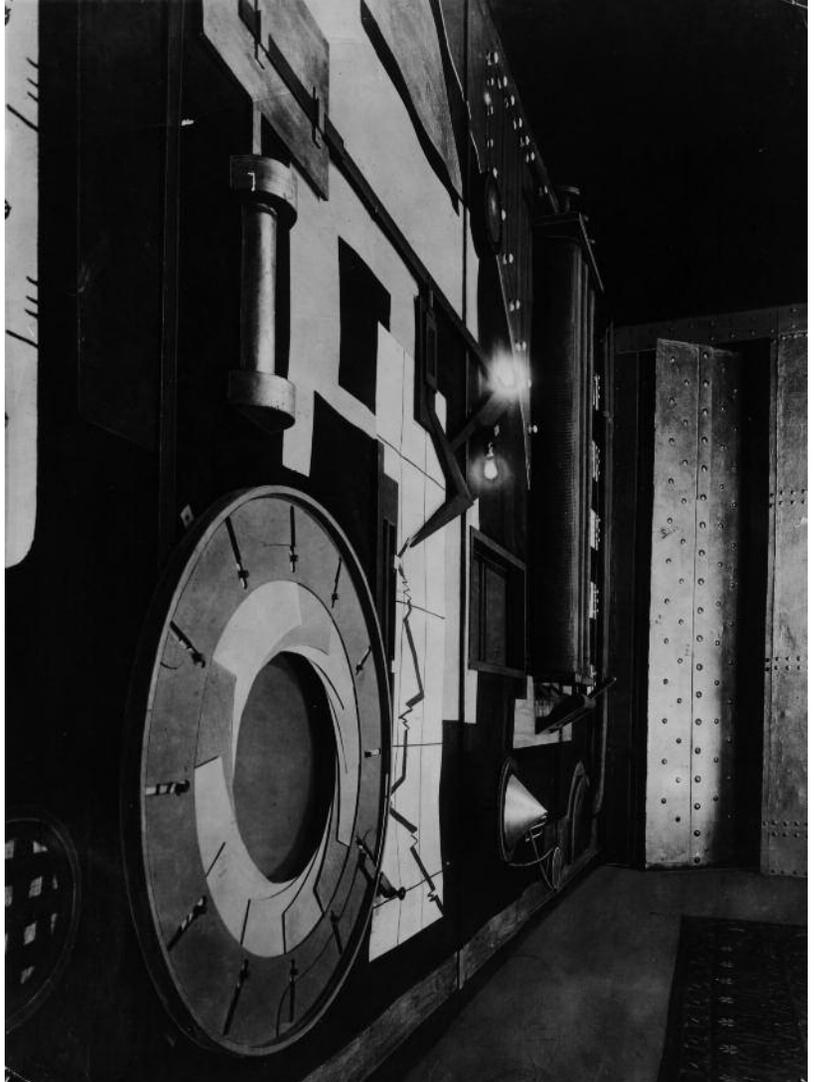


Frederick Kiesler. Scenery for  
*R.U.R.*, Berlin, 1923. © 2012  
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Kiesler Private Foundation,  
Vienna.



# An Audience of the Scientific Age: *Rossum's Universal Robots* and the Production of an Economic Conscience

JAMES D. GRAHAM

*If all those leaps of attention, flexings of eye muscles, fluctuations of the psyche, if all the effort it takes for a man just to hold himself upright within the flow of traffic on a busy street could be measured, he thought—as he toyed with calculating the incalculable—the grand total would surely dwarf the energy needed by Atlas to hold up the world, and one could then estimate the enormous undertaking it is nowadays merely to be a person who does nothing at all.*

—Robert Musil, *The Man without Qualities*<sup>1</sup>

On March 29, 1923, Berlin's Theater am Kurfürstendamm saw the German premiere of Karel Čapek's *R.U.R.* (1921), a play that rapidly garnered international interest.<sup>2</sup> German and English translations would be published that same year, and the broad appeal of the play—this “first dramatic importation from our new world neighbor,” as one critic wrote—introduced Europe and America to the literary potential of the young Czechoslovakia, still only four years removed from proclaiming its independence from the Austro-Hungarian Empire.<sup>3</sup> Čapek's first theatrical foray into science fiction, the play describes a world in which humanity is freed from work by an organically engineered population of robots, bringing about a series of unwanted consequences that reflect the then-ongoing upheavals of an emerging postempire Europe. Ambitiously wide-ranging in its technological and social scope, *R.U.R.*'s heady amalgam of science, industry, politics, and culture—sometimes whimsical, sometimes didactic—displays Čapek's unease with the modernist rhetoric of technological emancipation, widespread in the avant-gardes of the interwar period. In this regard, Čapek's evident allegory sits comfortably with plays such as Ernst Toller's *The Machine Wreckers* and

Georg Kaiser’s *Gas* of the years before, both of which tempered the prevailing currents of technoeuphoria by pointing to the capitalist militarism that lay latent in the mechanization of labor.<sup>4</sup> Harnessing the political energies and anxieties of the early 1920s—Czechoslovakia was then framed by the still-struggling Weimar Republic to the west and the ongoing civil war between the Reds and Whites to the east—the play’s explicitly antirevolutionary polemic and skeptical eye toward scientific rationalism made it a compelling and quickly embraced account of an unsettled social and political milieu.

If the German staging of *R.U.R.* signified a turning point for Čapek’s and Czechoslovakia’s literary reputations abroad—one critic wrote of the Berlin opening that “it seems that Čapek will succeed in leading us to Europe”—it was equally so for the Viennese architect and soon-to-be theatrical designer Frederick Kiesler.<sup>5</sup> *R.U.R.* would be his first opportunity to test a set of ideas about spectatorial psychology and the incorporation of media technologies into the theatrical arena, themes that would resonate through the following decades of his work. The play likewise marked his point of entry into the still-emerging design culture of Weimar Germany.<sup>6</sup> Kiesler’s staging was technically groundbreaking and indicative of his wide-ranging disciplinary proclivities, drawn from such intellectual discourses as the *Neue Sachlichkeit* and American pragmatist philosophy, and the production quickly assured him a privileged status in the avant-garde theater. Scantly documented by only three surviving photographs and no known drawings, the German *R.U.R.* nevertheless stands as a critical and innovative moment in Kiesler’s brief European career, which ended with his departure for the United States in December 1925.<sup>7</sup> His experience with *R.U.R.* significantly reoriented that career, and the pairing of designer and playwright proved to be a conceptually productive one. The collectivist mandate of Čapek’s robots found a sympathetic parallel in Kiesler’s belief that in the theater “each spectator must lose his individuality in order to be fused into complete unity with the actors,” offering one starting point from which to consider this moment of exchange between literature and design, each evincing a psychologically materialist exploration of modern subjectivity.<sup>8</sup>

The term *robot* was coined in *R.U.R.* The acronymic title refers to a multinational corporation known as “Rossum’s Universal Robots” (a phrase that is always in English, even in the original Czech edition). Čapek’s brother Josef, who designed the covers for the Czech and German editions



of the play, invented the word as a play on *robota*, the Slavic root for *work*, which still carried the historical connotations of serfdom.<sup>9</sup> As a result, *R.U.R.* is consistently invoked for its etymological, rather than its conceptual, import. Most accounts imply that Čapek's use of the term stopped short of its full potential.<sup>10</sup> But the notion of the "robot" as rendered in *R.U.R.*, despite its quick and wholesale absorption into the technological realm, is considerably more suggestive than its current usage implies. Subsequent renditions of the play (including the inaugural American production) regularly transformed Čapek's vision of an organically derived robot into a more machinic device. In a Belgian staging of 1928, for example, the robots were portrayed as "steel automata" (the description used by the production's designer), despite the fact that the metallic humanoids misinterpreted the central polemic of the play. Even in 1928, seven years after *R.U.R.*'s Czech premiere and just a year after the release of Fritz Lang's *Metropolis*—whose Maria is the iconic automaton of the modernist moment—the cartooned anthropomorphism of these mechanized suits of armor bore no slight trace of anachronism.<sup>11</sup> Čapek, as well as Kiesler, was after something else.

In a scathing review of *Metropolis* in the *New York Times*, H.G. Wells called it "the silliest film" and complained that "Čapek's Robots have been lifted without apology."<sup>12</sup> But the film's economic vision received Wells's sharpest rebuke, and that criticism points to a central problem of dystopian fiction taking the factory as its dramatic milieu. "One is asked to believe that these machines are engaged quite furiously in the mass production of nothing that is ever used," Wells wrote. Without the widespread spending power of a purchasing class—beyond elites ensconced in Edenic (if decidedly postlapsarian) pleasure gardens—no wealth would be obtained from industry's incessant output. This founding principle of Fordism guaranteed for Wells that factory culture would tend toward broader social equity. "The hopeless drudge stage of human labor lies behind us," he wrote, chastising *Metropolis* for having a theory of production but not one of consumption. Furthermore, he claimed that the film showed not the plausibility but the *redundancy* of "mechanized man" in the age of mechanization more broadly. According to the principles of scientific management, the work of Lang's harried machine-minders would have been better executed by the machine itself. "It is the inefficient factory that needs slaves; the ill-organized mine that kills men," Wells protested. "With a sort of malignant stupidity this film contradicts these facts."<sup>13</sup>

Čapek's economic schema in *R.U.R.* (which involves a binary order of consuming bourgeoisie and producing robots) would fare somewhat better in Wells's analysis, and Čapek and Wells were mutual admirers. But fiscal

literalism does little to explain why these works entered the cultural imaginary of their moment with such force. No simple allegories (despite the often reductive morality that underpins both plots), these iconic visions posit a stylized future-already-here, sublimating the managerial positivism that was increasingly entrenched in the booming economies of industrial cities like Weimar Berlin. At issue in *R.U.R.* and *Metropolis* alike was the still recent marriage between the physiological science of work (popular in Europe in the nineteenth and early twentieth centuries) and the newly developed materialism of American industrial psychology. Mind and body were to be conjoined in a single science of the laboring subject, a parascience that went by the name of “psychotechnics” and swept through central Europe in the 1920s. Seen in this light, *R.U.R.* might be appraised not as the creation of an economy per se but as an instantiation of the prevailing “economic conscience.”

The phrase “economic conscience” appeared in Thorstein Veblen’s *The Theory of the Leisure Class* (1899) as a counterpoint to the “conspicuous consumption” and “competitive expenditure” through which one defines oneself as a personality within a capitalist system. This “economic conscience” is a shared one, a conservation-minded material austerity against which individual vibrancy, inherently wasteful, makes its appearance. “In order to meet with unqualified approval,” Veblen writes, “any economic fact must approve itself under the test of impersonal usefulness—usefulness as seen from the point of view of the generically human.”<sup>14</sup> That human beings might exist in generic form (not as identical bodies but as subjects made measurable according to a codified datum of “normalcy,” whether social, physical, or mental) was also a central supposition of psychological materialism. The inventor of the psychotechnical discipline, the German-American Hugo Münsterberg, would adopt this same notion of the “economic conscience” as an equation of efficiency with industrial responsibility, if not morality, that expanded from the factory to the state itself. “It is fresh in every one’s mind,” Münsterberg wrote in 1913, “how during the last decade the economic conscience of the whole American nation became aroused.”<sup>15</sup> Within another decade, as cities, factories, and social institutions were being rebuilt in the aftermath of the First World War, Europe’s economic conscience would likewise become aroused on a scale not previously experienced.

Čapek, in inventing the robot, was concerned with the experience of a quasi-human population under a flourishing regime of organizational science at a specific historical moment, not an abstract collective of machines. This is a considerably less fantastical premise than that of the singular, precious, and fully controllable automaton (as Rossum’s robot was sometimes mistakenly portrayed), which is an exercise in replication rather than regu-

lation. *R.U.R.*'s pointed refutation of the clockwork automaton—an invention already popularized by Thomas Edison's Hadaly, Pierre Jacquet-Droz's young draftsman, Jacques de Vaucanson's digesting duck, and the like—casts the robot less as an anthropomorphic device than as a bifurcated *homo oeconomicus*, a new configuration of social relations in which the production of desire and the production of commodities are divided into two distinct, but distinctly organic, figures.<sup>16</sup> This biologically orchestrated estrangement of consumption and labor is a technological issue, but one of subjectivity rather than machinery.

The implications of Čapek's play and Kiesler's staging of it are far more fertile than they might initially appear, as the robot recasts a familiar constellation of modernist discourses—the affective possibilities of industrial technology, the organizational management of labor, the rise of the space-time paradigm—as participants in the production (and aestheticization) of the interwar economic conscience. As the laboratory psychology of psychotechnics focused on the factory setting, reimagining the “generically human” workers inside, it simultaneously cast glances outward to an emerging global order constituted of networks of capital, human and otherwise, aligning the invention of the robot with a still-to-be-determined postwar world order. Even the theater—which was experiencing its own upheaval as cinema took command of the cosmopolitan spectator—was not immune to these changes. Kiesler was uniquely instrumental in introducing many of these ideas to the theatrical milieu (and using *R.U.R.* to do it), beginning to produce what Bertolt Brecht, some years later, would call “an audience of the scientific age.”<sup>17</sup>

### **Partly of Science, Partly of Truth**

Čapek's comic “prologue” to *R.U.R.* begins with the arrival of the elegant Helena Glory, a representative of the “League of Humanity,” at the island headquarters of Rossum's Universal Robots. There she meets Harry Domin, the central director of the corporation. He explains that in the year 1932, a not-so-distant future for the play's early audiences but two generations in the past for the play's protagonists, the eponymous Mr. Rossum discovered a means of duplicating and developing organic material “that nature has not hit upon at all.” Rossum's name derives from the Czech *rozum*, “reason,” and he is described elsewhere by Čapek as “no more or less than a typical representative of the scientific materialism of the last century.”<sup>18</sup> While Rossum's aim is to replicate humanity itself, his son, “young Rossum,” instead uses his father's technology to devise a soulless but fully organic modification of the human machine:

DOMIN: So then young Rossum said to himself: A human being. That's something that feels joy, plays the violin, wants to go for a walk, in general requires a lot of things that—that are, in effect, superfluous . . . [Rossum] chucked everything not directly related to work, and in so doing he pretty much discarded the human being and created the Robot . . .

HELENA: It is said that man is the creation of God.

DOMIN: So much the worse. God had no grasp of modern technology.<sup>19</sup>

While the biological vision belongs to the two Rossums, Domin—an industrial entrepreneur of the following generation—sets the economic, geopolitical, and ultimately moral agenda. The proliferation of Rossum-manufactured robots is intended to produce such a vast material surplus that consumer goods and labor itself will lose all value:

DOMIN: There'll be no more poverty. Yes, people will be out of work, but by then there will be no work left to be done. Everything will be done by living machines. People will do only what they enjoy. They will live only to perfect themselves.<sup>20</sup>

The only dissenting voices at the factory are those of Helena's maid, who finds the robots blasphemous and uncanny, and the architect and pragmatic humanist Alquist, who rebukes his employer's economic worldview:

ALQUIST: What you're saying sounds too much like paradise. Domin, there was something good in the act of serving, something great in humility. Oh, Harry, there was some kind of virtue in work and fatigue.<sup>21</sup>

Spoken from the viewpoint of an architect, Alquist's equation of labor and morality might read as a distant echo of the debates around alienated handicraft and machine production being appraised by the *Deutscher Werkbund* through the preceding years, and these opposing ideologies of self-perfection—through the presence or the absence of work—are central to Čapek's broader philosophical thought.

After the prologue, the action of *R.U.R.* jumps ten years into the future. Domin and Helena have gotten married, but, unsurprisingly, the utopia has begun to unravel. Governments have begun using robots as soldiers in a thinly veiled recapitulation of the Great War. The robots themselves begin to transform as they seek liberation from their human masters. Beginning with the scientifically named Radius, the leader of the robots, these organic machines start to develop a sense of anguish, if not self-awareness:

HELENA: Doctor, does Radius have a soul?

DR. GALL: I don't know. He's got something nasty.<sup>22</sup>

*R.U.R.*, dir. Eugen Robert, Berlin, 1923. Alquist (right) with marauding robots. Courtesy Kunsthistorisches Museum and the Austrian Theater Museum, Vienna.

The robots self-organize, slaughter all of humankind, and eventually arrive en masse to retake the island factory—sparing only the architect Alquist, whom they identify as a fellow robot because of his workmanlike nature. As the play draws to a close, the robots acquire the reproductive capacities they were designed without. A strand of humanity reemerges from the engineered population, and the viewer is left with an image of postrobotic regeneration on Rossum's island.

The first American production—which opened in October 1922 at the Garrick Theater in New York, some five months in advance of the German staging—seems to have altered the ending to imply the defeat, rather than the propagation, of the robots. One critic dryly related this revised conclusion in a review:

Two young folk appear—*ex machina* as the Greeks put it, but certainly not out of the modern mechanism of industry—who have discovered how to fool the simple-minded Robots. They have found a deserted cottage with a cat and a dog. As the sun rises on the backdrop they give promise of becoming a new Adam and Eve.<sup>23</sup>

That the robots' vestigial humanity could motivate the drama's climax was perhaps too problematic a theme for audiences in the society that exported Taylorism. Haywire technology, not a revolution brought on in reaction to a culture of organizational management, was what American theatergoers saw—a reorientation that mirrored the later conception of the robot as a mechanical device divorced from social concern.

An antipositivistic fable, the play's political message aligns closely with Čapek's views on the recently concluded World War. "Much melancholy has devolved upon mankind, and it is detestable to me that might will triumph in the end," he wrote in a letter to the poet S.K. Neumann. "I think that I am slowly becoming an anarchist, that this is only another label for my privateness, and I think that you will understand this in the sense of being against collectivity."<sup>24</sup> This dogged individualism was a continuing refrain throughout



Čapek's writing. In his 1925 text "Let's Be Revolutionary," he uses the modern physicist's understanding of electron orbits as a metaphor for social change:

If we have to change the world, let's at least be revolutionary like atoms; let's each of us take a step forward by himself. The world won't take a step forward; the world is broad and peaceful, like matter. We need millions of individuals to accomplish revolutions in themselves, so that the people as a whole can evolve.<sup>25</sup>

And yet, despite the apparent naïveté of his progressive libertarian stance (which came under increasing pressure in the 1930s as eastern Europe felt the threat of the Third Reich), Čapek took a more nuanced view toward the ideologies of his chief characters in *R.U.R.*:

The factory director Domin establishes that technical progress emancipates man from hard manual labor, and he is quite right. The Tolstoyan Alquist, to the contrary, believes that technological progress demoralizes him, and I think he is right, too. . . . Finally, the Robots themselves revolt against all these idealists, and, as it appears, they are right, too.<sup>26</sup>

In these three sentences Čapek describes technology as potentially liberating, enervating, or oppressive, contingent on one's position relative to it but in all cases intimately tied to economic and political realities.<sup>27</sup> This built-in ambivalence toward progress in *R.U.R.*—neither utopian nor dystopian, the evident allegory notwithstanding—frustrates any reading of the play as a purely reactionary or avant-garde vision of society. That Čapek called *R.U.R.* a "comedy, partly of science, partly of truth," positioning science and truth as oppositional terms, further complicates the issue.<sup>28</sup>

### Economies of Inaction

The burgeoning fields of industrial mechanization and scientific management, which would be crystallized in the multiform international incarnations of Taylorism, found frequent expression in the literature of the early twentieth century. In Yevgeny Zamyatin's masterpiece of futurological literary speculation *We* (1921), for example, everyday life operates precisely according to the dictums of organizational science, codified in an all-encompassing temporal matrix known as "The Table." "Yes, that Taylor was, without doubt, the most brilliant of the Ancients," opines the book's earnest narrator, D-503. "How could they have written whole libraries about the likes of Kant—and not take notice of Taylor, a prophet, with the ability to see ten centuries ahead?"<sup>29</sup> While the techno-utopian tradition dates to the late-nineteenth century and earlier (including texts such as Edward Bellamy's *Looking*

Frederick Kiesler (left) with  
F.T. Marinetti, Enrico Prampioni,  
Theo van Doesburg, and others,  
1924. From *Pásmo* 5–6 (1924),  
in the collections of the Ústav  
pro Českou Literaturu, Prague.

*Backward, 2000 to 1887*, which is frequently cited in period reviews of *R.U.R.*), the messianic technocracy of *We* relies more on the historical moment of Taylorism's international blossoming.<sup>30</sup> That Zamyatin's novel—initially circulated in *samizdat* form and only officially published in Russian decades later—was written in the same year as *R.U.R.* indicates just how seminal these geographically mobile concepts were for interwar European culture, regardless of the ideological climate into which they were transplanted.

At the heart of these new societies is a prognosis for the individual who takes part in the collective order, a new kind of industrialized subjectivity. The formation of this “future man” received its most polemical treatment in Italian futurist F.T. Marinetti's manifesto on “Multiplied Man,” written during the previous decade. “Hence we must prepare for the imminent and inevitable identification of man and motor, facilitating and perfecting a continual interchange of intuitions, rhythms, instincts, and metallic disciplines,” Marinetti writes. “Future man will reduce his heart to its purely distributive function. The heart has to become, in some way, a sort of stomach for the brain.”<sup>31</sup> This emptying out of emotion and sexuality is the basis of a new epoch of productivity, whether Taylorist or ludic (and the clinical bureaucracy of sexual intercourse in *We* gives it palpable form).

Čapek had long been considering this evacuation of what one can only call the soul, given its opposition to the rationalist intellect. In a 1908 story by Čapek and his brother Josef called “The System”—predating even Marinetti's “Futurisme”—a factory-owning industrialist is none too subtle on this point:

Exploit the entire world! The world is nothing but raw material. . . . The worker must become a machine, so that he can simply rotate like a wheel. Every thought is insubordination! Gentlemen! Taylorism is systematically incorrect, because it disregards the question of a soul. A worker's soul is not a machine, therefore it must be removed. This is my system. . . . I have sterilized the worker, purified him; I have destroyed in him all feelings of altruism and camaraderie, all familial, poetic, and transcendental feelings.<sup>32</sup>

Čapek's anticipation of Marinetti's later essay on “multiplied man”—specifically the latter's call to “drastically reduce the need for affection”—is notable, and it frames the idea of the robot to be developed later in *R.U.R.*

in a distinctly different register than, say, the “constitutive mesh of technology and sexuality” that Andreas Huyssen detects in *Metropolis's* Maria.<sup>33</sup>



What sets *R.U.R.* apart from *We* or even Čapek's own earlier story is the promise of mass leisure rather than mass labor. "People will do only what they enjoy," Domin claims. "They will live only to perfect themselves."<sup>34</sup> The invention of the robot instituted an unequivocal split between work and pleasure, replacing the moral imperative of labor—the idea that "unwillingness to work is a symptom of the absence of the state of grace," as Max Weber writes—with a positivistic method of minimizing, if not avoiding, it altogether.<sup>35</sup> Where the architect Alquist still believes fatigue remains virtuous even in the industrial world, the figure of the robot circumvents fatigue by displacing labor outside the body, allowing the distinctly human privilege of laziness with minimal intervention in the systems of industrial production.<sup>36</sup>

An early salvo in this battle against work came with J.A. Etzler's *The Paradise within the Reach of All Men, without Labor, by Powers of Nature and Machinery* (1833), which outlines a host of new techniques for harnessing nature's energy surplus. Anthropomorphic automata were not the answer: "To imitate minutely all the infinite variety of produces of human industry by machineries," Etzler argues, "would be an endless, ungrateful, and foolish undertaking, though it might be possible." Rather, the task is to reconfigure desire itself, producing only objects that will "substitute or surpass the known necessities, comforts, and luxuries of men" through naturally powered means. This was to be a social rather than a technological transformation—a theme that continually recurs as the well-tailored automaton is relegated to preindustrial history—in which the population was "to relinquish entirely all . . . customary notions of human wants and substitute them by others of a superior and more systematic order."<sup>37</sup> Such cultural reordering was, for Etzler, a uniquely American opportunity. Having arrived in America only two years earlier, in the company of John Roebling (who would later design the Brooklyn Bridge), Etzler penned an open letter to President Andrew Jackson, claiming that the American "situation and national constitution are eminently more favorable to the free development of the human powers for general happiness, than any where on the globe."<sup>38</sup>

Fifty years later, Harry Domin's economic schema of idle self-perfection would find another antecedent in the anti-fatigue, anticapitalist worldview of Paul Lafargue, the Cuban-born son of a coffee plantation owner. His 1880 treatise on *The Right to Be Lazy* (appearing in serial form twelve years after his marriage to Karl Marx's daughter Laura) argues that idleness is the root of culture and aesthetic excellence:

A strange delusion possesses the working classes of the nations where capitalist civilization holds its sway. . . . This delusion is the love of work, the furious passion for work, pushed even to the exhaustion of the

vital force of the individual and his progeny. . . . In capitalist society work is the cause of all intellectual degeneracy, of all organic deformity. Compare the thoroughbred in Rothschild's stables, served by a retinue of bipeds, with the heavy brute of the Norman farms.<sup>39</sup>

Lafargue's metaphor became all the more poignant with animal labor's increasing anachronism in the early twentieth century. As "brute" labor was displaced by the machine, the worker engaged in the *management* of machines became a necessary counterpoint to the capitalist who enjoyed the resultant leisure. And yet, for Lafargue, this dialectic hardly led toward self-perfection for either party:

Because the working class, with its simple good faith . . . has blindly hurled itself into work and abstinence, the capitalist class has found itself condemned to laziness and forced enjoyment, to unproductiveness and over consumption. But if the over-work of the laborer bruises his flesh and tortures his nerves, it is also fertile in griefs for the capitalist. . . . To fulfill his double social function of non-producer and over-consumer, the capitalist was not only obliged to violate his modest taste, to lose his laborious habits of two centuries ago and to give himself up to unbounded luxury, spicy indigestibles and syphilitic debauches, but also to withdraw from productive labor an enormous mass of men in order to enlist them as his assistants.<sup>40</sup>

Lafargue's idea of the lazy promotes not the conspicuous display of surplus, as Veblen would describe this condition some sixteen years later—where material excess is paralleled by a kind of behavioral excess—or the profoundly idle elitism of *Metropolis's* overclass. Lafargue advocates instead for an economy of inaction and the drastic reduction of working hours (to three a day), where desire is neither inflated by the overabundance that Domin's social order creates nor found in the laborious practice of craft preferred by Alquist. Like Etzler, Lafargue saw America's adoption of agrarian technologies as an exemplar of this theory: "The American, free and lazy, would prefer a thousand deaths to the bovine life of the French peasant. Plowing, so painful and crippling to the laborer in our glorious France, is in the American West an agreeable open-air pastime, which he practices in a sitting posture, smoking his pipe nonchalantly."<sup>41</sup>

Lafargue ends his tract with an invocation to the muse of not working: "O Laziness, mother of the arts and noble virtues, be thou the balm of human anguish!"<sup>42</sup> Laziness was beloved of Čapek as well: "Idleness, pure, perfect idleness, is neither a pastime nor time's extension," he writes, "it is nothing, a negation, an intentlessness, a lack-purpose, I don't really know how to put it:

in short, something perfect and rare.”<sup>43</sup> Weber’s laborious state of grace is banished in favor of sublime inactivity, and while Čapek’s essay is largely whimsical, it points to certain complexities in his thinking that make *R.U.R.* appear less didactic than on first glance. Humanity and leisure are mutually indexical for Čapek, and the access to, and desire for, laziness is perhaps the most precise means of defining the population of robots relative to their creators. Technology is ancillary.

Etzler’s *Paradise* fell short on scientific grounds (his machines came nowhere close to meeting his impossible claims), while Lafargue’s voluntary underproduction stood little chance in a mercantile environment.<sup>44</sup> As the nineteenth century progressed, social reform was largely supplanted by the science of work, the lingering strains of utopian socialism notwithstanding. The body of the worker, considered in terms of *arbeitskraft*—literally “manpower” but in the same sense as “horsepower,” implying units of energy—became the privileged site of intervention, with the distinctly modern problem of “fatigue” as the chief adversary. “The greatest weakness of the science of work,” Anson Rabinbach argues, “lay in its most compelling assumption, that the body was a motor, and that scientific objectivity and expertise were sufficient to provide an objective solution to the worker question. The arrival of the American Taylor system in Europe shortly before the First World War dashed those hopes.”<sup>45</sup> Precisely at this moment in which the physiological outlook of the European science of work and the organizational outlook of the American science of management were being merged, one encounters the new phenomenon of the robot, and just when an “emphasis on the ‘human factor’ became an important corrective to Taylor’s limited interest in the social consequences of scientific management,” as Rabinbach states, one finds the displacement of labor enabled by the robot and a renewed interest in the representation of the modern metropolitan subject.<sup>46</sup> When Čapek’s industrialist claims that Taylorism is “systematically incorrect” because it lacks a mechanism to stifle the individuated soul of the worker, what is at stake is this very “human factor” and whether it is to be accommodated or removed altogether.

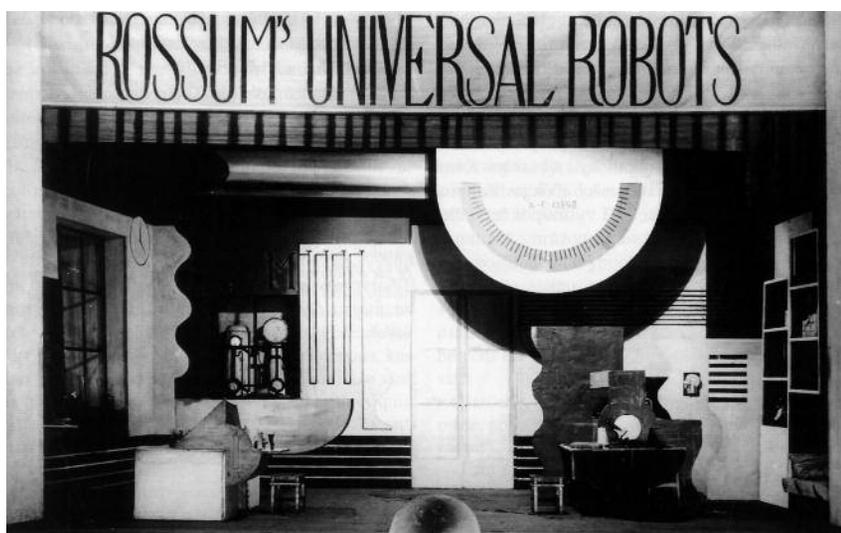
These highly charged discourses were not confined to the factory, and the theater was caught up in a similar set of debates as the figure of the modern cosmopolitan spectator took shape along remarkably similar lines (finding itself in an ambivalent position). Čapek’s play in particular is caught between the personal interpretation of novels such as *We* and the more fixed and widely transmissible images of the cinema such as *Metropolis*—each implies a model of perception. The theater’s mandate to re-present the playwright’s vision in a given milieu makes the play itself simultaneously abstract in its

textual form and historically specific in its actual staging, making the theater a highly contested mode of cultural exchange throughout the 1920s. On the eve of the sound film—“badly conserved theater at a higher price!” Münsterberg described it, advocating not for the theater but for the purity of silent cinema—the spectatorial immediacy and political geography of a theatrical event like *R.U.R.* offered a window onto an artistic discipline in crisis.<sup>47</sup> “THE THEATRE IS DEAD,” Kiesler argued in 1926; “WE WANT TO GIVE IT A SPLENDID BURIAL.”<sup>48</sup> That burial, in Kiesler’s mind, was to include a technological and aesthetic rebirth, evident in the fact that his polemic was delivered on the far-from-fatalistic occasion of his International Theatre Exhibition in New York. The rebirth, he would argue, began at the Theater am Kurfürstendamm.

### *De la nature morte vivante*

In the Czech premiere of *R.U.R.*—which opened on January 3, 1921, in the city of Hradec Králové, where Čapek had been expelled from high school for his involvement in an anarchist secret society—the Rossum factory’s futurism is indicated by unmistakable inflections of purism and De Stijl.<sup>49</sup> Designed by the young Czech architect Bedřich Feuerstein, the polychromy and simple geometric forms are reminiscent of Theo van Doesburg’s contemporaneous graphical projects, while a series of overscaled scientific instruments gesture toward technological positivism and give the scenic flats a sense of spatial layering. The aesthetics of modernism were hardly neutral in Prague at such an intensely charged cultural moment. After the end of centuries of Hapsburg rule, independence—and relative economic stability—led the avant-gardes ravenously to seek out international influence. The Devětsil group of poets and artists, including a young Karel Teige, was formed only months before the premiere of *R.U.R.*, and the following year would see the birth of the Czech journal *Život* (Life), which would actively promote the work of European designers such as Le Corbusier and issue a call for the widespread adoption of his purism.<sup>50</sup>

Kiesler’s sets, created in Berlin almost two years later, bear superficial similarities to the Czech version in that they blend geometric abstraction with the appearance of scientific instrumentation. But while the Czech production offers a stylized representation of technology, Kiesler’s staging of the



Rossum production office is notable instead for the incorporation of actual media apparatuses that transformed the stage into a new kind of spectatorial technology. “The amiable author ordered: a room with maps on the walls, tables. A desk, a club chair set. A large window through which one sees the factory,” Kiesler wrote in a 1924 text on his design—a typical enough stage setting. He continued, mock-apologetically: “Excusez moi, ce que j’ai fait: the first attempt at electro-mechanical scenery. The rigid image is brought to life. The scenery is active, played with. De la nature morte vivante.”<sup>51</sup> This “vivification” (*Verlebendigung*) is brought about in part through the mechanization of the stage set—a form of scenic dynamism that was also being explored in the Soviet Union in designs such as Liubov Popova’s *The Magnanimous Cuckold* or Alexander Vesnin’s *The Man Who Was Thursday* of 1922. But whereas the Soviet projects were spatial constructions, Kiesler’s scenic flat remained largely two-dimensional, adopting other means to achieve its spatial impact. Among these were visual technologies of corporate industrialism: “The seismograph (in the middle) moves forward in fits and starts. The turbine control (center bottom) rotates uninterruptedly. The number of finished manufactures climbs.” Moreover, the sensory overload of media technologies sets the scene. The spectator is assaulted by the noise of industry: “Work sirens sound. Megaphones speak orders, give answers.”<sup>52</sup> A device called a Tanagra Apparatus—something of a periscope that was occasionally used in puppetry and which made an appearance at the 1914 Deutscher Werkbund exhibition in Cologne—projected action from behind the theatrical flats onto their surface, reduced in scale.<sup>53</sup> In a later description, he calls this technology a kind of proto-television and recounts the spectator’s delight in its usage: “it was quite an illusion, because a minute later you saw the same actors appear on stage in full size. There was, inevitably, a burst of applause at this moment.”<sup>54</sup>

Kiesler’s most notable innovation was the use of projected film inside an operable oculus, a device that not only visually anticipated his 1928 designs for the Film Guild Cinema in New York but also inaugurated a long line of experiments in melding projections with scenery.<sup>55</sup> For Kiesler, the lens-like viewing apparatus draws an aesthetic (if admittedly nonfunctional)

Right: Frederick Kiesler. Film Guild Cinema, New York, 1928.  
© 2012 Austrian Frederick and Lillian Private Foundation, Vienna.

Opposite: Frederick Kiesler. Scenery for *R.U.R.*, Berlin, 1923.  
© 2012 Austrian Frederick and Lillian Kiesler Private Foundation, Vienna.



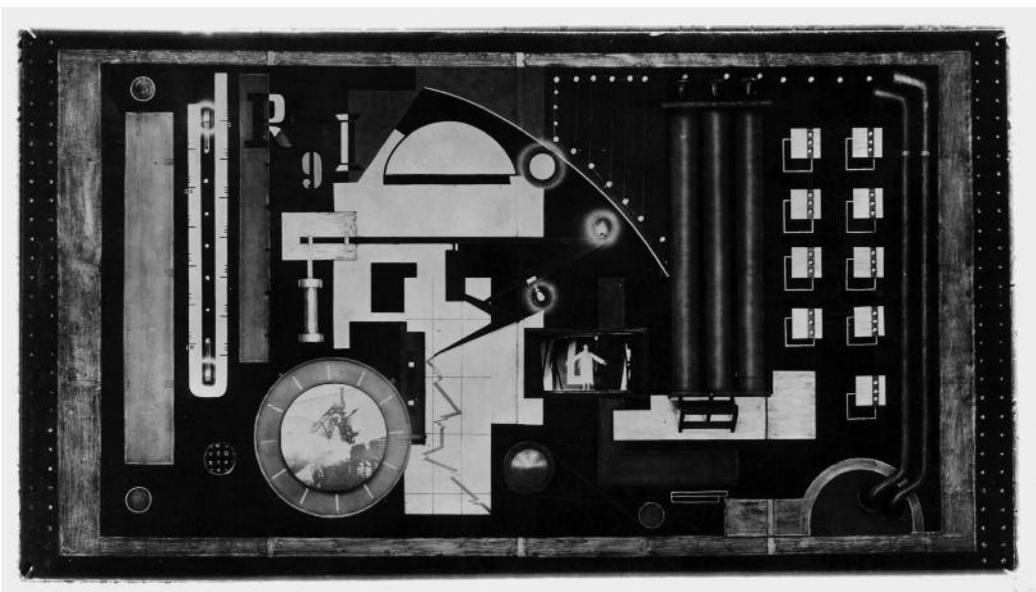
connection between the production and projection of film. On the left of the backdrop, Kiesler installed a nickel-plated iris, 1.10 meters in diameter, which housed a projection screen to be revealed in the course of the performance. “The iris opens slowly: the film projector clatters, a film plays on the circular area, cranked quickly, and the iris closes.”<sup>56</sup> The projection was used as a window through which the characters look to see a crew of bricklayers and accounting office employees, all of whom are robots. The technology of the cinema stands in for the technologization of labor, both manual and clerical. The mechanization of labor, the mechanization of production, and the mechanization of image are, for seven lines of dialogue, conjoined.<sup>57</sup>

This elision in *R.U.R.* of technology and its representation had its detractors. One noted the irony of “a play that introduced the term ‘robot’ and was highly critical of the mechanical world, [yet] had a stage set which celebrated just such possibilities.”<sup>58</sup> But Kiesler’s adoption of technology was far from uncritical, just as Čapek was hardly a Luddite. Almost thirty years later, Kiesler would return to this theme:

This sudden awareness of blindfolded progress has planted a terrific fear in our hearts. No one is immune to it. It has created a new emotional climate for us, in which we begin not to care about the machine-robots or even material profits; we really want to save our small lives, our small emotional satisfactions, and live in an emotional peace, in a balanced psychic state.<sup>59</sup>

His interest lay in the affective dimension of technology, not its productive ends—the persistence of the human emotional state, not the ongoing rationalization of life and labor. These are the grounds on which Kiesler’s and Čapek’s work mutually resonates.

*R.U.R.* was Kiesler’s first public work, and for a commission that would entirely alter his professional trajectory, it began haphazardly. In an unpublished manuscript, Kiesler offers a candid, if not cannily self-deprecating, account of his prospects before the Hungarian stage director Eugen Robert invited him to Berlin:<sup>60</sup>



I was ill in 1919 in Vienna, deadly ill, and it was after the war. Austria was completely down. I lived on dole. We architects had no orders. Nobody could sell anything. It was a hopeless situation. Unexpectedly, I got a telegram from the director of a theater in Berlin inviting me to design a scenic. I had once, some time past, had a discussion with this director. Due to my youth and social inexperience, I had lashed violently out against the present theater. Somehow that discussion had stuck with him. In his opinion, he had acquired what he called “a crazy script,” and felt it had an affinity to my ideas for the theater. I don’t know if he thought I was crazy, too, but it was a serious offer.<sup>61</sup>

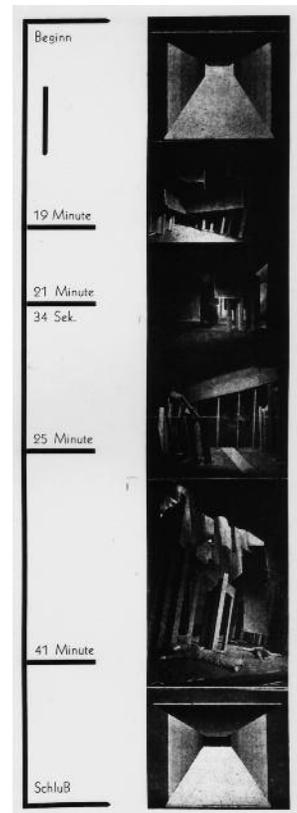
The only way to survive, Kiesler continues, is “to go to Berlin and do the thing. . . . I had never been on a stage in my life before. I knew nothing about theater design. I just did it.” Echoing Etzler’s and Lafargue’s New World can-do optimism, he adds that “the matter was done in a truly American way.”<sup>62</sup>

Be that as it may, the production of *R.U.R.* occasioned Kiesler’s dramatic entry into the De Stijl group and granted him an instant position of prominence in the architectural discourse of the moment. The second Berlin performance was attended by van Doesburg, Hans Richter (whom he had met in 1921), El Lissitzky, and László Moholy-Nagy (who had already begun designing stagings for Erwin Piscator, though without the incorporations of projections that would mark Piscator’s later work).<sup>63</sup> As Kiesler would later recall, “the gang came in . . . grabbed me without saying a word, lifted me up, and took me six or seven blocks around the corner to a club where we met Mies van der Rohe and spent the whole night talking about the future theatre.”<sup>64</sup>

While the discussions of this remarkable gathering are lost to history, Kiesler’s own contributions to this future theater revolved primarily around the principles of space-time and temporal continuity. His interest in continuity is chiefly known through his later American work, which offers formal and material interpretations of continuity in curvilinear volumes and ambiguously conjoined spaces, visible in projects such as his frequently revised “Endless House.” (Later readings of these projects have often been biased toward spatial rather than temporal concerns, belying the questions of duration at the heart of his thinking.) His pedagogical work at Columbia University also embraced space-time analysis in the development of a notion he called “correlation,” which he saw as a biotechnical method of fatigue prevention—ergonomics as the “economic conscience” of the body.<sup>65</sup> But his interest in the temporal calibration of space begins much earlier, with his not inaccurate claim to have brought space-time to architecture and theatrical design in a novel way.

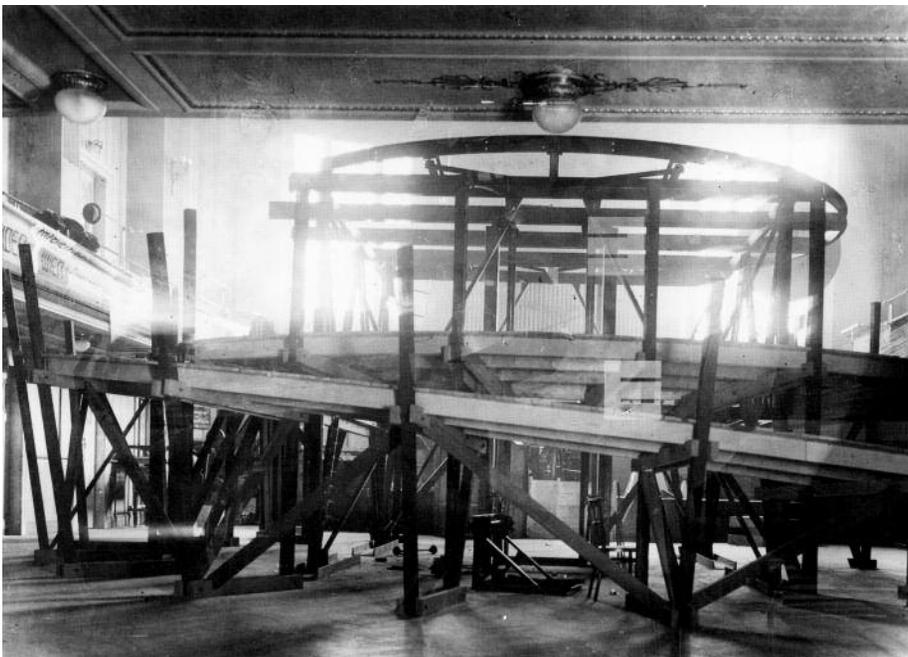
Right: Frederick Kiesler. Scenery for *The Emperor Jones*, Berlin, 1924. © 2012 Austrian Frederick and Lillian Private Foundation, Vienna.

Opposite: Frederick Kiesler. *Raubühne*, Internationale Ausstellung neuer Theater Technik, Vienna, 1924. © 2012 Austrian Frederick and Lillian Private Foundation, Vienna.



Space-time had already been thoroughly aestheticized by Italian futurists such as Giacomo Balla and Anton Bragaglia, who riffed on the “chronographic experiments” of Étienne-Jules Marey and the theories of duration championed by Henri Bergson (Marey’s colleague at the Collège de France). Kiesler’s translation of space-time to the theater differed, however, by giving it actual temporal duration and a measured perceptual impact. This is evident in the dynamic and intensely technologized sets of *R.U.R.* and in works such as *The Emperor Jones* (1924), which was diagrammed as a space-time event and used the shifting sets to mirror the anxiety of the onstage action, as though Hermann Warm’s sets for *The Cabinet of Dr. Caligari* (1920) had been further abstracted and then set into motion. This production, marginal as it has been in the architectural canon, may have helped inaugurate one of modern architecture’s most central concepts: with *The Emperor Jones*, Kiesler first replaced the usual *Bühnenbild*, “stage design,” with *Raumbühne*, “space stage.” Adolf Loos—who had employed Kiesler in Vienna and wrote an essay for his 1924 *Internationale Ausstellung Neuer Theatertechnik*—had not yet begun using the term *Raumplan*, and the inherent theatricality of his residential designs employing the *Raumplan* idea suggests an affinity with Kiesler’s ideas.<sup>66</sup> The apotheosis of Kiesler’s thinking in this regard was the “space stage” he designed for his 1924 exhibition, in which he tested his almost mystical obsession with the “fourth dimension” of temporal movement.<sup>67</sup>

As a bridge between the physiomechanical analysis of figures like Marey and the psychology of spectatorial perception, this interest in continuity points to the affective possibilities of technological rationalization for theatrical audiences—particularly, in Kiesler’s take, at the moment of the introduction of the cinema into the stage setting.<sup>68</sup> The mechanisms of this emotive transfer from the stage to the audience were grounded in recent findings in experimental psychology, making the modern theater itself—supplemented by new media technologies—the unique scene of new forms of collective experience.



## The Great Vehicle of Suggestion

“The house is darkened and quiet; all lines converge to the stage, which is brightly lighted, and heightened in visual effect by every device known to art. The onlooker’s mind is emptied of its content; all feeling of self is pushed down to its very lowest level.”<sup>69</sup> So wrote Ethel Dench Puffer in *The Psychology of Beauty*, a scientific and philosophical treatise from 1905 found on Kiesler’s bookshelves and which includes an essay on what she calls the “nature of dramatic emotion.”<sup>70</sup> Her description of this typically post-Wagnerian theatrical experience makes the case that “we feel *with*, rather than toward or about, the actors” because of the stage’s tendency to create a feeling of involvement—but, crucially, without any possibility of actual intervention.<sup>71</sup> Thus, the spectator “has before him a situation which he understands through sight and hearing, and in which he follows the action not only by comprehension, but by instinctive imitation. This is the great vehicle of suggestion.”<sup>72</sup> Suggestion is not a one-to-one mimetic relationship—the spectator’s experience is individuated, and Puffer sees it as a composite of the emotional forces of multiple characters and images—but is nevertheless structured according to largely determinable psychological effects.<sup>73</sup>

Written only two years after the invention of the 35 mm film format, the work’s omission of the nascent cinema in what is an otherwise systematic survey is not surprising. That task would revert to Puffer’s teacher and friend Hugo Münsterberg, with whom Puffer studied at Freiberg University, even living with him and his wife.<sup>74</sup> Münsterberg’s slim but seminal 1916 volume on *The Photoplay*—written while he ran Harvard’s Psychological Laboratory under William James—stakes his ground as the first psychologist to deal in depth with the new form of seeing brought on by the cinema.<sup>75</sup> Continuing in the vein of Puffer’s attention to visuality and space, he writes of the mechanisms through which film is perceived. “We have reality with all its true dimension, and yet it keeps the fleeting, passing surface suggestion without true depth . . . as different from a mere picture as from a mere stage performance.”<sup>76</sup> Motion, then, is created in the mind: “Depth and movement alike come to us in the moving picture world, not as hard facts but as a mixture of fact and symbol. They are present and yet they are not in the things. We invest the impressions with them.”<sup>77</sup>

This interplay between the second and third dimensions interested Kiesler in his writings on projected media, and he extended Münsterberg’s sense of cinematic spatiality to imagine a viewer unmoored from the confines of the theater. “The spectator must be able to lose himself in an imaginary, endless space,” Kiesler writes of the cinema, “even though the screen implies the opposite.”<sup>78</sup> This lost audience, emptied of individuality, neither fully

subjective nor entirely grounded in the realm of the real, takes on a new character thanks to the appearance of three dimensions on the flatness of the screen.<sup>79</sup> In this understanding of the perception of cinema, “projection” works in two directions: while technology throws a flickering sequence of images, the mind supplies temporal continuity and an appearance of reality, constructing a new format of space-time that can be standardized for a substantial audience.

One biographer notes that Münsterberg avowed a fervent belief in the “free and active play” of the spectator’s own mind when confronted with these impressions, despite the fact that his own analysis of the cinematographic apparatus mandates the opposite: “With its ability to ‘objectify’ the viewer’s mental processes,” Matthew Hale observes, “the film was far more effective in enforcing the viewer’s participation and eliminating the influence of his individual particularities.” Rather than affirming the individuality of the spectatorial subject, as Münsterberg believed was the case (and as Puffer saw in the case of the theater), “the mental act was taken out of the mind of each viewer and placed upon the screen.”<sup>80</sup> This mediated displacement of subjectivity and the formation of collective perception—again, seen more innocently—offers insight into Kiesler’s introduction of projected media into the theater.

Furthermore, Münsterberg’s psychotechnics—a word defined in his 1914 *Grundzüge der Psychotechnik*—provides a common framework for Kiesler’s technologized stagings and Čapek’s visions of robotic populations.<sup>81</sup> Čapek, who completed his doctoral dissertation on American pragmatist philosophy in 1915 and published an article on the subject in 1918 as an explicitly “pro-American gesture” in gratitude for the U.S. entry into World War I, subscribed to many of pragmatism’s tenets.<sup>82</sup> Each imagined that psychic life could be studied as a kind of internal apparatus, wherein empirically verifiable emotional and perceptual experiences could be both measured and instigated—or, in Rossum’s case, eradicated altogether. Taking a quasi-mechanistic but hardly Cartesian view of the human machine, Münsterberg’s varied researches reflect James’s own belief in psychological materialism. James explicitly refuted “automaton theory,” a then-common thought “that in everything outward we are pure material machines.” He insisted instead on the presence of the “conscious self,” despite the replicability of spectatorial affect.<sup>83</sup> This richly ambivalent position was as influential in Kiesler’s design work as it was in Čapek’s literary explorations of the contemporary worker—especially the odd blend of the physically organic and the psychologically mechanistic made visible in the figure of the robot.

Münsterberg frames the cinema’s audience as a kind of collective subject

partaking in a shared experience, one that transcends the traditional logistical limitations of the staged play: “One actor is now able to entertain many thousand audiences at the same time, one stage setting is sufficient to give pleasure to millions. The theater can thus be democratized.” In this passage, Münsterberg is talking about supplanting rather than augmenting the traditional theater, while Kiesler’s design for *R.U.R.* insists on the possibility of straddling those seemingly incommensurable terrains, if only for a few seconds. The desire for communal affect within the theatrical arena—and the subject formation that results—is captured in Loos’s essay for Kiesler’s 1924 Theater Exhibition in Vienna:

As experience has shown thousands of times, [sensations] can impress any number of people simultaneously and collectively. The most intellectual and the most brutal of men will undergo the same sensation, and need not be ashamed of doing so. . . . Properly understood thus, the theater is a preparatory school for unborn intellect.<sup>84</sup>

The implications of Loos’s and Münsterberg’s analyses of technology and audience point toward a production of quantifiable uniformity in the spectators’ modes of thought, framed positively here, not unlike Münsterberg’s version of the “economic conscience.”<sup>85</sup>

Despite being best known for his work on cinema, Münsterberg also wrote extensively on psychology and industrial organization. (James once quipped that while he desired a world of anarchy, Münsterberg preferred one of bureaucracy.)<sup>86</sup> Inclined toward relentless systematization, his *Psychology and Industrial Efficiency* of 1913 begins with the well-rehearsed lineage of Taylor (despite his “psychological naïveté”) and Frank Gilbreth (“a virtuoso”) before going on to expand their studies of movement-related fatigue to include mental fatigue or, as Münsterberg writes, “psychophysical effort.”<sup>87</sup> His study offers a series of training techniques and recommendations for mental testing that will discover—or rather produce, given the correct training—the “best possible man” for a given job. The benefits to Domin-like industrialists are obvious. For Münsterberg, however, equal improvement is to be found in the mental life of the worker. “The economic experimental psychology offers no more inspiring an idea than this adjustment of work and psyche by which mental dissatisfaction in the work, mental depression and discouragement, may be replaced in our social community by overflowing joy and perfect inner harmony.”<sup>88</sup>

But just as his sense of the cinematic spectator’s “free and active play” is ancillary to collective affect, Münsterberg’s system of economic efficiency subsumes its subjects into a corporatist logic. Such is the paradoxically

Enlightenment rhetoric of organizational thinking that would be mercilessly satirized in texts such as Zamyatin's *We*. Moreover, the psychotechnical drive toward the regularization of emotional states creates an unexpected moment of affinity between Čapek's on-stage robot-subjects and the Kieslerian spectator-subjects in the audience—the former drained of emotion, the latter finding it heightened, each position constitutive of the other and reliant on the same base of psychological materialism. This is not to suggest that the avant-garde theater was sowing the seeds of authoritarianism; to suggest so would be to conflate the means and the ends of psychotechnical thinking. What this interpretation does point to, however, is the extent to which the science of work and the science of aesthetic perception found a meeting point in the arena of design and theater in the 1920s. That applied psychology offered new tools with which to construct an audience is no less startling a proposition than those potential futures being staged in front of it.

### **Global Nationalism**

Perhaps the most intriguing result of Münsterberg's thinking on industry—which returns us to a central polemic in *R.U.R.*—is its eventual expansion to the international sphere, seen in his book *Tomorrow: Letters to a Friend in Germany*. Writing in 1916, the year of *The Photoplay* as well as his death, Münsterberg projects his organizational thinking forward to prefigure a post-war European order, an internationalism based in both global networks of efficient human capital and a kind of postempire nationalism that might be found, for example, in the Czechoslovakia that would emerge on October 28, 1918. “The pose of the prophet is not needed for such a message,” he writes. “It is obvious: our tomorrow will be nationalistic to the core.”<sup>89</sup> And such was the state of the newly drawn European map at the close of the war, particularly among recently liberated countries. “The newly-free nation expressed not the least inclination for mutual love,” one of Čapek's biographers writes of the situation in Prague. “The war, the poverty, and the international situation—above all the new Soviet Union, which demagogically declared itself the state of workers and peasants—radicalized all of Europe.” This was the case in Czechoslovakia, whose soldiers were forced “to defend the territorial integrity of their new state” from Hungarian socialist revolutionaries and the country's own social democrats.<sup>90</sup> While Münsterberg, fully cognizant of the drawbacks of nationalism, argues that it is nonetheless “the greatest gift of our time,” the reality of the newly emerged nation-states was a more unruly blend of fervid cultural development with widespread political and social suspicion.<sup>91</sup>

Unlike Franz Kafka, who wrote exclusively in what is known as “Prague German,” Čapek's oeuvre is almost entirely, pointedly, in Czech—although

the rapid translation of his work into German suggests the persistence of a cultural and linguistic connection. A vocal supporter of the newly formed state, its leadership, and its literature, Čapek turned away from novels and plays in the mid-1920s to focus on journalism: “Now I must help to educate the nation.”<sup>92</sup> And yet, despite his intense love for his own home, his experience of the war led him to take a deeply cynical view of postwar European nationalism. “What can you do,” he wrote; “it is terribly far from nation to nation; the further all of us go on, the more we are alone. Now better never set foot outside your homeland; better lock your doors and let them all do what they like.”<sup>93</sup> The pessimism of this position, which belies the internationalist bent of the various designs for *R.U.R.*, informs the eventual storming of the island factory, which is unable to secure its borders against the politics of the outside world.

World War I—the “great geometrical event,” as Le Corbusier called it—has often been invoked to herald the arrival of the twinned concepts of population and environment onto the field of combat. War became a question of demography rather than biography, of territorial systems rather than battle lines per se. Above all, it became a problem of management.<sup>94</sup> The issues of labor, collectivity, and aesthetics that constitute the robotic milieu of *R.U.R.* are inextricably tied to this geo- and biopolitical moment, and the war’s impact on technology, organization, and perception is unmistakable. On and off the battlefield, Münsterberg argues, this was a war of “technique” and thus of science. But the moral valence of this science of antagonism is, for Münsterberg, reversible. The technologies of territorial and organizational management could be turned to the establishment of a properly administered peace after the war’s conclusion, with science as the ultimate victor of the battle:

The laboratory has equipped the armies and has triumphed on the land, in the sea, and in the air, and even in the ether which carries the wireless. But it was and is not only the war of physics and chemistry; [it involves] problems of economics and geography, of hygiene and medicine and—if we take it with a grain of salt—of international law . . . national efficiency can never again be severed from scientific thoroughness.<sup>95</sup>

Münsterberg couches his internationalist optimism in the terms of global productivity: “The indignant pose cannot last long when a thousand tasks of international communication and transportation, of hygiene and law, of credit and safety, can be performed only by united labor.”<sup>96</sup>

This precarious balance between the overlapping subjectivities of the national and the international is mirrored in *R.U.R.* toward the end of the first

act. The factory director Domin admits that after the impending, long-anticipated robot revolution the factory will transition from building Universal Robots at a single site to creating National Robots in an interlinked but dispersed set of factories—a move that knowingly reinscribes the emergence of the nation-state within the internationalist politics of corporative globalism. The “identities” of these robotic populations, implying something of a technological vernacular in which the standardization of production is to reveal and even amplify national and cultural difference rather than mask it under the sign of internationalist homogeneity, brings Čapek’s ambivalent critique full circle. The robot, then, is far from an idealized and socially uninflected technology, as the automaton aspires to be; it is instead a complex figure borne of decades of physiological, psychological, organizational, and spatial research, as actual as it is utopian, which finds itself at the very heart of the interwar world order—stepping beyond the realm, perhaps, of science fiction.

## Notes

I thank the editors of *Grey Room*. Earlier drafts benefited greatly from the close attentions of Felicity Scott and Hollyamber Kennedy. Caroline Jones first alerted me to some of the historical and etymological connections that are central to my argument. This essay grew out of a footnote that kept expanding. The original thesis project that contained it was thoughtfully guided by Shannon Mattern.

1. Robert Musil, *The Man without Qualities*, trans. Sophie Wilkins, vol. 1 (New York: Vintage Books, 1995), 7.

2. The German title was *W.U.R.*, the eponymous “Rossum” having been renamed “Werstand.” Frederick Kiesler lists the date of the production as December 1922 in his catalogue for the 1924 Internationale Ausstellung neuer Theatertechnik (International Exhibition of New Theater Techniques) in Vienna, but reviews of the play in German newspapers date the performances to late March and early April of the following year. For an excellent and thorough account of the production, the best source remains Barbara Lesák, *Die Kulisse explodiert: Friedrich Kieslers Theaterexperimente und Architekturprojekte, 1923–1925* (Vienna: Löcker Verlag, 1988), which is one of few in-depth treatments of this period of Kiesler’s work.

3. John Corbin, “A Czecho-Slovak Frankenstein,” *New York Times*, 10 October 1922. The Czech premiere took place in 1921, shortly after the play’s publication in Prague. Despite not being published in English until the following year, the American premiere opened in New York in October 1922, some months before the Berlin premiere. The New York premiere was soon followed by productions in Chicago and Los Angeles. London saw its first production in April 1923.

4. See Jeffrey Herf, *Reactionary Modernism: Technology, Culture, and Politics in Weimar and the Third Reich* (Cambridge, UK: Cambridge University Press, 1984), 40.

5. The quoted review was written by literary critic Josef Kodíček, who adds, “although we were not exactly Africa, we were provincial.” See Bohuslava R. Bradbrook, *Karel Čapek: In Pursuit of Truth, Tolerance, and Trust* (Brighton: Sussex Academic Press, 1998), 49. After opening in Berlin, the Kiesler-designed production also played at Vienna’s Neue Wiener Bühne in October and November of 1923.

6. In a letter, Kiesler’s wife, Lillian, reports that Kiesler believed “that the three years 1922, 1923, 1924 were the most fruitful years of his life and felt the rest of his life was a follow up of those ideas.” Lillian Kiesler to Roger L. Held, 17 September 1976, in box 18, Lillian and Frederick Kiesler Papers, Archives of American Art, Smithsonian Institution.

7. The archival limitations surrounding Kiesler’s European work have understandably led to its relatively cursory treatment in much Kiesler scholarship, although this challenge also invites a more interdisciplinary approach that situates the available material in a wider set of discourses.

8. Frederick Kiesler, *Selected Writings*, ed. Siegfried Gohr and Gunda Luyken (Stuttgart: Verlag Gerd Hatje, 1996), 17.

9. For a concise definition and history of the term, see Chris Csikszentmihalyi, “Robotics,” in *Sensorium: Embodied Experience, Technology, and Contemporary Art*, ed. Caroline A. Jones (Cambridge: MIT Press, 2006).

10. A representative example suffices to illustrate this trend: “Čapek’s robots were organic

beings, not mechanical men. Nevertheless, they served the same purpose as the *real robots* introduced into factories just a few decades later: to relieve human beings of difficult, monotonous, or dangerous work.” Lisa Nocks, *The Robot: The Life Story of a Technology* (Westport, CT: Greenwood Press, 2007), 3; emphasis added.

11. Juliet Koss briefly treats the 1928 Belgian production of *R.U.R.* in her *Modernism after Wagner*, linking this more technologized version of the robot to *Metropolis*’s Maria: “Maria represented the wondrous potentials of serial production. So, too, does the *Steel R.U.R. Automaton*.” Juliet Koss, *Modernism after Wagner* (Minneapolis: University of Minnesota Press, 2010), 217–218. Sketches for this Belgian staging appeared in *Variétés* in 1928. Barbara Lesák goes still farther in linking *R.U.R.* to *Metropolis*, noting particular similarities of staging. Lesák, *Die Kulisse explodiert*, 83.

12. H.G. Wells, “Metropolis,” *New York Times*, 17 April 1927. Wells also felt that *Metropolis* had borrowed from his own work: “Possibly I dislike this soupy whirlpool none the less because I find decaying fragments of my own juvenile work of thirty years ago, *The Sleeper Awakes*, floating about in it.”

13. Wells, “Metropolis.”

14. Thorstein Veblen, *The Theory of the Leisure Class* (1899; New York: A.M. Kelly, 1965), 98.

15. Hugo Münsterberg, *Psychology and Industrial Efficiency* (Boston: Mifflin, 1913), 37. Münsterberg’s book is dedicated to Harold F. McCormick, the son of Cyrus McCormick, inventor of the mechanical reaper.

16. I use these two complementary functions of the *homo oeconomicus* as described by Michel Foucault: “*Homo oeconomicus* is an entrepreneur, an entrepreneur of himself . . . being for himself his own capital, being for himself his own producer, being for himself the source of [his] earnings. . . . The man of consumption, insofar as he consumes, is a producer. What does he produce? Well, quite simply, he produces his own satisfaction.” Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège De France, 1978–1979*, trans. Graham Burchell (New York: Picador, 2010), 226. For an engaging account of Hadaly and other automata, see Gaby Wood, *Edison’s Eve: A Magical History of the Quest for Mechanical Life* (New York: Knopf, 2002).

17. Bertolt Brecht, *Brecht on Theatre: the Development of an Aesthetic*, ed. John Willett (London: Methuen, 1964), 26.

18. Ivan Klíma, *Karel Čapek: Life and Work* (North Haven, CT: Catbird Press, 2002), 78.

19. Karel Čapek, *R.U.R. (Rossum’s Universal Robots)*, trans. Claudia Novak (New York: Penguin Classics, 2004), 6–9.

20. Čapek, *R.U.R.*, 21.

21. Čapek, *R.U.R.*, 21.

22. Čapek, *R.U.R.*, 28.

23. Corbin, “A Czecho-Slovak Frankenstein.”

24. Klíma, 34n.

25. Karel Čapek, *Towards the Radical Center: A Karel Čapek Reader*, ed. Peter Kussi (North Haven, CT: Catbird Press, 1990), 333.

26. This passage is from a 1923 article written for *The Saturday Review* in response to a debate between George Bernard Shaw, G.K. Chesterton, and others about *R.U.R.*’s London premiere; it is quoted in William Edward Harkins, *Karel Čapek* (New York: Columbia University

Press, 1962), 91.

27. Andreas Huyssen sees a similar set of “opposing views of modern technology” in *Metropolis*, and his linkage of this ambivalence to particular aesthetic modes relates well to Čapek’s vision: “The expressionist view emphasizes technology’s oppressive and destructive potential and is clearly rooted in the experiences and irrepressible memories of the mechanized battlefields of World War I. During the 1920s and especially during the stabilization phase of the Weimar Republic this expressionist view was slowly replaced by the technology cult of the *Neue Sachlichkeit* and its unbridled confidence in technical progress and social engineering.” Andreas Huyssen, “The Vamp and the Machine: Technology and Sexuality in Fritz Lang’s *Metropolis*,” *New German Critique* 24/25 (Autumn 1981): 223.

28. Patricia S. Warrick, *The Cybernetic Imagination in Science Fiction* (Cambridge, MA: MIT Press, 1980), 50.

29. Yevgeny Zamyatin, *We*, trans. Natasha Randall (New York: Modern Library, 2006), 31. For an extensive survey of like-minded fictional worlds, see Richard Stites, *Revolutionary Dreams: Utopian Vision and Experimental Life in the Russian Revolution* (New York: Oxford University Press, 1989), ch. 8.

30. This movement was embodied in postrevolutionary Russia by figures such as Alexei Gastev and his Central Institute of Labor. See, for example, Kendall E. Bailes, “Alexei Gastev and the Soviet Controversy over Taylorism, 1918–24,” *Soviet Studies* 29, no. 3 (July 1977): 373–394.

31. F.T. Marinetti, “Multiplied Man,” in *Futurism: An Anthology*, ed. Lawrence S. Rainey, Christine Poggi, and Laura Wittman (New Haven: Yale University Press, 2009), 90–91.

32. Klíma, 72–73.

33. Huyssen, 222.

34. Čapek, *R.U.R.*, 21.

35. Max Weber, *The Protestant Ethic and the “Spirit” of Capitalism and Other Writings*, trans. P.R. Baehr and Gordon C. Wells (New York: Penguin Books, 2002), 107.

36. Anson Rabinbach, *The Human Motor: Energy, Fatigue, and the Origins of Modernity* (Berkeley and Los Angeles: University of California Press, 1992), 18.

37. J.A. Etzler, *The Paradise within the Reach of All Men, without Labor, by Powers of Nature and Machinery: An Address to All Intelligent Men* (Pittsburgh: Etzler and Reinhold, 1833), pt. 1, 61–62.

38. Etzler, pt. 2, 95–96.

39. Paul Lafargue, *The Right to Be Lazy*, trans. Charles H. Kerr (Chicago: C.H. Kerr, 1975), pt. 1.

40. Lafargue, pt. 3. In the phrase “tortures his nerves,” we see a nod to the then-prevalent diagnosis of neurasthenia.

41. Lafargue, pt. 3.

42. Lafargue, pt. 4.

43. Karel Čapek, “In Praise of Idleness,” in *Towards the Radical Center*, 241.

44. Some have argued that Etzler’s ignorance of the second law of thermodynamics (still being worked through in European scientific circles) led to his overly optimistic view of energy capture, among other things. See Steven Stoll, *The Great Delusion: A Mad Inventor, Death in the Tropics, and the Utopian Origins of Economic Growth* (New York: Hill and Wang, 2008).

45. Rabinbach, 19. See also, Andreas Killen, *Berlin Electropolis: Shock, Nerves, and German Modernity* (Berkeley and Los Angeles: University of California Press, 2006).
46. Rabinbach, 276. One of the most common critiques of Taylorism was its orientation towards management rather than the worker.
47. Friedrich Kittler, *Gramophone, Film, Typewriter* (Palo Alto, CA: Stanford University Press, 1999), 172.
48. Frederick Kiesler, foreword to *International Theatre Exposition Program* (New York: n.pub., 1926), 5.
49. Harkins, 4, 9. The production moved to the National Theater in Prague later that same month, on January 25.
50. Jindřich Toman, *The Magic of a Common Language: Jakobson, Mathesius, Trubetzky, and the Prague Linguistic Circle* (Cambridge, MA: MIT Press, 1995), 219–222.
51. The text is written in a hybrid of French and German. To keep some sense of the original, I have translated only the German. Frederick Kiesler, “De la nature morte vivante,” in *Internationale Ausstellung neuer Theatertechnik*, exh. cat. (Vienna: Würthle & Sohn, 1924), 20–21.
52. Kiesler, “De la nature morte vivante,” 20–21.
53. Lesák, *Die Kulisse explodiert*, 70–83.
54. T.H. Creighton, “Kiesler’s Pursuit of an Idea,” *Progressive Architecture*, July 1961, 109. For further technical description of these devices, see Held, 11–17. Brecht credits Erwin Piscator for the original use of cinema in the theater, although Piscator may well have learned of Kiesler’s techniques while attending the 1924 Internationale Ausstellung neuer Theatertechnik, curated by Kiesler, or through László Moholy-Nagy, who saw *R.U.R.* Brecht, 77.
55. Held’s dissertation and later monograph on Kiesler thoroughly examines Kiesler’s claim to primacy in the incorporation of cinema into the theatrical arena. Sergei Eisenstein included a cinematic “interlude” in a March 1923 staging, and a 1919 dada performance in Berlin used film as an “out of context” interruption that, for Held, fits more “within the nihilistic tradition established by the Dada movement.” Kiesler’s use of film was novel because the film was integrated within the scenery and action itself. Held might extend his claim too far in suggesting that the film “was used to represent a machine of the future—closed circuit television.” Kiesler himself saw that role falling to the Tanagra Apparatus. The illusory space of the two-dimensional screen is more critical here than the panoptic visual flattening of closed circuit television. Held, 13–15.
56. Kiesler, “De la nature morte vivante.”
57. Although we have no documentation of which part of the prologue the projected media was used in, the following conversation is the most likely place: “DOMIN: Come over to the window. What do you see? HELENA: Bricklayers. DOMIN: Those are Robots. All our laborers are Robots. And down below, can you see anything? HELENA: Some sort of office. DOMIN: The accounting office. And its . . . HELENA: . . . full of office workers. DOMIN: Robots. All our office staff are Robots. When you see the factory . . . [At that moment the factory whistles and sirens sound.]” Čapek, *R.U.R.*, 13. Held argues that “the use of the factory whistle to stop the direction of the dialogue and change direction of emphasis serves also as a practical device for stopping the restricted amount of film,” although ascribing this intention to Čapek’s text is problematic because Kiesler’s use of film came well after Čapek wrote the play. Held, 12.

58. Yehuda Safran, "Frederick Kiesler 1890–1965," *AA Files* 20 (Autumn 1990): 83.

59. Creighton, 115.

60. Kiesler had visited Berlin in 1921; John Warren argues that "it was probably there that he fell under the influence of Russian Constructivism." Many Viennese artists and architects (including many Hungarians, like László Moholy-Nagy, who had arrived in Vienna after the failure of the 1919 Communist Revolution) made similar trips to Berlin at that time. John Warren, "Friedrich Kiesler and Theatrical Modernism in Vienna," in *Theatre and Performance in Austria: From Mozart to Jelinek*, ed. Ritchie Robertson and Edward Timms (Edinburgh: Edinburgh University Press, 1993), 82.

61. Lillian Kiesler to Barbara Lesák, 16 June 1976, in box 18, Lillian and Frederick Kiesler Papers, Archives of American Art, Smithsonian Institution.

62. Kiesler to Lesák.

63. For more on Moholy-Nagy's and Piscator's on-stage projections, see Noam Elcott, "Into the Dark Chamber: Avant-Garde Photography and the Cinematic Imaginary" (Ph.D. diss., Princeton University, 2009).

64. Creighton, "Kiesler's Pursuit of an Idea." Also cited in Held, 18. The future theater being discussed by this storied assembly of designers had, in a sense, already been under production for the previous decade. In 1913 Marinetti had issued his manifesto on "The Variety Theater," whose fourth precept called for the use of film. This was followed by Enrico Prampolini's "Futurist Stage Design," which argued for the use of an "electromechanical architectural structure" and "immense dynamic-stage" moving sets. Kiesler adopted the phrase "electromechanical scenery," revealing his sympathy with futurist rhetoric. The phrase is often seen as Kiesler's original coinage. "Never at a loss for a catchy phrase," Barbara Lesák writes, "Kiesler called the backdrop design for W.U.R. an 'electro-mechanical scenery' . . . the beginning of an increasing autonomy of the stage scenery vis-a-vis the literary text." Barbara Lesák, "Alles dreht sich, alles bewegt sich . . . Die dynamischen Bühnenprojekte von Friedrich Kiesler / Everything is Turning, Everything is Moving . . . The Dynamic State Projects of Friedrich Kiesler," *Daidalos*, 15 December 1984, 83. Kiesler met Marinetti and Prampolini not long after *R.U.R.*, but their writings were widely circulated and surely known to a man with such avid cultural and political interests (as would have been the dynamic constructivist sets designed for directors like Vsevolod Meyerhold and Alexander Tairov, who were invited to participate in Kiesler's 1924 exhibition in Vienna).

65. See especially, Stephen Phillips, "Toward a Research Practice: Frederick Kiesler's Design-Correlation Laboratory," *Grey Room* 38 (Winter 2010): 90–120.

66. Warren, "Friedrich Kiesler and Theatrical Modernism in Vienna," 82.

67. Kiesler's notions of dimensionality were often tinged with metaphysical undertones. One news reporter, unsure of what to make of Kiesler's thinking, noted that his system did not seem to stop with the usual definition of time as a fourth dimension. "When Kiesler was asked if a fifth dimension existed and could be applied in the theater, his answer could not be understood." "Kiesler Waves Old Theater Out and New One In," *New York Tribune*, 15 March 1926.

68. Beatriz Colomina argues that Kiesler ("perhaps the only avant-garde figure in architecture that one can speak of in the United States") was unique in his desire to create an affective architecture of stimuli and emotions—the production of an "unmistakably sexual blush," she writes. This results in a deep intertwining of designer and building, and she uses the

psychical frame to unpack Kiesler's personal struggles to complete any built work outside the confines of the theater and the museum: "Psyche and architecture are inseparable," she writes. "The architect cannot let go of his projects." These same psychological discourses can also be used to consider the unique perceptual and psychotechnical relationship—Kiesler's term—between audience and scenography that he was attempting in his designs for *R.U.R.*, among other projects. Beatriz Colomina, "The Psyche of Building: Frederick Kiesler's Space House," *Archis* 11 (November 1996): 72, 80.

69. Ethel Dench Puffer, *The Psychology of Beauty* (Boston: Houghton, Mifflin, and Co., 1905), 241. She later became Ethel Dench Puffer Howes and is now known primarily for her feminist work with the suffrage movement.

70. Several other books on aesthetics and psychology are found in Kiesler's collection, including works by William James, Gustav Fischer, and John Dewey (though none by Münsterberg). Despite the date of publication, Kiesler likely encountered this book after 1926 (journalists tended to comment negatively on his command of English when he first arrived in the United States). Lillian Kiesler, "Books in the Personal Library of Frederick Kiesler," 1983, in box 19, Lillian and Frederick Kiesler Papers, Archives of American Art, Smithsonian Institution.

71. For more on the role of empathy in the post-Wagnerian theater, see Koss, ch. 2.

72. Puffer, *The Psychology of Beauty*, 239–241.

73. "There must be a vivid emotional effect, but it is the spectator's very own, and not a copy of the hero's emotion, because it is the product of the essential form of the drama itself, the confrontation of forces." Puffer, *The Psychology of Beauty*, 260.

74. Puffer continued her scholarly association with Münsterberg at Harvard, later publishing an essay in a volume of research from the Harvard Psychological Laboratory. Ethel Dench Puffer, "Studies in Symmetry," in *Sixteen Experimental Investigations from the Harvard Psychological Laboratory*, ed. Hugo Münsterberg (New York: The Macmillan Company, 1903), available online at <http://www.scribd.com/doc/17394803>.

75. For background on Münsterberg's work at Harvard, see Giuliana Bruno, "Film, Aesthetics, Science: Hugo Münsterberg's Laboratory of Moving Images," *Grey Room* 36 (Summer 2009): 88–113. The appearance of *The Photoplay* in 1916 could not have been timelier. Kittler observes that the development of serial photography was intimately tied to World War One. "The barrels of machine-guns moved away from the black, yellow, and red skins against which they had been developed and started aiming at white targets. Movie cameras, however, kept pace and experienced a boom that might have been a misuse of army property." Kittler, 128.

76. Hugo Münsterberg, *The Photoplay; A Psychological Study* (New York: D. Appleton and company, 1916), 24.

77. Münsterberg, *The Photoplay*, 30.

78. Kiesler, *Selected Writings*, 17.

79. As Kiesler wrote, "The camera was walking into the interior of the factory and the audience had the impression that the actors on the stage walked into the perspective of the moving picture, too. I mention it only because these new devices to present the interplay of reality and illusion brought many artists to the theater." Creighton, 109. Kiesler's description of the spatial effect may be pushing the bounds of credulity because the circular screen had a diameter of only 1.10 meters.

80. Matthew Hale, *Human Science and Social Order: Hugo Münsterberg and the Origins of Applied Psychology* (Philadelphia: Temple University Press, 1980), 146.

81. Hugo Münsterberg, *Grundzüge der Psychotechnik* (Leipzig: Barth, 1914). See also, Kittler, 157.

82. On the motivations behind his doctoral dissertation, see Harkins, 7. Čapek's interest in American pragmatism was piqued by a lecture series given by Edvard Beneš, who would go on to become the president of Czechoslovakia in 1935. Čapek refers to Münsterberg only briefly in his 1925 volume *Pragmatismus*, which outlines his doctoral research (he focuses more heavily on James, Dewey, and F.C.S. Schiller). Karel Čapek, *Pragmatismus: Čili filosofie praktického života* (Prague: F. Topic, 1925).

83. William James, "Are We Automata?" *Mind* 4 (1879).

84. Adolf Loos, "The Theater," in *International Theatre Exposition Program*, 7.

85. Hugo Münsterberg, *Psychology and Industrial Efficiency* (Boston: Mifflin, 1913), 37.

86. Hale, *Human Science and Social Order*, 3.

87. Münsterberg, *Psychology and Industrial Efficiency*, 116, 180.

88. Münsterberg, *Psychology and Industrial Efficiency*, 309.

89. Hugo Münsterberg, *Tomorrow: Letters to a Friend in Germany* (New York: D. Appleton and Company, 1916), 20.

90. Klíma, 51–52.

91. Münsterberg, *Tomorrow*, 36.

92. Klíma, 18.

93. Harkins, 21.

94. Siegfried Kracauer offers a laconic take on the systematization of the German army under Walter Rathenau: "I recall the days of mobilization, when it was said that the minister of war, thanks to the organizational miracle of deployment plans prepared in advance, sat in his peaceful office with nothing to do while outside his troops were on the march. Admittedly, the war itself was then lost." Siegfried Kracauer, *The Salaried Masses: Duty and Distraction in Weimar Germany*, trans. Quintin Hoare (New York: Verso, 1998), 40.

95. Münsterberg, *Tomorrow*, 227.

96. Münsterberg, *Tomorrow*, 233.