# SCAPES 7

FALL
2008

SCHOOL OF CONSTRUCTED ENVIRONMENTS
PARSONS THE NEW SCHOOL FOR DESIGN

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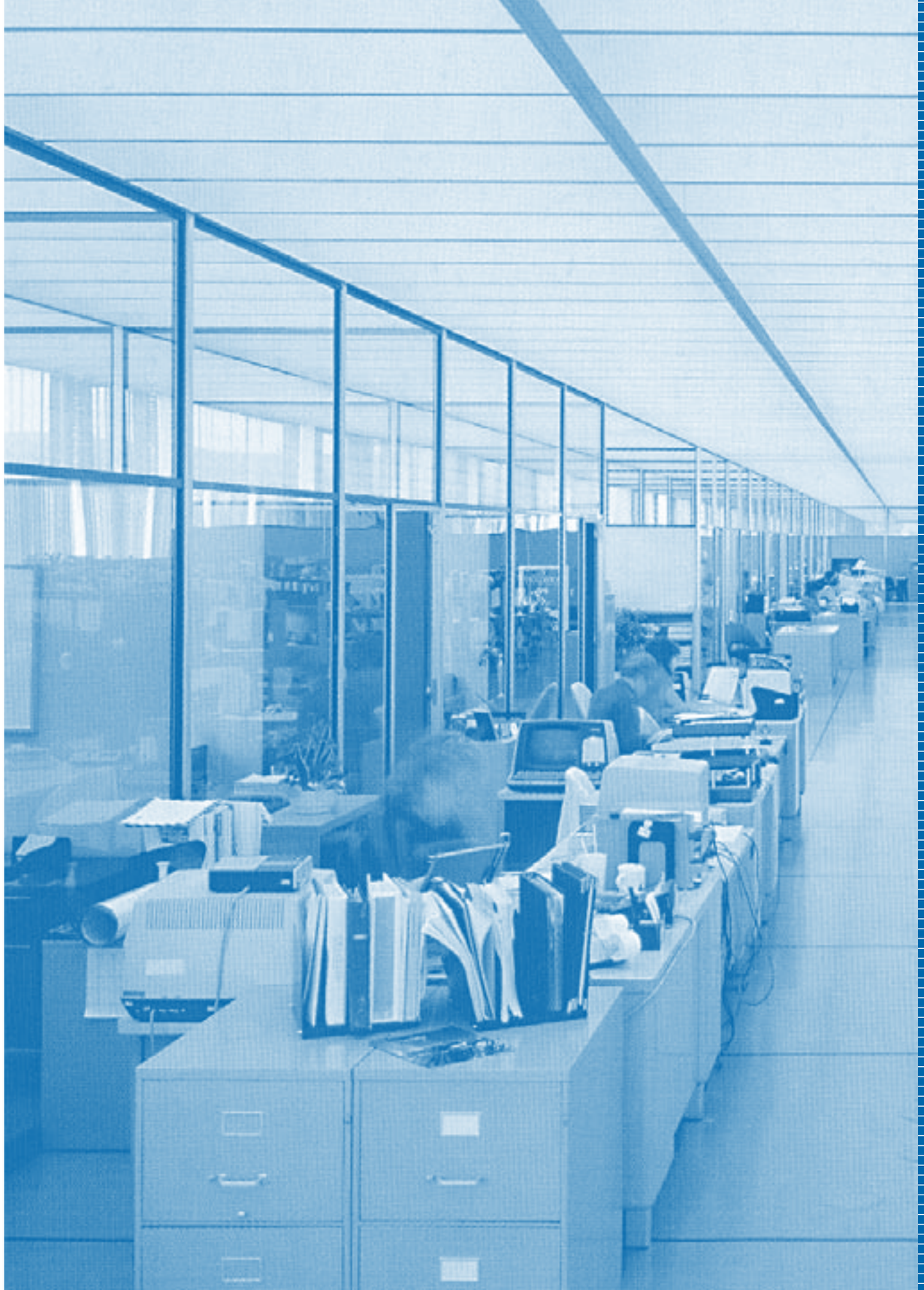


# Essays

# Perpetual Noon: Fluorescent Lighting and the Modern Office

Margaret Maile





**Fig. 1**
**The heavy Victorian aesthetic of this turn-of-the-century office reveals the close connection between the organization and decoration of the domestic and office environments during this period.**
F.G. Day Compiling Company, Glenwood, Iowa, undated. Courtesy Wittemann Collection, Prints and Photographs Division, Library of Congress

> "This life — life? What a joke. This situation — this room. . . You look terrible Mr. Waturi. You look like a bag of shit stuffed in a cheap suit. Not that anyone could look good under these zombie lights. I can feel them sucking the juice out of my eyeballs. Suck, suck, suck…These lights give me a headache. If these lights don't give you a headache than you must be dead, so let's arrange the funeral."
> From the scene "Joe Quits," in *Joe Versus the Volcano*, 1990[1]

The modern corporate office is frequently portrayed in popular media as a soulless landscape of beige cubicles and fluorescent lighting — a regularized, homogenous collection of boxes suspended in a field of ambient, artificial light. The abundant, shadowless illumination of fluorescent lighting that represents the triumph of modern technology over the circadian and spatial limitations of daylighting in the mid-twentieth century has become semiotic shorthand for the depersonalization of the individual office worker by the end of the twentieth century. In the 1990 film, *Joe Versus the Volcano*, the film's protagonist, Joe Banks, who works for the fictional American Panascope Corporation, labors day after day in a windowless, institutionally grey-green office lit by a series of flickering fluorescent lights. Within this setting a telling battle plays out between fluorescent light, representing the oppression and psychic leveling of the modern corporate office, and incandescent light, symbolizing the warmth, protection, and individuality of the domestic sphere. Plagued by a number of mysterious illnesses and feeling the office environment is contributing to his increasing malaise, Joe brings a small portable incandescent lamp with a scenic lampshade to work. Placing the lamp on his desk and switching it on, Joe huddles close to the pool of yellow light. This flagrant assertion of personality and human frailty poses an immediate threat to the standardization of the office and the worker. Joe's boss, Mr. Waturi asks, "What's this lamp for? Isn't there enough light in here for you?" Joe responds, "The fluorescents affect me. They make me feel blotchy and puffy. I thought this light would…" Mr. Waturi has no time for Joe's complaints, "Get rid of the light. This is not your bedroom, Joe. This is an office."[2]

The juxtaposition of the bedroom and office is critical in understanding the deep transformation of the workplace for the white-collar worker in the twentieth century. Building systems and technology are implicit in this change, both contributing to the social staging and architectural formalizing of modern, rationalized office work. Lighting in particular has had a key role in the design and popular perception of the modern office. The social and formal effects of the introduction and integration of electric lighting, and moreover, fluorescent lighting into the modern office largely has been overlooked, both critically and historically. As Donald Albrecht has argued, "The office is a microcosm of American social transformation and a yardstick of cultural progress… The shifting interaction between building design, technology, finance, and employees has yielded a dynamic environment whose significance extends beyond its physical boundaries."[3] While Albrecht calls attention to the multiple physical factors contributing to the cultural complexity of the modern office, he does not mention lighting technology specifically. Owing to its fundamental intangibility, light is not typically discussed as a principle driver in the architectural design process nor as a cultural artifact.[4] However, a reevaluation of the development of the white-collar workplace in the twentieth century reveals that lighting has indeed served both as an architectural and social agent, particularly in relation to the bottom-line of corporate office architecture.

The pre-history of the modern office began in the late nineteenth century as the production of the industrial revolution spawned unprecedented growth in clerical and financial industries. At this time the typical office was designed and decorated following the expectations of the domestic realm.[5] It was common to have heavy fabrics, area rugs, artwork, and decorative lighting fixtures — all recognizable from the Victorian parlor. A photograph of the turn-of-the-century offices of the F.G. Day Compiling Company in Glenwood, Iowa illustrates the organization and decoration of a pre-modern American office (Fig. 1). It is in this era that the physical and psychic distinction between the domestic interior and the place of white-collar work was beginning to be articulated, both in office design and in the critical understanding of these spaces as cultural constructions. Charles Rice, in his reevaluation of histories of the interior, suggests that for the nineteenth-century bourgeoisie, "the [domestic] interior emerges as a space separated from sites of work and productive labor, and becomes a place of refuge from the city and its new, alienating forms of experience."[6] This polarizing of the domestic interior and the workplace in the mid- to late nineteenth century into opposing realms of public and private was accompanied (and exaggerated) by the rapid development of construction and building systems technologies. The introduction of steel frame construction and the passenger elevator in the late nineteenth century ushered in a new age of office towers and the proliferation of office space for the emerging white-collar industries.[7] It is during this period that the United States witnessed an explosion in the managerial sector.

1 – *Joe Versus the Volcano*, written and directed by John Patrick Shanley, 1990, produced by Amblin Entertainment; Warner Bros. Pictures.
2 – *Joe Versus the Volcano*.
3 – Donald Albrecht, "Introduction," in *On the Job: Design and the American Office* (New York: Princeton Architectural Press, 2000), 17.
4 – In the early twentieth century there was some focused discussion within architectural and design communities about the role of light as an architectural "material" or form giver. This discourse was most highly developed in Weimar Germany in the debates surrounding lichtreklame and lichtarchitektur. However, after the Second World War this discussion largely was abandoned. See Werner Oeschslin, "The Architecture of Light," *Lotus International* no.75 (1993), 8-29 and Dietrich Neumann, "Lichtarchitektur and the Avant-Garde," in *Architecture of the Night: The Illuminated Building* (Berlin: Prestel, 2002), 36-53.
5 – Albrecht, 19.
6 – Charles Rice, "Rethinking Histories of the Interior," *The Journal of Architecture* vol.9 (Autumn 2004), 275–287.
7 – For a historical overview of the modern office, see Élisabeth Pelégrin-Genel, *The Office* (Paris; New York: Flammarion, 1996), 9-30.

Fig. 2
The reliance on daylight and natural ventilation is evident in this early twentieth-century office. Large exterior windows allow maximum daylight into the interior of the office, while internal operable transom windows provide natural cross ventilation. Notice also the privacy afforded the individual worker by the semi-enclosed desk.
Early twentieth-century American shipping company office, undated. Courtesy of the Bettman Archive

In the 1860 census, roughly 750,000 persons in the United States were counted as engaged in professional and commercial managerial positions. Thirty years later, the census revealed that the number for this sector had skyrocketed to 2,160,000 — and this figure would double again by 1910.[8]

A bounty of new office towers rose skyward with unprecedented rapidity after the turn of the twentieth century in American cities like New York and Chicago, fueled by speculative building and expanding clerical industries. Daylight was critical in the architectural design and organization of the office in this period, as electric light was too ineffectual to properly illuminate the workplace. Given the necessity of daylight, office plans were limited to a predictable set of volumetric conditions: high ceilings, tall and operable windows, and a depth (from window to corridor) of less than 28 feet. Key to the rentability of these offices, and therefore to the profitability of the investment, was the ability of daylight to penetrate the depth of the interior. The principle economics of office design encouraged the standardization of the basic office unit, which was largely determined by the necessity of access to natural light and air. Owing to these limitations, early twentieth-century offices were small in scale and held a unique connection to natural environmental conditions.[9]

A typical clerical office from this period reveals the symbiotic relationship between the principles of daylighting and natural ventilation in the functional design of the office (Fig. 2). The open windows on the left are mirrored in the open interior transom windows on the right — allowing the continual circulation of fresh air. Similarly the high ceilings, large windows, and shallow office depth ensure that daylight will be able to penetrate the whole of the office. Less obvious perhaps, but expressive of the nineteenth-century sensibility is the relationship between the electric lighting and the office furniture. In this anonymous shipping department, each worker has a tall, enclosed desk either with or without pigeonhole storage. Above each desk hangs a single incandescent downlight suspended on a knotted cord — seemingly tied individually to accommodate worker preference. The solitary lamp above each worker's head emphasizes the combination of the spatial and psychological privacy afforded by the semi-enclosed desk. One can easily imagine an early winter's evening where the setting sun brings dusk to the largely daylit office and the suspended incandescent lamps illuminate each worker's desk individually with a pool of warm light. The significance of this relationship, of the singular individuality it allows — one desk, one focused source of light, one worker — can only be fully understood when viewed in comparison with the rationalized design of the modern office. However, the seeds of standardization are visible even in these early twentieth-century offices. They represent the beginnings of the modern corporate workplace and a definitive move away from earlier domesticized offices. Yet it would take another generation of technological advances and new notions of business management to complete the transformation from the Victorian to the modern corporate office environment.

The radical shift in the cultural and spatial construction of the modern office was given a powerful thrust into the twentieth century in the early teens by the application of the principles of Taylorism to the design of office interiors and the management of white-collar workers. Frederick Winslow Taylor codified his theories of worker productivity in the 1911 book, *The Principles of Scientific Management*, and they were broadly applied in American industry, from the manufacturing assembly line to the typing pool. [10] A photograph of a Sears Roebuck's mail order room from 1913 illustrates Taylorist principles in the organization of equipment, furniture, and workers. Here workers are systematically and precisely organized into a kind of stationary assembly line (Fig. 3). The typists in these rationalized conditions were measured for productivity and were required to maintain a minimum number of typed lines per hour. [11] Control and regulation of both bodies and space was central to the Taylorist approach to worker management.

8 – Albrecht, 18.
9 – On the history of the "vernacular period" of skyscraper design in New York City and Chicago see, Carol Willis, *Form Follows Finance: Skylines and Skyscrapers in New York and Chicago* (New York: Princeton Architectural Press, 1995).
10 – Frederick W. Taylor, *The Principles of Scientific Management* (New York: Harper & Brothers, 1911).
11 – The typewriter itself is a significant example of the influence of standardization in the modern office. After the introduction and popularization of the electric typewriter, many other aspects of clerical production were standardized –letter paper took on a precise format, as did envelopes, mail trays, folders, files, filing cabinets and so on. For more on the standardization of office equipment, see Pelégrin-Genel, 36-38.
12 – The Modern Efficiency Desk, developed in 1915 for the Equitable Assurance Company, is a physical manifestation of the ideals of scientific management, and in particular notions of worker surveillance. Primarily a low table with shallow drawers, the Modern Efficiency Desk allowed managers to easily survey a room of workers and their work. Albrecht, 22.
13 – In his cultural history of street lighting Wolfgang Schivelbusch suggests that, "Surveillance and light, visibility and control: these pairs compliment each other, as much as crime/conspiracy and darkness/night are paired in myth and psychology." See Wolfgang Schivelbusch, "The Policing of Street Lighting," *Yale French Studies* no.73, Everyday Life (1987), 61-74.
14 – David Lyon, *The Electronic Eye: The Rise of Surveillance Society* (University of Minnesota Press, 1996), 123-4.
15 – Throughout the history of the modern office, many sociologists and efficiency experts argued that light levels in the workplace might have a direct effect on the productivity of workers. For example the famous Hawthorne Works study of 1924 was conducted to measure the effects of increased and decreased illumination in the workplace on productivity levels. It was eventually discovered that worker knowledge of being tested had more of an impact on productivity than any change in light levels. However, many researchers have returned to this question of the relationship between light levels and productivity. Current research indicates that significant gains in worker productivity can be achieved if workers are given access to daylight and views. On the Hawthorne experiments see, Richard Pearson Gillespie, *Manufacturing Knowledge: A History of the Hawthorne Experiments* (Cambridge: Cambridge University Press, 1991). Regarding contemporary research into daylight and increased worker productivity see, Heschong Mahone Group, "Windows and Offices: a Study of Worker Performance and the Indoor Environment," for the California Energy Commission (2003).
16 – Georg Simmel, "The Metropolis and Mental Life," in *Readings in Social Theory: The Classic Tradition to Post-Modernism*, 3d ed., edited by James Farganis (New York: McGraw Hill, 2000), 149-157.

Clearly visible in the photograph of the Sears Roebuck office, surveillance also was an important aspect of the scientific management of the modern workplace. The stern posture of the circulating supervisors transparently communicates the hierarchical relationship between the surveyor and the surveyed. The growing role of managerial surveillance is expressed materially in the design and organization of office furnishings and lighting in this period.[12] Returning to the image of the Sears Roebuck's mail order processing room, gone is the privacy afforded by the roll top, pigeonhole and Wooton desks of the nineteenth century. Now they are replaced by low, streamlined, clutter-free desks with little more than a typewriter and an in/out box to obstruct the floor manager's view of the worker and her work. Similarly, the individual downlights prominently centered over each desk in the previous illustration, have been replaced by regularly spaced incandescent suspended uplights. This type of suspended uplight throws light upwards onto the ceiling, which is then diffused over the surface of the ceiling and reflected downward as an ambient light source. As the photograph of the Sears Roebuck office shows, the increased volume and depth of the mail order room as compared with the previously illustrated office, clearly limits the effectiveness of the daylighting past a shallow perimeter of desks, indicating an increased reliance on electric light. The increasing efficacy of electric lighting in this period allowed for higher levels of artificial illumination, which is historically and culturally tied to notions of surveillance.[13] It is essential to recognize the transition from largely daylit offices to electrically illuminated workspaces in conjunction with the rationalization of the work place and labor production in order to fully comprehend the social and human dimensions (and dislocations) of the modern office.

David Lyon has called attention to the multi-dimensional impact of scientific management on the early twentieth-century worker, stressing the alienation of the individual from a connection to natural systems and rhythms in an increasingly rationalized and mechanized workplace. He argues, "From toiling in relative independence, and according to the traditional rhythms of seasons, day-to-night, and holy days, workers found themselves laboring to an increasingly ridged timetable, within enclosed spaces, ever observed by a supervisory eye." [14] Thus, the individuality and privacy of the late nineteenth-century office, as embodied in the large desks and the directional downlights, was eradicated by first quarter of the twentieth century, replaced by the low, clean profile of the modern efficiency desk and increasing levels of constant indirect, ambient light. [15] Early American cinema explores the psychological context of the increasingly artificial and rationalized white-collar office. In King Vidor's classic silent film, *The Crowd* (1928) the protagonist John Simms moves to New York City to find his fortune and to define himself apart from the masses. Instead he finds himself a numbered employee in a vast windowless office, filled with identical desks and innumerable workers (Fig. 4). The somber tone of the film's narrative and of the oppressive presence of the crowd — in the office and on the street — serve as a critique of the dehumanizing conditions of the city as well as the rationalized workplace. Similarly, turn-of-the-century German sociologist Georg Simmel in the seminal essay *The Metropolis and Mental Life* (1903) begins his examination of the psychological implications of modern urban life, stating, "The deepest problems of modern life derive from the claim of the individual to preserve the autonomy and individuality of his existence in the face of overwhelming social forces, of historical heritage, of external culture, and of the technique of life." [16] Simmel also called attention to the effects of the quantification of daily urban life — in particular a reliance on pocket

Fig. 3
The organization of equipment, furniture and workers in Sears and Roebuck's order entry department into a kind of stationary assembly line illustrates the radical effects of scientific management in the early twentieth-century white-collar work place.
Order entry department at Sears, Roebuck and Company, Chicago, Illinois c.1913. Courtesy Sears, Roebuck and National Museum of American History

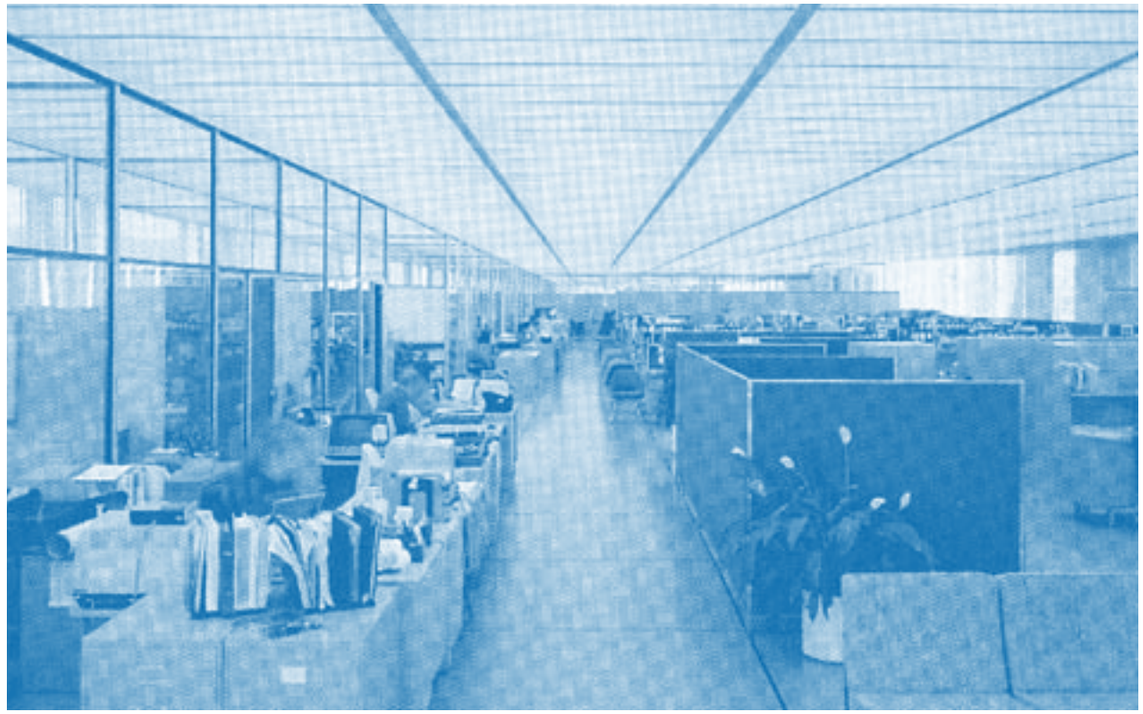
Fig. 4
King Vidor's 1928 silent classic, *The Crowd*, critiques the dehumanizing conditions of the city as well as the rationalization of the modern workplace.
*The Crowd*, 1928. Directed by King Vidor. Courtesy Metro-Goldwyn-Mayer Inc. All rights reserved

Fig. 5
The inclusion of luminous ceilings, as employed in the executive offices of the Seagram Building, provided a uniform field of ambient light as well as cleanly organizing the visual appearance to the horizontal ceiling plane in the mid-century corporate office environment.
Ludwig Mies van der Rohe and Philip Johnson, Seagram Building, New York, 1958. Photograph by Ezra Stoller ©Esto

Fig. 6
The cool diffuse, shadowless fluorescent lighting of the post-war era unified the great expanses of the white-collar workplace. The round-the-clock abundance of fluorescent lighting in combination with powerful HVAC systems resulted in environments of total artificial suspension.
Skidmore, Owings & Merrill, typical office floor, Union Carbide Building, New York, 1960. Photograph by Ezra Stoller ©Esto

Fig. 7 (opposite, top)
Skidmore, Owings & Merrill, Connecticut General Headquarters, Bloomfield, Connecticut, 1957.
Photograph © Peter Mauss/Esto





watches and the precise measurement of time in both work and leisure. The increased observance of measured time and the constructing of the workday around artificial measures — rather than in relation to the rising and the setting of the sun as in pre-industrial, rural cultures — had significant impact on the "mental phenomenon of the metropolis," he believed. The atrophy of daylight and the increasing domination of electric light in white-collar office in the first-third of the twentieth century must be considered a key factor in the transformation of the "mental life" of the urban office worker in this era.

The continued distancing of the average office worker away from natural light and air continued throughout the first-half of the twentieth-century, reaching levels of total artificial suspension in the boundless office landscapes of the hermetically sealed post-war glass towers. Technological advances in the performance of fluorescent lighting and HVAC systems removed the barriers posed by a reliance on natural systems to the potential depth or expanse of a modern office. While fluorescent lighting was first introduced in the late 1930s, it was not until the post-war building boom that it was widely adopted into the workplace. In this period incandescent lighting was swiftly replaced by the higher output, cooler fluorescent lamp. The high-levels of diffuse artificial light afforded by the new generation of fluorescent lamps were perfectly suited to the ideological shift in corporate architecture in the post-war era. As James S. Russell suggests, leading American corporations "wanted to put a face on the increasing importance of advancing technology in business success and economic growth. This coincided with American architects' belated love affair with European modernism." [17]

The boom in the construction of monolithic glass-curtain wall towers in the mid-century, predicated on the import of European architects and ideals, transformed the American corporate landscape — both internally and externally. From Pietro Belluschi's Equitable Building (Portland, Oregon, 1948) to a series of towers by Skidmore, Owings, & Merrill in the 1950s — the Lever House (New York, 1952), Inland Steel (Chicago, 1958), and Union Carbide (New York, 1960) — to such prestige commissions as the Seagram Building (New York, 1958) designed by Philip Johnson and Ludwig Mies van der Rohe, in the mid-century the glass tower became the sine qua non of corporate excellence in the United States. Even in the suburbs where towers were unnecessary, architects simply oriented the glass-box horizontally, designing long, low-slung glass-skinned corporate campuses such as Eero Saarinen's Thomas J. Watson Research Center for IBM

17 – James S. Russell, "Form Follows Fad: The Troubled Love Affair of Architectural Style and Management Ideal," in *On the Job: Design and the American Office* (New York: Princeton Architectural Press, 2000), 48-73.

Fig. 8
In Billy Wilder's dark comedy *The Apartment*, the protagonist played by Jack Lemmon acquiesces to a series of ethically compromised agreements in the hopes that he might escape the dehumanizing office pool, with its endless rows of orderly desks under a glowing sea of fluorescent lamps.
Photographic still from *The Apartment*, 1960. Directed by Billy Wilder. BFI stills

(Yorktown Heights, New York, 1961). Common to all were extensive artificial lighting and HVAC systems that supported the closed ecosystem of the open-plan office.

Far from being perceived as a necessary evil, the artificial environment of the mid-century corporate office was praised and celebrated for its stability. [18] It removed the imperfections and fluctuations of natural systems and allowed a constant controllable set of environmental conditions. Electric lighting contributed significantly to the constancy of the mid-century office environment; it as was argued that when correctly designed, electric light could effectively simulate, and even improve upon, the qualities of natural light. Fluorescent lighting became critical in the realization of the artificial ideal. While synthesizing natural light with incandescent sources is difficult — in part because of the warm color temperature of the incandescent and its directional quality — fluorescent lighting enables a sufficient intensity, distribution, and color temperature to match natural light.

The Seagram Building's iconic luminous ceiling — highly praised upon its completion — is an iconic example of this effect. It was designed to project a non-directional light pattern with the "absence of any design or configuration in the diffusing panels" in order to create a sense of "natural" illumination. [19] Comprised of translucent vinyl diffuser panels in an anodized aluminum-trimmed modular grid, the suspended ceiling hung below the fluorescent lighting system (Fig. 5). The soft diffused light produced by the luminous ceiling emphasizes the grid super-structure of the vinyl ceiling-panels and the rigorous geometry of the supporting metal frame, rather than the light source. The smooth vinyl panels also neatly disguised the lamps, water pipes, electrical conduits, and other services, hiding the working systems of the tower's services behind a clean, visually uniform ceiling. A unifying solid horizontal plane of light, the luminous ceiling, suppresses the messy workings of the building's systems and presents a uniform, controlled visual environment.

The aesthetics of control were a central issue in the design of the mid-century corporate office. As Robert Bruegmann suggests in his critique of post-war American architecture, *Modernism at Mid-Century*, the country's glass-skinned office towers represented an attempt to "present a cool, technologically advanced image to the world." [20] Uniformity was essential to this expression. Jürgen Joedicke's 1962 survey, *Office Buildings*, warns against deviation from the accepted standard of high levels of ambient light in the open-plan office. Joedicke argued that, "In a large office of the open-layout type, localized lamps mar the overall visual aspect of the office and will convey a restless impression." [21]

This notion of avoiding a "restless impression" — which clearly threatens the uniformity of the office as a controlled, designed volume — recalls the image of Joe Banks with his small incandescent decorative shaded lamp disrupting the order and psychic control of the office. The disruption of individuality in a field of homogeny was a constant and subversive threat to the harmonious balance of sameness in the mid-century white-collar office. The organization and regulation of space and bodies is a primary sub-plot to the history of the modern office. Somewhat facetiously, Stanley Abercomie makes this point in his essay on modern office furniture, "Office Supplies," writing:

> Union Carbide's structural system, its fenestration, its luminous plastic ceiling panels, its metal partitions, its filing cabinets, and its desks — all these were ordered by a single module of thirty inches. It may once have occurred to the designers that only six-ty-inch-tall workers should be employed, but some exceptions to the module were finally allowed. [22]

18 – A survey of some of the many articles praising the technological advancements of the Seagram Building's architecture and building systems, reveals the broad cultural interest and architectural pride in such iconic modern office towers. See for example, "The Seagram Building," *Arts and Architecture* vol.77 (January 1960), 14-15; William H. Jordy, "Seagram Assessed," *Architectural Review* vol. 124 (December 1958), 374-8; Building is Designer's Testament," *New York Times* (10 November 1957), Section 8, 1, 8; "Seagram's Bronze Tower;" *Architectural Forum* vol. 109 (July 1958), 67-71.
19 – The prolific mid-century architectural lighting designer Richard Kelly, in collaboration with Philip Johnson, conceptualized Seagram's luminous ceiling, which was realized with technical consultation and development from Lightolier's principle engineer in this period, Noel Florence. See, Margaret Maile Petty, "Illuminating the Glass Box: Architectural Lighting Design and the Performance of Modern Architecture in Post-war America," *Journal of the Society of Architectural Historians* vol. 66, no. 2 (June 2007), 194-219.
20 – Robert Bruegmann, *Modernism at Mid-Century: The Architecture of the United States* (Chicago: University of Chicago Press, 1994), 55.
21 – Jüreng Joedicke, *Office Buildings* (NY: Frederick A. Praeger, 1962), 136.
22 – Stanley Abercrombie, "Office Supplies: Evolving Furniture for the Evolving Workplace" in *On the Job*, 81-97, 89.

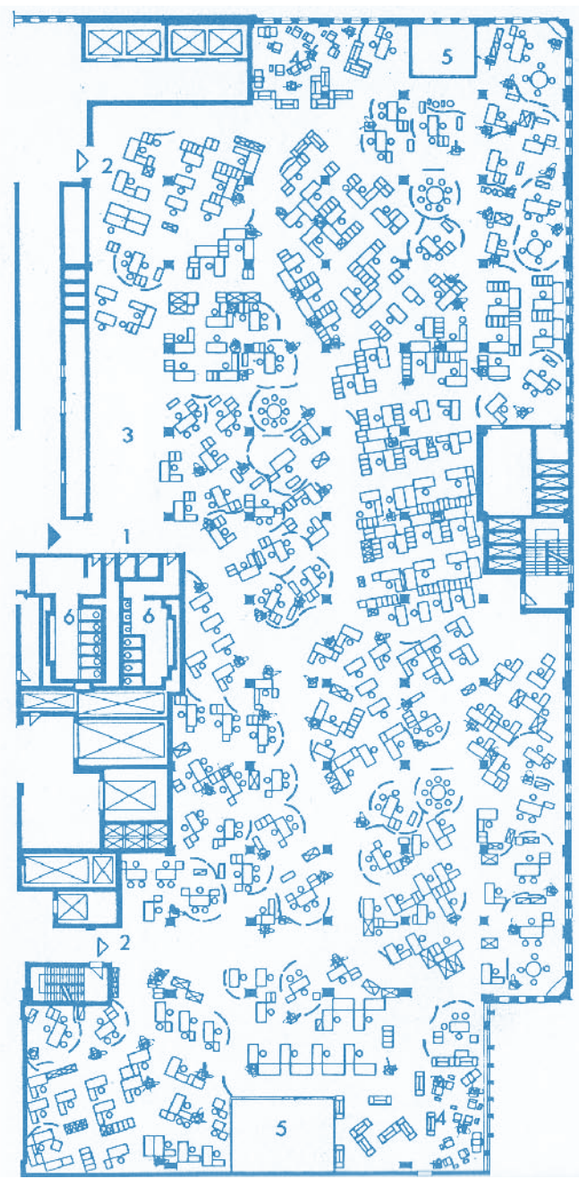



Fig. 9
Plan by Eberhard and Wolfgang Schnell (Quickborner Team) for Eastman Kodak, Rochester, New York, 1967.
From John Pile, *Open Office Planning* (London: The Architectural Press, LTD, 1978), 163.

The ceiling plane became an artificial sky, set to a perpetual noon. Cool diffuse, shadowless light unified the great expanses of the white-collar workplace in the post-war era (Figs. 6, 7). How absolutely revolutionary they must have seemed when completed; but at the same time, how quickly they came to represent the sterility and artificially homogenous conditions of the modern office. In films and literature these mid-century corporate environments frequently represented the vacuous anonymity of the modern white-collar workplace and work. In Billy Wilder's dark comedy *The Apartment* (1960), the office where the protagonist C. C. Baxter (Jack Lemmon) spends his days is a world of artifice that serves as both a mask and an agent for the immorality of the company's executives. Baxter, desperate to climb the corporate ladder to a private executive suite and escape the thankless drone-like existence of the open-plan office, agrees to lend his apartment to a number of his superiors for their extramarital affairs. Baxter hopes that these favors will lead to his promotion, delivering him from the dehumanizing office pool, with its endless rows of orderly desks and typewriters under a glowing sea of fluorescent lamps (Fig. 8). The logical and efficient appearance of the office is superficial, residing spatially and structurally but not psychically in the ethics or experience of the workers and executives. The restlessness that Joedicke identified as so important to avoid in the large open-plan office, perhaps is not limited to the solitary incandescent desk lamp, but rather resides in the individual office worker and his or her expression and experience of uniqueness and variability.

The highly structured order and rationalization of the mid-century office came into question by the mid 1960s, when designers and office planners began to rethink the corporate workplace. For example the German brothers Eberhard and Wolfgang Schnell developed a radical approach to office layout organized according to patterns of communication, rather than notions of regularization or power hierarchies, which they named the *bürolandschaft* or office landscape (Fig. 9). [23] The desire to reintroduce nature and a more fluid, flexible approach to the organization of workers and work lay at the heart of the *bürolandschaft* methodology. However, this new attitude towards office design did not extend toward lighting. The images of these new office landscapes, still suggest an artificial, constructed nature within a seemingly infinite expanses of fluorescent lighting — with only a few potted plants punctuating the horizon (Fig. 10).

Despite superficial changes to office layout and space planning the desired outcome of the late 1960s corporate work place remained that of maximizing worker efficiency and productivity. In a revealing statement from his 1968 survey of modern office buildings, Reinhold Hohl likens the well-designed office to that of an electrical circuit:

23 – John Pile, *Open Office Planning* (London: The Architectural Press, LTD, 1978).

> The organizational, and therefore also the architectural, tasks of the office design can easily be represented by an electric circuiting diagram: While keeping the voltage as steady as possible, working impulses introduced into a widely ramified network are required to lead, as directly as possible, to a productive power output. . . For a long time already, this model concept has been adopted in practice on the basis of careful studies: Efficiency experts organize the flow of papers; suitable office furniture and equipment of all kinds serve to eliminate more and more of the "resistances."[24]

Hohl's approach to office design aimed to reduce physical and psychological "resistances," and ultimately to engineer the most efficient workplace possible. This may explain in part why office lighting received so little attention in the rethinking of the office plan in the latter 1960s and early 1970s. At its introduction, the Schnell bothers' *Bürolandschaft* approach to office design was guided by no less than 68 rules (which one was obligated to follow) that strictly regulated the organization of furniture, workers, and paths of communication. One of the points required that "rigidly geometric patterns" be avoided in all instances, as they interfere with "flexibility in planning and replanning." [25] Diffuse, ambient fluorescent light avoided the problems of specificity and directionality in illumination distribution, and allowed office landscape designers to reconfigure office layout at will.

Also confounding the advancement of office lighting design was the late development of the discipline of professional lighting design, which only began to be recognized and practiced broadly towards the end of the 1970s. Prior to this guidelines regarding ideal light levels for various tasks, including office work, were largely determined by committees or associations sponsored by lamp and fixture manufacturers or electric power companies. Under such guidance, standard recommendations for office lighting levels soared from 30 footcandles to 80, 100, or even 120 footcandles by the end of the 1960s. For electric utilities and the lamp manufacturers, brighter was always better.[26]

Throughout the history of modern office design, major changes always come back to preserving the integrity of the bottom-line. The energy crises of the 1970s forced a fundamental rethinking of the midcentury approach to office lighting design. Quickly, it became fiscally and politically irresponsible to continue to light floor after floor of office space to 100 or 120 footcandles. The new challenge was how to scale back all-over ambient light while maintaining sufficient light levels for office workers to complete necessary tasks. In the latter 1970s task lighting was reintroduced as a way to avoid the excessive energy consumption needed to provide a uniform ceiling-bound ambient light source. In a sense, we return again to Joe Banks little desk lamp. Only this time, the light source was integrated into the mobile office units characteristic of the 1970s and 1980s. With power transmissions located within the modular furniture components (concealing wiring and connectors) and lamps typically recessed behind suspending shelving or storage units, the visual uniformity of the office landscape remained intact. However, a significant change had occurred — lighting migrated back to the individual worker, while remaining disguised within hybrid nature of flexible office furnishing systems. The reception of even this small shift in the illumination of the corporate office is telling of the human need for varied light conditions. As John Pile describes in his 1978 handbook for open office planning, "Users' reactions to task lighting are highly favorable. The space so lit tends to have a certain quiet, soft character suggesting residential lighting." [27] Pile recognized that office workers respond well to an environment that allows something of the individual and of the domestic within the corporate-controlled setting.

Today we are seeing more of the domestic in the corporate workplace, as the division between the home and the white-collar place of work that began in the nineteen century has begun a process of reversal. The internet revolution, the emergence of high-speed communication technologies and the practice of telecommuting have had significant impact on social expectations of the workplace. Young media and technology companies like Google are reaching out to potential employees with such non-traditional workplace amenities as children's day care, laundries, cozy reading-nooks, gyms, and basketball and volleyball courts, as well as Astroturf carpeted meeting rooms and gaming stations. [28] Similarly, once strict dress-codes, written or simply universally recognized — for example IBM's famous army of blue-suited "wing-tip warriors" — are being slowly eroded by "casual Fridays." The sartorial uniformity of the corporate dress code is losing cohesion with the influx of khakis and denim and the emergence of a generation of workers more inclined to t-shirts than button-down collars.

Along with the de-corporatization of the modern office, the twenty-first century has seen a return to a greater reliance on daylighting. Researchers and designers are finding that sustainable buildings, which incorporate and respond to the unique conditions of site and environment, foster a healthier and more productive workforce.[29] Offices lit for the majority of the workday with daylight — offering significant economic advantages to management as well as contributing to the well-being of office workers — are becoming more common. The rosewood-veneered walls of executive offices are being replaced with glass walls in order to bring daylight deeper into the office floor plate for the benefit of all, as recently seen in the design of the new Platinum LEED rated Bank of America Tower (New York City, 2008) as well as in the previously mentioned Google headquarters (Mountain View, CA, 2005). Daylight no longer belongs only to the privileged executive with the perimeter windowed office, while the majority of office employees labor under monotonous artificial lighting conditions. Along with the decentralizing of power in many organizations, has come a democratizing access to daylight and views as well as to personal freedoms and comforts. With this fundamental re-conceptualizing of the twenty-first century office, it is possible to imagine that the fluorescent fields of the twentieth-century workplace and the strict uniformity they engendered will become simply the stuff of cinema. ◊

24 – Reinhold Hohl, *Office Buildings: An International Survey* (New York: Frederick A. Prager, 1968), 2.
25 – Pile, 29-32.
26 – Pile, 120-121.
27 – Pile, 125.
28 – Steve Lohr, "At Google, Cube Culture has New Rules," *New York Times* (5 December 2005), 8; and Jade Chang, "Behind the Glass Curtain," *Metropolis Magazine* vol. 25, no.11 (July 2006), 136-147, 178-179.
29 – Heschong Mahone Group, "Windows and Offices: a Study of Worker Performance and the Indoor Environment," for the California Energy Commission (2003); Tove Fjeld and Charite Bonnevie, "The Effect of Plants and Artificial Daylight on the Well-Being and Health of Office Workers, School Children and Health Care Personnel," Floriade, Norway (2002); Joel Loveland, "Daylighting and Sustainablity", 2, *Design+Construction* vol. 5, no.5 (September/October 2002), 28-33.

**Fig. 10**
**German bothers Eberhard and Wolfgang Schnell, of the Quickborner Team, developed a radical approach to office layout organized in the later 1960s, which followed patterns of communication, rather than notions of regularization or power hierarchies.**
Eberhard and Wolfgang Schnell (Quickborner Team) with Walter Scholer and Associates, Administrative Services Building Offices for Purdue University, Indiana, 1970. From John Pile, *Open Office Planning* (London: The Architectural Press, LTD, 1978), 163.

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