least ‘condemned’ he was perfectly right...I, on my part, promise to keep on revising my book.” Yet, apart from the inclusion of new tables, figures, and a few updated passages, Ley’s *Rockets* remained largely standardized until 1967,

when he completely revised the text and retitled it *Rockets, Missiles, and Men in Space* (1968).⁷² The book contained almost 50 percent new material. The most notable addition to the book was a history of "space men." In fact, Ley rededicated the book to "the space explorers of the next generation who will want to know what their fathers thought and did." All previous editions had been dedicated to his wife Olga.

In the foreword, Ley reflected on the evolution of *Rockets*, as it had grown from 287 to 576 pages. Whereas his 1944 edition was evenly split between history and prophecy, his 1968 edition was entirely historical, with few immediate predictions. Ley wrote, "What you are holding now is virtually all history; the amount of prediction that remains is negligible." Ley added, "Some people may feel that this is a sad state of affairs—it was so nice to dream. But there is no reason for regret. When all the current projects have been carried out they will form a firm basis on which to build still another set of dreams."⁷³

Apart from significant revisions to specific chapters, Ley added a large chapter titled "Man in Space." As one might expect, the first American astronauts are described as incredibly brave explorers, who endured stress tests and other physical discomforts. Ley then described John Glenn's 1962 orbital flight in dramatic and heroic terms. Ley delighted in combining a description of the astronaut as a bold adventurer who longed for a breathtaking view of the heavens with a more down-to-earth representation of an engineer. For example, Glenn "really wanted... a capsule that was all glass," so that he could marvel at the wonders of nature. Yet, after reentry and splashdown, his words "were not the kind later put into the mouth of a hero in a play." Glenn simply remarked, "It was hot in there." Other Mercury astronauts used similar language. Likewise, Walter Schirra was not very impressed by the view. He remarked, "it was the same old deal; I might as well have been in a jet 40,000 or 50,000 feet up." Schirra also compared himself to a chimpanzee. Nevertheless, Ley celebrated this new breed of American explorers, while Russian cosmonauts are simply names, without personalities. By far the most emotional description occurs in "Postscript: 'If we die...'" Ley begins

by quoting Grissom, who told the press: "If we die, we want people to accept it. We are in a risky business... The conquest of space is worth the risk." Ley stated, "The tragic fact is that Grissom did die, along with Edward H. White II... and Roger B. Chaffee." Ley then described the fatal circumstances of their death during a simulation. Implicit in the narrative is Ley's heartfelt respect for the daring explorers who risked their lives. It is the most emotional section of *Rockets* to date. According to eldest daughter Sandra Ley, the only time when she saw her father cry was during media coverage of the disaster. The 1968 postscript can be read as a reflection of those emotions.⁷⁴

Ley ended his new version of *Rockets* with a celebration of human exploration:

Of course there is no proper ending to the story of rockets and spacecraft to come, any more than there was a proper ending to a story of exploration of our own earth when the North Pole had not yet been reached, Antarctica was merely known to exist, and the interior of Asia was forbidden territory. By now, of course, the exploration of our own planet may be said to have been completed... The exploration of space will go on forever and ever.⁷⁵

The astronauts would be the new heirs of a long tradition of heroic exploration. Their voyages of discovery were beginning. Their frontier was endless. More than any other edition of *Rockets*, this book put forth a perspective that had a lasting impact on the field of space history. It matched Siddiqi's later summation of a type of history that "described a space program whose central actors were hero astronauts, representing all that was noble in American culture."⁷⁶

The reception of Ley's final revision was mostly positive. One reviewer labeled the book as "his history-cum-encyclopedia." Others generally agreed that Ley's new edition was clear and definitive. One reviewer noted: "If you can buy only one book to learn not only the past but the future of space flight, this is the one to buy—accept no substitutes." According to a review in *Library Journal*, Ley's new edition was "truly monumental... the com-

plete record of rocketry and its place in today's world." A critic for the *Houston Post* argued, "Every field has a best reference book for laymen, and this is the one for those interested in the history of space flight." NASA's first historian, Eugene M. Emme, also noted, "Having gone through 21 printings and 4 complete revisions since it first appeared... Ley's now standard history has a history of its own."⁷⁷

Conclusions

When Ley died of a heart attack on 24 June 1969, his family, friends, and colleagues were shocked. Ley's widow, Olga, stated that the Moon landing "was the justification of all his dreams," which made his sudden death quite tragic. Isaac Asimov later reflected, "Willy had spent almost his whole life wrapped in rocketry. He was the world's leading writer on the subject... and he died six weeks before the [Apollo] attempt was to be made." P. E. Cleator eulogized, "his name will live on as one of the pioneers." Chesley Bonestell also wrote, "He probably did more than anyone else to make the public space conscious and to help man reach the Moon." In *Galaxy*, author Lester del Rey lamented, "If histories are written by men of understanding—it may some day be realized that the world has lost one of its singularly great leaders." Del Rey added, "He took what must be the very basic dream with which science fiction began... And more than any other man, often by the least obvious means, he built that dream into reality." According to this perspective, Ley had engineered the space age: "It was largely Willy's work that killed the public antipathy to rockets after their use as a terror weapon and began to make people dream of space again." "Somehow, through all his articles," del Rey wrote, "Willy and those who were converted by him had managed to convince half of the nation that there was value enough in the space program for them to go along with the huge expenditure... And step by step he led them to turn their eyes from this single planet to the vast reaches of space." Del Rey ended his emotional obituary with these words: "It took him forty years and he missed his goal of seeing the first man on the Moon by a month. But there is precedent for that... *And Moses went up from the plains unto the Mountain.*"⁷⁸

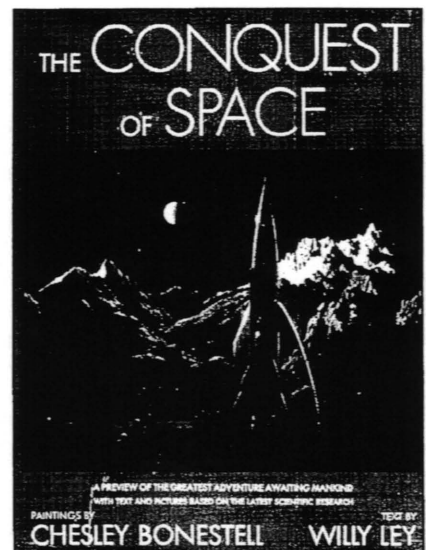
For over 25 years, Ley earned these praises by revising and expanding his *Rockets*, along with many related activities. Roger Launius is correct to label Ley's *Rockets* as the most significant "text-book." It was the most influential book in the popularization of rockets. Ley's *Rockets* became a technical "bible" and a reference work, not only for writers, but also historians. It is impossible to underestimate how many of our perspectives on people like Valier, Oberth, Nebel, and von Braun are deeply influenced by Ley's tales.

Historians will continue to struggle against the book's grand narrative, whether in its German-centric accounts or its contradictory synthetic perspective. Nevertheless, the book can still be read as a revealing piece of evidence, given changes to the text over time. A detailed analysis of the evolution and history of Ley's *Rockets* has led in such a direction, by illustrating how certain changes enrich our understanding of the tensions, contradictions, and key players. Ley began his historical inquiries with an agenda to debunk war rockets and promote space travel. By 1951, he was merging the history of war rockets with the future of spaceflight by conflating missiles and spaceships. He wrestled with the contradictions in a way that retained optimism for the future, in spite of the grim realities of war, both hot and cold. As he wrote in many editions of *Rockets*, "History, in the shape of the Peenemünde Research Institute, slightly upset the pattern of rocket development as it had been predicted in the twenties."⁷⁹ So too did politics, military interests, and war. Of course, Ley took advantage of opportunities to promote space travel as a national goal at the height of Cold War paranoia and "shock." Nevertheless, it seems safe to assume that he never intended to glorify missiles as weapons of war. Rarely did Ley comment on missiles as wonder weapons. Rockets, on the other hand, were wondrous spaceships of the future. Yet, both technologies had a shared history that must be told. The history of spaceflight had key personalities and shared experiences, across borders and throughout eras. There were some easy ways to avoid the inconvenient truths, by presenting engineers as apolitical. The technology could be viewed as "neutral,"

thus justifying a campaign for the "right" uses. Ley's *Rockets*, more than any other book, conflated the history of missiles and spaceships, while simultaneously campaigning for space travel as an ultimate goal. War had been a diversion of scientific and engineering expertise. Even amid Cold War nationalism, the history of the rocket was still an international story of pioneers and progressive "steps" in the right direction.

The tensions are interesting, and they have influenced the field of space history in many ways. Although Ley tried to remain objective and honest, his narrative did indeed provide a "a sanitized history of Nazi rocket activities."⁸⁰ Yet, the initial revisions of the text illustrate a tense relationship with his former colleagues. The later revisions show the extent to which Ley was relying on Dornberger and von Braun for insider accounts, although Ley tried to verify their accounts. It is also interesting how he initially distrusted his sources, until he considered the information credible or verifiable. There were also too many incentives to glorify von Braun, especially during a time when Ley was openly campaigning for the United States to close a perceived "missile gap." The way he told the story made sense, given both the known facts and the broader agenda of exciting the public about the future. One could see many parallels with the emergence of a field of historical inquiry, which has long struggled to balance objectivity and a presentist agenda of celebrating the past and promoting a future of human spaceflight. Perhaps the central flaw of Ley's *Rockets* did not surround misinformation and his reliance on Dornberger and von Braun. Given what he did and did not know, his historical judgments were sound. Yet, what both clouded the narrative and subsequently affected the field of spaceflight history was the presentist agenda of celebrating the triumphs, the "steps" in the right direction, and the heroic pioneers.

Historians have been deeply influenced by their founding fathers. Like many other historians of science prior to the 1960s, Ley used the history of science to celebrate the ascent of man, the fearlessness of the adventurer, and the anti-authoritarian attitude of the visionary. As Siddiqi notes, Ley combined reason "with a mod-



ern version of manifest destiny, a marriage of the near spiritual urge to explore new frontiers and the cold, hard rationale of technology.”⁸¹ One might add that Ley’s “technological utopianism” was also influenced by his self-described “romantic naturalism,” which was deeply embedded in German and American popular science. This romanticism was ever-present in both popular astronomy and natural history, and Ley spent his life writing both genres by combining facts with imagination, reason with awe, reductionism with holism, and science with spirituality. His secular humanism was not very secular. His triumphalism was deeply spiritual, worshipping and celebrating the inevitable human ability to overcome adversity, conquer nature, and exploit “her.” Progress was inevitable. Science was self-correcting. One step led to another. The fundamental fuel of the entire process was the journey and its daring explorer. The story was heroic. The voyage was manned.

This perspective explains Ley’s answer to a question in the 1957 *Night-Beat* interview: “Why do you want to go into outer space? What’s your fascination with it?” Ley answered, “Well, you have the old answer to the question of why do we want to climb Mount Everest: because it is there! It is... a basic drive. Man was born a curious animal.” Ley presented a rationale for spaceflight that assumed the form of a syllogism, as described by Stephen J. Pyne: “The urge to explore is a fundamental human trait. Space travel is exploration. Therefore, sending people into space is a fundamental characteristic of our species—what more is there to say?”⁸² Mike Wallace quoted a scholar who argued, “Man is venturing into space in order to find symbolic satisfaction for erotic or aggressive needs. It’s just as basic as sex...the urge to explore...is a human urge as fundamental as the human urge to procreate.” “What about it?” Wallace asked. “Well, he is probably right,” Ley admitted, “I mean I wouldn’t have phrased it this way. I probably wouldn’t have thought of it this way. I would have drawn, if I had written this, historical parallels to show that people of curiosity went after things with amazing results.”

Using “historical parallels” to celebrate human accomplishments was the defining characteristic of Ley’s style of

history. It is a style that continues to flourish, particularly in popular books. The stories are inspiring and educational. In Ley’s perspective, the historian was also performing a public service of painlessly educating readers, while combating prevalent representations of mad scientists or science-out-of-control. Many museums today have similar justifications for bringing science to the people in an inspirational, educational, and entertaining way. Serious historians may be tempted to condemn triumphalism, Whig history, and the methodology of founding fathers. In doing so, we should be very careful to not throw out the baby with the bath water.

About the Author

Jared Buss is an Instructor in the History of Science at the University of Oklahoma. He recently completed his dissertation, “Willy Ley, the Science Writers, and the Popular Reenchantment of Science,” (History of Science, University of Oklahoma, 2014). With the generous support of the Daniel and Florence Guggenheim Fellowship, as well as the HSS/NASA Fellowship in the History of Space Science, this project will produce the first book-length biography of Willy Ley. It will situate Ley’s works and influence within a broader nexus of spaceflight advocacy and popular science. By analyzing Ley’s “romantic naturalism” in educational media, the book argues that Ley’s perspective served as a bridge between Humboldt’s *Kosmos* in the nineteenth century and Carl Sagan’s *Cosmos: A Personal Voyage* in the early 1980s. Thus, the book documents the longevity of romanticism in American popular science.

Notes

1 Roger D. Launius, *Frontiers of Space Exploration* (Westport, CT: Greenwood Press, 1998), 190.

2 Michael J. Neufeld, “Creating a Memory of the German Rocket Program for the Cold War,” in *Remembering the Space Age: Proceedings of the 50th Anniversary Conference*, ed. Steven J. Dick (Washington, DC: National Aeronautics and Space Administration, 2008), 71. For Ley’s influence on secondary literature, see Marsha Freeman, *How We Got to the Moon: The Story of the German Space Pioneers* (Washington, DC: 21st Century Science Associates, 1993).

3 Asif S. Siddiqi, “American Space History: Legacies, Questions, and Opportunities for Future Research,” in *Critical Issues in the History of Spaceflight*, eds. Stephen J. Dick and Roger D. Launius (Washington, DC: National Aeronautics and Space Administration, History Division, 2006), 436. See also Michael J. Neufeld, “The Three Heroes of Spaceflight: The Rise of the Tsiolkovsky-Goddard-Oberth Interpretation and Its Current Validity,” *Quest* 19:4 (2012): 4-13.

4 Neufeld, “Creating a Memory,” 73.

5 Dr. Wolfgang Both has discovered a 1933 Reichsschriftkammer file, with a membership application for the Reichsverband Deutscher Schriftsteller, in which Ley claimed to have joined the NSDAP until the middle of 1928. He also claimed to be applying for readmission in 1933. See , “Ley, Willy,” RKK: 2100, box 0239, file “Fragebogen für Mitglieder.” Bundesarchiv, Germany, Sig. R9361V7771. A NSDAP “Partei-Abt.” confirms the membership of a Willy Ley, although Neufeld discovered that the folder, as seen in Parteikorrespondenz microfilm, incorrectly states the birth date as 02.02.06, rather than 02.10.06. Both documents ascribe different party member numbers to Ley, which must be explained. Other documents show that Ley’s father, Otto Julius Ley, was a post-1933 party member. See National Archives College Park, RG 342, MOFD (Ortsgruppenkartei), roll 0033.

6 De Witt Douglas Kilgore, *Astrofuturism: Science, Race, and Visions of Utopia in Space* (Philadelphia: University of Pennsylvania Press, 2003).

7 Willy Ley, “How It All Began,” *Space World*, June 1961, 25.

8 Willy Ley, *Die Fahrt ins Weltall* (Leipzig: Hachmeister and Thal, 1926). For this book’s loose sequel, see Mars, *der Kriegsplanet* (Leipzig: Hachmeister and Thal, 1927). Ley revised the text in 1929. See *Die Fahrt ins Weltall* (Leipzig: Hachmeister and Thal, 1929). For other works, see Willy Ley, ed., *Die Möglichkeit der Weltraumfahrt: allgemeinverständliche Beiträge zum Raumschiffsfahrtsproblem* (Leipzig: Hachmeister and Thal, 1928); *Konrad Gesner: Leben und Werk* (München: Verlag der Münchner Drucke, 1929)

9 “Probekapital aus Ley,” *Die Rakete*, April 1929, 60-61.

10 Translation taken from Freeman, *How We Got to the Moon*, 42. For original text, see Ley, *Die Möglichkeit der Weltraumfahrt*, iii-iv.

11 See Fritz Lang, “Movies: Sci-Fi Film-

- maker's Debt to Rocket Man Willy Ley," *Los Angeles Times*, 27 July 1969, 24. Lang also credits Ley with models, trajectories, orbits, and "large designs." For more on the "rocketry fad," see Michael J. Neufeld, "Weimar Culture and Futuristic Technology: The Rocketry and Spaceflight Fad in Germany, 1923-1933," *Technology and Culture* 31 (October 1990): 725-752; "German Spaceflight Advocacy from Weimar to Disney," in 1998 *National Aerospace Conference Proceedings* (Dayton, Ohio: Wright State University, 1999), 72-76; Frank Winter, *Prelude to the Space Age: The Rocket Societies, 1924-1940* (Washington: Smithsonian Institution Press, 1983). See also, Alexander Geppert, "Space Personae: Cosmopolitan Networks of Peripheral Knowledge, 1927-1957," *Journal of Modern European History* 6 (2008): 262-285.
- 12 Unless otherwise noted, quotes from this paragraph can be found in Ley's first autobiographical accounts. See Willy Ley, "The End of the Rocket Society, part 1" *Astounding Science Fiction*, August 1943, 64-78 and "The End of the Rocket Society, part 2," *ASF*, September 1943, 58-75. See also Willy Ley, "What's Wrong with Rockets?" *Amazing Stories*, March 1940, 49. For an unpublished, but insightful account of these developments, see Gallery Proof for *Inside the Orbit of the Earth*, Willy Ley Collection, box 5, folder 5.
- 13 *Ibid.*
- 14 He published a short outline of his historical research. See Willy Ley, *Grudriß einer Geschichte der Rakete* (Leipzig: Hachmeister and Thal, 1932).
- 15 Michael J. Neufeld, *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era* (New York: Free Press, 1995), 28 and "The Excluded: Hermann Oberth and Rudolf Nebel in the Third Reich," *Quest* 5 (1996): 22. Other quotes in this paragraph taken from "The End," parts 1 and 2.
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- 31 As Neufeld asserts, the "German Army rocket program was, in military terms, a boondoggle... the V-2's results were pathetic." See Neufeld, *The Rocket and the Reich*, 273.
- 32 Willy Ley, "Notes on Weapons: V-2, V-1, Me-163..." *Technology Review*, January 1945, 169. Ley was writing prolifically as an editorial associate for *TR*.
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- 34 Willy Ley to Robert A. Heinlein (RAH), 7 May 1946, Heinlein Archives, Box 220-3, "Personal Correspondence, 1943-1971," 1-2.
- Ley quoted Lanning in this letter.
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- 36 WL to RAH, 20 March 1946, HA, Corr-220-2, 2.
- 37 Willy Ley to Herbert Schaefer, WLC, box 1, folder 1: "Correspondence, 1945-1949."
- 38 Translation taken from Neufeld, *Von Braun: Dreamer of Space, Engineer of War* (New York: Vintage Books, 2007), 232. See also Willy Ley, "Too Few, Too Late: Is the Story of Some of Germany's Guided Aerial Missiles," *Technology Review*, March 1947, 281-282, 304, 306.
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