
THE CULTURE OF

TIME AND SPACE

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WITH A NEW PREFACE

S T E P H E N K E R N

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various sources relating to the two focal issues and conclude with a picture of Nietzsche's overman overjoyed at the prospect of eternal recurrence, happily affirming his fate in the here-and-now.

There was no actual confrontation over these two focal issues, because simultaneity and the thickened present attracted all of the innovative thinkers and artists. Simultaneity was the more directly influenced by technology, because electronic communication made it possible for the first time to be in a sense in two places at once, while temporal thickening derived from a theory of experience that could have been articulated in any age. Simultaneity also had the broader cultural impact. One response was a growing sense of unity among people formerly isolated by distance and lack of communication. This was not, however, unambiguous, because proximity also generated anxiety—apprehension that the neighbors were seen as getting a bit too close. Perhaps the most far-reaching impact of the new simultaneity was due to the cinema, which was able to bring together an unprecedented variety of visual images and arrange them coherently in a unified whole. German audiences moved visually between Munich and the wild American West; French audiences traveled to the North Pole and the moon. The cinema also thickened the present. Any moment could be pried open and expanded at will, giving the audience seemingly at once a vision of the motives for an action, its appearance from any number of perspectives, and a multitude of responses. A man is shot in an instant, but moviegoers saw the event prolonged and analyzed like a detailed case history. The present was thus thickened by directors who spliced time as they cut their film.

The new aesthetic and ethic joined in affirming the reality of a present that embraced the entire globe and included halos of the past and future which made it perceptible in the flux of time as atomic particles are made visible in their path through a cloud chamber. The new technology changed the dimensions of experience so rapidly that the future seemed to rush toward the present at a tempo as hurried and as irregular as Stravinsky's music. In the prewar years there was still a time to be born and a time to die, but the protracted sequence of events, each in its own time, was becoming ever more hurried and compressed. The world was racing into the future like the *Titanic* into the North Atlantic, and those who looked ahead foresaw both shipwreck and the wonders of time travel.

4 THE FUTURE

Shortly after the armistice in 1918 Eugene Minkowski began a work entitled "How We Live the Future (and Not What We Know of It)." He never published it but applied the ideas in his clinical practice in the postwar years and then incorporated them in *Lived Time*, where he distinguished two modes of experiencing the immediate future—activity and expectation. The essential difference is the orientation of the subject in time: in the mode of activity the individual goes toward the future, driving into the surroundings in control of events;

in the mode of expectation the future comes toward the individual, who contracts against an overpowering environment. Every individual is a mixture of both modes, which makes it possible for him to act in the world and maintain an identity amidst a barrage of threatening external forces. The war sharpened the contrast between the two modes. The dominant one for the soldier was expectation, as the war limited his activity and sense of control over the future. Minkowski's description of expectation reads like a phenomenology of life in the trenches. "It englobes the whole living being, suspends his activity, and fixes him, anguished in expectation. It contains a factor of brutal arrest and renders the individual breathless. One might say that the whole of becoming, concentrated outside the individual, swoops down on him in a powerful and hostile mass, attempting to annihilate him." Another image conjured up the sinking of the *Titanic*. "It is like an iceberg surging abruptly in front of the prow of a ship, which in an instant will smash fatally against it. Expectation penetrates the individual to his core, fills him with terror before this unknown and unexpected mass, which will engulf him in an instant."¹ While expectation dominated the war experience, activity dominated the prewar period, and the two modes constitute basic polarities of this generation—how they lived the future (and what they knew about it).

The future, to be sure, is not experienced as vividly as the present and is dependent on the past for its content of images reassembled and projected ahead. Nevertheless it is an essential component of the personality, as the organization of those projections provides a sense of direction and makes novelty, purpose, and hope possible. Although the historical data on how people viewed the future are more limited than those on the past or present, it is possible to identify this generation's distinctive experience. The new technology provided a source of power over the environment and suggested ways to control the future. The Futurists identified their movement with the promise of that technology and the new world that it offered. There was a burst of science-fiction literature that sought to appropriate the future imaginatively. Philosophers argued that the possibility of freedom required that there be an unknown future, and one political tactician considered the importance of a myth of the future for revolutionary movements. These examples cluster on the side of an active future, that expansive and creative embodiment of the *élan vital* that Minkowski, following Bergson, believed essential to mental health. The war put a swift halt to this exuberance, but even in the

prewar period some thinkers envisioned the future in the mode of expectation. The entire discussion of degeneration pointed to a future in which mankind waited to be overpowered by the forces of nature and society, leading to a decline of cultures and an ultimate extinction of the species.

The effect of the telephone on the past and present was recognized at once—it eliminated the preservation of the past in letters and expanded the spatial range of the present. But there was little recognition of the impact of the telephone on the experience of the future. The historian Herbert Casson, writing in 1910, touched on the subject. He noted that "with the use of the telephone has come a new habit of mind. The slow and sluggish mood has been sloughed off . . . life has become more tense, alert, vivid. The brain has been relieved of the suspense of waiting for an answer . . . It receives its reply at once and is set free to consider other matters."² Actually it had a far more complex effect. In comparison with written communication or face-to-face visits the telephone increased the imminence and importance of the immediate future and accentuated both its active and expectant modes, depending whether one was placing or receiving a call. A call is not only more immediate than a letter but more unpredictable, for the telephone may ring at any time. It is a surprise and therefore more disruptive, demanding immediate attention. The active mode is heightened for the caller who can make things happen immediately without enduring the delay of written communication, while the intrusive effect of the ringing augments the expectant mode for the person called by compelling him to stop whatever he is doing and answer. He is thrust into a passive role because the caller can prepare for the conversation and control it at the outset.

Even though interpretation reveals an intensification of both modes, the general impact of the telephone was its ability to manipulate the immediate future, because the telephone was conceived largely through the experience of the caller. (Casson did not even consider the magnification of expectation for the person waiting for a call.) Evaluations of the telephone divided sharply between optimists and pessimists, and those who viewed it favorably usually had the caller in mind. The pessimists pictured the recipient of the call first suspended in waiting and then disturbed by the intrusion. Indeed, waiting for the telephone to ring became a symbol of loneliness and helplessness in the expectant mode. It is more tormenting than waiting for a letter, because the call may or may not come at any time,

while the letter either does or does not arrive in the daily mail. One may thus prepare for a letter in a way that it is impossible to prepare for a telephone call.

A similar division between active and passive modes was created by the introduction of the assembly line at Ford's Highland Park factory in Detroit in 1913. While products made individually involved the worker in the manufacturing process, the conveyor belt and continuous operation of the assembly line eliminated challenges and surprises as the product moved along with every step worked out beforehand. Once uncertainty about the future was eliminated by the assembly line it became possible to streamline the productive process further by observing every stage, determining the minimum movements necessary to complete all tasks, and then instructing the workers to make them. This was the achievement of Frederick Taylor's time and motion studies,³ which accelerated production by increasing the predictability of workers' movements and depriving workers of the opportunity to select the sequence of actions to complete an operation. The assembly line and Taylorism diminished the factory worker's active control over the immediate future in the productive process and relegated him to an expectant mode, waiting for the future to come along the line, at the same time increasing the manufacturer's control. Although the impact of the new technology on the future fluctuated between these two roles, as was the case with the telephone, the larger and more decisive historical impact was a magnification of the active mode.

Another concrete manifestation of the active mode of the future was imperialism and the prospect of European ascendancy throughout the world in years to come. Annexation of the space of others, outward movement of people and goods, and the expansive ideology of imperialism were spatial expressions of the active appropriation of the future. In a famous address before the Colonial Institute in 1893, the Liberal-Imperialist Foreign Minister Lord Rosebery interpreted British motives for the colonization of Africa in terms of the future:

It is said that our Empire is already large enough, and does not need extension. That would be true enough if the world were elastic, but unfortunately it is not elastic, and we are engaged at the present moment, in the language of mining, "in pegging out claims for the future." We have to consider not what we want now, but what we shall want in the future. We have to consider

what countries must be developed either by ourselves or some other nation, and we have to remember that it is part of our responsibility and heritage to take care that the world, so far as it can be moulded by us, shall receive an English-speaking complexion, and not that of other nations . . . We have to look forward beyond the chatter of platforms and the passions of party to the future of the race of which we are at present the trustees.⁴

A personal reaction to the two modes of experiencing the future, so altered by new sources of energy and forms of technology, was recorded in Henry Adams' autobiography of 1907. The nineteenth century had measured its progress by carloads of coal produced. It was regulated by Newton's laws and accepted the law of contradiction as a basis for reasoning. But this coherence began to break up in the 1890s. Adams wrote that thinking was "caught and whirled in a vortex of infinite forces," men were flung about "as though [they] had hold of a live wire or a runaway automobile," and he was forced to learn to think in contradictions.

In 1892, when Adams was over fifty, he "solemnly and painfully learned to ride a bicycle." This was an active, if somewhat creaky, appropriation of the future, but the new technology also threatened to overwhelm him. At the Chicago Exhibition of 1893 he was awed by the mechanical forces of the dynamo, the creator of a new phase of history. By the Exhibition of 1900 his fascination had turned to devotion, and he saw the dynamo as a symbol as powerful in its way as the image of the Virgin. The achievement of science and the power of technology—radium and x-rays, "frozen air" and electric furnaces, automobiles and telephones—surrounded him as he looked up at the dynamo. All mocked the slow-paced, regular accounting that had shaped his historical thinking and shattered his neat categories of history. "Satisfied that the sequence of men led to nothing and that the sequence of their society could lead no further while the mere sequence of time was artificial, and the sequence of thought was chaos, he turned at last to the sequence of force; and thus it happened that, after ten years' pursuit, he found himself lying in the Gallery of Machines at the Great Exhibition of 1900, his historical neck broken by the sudden irruption of forces totally new." Henry Adams has left us with a dual image of his response to technology—a courageous man learning to ride a bicycle and an elderly scholar lying on the ground with his historical neck broken. Here are

the extremes of activity and expectation coming together in the life of a pioneer in the history of technology.

Although the world seemed to be rushing ahead at an ever faster clip, for some that was not fast enough. Science-fiction writers reached out for the future as if it were a piece of overripe fruit. Their stories came into vogue on a grand scale, indicating that the future was becoming as real to this generation as the past had been for readers of the Gothic novel and historical romance. There had been utopian writings before, but they generally meant to identify current problems rather than delineate a world to come and the processes by which it would evolve. From the 1860s on Jules Verne's *voyages extraordinaires* popularized the genre with projections of future developments from current science and technology, and in the 1890s H. G. Wells became even more fanciful with his "tales of space and time."

Wells interpreted this particular inclination of his generation in a lecture of 1902, "The Discovery of the Future." In a manner remarkably similar to Minkowski's he distinguished two types of mind by their attitude toward time and "the relative amount of thought they give to the future of things." One type is retrospective, a "legal or submissive" mind that looks for precedents to decide how to deal with the future. The other is the "legislative, creative, organizing or masterful type" that attacks the established order: "It is in the active mood of thought while the former is in the passive." Most people still cling to tradition: they travel on roads that are too narrow; they live in space-wasting houses out of a love of familiar shapes; their clothing, speech, politics, and religion all testify to the binding power of the past. But the modern age has turned away from a dogged adherence to tradition and has "discovered" the future as a source of values and a guide for action. While three hundred years ago people drew their rules of conduct "absolutely and unreservedly from the past," now they are more inclined to look ahead and consider the consequences of any action and modify the rules if the consequences merit it. Even modern wars are conceived and justified in terms of the future: "a comparison of the wars of the nineteenth century with the wars of the Middle Ages will show . . . in this field also there has been a discovery of the future, an increasing disposition to shift the reference and values from things accomplished to things to come." The spirit of modern science, the flood of technological discoveries, and geology, archaeology, and history have drawn attention to the flexibility of our life in time. As larger vistas of the past have been opened up and have shattered conventional

ideas about its duration and effect on the present, so a new knowledge of the future is becoming possible. Gravitational astronomy is able to predict stellar movements, medical science continually improves its ability to diagnose, meteorology predicts the weather, and chemists forecast elements before they are discovered, as Clerk Maxwell announced the existence of rays before Marconi put them to use.

Until 1902 Wells's vision of the future was full of catastrophes and degeneration; later he began to foresee progress. His lecture included both. It concluded with the hope that the creative energies of life will overcome the catastrophes, but the lasting impression was an expectation of disaster: some poison from industry or outer space, an uncontrollable killer disease or predator, evolutionary degeneration, war, collision with a heavenly body, and if nothing happens earlier, the certainty that the sun will cool and its planets rotate ever more sluggishly "until some day this earth of ours, tideless and slow moving, will be dead and frozen."

Wells explored this last dismal prospect in his classic of 1895, *The Time Machine*. Its hero, the Time Traveller, invents a machine in which he is able to slip like a vapor through the interstices of intervening substances and travel into the future. He stops in the year 802,701 and discovers the Eloi, a beautiful people living on fruit and playing all day long, seemingly without a care in the world. But they do fear the dark and the Morlock, a "bleached, obscene, nocturnal Thing" that lives underground and supports the Eloi only to harvest them for food in raids on moonless nights. The Time Traveller concludes that the opposition between capitalist and laborer had led to this radical differentiation between the Eloi and Morlocks, who had evolved physically into different species, occupied different living spaces, acquired different character traits, and lived in perpetual fear of one another though they were mutually interdependent for survival. It was, he reflects, a "working to a logical conclusion [of] the industrial system of today."

For Wells the most disturbing thought about the future was that man is not the end of all things, and the most fascinating speculation was about what is to come after. He ventured an answer in a chapter called "The Further Vision." Fleeing an attack by the Morlocks, the hero traveled into the future and stopped at the edge of a sea. But there were no waves. The work of tidal drag was done and the earth had ceased to rotate. The sun hung motionless on the horizon, swollen and red because the earth had drawn closer. The only vegetation

was a "poisonous-looking" cover like forest moss that lived in perpetual twilight, and the only animals were enormous crabs smeared with algae. When one attacked him, the Traveller sped on to his last stop, thirty million years hence, where he was horrified by an eclipse of the sun as one of the inner planets passed near the earth. There was a slight rippling from the sea but beyond that an uncanny silence, and when the eclipse was complete, it grew cold and black. That desolate scene sated his curiosity and he returned to his own time.

The story is a compendium of nineteenth-century theory projected into the future. Marx's vision of the growing stratification of classes is magnified in the conflict between the Eloi and the Morlocks. Eugenics is represented by the breeding of the Eloi. The ideal of preventive medicine is achieved since all disease is eradicated; the erosion of the family that many feared in Wells's time is complete; and the sexes have grown to look alike. The *fin-de-siècle* preoccupation with the decadence of mankind, summarized in Max Nordau's *Degeneration* (English translation, 1895), is vividly represented by the helpless, effete, and self-indulgent Eloi and the physically degenerate and cannibalistic Morlocks. Charles Darwin's theory is there, but in reverse—a devolution of the species from human beings back to giant crabs and then to a creature so elementary that Wells did not bother with his usual detailed description—merely "a round thing" with tentacles trailing behind it. George Darwin's prediction of the cessation of the earth's rotation from tidal drag and Kelvin's prediction of a cooling of the sun have come to pass. Wells utilized current speculation about the fourth dimension for an explanation of the way the Time Traveller slipped through the interstices of matter, and the time machine itself is a symbol of the hope of all technology to accelerate the processes of change.

Wells looked ahead again and again. In *When the Sleeper Wakes* (1899) the hero emerges from a cataleptic trance of 203 years and discovers an amazing technology in the service of big government that tyrannizes its subjects. Collective life has swallowed up all privacy and cities have become prisons. The story laments the passage of the character traits and social institutions that Wells valued and saw on the decline in his own day—individuality and privacy, the rivalries and jealousies of the middle classes, and the "strong barbaric pride" of the lower classes. The hero's reflections point to a moral: "It seemed to him the most amazing thing of all that in his thirty years of life he had never tried to shape a picture of these

coming times. 'We were making the future,' he said, 'and hardly any of us troubled to think what future we were making.' "7 He who does not contemplate the future is destined to be overwhelmed by it.

In *Anticipations* (1901), an ambitious essay in prophecy, Wells promised to follow a scientific method of forecasting and speculate from the trend of present forces. The reader will be a "prospective shareholder" in this sketch of the future that begins with some probable developments in land locomotion. As the railroad dominated the nineteenth century, the "explosive engine" will dominate the twentieth. There will be paved roads and "conspicuous advertisements" by the roadside; there will be traffic jams as motor vehicles replace pedestrians in the towns. By the year 2000 London will extend to Wales, and in the United States there will be a continuous city from Washington to Albany. Improvements in telephone and postal service will make possible a diffusion of talents to the suburbs. "The businessman may sit at home in his library and bargain, discuss, promise, hint, threaten, tell such lies as he dare not write, and, in fact, do everything that once demanded a personal encounter." The future will alter the "method and proportions" of human undertakings and the "grouping and character" of society. Three new classes will emerge: unskilled workers displaced by machines, technically trained people who can work them, and shareholders who do nothing.

Some of his predictions about future wars were memorably in error, notably that the submarine would do little more than suffocate its crew and founder at sea, or that the airplane would not seriously modify transport or communication. Although he got the vehicle wrong, he was right on the strategic impact of aerial warfare, which he thought would be conducted from balloons. "Stalked eyes," equipped with telephonic nerves, would hang above the front lines, observe enemy troop movements, direct artillery fire, drop explosives, and demoralize the enemy. He predicted the future of land warfare as though he had journeyed in his time machine and witnessed the battle of the Somme. He forecast the rifle with cross-thread telescopic sights and a machine-gun breech that will enable it to fire a spray of "almost simultaneous bullets." Wells's most famous prediction was the tank, called a "land ironclad," that could move fire power through no-man's-land, protect men from machine gun bullets, and tear apart barbed wire. Machines will also be used to dig miles of trenches. There will no longer be a sharply focused battlefield or a "Great General" observing from the field. Instead

somewhere in the rear a "central organizer" will direct operations along a vast front from a telephone center. At times Wells wrote as though he could smell the battle and feel the percussion of exploding shells. "For eight miles on either side of the firing lines—whose fire will probably never altogether die away while the war lasts—men will live and eat and sleep under the imminence of unanticipated death."⁸

The impulse to look ahead is universal, but the quantity of science fiction in this period and its success in the market place suggest that this generation was especially eager to do it. In America, Edward Bellamy's *Looking Backward*, a vision of the future in spite of its misleading title, was an immediate success. It sold 213,000 copies within two years of its publication in 1888 and initiated what one historian has called an "outburst of literary utopianism."⁹ Some authors saw the future as a nightmare—dystopias with destructive volcanos, killer diseases, and maniacal rulers who held people captive with fantastic new contraptions.¹⁰ Others looked forward to happier utopias with less drudgery, cheaper goods, and clean, safe cities. Still others saw mixtures of progress and degeneration, islands of care-free pleasure and oppressive technocracies.

The Futurists were not troubled by any ambivalence. They created a kind of science fiction of their own out of the latest of everything in artistic works that squeaked from newness. Marinetti's "Founding Manifesto" of 1909 traced the birth of the movement. After a night of frenzied scribbling and brooding over their ennui, he and his friends were drawn outside by the sounds of the city rising. The creaking of the bones of "sickly palaces" was interrupted by the roar of automobiles, and they set off to shake the gates of life. Their rush into the unknown led first into a ditch. But some fishermen rigged a derrick to pull them out, and as their automobile revved up again Marinetti proclaimed their objective: "We intend to sing the love of danger, the habit of energy and fearlessness." Here is fixation on change. "We stand on the last promontory of the centuries! . . . Why should we look back, when what we want is to break down the mysterious doors of the Impossible? Time and Space died yesterday. We already live in the absolute, because we have created eternal, omnipresent speed."¹¹ They will surge into the future at full throttle—innovating, challenging, and occasionally going smash. In a manifesto of 1910 they linked the progress of science and their orientation toward the future. "Comrades, we tell you now that the triumphant progress of science makes profound changes in humanity

inevitable, changes which are hacking an abyss between those docile slaves of past tradition and us free moderns, who are confident in the radiant splendour of our future."¹²

The Futurists strained the limits of traditional genres to create new forms. Enrico Prampolini defined "a new state of perception" among human beings—chromophony—the colors of sounds. Carlo Carrà announced a new painting of sounds and smells. Luigi Russolo called for a "music of noises" composed from backfiring motors, squealing electric trams, and the howl of mechanical saws sounding to such diverse rhythms as tapping valves and the irregular noises of city life. Sculptors were to fabricate wild shapes and integrate empty space in compositions out of ever new materials. Futurist theater jumped out at the audience and drew it into the action. Futurist paintings showed the new dynamics and technology of daily life. Traditional activities—running, swimming, descending a staircase—are "futurized" by depicting moving objects and the currents of water and air streaming off them. In Boccioni's *Dynamism of a Cyclist* (1911) man, cycle, and air interpenetrate in a composition of abstract volumes and lines of force, pumping limbs, and swirling eddies of light and air. However, the technology in these works is the current model—no time machines and, in spite of their praise of war—no ray guns. Bragaglia's multiple-exposure photograph of *The Typist* (1912) is very much of this world, and the Futurist content in Boccioni's *Train in Motion* is not a supercharged monorail but his innovative technique of showing movement.

The most explicit picture of a future world was drawn by the Futurist architect Antonio Sant'Elia. His manifesto of 1914 began with an attack on contemporary architecture and its "hilarious salads" of Egyptian pilasters, Gothic arches, Renaissance cherubs, and rococo scrolls.¹³ The new construction should use modern materials and be responsive to the needs of contemporary life and the aesthetics of modern technology. Instead of wood, stone, and brick, architecture will exploit steel, glass, cardboard, reinforced concrete, and textile fibers. The Futurist house must be like a gigantic machine, the city like a dynamic shipyard. Streets must no longer lie dormant at ground level but plunge into the earth to hold traffic and link up with moving pavements. Roofs and underground spaces must be utilized and walkways flung high above ground. Elevators must no longer be hidden like tapeworms in the bowels of buildings but be accessible and visible on the outside of façades. The purely decorative must be abolished. "Fussy moldings, finicky capitals, and flimsy doorways"

must give way to bold groupings of masses with bare or violently colored surfaces. The Futurists aim at an abandonment of the heavy and static for the light, practical, and swift. Whenever possible, emotive elliptical and oblique lines will replace rigid horizontals and perpendiculars; the "artificial" aesthetic of the mechanical world will replace the "natural" aesthetic of the past.

To identify the distinctive thought of any age, the cultural historian is on the lookout for ideas that are entirely new, like the one proposed in the final paragraph of Sant'Elia's manifesto. "From an architecture conceived in this way no formal or linear habit can grow, since the fundamental characteristics of Futurist architecture will be its impermanence and transience. Things will endure less than us. Every generation must build its own city." In earlier versions this was missing, and most likely it was added by Marinetti to bring Futurist architecture in line with the Futurists' commitment to a continually evolving, ephemeral art that would never become like the museum pieces they excoriated. According to Carrà, Sant'Elia disapproved of this statement but allowed it to remain in conformity with the larger Futurist program.¹⁴ Imagine the pressure that would lead an architect to put his name to the first formal commitment to build buildings that would fall apart. Sant'Elia's compliance evinces the Futurist addiction to change, born in an age in which change had become routine and the future seemed more within the active control of mankind than ever before. The recommendation that every generation build its own city shows that someone thinks it can. Sant'Elia's drawings for his city provided a blueprint, but no buildings were ever built and he was killed in 1916. The Futurist architectural program that every generation would have to rebuild itself was more true of its thinkers than of anything they ever built.

The philosophy of the future of this period was an emphatic repudiation of a body of deterministic thought that had been building for a century from its foundation in the naturalistic determinism of Pierre Laplace. With a spectacular show of ambitiousness, at the beginning of a century that was spectacularly ambitious about the possibilities of reason and science, Laplace speculated that the future is determined in the present state of matter in the universe. "An intellect which at a given instant knew all the forces acting in nature, and the position of all things of which the world consists—supposing the said intellect were vast enough to subject these data to analysis—would embrace in the same formula the motions of the greatest

bodies in the universe and those of the slightest atoms; nothing would be uncertain for it and the future, like the past, would be present to its eyes."¹⁵ Throughout the nineteenth century this was the goal, if not the achievement, of science. Bergson charged that it denied time and freedom by rolling up the future in the present the way the end of a film is already determined at the start of the reel. He conceded that the isolation of phenomena in closed systems for purposes of analysis is not entirely artificial, because matter has a tendency to constitute isolable units, such as the solar system, which, to a degree, conforms to regular laws. But it is only a tendency. Gravitational forces attract the solar system to the rest of the universe and draw it into a future of endlessly new orbits and configurations. And to whatever limited extent inorganic matter may be suited to such analytical reduction, organic matter is less so. Scientists think they can measure lived time and then compare measured intervals to derive laws of change. But they are wrong, like those people who believe that their life could be unfurled like a fan, open to view at a single glance. In reality it unfolds in time very differently, as Bergson put it in the opening pages of *Creative Evolution*. "If I want to prepare a glass of sugared water, try as I may, I must wait until the sugar melts. This little fact is of great significance." The time I have to wait through is not the same as the interval that can be measured mathematically, because that interval is completed before the measurement is made and therefore different from what I live through. Time as I live it "coincides with my impatience." That waiting constitutes its essence and ensures my freedom. Without it the future unfolds as something already known and we are locked in determinism. Science seeks to discover laws and predict the future, but human experience is an uncertain chain of events in time.

Bergson was joined in his insistence on the importance of that uncertainty by the eminent French physicist Emile Meyerson, who considered the problem in a famous chapter provocatively titled "The Elimination of Time."¹⁶ Meyerson indicted the tendency of modern science to eliminate time by the identification of cause and effect symbolized in the equal sign of an equation. This operation is based on the principle of conservation of matter and energy—that in any phenomenon nothing is created, nothing lost—and the postulate of reversibility—that in any causal action "the integral effect may reproduce the entire cause or its equal." Natural phenomena such as aging or burning wood are irreversible. Chemical reactions are also irreversible, but "chemical equations are the expression of the ten-

dency to identify things in time; one can say 'to eliminate' time." If science succeeded in describing everything with an equation, in identifying antecedent and consequent, nothing would change, time would be refined out of science, and the future would become a necessary consequence instead of a promise of surprise. It would be "the confusion of past, present, and future—a universe eternally immutable." He conceded that this complete identification of everything in an equation is impossible, but it is a goal. Modern science has not entirely eliminated time but cannot stop trying.

The French philosopher Jean Guyau made another argument on behalf of an active sense of the future by deriving our sense of time itself from it. To make this argument Guyau reversed Kant's theory that our sense of time is an *a priori* form of perception that makes all experience possible. Instead, Guyau derived the sense of time out of activity and the future orientation of experience. In *The Genesis of the Idea of Time* (1890) Guyau held that our idea of time is a product of evolution and the psychological development of the individual. His theory is anchored in human physiology. The child experiences hunger and reaches out for the nurse—that is the germ in our idea of the future. Bodily needs generate desire, the memory of former satisfactions generates a conception of the possibility of future satisfaction, and the individual prepares to gratify the desire with intentional activity oriented ahead of itself in space and toward the future in time. Thus out of desire and activity the idea of the future and our whole sense of time originates. This is a philosophy of the future in the active mode: "The future does not come toward us, but it is that toward which we move."¹⁷

Guyau and Bergson have left vivid images of the active and passive modes of the future—reaching out for a nurse and waiting for the sugar to melt. However, both saw the future as a combination of the two. Guyau insisted on a "passive form of time," a substratum of continuity against which change can be observed. This is not just a passive orientation toward the future; it suggests that the entire experience of time is an integrant of passivity and activity, permanence and change. Bergson's impatience is waiting with an active edge, like a sprinter in a starting block. Bergson understood that the experience of the future is a mixture of the active and passive modes, but the emphasis is on the link between freedom and action: we become freer the more we feel "our whole personality concentrate itself in a point, or rather a sharp edge, pressed against the future and cutting into it unceasingly."¹⁸ The two shared the central idea that an open

future is the source of human freedom and with Meyerson defended it against naturalistic determinism and the ubiquitous equal sign of modern science.

In spite of all their utopian tracts and projects for future change, social and political thinkers in the nineteenth century did not explore the social or historical basis of the experience of the future as such. The revolutionary movements of the nineteenth century had always held the promise of a better world as justification for the destruction of the present; the great problem was how to get people to act. For decades socialist leaders fought over tactics, while the rank-and-file members languished in chronic inaction. By the early twentieth century it was clear that analyses of the evils of capitalism, calculations of the benefits to accrue from socialism, and incantations of the rightness and inevitability of revolution would not budge them off the rock of the status quo. It took the starvation, killing, and general madness of World War I to get rid of the Romanovs, after all, and without such disruption to shake the stability of old regimes, revolutionary movements were stymied. Socialist revolutionaries shared the Marxian notion of the future as a triumph of socialism. They had a vision of the future but no concept of it, no explicit analysis of its motivating power independent of its content. Only one radical theoretician before the war made such an analysis. Faced with working class inaction, the French syndicalist Georges Sorel developed a tactic of action-for-action's-sake that relied on the creation of an inspiring vision of, and dynamic movement toward, the future.

A pioneer of social psychology, Sorel conceived of political action as theater and believed in the necessity of creating a sense of urgency, a movement toward climax, that would give the workers a profound and lasting impression of revolution. He drew from Bergson's theory that intuitive knowledge was superior to analytical knowledge and worked out a plan by which workers would intuit socialism as a whole, instantaneously, in the drama of a general strike. To get them to act leaders must create an anticipation of the future in the form of a myth embodying their hopes. Sorel theorized: "Without leaving the present, without reasoning about the future . . . we should be unable to act at all. Experience shows that the framing of a future, in some indeterminate time, may, when it is done in a certain way, be very effective."¹⁹ The idea of framing a future for mass manipulation of workers ran counter to orthodox Marxism. For Marx workers embodied the future: action was to come from class consciousness generated out of struggle with the present. For Sorel it

was to come from a deception of workers with a myth about the future. Sorel's modification was a lone, but distinctive, voice on behalf of an active appropriation of the future in politics. Nothing was inevitable: everything was up for grabs, and effective political action required a vivid sense of the future, whatever the cost to the integrity of the movement.



The new technology, the science fiction, Futurist art, and revolutionary politics looked at the future like a predator eyeing its prey. It was an age for planners and go-getters: for the great tomorrow of the Carnegies and the Rockefellers, anarchist terrorists and Bolshevik revolutionaries, the German Navy and the new Russian Army. But in contrast to all this active mobilization for the future some people voiced passivity and fatalism, focusing their thoughts on the concept of degeneration. Its spokesmen anticipated deterioration of the quality of urban living, breakdown of health, decline of Western civilization, extinction of life on the planet, and ultimately depletion of energy in the universe. Although the imminence of these catastrophes varied considerably, they tended to group in a single dreadful vision. Although they derived from the past, they were projected ahead into a threatening future.

The bad news in physics broke in 1852 with William Thomson Kelvin's essay "On a Universal Tendency in Nature to the Dissipation of Mechanical Energy," which predicted the death of the earth from heat loss as a result of the second law of thermodynamics—that the amount of energy available in the universe for useful work is always decreasing as entropy (randomness or disorder) increases. "Within a finite period of time past the earth must have been, and within a finite period of time to come the earth must again be, unfit for the habitation of man as at present constituted, unless operations have been, or are to be performed, which are impossible under the laws to which the known operations going on at present in the material world are subject."²⁰ The discovery of radioactivity in the 1890s forced Kelvin to revise his estimate of the age of the earth, but the implications of the second law of thermodynamics for the future were unchanged. Although the earth would not become unfit for human habitation until the far distant future, this prediction became the "nucleus of a number of gloomy biological, social, and historical

theories of contemporary degeneration: the blood of the race was becoming progressively polluted by an accumulation of diabetes, tuberculosis, syphilis, and alcohol; the intimate organic communities of the good old days were deteriorating into mechanistic societies, impersonal big cities of crime, suicide, and insanity; and civilization was heading toward spiritual collapse. Brooks Adams envisaged degeneration from the coming domination of capital, which he predicted in *Law of Civilization and Decay* (1895), and Oswald Spengler chronicled the crisis of the soul of the modern era in *The Decline of the West* in 1918.

Spengler's work is a sprawling history of the life and death of cultures, each interpreted under a unifying principle or "destiny-idea." Thus the classical world was Euclidean—spatially extended, atemporal, centered in the polis, and visibly symbolized by monumental architecture. The modern era is characterized by the restless striving of the Faustian soul and is inherently temporal. It began with the discovery of the mechanical clock and eventually produced the pocket watch that accompanies the individual to remind him constantly of his temporal existence. The drama of Spengler's message is prepared by his emphasis on the importance of a sense of the future in the modern world. While the classical world bowed in "submission to the moment," the modern world has an "unsurpassably intense Will to the Future." Western culture glorifies hard work as "an affirmation of Time and the future," and with its meaning embodied in the future, it is particularly sensitive to the pessimistic vision that Spengler sketches.

The modern age is suffering from the consequences of the rule of money allied to political democracy, but this alliance will not hold against the coming of Caesarism. Western culture labors under the tyranny of reason and the cult of science but has not produced any genius since Gauss and Helmholtz. In physics it is experiencing "the *decrecendo* of brilliant gleaners who arrange, collect and finish off." After the impressionists Spengler can find no painters; after Wagner, no musicians. But the main cause for alarm comes from nature itself. The discovery of the law of entropy in the 1850s and of atomic disintegration in the 1890s has given the life-sustaining energy of our world a time limit. Inorganic matter has acquired a perishability previously reserved for living matter, and it is heading for a period of steady decline. "What the myth of *Götterdämmerung* signified of old, the irreligious form of it, the theory of Entropy, signifies today—*world's end as completion of an inwardly necessary evolution.*"²¹

The timing of the publication of this book in Germany in the af-

termath of military collapse accounts for a large measure of its impact. The war seemed to show that Western civilization was worn out, and the book captured the sense of powerlessness, of passivity, that many experienced at that time. The dynamics of thought and emotion cluster in opposites. In an age of energy, while many sensed the great promise of things to come, others dreaded it and felt helpless. For all who thought that the future was theirs to control, there were those like Spengler, who braced for catastrophe, and the characters of Thomas Mann's *The Magic Mountain*, who spent the years from 1907 to 1914 waiting to die.

In 1912 Mann visited his wife at a sanatorium in the Swiss Alps where she was being treated for tuberculosis. He developed a cold and was advised by the doctors to stay, but left and began writing a story about his experience that swelled into an immense novel completed only twelve years later. *The Magic Mountain* is about Hans Castorp, who visits his cousin Joachim in a tuberculosis sanatorium, intending to stay for three weeks, and winds up staying seven years. Mann draws us into this community as Hans was drawn into its seductive monotony. Against the austere backdrop of Alpine sky the patients pace about, their coughs cutting the silence of the thin air. We follow Hans through the corridors, eavesdropping on discussions about a myriad of subjects including the nature of time, the past, and the present. The novel thus recapitulates the ideas surveyed in the first three chapters of this book and offers a vision of the future in the passive mode for the patients who helplessly awaited the progress of their disease as they did the daily routine of measuring temperature and sipping soup.

Both *The Decline of the West* and *The Magic Mountain* were conceived before the war, worked on during it, and published after. They spanned the period and sought to identify what it signified. Spengler's characterization, mired in cultural pessimism, was of a twilight of the Faustian soul. Mann ingeniously reconstructed the diplomatic community of Europe in the fictional community of the Berghof: explosive, feverish, constantly taking its temperature, struggling from one crisis to the next, with patients separated along national lines at their dining tables. And, as we would expect in a retrospective view of an age leading up to war, they were portrayed waiting for it to happen. Difficult as it is for contemporary historians to keep in mind that the "prewar" period did not become prewar until after war broke out, it was impossible for Mann or Spengler to conceive of it in any other way in the immediate "postwar" period when they completed their works.

Although Mann's narrative moves ahead with surprises for the reader, the characters anticipate only more of the same, and the dominant mode of their future is passive expectation. The patients at the Berghof curled up in their lounge chairs and awaited the onslaught of disease as, a few years later, front line soldiers would curl up in their fox holes and await the burst of artillery shells. When Hans saw an x-ray of his own hand, he had a gloomy vision of a future of endless waiting. For the first time in his life he understood that he would die, and all that remained in the time ahead was to "measure, eat, lie down, wait, and drink tea."²² The waiting, Mann explained, actually accelerates the passage of time: it consumes large chunks of it like a greedy man whose digestive tract processes great quantities of food without absorbing its nutritional value. Undigested food does not make him any stronger; time spent waiting makes him no wiser. The patients just waited and grew old. Some died and some recovered, but the end brought no resolution. The thunderclap of war shook Hans off the mountain, but he disappeared into the front lines, lost amid the shelling and killing as formerly he was lost amid the coughing and dying. Europe was finally choking to death after years of waiting.

The novel, like Spengler's history, contrasts with and sets off the active mode of the future that dominated the thinking of the age. But for all the age's hopeful action and aggressive, prospective thinking, there was also passivity and caution. The dialectic of thought and experience presented a mixture of contrasts. The telephone and assembly line accentuated both active and passive modes of the future. Henry Adams felt exhilarated by the dynamo, but it also broke his neck. Wells's *Time Traveller* sailed ahead assuredly with the aid of the new technology but found a world of stagnation and degeneration. Among these contrasts there are no simple syntheses, but we can identify the terms of discourse and get a sense of what people thought and why they acted. This generation had a strong, confident sense of the future, tempered by the concern that things were rushing much too fast. The *Titanic* symbolized both. It is appropriate that Hans was studying engineering before he came to the Berghof and spent his time reading a book called *Ocean Steamships* during his first months there. One of the patients, Settembrini, compared the lives of the patients with the voyage of an ocean liner, and, considering Mann's symbolic intention, the comment also applied to Europe before the war. The comfort, the luxury, the hubris of tempting fate and controlling the wild elements was a triumph of the human spirit, a "victory of civilization over chaos," but envious gods may take

swift revenge and wreck the luxury liner. And, he asked Hans, "are you not afraid of the hurricane which is the second circle of the Inferno" that whips and whirls those who sacrifice reason to desire? Settembrini concluded his argument with a suggestive image of Hans, like a small boat, "flapping about in the gale, head over heels"²³ (The *Titanic* went down in a calm sea, but her stern did flip straight up in the air before the final plunge.) The age had its doubts and hesitations, but it was essentially characterized by hubris that ignored the warning messages and pushed the throttle full speed ahead.

5

S P E E D

In 1897 Germany embarked on a policy of *Weltpolitik* and began to build a battle fleet to challenge British control of the seas. That same year the German passenger steamer *Kaiser Wilhelm der Grosse* took away from the British Cunard line the Blue Riband for the fastest Atlantic crossing. In 1903, with its national prestige at stake, the British government subsidized the construction of a vessel capable of reaching 25 knots and beating the German record. The Cunard yards produced the *Lusitania*, which regained the Blue Riband in 1907 and re-

4. The Future

1. Eugène Minkowski, *Lived Time: Phenomenological and Psychopathological Studies* (Evanston, 1970), 6, 87-88. Walter Lippmann saw America in 1914 as having two possible modes of moving into the future: it could continue the current "drift" or struggle to achieve a new, active mode of "mastery." These contrasting modes were prominent in his title, *Drift and Mastery: An Attempt to Diagnose the Current Unrest* (New York, 1914), and were elaborated throughout the text.

2. Herbert N. Casson, *The History of the Telephone* (Chicago, 1910), 231.

3. See next chapter for a discussion of Taylorism.

4. Cited in William L. Langer, *The Diplomacy of Imperialism* (New York, 1935), I, 78.

5. Henry Adams, *The Education of Henry Adams* (1907; rpt. New York, 1931), 382.

6. Published in *Nature*, 65 (February 6, 1902): 326-331.

7. E. F. Bleiler, ed., *Three Prophetic Novels of H. G. Wells* (New York, 1960), 142, 41.

8. H. G. Wells, *Anticipations of the Reaction of Mechanical and Scientific Progress Upon Human Life and Thought* (1901; rpt. London, 1914), 2, 46, 59, 32, 184. For another unusually accurate prediction of the future of warfare see I. S. Bloch, *The Future of War in Its Technical Economic and Political Relations* (1897; rpt. New York, 1899).

9. Kenneth M. Roemer, *The Obsolete Necessity: American Utopian Writings 1888-1900* (Kent, Ohio, 1976), 4. He surveyed 160 such works that appeared between 1888 and 1900 and concluded that during this period the utopian novel was one of the most widely read types of literature in America.

10. Mark R. Hillegas, *The Future as Nightmare: H. G. Wells and the Anti-Utopians* (Carbondale, Illinois, 1967).

11. F. T. Marinetti, "The Founding Manifesto of Futurism" (1909), in *Futurist Manifestos*, ed. Umbro Apollonio (New York, 1973), 19-24.

12. Umberto Boccioni, Carlo Carrà, Luigi Russolo, Giacomo Balla, Gino Severini, "Manifesto of the Futurist Painters" (1910) in *ibid.*, 24-25.

13. Antonio Sant'Elia, "Manifesto of Futurist Architecture" (1914), in *ibid.*, 160-172.

14. Marianne W. Martin, *Futurist Art and Theory 1909-1915* (Oxford, 1968), 190.

15. Pierre Laplace, quoted in Milič Čapek, *Bergson and Modern Physics* (New York, 1971), 122.

16. Emile Meyerson, *Identity and Reality* (1908; rpt. New York, 1962), 215-231.

17. Jean Guyau, *La Genèse de l'idée de temps* (Paris, 1890), 44.

18. Henri Bergson, *Creative Evolution* (1907; rpt. New York, 1944), 220.

19. Georges Sorel, *Reflections on Violence* (1906; rpt. New York, 1961), 124-125.

20. William Thomson, "On a Universal Tendency in Nature to the Dis-

sipation of Mechanical Energy," *Philosophical Magazine*, 4 (1852): 304, cited by Stephen G. Brush, "Science and Culture in the Nineteenth Century: Thermodynamics and History," *The Graduate Journal* (Spring 1967): 494. See also Jerome Buckley, "The Idea of Decadence" in *Triumph of Time* (Cambridge, 1966), 67. Thomson repeated this formulation forty years later in "On the Dissipation of Energy," *Fortnightly Review* (1892): 313-321.

21. Oswald Spengler, *The Decline of the West* (1918; rpt. New York, 1929), I, 129, 134, 137, 423-424.

22. Thomas Mann, *The Magic Mountain* (1924; rpt. New York, 1966), 219.

23. *Ibid.*, 356-357.

5. Speed

1. Robert Ensor, *England 1890-1914* (Oxford, 1936), 278-279, 505.

2. Geoffrey Marcus, *The Maiden Voyage* (New York, 1969), 289-291.

3. Lawrence Beesley, *The Loss of the SS. Titanic* (New York, 1912), 237.

4. Critics cited by Richard O'Connor, *Down to Eternity* (New York, 1956), 186-190.

5. Morgan Robertson, *Futility* (New York, 1898), 1, 3, 4, 29.

6. Karl Lamprecht, *Deutsche Geschichte der jüngsten Vergangenheit und Gegenwart* (Berlin, 1912), I, 171.

7. Georg Simmel, "The Metropolis and Mental Life" (1900), in *The Sociology of Georg Simmel*, ed. and tr. Kurt H. Wolff (New York, 1950), 409-424.

8. Joseph B. Bishop, "Social and Economic Influence of the Bicycle," *The Forum* (August 1896): 689.

9. Sylvester Baxter, "Economic and Social Influences of the Bicycle," *The Arena* (October 1892): 583.

10. Ch. Du Pasquier, "Le Plaisir d'aller à bicyclette," *Revue scientifique*, ser. 4, vol. 6 (Paris, 1896): 145.

11. Paul Adam, *La Morale des sports* (Paris, 1907), 449-450.

12. Maurice Leblanc, *Voici des ailes!* (Paris, 1898), 19, 65, 77, 108, 145, 147.

13. Octave Mirbeau, "La 628-E8" (Paris, 1908), 6-7, cited in Pär Bergman, "Modernolatry" et "Simultaneità" (Uppsala, Sweden, 1962), 17.

14. Cited in William Plowden, *The Motor Car and Politics 1896-1970* (London, 1971), 47.

15. *The Times*, London, April 14, 1914, 6.

16. Edward W. Byrn, *The Progress of Invention in the Nineteenth Century* (New York, 1900), 56.

17. Harold I. Sharlin, "Electrical Generation and Transmission," in *Technology in Western Civilization*, ed. Melvin Kranzberg and Carroll W. Pursell Jr. (New York, 1967), I, 583.

18. John Brooks, *Telephone: The First Hundred Years* (New York, 1975), 115. In a short story, "In the Year 2889," Jules Verne envisioned an electronic computer, a "Piano Electro-Reckoner," *The Forum*, 6 (1888): 676. Georg Simmel, in "Die Bedeutung des Geldes für das Tempo des Lebens," *Neue*