more advanced stage of humanity. Fear of science and the construction of the "mad scientist" are accompanied, in this view, by a moral climate of asceticism, sexual as well as intellectual purity, and a backwards-looking utopian impulse that yearns for prelapsarian oneness with nature. Interestingly enough, the two "moral climates" proposed by Pinker were both present, and on a collision course, in the cultural moment that forms the backdrop of Bulgakov's novel.

On the one hand, the NEP era has been viewed positively as a time of liberal cultural policies and great intellectual diversity; Bulgakov's Moscow, in particular, has been portrayed as a scene of jazzy optimism with pockets of material opulence. On the other hand, NEP-era Russia was a time of unprecedented anxiety and uncertainty, as the constituents of a new social order (recently literate peasants, newly empowered workers, embattled "bourgeois" intellectuals) were suddenly called upon to (re)define the limits of their power and identity in a radically reconstituted society. In the rituals and rhetoric of the NEP culture Naiman has identified signs of a moral climate marked by asceticism, anxiety about excess, and a desire to reestablish ideological purity. We can conclude that in 1925, the jet stream of what had been a radically modernizing, forwardlooking utopian climate collided with another front—what Naiman has described as "revolutionary anorexia."[55] Both attitudes are represented in the portrayal of science, scientists, and society Bulgakov created in *Heart of a Dog*.

Part Three

From Stalin to Sputnik and Beyond

Stalinism and the Genesis of Cosmonautics

MICHAEL G. SMITH

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The Russian aesthetic of cosmic oneness, first refined by the Symbolist and Futurist poets and later adapted by the proletarian writers, survived into the Soviet 1930s in various ways. F. A. Tsander expressed it when he translated the Stalinist slogan "To catch and surpass" as meaning a leap forward to a truly communistic society in outer space, a place for "free labor" and "universal creativity." G. Arel'skii, the writer of space travel adventures, even called for a whole new poetry based on mathematics and physics. "Science is building its own cathedral of Reason," he wrote, for "our earth is but one among the infinite islands in the ocean of the universe." It was an insight demanding a whole new way of thinking and writing, "a new era of planetary history for humanity."[1] Aleksandr Prokof'ev's poetry reproduced the earlier Promethean values for a new Stalinist generation. A student from the *Proletkul't* circles in 1922, he still

1 The term is from F.A. Tsander, "Dogonim I peregonim," 26 October 1931, ARAN, f. 573, o. 1, d. 252, l. 1. G. Arel'skii, "O problemakh poezii buduschego" [Issues of a poetry for the

celebrated the proletarian "We" of the revolution that "will be carried up to the heavens," predicting that communism would someday "dash off ships into flight"—and yes, even "to the stars."[2]

Official Communist ideology remained attuned to such imagery. *Pravda* valued Maiakovskii's poems for their cosmic "pathos" and "all-absorbing passion." The era of forced collectivization and industrialization was kind to the proletarian poets, their cosmist works reissued in new editions as forerunners of socialist realism. By definition this genre was all about the romanticism of heroic exploits, making miracles come true.[3] Here were the makings of an expressly Stalinist cosmism. Outer space, looking down on the planet, became one of its favorite frames of reference. "We have put socialism into practice," proclaimed one banner headline. "In place of Tsarist Russia heaves the great colossus of the USSR."[4] This extravagant globalism was a function of the very ideology of the Russian Revolution. It was built upon Marx's slogan "Workers of the World Unite." It was expressed in images of Lenin or of Bolshevik workers traversing the planet. It was screened cinematically in Dziga Vertov's film *One Sixth of the World* (1926), a visual celebration of the USSR's worldwide reach.[5] Propaganda posters featured Stalin's gigantic portrait fusing with Lenin's, like a new sun in the heavens illuminating the USSR. Stalin's own underground name, which blended the Russian *stal* (steel) with the name Lenin, was fortuitous too, allowing for a marriage between the images of the man of "steel" and the man of the "sun."[6]

Avant-garde artists retooled their techniques to the service of the Stalin regime. Konstantin Iuon repainted *New Planet* for the times, without the earlier fear and trembling of cosmic catastrophe, now with the "People" confidently at work, perhaps building a spacecraft or rebuilding their own planet, all against the background of cement mixers, searchlights, and stars. El Lissitzky's

2 Aleksandr Prokof'ev, *Sobranie sochinenii* [Collected works], 4 vols. (Moscow: Khudozhestvenania literaturia, 1965), 1:95, 107–8, 127–29, 188, 425.

3 A. Gurshstein, "Poet sotsializma" [The poet of socialism], *Pravda*, April 12, 1937, 4. See, e.g., M. P. Gerasimov, *Zariad* (Moscow: Tovarischestvo pisatelei, 1933). For context, see Boris Groys and Max Hollein, eds., *Dream Factory Communism* (Schiro-Frankfurt: Hatje Kantz, 2003), 107–15, 260–77.

4 Quoted from the magazine 30 *dnei* 5 (1931): 79–80; see also the front cover for 10–11 (1931): and *Krasnaia panorama* 39, September 23, 1927.

5 See these images and terms in *Komsomolskaia Pravda* [Comsomol truth]18, January 21, 1934, 3; and 2, January 1, 1934, 4. *Shestaia chast' mira* [A sixth part of the world], directed by Dziga Vertov (1926; Moscow: Sovkino).

6 Note the alignments of the signs of the zodiac and Lenin's portrait, along with Stalin's funeral

sculpture *Red Star*, made for the International Press Exhibit at Cologne (1928), showed a planetary system revolving around the new sun of proletarian values.[7] Kazimir Malevich offered the most towering of images: a study of Lenin as orbital "architecton," his arm pointed upward, reaching for space astride a series of skyscraper monuments and against the backdrop of Malevich's cosmic *Supremus No. 56*. Here was the ultimate parabola of the revolution—Lenin as rocket.

On the ground the Soviet Union now marked several natural frontiers for conquest: the "mobilization of the ether" through radio (*mobilizatsiia efira*); the "storming of the sky" (*shturm neba*) and "the "storming of the polar north" by airplane (*shturm severa*); the "storming of the earth's depths" by mines (*shturm nedr*); the "conquest of the stratosphere" via balloon or high-altitude plane (*zavoevanie stratosfery*); and even the "storming of the universe" by rocket (*shturm vselennoi*). Inspired by the first great "storming" of the Winter Palace in October 1917, these campaigns marked the vertical horizons of the Soviet state. As the poet Demian Bednyi wrote, "Our strengths, they're beyond measure / Heroes of the mines become heroes of the stratosphere." Or as one youth song put it:

> Komsomolists sing to the waters
> And they sing to the heavens
> Comrades suns and stars
> We'll become your masters.[8]

The rocket became a central image of pure mechanical prowess, Tsiolkovskii the herald of the conquest of the cosmos. Both suited the Stalinist preoccupation with reaching "ever higher" (*vsio vyshe*). Tsiolkovskii's rocket, together with Lenin and Stalin's revolutionary party, served the same generative purpose: moving human beings beyond Earth or moving historical events here upon it, against all odds. Astronautics, what the Soviets now began to identify more often as cosmonautics, became the science of the future, the realizable utopia of space travel.

7 See K. F. Iuon's painting *Liudi* (1930), in Ia. V. Apushkin, *Konstantin Fedorovich Iuon* (Moscow: Vsekhudozhnik, 1936), 78–79. El Lissitzky's sculpture (with the assistance of Georgii Krutikov) for the "Pressa" Exhibition at Cologne (1928) is in Sophie Lissitzky-Küppers, *El Lissitzky* (Greenwich: Graphic Society, 1968), plate 201.

8 Dem'ian Bednyi, "Stal'naia krepost'" [The steel fortress], *Pravda*, January 291937, 6; Leonid

Rockets and Mass Politics

Within these various contexts, the Soviet state also promoted a broadbased campaign to educate the public in rocketry and space travel issues through the 1930s. Rocketry took center stage in the city spaces of Moscow: with lectures and exhibits at Gorkii Park, in the city planetarium, in the lobby of the Civil Air Fleet (*Aeroflot*), and at the headquarters of the Red Army. It found a special niche in the mass circulation press. This was no fleeting movement. A generation of children and teenagers was raised on the possibilities of rocketry and space travel, symbols of scientific-technological progress.

Some of the campaign's texts were naïve. The youth magazine *Knowledge Is Power* (*Znanie—sila*) devoted a whole issue to the rather far-fetched potential of Tsiolkovskii's dirigible rocket. The *Komsomol* offered rural children an uplifting cartoon about little Alesha, who dreamed of flying off to the moon in a "stratoplane-rocket."[9] Other texts were quite instructive, offering lessons on rocket physics, orbital mechanics, and basic astronomy. Iakov Perel'man's *Interplanetary Voyages* was published in its tenth edition by 1935, hailed as the "world's first" popular survey to deal with rockets and spaceflight. The state publishing house translated Max Valier's and Hermann Noordung's classics, inspiring young and old with the real possibilities of space stations.[10] It reprinted some of Tsiolkovskii's science fiction from before the revolution. In children's magazines he now became little "Kostia," the boy who came from nothing to become the "great Russian prodigy," the original "astronaut" (*zvezdoplavatel'*). He was the inventor of that marvelous machine, the rocket, closed on one end, open on the other, carrying its own propulsion by purely reactive force. Thanks to him, fourth graders learned, the USSR would become the first to "conquer the Moon."[11]

9 *Znanie—sila* [Knowledge is Power] 23–24 (December 1932). The cartoon about Alesha is in "Puteshestvie na lunu" [Journey to the moon], *Kolkhoznye rebiata* [Collective farm friends] 10 (1937): 36. See also A. Abramov, *Raketa* (Moscow: Molodaia gvardiia, 1931).

10 Ia. I. Perel'man, *Mezhplanetnye puteshestviia* [Interplanetary voyages] (Moscow: ONTI,1935). See *Komsomolskaia pravda* 81, April 5, 1934, 4; and 222, September 23, 1934, 4; M. Val'e, *Polet v mirovoe prostrantvo kak tekhnicheskaia vozmozhnost'* [Space flight as technology possibility], ed. V. P. Vetchinkin and translated by S. A. Shorygin (Moscow: ONTI, 1936); German Noordung, *Problema puteshestviia v mirovom prostranstve* [Issues of spaceflight], ed. and trans. B. M. Ginzburg (Moscow: ONTI, 1935).

11 K. E. Tsiolkovskii, *Na lune* [On the moon], ed. Ia. I. Perel'man (Moscow: ONTI, 1934); K. E. Tsiolkovskii, *Grezy o zemle i nebe* [Daydreams of Earth and Heavens], ed. Ia. I. Perel'man

Children corresponded with "grandfather Tsiolkovskii," as they called him, building models of his various air and spacecraft. These groups included the All-Union Meetings of Young Aviation Designers, the Office of Young Inventors of the Society of Inventors, and the All-Union Children's Technical Stations, dedicated to cultivating technical and engineering skills. In late 1934 fifteen-year-old Mara Malkov organized a Laboratory for Reactive Propulsion in the Kharkov House of Young Pioneers (Ukraine), gathering a handful of his mates in the ninth and tenth grades. With great excitement they wrote Tsiolkovskii, asking for "all of Your books (absolutely all of them), and signed too." From their love of physics and model plane building, they now set out to build his rockets and even test Goddard's and Oberth's models, maybe even create a "museum exhibit on interplanetary communications." In all of these ways children became a priority audience for Tsiolkovskii's fantastic ideas. A widely reproduced photograph of the day depicted two youngsters at the old man's feet, in rapt attention, models in hand, listening to his kind wisdom.[12]

Tsiolkovskii's resurgent public fame and official recognition after 1930 were really more about the wider veneration for air power. "Man has conquered the elements" with his "metal bird," wrote the aviation publicist N. Bobrov, who was also one of Tsiolkovskii's first biographers. The regime recognized Tsiolkovskii as one of Russia's and the world's great aviation pioneers, worthy of inclusion in its "Big Life" biography series, inspirational stories for young readers.[13] His life was especially instructive because it perfectly paralleled the whole history of aviation. He was the first to conceive of an all-metal dirigible in 1892, three years before Count Zeppelin. He was the first to conceive of a functional airplane in 1894, nine years before the Wright brothers. He was the first to conceive of rocket power for spaceflight in 1903, nearly two decades before Goddard and Oberth. These historical and personal trajectories constituted Tsiolkovskii's "spirals to the sun." He would transform us, by airplane and dirigible and rocket, into points of light in the heavens.[14] For readers of the Young Communist League's newspapers, Tsiolkovskii's dirigible rocket flew

12 A. Volkov, "K. E. Tsiolkovskii i deti" [K. E. Tsiolkovsky and children], in Islent'ev, *K. E. Tsiolkovskii*, 223. Malkov's story is told in ARAN, r. 4, 0.14, d. 223, ll. 53–65. The photograph is in *Znanie—sila* 23–24 (1932): 6; and *Izobretenie* [Invention] 10 (1935): 5.

13 Nik. Bobrov, *Liudi-ptitsy* [Human birds] (Moscow: Osoaviakhim, 1930), 6–7; and N. N. Bobrov, *Bol'shaia zhizn': Tsiolkovskii* [A great life: Tsiolkovsky] (Moscow: Aviaavtoizdat, 1933).

14 Iu. Geko, "Spirali k solntsu" [Spirals toward the sun], *Priroda i liudi* [Nature and people] 2,

highest among the great artifacts of aviation, in an ascending arc, just above the 1908 Wright *Flyer*. He had taught the "Soviet people" how to "fly farther than all, faster than all, higher than all."[15] And in one dramatic article, sponsored by the Soviet government and military, Tsiolkovskii confidently predicted nothing less than the evolutionary adaptation of the human race to "ethereal space"—our "migration" to the solar system's planets, asteroids, and moons; the "extraordinary propagation and perfection" of human beings as space colonists; even our retreat to another sun as our own began to fail.[16]

In 1932, in honor of his seventy-fifth birthday, the state awarded Tsiolkovskii the Order of the Red Banner of Labor in formal ceremonies in Moscow. He received a new home in Kaluga and a better pension. Scholarships were named in his honor; streets were renamed after him. A host of government agencies touted his achievements with meetings and discussions, telegrams and press releases. No matter that Tsiolkovskii was a thinker, an inventor of ideas more than things. In all of this his "sagacity and originality" had already matched and surpassed Western inventors. In a marriage of the personal and the national, his dreams for the "conquest of atmospheric and interplanetary space" became all-Soviet dreams.[17] He became the "patriarch of aviation and pioneer of astronautics," father of a whole "international planetary school" of rocketry pioneers. He represented the best of Soviet socialism, marking the "path to a future" of global and planetary peace, a utopia of which capitalism was capable of dreaming but incapable of achieving.[18]

Soviet propagandists also celebrated Tsiolkovskii as terrestrial and solar engineer, in league with several Soviet and American scholars who also counted Earth's energy by the measure of the sun (including astrophysicist Charles G. Abbot, director of the Smithsonian Institution and

15 See the cartoon drawing in *Komsomolskaia pravda* 197, August 24, 1934, 6. Ivanov, "Korifei tekhnicheskoi mysli" [Treasury of technological insights], *Komsomolskaia pravda* 218, September 19, 1940, 5.

16 Paraphrased from the thirteen "Steps in Reaction Development," in K. E. Tsiolkovskii, "Trudy o kosmicheskoi rakete" [Works on space rockets], in Dubenskii et al., *Reaktivnoe dvizhenie* [Reactive movement], 11–12. Tsiolkovskii revised these "steps" from an original sixteen-step plan that he had devised in 1926.

17 Ia. I. Perel'man, *Tsiolkovskii* (Leningrad: Gostekhizdat, 1932), 8–12, 69; I. Merkulov, "Tsiolkovskii," in *Bol'shaia Sovetskaia Entsiklopediia* [Great Soviet encyclopedia], 65 vols. (Moscow: OGIS, 1934), 60:734.

18 *dnei* 9 (1932): 53, 59; *Iunyi proletarii* 10 (May 1933): 17; and *Nauka i zhizn' ll* [Science and

Robert Goddard's most dedicated patron). With them he appealed to the sun as the origin of universal life, worthy of veneration as the source of all energy and fuel resources.[19] He already knew that it would be the essential energy of interplanetary life and travel, powering the lush greenhouses of his space dirigibles. Solar mirrors might also be built and directed back on Earth, to power machines and cultivate deserts. The leading science fiction writer Aleksandr Beliaev praised his projects for the "reconstruction of the Earth" and the "reconsolidation of the globe," encasing its vulnerable parts in protective and productive glass membranes, all in preparation for the future settlement of space. Tsiolkovskii was that rare kind of pioneer who saw the planet from space, who measured it by an "astronomical scale," who counted life in "billions and billions." He was the first planetary man, filled with a "cosmic consciousness," a rare "love" and goodwill for our universal home. By way of his "cosmic rocket" he had written his name as a new shooting star in space.[20]

Tsiolkovskii's writings on dirigibles and rockets were also now published as "selected works." The first volume was dedicated to his long-suffering project to build an all-metal dirigible, a project again taken up by *Aeroflot* between 1932 and 1935, which worked on designs and models under his partial supervision. For the third and final time (as in 1894 and 1925) the all-metal dirigible was debated in Russia's military circles. Once again, nothing came of the idea—except publicity. Beliaev even wrote a story about it. Thus, Tsiolkovskii's all-metal dirigible only ever flew in fiction.[21] The second volume covered rocketry, now at the center of the RNII's mission, whose leadership sought out Tsiolkovskii's imprimatur, electing him as an honorary member of its Engineering Council and publishing several of his works. In his set of terminological standards for the new field of rocketry, G. E. Langemak assigned

19 B. P. Veinberg, *Solntse* (Moscow: ONTI, 1935); and Charles Abbot, *Solntse*, ed. Ia. I. Perel'man and translated by N. Ia. Bugoslavskii (Moscow: ONTI, 1936); K. E. Tsiolkovskii, *Budushchee zemli i chelovechestva* [The future of the earth and humanity] (Kaluga: Izd. avtora, 1928); and Tsiolkovskii, "Solntse i zavoevanie pustyn'" [The sun and the conquest of emptiness], *Vestnik znaniia* [Herald of knowledge] 5–6 (1933): 182–83.

20 Quoted from Aleksandr Beliaev, "Tsiolkovskii," *Iunyi proletarii* 31–32 (November 1932): 7–9; and Aleksandr Beliaev, "Pamiati velikogo uchenogo-izobretatelia" [Memories of a great scientist and inventor], *Iunyi proletarii* 23 (1935): 43–44.

21 K. B. Tsiolkovskii, *Izbrannye Trudy* [Selected works], vol. 1: *Tsel'nometallicheskii diri.zhabl'* [Metallic dirigibles], ed. Ia. A. Rapoport (Moscow: ONTI, 1934); A. Beliaev, "Vozdushnyi

Tsiolkovskii's name to the famous rocket equation describing the relationship between the rocket's exhaust velocity and its mass ratio.[22]

Tsiolkovskii's reputation prospered through the 1930s, a mark of the regime's optimism. The Stalinist state encouraged its people to dream. Soviet adventures targeted younger audiences with "flights of fancy," in A. R. Palei's terms, joining real achievements in aviation with imaginative storytelling about space travel. Tsiolkovskii's rocket, or some prototype of it, figured into almost all of these stories. Palei's own novel *The Planet KIM* (1930), the story of how an enterprising commune of Young Communists (he called them Soviet "Robinson Crusoes") colonized an asteroid, also featured an authoritative preface by the astronomer K. L. Baev, one of the first publicists for Robert Goddard's rocket back in 1923. Once again, Baev confirmed the legitimacy of rocket science and the real possibilities of spaceflight. The certainty of calculus made it all so.[23] Aleksandr Beliaev was Tsiolkovskii's most dedicated publicist. In a series of novels and stories between 1933 and 1940, he cultivated Tsiolkovskii's dreams of space engineering via his "New Ark" (outfitted with the signature liquid buffers and solar greenhouse), a multistage "star cruiser" and "man-made comet." He made it "sail upon the waves of the ethereal ocean," a lovely and dazzling streak of golden exhaust upon the azure blue of the skies. It was a celebration of human mobility and genius and "happiness," the foundation for a new race of human beings to become "star dwellers."[24] Vladimir Vladko also took his readers to the nearby planets, speeding on such a human-made "comet," drawing an "intricate curve" through outer space. With mini-lectures on space engineering, chemistry, and biology along the way, Vladko treated readers to a series of Soviet firsts: the first All-Union Society for Interplanetary Communications, the first flights into outer space and to the moon, the first exploration of the prehistoric jungles and dinosaurs of Venus.[25]

22 See S. A. Shlykova, "K. E. Tsiolkovskii's Correspondence with the Jet Scientific-Research Institute," in *Soviet Rocketry*, ed. A. A. Blagonravov and translated by H. I. Needler (Jerusalem: Scientific Translations, 1966), 127–32.

23 A. R. Palei, "Nauchno-fantasticheskaia literatura" [Science fiction literature], *Literaturnaia ucheba* [Literary studies] 2 (1936): 119–27. A. R. Palei, *Planeta KIM* (Kharkov: Proletarii, 1930), a novel for teenage readers. KIM was an abbreviation for the *Kommunisticheskii Internatsional Molodezhi* (Communist Youth International).

24 See Aleksandr Beliaev, *Pryzhok v nichto* (Leningrad: OGIZ, 1933); and Beliaev, *Zvezda* KETs (Moscow: Detlit, 1940).

25 V. M. Vladko, *Argonavty vselennoi* [Argonauts of the universe] (Rostov-Don: Oblizdat, 1939). For another story that detailed Tsiolkovskii's and Tsander's rockets, see Iu. Lipilin, "Polet na

These stories were not passing fads. At a number of local and national levels the government was committed to promoting science fiction and space fantasy. Note, for example, one radio contest for the best stories, drawings, and models on such topics as "The Arctic in 100 Years," "Aviation of the Future," and even "How to Fly to Mars." As the announcement stated, the Mars topic owed its inspiration to Tsiolkovskii's theories, bridging such diverse fields as astronomy, physics, engineering, and chemistry. Here was a perfect model for a middle school science fair, a way for children to ponder a future of spacecraft and space stations, rocket engines and solar energy. Aleksei Tolstoi's science fiction novel *Aelita* also enjoyed a new life into the 1930s, with both official approval and a genuine youth readership, now graced with illustrations of Tsiolkovskii's rocket headed toward a Lowellian Mars, studded with the infamous canals.[26]

Tsiolkovskii's own *Beyond the Earth* was not republished in the 1930s, but it found an even better venue as a feature film, *Cosmic Flight* (1936). Tsiolkovskii flew to space yet a second time, albeit still in science fiction. This time he flew not as the love-struck Los' but as the enterprising Soviet academician Pavel Ivanovich Sedykh, director of the "All-Union Institute for Interplanetary Communications," commander of a team of Soviet "astronauts": the Young Communist Marina and the Young Pioneer Andriusha, the "first" explorers on the moon. "Forward to the Cosmos," they proclaimed. The accent here was on the real, or rather on how only the USSR could really turn fantasies into realities, on a fact-based "flight of thought," as one commentator put it.[27] Tsiolkovskii served as scientific consultant to the film, collecting his thoughts and drawings in an album for the script. He offered sketches of the rocket (the *Stalin*), launch ramp, space suits, zero gravity environment, liquid acceleration barriers, and spacewalks; corrections about the look of the stars and sun and Earth from space; and strict advice on the mechanics and physics of spaceflight.[28]

26 From the pamphlet *Vzgliad v budushchee* [A look into the future] (Simferopol': Krymradiokomitet, 1941); Aleksei Tolstoi, *Aelita* (Moscow: Detlit, 1937), a juvenile edition with drawings by P. A. Aliakrinskii.

27 *Komsomolskaia pravda* 120, May 24, 1934, 6.

28 *Kosmicheskii reis*, directed by V. Zhuravlev (1935; Moscow: Moscow Film Studio). Several of the sketches are in K. E. Tsiolkovskii, *Works on Rocket Technology* (Washington, DC: NASA, 1965), 89, 236, 377–79, 382–83. The famous pilot M. M. Gromov also consulted on the

One of the last Soviet "silents," the film was a popular success, filled with captivating technology and comedic touches, including an "Earthrise" from the moon, some death-defying scenes, and the rescue of a cat. The crew even sent a Goddard-like signal flare back to prove their achievement: the bright letters *USSR*. When it premiered to Moscow's youngsters during the cold winter holidays of 1936, they broke into waves of cheers and laughter. The movie's launch ramp was especially emblematic of the Soviet future. Built at "Star City" (*Astrogorod*), it and the rocket dwarfed the magnificent city of Moscow itself, in the distance the planned "Palace of Soviets" and gigantic Lenin statue (to be larger than the Eiffel Tower and Empire State Building). Yet this ramp was not original. It was already a staple in European media and books, thanks largely to Max Valier, who first popularized it. Soviet graphic artists had even stolen Valier's ramp image and rocket flight in 1934—for a celebratory piece on flight into the stratosphere—Lenin's statue and the Moscow city center again conspicuously in the background.[29]

Tsiolkovskii's death on September 19, 1935, at "22 hours and 34 minutes," the beloved scientist reaching seventy-eight years of age, marked a peak in the Stalinist campaign for the cosmos. Kaluga honored him with a grand funeral. Fifteen thousand people attended, making their way along a cortege two kilometers long. Leaders of civil and military aviation gave speeches. An escadrille of airplanes from Moscow dropped leaflets about his life and lowered a wreath to his grave. His brain, weighing a full 1,350 grams, was turned over to the Moscow Institute of the Brain for safekeeping and study, not too far from Lenin's own. Tsiolkovskii's personality cult was on full display: the dreamer spurned by Tsarist authorities; the half-deaf genius struggling on alone; the enemy of gravity; the dirigible and rocket designer backed by rigorous mathematical proofs. It was a cult of stratospheric and space travel honoring the "all-metal interplanetary name of Tsiolkovskii." He was buried at Kaluga's outskirts. An obelisk, not yet a rocket, was mounted at his grave, amid birch and fir trees. Its inscription read, "Founder of the theory of reactive motion" and "Pioneer of the conquest of interplanetary space," along with Tsiolkovskii's own claim, from 1911, "Humanity will not remain forever on Earth."[30]

29 A. Garri and L. Kassil', *Potolok mira* [The roof of the world] (Moscow: Sovetskaia literatura, 1934), 12–121.

30 All of these images are based on my readings of *Izvestiia* and *Pravda* at the time of his death and on his biographies, with special attention to Lev Kassil', "'Zvezdoplavatel' i zemliaki" [Star-voyager and earthlings], in *K. E. Tsiolkovskii*, Islent'ev, 160–68. See also James T.

During this campaign of mourning (and for years afterward) the media also gave wide coverage to the letters Stalin exchanged with Tsiolkovskii just before his death, with the strange effect, given their ages, of Stalin playing the role of "wise leader: the father," and Tsiolkovskii the adoring and appreciative citizen, the son. These letters became centerpieces of the Tsiolkovskii postmortem cult. In grandiloquent terms, he bequeathed his papers and legacies to the "Bolshevik party and Soviet power" so as to promote the further "progress of human culture." In their own professional correspondence to Stalin, the administrators of Soviet rocketry tapped into the hyperbole to justify more funding. I. T. Kleimenov, director of the RNII, warned that liquid fuel rocketry, the project closest to Tsiolkovskii's heart, should not die with him. A. K. Korneev, head of K B-7, wrote to Stalin that "the hour will soon come when our Bolshevik interplanetary ships will rise up to the unbounded vacuum of space."[31]

Stalin's own public persona also became a cult of "cosmic" force. In a wildly imaginary lecture from a future "School of Interplanetary Communications," the propagandist Karl Radek celebrated Stalin for the "daring of a great rebel" and the "cool calculation of a mathematician," a young man who was a "thirsty student of the algebra of revolution," images that recalled Stalin's early years at the Tiflis Geophysical Observatory.[32] One of the more infamous of appeals came from Osip Mandelshtam in his panegyric the "Ode to Stalin" (1937), which drew Stalin's profile as lines in the sky. He became the one "who has shifted the world's axis." He became a giant towering over mountains, a "Prometheus" bridging countries and continents. He became the great cultivator, sowing progress "like tomorrow out of yesterday—/ The furrows of a colossal plow reach to the sun."[33] After the hagiography of Richard Maurice Bucke and John Addington Symonds from the turn of the century, Mandelshtam turned Stalin into a modern-day Walt Whitman. A poem in *Pravda* made much the same point: "Between the heavens and the earth / He fills the whole world with his girth." Stalin became the quintessential "vertical" man, standing upon the mausoleum as the dead Lenin lay horizontal within it, at one point towering above

31 Kleimenov letter to Stalin, November 2, 1935, RGVA, f. 4, o. 14, d.1398, l. 54. See also Korneev's letters to Stalin, April 12, 1937, ARAN, r. 4, o. 14, d. 150, ll. 16–17; and June 15, 1937, RGVA, f. 4, o. 14, d. 1628, ll. 123–26.

32 Karl Radek, *Portraits and Pamphlets* (New York: McBride, 1935), 4, 12.

33 The translation and context is in Gregory Freidin, *A Coat of Many Colors* (Berkeley:

Red Square, his portrait projected onto a tethered balloon, as if a new planet in the skies.[34]

These kinds of images help us better to understand H. G. Wells's second visit to the USSR in 1934. As a British celebrity with Soviet sympathies, he offered a reference point for the world, confirming just how dramatically the country had changed since his first visit with Lenin in the troubled year of 1920. He offered a "before and after" picture of Russia's long revolution. Wells arrived in Moscow by air, no longer the dilapidated site of one of his apocalyptic novels. Now he was flying into a "rigorous," vibrant city surrounded by a "patchwork of aerodromes" and many "hundreds of planes," to meet Josef Stalin, one of the great representatives of the "human future." True enough, as described in his "alternative" history, *The Shape of Things to Come* (1933), Wells saw both the United States and USSR as utopian civilizations in the making, each with a "major mass of human beings" ready to build the foundations of "an organized world-state."[35] Yet he favored Stalin and a "theory of world revolution" (one he shared with J. B. S. Haldane) meant to fulfill a "socialistic, cosmopolitan and creative" global government. Progress meant "abolishing distance"—by land and sea and air, among peoples and states, even between death and life. It meant mastering all life on the planet ("geogonic planning"); it meant reaching for outer space and immortality. William Winwood Reade's prophecies would come true: "This is the day, this is the hour of sunrise for united manhood. The Martyrdom of Man is at an end. From pole to pole now there remains no single human being upon the planet without a fair prospect of self-fulfillment, of health, interest and freedom."[36]

The film version of this fancy, *Things to Come* (1936), represented the future by a rocket, launched initially by Verne's cannon but piloted by courageous young people setting out to create a new civilization in outer space. It was a story line worthy of Stalinist socialist realism. Yet what might seem positively Fedorovian or Stalinist here was really at one with the very transformism at the heart of the Western experience. The aviation engineer

34 The quote is from "Rech' tov. Suleimana Stal'nogo" [Address of Comrade Suleiman Stalny], *Pravda* 99, February 19, 1936, 22. See the balloon on Stalin's seventieth birthday, in *Ogonek* 52, December 25, 1949, front cover. On Stalin and the "vertical," see Vladimir Paperny, *Architecture in the Age of Stalin* (New York: Cambridge University Press, 2002).

35 H. G. Wells, *Experiment in Autobiography* (New York: Macmillan, 1934), 685, 689–700.

36 H. G. Wells, *The Shape of Things to Come: The Ultimate Revolution*, ed. Patrick Parrinder (1933; repr., New York: Penguin, 2003), 393, 446, 508; J. B. S. Haldane, *Inequality of Man*

and science writer Waldemar Kaempffert perfectly summarized this futuristic vision as encompassing the cosmic: the reach for new sources of terrestrial and solar energy to power the industrial globe; the reach for longevity and even a kind of immortality through the new chemistry and biology; the reach for outer space and the planets by rocket. Thus, "the romances of yesterday," he wrote, become "the realities of today."[37]

37 *Things to Come*, directed by William Cameron Menzies (1936; London: Film Productions);