

# ROCKETS TO THE MOON

## 1919-1944

a dialogue between  
fiction and reality

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If science-fiction is a literary extrapolation from the known into the unknown, then the *Odyssey* of Homer is science-fiction. After all, until somebody came back from the western Mediterranean with an accurate map, men did not *know* that the straits of Messina weren't guarded on one side by a whirlpool and on the other by a many-headed monster! Centuries after Homer's time, around 160 A.D., the satirist Lucian of Samosata composed a "true history" (*Vera Historia*) to supply an adventure purportedly missing from the *Odyssey*, in which the voyagers are caught up in a waterspout and transported to the moon. Out of Lucian grew a long tradition of literary trips to Luna, nourished especially by the astronomy of the seventeenth-century *savants* and by the aeronautics of the later eighteenth-century balloonists, until the genre took its modern form in the writings of Verne and Wells.<sup>1</sup>

Science-fiction enthusiasts have always contended that the imaginative foreshadowings in their favorite stories paved the way toward public acceptance of concepts such as space travel, and thereby helped the prophecies to come true. But science-fiction may sometimes have had the reverse effect: public acceptance of what scientists and engineers soberly proposed to do in reality may have been delayed because such proposals had been treated for centuries as fantastic fiction.<sup>2</sup> The delay

may have been greater in some national cultures than in others. The Russian seer Konstantin Tsiolkovski, who wrote in 1903 that “the earth is the cradle of humanity, but man will not stay in the cradle forever,” remains a prophet with honor in his own country; the Soviet régime reprinted his pre-Revolutionary writings (including a science-fiction novell!), and a vast crater on the far side of the moon now bears his name.<sup>3</sup> But when the American experimenter Robert H. Goddard proposed the use of rocket propulsion as a method of reaching extreme altitudes, in a modest Smithsonian monograph published in 1919, he was spanked by the heavy hand of the New York *Times*.

In calling Goddard’s proposition “A Severe Strain on Credulity,” the newspaper committed a scientific blunder, of a popular kind which has dogged the rocket experimenter from the beginning: it stated that in the vacuum beyond earth’s atmosphere a rocket could not function because it would have nothing “against which to react.” So little had the elementary axioms of modern science penetrated even the educated lay consciousness, in the two centuries since Newton! But the newspaper insisted that it was Goddard, not the *Times*’ editorial writer, who “seem[ed] to lack the knowledge ladled out daily in high schools.” And of course the professor really knew better: “There are such things as intentional mistakes or oversights,” forgivable as poetic license in the writings of a Jules Verne or an H. G. Wells, but “not so easily explained when made by a savant who isn’t writing a novel of adventure.” The Smithsonian, the *Times* hinted darkly, was being defrauded.<sup>4</sup>

By taking the trouble to fire a revolver in a vacuum, and showing that the weapon recoiled even though the exhaust gases had nothing to “push against,” Goddard presumably proved his theoretical point. But his troubles were not yet over. In the summer of 1929, the explosion of one of his experimental rockets some ninety feet above Auburn, Massachusetts “sent Worcester ambulance and police hunting for tragedy,” and public indignation forced Goddard to move his work to New Mexico, “that state whose empty stretches, so much like the surface of the moon, seem to attract the rocket men.”<sup>5</sup>

Urban crowding was not the only reason he was driven away, for similar accidents happened in 1931 and 1932 on the *Raketenflügplatz* in suburban Berlin, where German rocket enthusiasts regularly launched their liquid-fueled cylinders; yet the Society for Space Travel (*Verein für Raumschiffahrt*) and the municipal authorities were able somehow to compose their differences. To be sure, the historical context was entirely different. In 1932 the *VfR* lost the services of its most promising young member, a brilliant nineteen-year-old named Wernher von Braun, to the secret Army Weapons Department, which was interested in rocket research in a thoroughly mundane way. Willy Ley, the *Verein für Raumschiffahrt*’s vice-president, reported many years afterward a conversation he had had in 1929 with Hermann Oberth, who ranks with

Tsiolkovski and Goddard among the fathers of space travel. "Do you think, Herr Professor, that there will be a need for rockets carrying a load of mail over five hundred kilometers?" Ley asked. "Oberth looked at me with the smile which old-fashioned pedagogues reserve for people whom they call 'my dear young friend' and said after awhile: 'There will be need for rockets which carry a thousand pounds of dynamite over five hundred kilometers.'"<sup>6</sup>

Lacking such obviously utilitarian motives, private American rocket investigators were easily victimized by public opinion. Robert Goddard "early discovered what most rocket experimenters find out sooner or later—that next to an injurious explosion, publicity is the worst possible disaster," wrote his fellow experimenter G. Edwards Pendray. Understandably bitter at the press, which had "branded him 'Moon Man' and hinted he was a crackpot after the Worcester interlude," Goddard kept reporters two hundreds yards off while he squired Harry Guggenheim and Charles Lindbergh around the premises of his New Mexico retreat in 1935. According to *Time* for March 2, 1936, "Dr. Goddard hates to stir up gaudy talks of moon flights"—and small wonder.<sup>7</sup> Occasionally a leading magazine in the interwar years would publish an article on a topic such as "Can We Go To Mars?", and editorially conclude that "the plan is theoretically sound," but the answering voices of negation were vigorous and dogmatic.<sup>8</sup>

The mass-circulation *American Magazine* interviewed one prominent American astronomer in 1927, and reported to its readers: "Professor [William H.] Pickering is of the opinion that the only feasible method of getting to the moon is visually through the eyepiece of a good telescope." For a more specialized audience, the readers of *The Catholic World*, R. L. Simons discoursed in 1934 on "Space Ship Hokum." And Science Service, a strong voice for the scientific Establishment itself, sought to allay the panic aroused by Orson Welles's "invasion from Mars" broadcast in 1938 in effect by showing that interplanetary travel is impossible; to reach escape velocity, even from the lighter gravity of Mars, would require more fuel than a rocket could theoretically carry.<sup>9</sup> By then, however, Major General Walter Dornberger and Wernher von Braun were hard at work on that very problem, in a region of "dunes and marshland overgrown with ancient oaks and pines, nestling in untroubled solitude" only four hours by train north of Berlin; a place with the Wagnerian-sounding name of Peenemünde. It was not quite so ideal for the purpose as Goddard's New Mexico, but it would do.

According to the British Interplanetary Society's Arthur C. Clarke, "All Goddard's initial pioneering work was financed by a grant of some \$11,000, but the German War Department sank £35,000,000 into the building of Peenemünde . . . the parallel with the history of nuclear physics is as striking as it is depressing." Even at Peenemünde, how-

ever, more than sheer militarism was involved. "Our aim from the beginning was to reach infinite space," General Dornberger has written. Indeed von Braun himself seems to have been denounced to the Gestapo during the War, and briefly arrested, for dreaming about orbiting spaceships, flights to the moon and atomic energy for voyages to the stars when he was supposed to be concentrating on the immediate necessities of the Third Reich.<sup>10</sup>

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Whether performed on a shoestring by the amateurs of the *Verein für Raumschiffahrt* or carried out with the backing of the mighty *Wehrmacht*, rocket investigation in Germany was hampered—and, on several occasions, all but destroyed—by skeptics within the Nazi government.<sup>11</sup> But skepticism in America, as in pre-Hitler Germany, was less efficiently organized. If rocket experimenters faced the opposition of sensation-hungry newsmen, they received the occasional endorsement of periodicals like *Popular Mechanics* and the *Scientific American*. They could also count on one staunch but perhaps less helpful ally in the newly-founded science-fiction magazines,<sup>12</sup> for these also catered to a readership that dreamed of orbiting spaceships, flights to the moon, and atomic energy for voyages to the stars.

Hermann Oberth himself, who would live long enough to be feted at one Apollo 11 pre-launch party as the man who had started it all, served in 1929 as the scientific adviser to Fritz Lang's science-fiction motion picture *Frau im Mond*. The plan was that the UFA Film Company would finance the building of one of Oberth's rockets, which in turn would be launched in time to serve as publicity for the picture's première. (By an irony, Oberth's preferred location for this public relations action was a spot on the Baltic coast not far from Peenemünde.)<sup>13</sup> Max Valier, a young German popular-science writer and lecturer, who had spent much of the Twenties in fruitless efforts to develop a rocket-powered automobile for the German motor tycoon Fritz von Opel, was killed by the explosion of an oxygen tank during a rocket experiment in 1930; a year later, the American science-fiction magazine *Wonder Stories* editorially hailed him as "the first man to give his life to rocketry," in a biographical sketch accompanying the English translation of Valier's short story "A Daring Trip to Mars."<sup>14</sup>

In the Thirties, the overlap between the factual and the fanciful in astronautic experimentation was even more substantial. The founding of the *Verein für Raumschiffahrt* in Germany in 1927 had been soon followed by the establishment of an American Interplanetary Society, in 1930 (re-christened the American Rocket Society in 1934); by a British Interplanetary Society, in 1933; and by Soviet, French, and Austrian organizations.<sup>15</sup> An article in the *New Outlook* for October, 1934, con-

sisting of brief biographical accounts of the leading "Men of Space," listed—alongside figures as internationally known as Oberth, Goddard, the stratosphere balloonist Auguste Piccard, and Tsiolkovski's junior colleague Nikolai Rynin—no fewer than five other men who both held office in these national rocket societies and also wrote science-fiction for the American pulp magazines.<sup>16</sup>

Willy Ley, for example, as a German refugee in America after 1934, published not only articles on rocketry and on zoology—the latter in such eminently reputable outlets as *Natural History* and *La Nature*—but also, under the pseudonym "Robert Willey," a number of carefully-researched science-fiction stories. To be sure, his characters face and solve variations on the customary pulp story problems of adventure and intrigue: they escape from a Soviet colony on Mars ("Novaya Respublika," complete with a Five Year Plan and cities having names like "Planetogorsk"), or they thwart a Japanese bid for the conquest of space. But they also wrestle, in highly convincing fashion, with such purely technical difficulties as mass-ratios, refueling in space, and the choice of the proper "Hohmann orbits" for traveling between the planets—named after the city architect of Essen-on-the-Ruhr, Walter Hohmann, who during the 1920's had actually calculated just such trajectories.<sup>17</sup>

Several of Ley's British and American equivalents led the same kind of literary double life. G. Edwards Pendray, science editor of the *Literary Digest*, president of the American Rocket Society, and designer of the first liquid-fueled rocket engine used in that society's experiments, wrote three longish science-fiction yarns for *Wonder Stories* under the pseudonym "Gawain Edwards."<sup>18</sup> P. E. Cleator, president of the British Interplanetary Society, ordinarily wrote factual rather than fictional predictions of space flight, such as his book *Rockets Through Space* (1936), but he also committed to paper for *Wonder Stories* a tale of "Martian Madness." Laurence Manning, a founder of the American Rocket Society, editor of its journal *Astronautics*, and co-designer of one of its rockets, wrote a dozen stories that appeared in *Wonder*, including his jaunty satire "Seeds From Space,"<sup>19</sup> and two others with Fletcher Pratt's collaboration. Nathan Schachner, another founder and a former president of the American Rocket Society, who suffered injury in an early rocket-engine experiment, wrote his first science-fiction "on a bet," as he afterward testified, "and much to my surprise it was accepted." In the next two decades he published more than fifty such stories, using the informal *nom de plume* "Nat Schachner"; he reserved "Nathan" for more conventional writings, such as a history of the medieval universities and biographies of Jefferson, Hamilton and Aaron Burr.<sup>20</sup> (Along with all these activities he also found the time to practice law!)

Stories by men like Ley, Pendray, Cleator, Manning and Schachner were far from being literary masterpieces, usually; but they did provide a kind of yardstick by which the engineering plausibility of other fic-

tional trips to the moon could be measured. Max Valier, in his "A Daring Trip To Mars," took time out from the narrative to discuss the errors committed by "previous novelists," most notably their descriptions of the phenomenon of weightlessness. (The occupants of the space ship would not "feel lighter and lighter from hour to hour" as they moved further away from the earth, Valier correctly pointed out; rather, they would experience weightlessness "at that moment, a slight distance above the earth, when the rocket is shut off.") Otto Willi Gail's "The Shot Into Infinity," which appeared in *Wonder Stories Quarterly* in 1929 following prior book publication in Germany, contains too much *schmaltz* and Teutonic nationalism for today's reader, but Gail's moonship *Geryon* was a well-thought-out three-stage rocket, whose ascent compares—roughly, but plausibly—to that of Apollo 11: ninety-eight seconds to burnout of the first stage, as against three minutes for *Apollo*; five minutes into the flight for ejection of the second stage at an elevation of 700 kilometers (426 miles), as compared with 9 minutes and 12 seconds, downrange 883 miles at an altitude of 100 miles, for *Apollo*. Once the *Geryon* is well under way, its occupants engage in a space walk: "The sunlit helmets and suits gleamed in the absolute darkness with an unearthly phosphorescence," the novelist wrote. "Day and night had joined in a seemingly impossible union"—language not unfamiliar to any reader of *Life* or the *National Geographic* during the past two decades.<sup>21</sup>

Shots as close to the mark as that one were accompanied, however, by other stories which make one understand why the science-fiction magazines were so often dismissed with the epithet "pseudo-science" (a term that used to infuriate the science-fiction fans). A prime example is Harl Vincent's "The Explorers of Callisto," published in *Amazing Stories* for February, 1930. Unlike the monstrous tower of a Saturn-Apollo stack, the rocket ship in this tale is only forty feet long; in fact it is a rebuilt airplane, lacking only struts and guy wires. In addition to rocket-firing cylinders it has conventional landing gear and tail structure, a 15-cylinder 600-horsepower radial engine for getting through earth's atmosphere, and a propeller. After the proud inventor, "Ray Parsons," has shown his handiwork for the first time to his friends "Gary Walton" and "Eddie Dowling," one of them asks "When do we go?", and the hero replies "Can you make it the day after tomorrow?" It is conceivable that a space ship built by a civilization less cumbersome than ours might have successfully taken off without its inmates being first subjected to NASA's relentless "simulation" exercises, but this author seems to have gone to the opposite extreme.

After takeoff—barely clearing a board fence and the tops of some trees, in the fashion not of a rocket but of a heavily-laden small airplane of the period—the good ship *Meteor* duly proceeds to the moon; the flight itself is somewhat more plausibly presented, although the dialogue

is pure Batman-and-Robin. On the moon's far side, the three adventurers encounter space-suited soldiers pursuing a fugitive across the lunar surface. Rescuing their intended victim, our hero looks through the space suit's face plate: "'Christopher!' he exclaimed. 'It's a girl! And a peach!'" Her name is Lola, and she turns out to be the daughter of the king and queen of Callisto, fifth of the Jovian satellites; with scarcely another look at Earth's moon, the action moves forthwith out to one of Jupiter's.<sup>22</sup> Perhaps it is no cause for wonder that while T. O'Connor Sloane, editor of *Amazing Stories* in the early Thirties, published many stories of interplanetary travel, he personally and editorially pooh-poohed the whole idea.

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Sloane's skepticism, however, was based not upon the New York *Times'* fatuous reasoning but upon the more plausible ground that the acceleration necessary to attain escape velocity would crush the pilot—a question which was in fact not resolved until the high-altitude test-piloting and centrifuge experiments of the late 1950's.<sup>23</sup> Science-fiction writers sometimes sought to meet this objection by positing "acceleration compensators," or,—a less question-begging response—by assuming that the astronaut would black out during liftoff: "Within the compact control room at the heart of the great space-ship, its solitary occupant lay unconscious in the straps and paddings of his seat, as the vast cylinder roared skyward" in one *Wonder Stories* serial of 1934.<sup>24</sup>

Not all of Sloane's readers agreed with his negative verdict on space travel, and the skepticism of Dr. Sloane was more than overmatched by the enthusiasm of Hugo Gernsback, his predecessor as editor of *Amazing Stories* and his competitor as editor of *Wonder*. Hailing Robert Goddard for having routed his critics on the question of rocket flight in a vacuum, Gernsback in an editorial for *Amazing* in 1927 commented that "just as the heavier-than-air machine was pooh-poohed by scientists of repute, space flying is being pooh-poohed today by the same class of scientists."<sup>25</sup> The harassed American rocket experimenter was also singled out for specific vindication in one story published under the régime of the more mistrustful Sloane: "Now that the Goddard rocket has at last made a fair hit on the moon," says one character in a story published in 1929 but presumably taking place a few years in the future, it behooves men to work out the technical details of a practicable space suit. Therefore, in a fictional world far more cozy than that of V-2 and Apollo 11, "a little social club of amateur astronomers, . . . mostly engineers or manufacturers from New York or Boston," builds the suits, while (in poetic justice to Goddard) the Smithsonian Institution on a readily-granted government appropriation builds the rocket. In this instance, the implausibilities were not technological but social.<sup>26</sup>

Like Hugo Gernsback, F. Orlin Tremaine, who became editor of *Astounding Stories* in 1933, disputed the skepticism of their competitor T. O'Connor Sloane. In an editorial prompted by the publication in 1936 of P. E. Cleator's *Rockets Through Space*, with its prediction that "a trip to the moon is actually possible to-day," Tremaine declared: "Perhaps we dream—but we do so logically, and science follows in the footsteps of our dreams."<sup>27</sup> But at least a few of the science-fiction writers already had matured enough to know that dreams which come true sometimes yield only disenchantment.

In "Magician of Dream Valley," published in *Astounding Science-Fiction* in 1938, Raymond Z. Gallun pictured "Imbrium City," man's first colony on the moon, as a place of "vast slag heaps," lighted by "the greenly phosphorescent pall of radioactive waste-vapors ejected from the chimneys of the plant." Man is building not a lunar utopia but an industrial wasteland to match the moon's own natural bleakness:

Sweeping around the ugly and eternally threatening squatness of the rocket fuel plant . . . were the gray plains of a "sea" which, on the quick-cooling Moon, had never contained water in any appreciable quantity. The aspect of those gently undulating expanses of billion-year-old lava was too awesome now, under the grimly factual stars, for any preconceived idea of romance in connection with them to overbalance their depressing suggestion of eternal death.

The only redeeming feature in this dreadful landscape consists of winking, mysterious "Hexagon Lights" which turn out to be sentient creatures of pure energy—and the radioactive waste-vapors from the fuel plant are poisoning them to death. In a desperate effort at self-preservation, the Lights seek to destroy the factory. The hero, as he usually does in such tales, thwarts them; but at the very end, like the paleface Americans after their subjugation of the Indian, he is caught up in sympathy and regret for this beautiful life-form that has fallen victim to technological pollution.<sup>28</sup>

Many critics of science-fiction have discerned in the genre a positivistic and optimistic bias, which indeed it had.<sup>29</sup> But even in the pre-atomic 1930's, minority reports like Gallun's continued to offer a more sombre theme. It was foreseen in the pulps for example that the conquest of space could have an appalling cost in human life. Manly Wade Wellman's "Men Against the Stars," also published in 1938, is told from the viewpoint of "John Tallentyre," a vexed executive at a spaceport on the moon who sends men out on missions further into space, with the knowledge that almost all the ships carrying them will explode. "Five days out in space, Mars-bound," we are shown the crew of Ship Number Fifty-Nine grousing at their moon-bound superiors, whom the ship's engineer regards as "straw-stuffed uniforms [who] sit back there with their feet on desks, while we're gunnin' out here, out where the danger

and the work is." A spacehand comes to the executives' defense, arguing that "they've probably got worries of their own":

"Worries of their own?" echoed the engineer. "On that buttonpusher's work? Say, if either of them worried a day of his life, I hope this ship blows apart right no- -"

Number Fifty-Nine was rose-red flame and sparklets of incandescent metal in that instant.

Number Fifty-Nine was one of Tallentyre's worries.<sup>30</sup>

But Tallentyre has previously been shown gunning down a would-be mutineer; for the man in command of this imagined NASA the job is worth doing, at whatever cost. For some fictional heroes, however, it was not. The protagonist in Edmond Hamilton's "What's It Like Out There?"—written in 1933, but (significantly) not published until 1952—receives an astronaut's welcome from his own home town, and tactfully makes the kind of modest little speech that has been expected of this kind of hero ever since Lindbergh. Afterward, however,

I wanted to go on and add, "And it wasn't worth it! It wasn't worth all those guys, all the hell we went through, just to get cheap atomic power so you people can run more electric washers and television sets and toasters!"

But how are you going to stand up and say things like that to people you know, people who like you? And who was I to decide?<sup>31</sup>

Or, conceivably, "what it's like out there" may be neither romantically dangerous nor realistically lethal, but merely dull. A character in one story published in 1939 is portrayed as putting in his time on the moon only as the necessary prerequisite to a better-paying Earthside post. He has a rousing adventure with an invisible rock-eating monster just landed from a meteorite, but he decides not to report the episode lest he be deemed mentally unbalanced and lose his job. After all, he and the bureaucracy of the "Spaceways Corporation" know well that "Nothing Happens On the Moon."<sup>32</sup>

#### iv

In the real world, meanwhile, at places like Peenemünde, a great deal was happening. American science-fiction writers did not know what Von Braun and Dornberger were doing,<sup>33</sup> but many of them understandably took a dim view of the prospect of space flight being achieved in Hitler's Germany. In the fading peacetime months of 1939 Robert Moore Williams published in *Amazing Stories* the tale of "Lundstret's Invention," in which a dying refugee scientist shoots his rocket uselessly out into space to keep it from falling into Nazi hands. In his last words, Lundstret admonishes the young American scientist "Martin Langley" to carry on his work: "Perhaps—by that time—science will be ruling the world—instead of the hoodlums. . . ."<sup>34</sup> Few science-fiction enthu-

siasts yet realized that after Hiroshima many would find such a forecast merely a choice between two equally intolerable futures.

Occasionally they recognized, however, that "it may not be mechanical faults that stop men from reaching the skies—it may be human trends." Those words editorially introduced one of Isaac Asimov's first-published stories, "Trends," set in a "Neo-Victorian Age" wherein a massive religious revival puts a halt to all attempts to reach the moon, judging them to be impious defiance of the Almighty. A disastrous rocket explosion, deliberately set off by a convert to give such ventures a bad image, triggers the passage of an Act of Congress in 1973 that outlaws all research on space travel, and sets up a Federal Scientific Research Investigatory Bureau to pass upon the legality of all scientific experimentation. (The Supreme Court upholds this "Stonely-Carter Act" by a 5-4 decision in "*Westly v. Simmons*.") With such substitution of political for engineering verisimilitude, magazine science-fiction had begun to enter upon a new phase.<sup>35</sup>

The politics of the period subtly colored science-fiction's technological forecasts in other ways. Even though rockets in science-fiction had long been used in sanguinary wars, both on Earth and in interplanetary (and interstellar) space, sometimes in the late Thirties they figured in a defense of American isolationism that verged occasionally on outright pacifism. In "Fugitives From Earth" by Nelson S. Bond (*Amazing Stories*, December, 1939), World War II has been raging for three years. American rocket experimenters under the leadership of "Frazier Wrenn," hiding out in the Arizona desert from government bombing planes and from "ruthless, sweeping 'drafts' which have bled the country of its finest young manhood," are building a spaceship in which to escape this war-torn world. German rocket experimenters led by "Erik von Adlund" are doing likewise, hoodwinking their government, which believes Adlund "is creating a new weapon with which to carry on the war." (Impudently, they use the *Raketenflügplatz*, where the *VfR* in peacetime innocence had launched its actual missiles, in the very shadow of their nation's capital.) Americans and Germans share their engineering secrets, trading America's "permalloy" for Germany's "sur-atomic power"; as Frazier Wrenn explains to his associates, "There is one thing we must leave behind us when we make attempt to escape our doomed Earth in this rocket-ship. That thing is—national pride." At the appointed time, with a success which at least in this one instance convicts both the Gestapo and the FBI of monumental inefficiency, the space ships *Goddard* and *Oberth* lift off.<sup>36</sup>

As war came closer to America, this kind of opposition to national pride went by the board. A cover by H. W. Wesso for *Thrilling Wonder Stories* in June, 1941 showed two space-suited men battling horned and fanged beasts, with the planet Saturn in the background—and behind them an American flag containing at least fifty-four stars. Rockets re-

appeared in U.S. newspaper headlines and general magazine stories, no longer as the insane creations of “moon men” but as sober instruments for the massive support of infantry. “From the frozen steppe of Russia to Libya’s burning sands,” declared one science-fiction pulp in 1943, “the weapon of the future is already exacting its terrible toll.”<sup>37</sup>

And, of course, more was to come. On October 3, 1942, a tense count-down of the kind the world would later come to know at Cape Kennedy took place at Peenemünde, with scientists, military men, and anonymous employees anxiously watching their handiwork on a TV monitor, provided by the Siemens electrical corporation. The tension of those long-drawn-out “Peenemünde minutes,” as they called them, broke as the “slender, perfect body of the rocket, lacquered black and white,” rose out of the evergreen forest into the sky to a height of sixty miles, breaking the altitude record set in World War I by Big Bertha. “We have invaded space with our rocket,” General Dornberger exultingly told his co-workers, “and . . . have proved rocket propulsion practicable for space travel.” Meanwhile, however, he acknowledged, there was a war to be won. The Allies concurred; in August of 1943 the RAF blasted Peenemünde with a massive thousand-plane raid.<sup>38</sup>

Yet there remained islands of calm even in the hurricane years of war. Late in 1942 one cover painting for *Astounding Science-Fiction*, in serene contrast to the bug-eyed monsters and screaming maidens that were staple fare on magazine covers at that time, depicted in subdued hues the now classic image of a rocket standing on the silent lunar surface, while the Earth glows overhead out of a dark sky. The cover story, Lester Del Rey’s “Lunar Landing,” showed the mastery of plausible detail which was becoming increasingly common in the better science-fiction magazines:

With the loose easiness of motion necessary here, he reached up and unfastened the zipper above him, then wriggled out of his sleeping sack, and pulled himself down to the floor by means of the ropes that were laced along the walls for hand-holds. . . . Greg took the coffee gratefully, drinking slowly through one straw; cups would have been worse than useless out here, since liquids refused to pour, but chose to coalesce into rounded blobs, held in shape by surface tension.<sup>39</sup>

The author’s emphasis was no longer, as in many earlier stories, primarily upon the plausibility of his gadgets. “Greg” turns out to be an eighty-pound, four-foot-ten-inch midget, and much of the story probes the psychology of his relationship with a normal-sized female member of the crew. The technological reasons for this plot situation are perfectly sound: the solution of the old mass-ratio problem dictates that rocket ships carry the lightest payloads possible, and one logical inference could be that the ship’s crews should consist of women and/or small

men. In practice it has not worked out that way; or, rather, this supposedly technical and engineering question has been answered in a non-scientific—some might say an *unscientific*—way. The USSR's Valentina Tereshkova has orbited the earth; from the standpoint of women's liberation in the West the shame of the USA's program was not so much that a woman pilot did not duplicate the feat as that our society did not feel that such a step was even imaginable. This kind of specific social eventuality the magazine science-fiction of the Thirties and Forties had difficulty in foreseeing.

V

On September 8, 1944, the first V-2's fell on London. Both the British Interplanetary Society's Arthur C. Clarke and the German refugee rocket experimenter Willy Ley were torn between their hostility to the foundering Nazi regime and a sense of the vindication of their own previous work.<sup>40</sup> Soon after the war's end, man reached out and for the first time lightly touched the moon, by means of a radar pulse bounced off the lunar surface from the U.S. Army Signal Corps' laboratory in Belmar, New Jersey—and at once, in the view of at least one distinguished American scholar, all the charming fantasy and fun that had gone with lunar voyaging since the time of Lucian was gone. "In our modern imaginary journeys to the planets men sail in great space ships constructed upon sound technological principles," Marjorie Nicolson wrote in 1948. ". . . They have gained verisimilitude, but they have lost the excitement of breathless discovery. The poetry of true belief is mute."<sup>41</sup>

To this aesthetic disenchantment there has lately been added a political disillusionment: "I once dreamed of man touching the moon," declared one child of the Sixties, in 1969. "Now I saw it. And I didn't care." "We walk safely among the craters of the moon but not in the parks of New York or Chicago or Los Angeles," mused one of his contemporaries.<sup>42</sup> And Nicolson's remark that the poetry of true belief is mute has been borne out by many an astronaut or cosmonaut, notoriously tongue-tied in his efforts to describe for his fellow-Earthmen "what it's like out there." But it would be a bit unfair to the men (and one woman) of the first generation in space to say that they have lost the excitement of breathless discovery. On the contrary, their responses to space have ranged from deeply-felt religious acts to exuberant expressions of physical joy. "They said it was *pretty*," said the veteran newscaster Eric Sevareid on CBS the morning after Apollo 11's moon walk. That men could seriously employ such a word to describe the moon's ultimate desolation may have come as a surprise to some of their fellows, but any long-term reader of science-fiction would have understood at once what was meant.

More surprising, after centuries during which lunar exploration was portrayed as fantastic adventure, has been the actual *dénouement* of the

Apollo program: the abandonment of the moon afterward, apparently out of sheer boredom. Two decades into the Space Age, wrote Melvin Maddocks in the *Saturday Review*, in 1973, "we are all, in one way or another, trying to evade that overwhelming fact"; instead, "with do-it-yourself diagrams and layman's explanations, we turn each Apollo rocket into a kind of nationally shared erector set."<sup>43</sup> But the overwhelming fact *is* a fact, even in spite of television's untiring effort to cut it down to suitably trivial size. The proper metaphoric comparison of Armstrong's long step down upon the gritty lunar soils is not with Columbus's crew setting foot on San Salvador; rather it must be compared with the supreme effort of that anonymous lungfish which first flopped up on the beach to stay.<sup>44</sup> Science-fictionists, at least, know this, and they are understandably bitter about the present, post-Apollo 17 situation. "It's been a lonely business, mine, to speak for space travel the past 35 years," Ray Bradbury regretfully writes. "I felt little or no company when I was 17, in my last year at high school, writing my first stories about landing on the moon. I don't feel much more company surrounding me today."<sup>45</sup> But as Isaac Asimov's early short story "Trends" still reminds us, historical trends can and do change. The Russians, the Japanese, or conceivably even the United Nations may not share our own currently fashionable rejection of the space frontier. One day, reflecting upon America's own past, we may also change our minds, and in that event the garish pulp magazines of forty years ago may then be accorded a place of honor. Prophets in their own time have often been somewhat unkempt characters.

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### footnotes

1. Marjorie Hope Nicolson, *Voyages To the Moon* (New York, 1948), *passim*, esp. 199-200; Willy Ley, *Rockets: the Future of Travel Beyond the Stratosphere* (New York, 1944), 11.

2. Peter Van Dresser hinted at this reason for the delay in public acceptance of the possibility of space flight in an article "The Conquest of Outer Space," *Harper's*, CLXXI (September, 1935), 448. But compare Van Dresser, "Why Rockets Don't Fly," in *Astounding Science-Fiction*, XXII (October, 1938), 81-89. His conclusion: money.

3. The quotation from Tsiolkovski is in Gene Farmer and Dora Jane Hamblin, eds., *First on the Moon: a Voyage with Neil Armstrong, Michael Collins, Edwin E. Aldrin, Jr.* (Boston, 1970), 16. Biographical data on Tsiolkovski may be found in Ley, 98-103; a Russian bibliography of Tsiolkovski's writings appears *ibid.*, 276.

4. *New York Times*, January 13, 1920, 12.

5. *Scientific American*, CXXXII (January, 1925), 50; *Time* (July 29, 1929) and compare also Ley, 256; Jonathan Norton Leonard, *Flight into Space*, rev. ed. (New York, 1957), 39.

6. Ley, 133-152; Walter Dornberger, *V-2*, tr. by James Cleugh and Geoffrey Halliday (New York, 1954), 33; Willy Ley, "V-2: Rocket Cargo Ship," *Astounding Science-Fiction*, XXXV (May, 1945), 100-122.

7. G. Edwards Pendray, "Number One Rocket Man," *Scientific American*, CLVIII (May, 1938), 270-272; "Moon' Man to Get More Help in Flighty Venture," *Newsweek* (October 5, 1935), 29-30; *Time* (March 2, 1936), 51.

8. James R. Randolph, "Can We Go To Mars?," *Scientific American*, CXXXIX (August, 1928), 140-142. The editors commented: "The article was first submitted to several laymen for opinion. They voted against it. It was then sent to several physicists. These favored publication"—indirect evidence, perhaps, for the validity of Sir Charles Snow's "two cultures" thesis?

9. George W. Gray, "Marvels of the Moon," *American Magazine*, CIV (August, 1927), 18-19, 144-150; R. L. Simons, "Space Ship Hokum," *Catholic World*, CXLIV (November, 1934), 164-170; "Monsters' to Mars," *Scientific Monthly*, XLVII (December, 1938), 549-550.

10. Dornberger, 45, 128, 131, 179; Arthur C. Clarke, *The Exploration of Space* (New York, 1954), 20. Albert Speer's memoirs confirm this story of von Braun's arrest; *Inside the Third Reich: Memoirs by Albert Speer*, tr. by Richard and Clara Winston (New York, 1970), 371.

11. On the dissolution of the VfR under the Nazis, see Ley, *Rockets*, 153-157; on the Army's bureaucratic fighting with the government, see Dornberger, 68-82, 161-166. Speer, 366, claims to have saved the V-2 project in 1939 from being struck off the priority list altogether; apparently he was "impressed . . . by these technicians with their fantastic visions, these mathematical romantics."

12. Science-fiction had appeared in general men's adventure magazines such as *Argosy* for some years, but the emergence of periodicals specializing in the genre dates from 1926, with the founding of *Amazing Stories*. *Science Wonder Stories* followed in 1929, and *Astounding Stories* first appeared in 1930.

13. Farmer and Hamblin, 42; Ley, *Rockets*, 120-127.

14. *Ibid.*, 132. Max Valier, "A Daring Trip to Mars," *Wonder Stories*, III (July, 1931), 254-273.

15. Ley, *Rockets*, 254-255. A standard work on space science first published in the Soviet Union credits these informal organizations with a major influence upon the development of astronautics. Ari Shternfeld, *Soviet Space Science*, 2nd rev. and ext. ed., tr. by Technical Documents Liaison Office, Wright Patterson AFB, Ohio (New York, 1959), Appendix, 338.

16. Ugo Andres, "Men of Space," *New Outlook*, CLXIV (October, 1934), 26-33. See also Sam Moskowitz, *Seekers of Tomorrow: Masters of Modern Science Fiction* (New York, 1967), 373.

17. Robert Willey [Willy Ley], "At the Perihelion," *Astounding Stories*, XVIII (February, 1937), 41-76; "Orbit XXIII-H," *Astounding Science-Fiction*, XXII (September, 1938), 17-56. Hohmann's work is described in Ley, *Rockets*, 109-110, 210-221, 266, 268.

18. Gawain Edwards [G. Edwards Pendray], "A Rescue From Jupiter," *Wonder Stories*, I (February, 1930), 774-787; (March), 910-925, 933; "Return From Jupiter," *ibid.*, II (March, 1931), 1062-1091, 1184-1185; (April), 1296-1327; "Mutiny in Space," *ibid.*, III (September, 1931), 500-521. Much the best-known of these was the last-mentioned, a piece of high if somewhat mawkish melodrama.

19. P. E. Cleator, "Martian Madness," *ibid.*, V (March, 1934), 840-849; Laurence Manning, "Seeds From Space," *ibid.*, VII (June, 1935), 8-27.

20. The statement by Schachner is from an autobiographical sketch in *Fantastic Adventures*, I (September, 1939), 91. Schachner's many science-fiction writings are listed in the standard bibliographic reference, Donald G. Day, *Index to the Science-Fiction Magazines 1926-1950* (Portland, Oregon, 1952), 58-59.

21. Max Valier, 251; Otto Willi Gail, "The Shot Into Infinity," *Science Wonder Quarterly* (afterward *Wonder Stories Quarterly*), I (Fall, 1929), 6-77, esp. 46, 59. Gail in his preface called the novel "no utopia," and credited Oberth and Goddard with the basis for his technical assumptions.

22. Harl Vincent, "The Explorers of Callisto," *Amazing Stories*, IV (February, 1930), 998-1011, 1045; quotations from 1001, 1003, 1008.

23. T. O'Connor Sloane, "Acceleration in Interplanetary Travel," *ibid.*, IV (November, 1929), 677. Sloane was still holding to this position in 1935; see his four-page editorial *ibid.*, IX (March, 1935), 9-12, aimed at the "many people who firmly believe that man will yet fly through the wastes of outer space and visit the moon and some of the planets." An early exploration of the possible traumatic *psychological* effects of space travel is Robert Bloch, "The Strange Flight of Richard Clayton," *ibid.*, XIII (March, 1939), 78-85.

24. John Beynon Harris, "The Moon Devils," *Wonder Stories*, V (April, 1934), 969-978; Richard Vaughan, "The Exile of the Skies," Part I, *ibid.*, V (June, 1934), 550-603, 656; quotation from 558.

25. John I. Burt, letter to the editor (in reply to Sloane's editorial of November, 1929), *Amazing Stories*, IV (February, 1930), 1091-1092; Hugo Gernsback, "Interplanetary Travel," *ibid.*, I (February, 1927), 981. In support of his judgment, Gernsback in the second issue of *Science Wonder Stories* began publishing in translation a non-fiction German popular science essay dealing with such topics—now familiar but then startling—as the influence of weightlessness upon the human system, the problems of cooking and eating under such conditions, and the space-station technique for space travel. Hermann Noordung, "The Problems of Space Flying," tr. by Francis M. Currie, *Science Wonder Stories*, I (July, 1929), 170-180, (August) 264-277, (September) 361-368. On Noordung, see Ley, *Rockets*, 225, 229, 275.

26. J. Rogers Ullrich, "The Moon Strollers," *Amazing Stories*, IV (May, 1929), 146-154. Sloane had been Gernsback's managing editor before Gernsback lost financial control of the magazine in February; on the other hand, the backlog of Gernsback-approved manuscripts would have taken months to use up, pulp publication customs being what they were. It is

thus impossible to determine at this late date whether Gernsback or Sloane—i.e., the “true believer” or the skeptic—chose to print this pro-Goddard story.

27. F. Orlin Tremaine, “Blazing New Trails,” *Astounding Stories*, XVII (August, 1936), 152. But the *Literary Digest*, also taking as its point of departure the publication of Cleator’s book, ran an article on the American Rocket Society which detailed the rocket experimenters’ continuing difficulties with “the ridicule of the public.” “Hopping Off to a Dance on the Moon,” *Literary Digest* (May 16, 1936), 18-19.

28. Raymond Z. Gallun, “Magician of Dream Valley,” *Astounding Science-Fiction*, XXII (October, 1938), 12-22; quotations from 13-14.

29. “The men who created and continued the specialist magazines through the 1930’s at least . . . were, by and large, enthusiasts of science. They . . . believed that science, technology in particular, gave men the tools with which to remedy the ills of society and advance it toward some (ever-more-distant?) perfection.” Thomas D. Clareson, “The Other Side of Realism,” in Clareson, ed., *SF: The Other Side of Realism* (Bowling Green, Ohio, 1971), 18. Yet Bernard DeVoto devoted one article in 1939 to a blast against science-fiction for what he took to be its unrelieved pessimism. DeVoto, “Doom Beyond Jupiter,” *Harper’s Magazine*, CLXXIX (September, 1939), 445-448.

30. Manly Wade Wellman, “Men Against the Stars,” *Astounding Science-Fiction*, XXI (June, 1938), 6-20; quotation from 12. The same issue carried Raymond Z. Gallun’s “Seeds of the Dusk” (*ibid.*, 76-96), a tale even less positivist-utopian in tone than Gallun’s “Magician of Dream Valley.”

31. Edmond Hamilton, “What’s It Like Out There?,” *Thrilling Wonder Stories*, XLI (December, 1952), 66-80; quotation from 79-80. The editor attributed this story to a “new,” postwar phase in Hamilton’s writing (boxed statement, *ibid.*, 69), but this claim has been vigorously and convincingly disputed by Sam Moskowitz, who makes out a case for the earlier date. Moskowitz, *Seekers of Tomorrow* (New York, 1967), 84. Nevertheless, there is significance in the fact that the readers’ tastes had sufficiently changed that a story judged unsaleable in 1933 could have become publishable in 1952.

32. Paul Ernst, “Nothing Happens on the Moon,” *Astounding Science-Fiction*, XXII (February, 1939), 97-108. The next logical step would be taken by Robert Heinlein in the late 1940’s, in a group of *Saturday Evening Post* stories depicting life on the moon not as far-off travelogue but as a normal mode of modern urban living.

33. Ley himself does not seem to have put all the pieces together, even after the disclosure of the V-2; he attributed the work primarily to Hermann Oberth, who does not figure in Dornberger’s account. (Ley, “V-2: Rocket Cargo Ship,” as previously cited.) Incidentally, Oberth appears to have turned Nazi and denounced Willy Ley to his Party superior after Ley had left the country, partly on the ground that Ley was in correspondence with Tsiolkovski. Ley, *Rockets*, 122n.

34. Robert Moore Williams, “Lundstret’s Invention,” *Amazing Stories*, XIII (June, 1939), 76-85; quotation from 85. In a sequel, “Rockets Over Europe,” *ibid.*, XIV (February, 1940), 28-39, the Nazis do indeed succeed in using rocket weapons; nevertheless, at the end, the hero reminds his French associates: “When the day for peace comes, remember Lundstret, who died to save his invention from being used as an instrument of war, and on that day be just and honorable.”

35. Isaac Asimov, “Trends,” *Astounding Science-Fiction*, XXIII (July, 1939), 33-46. Although the story has a “happy ending”—the hero does reach the moon, and public opinion thereupon swings back in favor of space travel—some readers have discerned in this evangelical upsurge the “Second Religiousness” discerned by Spengler in the coming decline of western civilization, which would make this tale, too, a not particularly optimistic forecast.

36. Nelson S. Bond, “Fugitives From Earth,” *Amazing Stories*, XIII (December, 1939), 8-23. A sequel, published in another magazine six months later, continued this antiwar theme. Bond, “Proxies on Venus,” *Science Fiction*, II (June, 1940), 41-52.

37. Will Garth, “Incident on Titan,” *Thrilling Wonder Stories*, XX (June, 1941), 93-102, flag-planting episode on 100; Carter Sprague, “The Rocket’s Red Glare,” *Startling Stories*, IX (June, 1943), 100-102.

38. Dornberger, 15, 17, 25, 139-152. By the summer of 1943 the Peenemuende group were working on preliminary designs for step-rockets, of the kind which would be needed for deeper penetration of space. *Ibid.*, 131.

39. Lester Del Rey, “Lunar Landing,” *Astounding Science-Fiction*, XXX (October, 1942), 9-31; quotation from 10. Compare the description of what happened to food particles aboard the *Vostok I*, in Yuri Gagarin and Vladimir Lebedev, *Survival in Space*, tr. by Gabriella Azrael (New York, 1969), 13.

40. “Yes, we might as well admit it, V-2 is the first spaceship. . . . The re-creation of these things can be undertaken with confidence after the war, because Peenemuende proved that it can be done.” Ley, “V-2: Rocket Cargo Ship,” 122.

41. Nicolson, *Voyages To the Moon*, 2, 236.

42. Michele Willens, "A Child of the Sixties: From Mouseketeers to McCarthy," *Los Angeles Times*, December 28, 1969; Saul Pett, "Camelot Keeps Fading," *ibid.*, February 15, 1970; both as reprinted in Frederick Gentles and Melvin Steinfeld, eds., *Dream On, America* (San Francisco, 1971), 492, 562.

43. Melvin Maddocks, "The Tank, in Fact, Exploded," *Saturday Review* (Feb. 24, 1973), 62. See also Ronald Kotulak, "Goodby to the Moon," *Chicago Tribune*, Nov. 12, 1972, sec. 1, 22.

44. Arthur C. Clarke, "Man's Future in Space," *True*, LI (July, 1970), 31.

45. Ray Bradbury, "From Stonehenge to Tranquillity Base," *Playboy*, XIX (December, 1972), 322.