the 1925 Follies, Edmund Wilson perceived such elements in the steps and patterns of the Tiller Girls, a precision drill troupe from England. The finale featured Will Rogers’s rope tricks and a cowboy song with the chorines creating precise geometric patterns. The Tiller Girls came on stage all in “white with purple leggings and sombreros,” and proceeded to “make a swinging line: all together.” The troupe “crack[ed] their whips all together . . . [then] circ[l]ed about the pedestal, [creating] two rings, one inside the other and turning in opposite directions.” The two lines of women began to spin inside each other like gear-wheels.

Will Rogers entered the scene with his trusty lasso to establish control, “drop[p]ing his lariat down about them, making it whirl in the opposite direction to the outer circle of girls.” Chorines were often called “ponies” or “fillies” (especially by black musicians) and Rogers lassoed the two circles of women while singing the words “I would like to corral [you].” Once Rogers had the Tiller Girls lassoed, the music was torqued up into a whirling, nearly out-of-control tempo; the women stayed together in their circles and Rogers ably maintained his role as ringmaster. Rogers’s persona here synthesized the engineer of mechanical order with the solitary Western loner.

Perhaps even more than the women, the machine—as-social-force needed to be corralled. Wilson described the escalation of tempo: “The beat has mastered everything; it pounds fast in a crash of orange. For two minutes in wheeling speed, focused in the green-gilt proscenium frame, they [the Tiller Girls] concentrate the pulse of the city.” A final reminder of the beauty of controlled perpetual motion concluded the number. The performers did not stop; the curtain was dropped on the whirling tableaux still in motion, “on the girls and the turning lariat”; then, a minute later, the curtain was reopened to show “the rings . . . still turning.” This dance coda suggests confident control over chaotic forces. Only after this last display of control over the human gear-wheels did “the circles draw in and halt.”

“The beat has mastered everything.” I wish to meditate on Wilson’s phrase to reemphasize a point crucial to my argument. To stretch a metaphor, the “beat” is the cultural base of Ziegfeld’s dynamo, while the mechanized choreography represents the cultural superstructure. Ziegfeldian spectacle—the conspicuous consumption of women and finery on display, the militaristic and geometric stylization of machine aesthetics, the nonverbal reinforcement of gender roles—was made possible by the cultural work done by the creation of “the beat” in American society.
Only after the beat had mastered everything could fluid geometric dance patterns be choreographed to reflect machine processes. Wilson understood this to be the primary function of the precision high-kicking of groups like the Tiller Girls: “[With] the strong urgent beats of their kicking they send home the strong beats of the music.” The beat was the foundation that made the spectacle of abundance “modern” and reflective of its historical moment.36

Ziegfeld himself understood something of the rhythmic basis of his modern syncopated revue. For his production of Show Girl (1929), the impresario hired Duke Ellington’s band to play for a cabaret scene—above and beyond the regular orchestra. A theater critic from the New York World Telegram questioned this duplication of musicians and Ziegfeld responded with a three-column reply in the same paper:

It was probably foolish of me, after spending so much money on a large orchestra, to include a complete band in addition, but the Cotton Club Orchestra, under the direction of Duke Ellington . . . is the finest exponent of syncopated music in existence. Irving Berlin went mad about them, and some of the best exponents of modern [that is, classical] music . . . during rehearsal almost jumped out of their seats with excitement over their extraordinary harmonies and exciting rhythms.37

Ziegfeld understood the difference between “symphonic jazz” and the emergent big-band swing. The former was a melody-centered approach based on subsuming a dynamic rhythm in an orchestral tradition; the latter was (and still is) a rhythmic conception featuring the conversational call-and-response of instrumental sections, the interplay of solo improvisation and collective drive, and the creation of new tone colors from original orchestrations of brass instruments. Ziegfeld’s praise was so important that the Cotton Club quoted it in full to advertise the Ellington residency there.

Jazz dancing—that is, African American social dance—was also a crucial ingredient of the Follies. Many kinds of dance were presented at the Follies over the years, including “traditional ‘hoofing’ numbers, acrobatic dances, popular dances such as the tango, shimmy, ‘jazz dancing,’ ballroom dancing, precision dancing, tap and ballet.” But black dance was central to the Follies, even as it was often caricatured. For example, ragtime music and dance was the theme of both the 1910 and 1911 Follies; there were eight rags in the former (“Temptation Rag,”
“Franco-American Rag”) and, in the latter, a presentation of “New Year’s Eve on the Barbary Coast” (San Francisco’s ragtime-driven cabaret district). The turkey trot was so popular nationally that it was presented, caricatured, and disseminated over a three-year period (1912-14). In 1914 the eccentric dancer Leon Errol taught the dance to a dressed-up urban throng of cops, garbage men, tramps, and horses in a skit entitled “Turkey Trottishness.” As far as individual dancers go, Ann Pennington danced the Black Bottom in her Follies tenure from 1913 to 1924; Gilda Gray danced the shimmy in the 1922 Follies; and Marilyn Miller tap-danced throughout the 1920s Follies.

According to scholars, the definitive edition of the revue was the 1919 Follies. The centerpiece of the first act was a depiction of jazz dancing and the shimmy that both celebrated and mocked black social dance. First, two men shimmied in a number called “A Shimmy Town”; the dance was then parodied by a chorus line called the “Shimmee Girls” and then by a group of children, the “Follies’ Pickaninnies.” Eddie Cantor followed with a song called “The Apostle of Pep,” which led into the first-act finale, “a minstrel spectacular” entitled the “Follies Minstrels.” As the star dancer Marilyn Miller impersonated the legendary (white) minstrel dancer George Primrose, performers in blackface provided commentary and song arranged in the standard semicircular minstrel format (with Eddie Cantor as “Mr. Tambo” and Bert Williams as “Mr. Bones”). In a typical Ziegfeld touch, the semicircular set of minstrel seats was covered in white, silver, and pink satin. The first act ended with Miller doing a fast buck dance accompanied by eight men and women from the chorus. Three years later the Follies featured a parallel white history of “theatrical dancing styles,” from late nineteenth-century Scottish clog dances to the precision dance of the Tiller Girls—as if showing the industrial (re)evolution of raw individual expression to collective mechanized choreography.

By 1928 Ziegfeld’s chorus lines had influenced all of Broadway; in terms of energy and originality, his only competition came from “the Negro shows.” White Americans had “learned a vast amount from negro dancing,” Seldes wrote in 1924, and the black tradition had “touch[ed] the dance at every point in music.” African American social and commercial dance styles were the crucial element “preventing the American dance from becoming cold and formal.” Seldes had little vocabulary for analyzing black dance, and he perceived in the huge hit Shuffle Along (1921) and other black revues only “the true frenzy,” the Dionysian
release, "elements ... riotous and wild"—the antithesis of the meticulous control and discipline on display in Ziegfeld's shows.

*Shuffle Along* was almost solely responsible for bringing black tap dancers to the attention of theater critics and audiences. The show's chorus line was influential for its speed, precision, songs ("I'm Just Wild about Harry"), and comedy (Josephine Baker's star comic turn as the incompetent chorine at the end of the line). The pace of all-black revues captivated London and Broadway theatergoers till the end of the decade, from *Shuffle Along* to *Hot Chocolates* (1929), and at Harlem’s Cotton Club and Connie’s Inn. David Levering Lewis describes Cotton Club floor shows as "Ziegfeldian in their gaudiness, and almost too athletic to be sensuous, with feathers, fans and legs flying in time to Ellington’s torrando renditions of compositions like ... 'When My Sugar Walks down the Street.'" Speed was the cry of those revues, and "all great Harlem floor shows of the Twenties ... [had] that quality [of] speed: a spectacularly frenzied pace."41

By the late 1920s Broadway had been so influenced by both the Folies and the black revues that dance directors were as important as writers and composers.42 Their prestige was directly related to the increasing importance of the chorus line in theatrical production. The focus on the scantily clad female dancer and on dynamic movement—rather than on costume and drill—permeated Broadway. The cookie-cutter chorus line combined English music-hall traditions of costumed older women performing marches and drills, Ziegfeld girls' precise movements, and dynamic black dance movement to create "[the] precision chorus line of 'girls' dancing in unison with rhythm and a sense of swing."43

In 1928 an anonymous Broadway dance director declared chorus lines themselves to be an artistic manifestation of the Machine Age. "Our day ... is a day of hop, skip and clockwork," he told the *Vanity Fair* critic Gilbert W. Gabriel. "Our art must be a grotesque vivifying of the rigid, steely architecture. ... Our dance must evoke the dynamo, the axle worm, the crank-shaft, the clash of great, glinting metal rods in swiftly syncopating formation." These perceptions disturbed Gabriel, who was "awed ... and depressed" by the associations. Like Wilson, he found the movements of chorus lines "joyless" and associated their coldness with overmechanization: their intensity, their group discipline, their unison kicks, "their torsos with ... clock-like communality of spasm, their heads and arms with such a crack infantry precision."44
But to Gabriel the dance director’s words shed light on a popular Broadway dance number in many 1928 productions. The routine was built on an old vaudeville slapstick bit where people simply stood and sat quickly, creating fast, chaotic, humorous patterns of movement. In the updated version, chorines stood and sat quickly—sometimes singly, sometimes in rows—and the repetition across rows of faceless women created a sense of interlocking mechanisms; their “alternate risings and squattings” came to resemble “the regularity achieved by a row of pistons.” Gabriel recommended that readers go look at the “inner workings” of an eight-cylinder car to see the fidelity of “this simple evocation.”

In the 1930s the precision chorus line became institutionalized in the Rockettes. The in-house cultural ambassadors of Radio City Music Hall, the Rockettes emphasized mechanical execution, geometric forms, collective malleability, and female pulchritude. Their production numbers offered neither individuality nor improvisation, but instead a dance machine made out of human female cogs. “Love one Rockette, and you love them all,” a British dance historian sneered, for “it is impossible not to connect them in the mind’s eye with [an] interminable procession of cheerleaders. . . . The Rockettes seem to a European to exemplify the clean-limbed all-American girl at her brashest: each one, no doubt, able to step up front and recite her essay on Why America is Best.” Born in 1925 as the “Missouri Rockets” and brought to Radio City in 1932 by Steve Roxy (and renamed the Roxy-ettes), the Rockettes are still promoted as “the quintessential American chorus line—an exciting precision drill team with great style,” and they continue to embody the stylized machine aesthetics of abundance, repetition, standardization, and precision.

Through music and dance, the female-powered dynamo brought the industrial soundscape into an artistic frame for its audience to ponder the new pulse of the city. With the machine process stylized into a driving rhythm, Ziegfeld could overlay, for a prosperous elite, the fantasies of abundance endemic to American technological utopianism. In the promise of hedonism and sex after the long industrial age of repression, in the reinforcement of traditional gender roles in dance and humor, in the assimilation of ethnic groups under one elite brand name, there lies a shift in cultural leadership from religion, politics, and the arts to popular culture. As for “the beat,” Ziegfeld culturally appropriated it to create speed and chaos on the one hand and yet maintain mechanical regularity and control on the other.
Ziegfeld the Industrialist

Ziegfeld was thus a captain of industry working in theatrical production; he did his homework and found his niche. He sat through every production of the 1906 Broadway season and concluded that the musical comedy field “lack[ed] in costumes and girls.” The formulaic production of the pre-Ziegfeld revue involved “about 20 girls, three changes of costumes, a pair of young lovers, a leading woman with a voice and reputation, a straight man, dancers, a dozen or so musicians in the pit and the inevitable boy-gets-girl plot.” For Ziegfeld, plot did not matter; he would instead “overwhelm [the audience] with beauty and magnificence,” doubling every commodity on the stage. Ziegfeld’s formula was itself a “fable of abundance,” to use Jackson Lears’s phrase: “In place of 20 girls of varied ages, some of whom could sing a little, some dance a little, he would have 120 girls whose figures would be as provocative as their faces,” wrote one biographer. “He would put 100 musicians in the orchestra . . . retain the greatest artists to design as many as 20 changes of costume for every girl. Where one comedian would amuse an audience, six would convulse it.”

A defining moment of Ziegfeld’s early Machine Age vision occurred in a vignette known as “The Artist’s Studio” in The Parisian Model (1906). Six women walked on stage wearing long cloaks and stood behind easels and then “suddenly the girls threw off their cloaks and the audience saw gleaming bare shoulders and curving bare legs.” One contemporary recalled: “The psychology was perfect. . . . [T]he logic of the illusion proceeded like this: (a) this was an artist’s studio; (b) artists paint beautiful young women in the nude; (c) hence . . . they were nude. They weren’t. . . . They wore strapless evening gowns with the skirts and trains pinned up. . . . [but the audience] wanted to believe the girls were naked.” This scene alone “lured men about town time and time again to the show.” Ziegfeld’s Broadway career began with a single female icon, the French musical-comedy star Anna Held. But he soon realized the audience’s investment in abundance and repetition, and he allowed their fantasies to inform his theatrical productions. As one biographer put it, “[Ziegfeld] glut[ted] the gourmets of excitement with a feast of desire.”

Ziegfeld’s investment in speed and precision, abundance and repetition, dictatorial control and mass distribution, and unified hierarchical organization and centralized refinement returns us to Seldes’s astute claim that Ziegfeld was an artistic visionary then in line “with our main
development.” The show proceeded seamlessly, as each number ran “smoothly and the parts . . . neatly dovetailed.”

Ziegfeld was an industrial manufacturer of beauty, the Henry Ford of the theatrical world. The Ziegfeld girls were the standardized parts in his assembly line; he boasted that he interviewed fifteen thousand girls a year (an unlikely number—that would be about forty a day). The Follies’ dance director Ned Wayburn claimed that Ziegfeld’s objective was “to invent groups of girls that could be moved artistically [as parts].” The manufacturing process was complex yet unindividuated. First, the Ziegfeld girls were trained in dance and kinesthetics by Wayburn, using the then-popular Delsarte system of naturalistic movement. Then they were taught how to walk and wear makeup. Finally they were costumed in the finest fabrics in order to be refracted in cutting-edge theatrical lighting. Ziegfeld girls came from all over the country but, except for the star performers, they were all stripped down into human canvases and rebuilt into products of fantasy. The process of what Ziegfeld called “glorifying the American girl” reflected the technology then dictating American life. As Veblen noted, the large modern organization “requires . . . that the labor force . . . be mobile, interchangeable, distributable, after the same impersonal fashion as the mechanical contrivances engaged. . . . [Workers must] be standardized, movable, and interchangeable in much the same impersonal manner as the raw or half-wrought materials of industry.” One admirer caught the quality of standardization in the Ziegfeld dynamo: “Ziggy was always looking for something different. But when he finally got through with it, it always looked like the same thing.”

The ten-minute opening sequence of Ziegfeld’s first film, *Glorifying the American Girl* (1929), featuring a review of past Follies that adapts the famous beauty parades to the screen, reflects this industrial method. As the overture plays twenty years of Follies’ themes (tides zing by, identifying “Glorifying 1919” or “Glorifying 1927”), a multitude of anonymous shapely women in every manner of dress march over a full-screen map of the United States: they are all heading for New York City. The girls march in a slow, perfectly regular step from points north, west, east, and south—akin to rivers or railroad lines—heading with calculated intent for Ziegfeld’s glorification factory. This parade lasts for ten minutes, during which a huge bubble filled with a rendering of the skyline floats over the heads of the aspiring showgirls.

This is a model of industrial manufacturing. In New York City,
Ziegfeld drew upon the raw, unrefined American women from the farm and the frontier, subjected them to a military regimen (on stage and off), transformed the one into manufactured beauty through the industrial process known as "glorifying," and integrated all the moving parts into a unified, fast-paced production that celebrated the nation's driving engine and ideological obsession: the machine.55

Ziegfeld's chorines also had to demonstrate the self-discipline their standardized roles suggested. As with the invasive surveillance of workers perpetrated by Ford's sociological department, Ziegfeld practiced paternalistic discipline, and it was part of his industrial appeal. All talking and kidding around during rehearsals were punished—and "during the rehearsals . . . [an] atmosphere of military discipline was retained." Eddie Cantor recalled that "no seminary students were ever under closer surveillance." Ziegfeld's principles were simple: "Don't get fat. . . . Don't stay up late. . . . Don't go to wild parties."56 As Veblen had theorized, the discipline and efficiency imposed by the machine process would eventually infiltrate everyday life.

Just as Le Corbusier termed the modernist home "a machine for living," the Ziegfeld Follies can justifiably be called a machine built of female beauty. Lewis Mumford theorized that the first machine—in ancient societies—was the "human machine," which comprised masses of humans yoked together to build monumental symbolic forms such as temples or palaces. Human laborers themselves were the "motor power" of the tools, and the lines and proportions of the pyramids, for example, stand up well to modern standards of precision. In the building of the pyramids, slaves acted as human bulldozers, tractors, and prospectors, and there were at least fifty separate job grades within a sophisticated division of labor.57 In the construction of the nation's transportation networks (canals, railroads, and levees), masses of ethnic immigrants and African Americans acted as collective steam shovels and human jackhammers to eliminate natural barriers so that goods could be moved to market.

In the Follies, sensual strength was built of masses of females that fetishized machine processes, reflecting beauty on both the power of machinery and on the manufacturer. The audience was to be "overwhelmed by the supreme glory of the spectacle."58 Ziegfeld girls functioned as the beautiful public face of the new machine-driven theater, with its mechanical tricks, its rotating stage, its electrically controlled layers of curtains, its rising and falling orchestra pit. In running women through mechanical patterns for leisure, Ziegfeld and his competitors
served to allay anxiety about mechanical power by dressing it up in beautiful female flesh. Ziegfeldian chorus lines were thus *female-powered dynamos,* or *pleasure machines made of women.* In mechanized choreography, the individual female body functions only to serve a larger pattern. Ned Wayburn's job was to see that "the chorus functioned as decorative elements and performers and as agents of spectacle... their individual physical attributes were not emphasized; rather, the composite effect was given primary consideration." The women were combined in patterns to temporarily recreate mechanical processes uniting fantasies of flesh and machine, sexual abundance, and commodified leisure. If the labor machine of the ancient world helped build the monumental iconography that emphasized visual reification and symbolic power, the female-powered dynamo helped audiences assimilate mechanical power through male fantasy. Veblen's analysis of turn-of-the-century industrial organization is quite relevant here. Veblen distinguished the roles of engineer and businessman in order to valorize the former as the driving force of the machine process; he idolized engineers and called businessmen agents of "interstitial adjustment." To Veblen, the businessman was simply the human lubricant at the interfaces between technical and economic components. The industrialist was no more than a salesman overseeing—and standardizing, and combining—separate industrial processes to maximize profit. Ziegfeld's biographers suggest that this was exactly the impresario's genius.

In making hundreds of daily decisions, Ziegfeld was an *aesthetic captain* of industry, despite having no technical skills as a dancer, actor, singer, choreographer, or set designer. What exactly did Ziegfeld bring to the Folies? According to Marjorie Farnsworth, "He gave the master's touch, the true entrepreneur's sense of proportion and timing, the quality that brought all these things into form and focus... Ziegfeld had a formula... a changing pattern held within the basic confines of certain fundamental concepts... but within those confines [he kept the drama] fluid and moving." Another biographer added that Ziegfeld "revolutionized at every level: in the use of color in costumes and sets, in the blending of music with action, in the reduction of long comedy acts to sketches integrated with a whole work." One historian points to "the careful integration of all these elements into a unified whole that distinguished the revue." And in the words of the best historian of 1920s musical theater, "The Ziegfeld touch lay in Ziegfeld's quality as ringmaster of talent."
Ziegfeld's death in 1932 was an apt marker of the transition between the Jazz Age and the Depression, from upper-class celebration of opulence and techno-progress to the nervous fear of economic disorder and social strife. The last Follies, in 1931 (after a four-year hiatus), was unsuccessful; significantly, one review deemed it full of "waste" and "extravagance." The Follies was permeated with the values of the 1920s, "with its opulent style, and its chorus of 80 beautiful women." The Follies "symbolized a golden age" of prosperity, "when the United States was a land of opportunity, freedom, and progress."

Ziegfeld transformed American theater by killing off the puritanical strain in the presentation of the female body and revealing upper-class elites to be as prurient as the vulgar working classes. During the Depression, Americans did not lose their taste for spectacle; fantasies of the wealthy were a major staple of films, for example, from Grand Hotel to The Philadelphia Story to the Thin Man series. But there was a distinct difference. In these films the lives of the rich—of luxurious consumption, of freedom from want—were the content. The leading female role was not that of a Ziegfeld girl presenting her body as an element in a fable of abundance.

Ziegfeld managed to impose order on sexual urges and fantasies of consumption for a passive theatrical audience in a mega-revue that reflected the values of prosperity and the processes of mass production. "He was at once witch doctor and organizer of tribal dances," according to one scholar. "Most American men were obsessed with dreams of glamorous sexual fulfillment, and Ziegfeld provided [them]." Ziegfeld's taming of "the beat"—its speed and rhythmic continuity—to run his female-powered dynamo is itself an important contribution to machine-age cultural creativity. But his most enduring artistic legacy with regard to machine aesthetics was an ability to view human beings and theatrical performance as if through a camera lens—intuitively, as it were, without any skills as a photographer or director. This skill was picked up by his heirs, Busby Berkeley and Billy Rose, both of whom carried on Ziegfeld's tradition of mechanized choreography until World War II.

**The Apotheosis of Mechanized Choreography: Busby Berkeley**

Busby Berkeley's musicals remain our most familiar touchstone of mechanized choreography. In what Martin Rubin calls "the Berkeleyesque," the camera is the engine that drives production numbers.