Scaffolding: Discourse, disruption, and progress in architecture as a cultural production

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ABSTRACT: This paper examines how discourse promotes progress in architecture as a discipline. More specifically, a framework of meta-discourse is proposed for such progress through "scaffolding" among the four realms of architectural investigation: design, research, forensics, and education. Scaffolding here refers to progress made by the interaction of professional, academic, occupational, and disciplinary actors. Historical-interpretive and qualitative methods provide supporting evidence for how such disciplinary realms and actors within them overlap, interact, provoke, and scaffold the entire discipline

KEYWORDS: Discipline, Framework, Theory, Practice, History

"Every profession bears the responsibility to understand the circumstances that enable its existence." (Gutman 1998)

INTRODUCTION

Architecture occupies the same four operating domains as other disciplinary pursuits: Professional ethics, Occupational service, Academic credence, and Disciplinary research nourishment (POAD). Unlike other professions however, these domain boundaries tend to divide architecture more than organize it. The division is extensive enough that some architects still deny that architecture even has a disciplinary basis. It is indisputable though that all four of the disciplinary categories are necessary for the operational coexistence of architecture and contemporary society. Functionally, in turn for a monopoly on their, architects agree (1) to be responsible for a large and difficult body of knowledge, (2) to use that knowledge in service to society, and (3) to advance that knowledge forward (e.g., Snyder 1984, Cuff 1992, Gutman 1996, Duffy 1998, Kostof (ed.) 2000, and Stevens, 2002). Beyond that compact, architects expect to enjoy the elite status of professionals and thus have claim to independent choice of work methods, membership in a moral community, reputations as trusted and altruistically motivated knowledge experts, collegial work relations, supportive cohorts, and a large measure of self-regulation. Most of these advantages are common to all professions, but in architecture there is a largely unique additional one at the heart of the motivations: claim to personal authorship of widely acclaimed work.

1.0 THE PROBLEM

Using the construct of scaffolding, and borrowing from social science literature on professionalism; this paper examines how domain interaction might be postured to advance the profession. Scaffolding is a principle in developmental psychology explaining the difference between what can done by a person alone versus what that same person can do when propped up by supporting resources that are gradually removed (Vygotsky, 1930-1934/1978; Bruner 1960). This paper adopts the scaffolding principle to frame the main structural discourses among the four disciplinary domains as leverage points. An explanatory argument is developed based on discursive interaction among those four realms (Table 1) of architectural investigation and are distinct from the POAD operating domains: Design, Research, Forensics, and Education (DRFE, aka FRED), (Bachman 2013). The goal is to provide a framework clarifying investigative modalities (FRED)

Table 1: Four investigations in architectural inquiry. Source: (Bachman 2013)

Architectural Investigations	DEFINING OPERATIONS
DESIGN	Specific solutions to specific situations
RESEARCH	General understandings addressing generalizable problems
FORENSICS	General understandings applied to specific situations
EDUCATION	General understandings generally dispersed

in architecture and the discursive roles of agents (POAD) that engage in those investigations.

1.1. Scope, context, and method
This paper is similar in scope to social science literature where matters of professionalism are treated as a broad topic. Methodologically, an historical interpretation of postindustrial forces on the discipline of architecture is set against the prevailing paradox of the profession; namely the conflict between its ideals and its actual practices. The comparatively low success of architecture relative to other disciplines and the risk of professional advantage are discussed as impetus toward an introspective meta-discourse.

1.2. Premise
The vital conversations among academia, practice and professional organizations in architecture remain, as a set, relatively unstudied. Against their shared background of disciplinary knowledge, theories, and practices, these discourses provide cybernetic feedback loops that steer the course of architecture as a profession. Such interactions are all negotiated separately as a matter of routine interaction and overlapping roles, but external and internal evidence of disruption suggests these conversations should be considered as a holistic system of forces whose balance deserves an introspective meta-discourse. External evidence for the necessity of this second order, bird's-eye view of architecture is given by the comparative lack of success relative to that of engineering, law, and medicine. Internal evidence is offered by social science literature which identifies architecture as a paradox of professionalism in its tension between ideals and practice.

Beyond mere coherence of the discipline, the internal and external ebb and flow of these disruptions inhibit the function of architects in service to society and risk the continual erosion of its disciplinary boundaries. Furthermore, social and technical contexts are evolving into new and significant demands in the postindustrial context of information society… demands that the chasm between the ideal aspects of design authorship and the practical aspects of in-place performance leave void. How are these vital discourses in architecture constructed so as to advance the progress of its disciplinary realms and enhance its service to society? Further, how can these discourses be advanced and monitored so as to intentionally further architectural progress? To develop and problematize such concerns for discourse, this paper explores how meta-discourse might frame such efforts.
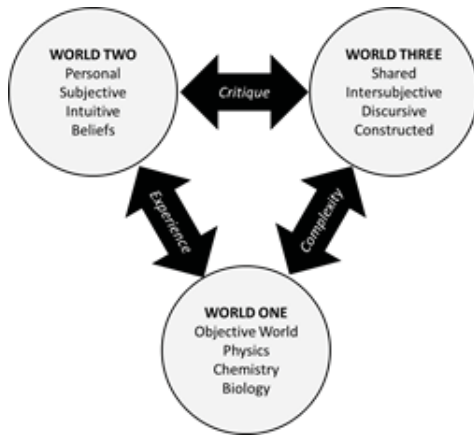

Figure 1: The author's interpretation of popper's three worlds ontology.

A foundational perspective is offered by the postpositive philosopher Karl Popper (1978) in his Three Worlds of Knowledge ontology (Fig. 1). For Popper, the transformation of World 2 personal positions into World 3 shared constructs such as architecture is clearly a function of discourse, debate, and critique. In this view it is evident and commonly accepted that a work is not good because the author believes or asserts it to be, but rather because it has been vetted by public discourse, skeptical comparison, and knowledgeable critique. In other words, there is a transformational difference between subjective knowledge and objective knowledge; and that transformation is only achieved through discourse.

Escape from World 2 subjective knowledge is thus only possible through intersubjective agreement that is negotiated through high level conversation and mapped onto the objective knowledge of World 3. Without

such discourse, our high order structures such as architecture simply do not exist; i.e., without a literature of architecture, there might be great buildings, but there would be no corpus of a thing called architecture.

At another level of granularity, this transformation of World 2 subjectivity into World 3 intersubjective discourse is what constitutes the basic mission of education, occupation, and professionalism. In Popper's own words (ibid, pg. 143):[i]

> By world 3 I mean the world of the products of the human mind, such as languages; tales and stories and religious myths; scientific conjectures or theories, and mathematical constructions; songs and symphonies; paintings and sculptures. But also aeroplanes and airports and other feats of engineering.

Popper ultimately links World 3 "constructions of the human mind" to the definition of "culture" (ibid, pg. 167) and from cultural evolution to World 3 evolution. This in turn supports the formulation of architecture as a field of cultural production, and thus as a profession. These definitions should be considered in terms of social science investigations into professions, fields, and professionalism; especially as related to the seminal work of Pierre Bourdieu (eg. Bourdieu 1993).[iii] It is relevant to note at this point that Popper's "field of cultural production" is identical in principle to Bourdieu's use of the same phrase (Sahin-Dikman 2013; 22-24), thus equating shared World 3 constructions achieved through discourse with a profession such as architecture. That point is a fundamental premise of this paper.

1.2. The risks
The past 50 years have dramatically pressed transformations in FRED disciplinary realms and POAD domain actors, especially in light of postindustrial shifts to knowledge-based production, cybernetic decision processes, ecological sustainability, and service economies. An interpretive timeline of these evolutions demonstrates the self-regenerating and constant scaffolding progress of the realms… and hopefully coaxes the actors into new perspectives about their interactions (Table 2).[iv]

The activity of design has evolved from being synonymous with craft and art in preindustrial times, to that of a professional specialty in the industrial era, and now to a knowledge-based discipline. Architecture was swept along with this evolution as it transformed first into a licensed profession with an accredited university degree, and now evolves into the postindustrial era facing a new societal context, accelerating technical demands, increased regulation, and a rapidly changing marketplace.

As Table 2 indicates, the challenges encountered by the profession of architecture in the postindustrial era are largely the result of transformations in knowledge. Reading any line of the table across from the Eotechnic to the Neotechnic shows how the sufficiency of intuition and personal subjective knowledge is

Table 2: Three eras of design[ii]. Source: (Bachman 2012)

	PRE INDUSTRIAL Before about 1700 The Eotechnic	INDUSTRIAL 1700 to the present The Paleotechnic	POST INDUSTRIAL The evolving present The Neotechnic
Design	Craft and design synonymous	Design as a profession	Design as a discipline
Materials	Raw materials	Mass standardization	Mass customization
Knowledge	Static	Incremental shifts	Continuous change
Cosmology	Mythical explanations	Anthropocentric	Biocentric
Order	Holistic	Hierarchical	Holistic
Development	Refine the prototype	Test unique artifact	Simulate possible artifacts
Change	Conformity	Novelty	Evolutionary
Instrument	Nature as the model	Drawings	Virtual simulations
Method	Normative rules	Policies and procedures	Cybernetic knowledge and systems integration
Perspective	Holistic	Components in isolation	Integrated systems
Dynamics	Innocent naivety	Self-referential	Intelligent
Lifecvcle	Degrade	Use and dispose	Reprocess as nutrient
Solutions	Transient	Fragile & fragmentary	Robust
Effort	Communal	Individual	Team
Educate	Trade apprentice	University: liberal study	Explicit and synthetic
Collaboration	Mono-disciplinary guilds	Multidisciplinary	Transdisciplinary
Application	Need	Art for the elite	Sustain societal goals

giving way to confirmability and publically constructed objective knowledge. In place of normative rules there is complexity. In place of personal expertise and multidisciplinary teams there is transdisciplinary effort. In place of hierarchical machines, there are deeply interrelated systems. In place of genius, talent, and intuition; there are teams, skills, and integrated project approaches.

The corresponding perils—and opportunities—of these transformations are already at hand for both the profession of architecture as a whole and for professional architects as individuals. To focus just on the risks as an impetus toward a disciplinary meta-discourse consider these points:
Constant erosion of professional boundaries as more and more of the built environment is served by a larger and larger number of other occupations, with just so much of the pie to divide among more and more hungry participants;
Regulation such as the ASHRAE 90.1 Energy Code which prescribe performance standards;
Verification of the architects work by third party commissioning agents, value engineers and the like;
Validation of the architect's work by post occupancy evaluation;
Loss of public trust as the scrim of privileged architectural knowledge is stripped away in a cybernetic world… and the consequential perception of architecture as a self-interested monopoly that one can do without and;
Erosion of identity via dismissal of the architect's mythical individualist and heroic figure.

To that point-wise list (which should probably be much longer), professional autonomy in many professions, especially that of the sole practitioner or small firm, is also being eroded by the growth of corporate management of professions. According to statistics from the American Institute of Architects (AIA 2012, 2014, Vinnitskaya 2013) there are some 105,000 registered architects in the United States working in about 17,500 firms, but 17% of registered architects are not working in architecture. By the reported distribution of work employment for various firm sizes then, it seems that about 30% of all those architects work for the 175 firms employing more than 100 architects. Another 20% or so work in firms of 50 to 99 total employees. The same data state that the 1% of firms over 100 employees accounts for more than 33% of all billings while sole practitioners account for another 2%. While working for a large firm is by no means a slight to any architect, the trend represents what Garry Stevens clearly identifies as the prevalence of a very few "major" architects and the proliferation of many "minor" architects (Stevens 2002, 142). The point here is not to stratify classes of architects or infer that large firm architects are less likely to succeed, but rather to point out that this trend is contrary to the image the profession projects as the ideal career where every individual should aspire to name brand authorship of significant buildings.

1.3. Architecture in the literature of professionalism
To summarize what the apparatus of social science literature makes of the architect's situation, consider this excerpt:
> An examination of architecture as a case study suggests that the architectural profession can be thought of as a field driven by the ideals of design originality and a field ridden with permanent conflicts between its autonomous ideals and external demands, between creative and symbolic capital on the one hand and technical-managerial capital on the other, and between the competing narratives of its realities. The architectural field is divided and its dominant representation is contested, but architects are also united by their shared experiences and belief in architectural ideals. (Sahin-Dikman 2013, 2)

So while this paper is too short for an extensive literature review of architecture as a profession, some comments shall suffice to indicate the architect's general paradox. A thorough and up-to-date review of that literature is available in Melahat Sahin-Dikman's dissertation for further depth (ibid).

Both external studies from social science (e.g., Kaye 1960, Gutman 1998, Sahin-Dikman 2013) and internal studies from writers embedded in architecture (e.g., Stevens 1998, Cuff 1991, Duffy 1998) note the struggle between "autonomous ideals and external demands" as the dominant theme and disruptive force of architecture as a profession. For the purposes of this paper, that disruption is manifested in the disconnect between what architecture says about itself, and what architects actually do as an operational reality—in other words, between the discourse and the job. With so much evidence at hand and so little in the way of counter-claims or optional perspectives, this paper suggests that a more persistent and productive meta-discourse negotiated by all the actors is necessary for the next order evolutions of architecture as a profession.

It must also be emphasized that discourse and meta-discourse are not framed here as the need for negative criticism and constant calls for radical change. The tension between design ideals and occupational practicality can itself even be framed positively as an essential animating force—something social science is

likely to overlook—but the disconnect suggests increased vulnerability to professional erosion and weakening of occupational boundaries if left to the default existing conditions.

2.0 REALMS AND ACTORS

Table 3: The four investigations in architecture and their correlation matrix

Scaffolding Dynamics		ESSENTIAL TRANSFORMATIONS		CONNECTIVE CONFIGURATIONS	
		DESIGN	**RESEARCH**	**FORENSICS**	**EDUCATION**
ESSENTIAL TRANSFORMATIONS	DESIGN	Bridging from real to ideal, abduction, analytical method to synthetic philosophy	Precedents, typology, systems…	Programming, project criteria, problem space definition…	History, theory, critique, and discourse toward abductive propositions
	RESEARCH	Theory, method, history, criticism…	From philosophical analysis to methodical synthesis… New generalizable knowledge applicable to a general set of situations;	Applied research, technology, systems integration, postoccupancy studies	Information literacy, methodology, propositions, operationalizing, measurement
CONNECTIVE CONFIGURATIONS	FORENSICS	Commissioning, postoccupancy, performance	Clinical analysis	Application of general clinical knowledge to one specific case, one case based on many cases… Problem space definition	Connective configurations of existing knowledge
	EDUCATION	Case based propositions and synthesis	The scholarship of teaching and learning (SOTL)	Case based analysis	Lifetime of teaching and learning toward mastery of theory and principles

Table 4: Disruptive discourse correlation matrix

POAD Interaction Sets	**PROFESSION**	**OCCUPATION**	**ACADEMY**	**DISCIPLINE**
PROFESSION	Community of ethical governance and resources	Ethics, regulation, and society	Standards and accreditation	Large and difficult knowledge base
OCCUPATION	Discourse of value	Contract of service to society toward gratification and ennoblement	Lifetime of learning, recruitment, new skills, critique	Application of knowledge in service to society
ACADEMY	Discourse of relevance	Discourse of experience	Basic knowledge, research, and indoctrination	Knowledge and theory development
DISCIPLINE	Discourse of principles	Discourse of competency	Discourse of knowledge	Propagation of theories and principles

Table 5: Traits of the FRED domains. Source: (Bachman, 2013)

Realms & Dimensions	DESIGN	RESEARCH	FORENSICS	EDUCATION
SCOPE	Physical	Positive, post-positive, and emancipatory	Strategic, clinical	Lifetime of teaching and learning
METHODS	Bridging the real and the ideal	Expanding wisdom and eroding existing paradigms	Information literacy	The scholarship of teaching and learning (SOTL)
SETTINGS	The built environment	Scholarly literature	Project specific	Principles, theories, practices, ethics
TACTICS	Precedent based, contextual, intentional, and opportunistic	Naturalistic, qualitative, and quantitative	Cybernetics, complex systems	History/Theory/Criticism, studio, technology, and core topics
TRUTH VALUE	Essential transformations	Essential transformations	Connective configurations	Connective configurations
NOVELTY	Transformative, appropriate, and intentional	Contingent truth	Discovery and invention	Autopoietic reproduction of the profession
GENERALIZABLE	Critique and discourse	Reliability, validity, confirmability, transferability, triangulation	Embodied human intelligence	Advancement of best practices

A 4x4 FRED matrix expounds six well-known scaffolding dynamics (using the tilde symbol for complementary pairs after Kelso 2006) as research~design, forensics~research, education~design, and so forth (Table 3). In application, these interactions also express practical relationships among the four principle (POAD) domain actors in architecture: Professional community, Occupational practitioners, Academic education, and shared Disciplinary foundations. Each pair also frames a discourse that moves the discipline of architecture forward (Table 4). For the theme of "research in practice" as just one example of a contemporary ambiguity (Groat & Wang, 2013), the agents Academy and Occupation might be selectively examined.

As in other disciplines, in architecture the POAD actors often play dual or even multiple roles: educators are frequently practitioners who directly participate in all four FRED realms. Office based practitioners increasingly engage in some form of research, be it as a service, as internal investment in learning, or both.

Those who serve in professional organizations towards ethical governance are also taken from the pools of academics and practitioners. And again, like other disciplines, there is a shared domain towards which all actors contribute
to and draw from: the disciplinary base of theories and principles upon which their authority is grounded. Ultimately however, the actors must change hats as they cross from one FRED realm to the next… the traits of each are realm specific (Table 5).

2.0 THE DISCOURSES

As an instigation only, the following sections outline the main features of discourse among the academic, occupational, and professional organization agents of architecture as well as their shared disciplinary context. This sketch of a structure is probably a necessary premise to any meta-discourse about architecture as a profession, but previous works already cited have previously broached the main categories of discussion and laid out basic relations among the same primary agents.

3.1. Occupation and academia—discourse on experience, research, learning, and critique
As a field of professional study, many academicians are also practicing architects, or have currency in the practice of architecture. This particular discourse may however be the most obvious source of paradox between how the architect's autonomy and power are represented in education versus how their restraints and responsibilities happen in practice. All that aside, it seems ideal that the academy would provide practice with not just new candidates to the profession, but also with balanced critique, new methods and techniques, counterproposals set against major practice projects, postoccupancy evaluations, and validated research. Practice in return not only reciprocates through accreditation standards and reviews of academic

institutions, but also through direct feedback on academic learning outcomes produced and the effective preparedness of graduates to enter the profession. The last point seems to ask how much "unlearning" happens in internship.

3.2. Occupation and profession—discourse on value, ethics, and service
Relations between the professional organizations and practitioners are well-structured and the role of those organizations in representing practitioner's interests to public society and governmental institutions is relatively straightforward. Similarly, the organization's role in framing ethical conduct in practice is acknowledged and respected. Part of that conversation is of course the definition and maintenance of the profession's status, licensure, competitive fairness, and architecture's defensible boundaries of the built environment marketplace against intrusion from outside. In supporting and funding the professional organizations, architects also form a community of practice and mutual support mechanism.

3.3. Academia and profession—discourse on relevance and standards
In tandem with governmental regulatory agencies, professional organizations also provide standards for academic program curricula and accreditation, with some movement toward learning assessment requirements and ongoing program refinement. The interactions involved in this validation process inevitably leads to push-pull negotiations as to what constitutes reasonable expectations, what external trends should be accommodated, and what the common denominator standards should be.

3.4. Scaffolding: shared discourse on the discipline—theory, knowledge, principles, and competency
To be a profession, architecture must claim a large and difficult body of knowledge, understandings, and wisdom by which it will benefit society. Evidence shows that this disciplinary knowledge base is continually engaged in the design, research, forensic, and education aspects of its activities and that professional organizations, practicing architects, and working academicians transform this work from subjective knowledge to objective knowledge through continual negotiation and agreement. Ideally this engagement alone would maintain and elevate the enterprise of architecture as a field of cultural production; but disruptions of postindustrial evolution and the complexity associated with the scope of architecture demand that a managing meta-discourse arise to scaffold progress.

CONCLUSION
Neither an art, nor a science; not an ideal, nor a normative practice… architecture is the bridge which connects such polarities by infusing innovative technology with sublime meaning and manifesting ideal visions with concrete realizations. Confronted with the complexity of this holistic challenge however, architects may too often default back to the individualist self-expression model of the heroic designer.[v] From that limited individual position of subjective understandings, architects can generally avoid the larger meta-context of their profession and engage it only when it provides leverage for their own personal viewpoints, or when it threatens to infringe on their standing as professional elites. In counterpoint, in the transition from preindustrial art/craft through the industrial age of professionalization; the individualist tact was not entirely unsuccessful or without social merit. In the emerging postindustrial context, something different must evolve.

This is not to say that architects are an irresponsible lot, or that they give no care to their profession as an institution or the role of that institution in society. But the fundamental difference between architecture and professions such as law, medicine, and engineering is that urge to individual subjective knowledge. A pluralistic mindset will be required if both the design ideals and the practical sustenance of the collective profession are to be maintained.

REFERENCES
Spiro Kostof. 2000. *The Architect: Chapters in the History of the Profession*. Berkeley: University of California Press.

Abbott, A. D. 1988. *The System of Professions: An Essay on the Division of Expert Labor*. Chicago: University of Chicago Press.

AIA. 2012 *AIA/NCARB Internship and Career Survey*. Accessed 5 December 2014. http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab098444.pdf .

AIA. 2014. AIA Architect, *Practicing Architecture: get on the good foot*. Accessed 1 December 2014. http://www.aia.org/practicing/AIAB104583 .

Bachman, L. R. 2012. *Two Spheres: Physical and Strategic Design in Architecture*. London ; New York: Routledge.

Bachman, L. R. 2013. *Four Gates to Castle Neos: A native framework for architectural inquiry.* Proceedings of the 2013 ARCC Conference on Architectural Research. Charlotte, NC. March 27-30. Accessed 27 October, 2014. http://www.arcc-journal.org/index.php/repository/article/view/231

Bachman, L. R. 2014. *New Professionalism: the post-industrial context.* Building Research & Information. Vol. 41, 6, p 752-760.

Bachman, L. R. 2010. *The Teaching of Research and the Research on Teaching: two frameworks and their overlay in architectural education.* Proceedings of the 2010 ARCC/EAAE International Conference on Architectural Research. Washington, D.C. June 24-26. Accessed 27 October, 2014. http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab087184.pdf .

Bourdieu, P. 1993. *The Field of Cultural Production.* Edited by Randal Johnson. 1st edition. New York: Columbia University Press.

Bruner, J. S. 1960. *The Process of Education; a Searching Discussion of School Education Opening New Paths to Learning and Teaching.* First Edition edition. Harvard University Press.

Cuff, D. 1992. *Architecture: The Story of Practice.* Cambridge, Mass.: The MIT Press.

Duffy, F. 1998. *Architectural Knowledge: The Idea of a Profession.* Hutton, Les. London: Spon.

Groat, L. N., and Wang, D. 2013. *Architectural Research Methods.* 2 edition. Amsterdam ; Boston: Wiley.

Gutman, R. 1996. *Architectural Practice: A Critical View.* 5th ed. edition. New York, N.Y: Princeton Architectural Press.

B, Kaye. 1960. *The Development of the Architectural Profession in Britain. A Sociological Study.* First Edition edition. George Allen & Unwin.

Kelso, J. A. S., and Engstrøm, D. A.. 2008. *The Complementary Nature.* Cambridge, Mass.; London: A Bradford Book.

Malecha, M. 2005. *The learning organization and evolution of practice academy concepts*, Raleigh, NC: North Carolina State University College of Design

Popper, K. 1978. *The Tanner Lectures on Human Values: Three Worlds.* University of London. http://tannerlectures.utah.edu/_documents/a-to-z/p/popper80.pdf. Accessed 30 November 2014.

Sahin-Dikmen, M. 2013. *A Bourdieusian Lens on to Professions: a case study of architecture.*(PhD diss., University of York. Accessed 5 December 2014. http://etheses.whiterose.ac.uk/5616/ .

Snyder, J. C. 1984. *Architectural Research.* Environmental Design Series ;; v. 6; Variation: Environmental Design Series (Stroudsburg, Pa.) ;; v. 6. New York: Van Nostrand Reinhold.

Stevens, G. 2002. *The Favored Circle: The Social Foundations of Architectural Distinction.* The MIT Press.

Vinnitskaya, I. 2013. *AIA/NCARB Survey Indicates Resurgence in Employment Rates for Architects* 15 Apr 2013. ArchDaily. Accessed 05 Dec 2014. <http://www.archdaily.com/?p=359798>

Vygotsky, L. S. 1978. *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner & E. Souberman., Eds.) (A. R. Luria, M. Lopez-Morillas & M. Cole [with J. V. Wertsch], Trans.) Cambridge, Mass.: Harvard University Press. (Original manuscripts [ca. 1930-1934])

ENDNOTES

[i] A similar set of arguments is offered by Aldus Huxley's *Knowledge and Understanding* where declarative (what, where, and when) and procedural (how) questions are distinguished from structural (why) understandings. In architectural literature, Garry Stephens' *The Favored Circle* (2002) is dedicated to the assertion on flawed disciplinary assumptions in architecture. Similarly, Tom Heath's *What, if Anything, is an Architect?* (1991) satirizes the architect at length and points to characteristic fallacies in architectural discourse.

[ii] Patrick Geddes and Lewis Mumford jointly coined the Eo-, Paleo-, and Neo-Technic terms to frame history into three eras of production. See Geddes (1915) *Cities in Evolution* or Mumford (1934) *Technics and Civilization.*

[iii] For more discussion on the intersection of Popper and Bourdieu, see Grenfell's *Pierre Bourdieu: Agent Provacateur* (2004, pp 172-173).