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Following engineers and architects through slums: the technoscience of slum intervention in the Portuguese-speaking landscape

Análise Social, 206, XLVIII (1.º), 2013
ISSN ONLINE 2182-2999

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Análise Social, 206, XLVIII (1.º), 2013, 154-180

Following engineers and architects through slums: the technoscience of slum intervention in the Portuguese-speaking landscape. This article revisits the long genealogy of State intervention in informal settlements and poorly built environments throughout the 20th century, in cities such as Lisbon, Porto, Rio de Janeiro, Maputo or Macau, to better frame some socio-technical complexities involved in the current project of slum rehabilitation in Cova da Moura, Lisbon. Then, it draws upon ethnographic research with experts from the National Laboratory of Civil Engineering (LNEC) during a scientific assessment of informal dwellings to show that the "evaluation" of informal dwellings with a view to "reconfigure" them, is a socio-technical operation based on a "laboratorisation" of the dwelling, but one that is crucially dependent on the subjective-objective experience of experts.
Keywords: colonial and postcolonial urbanism; slum rehabilitation; Cova da Moura; Portugal.

Seguindo engenheiros e arquitetos pelas barracas: a tecnociência da intervenção em zonas degradadas no contexto lusófono. Este artigo revisita a longa genealogia de intervenção do Estado em assentamentos informais e outros contextos habitacionais pobres ao longo do século XX, em cidades como Lisboa, Porto, Rio de Janeiro, Maputo ou Macau, para melhor enquadrar alguns elementos sociotécnicos presentes na iniciativa de reabilitação/requalificação do bairro da Cova da Moura, Amadora, Lisboa. Depois, a partir do acompanhamento etnográfico de peritos do LNEC – Laboratório Nacional de Engenharia Civil durante o seu trabalho, mostra como a avaliação das condições de habitabilidade dos alojamentos do bairro, conduzida com vista à sua reabilitação, se baseou numa "laboratorização" do alojamento, mas em que esta dependeu da experiência subjectiva dos peritos.
Palavras-chave: urbanismo colonial e pós-colonial; reabilitação de barracas; Cova da Moura; Portugal.

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INTRODUCTION

State intervention in informal settlements and other poorly built environments has for over a century been an arena in which adaptations of scientific and technological knowledge have interacted with urban and housing policies, in order to achieve the social aims of different political regimes regarding social stratification, segregation and access to rights. The nudity of poorly built environments allows us to see, clearer than in other urban environments, the mutations in the nature of social operation.

From the emergence of a housing biopolitics at the turn of the 20th century (Rowe, 1993) in the United States and Europe to the later developments of housing experimentation in the colonies (Rabinow, 1989), the combination of modernist planning, architecture, engineering and administration formed splintered but effective socio-technical regimes, which came together to orchestrate the urban spaces of the poor. Later, with the gradual failure of modernist programmes of housing during the 1960s and 1970s, the ideas of vernacular or traditional knowledge in building (Rudofski, 1964), of poor people's creativity (Lloyd, 1979), and of user sovereignty (Turner, 1976) started to appear regarding informal settlements or shanty towns, mostly in Latin America. During these two decades, 'social knowledge' was appended to the intervention on poor housing.

Then, from the 1980s onward, with the brutal implications of Structural Adjustment Programmes in full course in African, Asian, and Latin American cities, as well as the return of the classification of the slum (Gilbert, 2007), the paradigm of slum upgrade became the most disseminated solution, not least because it was part of the UN Habitat policies (UN Habitat, 2003, 2007). Originally presented as progressive, its implementation is often challenged

as neoliberal, because it alleviates housing poverty yet does not structurally address it. This state of affairs has been so prolonged that it opened the way for last decade's architectural and social fascinations with the slum as the urban grammar of the future (Koolhaas, 2001; Neuwirth, 2004).

All these developments belong to modernity's process of integration of the poor, the traditional or the unplanned into formal spaces of calculation (Mitchell, 2002); they make up the cumulative layers one must consider when investigating what it is that states do when they intervene in informal settlements. The latest trend, enabled by simplified personal computing, consists of the use of subjective knowledge or randomly-caught information about shifting realities in digital quantitative instruments. This can be illustrated by the use of infra-red technologies to find shacks with residential use in the suburban gardens of London (Hall, 2011), or by a simple but optimised instrument of assessing the rehabilitation needs of non-standard houses, in a slum upgrade/rehabilitation project in Lisbon, Portugal, which I discuss in this article.

The call is to follow the experts who are using these instruments when intervening in informal settlements; that is, to see this technoscience in action (Latour, 1987, 2005; Latour and Hermant, 2006; Roy, 2005; Jacobs, 2006; Farias and Bender, 2009). However, the prescription is to be historically situated, in order to understand the minutiae of assessment and intervention in light of longer term political configurations such as the value urban poor populations have for different political regimes. In the first section of this article, I will pinpoint some parts of this history in the Portuguese-speaking colonial and post-colonial landscape, where I suggest there was a process of policy dissemination regarding informal settlements. In the second section, I show and discuss a programme of slum rehabilitation in Cova da Moura, Lisbon.

HISTORICAL CONTEXT

THE HYGIENIST TRADITION AND THE OPTIONS OF CLEARANCE/REHABILITATION

The beginning of the 20th century saw the emergence of the first, incipient programmes of public housing, introduced in response to a 'housing crisis' in the 1910s-1920s and to the calls from 'hygienists' to improve the living conditions of different urban poor populations. Echoing the advances in other European countries regarding housing legislation, Ricardo Jorge had alerted, as early as 1889, to the fact that the working classes were strangled by higher rents, which they paid for insalubrious living quarters, than those of better-off populations (Jorge in Gros, 1994, p. 81). Twenty-five years later, in 1914, based on

a topographic survey of tuberculosis-related mortality rates in Porto, another hygienist, António Lemos, argued:

> There are two systems to sanitise the houses in this city: to build new houses according to all hygiene precepts and with such prices that they are affordable to the working class [*operariado*] or improve by partial works, under strict sanitary control, the state of the existing ones [Lemos, 1914 in Gros, 1994, p. 81]

It was one of the first times the dilemma between the options of clearance and rehousing, on the one hand, and upgrade or rehabilitation under technical-scientific supervision, on the other, was posed with such clarity. To respond to these concerns, it was argued that the crucial point was to commit the state to intervene, which occurred with the *Bairros Sociais* (Social Neighbourhoods) programme of 1918-1919 with direct financial participation of the state, a measure that eventually failed because of the state's financial shortcomings. For the urban poor, private provision was the norm (for instance through the *Companhias Urbanizadoras*), but many families could not afford these solutions and remained in slums (Pereira, 1994).

FIGURE 1
A working class neighbourhood in Lisbon, early 20th century.
Anonymous photographer.

This long period had in many countries seen the establishment of a strong relationship between medical scientific knowledge and housing economics, eventually leading to normative programmes for housing, where defined "dwelling principles" were techno-scientifically materialised in the idea of universal "housing standards" (Rowe, 1993). The city was the main arena for "engineering the social" (Rabinow, 1989). In the Portuguese-speaking landscape, this was also the time when Brazil's capital, Rio de Janeiro, saw the clearance of *Cortiços* and the opening up of avenues, that is, the triumph of the planning ideals that often resulted in the displacement of poor populations.

HOUSING UNDER THE DICTATORSHIP

Later, in Portugal, the provision of public housing under Salazar's fascist *Estado Novo* served mostly its ideological aims, as it was tied to social selectivity and hierarchy: for instance in its most important program of public provision, the *Casas Económicas* (Economic Houses) were usually allocated to lower-middle class state employees[1] who were members of the corporative trade unions (Pinto, 2009, p. 211), the pillars of the regime. The "urban poor in the real sense – dependent on menial forms of casual employment, working in construction or even in the in-between world of agricultural labour in small plots and market gardens that were dotted across the city (idem)" could only access schemes such as the *Casas para Realojamento* (Relocation Houses). The relative construction cost of Economic Houses in comparison to the average dwelling unit was 90%; the Relocation Houses, usually pre-fabricated structures with temporary tenure, 38% (Cardoso, 1983 in Gros, 1994, p. 84). Even in the period between 1953 and 1973, which saw increasing industrialisation and the need to house the labour force which migrated to cities, public provision amounted to only 10.8% of all built dwellings (idem, p. 83). The *Estado Novo* was not inclined to use Keynesian mechanisms of housing provision to support general economic demand and development. This resulted in the first explosion of shanties around Lisbon during the late 1960s-early 1970s period.

Despite public housing not being directed at the urban poor, the social modernity housing models such as *grand ensembles*, new towns, and similar types (Rowe, 1993) started to gain; what was built increasingly followed modernist architectural styles, and buildings drawing on concepts such as *unités d'habitacion* took shape. What is interesting in examples such as Olivais Sul is that, as Nunes (2007) shows us, a young generation of "technocrats" that worked for Lisbon's Housing Technical Bureau (GTH – *Gabinete Técnico da Habitação*) were able to articulate the construction parameters and the economic rationale of the Houses with Affordable Rent programme (which came from conservative housing policy) with a degree of freedom in conceptualising and experimenting in urban and architectural form (which reflected progressive ideals). They did so by managing scientific techniques of housing provision, or as Nunes (2007, pp. 63-93) puts it, by managing economy, normativity, and building standards. The scientific interplay here was between architectural knowledge, public administration economics, and pure politics (power). In the process, these groups guaranteed a wealth of technocratic

1 In the first decades mostly military or police personnel, later municipal or central government employees (Pinto, 2009, p. 211).

expertise in housing provision that would be fundamental in the post-revolutionary period (Bandeirinha, 2007).

THE AFRICAN GENERATION: MODERNISM AND THE INFORMAL CITY

At the same time approximately, i.e. from the late 1950s to the early 1970s, an "African generation" (Fernandes, 2002) of architects and planners, trained in Lisbon and Porto's universities, developed work in colonial cities (most notably Lourenço Marques, today Maputo, in Mozambique; and Luanda, Angola), where they could experiment with modernist languages more freely than in the "empire's capital". With progressive planning ideals and modernist typologies, they were building the "white city", that is, the part where the colonial administration and the white workers lived, in what were strongly dominated, racialised, and segregated societies.[2] The outer "black city" was usually unplanned, lacked infrastructure, and was segregated from the rest (Domingos, 2012).

In architectural terms, the experimentation with the modernist lexicon saw the development of an "African style" that Magalhães and Gonçalves (2009) coin as "Tropical Modern", which was similar to parallel developments in other African countries. Its most distinct features were either "technical" features related to air and light (the more emblematic were the street-in-the-sky galleries "shadowed" by reticulate concrete); or figurative expression with reinforced concrete (strongly inspired by the Brazilian modernism of Niemeyer and Lúcio Costa). The style's pinnacle is illustrated by the work of architect Pancho Guedes, for instance his *Leão que Ri* (The Lion that Smiles) building (see Fernandes, 2002, pp. 50-52; Magalhães and Goçalves, 2009, pp. 63, 197, 224). However, it was developed against a different political background than in other African cities, which were by then the capitals of independent states, where modernist architecture served the development of postcolonial projects (e.g. Dakar, Senegal, or Abidjan, Ivory Coast; see Myers, 2003 for a complex case in Zanzibar). Here progressive architecture was still at the service of a space of domination.[3]

2 Similarly to French and Belgian colonial legislation, social segregation in Portuguese colonies was organised into the categories of 'white', 'indigenous' and 'assimilated'. The most important pieces of legislation are the Indigenous Statutes from 1929 and 1954 and their revocation in 1961 (see more Castelo, 2007, pp. 292-295). The 'assimilated' status, however residual in number – by the time it was abolished, only 1% of Angola's and 0.5% of Mozambique's populations were 'assimilated' individuals – was the crucial mechanism of domination.

3 Some Portuguese architectural historians have tended to forget this fact, thus lending their studies of 'heroic' modernism in Africa to the criticism of being unreconstructed or nostalgic imperial narratives.

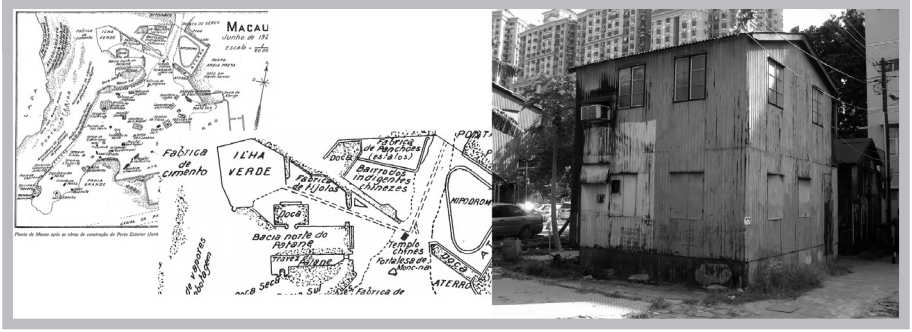
This said, some individuals belonging to this generation occasionally experimented in housing or infrastructure provision for settlements of colonised populations. There was a history to this too, with earlier projects where colonial imaginations had been behind the provision of mass accommodation for black labourers: houses followed racialised ideas of "how the black lived" and were designed in the image of *sanzalas*, i. e. slave quarters (Fernandes, 2002, p. 22; Milheiro, 2012, p. 311). But experiences of a more progressive nature were to follow. One example was the plan that "zoned" the *Caniço*, the informal black city of "popular shanties" immediately adjacent to the centre of Lourenço Marques (Guedes, 1971). The plan included infrastructure provision, but more importantly it marked the *Caniço* in the master plan designed to steer urban expansion: this was a strategy to avoid its population having to move further out and thus become unable to cover transportation costs (given that the majority worked in the "white" part). By allocating it a zone in the master plan, it was granting it existence and preventing future clearance derived from foreseeable urbanisation. At one point, there was even a *Caniço* department in the City Council (Fernandes, 2002, p. 56).

Another example was the innovative *bairro municipal* (municipal neighbourhood) in Lobito, Angola, planned by its master architect/planner Francisco Castro Rodrigues in 1970-73 for *indígenas* ("indigenous persons"). A type of "Sites & Services", its plans involved a total of 7,500 units, with the municipal government setting the foundations and providing materials (cement from Lobito, bricks from Catumbela, zinc panels from a factory in Benguela, all linked to the colonial manufacturing economy) and future residents providing their labour. It was a successful experience: homes were built for/by the urban poor and it became an established part of the city (Fernandes, 2002, p. 47).

A final illustration, from a different type of colonial relationship, that of Portuguese colonialism in China, comes from the landfill site of the *Bairro da Ilha Verde* in Macau in the second quarter of the 20th Century, with an embryonic sites & services programme to transform a neighbourhood mapped in 1929 as the "Neighbourhood of the Chinese Indigent" (Jesus, 1990, p. 128) into the informal but monitored settlement of a population of fishermen-turned-industrial-workers for a gun powder factory.

In these and other projects throughout the colonial landscape, there was a tentative response to conditions of inequality and segregation, involving a play between the architectural use of cheap construction materials and urban planning methodologies such as mapping or zoning. In other words, architects and planners working in colonial cities negotiated their practice in the interstices between freedom and power. While governing these settlements, whether using the instruments of planning or those of housing provision, a wealth of experience

FIGURE 2
A map of Macau, 1929. The area of *Bairro da Ilha Verde* is marked as the "Neighbourhood of the Chinese Indigent". Source: Jesus, 1990. The same area in 2008, with the self-assembled houses of cheap industrial materials. Photograph by the author.



was also garnered and indeed, experiments on self-building for colonial populations were inspirational for the later programme of the SAAL in Portugal.

THE SAAL: HOUSING AS AN EMPOWERING TOOL

The Mobile Service for Local Support *(Serviço de Apoio Ambulatório Local,* hereinafter SAAL) programme was instituted in July 1974, three months after the Revolution, as a program of assisted self-building which sought to respond to severe housing shortages in a situation where programmes of conventional supply were impossible to implement in the short term (Ferreira, 1987, p. 84). The programme was only a small part of the complete re-orientation of urban and housing policies. It was never intended as a way to solve the general housing crisis, only to tackle its most urgent problem, the "shanties everywhere" around Lisbon and Porto. In spite of a limited budget – at its peak it never exceeded 5% of the overall expenditure with housing (Bandeirinha, 2007, p. 165) – it was a powerful idea because it moved to ideas of direct democracy, it showed how democratic engagement with urban poor populations could be made and in a way instituted such engagement to be, from then on, an integral part of the mission of the state when encountering informal settlements and urban poor populations (Nunes and Serra, 2004).

DRAWING ON THE POLICIES OF ELSEWHERE, OR J. F. C. TURNER IN LISBON

The solution of self-building for this specific problem of a broader housing crisis was arrived at after much consideration and inspiration from different policy trends, academic research and urban projects. The work of J. F. C. Turner (1968, 1976) and Turner and Fichter (1972) had in the previous decade influenced thought on housing, and whether arrived at via his academic work

or via the first hand knowledge of projects in urban areas in Brazil, what he proposed stuck.[4] The six steps of the methodology were: 1) to prioritise populations that were "organised"; 2) the *in situ* preference; 3) autonomy in the design and building processes for each operation; 4) use of local resources; 5) decentralisation; and 6) experimentalism.

In total, there were 174 operations planned, involving around 40,000 families; some in small, some in larger shanty towns. Of the estimated 40,000 dwellings, however, only 7,000 were completed (Ferreira, 1987, p. 87). This was a result of the programme's collapse. In the words of star architect Álvaro Siza, who was involved in projects in Bouça, Porto (Machado, 2012), Malagueira, and Évora (Rowe, 1993, pp. 253-263), "the SAAL was shut down precisely at the moment when [it was realised] it was not just neighbourhoods, but the city that it was working on" (RTP, 2008). By this he means not the issue of scale but the programme's implications for the broader organisation of the capitalist city: which parts of the city poor people have the right to; which role property and expropriation have; and the programme's methodology consisting of an intense interaction between architects and residents that empowered the latter. When it became visible that the SAAL involved a different way of thinking the city – in sum, a mode of production of space that subverted capitalist urban processes – it was shut down. And it was done with Florentine, administrative relish (Ferreira, 1987, p. 92; Bandeirinha, 2007, pp. 175-218). In parallel with the programme's extinction, the trend of public investment in housing was reversed, gradually decreasing in the following years (Ferreira, 1987, p. 66). What was novel in the SAAL was that "Social Knowledge" was now summoned into the project: the tenets of social architecture, the work of social scientists, and an emphasis on process had become integral to slum intervention.

The participatory method would shape architectural practice in Portugal in the following two decades. Some local governments re-introduced it during the following decade and a half. Either re-applying legislation on self-building from 1962 (Ferreira, 1987, pp. 94-95) or through schemes of their own, City Councils used self-building to solve some of the problems facing them: for instance in the Loures municipality, the twin schemes of *Auto-construção* and *Auto-acabamento* ("Self-building" and "Self-finishing", see Cachado, 2012). The first one involved

4 The idea that housing is not what it is, but what it *does* for people; that local resources and technologies are key; and that residents should have the most important word regarding the design of their dwellings (Bandeirinha, 2007, p. 47). Other inspirations were the rehabilitation of the Brás do Pina *favela* in Rio de Janeiro in the early 1960s, which prevented the displacement of populations from the city centre (idem, pp. 48-53) and Italy's programme of popular housing INA-*Casa* (idem, pp. 55-56).

the City Council providing materials and "controlling" standards but basically delegating construction. Investment was paid back by residents over time, leading to ownership. The scale of both projects was, however, very small (fewer than 200 families), mainly due to the lack of municipal land available to scale it up. It was a drop in the ocean of housing problems in the municipality.

THE PER: INTEGRATION, MASS CONSTRUCTION, AND A "LOCKED MATRIX"

In the following years the housing problems did not disappear; and during the 1980s there was an exponential increase in informal settlements, with a considerable influx of migrants from Portuguese-speaking countries (former colonies), and a significant number of them settling in and expanding the existing shanty towns. The part-liberalisation of rent controls in 1985 (Ferreira 1987; Arbaci, 2008), associated with housing shortages, priced immigrants out of the rental market; and racist practices of landlords made it especially difficult for African immigrants. It was estimated that around 200,000 people were living in shanties during that decade. Meanwhile, strongly politicised housing academics (Silva and Pereira, 1986; Soczka *et al.,* 1988; Silva and Costa, 1989; Rodrigues, 1989) drew attention to the need for stronger state intervention in housing provision.

So when the Special Relocation Plan *(Plano Especial de Realojamento*, hereinafter PER) was established, even those who highlighted the potential "poverty trap" of segregated public housing (Pereira, 1993) were happy it had been enacted. The solution of clearance and mass construction was welcomed as the lesser evil, in the sense that alternative ways would take too long and waste valuable time. In the process, a language bearing strong echoes of the hygienist discourses described in the beginning of this section was often deployed to justify this approach, perfectly illustrated in the decree-law that introduced it (Decree-law 163/93). Even academics that focused on the problems of segregated re-housing used the biological metaphor: "…to banish from Portuguese society the social cancer of shanties and deficient habitability conditions" (Freitas, 1994, p. 27).

Thirty thousand dwellings were built under the PER, costing 1.2 billion euros – 600 million in direct investments and 600 million in credit lines for municipal authorities (IHRU, 2007, pp. 142-145). The relocation procedures began in 1993 with the surveys of slum dwellers in each slum neighbourhood (*núcleos PER*), often conducted in collaboration with university research centres. Disregarding activists' warnings of the need for self-surveys and community involvement (Roseta, 1993), the adaptation of census-like methodologies in shifting realities (people moved in and out of shanty towns; a given shack could house three or four households) meant these surveys would later become instruments of social injustice (Cachado, 2012; Ascensão, 2012). The statistical

adaptation was taken at face value and as a "locked matrix" (in compliance with the programme's main principle that everyone would be rehoused but no more shacks would be tolerated); and it was then implemented through law and administration, which regulated who was eligible for rehousing, who was not, etc. Originally summoned to solve a problem, statistical adaptation combined with the top-down decisions of city councils to make life difficult for target populations (Ascensão, 2011, pp. 284-342).

TOWARD A MULTICULTURAL POLITICS AND "JUST" PLANNING PRACTICES

In parallel with the PER, the mid-1990s saw an explosion of inclusion agendas in different sectors, and with it the proliferation of non-governmental organisations tentatively moving toward multicultural politics. Scholarship on immigration and residential segregation (Malheiros, 2002; Malheiros and Vala, 2004), and ethnographic research on different immigrant communities (Mapril, 2002; Bastos and Bastos, 1999) including those who specifically lived in informal settlements (Bastos, 1990; Beja-Horta, 2006), was part of a broader move toward "integration", first, and "multiculturality", later. Simultaneously, the academic push for just decision-making in urban policy as a condition for social justice in the city (Cardoso and Breda-Vázquez, 2009) challenged the institutional culture in Portuguese planning, which was still strongly framed by technical or political considerations; it was not citizen-driven. It is in this scenario that an initiative for highly deprived neighbourhoods, the Initiative for Critical Neighbourhoods, (*Iniciativa Bairros Críticos,* hereinafter IBC), one of many programmes for urban regeneration currently in action (Breda-Vázquez *et al*., 2009, pp. 2221-2223) was devised in 2007. Amongst its overarching aims is to institute a strong participatory element in the regeneration or rehabilitation of three different areas, each with a different type of housing stock. One of them is the informal settlement of Cova da Moura[5], which I will focus on in the next section.

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To summarise, in this section I have provided examples from the history of state intervention in informal settlements, showing the different layers of knowledge mobilisation in such operations. The argument is that these were cumulative, in the sense that since urban policies "travelled" across this Portuguese-speaking world-economy, these and other solutions were appended

5 The other two are the municipal neighbourhood (*bairro municipal*) of Lagarteiro, Porto; and Vale da Amoreira, Moita, in the Lisbon Metropolitan Area. See www.portaldahabitacao.pt/pt/ibc, last accessed 15-03-2013.

to the toolbox the state used on informal settlements. Urban policy travels across space (Robinson, 2011), but so do continuities across time. The perennial dilemma between clearance and upgrade, and what it says about the value given by different political regimes to the urban poor, is one such continuity. The issue of relative costs is another. In the next section I focus on an ongoing (or interrupted) project of slum rehabilitation, with some of its aspects corresponding to threads from this history.

PRESENT DAY

THE IBC (INICIATIVA BAIRROS CRÍTICOS) IN COVA DA MOURA: MULTICULTURAL URBAN REGENERATION

The IBC was put in place as an experimental programme by the Secretary of State for Cities and Planning, João Ferrão (2005-2009) – an academic geographer who had researched Lisbon's peripheries – and by the Institute for Housing and Urban Regeneration (*Instituto da Habitação e da Reabilitação Urbana*, hereinafter IHRU). It sought to "demonstrate" how more participative planning practices may take shape (Interview 7, Dec 2009), using these three experiments as "test tubes" for a more just planning system, to be rolled out in future projects under European Polis XXI urban policies (IHRU, 2009). The programme includes features not strictly linked to the built environment such as job opportunities and the "integration" of socially excluded populations. The intervention to be made in Cova da Moura is partly inspired by Brazil's Favela Bairro programme, partly situated within the "urban regeneration" paradigm (it uses EEA funds), here applied to a slum neighbourhood. Indeed, this is another aspect in which the project is "experimental": it is not simply a "demonstration" project to see if it can be replicated; but an "experiment" that uses known formulas in a new setting.

Organised around 9 strands, the project involves 1) reconstructing the image of Cova da Moura ("re-branding" its association with crime and drugs); 2) reconstructing social dynamics (economic opportunities through training); and 3) reconstructing the physical environment. The last responds to the community's demand to "stay" in Cova da Moura, that is, for the upgrade or rehabilitation to be conducted *in situ*. The built environment indeed suggests possible (if complex) rehabilitation: many of its multi-storey dwellings, although built by illegal contractors with sub-standard engineering solutions, are potentially open to amelioration while keeping the structure. The houses will have to comply to standards set in dedicated regulation for the reconversion of Urban Areas of Illegal Genesis (Áreas *Urbanas de Génese Ilegal*, hereinafter AUGI) (LNEC, 2008, p. 1), a more flexible approach to housing "minimum standards"

but one that still assures the "acceptable living conditions" guaranteed in the Portuguese Constitution's article 65.

By doing all of this instead of clearing and relocating the population, the state is acknowledging the local cultures and knowledges, making them integral to the rehabilitation scheme. Cova da Moura has a heterogeneous population of around 5,000 inhabitants, many of whom are postcolonial immigrants from Cape Verde, Angola, and other Portuguese-speaking African countries, and the neighbourhood has a rich transnational culture (Beja-Horta, 2006). The idea of the intervention, in a way, is that of multicultural theory applied to urban regeneration. "Involving minority immigrants in the transformation of a neighbourhood" (Sandercock, 1998, p. 173) is a positive sign that, to use Sandercock's simple language, "Lisbon has decided it wants to be Cosmopolis". It is learning how, through small steps like the IBC. The key point to underscore before proceeding is that the rehabilitation of these houses will very likely be more expensive than providing standard public housing on municipal land, and this has been accepted by the politicians.[6]

The crucial first step for this was an evaluation of the present habitability conditions of each house, to prepare the terms of the international competition to be opened for the design of the *plano de pormenor* (design plans). The project comes up against the specific techno-scientific problem of how to evaluate the informal city (i.e. the non-standard, non-scientific) so as to be able to bring it into the realm of the measurable, and then upgrade it. I next focus on the exact juncture where this occurs.

THE ANALYSIS OF THE BUILT ENVIRONMENT: ASSESSING HABITABILITY CONDITIONS AND REHABILITATION NEEDS

The Evaluation of the Building's Rehabilitation Needs (LNEC, 2008) was conducted by the National Laboratory of Civil Engineering *(LNEC – Laboratório Nacional de Engenharia Civil*, hereinafter LNEC) with the objective of characterising all the dwelling units' habitability conditions according to safety standards (e.g. structures, fire hazards); hygiene, health and comfort standards (e.g. air quality, humidity); and whether they were adequate for the use they had (in terms of surface areas, ventilation for spaces used as kitchens, etc.). It was not a detailed survey of the built environment, but a characterisation of it (*idem*, pp. 2-3). The methodology used reflected the time constraints and human resources available: it would not be feasible to carry out a detailed

6 Even the mere clearance and re-building would amount to at least 120% of the average costs because of the intricate nature of the urban fabric that needs demolition – 20% for clearance and groundwork alone (Interview 6, Oct. 2008).

measured survey of each house, draw their different layouts, or rigorously record anomalies such as cracks or unlevel features given the myriad of non-standard solutions each one presented. Therefore, these formalised procedures had to be adapted. It is a mixture of "naked eye" assessment (subjective appraisal) and mandatory criteria filled into a form (objective record).[7]

Teams of architects and engineers visited each of the 1,617 houses for 20 minutes, on a tight schedule prepared beforehand by the project team, which manages the appointments with residents. Each team consisted of two or three individuals and visited four to six houses (and the different dwelling units they were formed of) each morning. Afterwards, the data collected were inputted into software developed by LNEC, which has a mathematical algorithm that calculates whether each house needs mild, average, or extensive rehabilitation.[8] Very importantly, the form included a written description of anomalies, which supersedes the calculation from the algorithm should the two differ: if for example the summation of recorded objective criteria calculated by the algorithm states the house requires, for example, average rehabilitation, when the evaluator's written description pointed to extensive rehabilitation, then it is the latter that counts.

EXPERIENCED EYES AS SCIENTIFIC INSTRUMENTS

For this to work, the evaluators needed considerable experience in similar contexts in order to avoid being too impressed by aspects that may be misleading (such as uncleanliness, untidiness, smells, etc.), although this did not mean to ignore bodily impressions, as illustrated below. Instead, the evaluators were instructed to look for visual indicators of "hard" structural factors (e. g. cracks or leaks). In a way, "experienced eyes" were the necessary scientific instruments for the evaluation. Some of the architects and engineers from LNEC and IHRU indeed have a great deal of experience of working in shanty towns, and were part of the generation that saw both the SAAL and the PER. They also transmitted some of that embodied expertise and experience to the younger members of the teams.

7 The methodology was developed by LNEC's Buildings Department, using other studies to contextualise the area, such as the initial 'diagnosis report' for socio-territorial intervention (Malheiros *et al.*, 2006) or the report produced by the first project team formed by architects Ana Soeiro and Helena Campos (Soeiro and Campos, 2007).

8 The form had three sections: the first had different habitability criteria (structure, roof, external walls, windows, common stairs, etc.) divided by type; the second had a space for written description of anomalies; the third was for the evaluation of construction and spatial features of the house. Ticking the boxes in part 1 and sections of part 3 was what generated the algorithm calculation.

"Experienced eyes" and dependence on subjective or embodied knowledge was utilised to make the evaluation more accurate and "objective", not less: the impression evaluators had of the houses as soon as they entered them (dampness, darkness, confinement) was the first impact; this was then to be corroborated by visual analysis (looking for and photographing) of what causes those bodily impressions (leaks, lack of light, exiguous areas, etc.).

LNEC's "visual evaluation" methodology thus included the bodily knowledge of the experts into the overall process. This is an interesting twist in the tradition of state engineers' use of numerical and quantitative aptitude to formulate policy justifications (Porter, 1995, pp. 114-147). Here, we see the incorporation of subjective knowledge into an evaluation that indeed has quantitative outcomes and that will be the base for architectural and political decision (how, and if, to rehabilitate).

A DAY OF EVALUATION: TWO VISITS

I next present two evaluations made one morning in February 2008. The visits on this day were not scripted for my benefit, but they illustrate different sets of problems in progression, from less to increasingly problematic situations.

FIGURE 3
The "visual evaluation" methodology, February 2008. An engineer and an architect examine one house, taking photographs, measuring distances, and assessing safety features. Photographs by the author.

To describe the cases I rely on the notes and photographs taken at the time, as well as on a final oral summary by the project's head engineer, António Vilhena, and head architect, António Baptista Coelho (Interview 4, Feb. 2008).

House #1

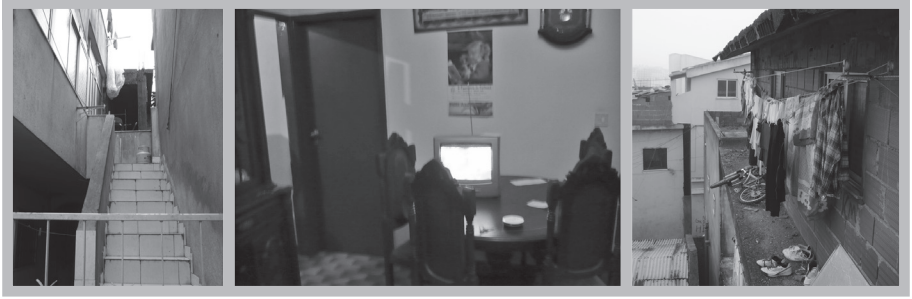
The first house consisted of three independent units that formed one three-storey building. Each floor had a different entrance from the outside stairs (image 4a). Only two of the three floors/units were visited.

The structural elements of the house were acceptable, which was expected given that its resident-builder worked in construction and because "he fortunately stopped adding floors at the right point" (head architect, interview 4). No problems of humidity or air circulation, but there was a marked lack of direct light (image 4b). Some windows opened to contiguous plots.

> The methodology we use in these cases, which I think is an appropriate one, is to regard each case in isolation. As if we'd taken the building out and put it, isolated, in the lab, with nothing around it. If it was done any other way we'd never get this finished, this would be incredibly complex . So we have to imagine the building as if it was isolated, and then see if we can open windows. Forgetting for the time being the adjoining structures. (…) In this case there is some possibility to open windows in the part that does not lead to the adjoining lot. At least for the ground floor this would provide some indirect light (head architect, interview 4).

The attempt at a "laboratorisation" of urban reality is clear here. The built environment was broken down into its constituent parts, and these were "constructed" as isolated in order to see how they work, first, and how they can be modified, second. Re-assemblage back into a new, coherent whole is to be made at a third point in time. On the second floor, the problem was that the walls were not finished and that storage spaces that could potentially be sublet

FIGURE 4
House #1 a b c



were exiguous and had no ventilation. Essentially the issues would be of opening windows where possible: "The first floor, despite its lack of windows does not have much humidity. But it's a dark, sad place…" (idem).

You start to see how a subjective appreciation (the "sad" qualification) is strongly rooted in objective elements that can be detected visually (demonstrable lack of light). Both are part of the evaluation. The third floor had a particularly unsafe feature in the form of a balcony without any balustrade (image 4c), which will need addressing.

House #2

The three units that made up the second house had the worst living conditions found that day. All three units had been built in a space between other buildings. The entrance arch (image 5a) leads directly to unit 5 and then to two other add-ons built against pre-existing buildings, units 5a and 5b (respectively image 5b and image d, behind the clothes). The team had to re-draw the map of the lot's limits (image 5c) as they accessed previously uncharted spaces. For reasons of space I will only focus on the first unit.

Unit 5 (as numbered by the team) was a one-storey structure with very poor roof insulation. As a result, rainwater was absorbed and slowly leaking inwards (image 6a). This had an overwhelming impact inside the house:

FIGURE 5
House #2

oppressive humidity levels, with water draining down the walls (image 6b, note the plastic paint is bubbling due to the leak); fungi on all walls (image 6c); perennially flooded floor (image 6d); and safety concerns regarding gas and electricity – with uncovered plugs in proximity to water, if a short circuit happened while a person was barefoot he/she would be electrocuted. This unit was an aquarium more than a dwelling.

The engineer inspected the roof (image 5d) and noted that the fungi growing out of the side of the roof (images 5e and 6e) were an indication that it was completely "soaked". Unit 5 is a case of absolute unsanitary conditions and immediate risk. It was inhabited by a father and his daughter, making it an especially desolate case. When the team got back to the office, they instructed the local unit to alert social services with urgency.

> There is "immediate risk" there. There's a child there… When it's grown-up men, overcrowded like on 5b, it's a concern, yes, but this… with the little girl, it's depressing… (head architect, interview 4).

Cases like this one are clear demolitions, and this one can indeed re-open the small patio-like space that initially existed there. I will return to this.

FIGURE 6
House #2
(Unit 5)

WRAP UP

The teams returned to the office and discussed their findings with the head of the project team. They explained the new drawings of the extents of the lots and their inner configurations, to be kept and later inserted into the map (Figure 7); and wrote up the information to be forwarded to social/welfare services. They informally speculated on the future solutions for each case, but their work there was done.

During that afternoon, the teams went to the IHRU offices to input the data into the software. It was preferable to do this on the same day. In order to keep to the 20-minute slot for each house, the evaluators had to use shorthand, thus they required a fresh memory of the houses (again a bodily type of knowledge) when inputting the data. Data input took an average of 40 to 50 minutes for each house, depending on how many "units" had been found for each.[9] So much depended on the evaluation it had to be as accurate as possible.

FIGURE 7
After the visits, new information is forwarded to the project team to update the maps.

OUTCOMES: MAPPING HABITABILITY INSUFFICIENCIES

The principal outcomes of the evaluation are maps that classify each unit according to its need for mild, average, or extensive rehabilitation.[10] The most important ones are:

Map C.6 Overlaps with adjoining buildings
Map C.7 Distance between buildings

9 Data input alone involved 1,350 work-hours. From a total of 1,617 houses, around 2,000 units were registered, 10% of which were vacant (LNEC, 2008, p. 41).

10 Grossly put, mild means painting, small insulation works, etc; average means tearing down walls or similar solutions; extensive means structural reinforcements and/or change in typology.

Map C.8 Walls/bays without fire resistance
Map C.9 Walls over adjoining lots
Map C.10 Air and light in inhabited spaces (Figure 8)

The juxtaposition of these data layers is then reviewed and calculated – the algorithm working – to give synthesised overall results distributed by the sections or blocks the map is divided into (61 "blocks' in 3 larger sections of the neighbourhood; see LNEC, 2008, pp. 31-38).

The complex strata of data are made operational by cross-tabulation of the two analytical frameworks used, "level of rehabilitation the building needs" and "level of anomalies between the buildings" (idem, p. 39). To give an example, only 17% of the buildings analysed share the two less critical categories (mild or average rehabilitation) in both frames, or put another way, only 17% of the buildings require mild or insignificant rehabilitation of the building itself *and* mild or insignificant work on its anomalies in relation to other buildings. This resulted in 83% of the buildings not complying to AUGI legislation in either "building standards" or "insertion in the urban fabric" (idem).[11]

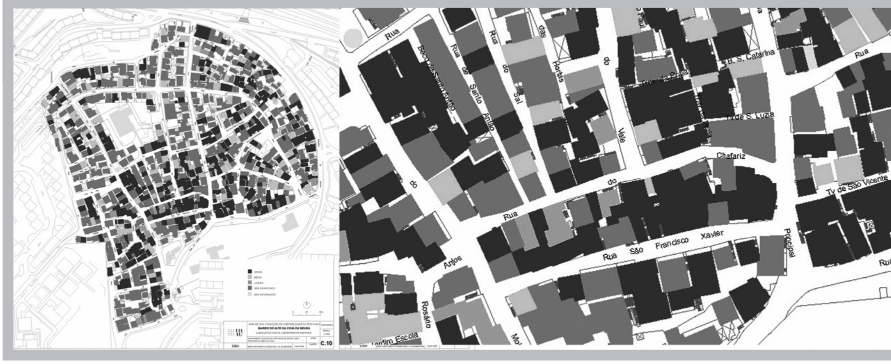
THE PARADOXES OF SLUM REHABILITATION

The 83% figure portrays a built environment of very poor standards. To the project team, it suggested that rehabilitation could be close to technically infeasible or simply too expensive to make sense. Moreover, the 83% is but one among other discouraging figures, such as the fact that, when seen in isolation, 45% of dwellings needed average rehabilitation and 19% needed extensive rehabilitation. For a period in late 2008 when the research findings had been concluded, feasibility was the concern, even for the LNEC engineers.

However, the 83% figure can easily start to come down with small, simple measures. One example from the visits: if house #2 is demolished, as it surely will be, 6 or 7 houses in that block will immediately go into less critical categories on the "distance to other houses" criterion. Furthermore, such demolition will also grant space for small ameliorations (such as opening windows) that improve the "habitability conditions" (ventilation, light), thus potentially putting those 6 or 7 houses in less critical rehabilitation categories for the "housing standards" criteria as well. This can be illustrated by the map below, which refers to air and light conditions in the houses. The houses represented in black require extensive rehabilitation, but close inspection of the map indeed shows a number of pockets where removal of one or two interior units will break up exaggerated density.

11 Other problems include the absence of safe fire evacuation routes. Many of the labyrinthine alleys will have to be re-designed in the *plano de pormenor*.

FIGURE 8
Map C.10 and detail, representing air and light conditions in the dwellings. The black colour represents the cases that need extensive rehabilitation. Source: LNEC/IHRU.



Each dwelling unit "laboratorised" in the evaluation will have to be re-grouped now, back into a new coherent whole, with possible "extirpation" (to continue the medical metaphor) of some of them. The finely tuned resolution of individual cases is to be made by the architecture/planning team that wins the competition to design the *plano de pormenor*, to be carried out in collaboration with the population. This sample shows that it will be an exciting, if challenging, task. Not all cases will be as clear as house #2, but the same principle will apply: the decision to demolish or rehabilitate will be based as much on their individual merits as on their relationship to other buildings and to the urban fabric.

The implications of this principle lead to a paradox: in order to make the rehabilitation feasible – in spatial as well as in financial terms – some people will have to move out. In spatial terms, house #2 illustrates that excessive density can be solved by demolishing some houses (to open up small squares, to extend what at present are dead-end alleys, etc.). In financial terms, too, if everyone would stay in place, each house's rehabilitation costs would rise to prohibitive levels given that such simple ameliorations would not be possible. Therefore it is likely that a combination of rehabilitation of old buildings and construction of new ones (on site or in the vicinities) will be required. Such was the understanding of IHRU over two different periods (Interview 8, Jan. 2011, updated with informal communication, Oct. 2011). The residents will be given the option to stay in rehabilitated houses, in newly-built projects or to be relocated elsewhere (through an offshoot of the PER, the PER-Famílias). The freedom to choose will not be "steered", but the paradox is still manifest: in order to grant the community of Cova da Moura its "right to the city', which people have cogently fought for two decades, it is

likely that the only way to achieve it with any quality is if a part of that community chooses to leave.

How this is to be managed will be a delicate process. The rehabilitation start date is at present still a distant prospect (estimated 2-3 years for completion), so it is likely many people will opt at present to leave. However, it is also likely that as the works' start date gets closer and rehabilitation becomes more tangible or demonstrable, fewer people will do so.[12] In that sense, it would be convenient if a sufficient number of people choosing the "exit" option could be guaranteed as soon as possible, thus liberating space for the necessary readjustments for those who choose to stay. This is speculation, even if well-informed, but the point is that the people *who go* will in a way be the safeguard that those *who stay* will have an acceptable built environment to live in.

I repeat that rehabilitation was not put forward in this case because it was a less expensive solution than clearance and rehousing – in fact, as we have seen, in the short term it will certainly be more expensive, whether it ends up below or above the symbolic 150% figure – but because it responded to a different set of objectives on the part of the state: a general move towards urban regeneration/rehabilitation programmes, a specific move toward participatory planning practices and a localised meeting of the demands of a specific population for its "right to place" and its "right to the city".

CLEARANCE REHABILITATION INTERRUPTION

The IBC project in Cova da Moura is the culmination of one of the two "technological frames" (Aibar and Bijker, 1997) that have co-existed regarding intervention in slums in the Portuguese-speaking landscape. One is the modernist approach, with displacement to distant housing projects, but which in some cases is yet to be achieved. The other is the process described here, an interrupted tradition of collaborative, participatory approaches (and/or *in situ* upgrade/rehabilitation) now resumed, albeit in a more complex context than in the 1970s. I have sought to show that these frameworks have run somewhat in parallel, or rather, with a sporadic resurfacing of the second amidst a more continuous presence of the first. More importantly I have tried to show how each relates to its historical context and "makes sense" in it; and finally that each encounters problems, paradoxes, and delays of a socio-technical nature.

I have also shown hygienist notions running from the beginning of the 20th century to the present day (hygiene standards are important, as house #2

12 This will be especially acute if the majority of residents do not make their choice by the time the first rehabilitated houses are completed, for in the case they are 'attractive', they would become 'live showrooms'.

proves); and that "hard" factors such as land structure and planning by-laws are played out in diverse circumstances but always frame the results. I hope to have shown that mobilisation and insurgent practices from populations, though easily shut down if the historical context is against them, can sometimes initiate empowering projects.

Finally, in showing the evaluation of Cova da Moura I have also pointed out that socio-technical change in the city (Hommels, 2009), even when it is a part of a path toward a "negotiated city" (Kesteloot, 2005; Bourdin, 2009), is enacted in a continuum of objective-subjective knowledge deployed by experts. In the case of intervention in informal settlements, this is a continuum that stands atop the cumulative layers of technoscientific knowledge discussed in the first section; but then takes on, "laboratorises", unpacks, and reassembles the un-formalised knowledge used by poor populations when building a shack or a house of poor standards some 30 years ago.

POST SCRIPTUM

In March 2011, the competition for the *plano de pormenor* was concluded but construction did not start. Throughout 2011 and 2012 it became increasingly clear that the project was slowing down, until it was suspended in May 2012. Interruption has always been one of the things informal settlements have suffered from: interruption of infrastructure, interruption of social help, interruption of citizenship. In fact, informal settlements have been the real "state of exception" of neoliberal urban policies in the last four decades, so it is sad but fitting that an attempt to properly rehabilitate one of them and improve the lives of its inhabitants is halted because of the current austerity.

The questions for the near future concern the management of interruption: what to do? We are back to the original questions. Raze and build anew? With what funds, at this point? Proceed with rehabilitation? In that case, why was it suspended? Leave things as they are, with the population remaining without any amelioration of their housing conditions? The work already done goes to waste, and if the programme was a test tube for Polis XXI, this is worrying (the state studies, evaluates, and then stops). Furthermore, given the length of the delay and the contingent conditions of the homes, it is likely that the previous analysis is already out of date and would need to be started again. And the final question: in the event that nothing happens, do we continue to celebrate the "localised transnational culture" of the neighbourhood for political gain without providing actual improvements to the population that is celebrated – the ever-repeated strategy by policy makers in the case of Cova da Moura?

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2. IBC Cova da Moura Local Unit (Phase II) – Head of Local Unit – January 2008.
3. LNEC Engineer (co-head of Cova da Moura slum rehabilitation assessment) – February 2008.
4. LNEC Head architect and engineer during assessment – February 2008.
5. IHRU Head of IBC program – September 2008.
6. LNEC Engineer (co-head of Cova da Moura slum rehabilitation assessment) – October 2008.
7. Former Secretary of State for Cities and Urban Planning – December 2009.
8. IHRU Deputy head of IBC program – January 2011.

Recebido a 14-03-2012. Aceite para publicação a 11-03-2013.
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