A terra como arquitetura na construção de possibilidades: aspectos, experiências e desafios no Brasil

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Abstract

In recent years, the production of earth-based architecture has grown in Brazil, however, it is stigmatized and pursued by the Market Architecture, here called Police Architecture. The Police Architecture imposes itself through Education; the organization of Work in the productive process and the Market itself. This article deals with land technology as a possibility to exercise a libertarian education that forms people and not objects; with an cooperative work without extreme division of labor and with no hierarchy of command; and a market opened to all forms of making architecture.

Resumo

Nos últimos anos, a produção de arquitetura com terra tem crescido no Brasil, no entanto, ela é estigmatizada e perseguida pela Arquitetura do Mercado aqui denominada de Arquitetura da Polícia. A Arquitetura da Polícia se impõe através da Educação, da organização do Trabalho no processo produtivo e do Mercado em si. Este artigo trata da tecnologia da terra como possibilidade para exercer uma educação libertária que forma sujeitos e não objetos, de organizações de trabalho cooperativo sem extrema divisão do trabalho e sem hierarquia de comando, e de um mercado aberto a todas as formas de se fazer arquitetura.

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Introduction

In recent years, the production of earth architecture has significantly grown in Brazil, as well as its presence in the academic field – teaching, research, and extension –, and the production of specialized literature. Such growth is primarily related to the ever-increasing emphasis on environmental issues (and on the various approaches, on resulting proposals and strategies), and secondarily to the revaluation of traditional cultures. Important recent milestones in this context that stand out are (i) the creation of certification systems for sustainability aspects related to the construction industry, in both national and international ambit, (ii) the development of normative instruments linked to the control of the construction industry's environmental impact, (iii) the Sustainable Development Goals (SDGs) established in 2016, at UN's Habitat III Conference, (iv) the achievements in the national and global scenarios regarding the recognition of traditional people's culture and rights, and (v) broadening of university extension and its consolidation as curricular component. In Brazil the number of formation centers, and permaculture and bioarchitecture practices were increased, and it is possible to more extensively observe a rise in the quantity of planners and builders who use earth techniques and building systems, as well as clients interested in this type of production.

It is a highly heterogeneous production which, despite the observed growth, is still modest in relation to the broader context of the construction industry in the country. Earth construction was once the norm in Brazil, as demonstrated by most of the historical built heritage, but is an exception nowadays. Most times it appears, it is due to precarious living conditions, resulting from a lack of options; or in mediumhigh and high-standard buildings, defined as "alternatives". The timid participation of earth as building material is often explained as a "cultural issue", characteristic of most of the population's resistance to the use of earth techniques and building systems. It is necessary to better qualify this expression – How does this issue conform with time-space and its current configuration?

In this paper, we sought to stress some elements of this process, to discuss means through which it operates, and articulations established by such architecture between the immediate trait of the building itself, the material (earth), and the conformation of police as social and spatial order in a broader manner.

Initially, the paper addresses the conformation of such police architecture in contemporary Brazil, regarding the (re)production of space and how earth construction operates a rupture in such order, becoming a political space. Thereafter, aspects linked to education, labor, and market of the so-called 'police architecture' are addressed. Thenceforth, on concrete experiences, we discuss how objective and subjective conditioning, established in the ambit of police, impose challenges and limits to the conformation of earth construction, and ponder how contradictions take place in such political spaces. The earth construction approach, through its relationship with such elements – education, labor, and market –, may contribute to the advancement of critical perspective on architecture and the construction industry, and shed light on the issue of the obstacles to the greater development of earth architecture in the country, as well as its confrontation.

Culture against earth? Police-architecture and contemporary construction culture

It is certain that there is a contemporary construction culture which favors some materials and systems, naturalized as "normal" (the architrave reinforced concrete structure system and the ceramic block masonry enclosure as most notable expressions); some more desired, or desirable, are seen as distant for most of the population. And others due to lack of option. However, in the contemporary urban world, cultures are not only historically built and reproduced, as in traditional communities; they are built and maintained, or modified, in close connection with economic dynamics and dominant policies, and are functionalized to operate the naturalization and perpetuation of the social and spatial practices that realize such dynamics. In other words, contemporary construction culture (which excludes earth construction) is a constitutive element of the status quo and its reproduction. Santos (2008) stresses the perception of students enrolled in Architecture and Urban Planning courses on reinforced concrete structure and ceramic block masonry enclosure as "normal", from which they think the conception and development of architectural project activities. The scholar demonstrates, by means of a historical-documental focus, how such concrete normativity was produced in Brazil.

There is a subjacent logic which stablishes the correspondence between subjectivity, the material world, the current system of production relations, and the institutional sphere, which tends to reproduce the *status quo*. This logic and the spatial

goal of understanding, in a more qualified manner, how and why it is still difficult building with earth in Brazil, which possibilities are already available, and how they can be better explored; and others may be created, through experimentation-rupture to such order.

One of the possibilities of reflection intends to shed light on the debate on earth construction in the country and to advance in the building-experimentation of its world-construction potential, though the identification of privileged analysis elements. Some "generating themes" may be put, based on the elements, agents, processes, and aspects that characterize clients, professionals, norms, public policies, and the market. How is social consciousness on architecture built? How do the formation of professionals and the technical and technological development take place? How are the norms produced and what is their role? How are the issues related to the built space conformed as public problems? How was the current economic scenario constituted and what is the relation it establishes with the construction industry? Such questions, in turn, unfold into sets of questions, cuttings, views.

In the set of direct correspondences established by space order, regarding space production, three key-elements stand out: education, labor, and market.

Education, understood as human formation, pertains to the formation of subjectivities that define, according to their own specificities, the formation of social consciousness, the formation of professional consciousness, and the formation of norms, penetrating the possibility conditions of desire, knowledge, and recognition of earth construction. Labor, understood in its broader sense of activity that transforms the world according to human desires and needs, percolates the set of actions and relations present in the building production itself, establishing relation logics between bodies, between bodies and spaces, between hierarchies of body gesture in the production space, of bodies and minds in space production. The market – the current shape of capitalism in the periphery of the contemporary world – penetrates and subordinates education and labor, restructuring them according to its needs, by means of the institutional world (the Modern State's rule of law is essentially a capitalist State).

conformation it produces (and which it is) are what we call 'police-architecture'. Such concept, as defined by Lelis (2015; 2018), arises from the premise that the social order is realized as spatial order, and has a double origin: (a) on the concept of police, by Rancière (1996), who characterizes all social order as artificial and anchored on an also artificial correspondence between agents, practices, and social places; and (b) on the approach of space as totality, by Lefebvre (1991), sometimes characterized and perceived space, lived space, and conceived space, other times and representation space – representation of space and space practice. Police-architecture characterizes social and spatial order as a *specific configuration*, like the built space when we focus contemporary architecture with the institutional and symbolic aspects it entails; and as *processes*, by means of which agents act on such actual, institutional, and symbolic spaces, *producing* this actual scenario and ensuring its reproduction.

In this sense, the framework of earth architecture in Brazil is inscribed in a certain space order, which firms it presence – or non-presence – in such police-architecture. What most clients desire, in terms of architecture, corresponds to what professionals are trained to offer, the norms establish, and the State finances, and which best reproduces and strengthen the dominant economic dynamic.

Therefore, the population's "cultural resistance" is not a contingency, does not originate in itself, nor does it reproduce by itself, is not explained by objective material characteristics – its potentialities and limitations –, nor by being within reach of available techniques and technologies. The exclusion of earth of the ordinary scenario of Brazilian construction industry, as an actual result, is operated in specific ways, in such police "architecturation". It is a broadened conception of space as totality, space-world, which comprises a material dimension, a symbolic dimension, an institutional dimension, and a temporal aspect. It would be naïve to assume that a theoretical-methodological analysis section, whichever it may be, would offer a finished systematization of the structuring and conforming of police-architecture, even if we separated a theme cutting as specific as earth architecture in current Brazil. Nevertheless, this initial theoretical problematization allows for the successive approximations of this object not to be lost within themselves and articulate, in the search for its connections. Thus, elements of new cuttings and new approximations may be indicated, ones that contribute to the broader ever-in-process formulation, with the

Thence, these three elements permeate the conforming and the reproduction of direct correspondence established and operated as police architecture. However, the so-determined space-world does not correspond to the totality of what actually "exists" or could exist; what it determines is in fact a cutting, which becomes collectively shared as the whole, the best or the only one possible. Rancière (2005) conceptualizes such aspect of social order as "the distribution of the sensible'. The distribution of the sensible, as space order, creates borders, leaving out that which does not fit the system of correspondences and its reproduction.

In the case of earth construction, such borders may be identified in the elements of such correspondences:

- a) In supply formation, by the exclusion of the study of said material in the formation of architects and engineers (academic curriculums), by the difficulty in financing research on the theme (technical and technological development, knowledge diffusion) and, as a result, the difficulty in finding project professors capable of mentoring earth construction projects;
- b) In demand formation, by the non-promotion of the various interesting earth buildings, present in all aesthetics and for all income levels and social layers, the dissociation operated between the national historical heritage building characteristics and the earth construction characteristics, the decontextualization and hyper promotion of earth-built precarious housing, the absence of earth construction in actual and imaginary opinion-maker buildings – public and institutional buildings, imaginary "buildings" in film and television;
- c) In the institutional sphere, by the absence of public policies that recognize earth as building material, evident in the low standardization, the unavailability of public resources for research and earth construction; and
- d) In the role the construction industry plays in current capitalism, in the manners through which such role is played to ensure, for instance, the universalization of production, availability, and use of this model's basic materials specially cement –, the continuity of an archaic way of building, which requires low qualification and is subject to low compensation, and the development of "machining" mechanisms of the working body.

Permeated by actions in education and labor subordinate to the market, these elements drive most of the population, including social agents connected to engineering and architecture, to immediately identify in earth construction (only) precariousness, poverty, repair, pastiche, alternativeness. Such elements may characterize part of earth construction – as well as parts of other constructions that do not employ earth –, but they do not represent the totality of such production. Albeit incipient, in the general extent of the construction industry, there is a growing production of good quality earth architecture in the country, that is not in any way limited by such identifications, and yet is little known outside the specialized mediums.

Here and there, despite the space order, earth architecture presents itself, is reproduced, lived in, and develops. Sometimes, perfectly absorbed by such order, as extraordinary element – fetish decoration object, pastiche for the consumption of the "colonial", alternative. Other times, as a different experience of formation, production, inhabiting the space with the body, thinking-making space, living-space. As world which is world-fissure, earth construction as experience of knowledge, thinking-making, and inhabiting presents itself as political experience, ruptures the space order and its distribution of agents, places, and senses.

Such space-experiences propose other dialectics of the impossible possible, since they rupture, at the same time-space, various elements and processes of police-architecture and replicate others. Before another education/other formative process, another manner of work/another manner of thinking-acting in space is established; the artificiality of the order of the construction world is demonstrated in the actual world. Nevertheless, as process conceived and realized in the same order, it is an experience that bears within itself the police pre-established traits and determinations.

The education of police-architecture

Education has been guided, even before capitalism, by the teaching of those who think and by the teaching of those who do, ancient labor division inherent to Ancient Greece divided into Liberal Arts (those who think) and Mechanical Arts (those who do).

Teaching encourages such division. In Diederichsen's (2017) thesis, this dynamic was seen at the foundation of the Liceu de Artes e Ofícios de São Paulo – LAOSP

(São Paulo School of Arts and Crafts).

LAOSP arose in the center of Sao Paulo's class struggle, carried out by the newlyformed coffee bourgeoisie, immigrant Italian craftsmen – anarchist militants, politically organized - and the city's workers, their inspired followers, motivated by the work conditions in São Paulo's factories. The local elite would not accept being threatened by such urban social mobilization and articulated an original and efficient strategy of reaction and working-masses control, especially construction workers. Beside direct, police, and legal actions conducted by the State, a solid and sustainable political-economical-ideological model of domination through education was implemented: Professionalizing Education. To this end, São Paulo created, simultaneously, two schools for construction professionals, with distinct functions, albeit complementary and pedagogically aligned: one geared towards the teaching of engineering (the Polytechnic School, teaching to think and give orders), and the other geared towards the technical training of construction industry labor (LAOSP, whose teaching was focused on how to do). Provided with harmonically dual content and method, while the former addressed teaching for thinking, the latter taught to do and obey.

But according to Paulo Freire, the ontological vocation of the being is the act of reflecting, which begins with the empirical, transforms into abstraction, and returns to the empirical modifying reality. For this reason, according to Freire, it is the man who makes their history through *praxis*.

Praxis, being reflection and action truly transformative of reality, is source of reflective knowledge and creation. [...] in effect, while animal activity realized without praxis does not entail creation, transformation exercised by men does. Through its permanent transformative action, they create history and become historical-social beings. (FREIRE, 2019)

In separating thinking from doing, the transformation of reality, that should occur when the subject returns the result of their critique to said reality, does not occur. The division between thinking and doing prevents praxis from existing, which does not alter the *status quo*. The alienated being does not reflect and, therefore, does not transform reality from a problem seen by them. Such pseudo subjects do not see

themselves as unfinished in an equally unfinished world, to be completed and transformed by them.

Earth architecture in the construction of possibilities: aspects, experiences, and challenges in Brazil

Freire says there is no life without death and there is no death without life, but there is death in life when life is barred from being lived, resulting in the silence culture that

The separation between thinking and doing, according to Freire, prevents the formation of autonomous subjects, turning them into mere things. Such praxis-interrupting pedagogy forms objects, not subjects. Freire indicated the need for a pedagogy that freed man's reflective vocation to leave heteronomy in order to conquer their autonomy.

Labor in police-architecture

forms "near-thing" people.

The split between thinking and doing also occurs in the world of labor, and Taylor's theory was the epitome of it in the beginning of the twentieth century. But before that, according to Sérgio Ferro, it already occurred in the eleventh century's world of architecture, as he mentioned in an interview to Grupo Papo Terra on YouTube.

Ferro recalled his latest literary production, 'The Construction of Classical Design', beginning on how architectural design was produced in the eleventh century, by workers, architects, carpenters, etc., an instrument internal to the construction site. There was no hierarchy of command, and all opined on aesthetic and technical solutions during the production process. Ferro demonstrated that the design was initially done at the construction site, in 1:1 scale, using giant compasses, rulers, and squares that drew, on the walls or on the ground, a collective reflection of popular knowledge and know-how, orally transmitted, as secrets.

I launched a book titled *The Construction of Classical Design*, which addresses architectural design since the eleventh century. [...] The book begins around the eleventh century, when there was no separate design as we know today. There were drawings – more internal to the construction site, and treated as part of the work tools, like the shovel or hoe. Generally, in 1:1 scale, [the drawings] were made on the walls or on the ground, every time it was necessary to detail any component of the build. (Grupo Papo Terra, 2020)

The loss of the working knowledge began when design production stopped being a collective production internal to the construction site and started being produced by the architect, outside of the site, brought to them as a service order. Sérgio Ferro

says this moment coincided with the introduction of work organization as manufacturing, on the construction site. The manufacturing way of organizing work came from the fabric production in Florence, which was composed of an extreme division of labor into different teams, specialized by function, with the aid of rudimentary tools.

Ferro states that the transition of manufacturing to the factory never occurred in the construction industry, and the reason is clear, according to the Marxist concept of 'living labor' and 'dead labor' (machines): living labor would only be that of who produces added value, so that there is capital reproduction during the production process. Ferro mentions that even in industrialized countries, manufacture still remains in the construction industry, differing only by the industrialized products brought into the construction site, albeit maintaining an enormous contingent of workers.

The labor market of police-architecture

In his talk with Grupo Papo Terra, Ferro stated that the disqualification of the working force's labor market in the construction industry currently persists and intensifies.

The pursuit of added value has grown with the evolution of the financial capital, which is leading to a concentration of economic power and consequent labor devaluation and insecurity worldwide. In the Brazilian scenario, the following calculation may be made: 30% of the Brazilian population is already out of the market and does not have access to anything. Paris, for example, is currently elaborating a plan that will duplicate the size of the city with highways, subways, airports, residences, smart office buildings, etc. The remainder of the economy has nothing as modern as, for instance, Silicon Valley; on the contrary, they are luxury activities to increase the demand for restaurants and hotels. Cities turn into tourist cities. Paris is currently considered the most important tourist city in the world, with an increase of precarious labor, such as 'butlers and waiters'. Around 41% of these cities' GDP is devoted to the construction industry, producing a giant mass of added value to compensate the loss of other sector's profit rates. [...] Reactions to this situation are taking place; for example, those beneath the poverty line, such as the Yellow Vests in France, who are retired workers - former teachers, bank tellers, etc. -, living on rests found in the garbage, with no government assistance and violently repressed by it, as it also happens in the United States and other European capitals. (Grupo Papo Terra, 2020)

Authors such as Filgueiras and Cavalcante, in 'Uberization, digital labor, and industry 4.0', compare the current moment with that of working conditions in nineteenth century England, with excessive working days, and lack of legislation ensuring any

Earth architecture in the construction of possibilities: aspects, experiences, and challenges in Brazil protection for the workers, and, as a result, squalor and social inequality.

The current policies of disqualification and labor insecurity affect all workers, regardless of the sector they are in. The technology of the so-called 'Industry 4.0', associated to the "jobs" available on digital platforms, have led the labor world to a barbaric situation.

Industry 4.0, term coined by the German government, or the Fourth Industrial Revolution, expression used by the participants of the latest World Economic Forum in Davos, constitutes a set of innovative technologies, such as nanotechnology, digital platforms, artificial intelligence, robotics, the internet of things, amongst others, that represent a quality leap on the ability of organizing and controlling labor. The platforms are combined infrastructures of software and hardware, organized by means of digital algorithms. The algorithm may a cake recipe or any process of activity rationalization. In the case of digital algorithms, it is a sequence of instructions that informs the computer on what to do within a set of precisely defined stages and rules designed to perform a task. [...] What actually determines the new productive ability of platform-companies is the platform itself, which broadens the ability of organizing and controlling labor. (ABÍLIO, 2020)

Capital-serving technology exacerbated the separation between thinking and doing and it currently affects not only construction workers, but all professions – such as designers, architects, professors, dentists, physicians, nurses, etc. – of socially-secured salaried workers, turned into informal, precarious workers, forced to obey orders given by the digital platforms.

Education, labor, and market, associated to the technological productions directed at the extraction of added value, are proper to police-architecture.

Earth technology

The hegemonic presence of so-called conventional processes in housing construction and space production, both in the country and the cities, partially arises based on the symbolic and deterministic construction of the maintenance of capital reproduction processes. Within this logic, education, labor, and market follow the booklet: creating mechanisms for the capital to keep on capturing processes, materials, and production, whenever possible.

Some processes deviate from the rule and open loopholes, possibilities of exit. Methods, processes, and materials that follow other routes, escape such capture.

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Earth architecture in the construction of possibilities: aspects, experiences, and challenges in Brazil using as little other components as possible. Arches, domes, and vaults replaced elements conventionally built of reinforced concrete (Figures 1, 2, and 3).

Nonetheless, survival of such processes will only be possible if it is shielded against the construction of narratives from police-architecture, hence the fundamental importance of the formative and pedagogical processes that accompany them. If, in the field of thought, Ferro proposes the approximation of critical reflection – and creative labor – to manual labor, alienated and expropriated of the possibility of decision making, for the construction of what he considers 'collective work', some options and paths are also possible, in the field of experimentation. They are experiences that rouse in the construction industry, combine political struggle against hegemony (or for a popular hegemony), formative processes, work reorganizing from the logic of a solidary or cooperative economy, and propose alliances with nature and the environment. While such experiences are mostly implemented in the countryside, not always is earth (nor timber or other natural building elements) a recurring choice, or privileged material in its technical applications.

Some of which merit emphasis. It is the case of Acácio Gil Borsói's design, in Cajueiro Seco, Pernambuco, in 1963, during Miguel Arraes's tenure. In the construction work of the housing units, in addition to recovering and using techniques of popular knowledge and domain, the design team formulated a process in which it was possible to include men and women, future dwellers of the units, in the decision-making process, both on building technique and house design. The pre-fabrication of panels, with timber framework, provided a good variety of floorplan layouts, accommodating the different needs of the dwelling groups. Still on the subject of technique, the stage of filling the walls with locally sourced earth was a completely autonomous operation, since the material, abundant in the region, could never be monopolized by the great construction market. In this context, local knowledge and culture were allied to the political will and technical pre-disposition for amalgamating agents, institutions, and knowledge.

In the wake of assistance for housing construction, in 1984, USP's project FAVELAS incorporated not only earth as building material but also the possibility of combining housing provision to the training of new workers. In using compressed-earth blocks (BTC) as the main building element, it was possible to organize – by means of participating design processes – production, training, and social labor organization in a pattern that incorporated procedures capable of ensuring high element performance



Figure 1 - Production of compressed-earth blocks. Source: BUCARETCHI (2002)



Figure 2 - Assembly of the vaults. Source: BUCARETCHI (2002)

Earth architecture in the construction of possibilities: aspects, experiences, and challenges in Brazil construction of discourse, knowledge, erudition. A solution that educates with labor, remains informative with its materiality, and shields construction against police architecture.

Some efforts of using earth on MST's settlement construction were attempted. Examples of such experimental initiatives are Projeto Sepé Tiarajú, in Serra Azul, SP, and 'A participação das famílias nos projetos de habitação, saneamento e produção em assentamento de Reforma Agrária' project, coordinated by the departments of Architecture and Urban Planning, Civil and Environmental Engineering, Home Economics, Soil, and Social Communication at Universidade Federal de Viçosa – UFV (Viçosa Federal University), MG, at the 'Olga Benário' settlement (Visconde do Rio Branco, MG). Those are projects that painstakingly attempted to implement earth as a technical possibility, and who promoted the debate on the necessary revision on the legitimation of their choices from the interpretation of their matrices.

Nowadays, projects such as MNLM's² Occupation 'Solano Trindade', in Duque de Caxias, RJ (Figure 4), MST's Sustainable Development Project (Projeto de Desenvolvimento Sustentável – PDS) 'Oswaldo de Oliveira' in Macaé, RJ, which includes the participation of people who were in the construction of ENFF (Figure 5), or of the 'Rosa Luxemburgo' School, in Iaras, SP, begin their construction work from a basis of critical and symbolic reflection, namely the importance of using such techniques as a way of political struggle. To these groups, dealing with the problem of earth as building material becomes an important strategy to achieve such condition of popular labor hegemony. In building houses, the imagery is reconstructed, the confidence on the possibility of being autonomous, being subject, is nurtured – not without struggle. While MST's settlements opt for an agroecological practice, earth-building material as a political tool for the overcoming of labor subordination, MNLM in Duque de Caxias reorganizes such labor in the construction site, creating income from the in loco production of the compressed-earth blocks (BTC). Cooperative production, present in both cases, assumes the role of undertaking - along with various other initiatives, not mentioned here – a national reconstruction mission, symbolized by earth.



Figure 3 – Images from the construction of houses in Favela San Remo, São Paulo, SP. Source: BUCARETCHI (2002)

Earth, traditionally used based on local experience and customs, or as reproduction of already confirmed efficacy, now serves as object in as innovation study, in the scope of a United Nations Development Program (UNDP) project instituted in 1984. Amongst various other unconventional materials, some techniques were researched and implemented in housing projects, in various regions of Brazil. Albeit little reported, the reflection of those experiences is perceived to this day, in many studies that open technical possibilities on earth use. One of such outcomes is the emblematic construction of the Escola Nacional 'Florestan Fernandes' - ENFF (National School 'Florestan Fernandes') in Guararema, SP. ENFF is a reference center in the training of members and leaders of Movimento dos Trabalhadores sem Terra - MST (Landless Workers' Movement), and its architectural design merits observation, be it for the use of earth as raw material, or for the political will of appropriation of earth as an important element for the autonomy of country construction, and the organization of work by brigades, alternated from time to time so that the incorporated knowledge, resulting from construction site experience, may be disseminated and replicated in the various regions of Brazil. The construction of ENFF/MST opens a new perspective: whilst it consolidates semantics, used in a new narrative – in the picture of the counter-hegemonic construction -, as a school it represents the locus of

¹ 'The participation of families in the projects for housing, sanitation, and production in Agricultural Reform settlement', in free translation.

² Movimento Nacional de Luta pela Moradia, or National Fight for Housing Movement.

Final considerations

Police-Architecture was herein problematized in order to be overcome by Praxis Reflection. In this sense, proposals such as the use of earth and Sérgio Ferro's free labor are utopian forces to bar the contemporary labor world's barbarity. Instead of heteronymy and hierarchy, it is about producing dialogue and autonomy.

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Figure 4 – Wall built with compressed-earth blocks, produced at the Occupation 'Solano Trindade', Movimento Nacional de Luta pela Moradia (MNLM), Duque de Caxias, RJ. Source: the authors.



Figure 5 – Residents exhibit compressed-earth block, produced at the Sustainable Development Project, Movimento dos Trabalhadores sem Terra (MST), Macaé, RJ. Source: Brasil de Fato. Available at: https://www.brasildefato.com.br/2021/01/28/bioconstrucao-conheca-um-dos-dialogos-en-tre-agroecologia-e-reforma-agraria-popular

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