UTOPIA COMPUTER

The »New« in Architecture?

Nathalie Bredella, Chris Dähne,
Frederike Lausch (Eds.)

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The critical concern of the book “Utopia Computer” is the euphoria, expectation and hope inspired by the introduction of computers within architecture in the early digital age. With the advent of the personal computer and the launch of the Internet in the 1990s, utopian ideals found in architectural discourse from the 1960s were revisited and adjusted to the specific characteristics of digital media. Taking the 1990s discourse on computation as a starting point, the contributions of this book grapple with the utopian promises associated with topics such as participation, self-organization, and non-standard architecture. By placing these topics in a historical framework, the book offers perspectives for the future role computation might play within architecture and society.

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MARCUS BERNARDO

Unmanageable Utopias

This essay proposes, through a case study, a utopian project based on cybernetic reasoning. The case involves self-organized families trying to solve their housing problems by occupying idle land in a large Brazilian city. The essay will analyse three cybernetic strategies thought to alleviate the groups' problems: Stafford Beer's Team Syntegrity, the use of analogically-computed interactive topological models and self-organization strategies. Three cybernetic concepts will be introduced to analyse and discuss self-organization, collective control and the use of indeterminate models in design.

Introduction

The holistic thinking of the counterculture movement that began in the 1960s did indeed imagine a different utopian society immersed in new technologies. However, the technological products of this junction between engineering and other areas of knowledge were mostly incorporated for mainstream purposes.[1] Interconnectedness, productive autonomy and the adaptability of new technologies were key in the imagination of a more plural and collectively managed society. Nevertheless, the impact of these technologies in the opposite direction is undeniable. Many new technologies have trivialized social relations, reinforced control mechanisms and failed to effectively manage the problems of society.

My contribution to this discussion is to present the results of my study on collective space planning, which supports the hypothesis

1 Fred Turner, From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism (Chicago/IL: University of Chicago Press, 2010), 3–4.

of the anthropologist Mary Catherine Bateson that the "tragedy" of the cybernetic revolution was the abandonment of its systemic reflections in favour of the amenities of uncritical automation.[2] We live in a society organized by systems whose implementation is primarily based on cybernetic principles. During the Cold War, the institutional implementation of these principles had a predominantly negative impact on urban development in the United States,[3] and on political control in the Soviet Union[4] and China.[5] However, within the field these implementations have been widely criticized. Indeed, Norbert Wiener had already warned about these impacts in the field's early years in his book *Cybernetics*: "That [communication] system which more than all others should contribute to social homeostasis is thrown directly in the hands of those most concerned with the game of power and money."[6] There were attempts to develop different, critical approaches, such as those cyberneticist Stafford Beer conceived for Chile's economic management system. Called Cybersyn, the Chilean initiative was theoretically a top-down attempt to build a factory coordination system led from the ground up by workers, but in practice it became a way to distribute factories between the government's political allies.[7] After the successes and failures of this project, Beer brought his critical reflections to the field of social organization in a series of lectures he called "Designing Freedom," published in 1974. If Bateson was right, some of these abandoned reflections can bring light to the problems we are currently witnessing.

2 Mary Catherine Bateson, "How to Be a Systems Thinker," interview by John Brockman, dir. Nina Stegeman, Edge, April 17, 2018, video, 42 min. Accessed September 15, 2021. https://www.edge.org/conversation/mary_catherine_bateson-how-to-be-a-systems-thinker.

3 Jennifer S. Light, From Warfare to Welfare: Defense Intellectuals and Urban Problems in Cold War America (Baltimore/MD: Johns Hopkins University Press, 2003).

4 Slava Gerovitch, From Newspeak to Cyberspeak: A History of Soviet Cybernetics (Cambridge/MA: The MIT Press, 2002).

5 Susan Greenhalgh, "Missile Science, Population Science: The Origins of China's One-Child Policy," The China Quarterly 182 (June 2005): 253–276.

6 Norbert Wiener, Cybernetics: or Control and Communication in the Animal and the Machine, 2nd ed. (Cambridge/MA: The MIT Press, 1961), 161–162.

7 Eden Medina, Cybernetic Revolutionaries: Technology and politics in Allende's Chile (Cambridge/MA: The MIT Press, 2011).

The methodology used for this field study involved first searching for situations where collective organization for space planning was happening, and then conducting participatory observations and laboratory experiments to discuss cybernetic strategies in context.

A self-organized settlement

The situations I found to be illustrative of the cybernetic principles I will examine are situated in Belo Horizonte, a city of almost six million people in Brazil with a history of strong occupation movements and large informal settlements. One reason for the number of occupations is that the housing deficit is high, but the amount of vacant land and buildings is even higher. Housing is a multidimensional problem that involves politics, power, economy, technology and other fields. Given this situation, the university where this project was conceived, like many other universities in the area, studies and supports these occupation groups to understand what can be improved within this unbalanced context. This ongoing research made it possible for me to access different initiatives undertaken by collective organizations and create cybernetic experiments around them, one of which I discuss here.

The selected case study involves around 200 families, who, in collaboration with activists, are trying to solve their housing problems by occupying idle land. Their problems cannot be addressed either by state housing policies or by the real estate market. The size of their families or their activities exceed the capacity of the state apartments, and their income is not sufficient for the available housing on the market. The situation they face consists of parcelling the recently occupied land and planning its infrastructure, then building.

The occupation is overseen by a bigger group that has already acquired other land over the past eight years. Most informal settlements in Brazil occur through spontaneous self-organization, but organized occupations are also significant; in Belo Horizonte alone, twenty-four of them involve more than fifty thousand people.[8] To outline this organization process briefly, over time the organizations have gradually established decision-making authorities: plenary assemblies are used to discuss collective matters and elect semi-autonomous committees for specific tasks. These committees manage everything, from the search for proper land to occupy to a scoring system to record participation and manage the sequence of land distribution. Each committee decides most things autonomously, meets with others, and calls for plenaries when they think an issue needs to be discussed with the whole group. If poor decisions are made autonomously by a committee, they can be dissolved by a plenary vote. After any new occupation, a committee is established to plan the settlement's infrastructure and the subdivision of the land. Only after that does building commence. Once the occupation is consolidated, the organization remains strong so long as there are collective claims and actions to carry out. Organizing can become less pronounced and sometimes dysfunctional after public amenities are provided to the new settlement.

In earlier occupations, the settlements were designed solely by the technical committee elected for that purpose. Designs were repeatedly presented in assemblies for discussion and approval and, once approved, implemented. Assigning lots to families was the final step, as the generic subdivision of land drastically simplified design requirements. However, this parcelling process also led to problems later, when some residents were given plots other than those they had imagined.

In this occupation, the committee tried to enact a collective planning process. The first attempts were made at a meeting at a local school. Committee members divided the family representatives into nine groups of around 20 people. Each group developed a proposal which was voted on at the end of the session. Observing from the outside, the chosen proposal did not appear any better than those previously prepared by the committee in isolation. The problems with the allotments had not seemed to be resolved, as the design plan continued to include generic lots.

8 Rafael Reis Bitterncourt, Cidadania autoconstruída: o ciclo de lutas sociais das ocupações urbanas na RMBH (Belo Horizonte: UFMG, 2016).

These solutions did not look very different from the ones provided by the state either, since they did not address the specific needs of each family. In order to resolve this issue, the planning committee studied how to enable the subdivision of blocks of land into plots proportional to three types of family size, and had to decide what criteria would be used to determine this.

According to two previous and significant studies on the socio-spatial structures of favelas in Belo Horizonte, it is clear that much more can be considered when it comes to the proper division and distribution of land and infrastructure than family size. According to this research, during its formation, the built space of the favela grows to accommodate relations between neighbours, the compatibility of their activities, the diversity of their family structures, mobility requirements, domestic production and commercial activities, and many other factors. Sometimes, for example, a group of neighbours changed the access routes to their houses to avoid another group. The creation of alleys also served to connect interdependent houses, like those of young families and their elderly parents. Most houses were continually transformed through the construction of walls, alleys, and rooms to avoid convivial problems and accommodate new family members and work initiatives, like a hair salon, a mechanic's workshop, or a vegetable garden.[9] If all of these parameters could be considered in the planning process, conflict could be avoided, diversity fostered, and the families could be supported to coexist in a more stable situation than in the favelas. How to design with all these variables collectively?

Cybernetic analysis of the situation

In his aforementioned lectures, Beer warned that the survival of purposeful social organizations depends on their ability to adapt their responses to their dynamic context and to maintain their

9 Cidade e Alteridade, Direito Fundamental à moradia adequada: "novos olhares sobre os impactos e efeitos das políticas públicas de assentamentos e reassentamentos em aglomerados urbanos de Belo Horizonte" (Belo Horizonte: UFMG, 2015).

purpose.[10] For this adaptation to keep pace with the environment, decision-making processes cannot rest at the top of hierarchies, as the ability to make decisions towards the top diminishes in typical pyramidal administrative structures.[11] He states that the network pervasion can aggravate this problem if there is no change to administrative structures.[12] For an organization to be effective, its communication structures must enable different degrees of autonomy.[13] Thus, problems should be solved, whenever possible, by smaller groups, with a decreasing number of pertinent questions as the group becomes larger and its scope more general. Nonetheless, the second problem, stated clearly by Beer's research fellow Gordon Pask, is that this decision-making structure is too complex to be designed; it must be self-organized to create a context-efficient organization.[14]

Beer and Pask's statements can be evaluated in the context of the occupations in Belo Horizonte. In the occupation assemblies, the higher the number of people involved, the greater the number of issues to be discussed, but there is less capacity to discuss all these issues comprehensively. As questions accumulate, speaking time gets too scarce to engage in effective collective decision-making.[15] I observed that this scarcity promoted three types of economy: (1) the economy of the number of problems to be discussed, using the ideology of needs, which discerns between personal desires and "important basic needs"[16]; (2) the economy of the complexity of the problems discussed, using generic solutions that can be adopted from the

10 Stafford Beer, Designing Freedom, Massey Lectures vol. 13 (New York/NY: Wiley, 1974), 6.

11 Ibid., 73.

12 Ibid., 26.

13 Ibid., 70–72.

14 Gordon Pask, "My prediction for 1984," in Cidoc Cuaderno 1014: Interpersonal Relational Networks, ed. Heinz von Foerster (Cuernavaca: Centro Intercultural de Documentacion, 1971), 4, 8–12.

15 Gordon Pask, "The limits of togetherness," in Information processing 80, ed. Simon Lavington (Amsterdam: North-Holland, 1980), 1001.

16 Ivan Illich, "needs," in The Development Dictionary: A Guide to Knowledge as Power, ed. Wolfgang Sachs (London: Zed Books Ltd, 1992), 95–110.

establishment of standard needs; and (3) the economy of the debate about the problems, which reduces all the voices of the collective to one voice through voting or unanimity—a viable route only when the discussion involves generic solutions that concern everyone. What the case study indicates is that assemblies have a structure that, at best, flattens individual issues and directs collective decision-making only to the problems that affect all participants. There is no opportunity to discuss problems that are specific to individuals but would be better solved collectively due to their relational nature. However, at worst, assemblies as a form of organization can also be used to prioritize the individual issues of those who have more informally-established power, as explained by the feminist political scientist Jo Freeman: “the idea of ‘structurelessness’ does not prevent the formation of informal structures, only formal ones… [and] …becomes a smokescreen for the strong or the lucky to establish unquestioned hegemony over others.”[17]

The problems that arise from the economies mentioned above affect the solutions generated in the assemblies and influence how the committees are formed to implement these solutions. We saw that these committees split tasks according to functions, such as a purchasing committee, communication committee, design committee and so on. This subdivision allowed the committees to implement solutions already decided in the assembly and adapt them as needed in an autonomous way. Conversely, this subdivision did not help overcome the problems that resulted from adopting simplified solutions, since it siloed essential aspects that needed to be discussed together in order to adopt new solutions. Ultimately, the subdivisions made in the assemblies, instead of forming autonomous groups according to what concerned each of them, split the issues affecting everyone into parts and distributed them among the groups.

The project committee’s attempt to subdivide residents into nine non-specialized groups to design separately was a step forward,

17 Joreen Freeman, “The Tyranny of Structurelessness,” The Second Wave 2, no. 1 (March 1, 1972): 1.

yet the design method being used was the same as one that might be used by an architect designing alone. Consequently, the nine groups could not work on the project in parallel, but only in competition for the best idea to solve the problems of a homogenized group, composed of supposedly generic families.

Cybernetic strategies in the context of the occupation

As a result of the above analysis, I thought three cybernetic strategies to assist dwellers in their planning efforts:
(1) The first strategy uses principles from Beer's Team Syntegrity meeting protocol. As an alternative to general assemblies, Team Syntegrity focuses on problem-solving groups that adhere to the issues raised individually: in the first stage, participants interested in a general theme meet and, to start a discussion, any of them can visibly write, for example, on a whiteboard or poster, the issue they want to discuss.[18] Other participants may freely join or leave this discussion, and may also start other independent discussions. In the second step, topics are selected for discussion in groups of five people. Each person participates in two topics as an active discussant and in two topics as a critic. Consequently, small groups can meet separately at the same time, while at every meeting, each participant relates information from the other three groups in which they have participated. To foster the integration of groups, people are organized like the edges of platonic geometries,[19] each person connecting two nodes that represent the topics they address. This organization protocol guarantees the possibility of simultaneous parallel work, and, after many rounds of meetings, it foments integration between

18 Allena Leonard, "Team Syntegrity: a New Methodology for Group Working," European Management Journal 14, no. 4 (August 1995): 407–413.

19 Platonic forms are ideal for performing the protocol, but a number of variations have already been obtained to suit different numbers of people. More information can be found in: Marcus Bernardo, "Integrating parallel conversations in an institutionalized society: Experiments with Team Syntegrity online," Technoetic Arts: A Journal of Speculative Research 19, no. 1–2 (2021): 61–69.

topics.[20] In tests I conducted online with architecture students, it seemed that the process favoured personal expression, not only because of the small size of the discussion groups but because it brought together participants with information from other groups with which the other participants were unfamiliar.

If we were to apply the same strategy to the settlement design, the families would freely articulate their spatial desires in the first stage. Clustering around their shared interests, groups of families would discuss the form they would like the settlement to take. Instead of finding topics, we would raise "spaces of interest" in a decentralized manner, for example, different types of houses, parks, quiet streets, busy streets, stores, schools, workshops, riverside spaces and so on. For the next stage, interrelated groups would be formed to design the spaces. The design could start with the spaces inside each house, which could be discussed by each family as an interrelated group of individuals, and in the next step, groups of families with common interests could plan the design of small neighbourhoods. The presence of common or conflicting interests between these groups would connect or separate them the same way as the topics were integrated by the multiple roles of participants in Team Syntegrity. Similarly, each person would participate in the design of different spaces and pass information between groups. However, for this design process to work, it would be necessary to use design tools that make it easy to adapt the group's different solutions synchronously, which leads to the second strategy.

(2) The second strategy involves the use of analogically-computed interactive topological models as an alternative to traditional deterministic blueprints. Topological models, in general, are not defined by the geometry of their parts, but by how these parts relate to each other: their connectivity, adjacency, enclosure, overlap, etc. If instead of drawing spaces using specific geometrical forms, we think of them as a collection of disks connected by elastics, we can maintain specific desired configurations while

20 Leonard, "Team Syntegrity: a New Methodology for Group Working," 407–413.

varying their geometry to create a wide range of forms. Each family could assemble their houses by connecting disks of various sizes, up to an amount of land proportional to the size of the family. Houses would join together around streets, patios and other shared spaces composed of donated areas. Flexible tubes would represent linear elements like streets, walkways or pipes. Designing this way, parallel solutions would automatically adapt to each other by varying their geometry when joined.

To achieve this model, I first tried different strategies using the software Grasshopper and its physical simulation plugin Kangaroo to make a digital model. Grasshopper is a visual programming environment that runs within Rhinoceros 3D, a computer-aided design application. The software is used to create processing paths where inputs, like the number of houses and their configuration, can be varied to produce different outputs, for example different neighbourhood projects. Accordingly, a processing path was created to output an interactive graphic where houses were represented by disks behaving as if they were tied by elastic strips. This worked, but I could not process the agglomeration of more than forty houses without creating errors in the physical simulator. Consequently, the next step was to try physical models. I found in screw-nuts an accessible hexagonal form that gives a snap to movements when joined with latex strips. This form provides some stability to the model if a specific positioning is desired, but automatically adapt its form to maintain its configuration. The interactive model generated is easy to reproduce in the context and capable of automatically and simultaneously processing the same information as the digital model, without the computational limits of digital serial computers. After some tests with screw-nuts, I designed a 3D printed version that is not as accessible, but is easier to attach to elastics (fig. 1).

One disadvantage of this physical model is that, once all the spaces are connected, it is hard to manipulate the model to suit all families simultaneously. Two hundred family representatives around it would form a circle with a diameter of 20 meters. For the parallel design process to work in its analogue version, I would need to subdivide and detach areas for groups of neighbours

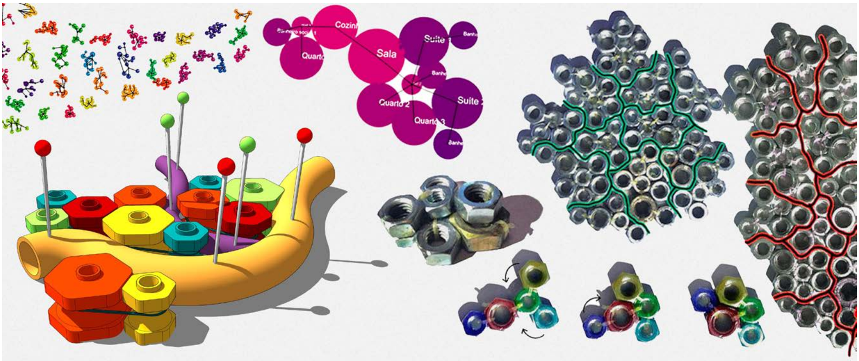

Fig. 1: On the top left, digital experiments with discs agglomerated by forces of attraction; on the right, experiments made with screw-nuts and rubber bands; on the bottom left, the digital representation of a version developed for 3D printing. Source: image created by the author

to design details separately, after fitting the agglomeration to the land geometry. A recurrent subdivision would be needed to entwine the parallel designs, every new subdivision embracing the borders of the last subdivision (fig. 2).

(3) The third strategy uses self-organization to perform the necessary actions for implementing solutions, as an alternative to integral coordination through a consensual deterministic project. Centralized coordination through deterministic design is not necessarily an efficiency tool but a workforce control feature,[21] as it a priori defines the solutions to be adopted and does not employ the decision-making power of the workers involved in construction. There are non-mapped trees, terrain accidents, and underground rocks in the occupied land, not to mention the changing relationships in the neighbourhood and a host of other factors that need to be taken into account when implementing a solution. These features are too complex to capture, process, and deterministically model, even using the parallel processing strategies mentioned. Given this situation, there is no sense in using deterministic models when the inhabitants are managing the building of the houses and infrastructures on their own. The same

21 Pedro Fiori Arantes, The Rent of Form: Architecture and Labor in the Digital Age, trans. Adriana Kauffmann (Minneapolis/MN: University of Minnesota Press, 2019), 101–109.

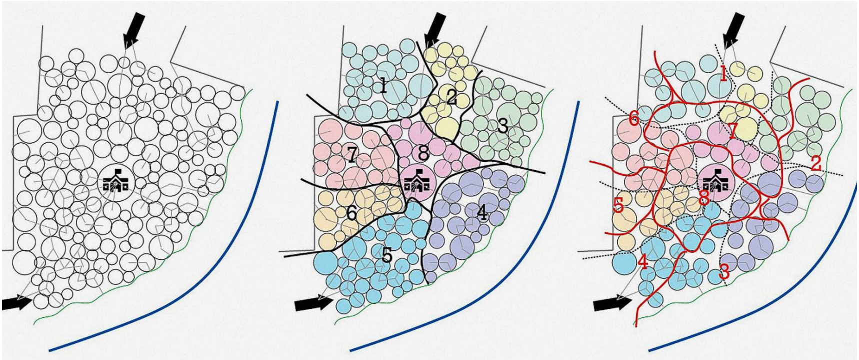

Fig. 2: Illustration of how a parallel settlement design process could be achieved. From left to right: agglomeration adapted to the geometry of the land; the subdivision of groups by area; new subdivision done in a way that does not coincide with the previous division. Source: image created by the author

cybernetic reflections applied to the first strategy can be used here to devise an alternative strategy to centralized coordination. While Team Syntegrity can attenuate the variety of issues to be collectively resolved, its use for opposite purposes can amplify the variety of individual responses to a complex context through autonomous self-organization.

Working this way, models and meetings could be used as tools to imagine settlement possibilities and for planning abstract rules to guide their realization by self-organized autonomous groups. In the case of the subdivision of land, residents—keeping plot areas and street axes collectively organized—may negotiate on-site as to the best form for their plots and implement together any infrastructure they deem necessary.

Analysis of strategies

If in the 1960s there was a utopic dream of a society immersed in cybernetic technologies, today's dream society might be immersed in cybernetic strategies. Three cybernetic principles can be used to analyse and discuss the impact of these cybernetic strategies on today's utopic imagination. The first is about self-organization, the second about collective control, and the third about indeterminate models:

(1) The use of the word "self-organization" to describe some events in this essay calls for a better understanding of its potential meaning. The subdivision of any observed phenomenon into parts organized in a way that behaves like this phenomenon is what the cybernetics pioneer William Ross Ashby calls a "system."[22] Accordingly, a system is an abstract machine that reproduces a phenomenon. The more conditionality the system has between its parts—the more organized it is—the fewer the possibilities of what could happen, and the better the phenomenon is known to uncertain observers who calculate probabilities based on what they have already seen.[23] As a result, we depart from a phenomenon observed as one entity that changes its states to a phenomenon observed as a machine that can have its parts manipulated. Ashby explains that the same phenomenon can be divided and organized in many ways that reproduce its behaviour, and that the observers are the ones who decide how to do it depending on the goals they want to achieve.[24] In the same way, the description of how some systems move from independent parts to connected parts, i.e. how they organize themselves, is a second-order observation of the same kind as the first, namely the organization of the organizational process.[25] In this context, Ashby states that greater or lesser organization, in itself, is neither good nor bad, nor is any type of organization. An organization can only be good according to an observer's criteria. Depending on the criteria we use, we can imply that disorganization can be better than bad organization,[26] as it at least carries the possibility that good organization might emerge. This is where self-organization comes into its own—when we relinquish control to achieve something beyond our control capabilities.[27] Nevertheless, as Ashby just stated, an emergent organization does not mean a good organization. Therefore, Ashby alerts designers that it is

22 Ross Ashby, "Principles of The Self-organizing System" in Mechanisms of Intelligence: Ashby's Writings on Cybernetics, ed. Roger Conant (Seaside/CA: Intersystems Publications, 1981), 55.

23 Ibid., 53–54.

24 Ibid., 54–55.

25 Ibid., 62–63.

26 Ibid., 59–61.

27 Pask, "My prediction for 1984," 9.

crucial to understand what kind of organization tends to consolidate in these fomented indeterminate processes.[28]

In light of this reasoning, we can view the group I observed as self-organized, in the sense that it started with disorganized people and ended organized into committees with specific roles. However, even though this process of organization was not predicted, it happened in a context that came out of traditional organization formats, such as the general assembly and specialized subdivision. This organization made the group capable of accomplishing many tasks, but if they continue with it, further possibilities of organization will be reduced. As I previously described, their organization implies a series of economies in the design process. In this sense, the imagined strategies can generate an alternative context that fosters different self-organization which might be better for settlement planning and implementation. The criterion for “better” here is specific: increase personal expression through the integration of decentralized decision making. The first reason for this criterion is the previously quoted statement from Beer, that a form of organization that balances centralization and decentralization will more likely succeed in achieving the group’s goals. Nevertheless, one more significant reason can be mentioned, and this is about control and freedom.

(2) Engineer and philosopher Jean-Pierre Dupuy refers to a conjecture that helps us to understand the necessary balance between individual and collective control. He calls it the Heinz von Foerster postulate. The postulate suggests that when new possibilities for the interrelationship between individuals in an observed society emerge, each individual’s sense of control over their future increases, while the path of society as a whole becomes more unpredictable. Furthermore, he affirms that the same is true in reverse. For those inside a system composed of trivial relations, there is no individual control or freedom within the fate of a whole that conducts itself autonomously to a predictable

28 Ashby, “Principles of The Self-organizing System,” 65–67.

future.[29] This is another way of saying that system control depends on recognizing patterns of behaviour. Accordingly, for any amount of collective control to exist, some trivialization of relations is necessary. This is a second reason to think that even true collective control must have a degree of indeterminacy. In this case, control must be balanced with non-modelled self-organization, not just for efficiency but also for freedom and diversity.

This strategy is already used to increase the efficiency of Artificial Intelligence, to give machines a specific scope to autonomously search for solutions.[30] Moreover, it is also used in Toyotism, giving workers a certain amount of autonomy to produce goods and achieve their productivity targets.[31] The same strategy can be used by agents that are not organized by companies but organize themselves to achieve a shared collective goal that has some complexity.

The group I studied implements some control, which is achieved by distributing roles and adopting protocols. Despite creating some limits, these controlled relations also provide the predictability necessary to allow integrated actions that compensate for any limits by performing tasks that individuals alone could not achieve. Therefore, balance comes from a limit bringing its opposite: freedom. Accordingly, maintaining balance can also mean that these organization protocols aligned with the group consensus can seek to foster its opposite wherever possible: decentralized decision-making. It can also mean that the trivializations caused by these protocols, like stipulating specific activities and subdivisions into groups, can focus instead on making room for diversity and personal expression to emerge.

29 Jean Pierre Dupuy, "Que reste-t-il de la Cybernétique à l'ère des sciences cognitives," in Seconde Cybernétique et Complexité: Rencontres avec Heinz von Foerster, eds. Evelyne Andreewsky and Robert Delorme (Paris: Editions L'Harmattan, 2006), quoted in David Chavalarias, "The unlikely encounter between von Foerster and Snowden: When second-order cybernetics sheds light on societal impacts of Big Data," Big Data & Society (January–June 2016): 1–11.

30 Paul Horn, Autonomic computing: IBM perspective on the state of information technology (New York/NY: IBM T.J. Watson Labs, 2001), 13. Accessed September 15, 2021. https://homeostasis.scs.carleton.ca/~soma/biosec/readings/autonomic_computing.pdf.

31 Ricardo Antunes, The Meanings of Work: Essay on the Affirmation and Negation of Work (Chicago/IL: Haymarket Books, 2014), 38–39.

(3) The third reasoning comes from the cybernetician and design theorist Ranulph Glanville and throws light on how the way we model control can support this balance between organization and indeterminacy. Glanville says that since design models are not meant to be used for prediction, like scientific ones, they can be indeterminate, leading not only to one result but a range of satisfactory possibilities. While in the sciences this brings uncertainty, in design this is not a problem but an advantage, as all these possibilities provide more choices. Accordingly, architectural models do not need to be determinate; they can simply help filter out the possibilities we do not want to choose. Filtering a range of good possibilities can help groups move from unmanageable situations to more restricted and achievable ones.[32] The topological model can exemplify this reasoning in the context of the occupation. Once determined, the configuration of a space (a house, for example) and the manipulation of its form is restricted to the range of forms that attend to that configuration. When a whole neighbourhood is configured, there is a great range of possible arrangements of its parts that can be easily manipulated without changing their configurations. This restricted model can make the situation manageable through manipulation. The organization of the whole protocol into steps and division into groups is a restriction that can filter out undesirable situations and leave room for autonomous decisions and self-organization.

Discussion

The aim of this article was to introduce some cybernetic principles that might shed light on the unfortunate transformation of the utopian 1960s' technological imagination into a dystopic one, and to suggest that an alternative utopia can focus on spreading cybernetic strategies (rather than cybernetic machines). I imagined a strategy of integrated parallel processing in the

32 Ranulph Glanville, "Designing Complexity," Performance Improvement Quarterly 20 (2007): 75–96.

collective planning of settlements by their occupants. This strategy was inspired by the alternative approach an existing group took to solving housing problems and managing urban space. This group has resisted many forces and regulations to create an experimental space for collective land management directly by inhabitants. Accordingly, the cybernetic analysis I conducted has no intention of disqualifying this collective organization, but departed from it for the purpose of a utopian thought exercise. As a collection of exercises, my research is not meant to be applied in the context of the actual occupation because it was not developed there (if it was, it would involve many more aspects than those mentioned here).

Despite not directly applicable to housing, the results can yield insights about what we do in the realm of exercises and imagination: the architecture school. Design exercises imagine a society in order to develop and provide instruments and strategies that can be used to benefit that society. Therefore, one venue for further research is to test and develop these alternative practices of collective and parallel design in the context of architects or architecture students designing together.

Although this essay used only one case study in its analysis, thanks to the work presented by researcher Grayson Daniel Bailey at the Utopia Computer workshop, I found echoes with far greater studies linking architecture, cybernetics and anarchism. The anarchist writer and architect Colin Ward brought many other examples of cybernetic strategies for self-organized town planning. The concept of social self-organization, and insightful cybernetic approaches to it, can be also found in the work of the philosopher and economist Cornelius Castoriadis.

Bailey's text highlighted the pre-requisites of self-organization, which motivated my inclusion of Ashby's arguments about the dependence of self-organization on its wider context. Moving forward, the discussion can progress by making an inversion, and asking, based on which pre-requisites do we want our design strategies to unfold? If design strategies are to be built on top of over-descriptive digital models, they will require trivial behaviour from inhabitants and a lot of processing effort. Another study at the conference, presented by Donal Lally, showed how big data storage and processing is not just a significant effort involving matter, energy, and precarious labour, but is already impacting urban planning. He discussed plans by the city of Dublin to use the heat generated by a large data centre to warm houses. This system will also manage heat distribution using artificial intelligence when shortages occur. In other words, upon the structure built for processing big data, self-organization strategies will grant digital computers the space to tackle complexity. If we compare this to the cybernetic strategies analysed, we can see that both use self-organization to deal with complexity; however, the indeterminate processes, or decision spaces, are left to be carried out by different agents.

These cases bring back into our imagination the utopia Beer advocates in his aforementioned “designing freedom” lectures: a space where collective organization works by and for the individual’s freedom,[33] remaining complex and unable to be managed by datacentres, universal models or large computers.[34] However, in order for this to happen, the reflections of Ashby about the role of the observer in defining goals must be considered.[35] As we can infer from Heinz von Foerster’s postulate, from the moment that goals are assigned to objects rather than subjects, the world risks becoming an oppressive automaton. This problem seems to be aggravated when adaptive technologies are used to meet the goals that their creators set for the people they serve, rather than interlinking these subjects’ goals. The failure of past cybernetic experiences in Chile[36] and the Soviet Union[37] show that the general distrust for the undetermined subject can turn into a technocratic reliance on objective structures, even when they project a dystopian destiny.

33 Beer, Designing Freedom, 87–100.

34 Ibid., 42–43.

35 As explored in depth in second-order cybernetics and radical constructivism.

36 Medina, Cybernetic Revolutionaries.

37 Gerovitch, From Newspeak to Cyberspeak.

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The critical concern of the book “Utopia Computer” is the euphoria, expectation and hope inspired by the introduction of computers within architecture in the early digital age. With the advent of the personal computer and the launch of the Internet in the 1990s, utopian ideals found in architectural discourse from the 1960s were revisited and adjusted to the specific characteristics of digital media. Taking the 1990s discourse on computation as a starting point, the contributions of this book grapple with the utopian promises associated with topics such as participation, self-organization, and non-standard architecture. By placing these topics in a historical framework, the book offers perspectives for the future role computation might play within architecture and society.

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