

Trajectories of Axonometry through Distances and Disciplines

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Unique in its power to interrelate multiple planes with minimal distortion, the axonometric negotiates, as Alan Colquhoun notes, between the archaic and the modern. In this paper, we evidence this notion, as well as positing other spectra that the drawing type spans: from the strategic to the poetic, the primitive to the acutely detailed, from urban to conceptual space, from the bird's eye to the mind's eye. There are numerous trajectories possible in a reading of history through the lens of the axonometric, but the path herein collects instances from the medieval, via Massimo Scolari, to Le Corbusier, Kazimir Malevich, and Ivan Leonidov. Each drawer is situated in a vastly different context, but their divergence is key: they are bound by the drawing type, and its ability to transcend and translate is testament to its versatility as a drawn language. By studying different types of axonometrics and the motives for their employment, as well as their nature as operative, we uncover connections that are driven by warfare, politics, and theoretical shifts. We observe how qualities such as points of view, orientation, and promiscuity of the rules of projection can be inextricably bound to the author's conceptual and critical locale. We explore Le Corbusier's oeuvre, uncovering how a launch into the aerial vantage through a roof-centric axonometric view may have been instrumental to the development of his "five points" of architecture. We pursue a connection that sees the axonometric extend from figural to cognitive space in the hands of Leonidov. Where others identify the post-modern era as the critical locus for the axonometric, these explorations indicate an earlier genesis. Lastly, we suggest that inheritances from Le Corbusier and Leonidov can be traced into the last pre-digital moment of architectural drawing in the 1970s and 80s.

Keywords: axonometry; axonometric drawing; parallel projection; Le Corbusier; Massimo Scolari; Ivan Leonidov

Robin Evans notes how the conventions of parallel projection provide a basis for experiment, rather than constraint, of architectural conception through systematisation and legibility. Arguably, the axonometric drawing epitomises these qualities of reading, writing, and transferring information because of the directness of correspondence between its planes. Unlike other forms of projection that entail planar reconstruction, the plan remains embedded in the drawing. In this way, through a constant relaying of information through and between undistorted plans, the axonometric becomes a simulacrum of a construction site:¹ whereby a “ground” is directly drawn out of and into. It becomes a “viable medium, allowing the architect to spill his imagination onto it, sure in the knowledge that much of the effect would travel.”² Such a scaffold offers up both a philosophical and literal framework: an operative space.

Indeed, the earliest forms of parallel projection—many of which Massimo Scolari excavates in his treatise on oblique drawing—are axonometrics. Even where the conventions are being hinted at but remain confused and fledgling, his survey of paintings, illustrations, and in particular military drawings, are largely obliques and axonometrics. What is common to these is the remainder within them of something “square”—something with perpendicular corners—for the axonometric, the plan, and for the oblique, the elevation. One is effectively a rotated version of the other. Thus, in this paper, we establish the axonometric as a *basis*, both in a chronological and figurative sense. Its legibility, however, should not be confused with rigidity. It is a profoundly operative type—its construction lines “act as guide rails into the blindness of an as yet unrealised dimension.”³ A change in vantage—privileging either front, roof, side, or base; casting vertically or obliquely—expands not just pictorial scope, but creates space for architectural thinking.

Sonit Bafna and Hoyoung Kim have noted the rhetorical capacity of axonometry, and the association between a post-modern revival of the format with a deepening in conceptual thought among its exponents, from the Neo-Rationalists to the New York Five.⁴ While they investigated the critical writing that emerged alongside and influenced the drawings, we are interested in the drawings themselves, and what can be garnered through their reading as visual texts. Here we make two novel points regarding axonometry’s subjectivity. Firstly, where some authors believe the projection’s measurability makes these drawings objective,⁵ we demonstrate that modernist axonometry became capable of acquiring a spectrum of personal ideologies.⁶ Alan Colquhoun’s critical examination

1 Peter Cook, *Drawing: The Motive Force of Architecture* (West Sussex: Wiley & Sons, 2008), 20.

2 Robin Evans, “Translations from Drawing to Building,” *AA Files* 12 (Summer 1986): 8.

3 Evans, “Translations,” 11.

4 Sonit Bafna and Hoyoung Kim, “Beyond instrumental use: a study of writing on architectural drawings in the late twentieth century,” *ARQ* 22, no. 1 (2018): 43.

5 Helen Thomas notes “the objective quality of isometric projection”. Thomas, *Drawing Architecture* (London: Phaidon, 2018), 10. Cook refers to axonometry’s “solid, matter-of-factness.” Cook, *Drawing*, 99. Robert Stern claimed that “the axonometric is a drawing of the poly-technician and not of the poet.” Stern, “Drawing Towards a More Modern Architecture,” *AD* 47, no. 6 (1977), 383. Also, Yve-Alain Bois has rightly observed that the only objective axonometric is one that is completely reversible, as employed by El Lissitzky. Bois, “Lissitzky, Malevich, and the Question of Space,” in Miroslav Lamac, Jiří Padrta, and Bois, et al., *Suprématisme* (Paris: Galerie Jean Chauvelin, 1977), 37.

6 Richard Difford, “Conversions of relief: on the perception of depth in drawings,” *Journal of Architecture* 19, no. 4 (2014): 483-510; and Desley Luscombe, “Architectural concepts in Peter Eisenman’s axonometric drawings of *House VI*,” *Journal of Architecture* 19, no. 4 (2014): 560-611.

of axonometry’s simultaneous possession of both primitive and modern qualities,⁷ parallels our study of Ivan Leonidov’s drawings, which exploit archaic techniques to create ambiguous and subjective representations. Secondly, where some consider axonometry to be the clearest formal depiction of architecture,⁸ and the most communicative drawing for non-architects,⁹ our case studies support Bafna’s and Kim’s study of projections which “deliberately favour abstract compositional qualities over interpretive clarity.”¹⁰ Where other authors locate the post-modern as axonometry first conducting a disciplinary critique,¹¹ we posit this moment occurred much earlier, after 1918.

From here, with successive steps taken in distance and time, we find its capacity to absorb rhetoric and meaning to be commensurate with shifts into more combinatory and distortive forms of parallel projection.¹² Resonances exist between the post-modern and the medieval via the axonometric, between architecture and art, as a projection capable of absorbing and translating theoretical polemics across nations and eras.

Axonometry from the Archaic to the Modern

Scolari’s discourse on parallel projection points to the emergence of the code of the axonometric as the “military perspective:” a parallel cast giving scalar relationships between defensive structures and their environs.¹³ But if the laws of axonometry were firmed in this context, they had been intuited and hinted at beforehand. Scolari collects together a number of drawings from as early as the first century BC that, while commingled with perspectival elements, clearly contain oblique structures.¹⁴

We would posit that the principles of axonometry are also latent in medieval *mappa mundi* and town cartography, as these drawings tend to lay out the plan, un-tilted, and elevate recognisable visible features (building frontages, topographic elements) in situ. There is an innate logic in this system, as the plan deals with the master-view and navigation, and the elevation provides landmarks and points of recognition within that field. It is a synthetic drawing, as the plan is for the body, and the elevations for the eyes. Medieval town maps and early ocean cartography position both the world, and the subjects within it—buildings and ships—as a kind of evidence. If the axonometric is a plan-form with vertical extrusions, such images constitute an intriguing conceptual basis for the type.¹⁵ Not only do these maps foreshadow the emergence of axonometry, but they come to resonate later on—as perhaps the locus of the “archaic” referred to by Colquhoun, and as lending a quality

7 “... axonometry has assumed a largely symbolic role: an ambiguous symbol of an aestheticized science, but also of a sort of metaphysical archaism. Which raises a new question: what rapport can exist between these two divergent aspirations, between a discourse that deliberately adopts archaic forms and metaphysical references, and the love of moderns for mechanization, technology and science?” Alan Colquhoun, “Assonometria: Primitivi e Moderni,” in *Alberto Sartoris*, ed. JG and AA (Turin: Mazotta, 1992), 13.

8 Thomas, *Drawing*, 241; Cook, *Drawing*, 99.

9 Cook, *Drawing*, 21.

10 Bafna and Kim, “Beyond Instrumental Use,” 41.

11 Bafna and Kim, “Beyond Instrumental Use”; and Luscombe, “Architectural Concepts.”

12 Isometric projections, among others, are one of these more complex formats of drawing as they entail planimetric reconstruction.

13 Massimo Scolari, *Oblique Drawing: A History of Anti-Perspective* (Cambridge, MA: MIT Press, 2012), 6.

14 Scolari, *Oblique Drawing*, 2.

15 This is perhaps implicit in Scolari’s survey, but not explicit. It can be intuited from other connections he makes (Egypt, the military perspective), but his discursive arc does not include medieval charts or *mappa mundi*.

of shrewd primitivism to the upright projections of Leonidov. Archaism in architectural representation is not to be seen as a defect.¹⁶

The origins of sixteenth-century military axonometry shed light on its post-war re-emergence as the projection of choice for representing critical and theoretical “forms of attack.”¹⁷ Where etymologically, *cavalière perspective* translated to “perspective of a horse rider, that is: seen from above,”¹⁸ the twentieth-century bird’s-eye axonometric was the view from a military plane. Although the original defensive projections were not urban, they were required to be site-specific, and in these drawings “site and building interacted as never before.”¹⁹ These qualities of military projection—site-specificity, and their generative power of “allowing the infinite to be thought”²⁰—led axonometry to acquire an urban status in the twentieth-century.

In modern axonometry’s relation to the political and the urban, Pier Aureli’s scholarship on the emergence of nineteenth-century urbanism and the possibility of an absolute architecture is of relevance.²¹ It is no coincidence that the architects Aureli examines—Ludwig Hilberseimer; Aldo Rossi; Giorgio Grassi; Oswald Mathias Ungers; and Rem Koolhaas—consistently utilise axonometry in their political and urban proposals. Axonometry’s ability to depict a measured “composition of built and void space,”²² and its infinite extendibility, re-established the city as “a political confrontation and recomposition of parts” via “the idea of the archipelago as a form for the city.”²³

Le Corbusier and Urban Axonometry

The launching of human vantage into the air influenced the re-emergence of bird’s-eye axonometry among many proponents of the European avant-garde. Aviation is to be understood as more than a technological development, having a profound philosophical impact on architecture, perception, and representation.²⁴ In *Aircraft: The New Vision* (1935), Le Corbusier noted that “war was the hellish laboratory in which aviation became adult ... when peace came the airplane was abandoned.”²⁵ Le Corbusier’s utilisation of bird’s-eye projection, where flying is the only view that could be compared with the axonometric lens,²⁶ represents a critical disruption to the status quo of modernism.

Critics have observed Le Corbusier’s skilful utilisation of modern media,²⁷ however his use of bird’s-eye axonometry has been largely overlooked. It is intriguing to track Le Corbusier’s

16 Scolari, *Oblique Drawing*, 65.

17 Cook, *Drawing*, 10.

18 Bois, “From minus infinity to plus infinity: Axonometry, or Lissitzky’s mathematical paradigm,” in *El Lissitzky: 1890-1941: Architect Painter Photographer Typographer*, ed. JD (Thames & Hudson: London, 1990), 27.

19 Scolari, *Oblique Drawing*, 266.

20 Bois, “Lissitzky,” 33.

21 Pier Aureli, *The Possibility of an Absolute Architecture* (Cambridge, MA: MIT Press, 2011); and Aureli, *The Project of Autonomy: Politics and Architecture within and against Capitalism* (New York: Princeton Architectural Press, 2008).

22 Aureli, *The Possibility of an Absolute Architecture*, 184.

23 Aureli, *The Possibility of an Absolute Architecture*, xi.

24 Adnan Morshed, “The Cultural Politics of Aerial Vision: Le Corbusier in Brazil (1929),” *JAE* 55, no. 4 (May 2002): 201-10.

25 Le Corbusier, *Aircraft: The New Vision* (London: The Studio Ltd.), 9.

26 Bois, “Lissitzky,” 39.

27 Beatriz Colomina notes that drawing plays an essential part in Le Corbusier’s process of “appropriation of the exterior world,” as well as photography and advertising. Colomina, “Le Corbusier and Photography,” *Assemblage*, no. 4 (1987): 6-23; and Colomina, *Privacy and Publicity: Modern Architecture as Mass Media*, (Cambridge, MA: The MIT Press, 1994). On the relation of the bird’s-eye view to Le Corbusier’s sketches and urbanism, see Morshed, “The Cultural Politics;” and M. Christine Boyer, “Aviation and the Aerial View: Le Corbusier’s Spatial Transformations in the 1930s and 1940s,” *Diacritics* 33, no. 3/4 (2003): 93-106.

axonometric methods against his position, where the aerial view makes consistent appearances after 1922, and seems to increasingly plot urban and contextual connections, and eventually home in on the roof as a new ground. The technique applied is a 60/30 plan rotation, which can be considered a standard or modern mode. Figures 1 to 3 are Le Corbusier's first bird's-eye axonometrics,²⁸ drawn in 1917, 1922, and between 1922 and 1925 respectively.

28 H. Allen Brooks (ed.), *Le Corbusier: Early Buildings and Projects, 1912-1923*, (New York: Garland Publishing, 1982).

Figure 1 describes a *solitaire* type, positioned within a context but largely objective, and lacking in his characteristic roof gardens. Figure 2 shows an expanded field—an urban project—with suggestions that the focal form is repeated. This shift in scope suggests Le Corbusier discovering that axonometry's ability to extend infinitely while maintaining scalar relations, is commensurate with the proliferation of the architecture into a system, and as an instrument of urban theory. Between 1922 and 1925 his first roof gardens appear as shown in Figure 3. Further, the couching of the architecture within its urban context bears out numerous relationships to his "Five Points for a New Architecture."

The Ideologies of Axonometry in Le Corbusier's Five Points

Le Corbusier's Five Points—*pilotis*; roof garden; free plan; horizontal window; and free façade—are interchangeable with the qualities of his exterior axonometry. Inherent in his Five Points is the Dom-ino system developed in 1914, which—like axonometry—represents "both a project for the domestic sphere and the city at large"²⁹ which "could be extended ad infinitum."³⁰ Yet axonometry also influenced Le Corbusier's decisions at the formal scale: although his Five Points were not published until 1929, they are evident in his projects from the early 1920s onward.³¹ The *pilotis* and roof garden serve the same ideology, both "freeing" the ground, and "recovering" the roof.³² *Pilotis* also enable the free plan and façade, releasing construction from a traditional "optical relation to the ground,"³³ and suppressing "all notions of 'front' or 'back' or 'side'."³⁴ This apparent weightlessness, and loss of frontality, are both consequences of axonometric representation.

We speculate that axonometry was not selected only to convey predetermined architectures, but rather, by virtue of its capacity as scaffold or operative design space, that it may have been instrumental in the generation of these speculations and theories themselves. As Evans says, "the subject matter will exist *after*

29 Aureli, "The Dom-ino Problem: Questioning the Architecture of Domestic Space," *Log 30* (2014): 153.

30 Aureli, "Dom-ino," 163. Eleanor Gregh also stated the Dom-ino would 'become the basis for an architecture that can be expanded into urban design'. Gregh, "The Dom-ino Idea," *Oppositions*, no. 15/16 (1979): 70.

31 Werner Oechslin, "Les Cinq Points d'une Architecture Nouvelle," *Assemblage 4* (1987): 84; and Kenneth Frampton, "Le Corbusier and *L'Esprit Nouveau*," *Oppositions* 15/16 (1979): 21. Gregh stated the Dom-ino "holds the key to Le Corbusier's architecture of the 1920's and heralds the famous Five Points." Gregh, "Dom-ino," 61.

32 Le Corbusier, "Techniques are the very basis of poetry (1929)," in *Precisions* (Cambridge, MA: MIT Press, 1991), 41.

33 Le Corbusier, "Techniques," 56.

34 Le Corbusier, "The Plan of the Modern House (1929)," in *Precisions*, 139.

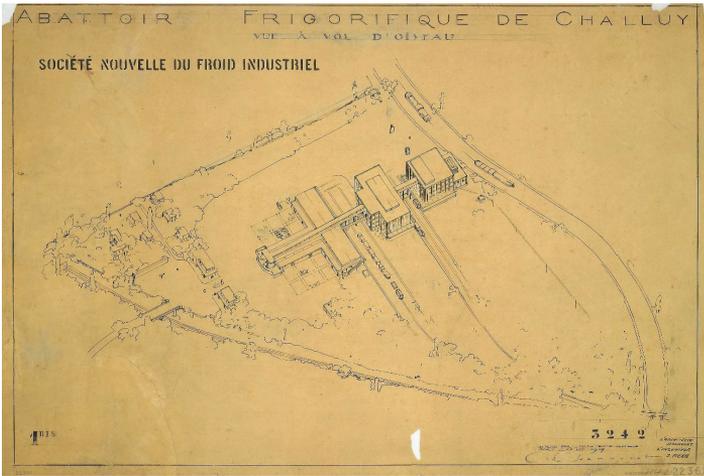


Figure 1. Unrealised proposal for an Abattoir, Challuy, France (1917). Reprinted with permission. © Foundation Le Corbusier/ADAGP. Copyright Agency, 2019.

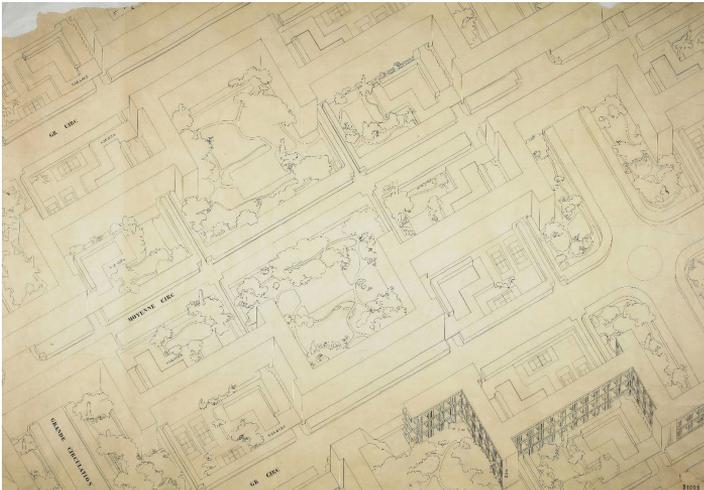


Figure 2. *Ville Contemporaine pour trois millions d'habitants* (1922). Reprinted with permission. © Foundation Le Corbusier/ADAGP. Copyright Agency, 2019.

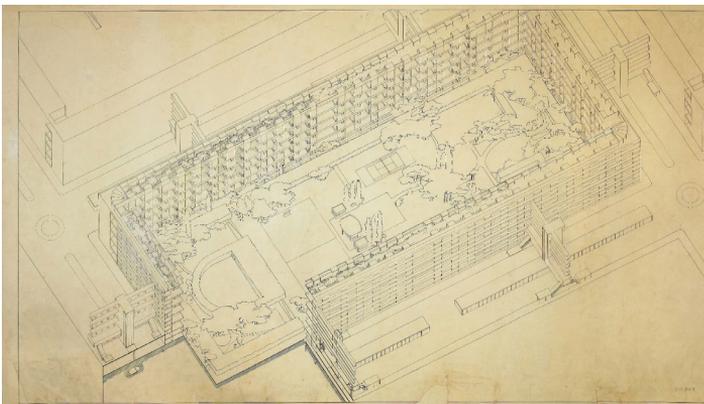


Figure 3. *Immeuble-villas* (1922-25). Reprinted with permission. © Foundation Le Corbusier/ADAGP. Copyright Agency, 2019.

the drawing, not before it.”³⁵ Had Le Corbusier not taken to the sky and privileged the roof plane in his axonometry, would he have come to lavish design attention upon it? The manner in which such a vantage exposed the roof as an area of concern and grounded the architecture within an urban and civic milieu, while revealing roof, façade, and ground plane in concert, offers if not a causal relationship to the Five Points, then certainly a synthetic one. Intriguingly, in their critiques of the infamous Dom-ino (which Le Corbusier represents in perspective), Peter Eisenman,³⁶ Eleanor Gregh, and Aureli *all* redraw it in axonometric.

Le Corbusier and the Constructivists

The physical distance between Western Europe and the Soviet Union was diminished via the rich intellectual exchanges between Le Corbusier and the Constructivists. While Le Corbusier was expanding his architectural polemic via both art theory and axonometry, his contemporaries at the Vkhutemas School—where Malevich taught and Leonidov studied³⁷—were also exploring the projection type, and collapsing disciplinary boundaries between art, architecture, and urbanism in a search for non-objectivity.³⁸ In fact, Le Corbusier praised Leonidov as “the hope of Russian Architectural Constructivism.”³⁹

Where Le Corbusier’s axonometric concepts were inspired by aviation’s *physical* flight, Malevich focused on a *cultural* flight “from the earth as a land of reference,”⁴⁰ referring to Suprematism as “aeronautical”⁴¹ with the aim to “destroy the ring of the horizon.”⁴² While he himself did not draw in axonometric, his eradication of the horizon is a conceptual invitation, and anti-perspectival in nature. Like Le Corbusier, Malevich’s polemic was reactionary and critical; he considered himself a member of “the creative army.”⁴³ Looking to the writings of Malevich, whom Koolhaas cites as “Leonidov’s distant but ever present master,”⁴⁴ we examine how Leonidov encapsulates urban, political, and personal ideologies via his deviation from Le Corbusier’s modern axonometry.

Leonidov’s ‘Four-dimensional’ Axonometry

Malevich’s artistic desire to ‘give fullest possible expression to feeling’⁴⁵ is translated to Leonidov’s archaic axonometric methods, which privilege the subjective over the objective. Both individuals believed in a fourth dimension, which Malevich termed an “inner movement,”⁴⁶ and Leonidov as the architectural

35 Evans, “Translations,” 7.

36 Eisenman, “Aspects of Modernism: Maison Dom-ino and the Self-Referential Sign,” *Oppositions* 15/16 (1979): 118-28.

37 Vieri Quilici, “Introduction,” in Kenneth Frampton and Silvia Kolbowski (eds.), *Ivan Leonidov* (New York: IAUS, 1981), 7.

38 Le Corbusier, “The Quarrel with Realism, The Destiny of Painting,” in J. L. Martin, et al. (eds.), *Circle: International Survey of Constructive Art* (London: Faber and Faber, 1937), 67-74. Through architecture, Leonidov aimed to “comprise the challenge of objectification, paralleling Malevich’s aim ‘to free art from the ballast of objectivity.’” Leonidov, “Criticism of Constructivism (1928),” *The Journal of Architecture* 22, 3 (2017): 616; and Kazimir Malevich, “Suprematism,” in *The Non-Objective World: The Manifesto of Suprematism* (New York: Dover Publications, 2003), 68.

39 Constantin Boym, *New Russian Design* (New York: Rizzoli, 1992), 14.

40 Bois, “Lissitzky, Malevich, and the Question of Space,” 39.

41 Malevich, “Introduction to the Theory of the Additional Element in Painting (1927),” in *The Non-Objective World*, 61.

42 Malevich, “From Cubism to Futurism to Suprematism: The New realism in Painting (1915-16),” in *Art Theory 1900-2000*, 173.

43 Malevich, “The Question of Imitative Art,” 295.

44 Rem Koolhaas and Gerrit Oorthuys, “Ivan Leonidov’s Dom Narkomtjazzprom, Moscow,” *Oppositions* 2 (1974): 95.

45 Malevich, “Suprematism,” in *The Non-Objective World*, 61.

46 Malevich, “On New Systems,” 83.

experience of “sensory perception.”⁴⁷ Other contemporary artists and architects believed the fourth dimension represented time through a literal, pictorial movement, such as in the canonical axonometrics of Theo van Doesburg and El Lissitzky. Under Lissitzky, devices such as symmetry are used to systematically enhance ambiguity and enable a flip-flop between top and bottom views. The confusion doesn’t belong to the objects—only to the particular instance of the chosen composition: Evans states that the concept of movement is thereby “locked into the drawings,” and the qualities of the axonometric are not cogent with phenomenal space, or “exportable into the three-dimensional world.”⁴⁸

In contrast, Leonidov’s novel modern-archaic techniques creates an *inner spatial* alternation, which is not locked into the *surface* of the drawing but occurs within the *mind*: one must put the pieces together in mental space. Following Malevich’s “abhorrence for the third dimension,”⁴⁹ Leonidov’s axonometry favours the second and fourth. The result is a tectonic and poetic representation of architecture that possesses qualities of both constructability and subjectivity. In light of this, we locate three novel techniques in Leonidov’s drawings: figure-ground reversal; the incorporation of primitive techniques; and deliberate inconsistencies between parallel projections of the same project.

Leonidov and the Confounding of Convention

The relationship between solid and void held conceptual importance for both Malevich and Leonidov. Leonidov’s tendency to invert drawings to black fields with white line-work presents a small but significant shift away from Le Corbusier and Malevich, as with his new town for ‘Magnitogorsk’. While this mode of drawing resurfaced in the 1950s, the rarity of inverted projections in the early twentieth-century must be noted.⁵⁰ This shift represents “a complete reversal of the canonic tradition,”⁵¹ whereby the space of urbanism became visible for the first time,⁵² or, to use Aureli’s terminology, the urban “archipelago” is foregrounded over architectural “islands.” Akiko Honda suggests Leonidov’s figure-ground reversal depicts a “non-gravitational space,”⁵³ but this is too literal an interpretation. If traditionally the white field represents an empty space awaiting design, Leonidov’s black field establishes the drawing as a critical and complete “counter-project,”⁵⁴ where void is as important as solid. The absence of lineweights furthers this figure-ground ambiguity, removing traditional hierarchies,

47 Leonidov, “Criticism of Constructivism,” 617.

48 Evans, *The Projective Cast*, 344.

49 Linda D. Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (Princeton, NJ: Princeton University Press, 1983), 283.

50 Mark Wigley, “Back to Black,” *Art on Paper* 7, no. 3 (2002): 52.

51 Wigley, “Back to Black,” 50.

52 Wigley, “Back to Black,” 52.

53 Akiko Honda, “A New Vision in Architecture: Ivan Leonidov’s Architectural Projects Between 1927-1930,” *Bulletin for the Waseda University of Advanced Studies* 8 (2016): 82.

54 Aureli, *The Possibility of an Absolute Architecture*, xiv.

and reinforcing the primacy of the urban field and “tense and meaningful voids.”⁵⁵

55 Quilici, “Introduction,” 10.

Rather than pictorially, Leonidov’s four-dimensional axonometry represents depth through an intellectual process. Leonidov reflects on this visual-cognitive relationship:

... organizing emotions and feelings is essentially the organization of one’s consciousness. ... The problem is not to organize visual stimuli, but one’s consciousness. The eye is a precise mechanism which transmits impressions to the brain.⁵⁶

56 Ivan Leonidov, “Interview (1929),” in *Ivan Leonidov*, 27.

Through the incorporation of archaic techniques, Leonidov creates a Malevichian “contradiction on the surface of his picture.”⁵⁷ If Le Corbusier’s 30/60 mode of axonometry constitutes a typical employment, Leonidov’s is less doctrinal. His plan remains un-tilted, and his vertices are sometimes slanted, and sometimes plumb, as an elevation without implied depth—in the manner of a medieval map. Trees and built forms adhere to non-compliant vertices: we are positioned at once above, and at ground. This cognitive depiction of depth reflects Leonidov’s desire for “spatial and volumetric” elevations.⁵⁸ In contrast, Le Corbusier’s technique depicts “the *actual space of the object* rather than the object in space,”⁵⁹ evidencing a comparably detached vantage point, representing only the formal, and none of the poetics of his architecture.

57 Malevich, “On New Systems,” 85.

58 Leonidov, “The Palette of the Architect (1934),” in *Architecture & Arts: 1900/2004: A Century of Creative Projects in Building, Design, Cinema, Painting, Sculpture*, ed. GC (Milan: Skira, 2004), 148.

59 Scolari, “Elements for a History of Axonometry,” *AD* 5, no. 5-6 (1985): 73.

Similar archaic techniques of simultaneous plan-elevation are explored in Scolari’s aforementioned historical overview. For example, Egyptian hieroglyphs represent partial aspects of both the front and side elevations of figures, yet “the impression of the whole is more powerful,” which “strike the *mind* more than the *eye*.”⁶⁰ This foreshadowed Plotinus’ (203-270 AD) renunciation of pictorial depth, and his assertion of interpretation not through the “eye of the body,” but rather the “inner eye” which represented “the Intellect.”⁶¹ Leonidov’s echoing of primitive technique, and his overlap of multiple vantage points, represent metaphysical concepts of a humanist, perceptual, and four-dimensional architecture. Another instance where Leonidov distorts modern conventions of axonometry to highlight four-dimensionality is through deliberate inconsistencies between parallel projections of plan and isometric (fig. 4).

60 Scolari, *Oblique Drawing*, 54.

61 Scolari, “Elements,” 77. Thomas has suggested the worms-eye axonometric works in this way: “difficult to read at first because it is so artificial, but the process of working out what the drawing is revealing compels the viewer to make their own sense of the building as a formal object.” Thomas, *Drawing*, 150.

The shift here from axonometric to isometric casting has the effect of flattening the ground plane and emphasising the tower. What confounds convention here is the circle, which remains in plan-form as it would in an axonometric projection.

Also, the isometric components are leaning backwards in a disturbing way—the z axis is not vertical. This slanted casting of the z axis is usually reserved for an axonometric whose plan is left orthogonal, or un-tilted. But in this drawing, everything is *reconstructed*—nothing remains on orthogonal crosshairs, giving the entire composition the effect of leaning backward. Nothing, that is, except the circle, which is therefore abstract and notational. The mixed conventions and backward pitching of the composition produce a precarious sense of gravity, or even imply a sense of centrifuge or orbit. This non-uniform instance of axonometric projection reflects “non-uniform spaces of perception,”⁶² and a trick that implies a four-dimensional understanding of his work. It also mimics the tendency of medieval representations to “resist substitution.”⁶³

Approaching our conclusion, it is important to reflect on the misinterpretations of Leonidov’s oeuvre. The term “leonidovshchina”⁶⁴ which translates to “Leonidovism,” was a somewhat pejorative term circulated within the Soviet architectural press, referring to architecture that appeared “unrealisable and visionary.”⁶⁵ We hope to have demonstrated that although Leonidov’s projects are unrealised, they are not to be interpreted as fantasies, but rather as perceptual “supra-tectonic”⁶⁶ works. We believe this misleading notion of “Leonidovism” originated for the same reason that his

62 Robin Evans, *The Projective Cast: Architecture and its Three Geometries* (Cambridge, MA: MIT Press, 1995), 351.

63 Scolari, “Oblique Drawing”, 65.

64 S. Khan-Magomedov, “Ivan Leonidov (1964),” in *Ivan Leonidov*, 15.

65 Peter Anders, “The Lenin Institute: Leonidov’s Icon of the Future,” *JAE* 37, no. 1 (1983): 25.

66 Frampton, “Preface,” *Ivan Leonidov*, 1. Also Anatole G. Rappaport, “Fantasy versus Utopia,” in *Nostalgia of Culture: Contemporary Soviet Visionary Architecture*, ed. MB (London: AA, 1988), 9.

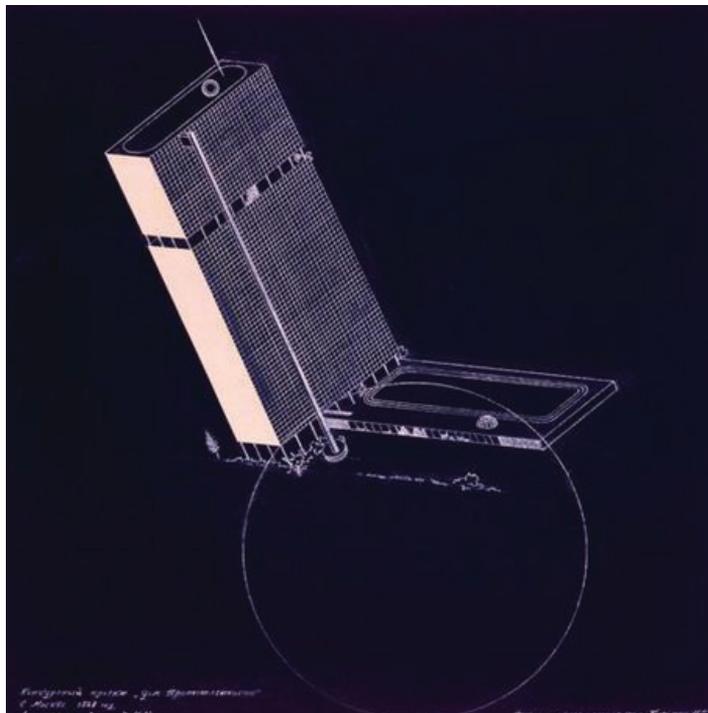


Figure 4. Isometric for Leonidov’s House of Industry competition entry, Moscow, 1930. Unrealised. Reprinted with permission. © Shchusev State Museum of Architecture.

axonometry is to be seen as a critical project: his defamiliarising of a modern technique via the archaic.

Toward Post-modern Axonometry

Both Leonidov's primitivism and Le Corbusier's strategic use of axonometry were central to the post-modern discourse of the Institute of Architecture and Urban Studies New York (IAUS). The Institute's selective curation of content makes this connection plain. Included in their Series 1 and 2 exhibitions and catalogues (1976-81), is an entire monograph on Leonidov, and their journal *Oppositions* (1973-84), features two double issues on Le Corbusier. In an exploration only touched upon here, the IAUS extend the lineage of axonometric discourse established by the modernists, most notably Rem Koolhaas and John Hejduk. Both characters continue to dissolve distinctions between architecture and urbanism, and between architectural and art theories, through the medium.

Hejduk makes frequent use of the Leonidovian un-tilted axonometric, giving his drawings an anthropomorphic and soldierly appearance that resonates with medieval and military techniques, thus representing a humanist framework.⁶⁷ Further, both Leonidov and Hejduk employ a symmetrical, 45 degree cast, which "leads to an ambiguity as to both the nature of the drawing as well as the architecture."⁶⁸ Yet, unlike Leonidov's urbanism, Hejduk internalises his inter-disciplinary critique, concentrating on the autonomy of architectural form. Koolhaas was granted an IAUS fellowship in 1973, where he completed *Delirious New York* (1978),⁶⁹ and with Madelon Vriesendorp, Elia and Zoe Zenghelis, established the firm Office of Metropolitan Architecture (OMA) in 1975. The illustrations for this text include some of the most infamous axonometric drawings of the twentieth-century. OMA clearly employ Leonidovian methods such as figure-ground reversal, the use of pure geometries to represent abstract concepts,⁷⁰ and deliberate inconsistencies within the axonometric method via the inclusion of perspectival imagery.⁷¹ Where Hejduk utilises the axonometric to conduct a formalist critique, OMA combine the modern and the archaic, creating 'speculative drawings' that reflect on the postmodern urban condition.

Conclusion

Uniquely legible and synthetic, the axonometric projection is an operative type that we have observed to be capable of absorbing

67 Alberto Pérez-Gómez, "The Renovation of the Body: John Hejduk & the Cultural Relevance of Theoretical Projects," *AA Files* 13 (1986): 26-29; and Kenneth Frampton, "John Hejduk and the Cult of Humanism," *A+U* 53 (1975): 141-42.

68 Sandra Kaji-O'Grady, "Architectural Serialism," *Architectural Theory Review* 3, no. 2 (1998): 25.

69 Lara Schrijver, "OMA as Tribute to OMA: Exploring Resonances in the Work of Koolhaas and Ungers," *Journal of Architecture* 13, no. 3 (2008): 259.

70 Thomas, *Drawing Architecture*, 10. See OMA's Egg of Columbus Circle (1975).

71 See OMA's Welfare Palace Hotel (1976).

content from the objective to the highly subjective. The manner of axonometric construction—the privileging of different faces, its tilt, and its level of distortion—contributes to the reading of a visual text through theory and time. We locate a modern use of the axonometric under Le Corbusier commensurate with air travel and speculate that the interplay of ground and roof that follow may have been crucial to his Five Points and his conception of the roof plane as a site of design. Such a critical locus for the drawing would substantially predate its widely held entry into theoretical discourse in the post-modern era. We have traced a connection from Le Corbusier to the Constructivists and observed how Leonidov’s inflections and distortions of the type see it take on a humanist guise. Through connections back to medieval town maps, which we posit as a specific prototype for the axonometric code, Leonidov’s drawings take on a rich archaism, and these in turn find lineage in Hejduk’s subjective and anthropomorphic works. Amid the IAUS, inheritances from both Le Corbusier and Leonidov find direct discursion and exhibition through the medium of axonometry. Produced in the last pre-digital moment of speculative drawing, their constructions contain an element of labour and deliberation that is distinct from their digital sequelae.

If axonometry, which preserves the plan, can be understood as an elementary form of paraline drawing, and a hybrid of the archaic and the modern, then the laborious reconstruction of “ground” in isometry and obliques can be seen to add a complexity that is both conventional and conceptual. While perhaps initially developed in the pragmatic service of navigation and warfare, the axonometric has since taken on considerable theoretical capacity, but its legibility endures and allows it to carry meaning in a trajectory through time only partly exposed by this paper.