Ngā Pūtahitanga / Crossings

Graphic by Amber Anahera Ruckes

David Crane's 'Capital Web':
Crossings between Architecture, Urban Design and Planning as Disciplines and Practices from the 1950s

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Abstract

Architecture and planning have historically struggled to find agreement on defining urban design and a relevant body of theory. In the 1950s, Dean Josep Lluís Sert first used the term 'urban design' for proposed new programmes of study at the Harvard Graduate School of Design (GSD). However, facing opposition to the move, urban design was introduced as extensions to established teaching programmes. At the same time, Dean George Holmes Perkins at the University of Pennsylvania (Penn) took a different approach, embedding urban design into a joint Master's programme. Louis Kahn and David Crane were appointed to lead the architecture and city planning studios respectively. Despite a relatively short tenure at Penn from 1958 to 1964 and publishing relatively little, it is argued that David Crane significantly influenced thinking about urban design at a time when Modernism was failing. Crucial was the revalidating of public spaces and amenities as a key to urban place making and social identity. Importantly he argued that the role of the urban designer was establishing the framework to guide future development: what he called a 'capital web'. The paper traces Crane's core ideas and how they intersected with other urban thinkers at that time. Also examined is the way Crane's teaching shaped the career development of two graduates, Roelof Uytenbogaardt and Denise Scott Brown, and how this propelled their subsequent practices. The conclusions argue that Crane's 'capital web' remains a potent conceptualisation finding new relevancy in the twenty-first century.

Introduction

The disciplines of architecture and planning have struggled to find an agreed understanding of urban design as a practice and coherent body of theory. Although the

design of cities is a practice arguably stretching back to antiquity, Josep Lluís Sert, Dean of the Harvard Graduate School of Design (GSD), first used the term 'urban design' in the late 1950s.[1] Sert arrived in America in 1939 as one of many émigrés escaping the Nazi uprising in Europe, another being Walter Gropius, who preceded Sert as Dean.[2] They brought to the GSD the intellectual energy of the European Modern Movement and its promotion through the Congrès Internationaux d'Architecture Moderne (CIAM) that counted Le Corbusier among the founding members.

In a 1942 publication, *Can Our Cities Survive*, Sert expressed concerns about the state of American cities and unregulated low-density suburban sprawl.[3] Given his involvement with the CIAM, it is unsurprising that he saw potential salvation in their vision for the modern Functional City demonstrated in Le Corbusier's Ville Radieuse. Consequently, Sert moved the discourse about American urbanism beyond the American City Beautiful Movement that focused on "civic design" to a more holistic view of the city-making ideas that shaped his thinking about urban design when he was appointed Dean to the GSD in 1953.[4]

In his drive to bring urban design into the GSD curriculum, Sert encountered disagreement on how this should be done. Sert's view was that urban design should be a collaborative effort able to meld the design skills of architects with the social and economic knowledge of planners, and to debate this idea, they organised a series of conferences in the late 1950s. Despite strenuous efforts, the conferences failed to achieve a consensus, and Sert's compromise was to offer urban design as extensions to established professional programmes. Richard Marshall describes this as treating "urban design as a free-floating sub-discipline with no real home."[5] Marshall further notes the developing rift between planning and architecture at Harvard, leading to the whole city planning department moving out of the GSD.

Urban Design at the University of Pennsylvania

The same deliberation took a different path at the University of Pennsylvania (Penn) following the appointment in 1951 of Harvard graduate George Holmes Perkins as Dean of the School of Fine Arts.[6] To the existing programmes in architecture and landscape architecture, he added city planning and directed that all teaching should be studio-based.[7] At this time, Penn was looking for ways to capture research funding tied to federal urban

renewal programmes for which research was mandated. Seeing an opportunity for the built environment professions to attract this funding, Holmes Perkins set up the Institute of Urban Studies. He appointed prominent academics to lead the research, including Lewis Mumford, Robert Geddes, Robert Mitchell, Herbert Gans and Ian McHarg. He also hosted several urban design conferences that brought together leading urban thinkers (see Figure 1).[8]

Figure 1. Delegates to the 1958 Conference on Urban Design Criticism. Included are key figures at the University of Pennsylvania, from left to right: Lewis Mumford, Ian McHarg, David Crane, Louis Kahn, G. Holmes Perkins, Jane Jacobs and Kevin Lynch (Photograph by Grady Clay, with captions added by Peter Laurence).

Holmes Perkins also made sweeping changes to modernise the curriculums and to this end, made further key appointments, including Edmund Bacon, Kevin Lynch and Robert Venturi.[9] He also established a joint Master's programme in architecture and city planning, appointing Louis Kahn and David Crane, respectively, to lead the architecture and city planning studios. Louis Kahn proved to be a star attraction in architecture, but Crane, with his understanding of studio pedagogy, quickly established a programme of study recognisable as urban design. John Lobell sees the period from 1951 to 1965 at Penn as a "golden age that saw a unique convergence of city, practice and education," and in 1961 *Progressive Architecture* devoted an issue to what was identified as the 'Philadelphia School'.[10]

Unlike Kahn, David Crane had a lower profile and published little during his relatively short tenure from 1958 to 1964. Notwithstanding, this paper argues that David Crane advanced thinking about urban design in the 1960s, which was influential among colleagues and his graduates, and established a theoretical framing of urban design with enduring validity.

David Crane and the 'Capital Web'

David Crane studied architecture at Georgia Tech, followed by city planning at Harvard. He went on to practice as an architect/planner in New York and Boston until his appointment to Penn in 1958.[11] He published three papers in 1960: "The City Symbolic," "The Dynamic City" and "Chandigarh Reconsidered," and a further one in 1964.[12] In the publications Crane evaluates issues of that time: the perceived failure of CIAM-inspired modern cities and urban renewal programmes at a time when these doctrines were being challenged in the UK.[13] In the quest to revalidate urban design as a pathway towards better-designed cities, Crane saw entrenched professional positions as an obstacle:

> Planners are uninterested in city form. Architects who are interested in form are either caught up in fixing or patching or competing with each other on obscure points of small scale philosophy… New philosophies of city form and new processes of city form making must be built.[14]

Finding new philosophies became Crane's mission. For him, the Modern Movement had devalued the public realm and became "what is left over between individualistic buildings of no communal importance."[15] He characterised the resulting urban form as the 'City Freestanding', as in Le Corbusier's vision of buildings as objects set in vast open space.

Contemporaneously, Jane Jacobs was articulating her view of the failure of planners in urban renewal programmes to understand the social drivers of good urbanism and the "folly of creating a physical structure at the price of destroying the social structure of a community's life."[16] While Crane recognised the social significance of what Jacobs was saying, for him, the primary focus was an appropriate design response to the public realm essential to public life.

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Dismissing the City Beautiful Movement as piecemeal civic improvements, Crane argues that cities must be understood holistically. City form needs to construct meaning on the part of users, conceptualising the city as a "giant message system."[17] While this mirrored Penn colleague Kevin Lynch's idea of "imageability,"[18] Crane suggested that the concept needed expanding to capture "space and time" and the "great scale and potential disjointedness of the modern city."[19]

The idea of city development being disjointed underpinned his rejection of the belief that whole cities can be designed in an orderly way, as asserted by Le Corbusier.[20] More realistically, Crane argued that cities develop and change over time as a process that involves countless actors well beyond the capabilities of a single designer – what he called the "City of a Thousand Designers." This concept of incremental urban growth was later echoed by Christopher Alexander.[21] The conundrum was how to design a city that serves necessary functional and symbolic purposes and yet be able to accommodate incremental development and renewal by many actors over time. To do this, he argued, requires the creation of a:

> … least skeletal continuity on a metropolitan scale [and] a more complete
> planning process philosophy that would embrace the fourth dimension of time
> and turn from opportunistic juggling to a process of designing built-in capacity
> for change, followed by successive adaptations based on change possibilities
> created.[22]

To achieve this outcome, Crane envisaged that the proper focus of city design should be on the configuration of the urban framework that serves both functional and symbolic needs. This framework comprised the networks of streets, parks and public amenities and spaces – what Crane called the 'capital web'. This concerned both investments by public authorities in necessary physical infrastructure and a public realm able to bring meaning to users. For him, the 'capital web' not only enables the symbolic role of cities to be restored but also enables incremental growth over time. The 'capital web' provides a robust framework to which the subsequent development can be an 'outgrowth'.

In "The Dynamic City," Crane considers what he calls the "basic truths" about the modern city: "the rapid acceleration of change in city life and unequal physical progress, the interdependence of life and structures over time and the complexity of the modern city."[23] Whereas "The City Symbolic" captured the opportunity to reaffirm the role and value of public spaces, "The Dynamic City" accounts for the piecemeal way cities grow over time, based on "the process principles of capital designing and town building."[24]

The publications "Chandigarh Reconsidered" and "The Dynamic City" demonstrate Crane's application of the 'capital web' using drawings produced by students participating in his studio, including the 1959 studio project "New City." Taking the brief given to Le Corbusier for the new capital of Indian Punjab as a starting point, the project was a confronting challenge to the CIAM orthodoxy and thrust students into unfamiliar cultural, social and economic contexts. The outcomes demonstrate designs based on the 'capital web', able to develop and expand incrementally over time, with indicative development of city blocks accommodating traditional building methods and self-help construction.[25] The designs lacked the formality and completeness of Le Corbusier's plan for Chandigarh, which had rigid functional zones and the monumentality of an architecture bearing the imprint of a single designer imposed on Indian culture.

Crane left Penn in 1964 to work as an urban designer for the Boston Redevelopment Authority (BRA) on a project that aimed to reconnect the city to its waterfront. For Crane, this was an opportunity to apply his 'capital web' as a framework to establish publicly funded urban spaces and movement networks supporting market-driven development. In "The Public Art of City Building," published after he left Penn, he discusses the potential contradiction between the American ideal of individual freedom of landowners versus development control and regulation to achieve public outcomes and benefits. To this end, he sees the 'capital web' facilitating a quality public realm while enhancing flexibility for private development over time: "to leave and make creative opportunities for the private sphere."[26] Crane also recognised that the implied freedom for development does not abandon the need for public reviews and controls, and that: "Perhaps zoning should be less a mediation between conflicting private developments and more a bulwark against private encroachment on the common good in public streets and open spaces."[27]

Roger Trancik observes that Crane's contribution to the Boston project was a reframing of the 'capital web' as a "development synergy in which public and private activities were brought together to create sufficient force to transform the urban district" of Boston's docklands.[28] The recognition of urban design being a partnership between public and private interests is of course now embedded into market-driven development processes and public-private partnerships.[29]

Through the four publications, David Crane articulated his understanding of the failure of Modern Movement-inspired city design to create good urbanism and the inability of architects and planners to reconcile their entrenched views to recognise urban design as a discrete practice. Crane's tenure at Penn is described by Alan Kreditor as the "era of Louis Kahn and David Crane" when the joint programme came to international prominence.[30] They were part of a wider group of distinguished academics at Penn setting out new theoretical groundings that diverged from the mainstream orthodoxy. This energy, however, did not last, as observed by a graduate of the joint programme at that time, Denise Scott Brown:

> So eventually all the planners left Penn, as well as many architects who were not Harvard-trained modernists. This was because research money dried up with Nixon and Reagan, but also because our Dean [Holmes Perkins], great in many respects, saw Harvard as the shining model for architectural education. So nonconformists were not reappointed [and] Crane and I left and [Robert Venturi] too, and Penn lost the opportunity to be the first school to build on the early links then forming, over our somewhat mangled bodies, between the social and the physical in architecture.[31]

Moving on from the BRA, David Crane was appointed to Rice University in the 1970s, where he established the Rice Centre for Community Design and Research, and in 1986 joined the University of South Florida in Tampa, retiring in 2002. It is the contributions he made to urban design while at Penn that stand out as being seminal and influential.

Post-Penn Legacies

Despite the disintegration of the 'Pennsylvania School' as perceived by Scott Brown, the legacy of David Crane's thinking persisted among his many graduates from the city planning studio.[32] This is well demonstrated by two graduates whose work from his studio is used to illustrate his articles – Roelof Uytenbogaardt (Figure 2) and Denise Scott Brown.[33]

Figure 2. Roelof Uytenbogaardt, ca 1994
(www.cape300foundation.org.za/pop/8.htm, accessed 4 April 2023; Courtesy Khula Cape Foundation).

Uytenbogaardt completed the joint programme with Crane in 1958-59, coming to Penn as an architecture graduate from the University of Cape Town (UCT). His project, "A New City at Four Corners, Utah," was used by Crane to demonstrate the 'capital web' in "The City Symbolic" (Figure 3). Crane clearly was impressed with Uytenbogaardt, writing that he was "perhaps the most talented designer we have ever graduated out of this school."[34]
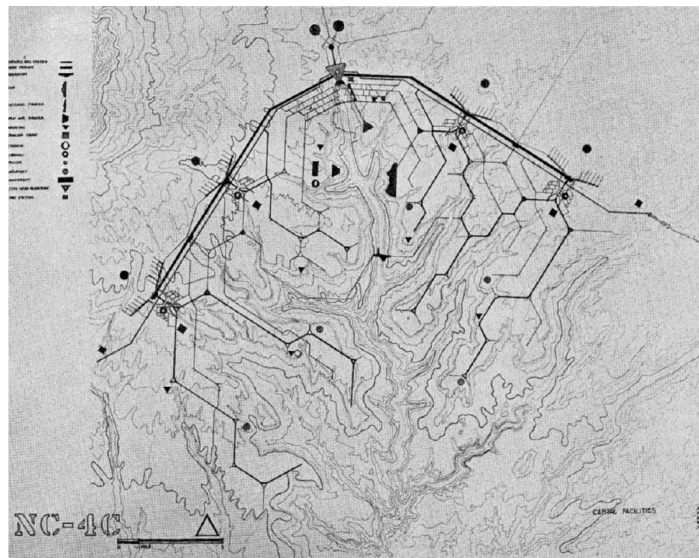
Figure 3: A plan for a new city on Four Corners, Utah, by Roelof
Uytenbogaadt, 1959 (Crane, "The City Symbolic," 290; courtesy
University of Pennsylvania Stuart Weitzman School of Design,
Architectural Archives).

After graduating from Penn, Uytenbogaardt was appointed chief planner to the Boston
Redevelopment Authority (before the arrival of Crane) and lectured on urban design at
MIT and Harvard. Returning to Cape Town in 1963, he established his practice and began
teaching at UCT, where he progressed to professor and head of city and regional planning.
In 1975 he established the Urban Problems Research Unit and a combined school of
architecture and planning to which he was appointed Director in 1985. Among influential
publications is the *South African Cities: A Manifesto for Change*, co-authored with David
Dewar (Figure 4).[35] Reflecting Crane's 'capital web', they argued that:

> … in the creation of order and structure, two different sets of actions can be
> usefully distinguished: private actions, which seek to further the interests of
> individuals and corporations; and public actions, ostensibly directed by a
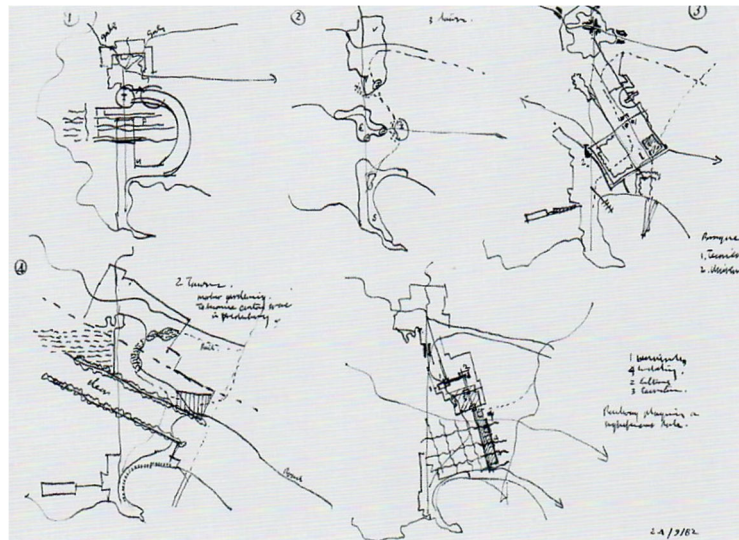> concern with societal… good.[36]

Figure 4. Drawing by Roelof Uytenbogaardt (1982) showing an
analysis of the 'capital web' structure of parts of Cape Town
(Roelof Uytenbogaardt Collection, BC1264,
University of Cape Town Archive).

Shaped by his Penn experience, Uytenbogaart's academic influence in research, teaching
and practice is widespread in South Africa and currently underpins the City of Cape Town's
"Dignified Places Programme."[37]

Also originally from South Africa, Denise Scott Brown (Figure 5) completed a Bachelor of
Architecture in 1952 at the University of the Witwatersrand (WITS) in Johannesburg, which
at that time was fully immersed in the Modern Movement.[38]

Figure 5. Denise Scott Brown in her home in 1978 (Photograph
by Lynn Gilbert, www.archdaily.com/895624/the-often-forgotten-
work-of-denise-scott-brown, accessed 4 April 2023;
Creative Commons License).

Scott Brown referred to the political and racial turmoil in South Africa when she graduated, prompting a move to London and study at the Architecture Association (AA). Among the teachers were Alison and Peter Smithson, expounding on New Brutalism, and it was on their advice that she sought admission to Penn.

Scott Brown, with her then-husband, Robert Scott Brown, were part of Crane's studio that produced the "New City" project published in "Chandigarh Reconsidered," and both graduated in 1960.[39] She regards her time at Penn as formative in shaping her thinking, directly acknowledging David Crane's role in interviews and her writing, declaring that much "of my professional life has been spent trying to connect urban thought with architecture."[40] She recounts that during her first year at Penn with David Crane, "we went spinning around like tops in the most interesting intellectual environments we had ever encountered."[41] The "New City" project not only enabled Crane to demonstrate his 'capital web' idea through the work of students but also provided Scott Brown with conceptual tools to take forward her own ideas (Figure 6).
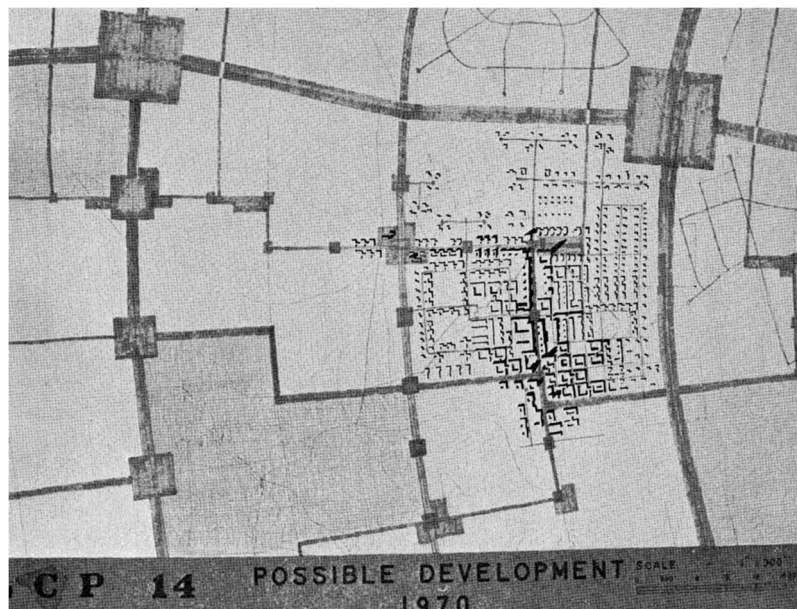

Figure 5. Denise Scott Brown drawing for the "New City" project, showing the application of a 'capital web', 1959 studio, University of Pennsylvania (Crane, "The City Symbolic," 286; Courtesy Pennsylvania Stuart Weitzman School of Design, Architectural Archives).

Following teaching roles at Penn working with Crane, in 1966 she was appointed to the University of California (Los Angeles) to establish a new school of architecture and planning. She acknowledges that Crane provided a model for her studio teaching method, although taking this in new directions. What she called 'town watching' was actively deployed in the studio as a "deliberately crafted research and pedagogical tool."[42] Working with the challenging urbanism of Los Angeles, she sought to identify 'underlying forces' and understand the disjointedness of the modern city:

> Admitting into urban design the untidy reality of urban decision-making is a risky procedure that designers try to avoid, because all designers experience loss of design control as the sensation of drowning. Yet the infringement of reality on the independence of the designer may act as a goad to imagination and creativity, leading to better designs.[43]

In 1967 Scott Brown married Robert Venturi, who she met at Penn, where he taught architecture theory, forming a long-standing personal and professional association leading to their roles in framing postmodern architecture and urbanism. The analytical methods Scott Brown developed at UCLA underpinned the seminal 1972 book co-written with Robert Venturi and Steven Izenour, *Learning from Las Vegas*.[44] Despite not always being fully and independently recognised, Scott Brown has contributed significantly to reshaping thinking about urban design, building on the foundation of David Crane's influence.[45]

Evidence of Crane's conceptualisation of urban design can be detected in the work of many others. Roger Trancik, for example, builds on Crane's characterisation of 'The City Freestanding' in his concept of 'Lost Space', reaffirming the crucial role of streets for good urbanism.[46] Leon Krier shared with Crane the same criticism of as Modern urbanism. Krier's practice of replicating traditional urbanism and architecture, organised by an urban space framework and movement network, went on to underpin the New Urbanism movement.[47]

The idea that urban design fundamentally provides a framework to guide development and condition the quality of the public realm is now embedded into contemporary urban thinking and urban design 'manuals'. Published in 1985, *Responsive Environments* sees

urban design providing "users with an essentially democratic setting, enriching their opportunities by maximising the degree of choice available to them."[48] As in many manuals that have followed, urban design 'principles' are established as a way of designing the public realm as a framework and an interface with the street edges, underpinned by the 'capital web' concept. There is now wider adoption of policies by city authorities aimed at achieving good urban outcomes, focusing on the public spaces and the interface between the public and private realms.

More directly, Peter Buchanan, in a recent call to arms on behalf of urban design, revives David Crane's 'capital web', suggesting that his approach and "its legacy have been too soon forgotten, perhaps because Crane published so little."[49] Buchanan reasserts that the fundamental purpose of urban design is "to provide a framework to guide the development of the citizen" and revalidates the 'capital web' concept as an urban design tool appropriate for the twenty-first century.

Although urban design is deployed at a range of scales, perhaps the more typical is 'master planning' at the precinct or neighbourhood scale. Whereas Crane saw the application of the 'capital web' at a metropolitan scale, urban design at a smaller scale can still be effective in delivering good urbanism where there are clear distinctions and positive interactions between public and private realms.

Conclusions

While at the University of Pennsylvania, David Crane added his voice to the critique of the Modern Movement and the functional precepts of the CIAM. More controversially, he also challenged the view that city-making should be based solely on social considerations. He revalidated the essential element of good city-making to be the design of the public realm: the network of streets, spaces and public amenities: the 'capital web'. He further argued that this public realm be conceptualised as a framework supporting the development of the rest of the city over time. The measure of this contribution to urban design thinking is the extent to which it has influenced and shaped the thinking of his graduates and other urban design thinkers since the 1950s, many of whom have contributed new insights building on those of Crane.

Also evident from the 1950s was the disagreement among built environment professionals on what may constitute urban design and which discipline should take the lead. The unresolved discussion at that time led to compromises in establishing urban design as an area of study and practice and in the relationships to the architecture and planning professions. Surprisingly, this disagreement has not entirely dissipated. Michael Gunder argued that "urban design should return to its twentieth-century position within urban planning and principally be practised as an important subset of wider spatial planning."[50] Opposing this, Alan Kreditor is more optimistic about the potential for urban design to be a distinct practice, which can begin to "create a definable body of knowledge, a set of methods and a professional and civic ethos."[51] While this may remain unresolved or need thinking through differently, there is little doubt about David Crane's significant contribution to the discourse on urban design and his widespread influence on shaping urban design knowledge and practice that retains relevance in the twenty-first century.

Endnotes

[1] Eric Mumford and Hashim Sarkis (eds), *Josep Lluís Sert: The Architect of Urban Design, 1953-1969* (New Haven: Yale University Press, 2008).

[2] Walter Gropius, founder of the Bauhaus in Germany, appointed Head at the Harvard GSD in 1932. Discussed in Richard Marshall, "Josep Lluís Sert's Urban Design Legacy," in *The Urban Design Reader*, 2nd edn, ed. Michael Larice and Elizabeth MacDonald (Oxford: Routledge, 2013), 106-17.

[3] Josep Lluís Sert, *Can Our Cities Survive? An ABC of Urban Problems, Their Analysis, Their Solutions* (Cambridge, Mass: Harvard University Press, 1932).

[4] The City Beautiful movement, founded in America by Daniel Burnham, who, with Edward Barnett, produced the 1909 Plan of Chicago for improvements to streets and civic spaces. See Elmer W. Johnson, *Chicago Metropolis 2020* (Chicago: University of Chicago Press, 2001).

[5] Marshall, "Josep Lluís Sert's Urban Design Legacy," 115.

[6] The University of Pennsylvania Almanac: Biography of George Holmes Perkins, https://archives.upenn.edu/collections/finding-aid/upb8_4perkins/, accessed 26 September 2022.

[7] Perkins insisted that all studio projects were 'real' projects from professional practices, a point underscored by a Penn Masters graduate, Glen Gallaher, in a recorded interview in Johannesburg by the author, 29 March 2005.

[8] The context of teaching at the University of Pennsylvania is well documented by Denise Scott Brown. See: Oral history interview with Denise Scott Brown, Smithsonian Archives of America Art, 25 October 1990 – 9 November 1991, www.aaa.ai.edu/askus, accessed 26 September 2022. See also William Menking, "Denise Scott Brown on the Unknown History of Architecture and Planning at the University of Pennsylvania," *The Architect's Newspaper*, 19 May 2016.

[9] Each were to produce seminal books: Edmund Bacon, *Design of Cities* (London: Thames & Hudson,1967); Kevin Lynch, *The Image of the City* (Cambridge, Mass: The MIT Press, 1960); Robert Venturi, *Complexity and Contradiction in Architecture* (New York: Museum of Modern Art, 1966); Ian McHarg, *Design with Nature* (New York: Doubleday & Co, 1969).

[10] John Lobell, *The Philadelphia School and the Future of Architecture* (New York: Routledge, 2022).

[11] No comprehensive biography of David Crane could be sourced. See death notice by Lynwood Abram, *Houston Chronicle*, 9 June 2005, www.chron.com/news/houston-deaths/article/Deaths-Crane-former-Rice-architecture-dean-1923999.php#:~:text=David%20A.,work%20with%20actual%20city%20problems, accessed 26 September 2022.

[12] The 1960 papers are: David Crane, "The City Symbolic," *Journal of the American Institute of Planners* 26, no.4 (1960): 280-92; "Chandigarh Reconsidered," *American Institute of Architects Journal* (May 1960): 32-39; "The Dynamic City," *Architectural Design* (April 1960): 158-62; "The Public Art of City Building," *Annals of the American Academy of Political and Social Science* 352, no. 1 (1964): 84-94.

[13] Team 10 was a movement formed by CIAM members who became dissatisfied with the doctrines of functionality, and Alison and Peter Smithson were among the leading protagonists, both teachers at the Architectural Association in London during the 1950s. 'New Brutalist' (as defined by Denise Scott Brown) was less doctrinaire, and more focused on neighbourhood and community development. See Denise Scott Brown, "Paralipomena in Urban Design," an expanded version of a paper presented for a symposium at the University of Kentucky,1985, https://web.mit.edu/4.163J/BOSTON%20SP%202011%20STUDIO/Urban%20Design%20Docs/03.%20Urban%20Design%20Reader/Scott-Brown%20Urban%20Concepts.pdf, accessed 26 September 2023.

[14] Crane, "The City Symbolic," 284.

[15] Crane, "The City Symbolic," 281.

[16] Marshall, "Josep Lluís Sert's Urban Design Legacy," 111.

[17] Crane, "The City Symbolic," 284.

[18] Lynch, *The Image of the City*.

[19] Crane, "The City Symbolic," 284.

[20] Le Corbusier produced a number of city design projects in the 1930s including the Ville Radieuse (1930) and the Plan Obus for Algiers (1930), culminating in his city design for Chandigarh (1952). See Kenneth Frampton, Chapter 20, *Modern Architecture: A Critical History* (London: Thames & Hudson, 2007).

[21] See for example Christopher Alexander, *The Timeless Way of Building* (Oxford: Oxford University Press, 1979).

[22] Crane, "The City Symbolic," 283.

[23] Crane, "The Dynamic City," 162.

[24] Crane, "The Dynamic City," 162.

[25] Crane, "The Dynamic City," 161. Crane references Charles Abrams in Ghana who advocated self-built housing in poor countries. The provision of 'core' housing to which occupants add and extend over time is an architectural equivalent to a 'capital web'.

[26] Crane, "The Public Art of City Building," 91.

[27] Crane, "The Public Art of City Building," 91.

[28] Roger Trancik, *Finding Lost Space*: *Theories of Urban Design* (New York: John Wiley and Sones, 1986),141.

[29] For example, David Adams and Steve Tiesdell, *Shaping Places: Urban Planning, Design and Development* (London: Routledge, 2013).

[30] Alan Kreditor, "The Neglect of Urban Design in the American Academic Succession," *Journal of Planning Education and Research* 9, no. 3 (1990): 155-63. Louis Kahn died in 1974.

[31] Menking, "Denise Scott Brown on the Unknown History."

[32] Menking, "Denise Scott Brown on the Unknown History."

[33] Crane gives a full list of students participating in the 1959 studio in "Chandigarh Reconsidered" and "The Dynamic City." Projects are not ascribed to individual students, although the work of Denise Scott Brown is easily identified. In "The City Symbolic," Crane names the authors of the work as D. Scott Brown, R. Uytenbogaardt and A. Bergamasco (A. Bergamasco could not be found in an internet search).

[34] Biography of Roelof Uytenbogaardt. Artefacts. www.artefacts.co.za/main/Buildings/archframes.php?archid=2099, accessed 26 September 2022. Corroborated by Glen Gallagher, who recalls Louis Kahn saying to him that Uytenbogaardt was the "best student" to graduate from the programme. Glen Gallagher, In a recorded interview in Johannesburg, 29 March 2005.

[35] David Dewar and Roelof Uytenbogaardt, *South African Cities: A Manifesto for Change* (Cape Town: Urban Problems Research Unit, 1991).

[36] Dewar and Uytenbogaardt, *South African Cities*, 23.

[37] The influence of David Crane on Uytenbogaardt is underscored by Barbra Southworth, "Urban Design in Action: The City of Cape Town's Dignified Places Programme – Implementation of New Public Spaces towards Integration and Urban Regeneration in South Africa," *Urban Design International*, 8 (2003): 119-33.

[38] South African architecture embraced the Modern Movement with a student study tour of Europe in 1928. See Errol Haarhoff, "Appropriating Modernism: Apartheid and the South African Township," *ITU AZ* 8, no. 1 (2011): 184-95.

[39] Robert Scott Brown was killed in a car accident in 1961, and acknowledged in Crane, "Chandigarh Reconsidered," 34.

[40] Denise Scott Brown, "Paralipomena in Urban Design," 6. An expanded version of a paper presented for a symposium at the University of Kentucky,1985, https://web.mit.edu/4.163J/BOSTON%20SP%202011%20STUDIO/Urban%20Design%20Docs/03.%20Urban%20Design%20Reader/Scott-Brown%20Urban%20Concepts.pdf, accessed 23 September 2022.

[41] Scott Brown, "Paralipomena in Urban Design," 10.

[42] Sylvia Lavin, "Positioning Denise Scott Brown: Los Angeles, 1965-1966," *E-flux Architecture,* March 2022, www.e-flux.com/architecture/ positions/443513/positioning-denise-scott-brown-los-angeles-1965-1966/, accessed 23 September 2022.

[43] Lavin, "Positioning Denise Scott Brown."

[44] Robert Venturi, Denise Scott Brown and Steven Izenour, *Learning from Las Vegas* (Cambridge, Mass: MIT Press, 1972).

[45] Lavin, "Positioning Denise Scott Brown." Apart from not recognising Scott Brown in the Pritzker Prize awarded solely to Robert Venturi, Lavin points to the same omission in Vincent Scully's introduction to Venturi's book, *Complexity and Contradiction in Architecture*.

[46] Transik, *Finding Lost Space,* 140-41. Transik references David Crane's appointment to the Boston Redevelopment Authority and the application of his 'capital web' in this ground-breaking project.

[47] Leon Krier is an architecture practitioner who replicates traditional architecture and urbanism and has been influential in the New Urbanism movement. New Urbanism as a practice has come under criticism for many reasons including the replication of traditional architecture aesthetics and the appropriation of a sustainability agenda. See Michael Gunder, "Commentary: Is Urban Design Still Urban Planning?: An Exploration and Response," *Journal of Planning Education and Research* 31, no. 2 (2011): 184-95.

[48] Ian Bentley, Alan Alcock, Paul Murrain, Sue McGlynn and Graham Smith, *Responsive Environments: A Manual for Designers* (Oxford: Architecture Press, 1985), 9.

[49] Peter Buchanan, "The Big Rethink Part II: Urban Design," *Architecture Review,* 5 March 2013. He provides a checklist of urban design criteria applicable to the concept of the 'capital web'.

[50] Gunder, "Commentary," 191.

[51] Kreditor, "The Neglect of Urban Design," 160.