

# Knowledge Conditioned by the Void: On Complexity and the Design Problem

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What does it mean when we say that design problems are complex? That they are indeed complex is self-evident—if they were simple, they could be solved with elementary logical deduction. But what the statement predicates beyond this simple exclusion is far from clear, and giving substance to this complexity has been one of the defining tasks of design theory. A sampling of terms ascribed to design problems—wicked, indeterminate, paradoxical, ill-structured, near-decomposable—attest to complexity’s refusal to yield to rational reduction but tell us little of its source or nature.

This reflects the wider ambiguity of the term. Depending on the field of discourse, complexity can be taken as a quantitative or qualitative property, as a determination of object or subject, and as reducible or irreducible. Design theory has run the gamut of these delimitations and come away with little certainty for its efforts. One might argue (as I do below) that the definition of complexity in design theory has reached the point of antinomy, that is, the competing definitions of complexity are logically sound, but are mutually exclusive when taken together. This ambiguity limits complexity’s usefulness to design theory because it offers little clarity to the determination of its concepts. Design theory finds itself at a logical impasse—we can recognize that design problems are complex, but we cannot say with any certainty what this means.

In this article, I argue that this need not be the case. The key to making complexity useful to design theory, I contend, is in recognizing that this ambiguity is meaningful in itself. I do this first by distinguishing between artificial (computational) complexity and social (intersubjective) complexity and then between complexity as a property of a system and complexity as a product of observation. I argue that this latter disjunction is the result of a thorny logical category that Hegel called the determination of reflection, by which a particular figure is “universalized” into its own ground, and that social complexity—the complexity proper to the design problem—is the result of the circular reasoning

of the reflexive determination of a social system. Recognizing this logical sleight-of-hand allows us to reconceive the complexity of the design problem as a consequence of the dependence of every apparently rational social system on some irrational core that defines it. I conclude by briefly addressing the implications of this reorientation.

### From Artificial Complexity to Social Complexity

The concept of complexity that shapes design theory has roots in the interdisciplinary speculations of the early cybernetics movement, where it designated a degree of computational convolution. Warren Weaver refined the concept by distinguishing between disorganized complexity (which is of a sufficient magnitude to yield to statistical analysis) and organized complexity (which is not). The latter, he averred, was the challenge of the age: “These new problems ... requires [*sic*] science to make a third great advance, an advance that must be even greater than the nineteenth-century conquest of problems of simplicity or the twentieth-century victory over problems of disorganized complexity.”<sup>1</sup> His contemporaries Warren McCulloch and Walter Pitts similarly saw great potential in the work of disentanglement. Bringing it to bear on a model of neuronal connection, they prognosticated an end to all subjective uncertainty: “With the determination of the net, the unknowable object of knowledge, the ‘thing in itself,’ ceases to be unknowable.”<sup>2</sup>

The key to crossing this transcendental threshold to predictability was the reduction of a complex system to the set of logical propositions that determine its behavior, a task that a new age of computer technology and interdisciplinary research made imminent. But the great disentanglement heralded by first-order cybernetics never came to pass. Despite many research innovations, there always remained some elusive factor that foiled the complete reduction of any particular system to rational terms. That factor was *reflexivity*: the internal autonomy of every system appeared to hinge on its purpose being defined from the outside by an external observer.

The reintroduction of reflexivity to what we could call the “flat ontology” of first-order cybernetics marked the passage to second-order cybernetics. Because an autonomous system can only be defined as such when its purpose is determined by an external observer, the observer has to be included in the definition of the system. Second-order cybernetics takes account of this reflexivity. As Heinz von Foerster surmises: “The cybernetics of observed systems we may consider to be first-order cybernetics; while second-order cybernetics is the cybernetics of observing systems.”<sup>3</sup> When the purpose of the observing system is also reflexively determined, this regress becomes infinite.

1 Warren Weaver, “Science and Complexity,” *American Scientist* 36, no. 4 (1948): 540.

2 Warren S. McCulloch and Walter Pitts, “A Logical Calculus of the Ideas Immanent in Nervous Activity,” *Bulletin of Mathematical Biophysics* 5 (1943): 131.

3 Heinz von Foerster, *Understanding Understanding: Essays on Cybernetics and Cognition* (New York: Springer, 2003), 286.

We can define the complexity of first-order cybernetics as artificial. Artificial complexity is reducible to simple, rational propositions, but only because it overlooks the bounding maneuver effected by the observer of the system when determining its purpose. The complexity of second-order cybernetics, which recognizes the illegitimacy of this erasure of the observer, can be defined as social, given the necessarily social nature of observation.<sup>4</sup> Whereas artificial complexity is a property of an observed system minus its observer, social complexity refers to the inability of an observer to reduce the system they observe to simple logical propositions without effacing their role in defining it.

The cause of this irreducibility is the paradoxical structure of the system: the autonomy of any system—its closure, its boundedness—is dependent on erasing the observer's participatory role in defining it as an object. This gives rise to a kind of parallax structure: from one position (that of the observer), there is a bounded, rational system minus its founding determination; from another position, this foundation comes into view, but the boundary is lost because we are obliged to include within the system some point outside of it (i.e., the observer). There is no way to behold both foundation and boundary simultaneously. Social complexity thus represents the impossibility of resolving this structural paradox, and thus the impossibility of knowledge of the system being totalized.

Far from resolving Kant's transcendental challenge to philosophy and granting access to the "thing in itself," cybernetics found itself reckoning with a structural curiosity that Hegel had recognized in his radicalization of the Kantian project some 150 years earlier. This formal paradox had beguiled Karl Marx and Sigmund Freud and became a defining preoccupation of poststructuralist philosophers working contemporaneously to the second-order cyberneticists, and frustrated the "general theory" ambitions of systems theorists, economists, sociologists, and design theorists. Whatever the field of knowledge, the challenge was the same: to account for what Jean-Pierre Dupuy calls "the internal production of an exteriority"<sup>5</sup> on which a system depends for its autonomy.

This concept of an autonomous, evolving system responding to the conditions of its environment has roots in the systems thinking approach to biology initiated by Ludwig von Bertalanffy<sup>6</sup> and elaborated by Francisco Varela and Humberto Maturana.<sup>7</sup> These authors began by delineating the features of autonomous systems in nature and then cautiously extending this model to nonnatural contexts. Others have exhibited less caution—sociologist Niklas Luhmann, for instance, enthusiastically embraced Varela and Maturana's concept of autopoiesis in his elaborate theorization of social systems.<sup>8</sup> Elsewhere, thinkers such as Freud and

4 "Let me repeat the three concepts that are in a triadic fashion connected to each other. They are: first, the observers; second, the language they use; and third, the society they form by the use of their language.... You need all three to have all three." Ibid., 284.

5 Jean-Pierre Dupuy, *Economy and the Future: A Crisis of Faith*, trans. M. B. Debevoise (East Lansing: Michigan State University Press, 2014), 15.

6 For a summary, see Ludwig von Bertalanffy, "The History and Status of General Systems Theory," *Academy of Management Journal* 15, no. 4 (December 1972): 407–26.

7 See Humberto R. Maturana and Francisco Varela, *Autopoiesis and Cognition: The Realization of the Living* (Dordrecht: Reidel, 1980).

8 See Niklas Luhmann, *Social Systems*, trans. John Bednarz and Dirk Baecker (Stanford, CA: Stanford University Press, 1995).

Jacques Lacan began with the components of social systems before accounting for their interaction, and still others (such as Hegel, Marx, and Louis Althusser) took the social as a system *sui generis* and then attempted to account for its apparent autonomy and evolution. In every attempt, the stumbling block is the same: the mysterious presence of a founding term that defines the system but cannot be counted within it. Hegel calls it the “determination of reflection” (*Reflexionsbestimmung*); for Marx, it is found within the mystical transformations of commodity exchange; Freud alludes to it in what he calls the *Vorstellungsrepräsentanz*;<sup>9</sup> Lacan calls it the “master signifier,” Luhmann the “double contingency.” Whatever its formulation, the formal difficulty it produces is the same: it acts as a “knot” in the structure of knowledge that prevents that knowledge from being totalized into a complete, autonomous system.

Responses to this difficulty fall into three basic categories: (1) to “desubjectivize” the components of the system and thus privilege the system ahead of its components (as we see in theories of Friedrich von Hayek, Althusser, and Luhmann); (2) to construe the unity of the system as a purely subjective attribution that has no substantial being in reality (the response of the pragmatists, “soft” systems theorists, and radical constructivists); or (3) to “ontologize the knot,” so to speak, and thus treat this difficulty not as an obstruction to the full knowledge of reality but as an irreducible condition of that reality and thus an irreducible condition of subjective being (as per Hegel and Lacan). Because these three responses represent distinct approaches to the issue of complexity, it is worth considering each one in a little more depth.

### From Knowledge to Belief

The basic maneuver of the “desubjectivizing” approach to social systems is to grant the system the upper hand in determining its operation, thus deeming its component subjects unwitting dupes to some greater purpose beyond their comprehension. A well-known formulation of this systemic subject is Adam Smith’s “invisible hand” of the market, which ensures the stability of the social system as long as its individual participants act in their own interests rather than in the interests of the system.<sup>10</sup> The lesson of the invisible hand is that the complexity of the system puts it beyond the comprehension of its components, and thus it should be spared their intervention in its operation. Austrian social theorist Friedrich von Hayek marked this lesson well, elevating Smith’s observation to the basis of a theory of social systems.

Hayek took the conceptual tools of cybernetics and systems theory and made a model of society in which every subject is blind to the ultimate cause and effects of their actions. “We never

9 The term (translated by Strachey as “psychical (ideational) representations,” but which could be more literally translated as “representations of representations”) appears in Freud’s 1915 essay “Repression,” in *The Standard Edition of the Complete Works of Sigmund Freud Volume XIV*, trans. James Strachey (London: Vintage, 2001): 146–58. The term is an attempt to account for the representation of repressed representations that cannot appear to the conscious mind but nonetheless have a formal presence.

10 “He is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention.... By pursuing his own interest he frequently promotes that of the society more effectually than when he really intends to promote it.” Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* (Chicago: University of Chicago Press, 1977), 593–94.

act," he says, "and could never act, in full consideration of all the facts of a particular situation, but always by singling out as relevant only some aspects of it; not by conscious choice or deliberate selection, but by a mechanism over which we do not exercise deliberate control."<sup>11</sup> We rely on rules, norms, conventions, and institutions to guide our actions—"experience" that is not our own but has "become incorporated in the schemata of thought which guide us."<sup>12</sup> Though we may believe ourselves to be rational subjects, a determining portion of that subjectivity belongs to the social system in which we participate. The autonomy of the participants in a social system is therefore a "synoptic delusion"<sup>13</sup>: it is the system, not the components, that is rational.

Hayek's model resembles the model of historically determined thought elaborated by structuralist Marxist philosopher Louis Althusser. In Althusser's antihumanist interpretation of Marx, knowledge is the output of a mode of production in which thought is the labor and is thus determined like any mode of production by social, historical, and economic relations. "This definite system of conditions of theoretical practice is what assigns any given thinking subject (individual) its place and function in the production of knowledges."<sup>14</sup> This "place and function" determines the thought of the subject: "This determinate reality is what defines the roles and functions of the 'thought' of particular individuals, who can only 'think' the 'problems' already actually or potentially posed."<sup>15</sup> Thus the autonomy of the subject, which Althusser scorns as "the myth that idealism produces as a myth in which to recognize and establish itself,"<sup>16</sup> is an illusion that hides the determining function of the system.

Although they draw different political conclusions, Hayek and Althusser see society as an autonomous system that relies on the lost autonomy of its component subjects. The subjects are "desubjectivized" in that they are reduced to machines rather than autonomous individuals—(over)determined rather than determining. The complexity of the social system puts it beyond the comprehension of its subjects. Whereas Hayek sees this complexity as the ultimate horizon of subjective knowledge that must be accepted as such, Althusser sees it as a call for a new approach to analyzing subjectivity that takes account of this "determination by a structure."<sup>17</sup>

An alternative approach to complexity is to construe it as a purely epistemological (rather than a metaphysical) problem, whereby complexity is seen as a challenge to one's methods of inquiry and validation. We can see this approach as a kind of tactical retreat from the totalizing ambitions of first-order cybernetics, with uncertainty replacing certainty as a general condition of knowledge. Within the cybernetic paradigm, this approach is

11 Friedrich von Hayek, *Law, Legislation and Liberty: A New Statement of the Liberal Principles of Justice and Political Economy* (London: Routledge, 1982), 30.

12 Ibid.

13 Ibid., 15.

14 Louis Althusser and Étienne Balibar, *Reading Capital*, trans. Ben Brewster (London: Verso, 2009), 44.

15 Ibid.

16 Ibid., 45.

17 Ibid., 203.

exemplified in the work of von Foerster, as well as in the conversation theory of Gordon Pask<sup>18</sup> and the radical constructivism of Ernst von Glasersfeld<sup>19</sup> and Ranulph Glanville, all of which reassert the role of language and reflexivity in the construction and testing of knowledge.

In contrast to the desubjectivizing approach, the constructivist approach focuses its attention on the subject rather than the system, regarding the latter as never more than a construct in the mind of the former insofar as it is ascribed purpose and direction. Because the role of the observer is inseparable from the system, the task for the researcher is to discover how knowledge of the system—of “external reality”—is constructed by the observing subject and how mental representations of objects are confused with the “thing in itself”: “Forgetting that we are treating our constancies *as if* they were objects, we treat each object as is instead. And forgetting that the qualities we find in these constancies are attributed by us, we treat these qualities not as attributes but *as if* they were properties of our objects.”<sup>20</sup>

Accordingly, the main concern of this approach is the analysis of truth claims and the construction of objects of knowledge. As emphasized in systems theory versions of this approach, such as Werner Ulrich’s critical systems heuristics,<sup>21</sup> the description of a system and its components is inseparable from one’s beliefs about its purpose and goal and thus can never be reduced to objective propositions. Complexity stands for this irreducibility to objective truth. As theoretical biologist Robert Rosen puts it: “Complexity is not an intrinsic property of a system nor of a system description. Rather, it arises from the number of ways in which we are able to interact with the system.”<sup>22</sup>

The concept of complexity is thus conditioned by whichever entity is granted determining priority: either the social system determines its subject or vice versa. The two positions represent an antinomy: both cannot be true at the same time, yet neither is logically flawed. The truth of a social system is either noumenal or groundless, and as long as the positions remain contradictory, our analysis is constrained to a choice of one or the other. The only possible way to overcome this aporia, it seems, is to refuse the choice and turn to the conditions that necessitate it. The third approach to complexity begins by identifying complexity precisely with this “impossible” point in the structure of the social system at which both positions are true, that is, the point at which the subject determines the system that determines it as subject.

The challenge of pinning down this elusive formation in language is in evidence in the circuitous constructions to which it frequently gives rise. Hegel sets the standard early in this regard, with his description of the *Reflexionsbestimmung* in his *Science of Logic*:

18 See Gordon Pask, *Conversation, Cognition and Learning: A Cybernetic Theory and Methodology* (Amsterdam: Elsevier, 1975).

19 See Ernst von Glasersfeld, *Radical Constructivism: A Way of Knowing and Learning* (London: Routledge, 1995).

20 Ranulph Glanville, “An Observing Science,” *Foundations of Science* 6, nos. 1–3 (2001), 64 (emphasis in original).

21 See Werner Ulrich, “A Brief Introduction to Critical Systems Heuristics (CSH),” available at [http://www.wulrich.com/downloads/ulrich\\_2005f.pdf](http://www.wulrich.com/downloads/ulrich_2005f.pdf) (accessed October 1, 2018).

22 Robert Rosen, *Anticipatory Systems: Philosophical, Mathematical and Methodological Foundations* (New York: Springer, 2012), 298.

The determination of reflection ... has taken its otherness back into itself. It is *positedness*—negation which has however deflected the reference to another into itself, and negation which, equal to itself, is the unity of itself and its other, and only through this is an *essentiality*. It is, therefore, positedness, negation, but as reflection into itself it is at the same time the sublatedness of this positedness, infinite reference to itself.<sup>23</sup>

Through the determination of reflection, a particular entity comes to stand for the universal of which it is a particular—it is defined with reference to itself and thus closes the loop of determination by forgoing reference to a higher category that encompasses itself and its other. An example Hegel gives in a later work is the figure of the monarch, who as a personification of the state universalizes in a particular entity that which unifies his or her particular subjects. The monarch is at once a person like any other and simultaneously manifests in one particular entity the universality in which every other particular person partakes.<sup>24</sup> The determination of reflection is thus a kind of short-circuit—it halts the regress of determination by turning back in on itself: “*Because of this reflection into themselves, the determinations of reflection appear as free essentialities, sublated in the void without reciprocal attraction or repulsion.*”<sup>25</sup>

Marx describes the same structural formation in his analysis of commodity exchange, such as in his accounting for how one particular commodity (money) becomes the universal equivalent of the exchange value of all commodities. Commodity exchange presupposes the equivalence of all commodities, but money is just one particular commodity among others and is therefore somehow both universal and particular:

What appears to happen is not that a particular commodity becomes money because all other commodities express their values in it but, on the contrary, that all other commodities universally express their values in a particular commodity because it is money. The movement through which this process has been mediated vanishes in its own result, leaving no trace behind.<sup>26</sup>

Marx deploys the language of religion in his account of this miraculous transformation, referring to it as “transubstantiation” and the power it confers as a “fetish.” Commodity exchange appears to rely, he says, on some belief on the part of participants whose logic is irrational but the affirmation of which is necessary for exchange to take place. No explicit disavowal of reason is required—the affirmed belief is implicit in the act of exchange: “They do this without being aware of it.”<sup>27</sup>

23 Georg Wilhelm Friedrich Hegel, *The Science of Logic*, trans. George Di Giovanni (Cambridge: Cambridge University Press, 2010), 353 (emphasis in original).

24 See §§ 279–80 of G.W.F. Hegel, *Outlines of the Philosophy of Right*, trans. T. M. Knox (Oxford: Oxford University Press, 2008), 267–73.

25 Hegel, *The Science of Logic*, 352 (emphasis in original).

26 Karl Marx, *Capital: A Critique of Political Economy, Volume 1*, trans. Ben Fowkes (London: Penguin Books, 1980), 187.

27 *Ibid.*, 166–67. The English translation of this sentence loses the biblical allusion of the German original (“Sie wissen das nicht, aber sie tun es”), which bears close resemblance to Luke 23:34 (“Father, forgive them, for they know not what they do”; in German: “Vater vergib ihnen; denn sie wissen nicht, was sie tun”).

As economic theorist Alfred Sohn-Rethel emphasizes, this moment of “practical solipsism” by which particular values become subject to universal exchange-value not only allows the process of exchange to take place but also grounds the social system it unifies by determining all value (of labor, of materials, of usefulness) as equivalent:

The relations of exchange transacted in a market express themselves in quantitative differences of this uniform denominator as different “prices” and create a system of social communication of actions performed by individuals in complete independence of one another and oblivious to the socializing effect involved. The pivot to this mode of socialization is the abstraction intrinsic to the action of exchange.<sup>28</sup>

Thus the act of exchange is what makes values equivalent—they are not exchanged because they are equivalent; they are equivalent because they are exchanged. The subjective belief implicit in this action “closes the loop” of the social structure by presupposing the condition it produces. For their coherence, subject and system both depend not on any rational knowledge but on an irrational belief, that is, the belief in the equivalence of all forms of value. This belief—implied by the abstraction necessary to social action—must remain “unthought” to be effective. It must remain unthought precisely because it is irrational, and it is irrational precisely because it is the moment of logical sublimation through which the subject presupposes the system that determines it as subject, a process that then “vanishes in its own result.”

We find the same paradoxical figure in the work of Jacques Lacan in the form of the master signifier. Lacan uses the terminology of semiotics to frame the relation between a subject and the system that defines it (what Lacan calls a “field of knowledge”). Within this schema, the master signifier is the signifier of “pure difference” that guarantees the consistency of a field of knowledge because it is the signifier to which all other signifiers ultimately refer through their relations of difference. As such, it performs the formal function of the determination of reflection: “Knowledge initially arises at the moment at which  $S_1$  [the master signifier] comes to represent something, through its intervention in the field defined, at the point we have come to, as an already structured field of knowledge.”<sup>29</sup> The autonomy of a field of knowledge relies on the exceptional status of one particular signifier, which, like the monarch or money commodity, intervenes in a field of knowledge so as to bound it. This exceptional signifier stands for the field of knowledge itself; its “signified” is “the unity of all signifiers in the field of knowledge.” The master signifier therefore

28 Alfred Sohn-Rethel, *Intellectual and Manual Labour: A Critique of Epistemology* (London: Macmillan, 1978), 30.

29 Jacques Lacan, *The Other Side of Psychoanalysis*, trans. Russell Grigg (New York: Norton, 2007), 13.



represents the action of the observing subject on a system: it signifies the suturing effect on the system of the erasure of the observer—the very action that reduces social complexity to artificial complexity.

Through the determination of reflection, antinomy becomes autonomy. In the foregoing examples, the action of the determination of reflection assures that the social system functions as an autonomous system and remains irreducible to rational knowledge. At any given moment, its status as a bounded system depends on its content—knowledge—always being supplemented with a subjective action that remains purely formal (i.e., unconscious). This action implies belief because it cannot be reduced to knowledge—the subject must *act as if* the system is a system for the system to function as a system.

This suggests that complexity emerges from the irreducible gap in knowledge introduced by belief. Attempting to bridge this gap with rational knowledge can only lead to a position of antinomy—the gap, once bridged in this way, simply opens up elsewhere. The path beyond this antinomy is via the elaboration of the proposition that the complexity of a social system is the result of its autonomy being dependent not on some missing piece of rational knowledge but on an irrational subjective belief.

### The Design Problem as Symptom

We can see the passage from the first to the second approach to complexity play out in the field of design theory in its own passage from rationalism to pragmatism. The former approach is best exemplified in the work of Herbert A. Simon and the first generation of the design methods movement, and the latter in the reflective practice of Donald Schön and the second generation of the same movement. Simon's pioneering and influential work on the structure of design problems is widely acknowledged, but he can be also credited as the first to make the antinomy between the two approaches to complexity explicit when he conceded in a 1962 paper that “in the face of complexity, an in-principle reductionist may at the same time be a pragmatic holist.”<sup>30</sup> Although he recognized the limits to which complex problems could be “decomposed” into rational propositions, he failed to embrace the transcendental challenge presented by this inherent limitation.

The theorists of the first generation of the design methods movement similarly failed to bridge the “rationality gap”<sup>31</sup> that prevented their various programs from fully desubjectivizing the design scenario and thus achieving systemicity. For instance, J. Christopher Jones attempted to develop a “unified system of

30 Herbert A. Simon, “The Architecture of Complexity,” *Proceedings of the American Philosophical Society* 106, no. 6 (December 1962): 468. This line was omitted when the essay was reproduced in Simon's later work, *The Sciences of the Artificial* (Cambridge, MA: MIT Press, 1996).

31 The term comes from Jane Darke, “The Primary Generator and the Design Process,” in *Developments in Design Methodology*, ed. Nigel Cross (Chichester: Wiley, 1984), 175–88.

design” by maintaining a programmatic separation between logical analysis and creative synthesis.<sup>32</sup> Christopher Alexander argued that design needed new rational methodological tools based on the hypothesis that “for every problem there is one decomposition which is especially proper to it ... usually different from the one in the designer’s head.”<sup>33</sup>

The second generation of the movement was born of the failure of these programs to cohere into a system. Once this defeat was conceded, the support of rationalism fell away: knowledge lost its secure status, the design problem was reclassified as “wicked,”<sup>34</sup> and the vanguard of the first generation vituperated their earlier efforts. What remained is a much more cautious methodology based explicitly or implicitly on the principles of philosophical pragmatism. The high theoretical ambitions of the rationalists were abandoned for what Donald Schön called the “swampy lowlands” of real practice, wherein problematic situations are “confusing messes incapable of technical solution” and one’s progress relies on “experience, trial and error, intuition and muddling through.”<sup>35</sup> Design theory has been largely content to remain in these regions.

A danger of this pragmatic turn, however, is that the social dimension of design should remain forever a “given” in the background of any particular design problem. The role of the social as a determining structure eludes a pragmatistic approach due to the reluctance to posit the social as a system (albeit one with a meaningful constitutive gap). The result is that the transformative power of design is foreshortened because it is restricted in each case to addressing a unique and isolated problem that disappears as soon as it is solved. “The truth is a moment of correct practice,” wrote Max Horkheimer, in a critique of American pragmatism, “but whoever identifies it directly with success passes over history and makes himself an apologist for the reality dominant at any given time.”<sup>36</sup> When treating design problems as merely wicked, design theory does so at the risk of failing to discover a deeper critical purpose.

I suggest that this depth can be realized by a definition of the design problem that recognizes its complexity as an effect of the reflexive determination of a social system. The autonomy of a social system depends on some defining truth that produces its formal unity. A complex problem arises when this truth is no longer self-evident and thus fails to “close the loop” of the system. The subject’s knowledge of the social is thus deprived of its master signifier—it is not sutured by truth but holed by the void of doubt. Complexity no longer unifies the system but decenters the subject.

32 See J. Christopher Jones, “A Method of Systematic Design,” in *Developments in Design Methodology*, ed. Nigel Cross (Chichester: Wiley, 1984), 9–32.

33 Christopher Alexander, *Notes on the Synthesis of Form* (Cambridge, MA: Harvard University Press, 1964), 83.

34 See Horst W. J. Rittel and Melvin M. Webber, “Dilemmas in a General Theory of Planning,” *Policy Sciences* 4, no. 2 (1973): 155–69.

35 Donald Schön, *The Reflective Practitioner: How Professionals Think in Action* (London: Basic Books, 1991), 43.

36 Max Horkheimer, *Between Philosophy and Social Science: Selected Early Writings* (Cambridge, MA: MIT Press, 1995), 200.

This definition of a complex problem aligns to Lacan's definition of the symptom: that which "attaches itself to a truth that no longer functions."<sup>37</sup> Accordingly, a design problem, as social symptom, can be understood as the metaphoric elaboration of the loss of efficacy of a founding truth. The advantage this symptomatic approach has against the constructivist approach is that this realization need not lead directly into the spurious infinity of "observer-defining-system" because it recognizes that any founding truth achieves the status of truth only insofar as it predicates belief; that is, its necessity derives only from being posited as foundational so as to retroactively suture the system that it founds (as per its function as reflexive determination). This grounds all questions of boundaries in the actions and knowledge of the subjects whose belief defines the system in which the problem obtains. It addresses not the validity of this truth but its determining effect on the system and its boundary (i.e., its formal closure). If the truth that predicates this belief no longer functions, then the boundary (relative to the subject) is precisely the problem.

This symptomatic approach to complexity distinguishes truth from knowledge by recognizing the former as the necessary irrational supplement to the latter if the latter is to take the form of an autonomous system. This truth is in evidence in the actions of subjects—it is the implicit belief that must be held if the system is to appear rational to its subjects (per Althusser, it is the "answer which does not correspond to any question posed"<sup>38</sup>). Social complexity derives from the indeterminability of this truth: it is irreducible to rational knowledge because it is reflexively determined and thus can only be predicated on belief. Accordingly, a complex problem arises when this noumenal truth on which the system depends no longer inspires faith—when it no longer "goes without saying." Without this truth to close the loop of the system, its rationality becomes corrupted and disordered. Its boundaries are no longer clearly delineated. When this loss of belief is widespread, the system may disintegrate entirely.

The designer is summoned to arrest this decline. When her actions are successful, she instates a new truth around which the knowledge of a system can cohere (she does this without being aware of it). The novelty of this truth never appears as such; first because this truth is only ever implied in the actions of subjects and remains "unthought," and second, because this truth is retroactively posited as a founding moment in some distant past such that it appears that it was "ever thus." Her solution to the problem is seen as having revealed some essence of the social system that was until then misrecognized—some common cause uniting the interests of every subject of which they had lost sight.

37 Jacques Lacan, *Le séminaire: Livre XIX... ou pire* [The Seminar: Book XIX... Or Worse] (Paris: Éditions du Seuil, 2011), 46: "Voilà pour le symptôme en tant qu'il se rattache à la vérité qui n'a plus cours." [Here is the symptom in so far as it attaches itself to a truth that no longer functions].

38 Althusser and Balibar, *Reading Capital*, 29.

This might appear to suggest that design acts in an essentially conservative fashion, restoring wayward social systems to the status quo. If this is so, it is because design theory has been reluctant to posit the social dimension of design problems as anything other than a given. To recognize social complexity as a sign of the determination of reflection that unifies a system is to recognize that for its appearance of autonomy, every social system depends on the beliefs implicit in the actions of its subjects (whom the system constitutes as subjects). The social system is therefore not simply the backdrop before which a design problem is staged; it is the *essence* of the complexity of a design problem.

This belief that sutures the social should properly be called ideological, and I suggest that via a turn toward the ideological, design theory can sublimate the rationalist-pragmatist deadlock. This would allow the field to advance in productive new directions because it would add both the subject and the social system to its objects of study—an elaboration that the antinomy of complexity has heretofore proscribed.