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UNIVERSIDADE DE COIMBRA

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S U M Á R I O

C O N T E N T S

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Rib fractures in the Coimbra Identified Skeletal Collection: potential associations with biological sex, age-at-death and bone mineral density

Fraturas das costelas na Coleção de Esqueletos Identificados de Coimbra: possíveis associações com o sexo biológico, idade à morte e densidade mineral óssea

Francisco Curate[1,2a*]; Eugénia Cunha[2,3,4b]

Abstract There is a high prevalence of rib fractures in human remains from archaeological contexts, but these are seldom the focus in paleopathological studies pertaining skeletal trauma. This study aims to document rib fracture patterns in the Coimbra Identified Skeletal Collection, Department of Life Sciences, University of Coimbra. Specific aims of this study included the estimation of rib fracture prevalence in 252 individuals, from both sexes (females: 128; males: 124), with age-at-death varying from 20 to 96 years; and the analysis of the relationship between rib fractures andbiological sex, age-at-death, and bone mineral density measured at the proximal femur. The crude prevalence of rib fractures was 6.3% (N=16); while the true prevalence rate

Resumo A prevalência de fraturas das costelas é elevada em contextos arqueológicos, contudo, estas raramente são o foco de estudos paleopatológicos sobre traumatismos esqueléticos. Neste trabalho, pretende-se documentar os padrões de fratura das costelas na Coleção de Esqueletos Identificados de Coimbra, Departamento de Ciências da Vida, Universidade de Coimbra. Os objetivos específicos incluem a estimativa da prevalência de fraturas das costelas em 252 indivíduos, de ambos os sexos (mulheres: 128; homens: 124), com idades à morte compreendidas entre os 20 e os 96 anos; e a análise da relação entre fraturas das costelas e o sexo biológico, a idade à morte, e a densidade mineral óssea mensurada no fémur proximal. A prevalência bru-

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was 0.7% (38 fractured ribs in relation to 5656 ribs studied). Males have been more affected than females (males: 10.5%, 13/124; females: 2.3%, 3/128). Individuals with one or more rib fractures were significantly older (mean=66.19 years old; standard deviation [SD]=14.08) than those who have not experienced any rib fracture (mean=50.41 years old; SD=19.45). Low bone mineral density was also associated with the presence of rib fractures but only in females. These results expand the scientific awareness about the prevalence of rib fractures in human skeletal collections.

Keywords: Skeletal trauma; paleopathology; bioarchaeology; forensic anthropology; reference skeletal collections; Portugal.

ta de fraturas das costelas foi de 6,3% (N=16); enquanto a prevalência real foi de 0,7% (38 costelas fraturadas em 5656 observadas). Os homens foram mais afetados que as mulheres (homens: 10,5%, 13/124; mulheres: 2,3%, 3/128). Os indivíduos com uma ou mais fraturas das costelas eram significativamente mais velhos (média=66,19 anos; desvio padrão [DP]=14,08) que aqueles que não sofreram qualquer fratura (média=50,411 anos; DP=19,45). Valores baixos de densidade mineral óssea encontravam-se também associados à presença de fraturas das costelas, mas apenas no grupo feminino. Estes resultados incrementam a consciência científica acerca da prevalência de fraturas das costelas em coleções osteológicas humanas.

Palavras-chave: Traumatismos esqueléticos; paleopatologia; bioarqueologia; antropologia forense; coleções osteológicas de referência; Portugal.

Introduction

Skeletal trauma — and particularly fractures — is undoubtedly a prominent finding in human remains from past communities (Lovell, 1997; Redfern et al., 2017; Redfern and Roberts, 2019). Bone fractures are hybrid events, permeated by interlacing threads of biological, social, cultural or political factors, and their historical/diachronic analysis has made consequential contributions to the interpretation of multidimensional expressions of human life experiences in the past, including the provision of care to suffering individuals, interpersonal and structural violence, the effects of age, and sex and/or gender, medical procedures, among many others (Domett and Tayles, 2006; Piombino-Mascali et al., 2006; Redfern, 2010; de la Cova, 2012; Robbins et al., 2012; Šlaus et al., 2012; Milner et al., 2015; Binder et al., 2016; Lovell, 2016; Pfeiffer, 2016; Lambert and Welker, 2017; Antunes-Ferreira et al., 2018; Mant, 2019). It is crucial to be familiar with the information potential provided by different types of fracture. Nonetheless, most of the studies in archaeological contexts have been focused either on cranial frac-

tures (maybe a reminiscence of what Saul Jarcho (1966) once described as a cranial fixation by anthropologists), fractures of the long bones, or an assortment of these, undervaluing fractures in other areas of the skeleton, such as the ribs (Brickley, 2006; Matos, 2009).

In the classical medical textbook "A practical treatise on fractures and dislocations", Frank H. Hamilton admitted the scarcity of rib fractures when compared with fractures of the long bones (Hamilton, 1860). Lewis Stimson, just two decades after Hamilton's remarks, espoused a divergent perception, stating that rib fractures were "among the commonest of all fractures"(Stimson, 1883: 190). In modern clinical data, these are very common injuries, occurring in 10 – 20% of all blunt trauma patients (Ismail et al., 2006; Talbot et al., 2017; Liebsch et al., 2019; Peek et al., 2022). Nonetheless, rib fractures' clinical awareness is not flawless and the exact incidence may be higher than what is reported (Ismail et al., 2006; Talbot et al., 2017). Rib fractures are also a very common finding in archaeological populations (Lovell, 1997; Brickley, 2006; Redfern and Roberts, 2019) but they are seldom the focal point of comprehensive bioarchaeological or forensic studies about skeletal trauma (Brickley, 2006; Matos, 2009). Exceptions comprise analyses of archaeological populations (Brickley, 2006; Garcia, 2019), reference skeletal collections (Matos, 2009) and forensic contexts (Love and Symes, 2004; Daegling et al., 2008; Christensen et al., 2013).

The paucity of published paleopathological reports focusing on rib fractures thwarts any attempt to identify and understand historical patterns of injury in the thoracic region and restrains diachronic and geographic comparisons between archaeological samples. Some studies include reports on rib fractures from archaeological samples (e.g., Robledo and Trancho, 1999; Roberts and Cox, 2004; Assis, 2007; Jordana, 2007; de la Cova, 2010; Agnew et al., 2015), but confined the scope of analysis to the global prevalence of fractures. Other authors state that rib fractures were analyzed but no specific statistics are given (Scott and Buckley, 2010). A while back, Brickley (2006) recommended a higher level of detail and specificity when recording rib fractures, towards comprehensive paleoepidemiological studies that aim to reproduce the complexity of biological, social and cultural factors that influence rib fracture patterns in a certain geographical and chronological context.

Rib fractures are not only common but also contribute disproportionately to patients' morbidity and mortality. Formerly considered relatively innocuous, their various detrimental effects are now well-known (Flagel et al., 2005; Peek et al., 2022). Fractured ribs are clinically relevant for numerous reasons. Very often they are an indication of a more serious injury, with high morbidity and mortality from associated lesions such as head injuries and lung, heart and abdominal visceral organ complications. Pulmonary problems due

to rib fractures comprise hemothorax, pneumothorax, flail chest, pulmonary contusion, pneumonia and atelectasis (Barnea et al., 2002; Sirmali et al., 2003; Palvanen et al., 2004; Freixinet et al., 2008; Lin et al., 2016; Talbot et al., 2017; Liebsch et al., 2019; Peek et al., 2020; 2022). Rib fractures are associated with pain because of movements of fractured sections with each respiratory effort (Shukla et al., 2008).

The aetiology of rib fractures is intricate and multidimensional, but most epidemiological studies have been showing that the leading causes of these fractures include road traffic accidents (unusual or non-existent in many past societies), accidental falls, interpersonal violence and work-related hazards (Sirmali et al., 2003; Freixinet et al., 2008; Ingoe et al., 2020; Peek et al., 2022). Chronic alcoholism (González-Reimers et al., 2005), domestic violence (Porter et al., 2019), and child abuse (Cattaneo et al., 2006) are also acknowledged as important causes of rib fractures. Bone fragility caused by osteoporosis, which facilitates fractures in the ribs when less kinetic force is applied to the thorax, is also considered a major predisposition factor (Flagel et al., 2005; Prins et al., 2020).

Following the suggestions by Brickley (2006) highlighting the potential relevance of the paleopathological study of rib fractures, and related works by Matos (2009) and Garcia (2019) in Portuguese skeletal samples, the purposes of this investigation include: 1.) the assessment of rib fracture prevalence in an identified skeletal study-base from Coimbra, Portugal (Coimbra Identified Skeletal Collection); and 2.) the analysis of the relationship between rib fractures, assigned sex at birth (i.e., biological sex), age-at-death, and bone mineral density measured at the proximal femur.

Materials and methods

The Coimbra Identified Skeletal Collection (CISC) was collected between 1915 and 1942, by Eusébio Tamagnini, and is at present curated at the Department of Life Sciences in the University of Coimbra. The collection is composed by 505 skeletons; and most of them were exhumed from shallow graves in the *Cemitério Municipal da* Conchada (Rocha, 1995). These individuals were predominantly manual workers with low socioeconomic status (Cunha and Wasterlain, 2007). A corpus of biographical data pertaining these individuals was assembled in a *Registry Book*, which is, in effect, an anthology of lives condensed in a clear and scrupulous, almost bureaucratic, record. The data collected for every individual include the biological sex, age-at-death, occupation, cause-of-death, and marital status, amongst others. The majority of the skeletons is complete and well preserved, although some display taphonomic alterations, essentially due to continuous handling over the years (Rocha, 1995; Cunha and Wasterlain, 2007; Curate et al., 2019).

Only adults (age-at-death ≥ 20 years) with no signs of gross taphonomic dam-

age were incorporated in the sample. Individuals that lacked supporting biographical information, such as age-at-death, biological sex, or cause of death, were excluded. The study sample consists of 252 adults from both sexes (females: 128; males: 124), with ages-at-death ranging from 20 to 96 years (Mean=51.4; SD=19.5; Figure 1). It comprises individuals born between 1827 and 1914 that died between 1910 and 1936. The majority came from central and northern Portugal, especially from the Coimbra District.

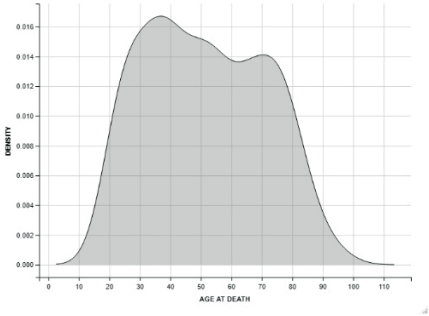

Figure 1. Probability density distribution of age-at-death in the Coimbra Identified Skeletal Collection sample.

The ribs from every individual were observed macroscopically, and the bone representation index, which measures the frequency of each bone in the sample, was evaluated. It is simply the ratio between the actual number of bones observed and the total number of elements of the skeleton that should have been present. Also, the state of preservation of rib cortical surfaces was assessed by the qualitative bone index, which is the ratio between the flawless cortical surface and the damaged cortical surface of each bone (Bello et al., 2006; Robb, 2016).

Fractures (i.e., any break in the continuity of the bone; Lovell, 1997) were recorded according to the protocol proposed by Brickley (2006). All visible antemortem (and, if present, perimortem) rib fractures were included irrespective of the state of healing. For each individual all the ribs were counted and identified. The number of fractures present in each individual and, when possible, the actual rib number at which the fracture was observed were recorded. The fracture location in the anatomy of the rib (sternum or vertebral ends, and shaft), the healing state (healed, healing), the presence of callus or remodeled bone and the occurrence of associated features, such as angular displacement, were also recorded (Lovell, 1997; Matos, 2009).Fracture prevalence was estimated as a crude ratio — a proportion of the total number of rib fractures and the total number of individuals — and as a true ratio — a proportion of the total number of fractured ribs and the total number of ribs in the sample (Judd, 2002a; Lovell, 2008).

Bone mineral density (BMD) at the proximal femur (regions of interest "Total Hip" and "Neck") was assessed through Dual X-ray absorptiometry (DXA), according to Curate et al. (2013; 2017), in a subsample of 204 individuals (112 females and 92 males).

A Fisher's exact test was performed to examine the association between two categorical variables. Additionally, the odds ratio (and corresponding 95% confidence interval, CI) was employed to measure the strength of association between two binary variables (Szumilas, 2010). Pearson's correlation was used to measure the linear association between two sets of data. A Student's t-test was employed in order to evaluate the null hypothesis that the means of two groups were identical. When a violation of normality was detected with the Shapiro-Wilk test, a non-parametric alternative (Mann-Whitney U) was used. Logistic regression, a non-parametric statistical classifier, was employed to describe the association of one or more independent variables to a dichotomous dependent variable. A p-value ≤0.05 was considered statistically significant. All statistical analyses were performed with SPSS (v. 28) and R language (R Core Team, 2021).

Results

A total of 5656 ribs were observed from 256 individuals, representing 93.5% of the total number of ribs expected (i.e., 6048 presuming the existence of 24 ribs for each individual). The number of ribs present ranged from 18 (1.2%; 3/252) to 24 (29.8%; 75/252), with an average of 22.4 ribs per individual affected (SD=1.4; Mode=24). The bulk of the sample (98.0%, 247/252) showed at least 20 preserved ribs per individual. Of the 5656 ribs present in the sample, 1598 (28.3%) presented cortical surface damage, with an average of 6.3 damaged ribs per individual (SD=6.9; Mode=0). Of the damaged ribs, 2.1% (33/1598) were placed in the Class 3, 8.3% (133/1598) in the Class 4, and 89.6% (1432/1598) in the Class 5 of the qualitative bone index (Bello et al., 2006).

The crude prevalence for rib fractures per individual observed in this study is summarized in Table 1. The overall prevalence rate for both sexes is 6.3% (16/252). The true prevalence of rib fractures (i.e., considering the total number of fractured ribs and the total number of observed ribs) is 0.7% (38/5656; Table 2). All fractures occurred antemortem.

Males were significantly more affected than females (males: 10.5%, 13/124; females: 2.3%, 3/128; Fisher's exact test: p=0.009; Odds Ratio: 4.88, 95%CI: 1.35 – 17.57). Individuals with one or more rib fracture were older (Mean=66.19 years old; SD=14.08) than those who do not present with fractures (Mean=50.41 years old; SD=19.45; Mann-Whitney U: 985.500; Z=-3.199; p=0.001). Eight of the affected individuals, one female and seven males, presented with multiple (two or more) rib fractures (50.0%; 8/16). Within the multiple fractures' group, an overwhelming majority of individuals (87.5%; 7/8) showed two or more adjacent ribs with fractures. Contiguous rib involvement ranged from two to four ribs. Just one individual exhibited adjacent broken ribs in both sides of the thoracic cage. Multiple fractures in the same rib (Figure

Table 1. Crude prevalence of rib fractures in each age / sex category (CISC).

Age Categories	Males			Females			Total		
	N	NF	%	N	NF	%	N	NF	%
20-29	18	0	0.0	23	0	0.0	41	0	0.0
30-39	23	0	0.0	22	0	0.0	45	0	0.0
40-49	21	3	14.3	16	0	0.0	37	3	8.1
50-59	18	0	0.0	20	0	0.0	38	0	0.0
60-69	17	4	23.5	16	1	6.3	33	5	15.2
70-79	20	4	20.0	17	1	5.9	37	5	13.5
80+	7	2	28.6	14	1	7.1	21	3	14.3
Total	124	13	10.5	128	3	2.3	252	16	6.3

N: sample size; NF: number of individuals with one or more rib fractures; %: percentage.

Table 2. True prevalence of fractures by sex / age categories (CISC).

Age Categories	Males			Females			Total		
	N	NF	%	N	NF	%	N	NF	%
20-29	410	0	0.0	515	0	0.0	925	0	0.0
30-39	524	0	0.0	494	0	0.0	1018	0	0.0
40-49	474	4	0.8	357	0	0.0	831	4	0.5
50-59	411	0	0.0	449	0	0.0	860	0	0.0
60-69	376	15	4.0	357	1	0.3	733	16	2.1
70-79	463	13	2.8	374	2	0.5	837	15	1.8
80+	147	2	4.3	305	1	0.3	452	3	0.7
Total	2805	34	1.2	2851	4	0.1	5656	38	0.7

N: the number of left and right ribs; NF: the total number of rib fractures; %: percentage.

2) were observed in a total of five ribs belonging to two individuals. The number of fractured ribs was positively associated, albeit moderately, with age-at-death (Pearson's r: 0.165; p=0.009), and varied between one and eight per individual, with an average of 2.4 fractures per individual (SD=1.9; Mode=1).

Three males (20%; 3/15) showed rib fractures still healing at the time of death (Figure 3). One of these individuals presented with well-healed fractures adding up to the rib fractures with active callus formation, suggesting that the injuries happened in more than one traumatic event.

The left side of the rib cage was affected more often (81.3%%; 13/16) than the right side (6.3%; 1/16). Two individuals (12.5%; 2/16) suffered rib lesions in both sides of the rib cage. The ribs most frequently affected were those in the middle region (fourth to ninth rib), encompassing 65.8% (25/38) of the recorded cases, followed by those of the lower region (tenth to twelfth rib), with 18.4% (7/38), and those of the upper region (first to third rib), with 15.8% (6/38). The seventh rib was the most frequently fractured (14.7%; 5/38), followed by the fourth (11.8%; 4/38) and the eighth ribs

Figure 2. Two fractures in the 8th left rib. In one of the fractures, near the sternal end, the callus is visibly healing, while in the other the callus is well-remodeled. This individual (CISC, number 212), a 78-year-old male, suffered fractures in five ribs as well as in the distal radius (Colles' fracture).

Figure 3. Fracture in the shaft of the 5th left rib in a 79 year-old-male (CISC, number 303). Woven bone and porosity are noticeable adjacent to the margins of the fracture.

(11.8%; 4/38). The first (with no fracture recorded) and the twelfth (only one case recorded) were the least affected ribs. Of the 38 ribs with at least one fracture, 31 (81.6%) were fractured in the shaft (matching the lateral portion of the rib cage), and 7 (18.4%) near the sternal end (corresponding to the anterior region of the rib cage). There were none in the vertebral end region (posterior rib cage).

Bone mineral density values at the total hip and the neck of the femur in women without rib fractures are significantly larger than in women with fractures (BMD Total Student's independent sample t-test: 1.773; df=100; p=0.039 / BMD Neck Student's independent sample t-test: 2.071; df=100; p=0.020). In men, bone mineral density is also larger in individuals without rib fractures but the differences are not statistically significant (BMD Total Student's independent sample t-test: 1.439; df=90; p=0.077 / BMD Neck Student's independent sample t-test: 1.214; df=90; p=0.114). Descriptive statistics for the bone mineral density are summarized in Table 3.

Additionally, a stepwise logistic regression was implemented to ascertain the effects of biological sex, age-at-death, BMDTotal on the likelihood that an individual from the study-sample suffered one or more rib fractures. Stepwise selection removed BMD Total from the resulting model, and only sex and age-at-death remained as explanatory variables (Table 4). The model was statistically significant (X^2: 18.773; df=2; p<0.001), explaining 19.1% (Nagelkerke R^2) of the variance in the occurrence of rib fractures and correctly classified 93.7% of cases. Males were 4.9 times more likely

Table 3. Bone mineral density at the Total Hip (BMD Total) and Neck (BMD Neck) in individuals without and with rib fracture, according to sex (CISC).

	Without Rib Fracture				With Rib Fracture			
	Mean	**SD**	**95% CI**	**N**	**Mean**	**SD**	**95% CI**	**N**
Females								
BMDTotal	0.792	0.16	0.762 – 0.823	109	0.626	0.10	0.373 – 0.879	3
BMDNeck	0.690	0.15	0.661 – 0.719	109	0.506	0.08	0.298 – 0.714	3
Males								
BMDTotal	0.891	0.17	0.854 – 0.928	82	0.810	0.16	0.693 – 0.928	10
BMDNeck	0.765	0.16	0.729 – 0.800	82	0.699	0.16	0.582 – 0.816	10

SD: standard deviation; 95%CI: 95% confidence interval; N: sample size.

Table 4. Stepwise logistic regression model fitting for the likelihood of having suffered one or more rib fractures (CISC).

	Variable	**β**	**SE**	**Wald**	**Sig.**	**Exp (β)**	**95% CI for Exp (β)**
Rib Fractures (CISC)	Sex	1.598	0.695	5.288	<0.001	4.944	1.266 – 19.302
	Age	0.057	0.020	7.964	<0.001	1.059	1.018 – 1.102
	Constant	-6.772	1.276	28.160	<0.001	0.001	

β: the coefficient for the constant in the null model; SE: standard error; Wald: Wald chi-square test; Exp (β): exponentiation of the β coefficient; 95% CI: 95% confidence interval.

to exhibit rib fractures than females. Increasing age was also associated with an increased probability of showing a rib fracture. Bone mineral density was not linked with the likelihood of exhibiting a rib fracture in the logistic model.

Discussion

It is becoming increasingly obvious that the nature and amount of information that may be obtained from skeletal assemblages are correlated not only with the demographic profile of the sample but also with the completeness/incompleteness of the skeleton and the state of preservation of the osseous remains (Mays, 1992; Bello et al., 2006; Robb, 2016). The completeness/incompleteness and the state of preservation of skeletal remains are linked to the action of taphonomic agents, as well as on excavation procedures and recovery circumstances. Results on the rib preservation index and the qualitative bone index in the CISC sample suggest that the observed rib sets were fundamentally complete and very well preserved.

In archaeological studies, there is a common perception that the post-mortem survival of ribs is poor (Brickley, 2006). Waldron (1987) and Mays (1992) reported rib survival rates largely inferior to the postmortem preservation of other skeletal components, and Bello et al. (2006) observed a substantial variability in rib conservation. Good rib preservation and qualitative bone indices in the sample from the CISC — similar to what was recorded by Matos (2009) in the Lisbon Identified Collection — can be explained by the short time period between the inhumation of the individuals and their exhumation (less than 10 years), which is unusual in archaeologically-derived samples; and careful excavation of the skeletons. Postmortem damage in this sample is mostly limited to the continuous handling of bones over the years.

Rib fractures are a common injury following blunt chest trauma, accounting for a substantial number of thoracic injuries from non penetrating trauma (Liebsch et al., 2019; Kim and Moore, 2020; Peek et al., 2022). Rib fractures are also a frequent finding in the paleopathological literature (Mays, 2000; Judd, 2002b; Brickley, 2006; Mant, 2019; Redfern and Roberts, 2019; Scott et al., 2019) and this type of injury was already observed in the Pliocene fossil "Lucy", the female *Australopithecus afarensis* with 3.18 million years (Kappelman et al., 2016). Notwithstanding, rib fractures are hardly ever the focus of studies investigating physical trauma in the past. As such, published reports on their specific prevalence are relatively scarce (Brickley, 2006; Matos, 2009; Garcia, 2019), with some comprehensive studies of skeletal trauma in the past omitting rib fractures from the analysis (Gilmour et al., 2015; Milner et al., 2015; Lambert and Welker, 2017).

A few paleopathological studies reported a crude prevalence ranging from 0.0% (Lambert, 2002) to 63.3% (de la Cova, 2010). Also, a substantial disparity between the true prevalence rates in the available studies was found, varying between 2.3% (Brickley, 2006) and 5.6% (Garcia, 2019; Tables 5 and 6). Therefore, the crude prevalence (6.3%) and true prevalence (0.7%) found in the present study are among the lowest reported in the available literature. The low prevalence in the CISC sample is even more obvious if compared with the frequencies reported by Matos (2009) — 23.9% and 2.6% — in a seminal study completed in a well-preserved sample of identified skeletal individuals from the National Museum of Natural History of Lisbon (Portugal). The sample of Lisbon comprises relatively more males (with a higher risk of suffering rib fractures), but sex-specific prevalences are also higher in the Lisbon collection. Also, unlike what was observed in the Coimbra study-base, some younger individuals from the Lisbon sample suffered rib fractures.

Of course, the interpretation and comparison of these rates, especially the true prevalence rate, are convoluted because they depend on highly variable

features such as the representativeness and preservation of bones (Bello et al., 2006). The importance of the differential survival of bones to achieve accurate estimates of disease prevalence in the past is unquestionable (Waldron, 1987). The good preservation of ribs in this analysis is not a common finding, with the study by Matos (2009) featuring another exception; this complicates comparisons with other paleopathological studies, especially those that do not report rib survival rates. Comparisons with modern epidemiological studies are also difficult as the incidence and prevalence of rib fractures are significantly underreported (Cattaneo et al., 2006; Ingoe et al., 2020).

Fracture patterns within a population are highly informative (Lovell, 1997), and sex and age influence the frequency and nature of skeletal trauma. In this study, there is a significant statistical difference in rib fracture prevalence between females and males, with the latter presenting a higher likelihood of having suffered a rib fracture. These results are similar to other studies (Robledo and Trancho, 1999; Brickley, 2006; Assis, 2007; Jordana, 2007; Matos, 2009; Garcia, 2019), that also fathom that males in the past were probably more prone to this kind of fracture. Epidemiological studies also suggest that men are more frequently affected by rib fractures (Palvanen et al., 2004; Ismail et al., 2006; Liebsch et al., 2019; Peek et al., 2022). Most thoracic trauma patients are males involved in high-energy accidents, but also in work-related incidents or alcoholism (Sirmali et al., 2003; González-Reimers et al., 2005; Lin et al., 2016). Interestingly, the association of injury recidivism, including multiple rib fractures, and substance abuse has been proposed in a middle-aged man that was buried in the Chapel of the Holy Spirit in Bucelas, Portugal (Antunes-Ferreira et al., 2021). Also, in bioarchaeological contexts rib fractures are often the outcome of interpersonal violence, a behavioral pattern more common in males (Lovell, 1997; de la Cova, 2012; Antunes-Ferreira et al., 2021).

In the CISC sample, the prevalence of rib fractures and the number of fractured ribs increased with age. The results are in agreement with those reported in other paleopathological (Brickley, 2006; Matos, 2009; Garcia, 2019), and clinical studies (Palvanen et al., 2004; Ismail et al., 2006; Elmistekawy et al., 2007; Coary et al., 2020; Kim et al., 2020). Advanced age is associated with comorbidities, increased frailty and geriatric conditions that amplify the propensity to fall (Coary et al., 2020). Multiple lines of epidemiological evidence suggest that falls are central in fracture risk determination, and particularly rib fractures (Sirmali et al., 2003; Liebsch et al., 2019; Coary et al., 2020). Amongst the aged, home and leisure accidents are frequent and almost always due to fortuitous falls with a single, low impact chest injury (Freixinet et al., 2008; Peek et al., 2020). It must be cautiously noted that in paleopathological studies, it is not absolutely clear whether the

Table 5. Crude prevalence of rib fractures in archaeological and reference skeletal samples.

Study reference	Provenience	Chronology	N	NF	%
Agnew et al. (2015)	Giecz, Poland	11th–12thAD	142	32	22.5
Agnew et al. (2015)	Poznan-Sródka, Poland	10th–12thAD	57	1	1.8
Assis (2007)	Constância, Portugal	14th–19th AD	36	6	16.7
Brickley (2006)	St. Martin's, Birmingham, UK	18th–19thc. AD	352	55	15.6
de la Cova (2010)	African-Americans♂, TC, USA	19th–20thc. AD	345	105	30.4
de la Cova (2010)	Euro-Americans♂,TC, USA	19th–20thc. AD	289	183	63.3
Garcia (2019)	Leiria, Portugal	12th–16thc. AD	64	21	32.8
Jordana (2007)	Sant Pere Church, Terrasa, Spain	4th–8th c. AD	53	7	13.2
Lambert (2002)	Ute Mountain, USA	1075–1280 AD	25	---	20.0
Lambert (2002)	Pueblo Bonito, USA	900–1050 AD	45	---	6.7
Lambert (2002)	Eldon Pueblo, USA	1100–1300 AD	20	---	0.0
Matos (2009)	NMSMH, Lisbon, Portugal	19th–20th c. AD	197	47	23.9
Roberts and Cox (2004)	Several locations, UK	Late Medieval	2515	157	6.2
Roberts and Cox (2004)	Several locations, UK	Neolithic	41	1	2.4
Roberts and Cox (2004)	Several locations, UK	Iron Age	113	3	2.7
Robledo and Trancho (1999)	Xarea, Almeria, Spain	9th–15th c. AD	142	15	10.6
Present Study	University of Coimbra, Portugal	19th-–20th c. AD	252	16	6.3

N: sample size; NF: number of individuals with one or more rib fractures;%: percentage; TC: Terry Collection; NMSMH: National Museum of Science & Natural History of Lisbon.

Table 6. True prevalence of rib fractures in archaeological and reference skeletal samples.

Study reference	Provenience	Chronology	RO	NF	%
Assis (2007)	Constância, Portugal	14th–19th c. AD	498	24	4.8
Brickley (2006)	St. Martin's, Birmingham, UK	18th–19th c. AD	5975	138	2.3
Garcia (2019)	Leiria, Portugal	12th–16th c. AD	1169	66	5.6
Matos (2009)	NMSMH, Lisbon, Portugal	19th–20th c. AD	4276	123	2.9
Roberts and Cox (2004)	Several locations, UK	Post-Medieval	2081	88	4.2
Present Study	University of Coimbra, Portugal	19th–20th c. AD	5656	38	0.7

RO: ribs observed; NF: the total number of rib fractures; %: percentage; NMSMH: National Museum of Science & Natural History of Lisbon.

higher prevalence of fractures in elderly individuals is the outcome of the accretion of fractures during lifetime, or the result of other phenomena, such as falls or underlying diseases. The longer an individual lives, the higher the probability of suffering bony lesions (Glencross and Sawchuck, 2003).

In the elderly, even low trauma injuries can result in multiple rib fractures. This can be explained, at a population level, by reduced bone mass, i.e., osteopenia and osteoporosis (Ismail et al., 2006; Wuermser et al., 2011; Prins et al., 2020). While the association between low bone mass density (BMD) and bone strength is not straightforward, low BMD values are related to increased fracture risk at a population level (Curate, 2014). Bone mineral density in the proximal femur seems to be related with rib fractures in the CISC sample only in women. However, the effect disappears in the logistic regression model. An association between rib fractures and lower cortical bone mass (measured in the second metacarpal), especially noticeable in women, was also observed in a smaller sample of the CISC (Curate and Cunha, 2009).Concurrently, 36.7% (6/16) CISC individuals affected by rib fractures also sustained fractures that are usually considered to be of osteoporotic nature, namely hip, Colles' and vertebral fractures.

Only three aged (ages-at-death between 70 and 79 years) male individuals presented fractures that were still in the process of healing at the time of death. In the study by Brickley (2006), most of the individuals with healing fractures were older males. Age is a critical determinant of mortality and morbidity caused by rib fractures (Sirmali et al., 2003; Peek et al., 2020; 2022). Also, these three individuals suffered multiple fractures; each one had sustained at least four rib fractures. The number of fractured ribs is directly related to the severity of the injury (Sirmali et al., 2003; Flagel et al., 2005; Freixinet et al., 2008; Witt and Bulger, 2017; Ingoe et al., 2020), with higher rates of pleural involvement, health complications, including flail chest and pneumonia, longer hospital length of stay, and mortality. The three individuals died from heart diseases (ICD-10: I00-I99) and not from complications directly related to rib fractures. This conveys an important concern: as the cause of death is largely indeterminable based entirely on skeletal evidence (Cunha and Pinheiro, 2005), it is important to be circumspect with interpretations about the health outcomes of rib fractures in paleopathological studies even when multiple, still healing, rib lesions with a life-threatening prognostic, and an "appropriate" demographic profile, are observed.

The ribs most commonly involved were those from the midsection of the thorax, from the fourth to the ninth, as in the study by Sirmali et al. (2003). In other epidemiological and anthropological studies the midsection ribs are usually the most frequently affected (Brickley, 2002; Kara et al., 2003; Matos, 2009). Ribs

from the upper region (but not the first rib) and the lower region (tenth to twelfth ribs) were also affected. Fractures of the upper ribs typically involve a severe physical trauma, being frequently associated with injuries to great vessels. Injury of the lower ribs may result in damage of the liver, diaphragm, spleen or the kidneys (Sirmali et al., 2003; Talbot et al., 2017).

Final remarks

Rib fractures are common in both archaeological and epidemiological contexts, usually encompassing modest to severe health outcomes (Brickley, 2006; Peek et al., 2022). Nonetheless, the paleopathological analyses of this particular type of bone injury have been uncommon, while epidemiologically relevant (Brickley, 2006; Curate and Cunha, 2009; Matos, 2009; Garcia, 2019). Results in the CISC sample broaden the knowledge about the prevalence of rib fractures in skeletal collections from the past, interspersing in a wider pattern of sample and individual heterogeneity. Assigned sex and age-at-death patterns of fracture are largely comparable to those that have been reported by previous studies, with males linked to an increase in the likelihood of presenting with at least one rib fracture, and a positive association of age with rib fractures. Low bone mineral density is also correlated with the presence of rib fractures — but only in females. Limitations of this study obviously incorporate the collecting biases of the CISC, in particular, and of any skeletal collection, in general (Albanese, 2003). Future analyses of rib fractures in archaeological contexts should aim toward a geographic and diachronic integration of data, grounded on detailed and multilayered descriptions of the fractures.

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Multi-species anthropology: brief theoretical perspectives from anthropocentrism to the acceptance of the non-human subjectivity

Antropologia multi-espécie: breves perspetivas teóricas do antropocentrismo à aceitação da subjetividade não humana

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Abstract The present article aims — albeit briefly — to reflect about the theoretical origins and development of multi-species anthropology. Our brief "journey" has its starting point in the paradigm of the human exceptionalism and the anthropocentric view of the relationship between human beings and the rest of the natural world. This gaze, having constituted the central paradigm of the origins of the anthropological discipline, is the result of profoundly western ways of looking at and interpreting the world and the diversity it contains. Traditional dualisms such as nature-culture are based on it, which justified the distinct treatment of the non-Western "other". In turn, the end of this paradigm emerged as the result of the modernity rise

Resumo O presente trabalho visa — ainda que de forma resumida — refletir sobre as origens teóricas e sobre o desenvolvimento da antropologia multiespécies. A nossa breve "viagem" tem como ponto de partida o paradigma do excecionalismo humano e o olhar antropocêntrico sobre a relação entre o ser humano e a restante natureza. Este olhar, tendo constituído o paradigma central das origens da disciplina antropológica, é o resultado de formas de olhar e interpretar o mundo e a diversidade nele contida, profundamente ocidentais. Nele assentam dualismos tradicionais como natureza-cultura que justificaram o tratamento distinto do "outro", não ocidental. Por sua vez, o fim deste paradigma surgiu como resultado da emergência de questões da

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up questions such as the mediatization of environmental issues. In this context, a new area of research emerged, the Human-Animal Studies (HAS), as coined by DeMello, despite other designations used by different research areas (e.g. anthrozoology). In this new area of investigation, relationships with other animals are seen as co-constructed, interdependent and relational, just like ecosystems themselves, and are inside a new line of thought: an Anthropology beyond humanity.

Keywords: Human exceptionalism paradigm; multi-species anthropology; post human anthropology.

modernidade, especificamente, a mediatização das questões ambientais. Neste contexto surgiu uma nova área de pesquisa, a Human--Animal Studies (HAS), assim cunhada por DeMello, não obstante outras designações utilizadas por diferentes áreas de pesquisa (ex. antrozoologia). Nesta nova área de investigação as relações com os outros animais são vistas como co-construídas, interdependentes e relacionais, assim como os próprios ecossistemas, e estão enquadradas numa nova linha de pensamento: a pós-humana.

Palavras-chave: Paradigma do excecionalismo humano; antropologia multiespécie; antropologia para além do humano.

1. The origins of anthropology and of human exceptionalism

Portugal was no exception to the trend observed in the rest of the world where the origin of Anthropology is confused with the so-called "Physical Anthropology". But that is not what we want to focus on, not even the great paradigm shift that took place in the 1950s in this subdiscipline of Anthropology and which gave rise to "Biological Anthropology". In this text, when we speak of Anthropology, we speak of what was called in Portugal, before the 25th of April, Ethnology and which corresponds to what we call today Cultural Anthropology (Pereira, 2021).

Anthropology has followed different paths between Cultural Anthropology in the USA with Lewis Henry Morgan (1818-1881), and later with Franz Boas (1858-1942) and his school of historical particularism, followed by countless disciples including Mead (1901-1978), Benedict (1887-1948), Kroeber (1876-1960) and many others. Moore (2009) argues that Boas was probably the author who most influenced North American Anthropology in the first half of the 20th century. Erikson and Murphy (2021) and Moore (2009) state that the well-known four fields of North American Anthropology are also — but not only — a partial reflection of Boas' broad interests and that did not accompany Anthropology in Europe, probably taking away the strength it could have had there, as a subject, as it is the case we see today in the USA.

The British School of Social Anthropology has its roots in the work of Tylor

(1832-1917) who was the first anthropology professor at Oxford University (Moore, 2009). But this School starts to reach a considerable projection with the structural-functionalism approach and with Radcliff-Brown (1881-1955). Radcliff-Brown students such as Evans-Pritchard (1902-1973), Fortes (1906-1983) or Gluckman (1911-1975) saw kinship, law and politicism as fundamental institutions of traditional societies (Eriksen,2004). It is unavoidable not to mention Malinovsky's (1884-1942) functionalism in the British School of Social Anthropology. However, Erikson and Murphy (2021) argue that bridges were established between North American and British Schools. For example, Evans-Pritchard built a connection with American anthropologists by recognizing the importance of the historical perspective.

The French School of Anthropology was deeply marked first by Durkheim (1858-1917) and Mauss (1872-1950), both sociologists — and later by Claude Lévi-Strauss (1908-2009) and the structuralism. This anthropologist argued that logic, being universal, was based on dualities of binary oppositions (probably influenced by the structural linguists of the Prague School) such as life after death or the opposition nature vs. culture.

Until now we have focused our attention on the existence of an institutionalized and professionalized anthropology, however the rational project that gave rise to the birth of modern anthropology is much newer and constitutes the materialization of a series of typically Western representations about the human condition and that since its origin had important consequences in the shaping process of anthropology as a scientific discipline (Kuhn, 1962).We refer specifically to a rational project, which translated into forms of control, domination, exclusion, appropriation, marginalization, not only of the "others" considered by the West as "barbarous and savage" and therefore undesirable, and which by opposition allowed and justified the vision of the West itself as "cultured" and "civilized" and therefore desirable and necessary, but the construction of a hierarchy based on prejudices of race, gender, species, considering the human being, for more signs, white, masculine and western as the pinnacle of the mentioned hierarchy.

Thus, the nomenclatures based on Western dichotomous thinking: nature-culture, male-female, wild-civilized, human-animal, are not just neutral forms of the Western worldview. Knowledge is never naive and much less aseptic or pure. Every form of representation of the world, in addition to naming and creating identities, translates into forms of relationship, of appropriation, in general in general strategies of intervention in reality (Hacking, 1983).

All the aforementioned dichotomies carried in their seed the germ of forms of relationship, domination, control, marginalization, all of them consistent with the process of colonialist expansion.

With several centuries of existence, the costs that we as a species are pay-

ing today in terms of inequality, hunger, ecological deterioration, climate change, forced migration, are enormous. The greatest problems that we as humanity live today are a consequence of that project that began around the 17th and 18th centuries and of which institutionalized anthropology is only one of its manifestations, together with a scientific-technological development without ethics and without conscience.

Returning to the origins of the discipline, in the middle of the 20th century, Anthropology (both "physical" and "cultural") appear undoubtedly linked to colonialism, often in an implied way (Pereira, 2021). Portugal was also no exception to this rule (Pereira, 2021). Here we speak of colonialism because of the question of alterity, the opposition between the "I" and the "other", the dualisms that were established at the time between the so-called "savages" and "civilized", that were also transported to humans and non humans. The "savages" needed to be tamed, ripped off their animality (to assume an identity similar to that of the Westerners) to be able to be "we" and not "them" (their own identity) as before that. In this way they were considered closer to animality than to humanity, embodied by the West. They were closer to animals than human beings (Vera, 2014). Due to the very nature and origin of the discipline, alterity was and is a central mark allowing anthropologists to understand the "other" (Casanova, 2016). And this is also why contemporary Anthropology is, in many countries, and this needs to be said, at the forefront of though decolonization and at the forefront of the minority groups defense.

The growth of Anthropology accompanied not only the colonial expansion but also a long period of industrial scientific and technological expansion in Europe and the USA that gave strength to the Human Exceptionalism Paradigm (HEP) and which, according to Descola and Palsson (1996) had its roots in the Renaissance and was marked out by authors such as René Descartes. In the line of thought by Descola and Palsson (1996) in Anthropology, the HEP is intrinsically linked to alterity and the comparison between the "I" and the "other" (Casanova, 2016). Colonial ideology argued that the "other" was a "savage" that needed to be civilized, and the "I", the Europeans, had thus a civilizing mission. Thus, anthropology was itself an instrument of a Western civilizing project that, as a condition of existence and functioning, should protect relationships with others and with nature. This difference allowed for the unequal treatment of the "other" by the colonizing powers, enslaving and exploiting them. The "other" still belong to a category inside "nature" (considered very proximal to other animals) and needed to be tamed and civilized (Vera, 2014). Now, duality and otherness are deeply linked to the very development of Anthropology based on the opposition nature vs. culture that began with the famous opposition "nurture" — "nature" (Casanova, 2016). We can argue that the nature-culture dichotomy

is one of the fundamental touchstones of the Western worldview and the foundation of anthropological thought, at least in its origin as a scientific discipline.

Anthropology, as a science, was born in the so-called "Western world" — to use the expression by Descola and Palsson (1996), such as most other sciences. Therefore, the Anthropology frame of reference reflects that: its place of origin and respective historical, political and philosophical contexts (reflects the worldview with which the West has looked at the world),among others.

Also, as a reaction to the positivist explosion and the reinforcing of the HEP, Anthropology (and other social sciences) ended up falling into what many named of "cultural imperialism", a reductionist approach that wanted to reply to the geographical and biological reductionisms. This reductionism was responsible for placing a blindfold [to use the famous expression of Catton and Dunlap (1978)] that prevented these sciences from following up in due course many problems of modernity, such as environmental issues from the social and cultural point of view: climate change, mass extinction, biodiversity destruction, environmental justice, animal rights, environmental racism and neocolonialism, traditional and ecological knowledge, amongst many other themes.This reductionism was, of course, also the consequence of the reductionist exercise of Western science.

The HEP was strengthened with technological and scientific advances and was as well a reaction to positivism (Catton and Dunlap,1978).This defense of unrealistic and scientifically outdated assumptions was also fueled by and exaggerated optimism that emerged with the post war period and which included the following principles (see Schmidt (1999) also for these HEP principles in the case of Sociology):

i) Humans were the only beings who had culture (although Jane Goodall prove this to be wrong in the 60's with chimpanzees): they were the only ones with accumulated cultural heritage distinct from the genetic heritage of animal species, so there was no biological continuum between humans and the rest of the animal kingdom: in fact humans do not even see themselves as animals (see Edmund Leache's studies on the views of animals in cultures living under the influence of the Jewish-Christian paradigm that, although dated, are still accepted amongst many scholars as valid in the present). Here we call attention upon the so-called Natural Scale of Beings, a graphic representation of the place assigned to biological diversity, that placed the human being at the top of the hierarchy. The implications of such a graphic representation that emerged during the 17th century, popularly maintain a disturbing validity (Lovejoy, 1936);

ii) Only social and cultural factors determined human actions (environmental issues were not even considered by some anthropologists and other social scientists)". Culture was infinitely diverse

and changed much more rapidly than biological traits;

iii) Human differences were a product of social and disadvantageous aspects that could be eliminated, that is, social and cultural environments were those that matter for the human actions and the environment and other species were of little relevance to human beings. The other species were only relevant if they had an instrumental value for the "chosen" species, the human one;

iv) Cultural accumulation would lead to limitless technological and social progress that would solve all social problems.

The HEP is therefore based not only in an anthropocentric but also in an ethnocentric view of the world, which projected nature and culture as separate spheres. This view is common but in the "western world" (Descola and Palsson, 1996). The anthropocentric view of the relationship between human beings and the rest of nature is right in a central paradigm of the origins of anthropology and was the result of a profoundly Western way of looking at and interpreting the world and the diversity it contained (Descola and Palsson, 1996). The prejudice of anthropocentrism has its roots in the hegemonic vision of HEP that was extrapolated to all societies.

The human superiority towards other all beings (Kortenkamp and Moore, 2001) is a clear speciesist prejudice (Casanova, 2016). In anthropocentric narratives, there are numerous efforts to show the special place occupied by human beings amongst all other beings of the planet and understand its exceptional statues in almost all contexts (Calarco, 2013), mainly in societies that live under the Christian-Judaic Paradigm (Casanova, 2016).

The cultural and scientific *milieux* where Anthropology was born created human beings to the image of God (Casanova, 2016) and the representations of this God usually have human features but also mostly a white skin colour, a masculine gender (and sometimes even blue eyes and blond hair). The Paradigm of Anthropology beyond humans is supposed to be free of a colonialism, male, racist and speciesist approaches, hence the importance of the search for new positions or theoretical frameworks in contemporary anthropology (e.g., post-human anthropology, amongst other).

2. The emergence of a new paradigm or searching for new alternatives: an anthropology beyond humans

With the emergence of environmental problems in the 60s of the last centuries in the USA and also in Europe (e.g., Germany), a state of distrust and concern was established and reached the HEP, especially with regard to the independence of the human species from the planet ecological laws, and the importance of social and cultural contexts alone. The HEP and many of the sciences based on it were also crumbling with the discoveries of other sciences ranging from

Primatology to the studies of Ethology and Cognitive Ethology, Neurobiology and Neurophysiology, also from the last century. *The Cambridge Declaration on Consciousness in Nonhumans*, back in 2012, only confirmed what these scientific fields had already been demonstrating since the 1960s. Paradoxically, some evidence emerged in the field of traditional anthropology, which showed that the "others" did not share the dichotomous thought of the West, with which the supposed universality of the nature-culture dichotomy was questioned (Descola and Palsson, 1996).

From the societal point of view, this paradigm shift was clear with civil society's focus of interests targeting environmental issues ranging from the fight against the dangers of the nuclear energy to the protection of endangered species (Schmidt, 1999), fighting for animal welfare and animal rights, social movement against animal experiments and other non-humans who shared human daily-lives: from livestock farms to companion animals, to laboratory animals.

Simultaneously, and from other approaches and other geographies linked to what has been called the "Global South", various criticisms emerged articulated in the so-called "Decolonial Perspective". A critique of traditional Western epistemologies based on colonial expansion is proposed from Latin America through various authors such as Aníbal Quijano in Peru, Enrique Dussel in Mexico or Walter Mignolo in Argentina articulated in the Modernity/Coloniality Group. From this position, alternatives to the coloniality of power, to the processes of domination and liberation, and to alternatives to the condition of subalternity are criticized and sought. All of them of importance for the issue at hand and specifically for the HEP: for traditional epistemologies subordinating some human beings to the condition of animality and nature, to a project of economic and political expansion based on domination, exploitation and control.

As Sociology, Anthropology was drawn into these issues through ethnography and field studies. There was, in fact, a time when it was common amongst the social sciences to neglect the dependence of ecosystems on the part of human communities and to neglect the laws of other sciences: such was the case of the Entropy Theory of the Law of Energy Conservation, as if the human condition was not affected by laws other than the social ones (Schmidt, 1999).

The end — due to the maladjustment and limitations — of the HEP gave rise to a more inclusive and ecocentric Anthropology, the post-human paradigm: an anthropology beyond humanity (e.g.,Kohn, 2013). The post-human paradigm began to incorporate data from other sciences, and which also reflected the concerns of civil society, organized in social movements, NGO's, etc. But this did not happen without tensions (Haraway, 2013; Casanova, 2016). In fact, for some anthropologists the anthropocentric

prejudice was (and is) so strong that everything that as to do with nonhumans as agents/social actors (that cannot have agency) is not Anthropology. In in some cases, due to profound ignorance, multispecies anthropology it confounded with Biological Anthropology due to the fact that this subdiscipline of Anthropology includes knowledge from primate behavior, evolution, conservation or just simply the presence of nonhumans. As we were saying, when prejudices are strong, even after well-established positioning (such as the beyond human paradigm), tensions and paradoxes continue to emerge (Haraway, 2013; Casanova, 2016). It would be ridiculous to consider that Geertz (1973), when conducting his field studies in Bali, just because he wrote on the importance of cook-fighting (and its meaning), was doing Biological Anthropology. Or when the already mentioned Lewis Henry Morgan wrote *The American Beaver and His Works* (1868) was doing Biological Anthropology. In this work, Morgan designs similarities between basic engineering works between humans and beavers (Dapra and Casanova, 2020).Another example is Roy Rapaport and the pigs that were used in rituals for the ancestors in New Guinea (1969) as being seen,ridiculously, a biological anthropologist.

These anthropologists are considered by some as the Multispecies ethnography founders (Kirksey and Helmreich, 2010). But more recent works are considered for the foundation of the new positioning, beyond human another anthropologist: that is the case of Lévi-Strauss (1966) who analyse the totemic powers and social orders attributed to different types of plants.

Regarding Multispecies Anthropology, Locke (2018) is very clear: this approach corresponds to another more than human view within cultural anthropology where it is shown that we cannot totally understand humanity if we isolated ourselves from the rest of the animals and ecosystems where we live.

On the other hand, Edmund Leach (1964) in a predecessor work on ethnobotany and ethnozoology, analyzed nonhumans and plants as "repositories" of totemic power, even structural order, as it was the case of Lévy-Strauss (Dapra and Casanova, 2020). Evans-Pritchard (1996 [1940]) saw the central importance of cattle for the Nuer people.

Although less common, such tensions still arise. This is not surprising considered the already mentioned colonialist and ethnocentric past of our science: there was always the anthropological "exotization" of the nonhumans in the so-called "Western cultures" which implied the construction of dubious boundaries between humans and nonhumans as if humans were not animals (Casanova, 2016; Dapra and Casanova, 2020). This anthropological "exotization" of the "other" can still be seen. In fact, archaeologists (Ingold, 1994) have already shown that the dichotomies and boundaries between humans and nonhumans are far from clear-cut. That is why

today some anthropologists argue that nonhumans are the ultimate "others" of anthropology (Casanova, 2016).

The end of the HEP allowed for multiple changes and for the emergences of new study fields where *HAS* and multispecies anthropology have new places (Ogden et al., 2013). The mentality that accompanied the end of the HEP indeed change allowing for the emergence of *HAS* (Casanova, 2016) and with that knowledge, other sciences were incorporated in Anthropology and other social sciences: animal agency, sociability, culture in nonhumans, amongst many other previous taboos (Desprest, 2008; Casanova, 2016; Dapra and Casanova, 2020). This new positionings constituted by premises that, while not denying the importance of human beings, places them in a particular space within an ecological context, defined by its relationships and interactions, where its role, but also that of the species that surround it, is active in defining the entire system. Niche construction theory emphasizes the agency and feedback of components that make up the human environment, but also that of any other species, occupying ecosystems shaped, but that also influence and shape human societies in a process of co-influence and co-construction. Human beings are seen in a specific historical, political, and economic context: the Capitalocene. Human life and its activities are now framed in ecological laws. In this text we adopted the term Capitalocene [first coined by Haraway and latter followed by Moore (1996)] because we argue that the term Anthropocene (Crutzen, 2002) — as it is used now — is less appropriated from the anthropological point of view: in fact, we cannot consider the Yanomani or the Runa from Amazonia or the Maasai from Kenya equally responsible for the state of the planet such as States like China, USA, Germany, just to mention a few. Also, when using the Malthusian term Anthropocene, history is the first victim (such as colonialism, imperialism, and racism). Not all human communities and societies along the history of humanity (or even today) had the same impact on the disastrous state of our planet as the current hegemonic social and political system: this is the era of capitalism, or Capitalocene (Moore, 2016).

We recognize that the choice of the term Capitalocene is not naïve: it is because the term Anthropocene masks an at least debatable position that affirms the Hobbesian aphorism that "man is the wolf of man". For it is not the human condition *per se* or the sole activity of any human society in any time or space that is responsible for the current economic, political, and ecological crisis, but rather a specific project of economic development based on exploitation, control and domination of alterity (human or animal) as the capitalist project supposes, with a temporality and a specific historical context. Thus, for example, we see climate change not as having anthropogenic reasons but capitalogenic ones.

The scientific discoveries coming from the mid last century (ethology, primatology, archaeology, neurology, amongst many other) allowed for a less anthropocentric and ethnocentric view of anthropologists regarding other animals and nature (where we are included). Human beings cannot be seen as not making part of a global system. This global system acts in an interdependent way just like what happens in an ecosystem. Human beings are involved in an entanglement relationship with the rest of the animals also having a boomerang effect as they are part of nature too. Just like the consequences of a beaver that builds a dam, human actions have innumerous consequences in our planet when we change (or destroy) ecosystems. We depend on the planet that has biophysical limitations and these, provoke strong physical and biological restrictions and constraints on human actions. Despite the conquests of humanity (although inequality is rising, racism is still a major problem, neocolonialism seems to be here to stay, amongst so many other problems), we cannot keep ignoring ecological laws.

With this new positioning and this new kind of thoughts, Anthropology (and other social sciences) began to leave its cultural imperialism and began to address the concerns of the communities they themselves study.

Multispecies Anthropology, just like Environmental Anthropology, are areas that emerge from these "new" thoughts in the middle of the last century (60's). In the case of Multispecies Anthropology, this new subdiscipline of Anthropology appears in this context that encompasses a wider field that is the so-called *Human-Animal Studies* (HAS), coined by anthropologist Margot DeMello (2012).

There are other names that are similar and that sometimes even partially overlap *HAS*, as it is the case of "Anthrozoology" (mainly used by colleagues working from the veterinary medicine research area) or the case of "Animals and Society" (mainly used by our colleagues from Sociology). But *Human-Animal Studies* (*HAS*/ Multispecies Anthropology, but not only) is the designation coined by the field of Cultural Anthropology.

This disciplinary area is not theoretically linked to subfields of Biological Anthropology such as primatology or ethno-primatology. *Human-Animal Studies* (*HAS*) have been always anchored in a social and cultural perspective (DeMello, 2012). This explains why the first thematic files dedicated to the *HAS* were named "multispecies ethnography" and were published in journals such as *Cultural Anthropology*. According to this new position where anthropology adventures itself beyond humans, the other animals are seen in their relationships with us, relationships that are co-constructed, interdependent and relational. The same can be applied to the relationship between human beings and other elements of an ecosystems. *HAS* and Multispecies Anthropology did benefit from the

knowledge of primatology, ethnoprimatology and other ethnosciences, psychology, physiology and neurophysiology but they are anchored in Cultural and not Biological Anthropology.

Multispecies Anthropology (Fijn and Kavesh, 2020; Kavesh, 2022) implies ethnographic research (e.g., focused on beings/social actors with agency) but also quantitative research. The relationships between several organisms (plants, humans, and nonhumans) with particular emphasis to the humans that emerge from these relationships have been widely studied (Ogden et al., 2013). What started has multispecies ethnography (e.g., Kirksey and Helmreich, 2010) has now a theoretical corpus of several research decades and it has been coined by many as Multispecies Anthropology (e.g., Fijn and Kavesh, 2020; Kavesh, 2022) with publications specifically dedicated to methodology (e.g., Swanson, 2017) or the combination of different methodologies (Remis and Robinson, 2020). This represents a major epistemological shift within the social and humane sciences (Dapra and Casanova, 2020). Theoretically such works have contributed to reconceptualize what it means to be is human (Ogden et al., 2013). The return of nonhumans to social sciences (e.g., Desprest, 2008) took back anthropologists and other social sciences to classical ethnography (Smart, 2014). If nonhumans are seen as active agents, active beings, and actors, then the Latour definition (2008) to everything that makes a difference in the fields of interaction is essential — and it will be necessary to admit that what human being does not understand, has impact on them (Dapra and Casanova, 2020).

3. Agency and nonhuman subjectivity

The most conservative scientific views stated that the absence of language confined the remaining animals to behaviour that were only genetically inscribed and that were limited to being performed following a previously determinate order. Howell (2019) recalls that in the traditional Descartesian view, it is the human ability to reason that separated us from other animals (and it relegates the latter to a level of programmed automata). Nonhumans as beings without agency were an inescapable dogma. This reality served the purposes of Anthropology until quite recently. After all, as we have seen here, this science has anthropocentric roots (speciesists) and was built on the platform of anthropocentric language. We dictated a world seen from an exclusively human perspective, leading to the representation of metaphorical, allegorical, or symbolic animals to explore anthropocentric themes. In fact, Ingold (1994) pointed out that anthropology always looked to emphasize specifically human attribution of symbolic imagination and its products, drawing a contract with the apparent deficiencies of the nonhumans, and this characterization was quite negative and was being reinforced over time,

given more strength to the HEP.

The basis of all marginalization, ethnicity, gender, sexuality, speciesism (anthropocentrism), among other variables, originates from an exclusive normative subjectivity that endorses a universal definition of the subject that occupied the center. In fact, it was the exclusion and subordination of "other" humans and "other" "animals" that made the oppression and domination of the "others" morally permissible and ethically possible. The human, as a being of intellectual and rational superiority, could torture and subjugate other animals without any moral repercussions. And, as every practice requires discourses that justify it, anthropology found in the supposed human intellectual superiority, the justification of the domain of what is considered not only non-human, but inferior, and all this without assuming any responsibility of an ethical nature.

As Chakraborty (2021) states, the ride of post-humanism came to question this position of the human being at the center of the universe and seeks to dethrone *Homo sapiens sapiens* from any particular privileged position in relation to questions of meaning, information and cognition (Dupré, 1996).

Animal agency can also be seen through the need all animals have to interact with their environment in order to survive and reproduce. In this case, agency is a central adaptive feature of animal life (Špinka, 2019). In this line of thought, Špinka (2019) proposes four levels of agency:

i) Passive/Reactive agency (a non-human can be behaviorally passive or purely active);
ii) Action-oriented agency (an animal that behaviorally pursues current desirable outcomes);
iii) Skills building agency (an animal that engages with the environment to obtain skills and information for future use) and
iv) Aspirational agency (the animal achieves long-term goals through individual autobiographical planning and reflection).

Recent advances in affective neurobiology show that, at least in mammals, each level of agency is underpinned by a different type of affective functioning. Specific levels of agency can be linked to different degrees of consciousness as defined by recent theories of individuality.

Anthropology beyond humans looks at the other animals from the point of view of content, theme, and object of knowledge (the "animal" studied by animal studies) but also from the point of view of a theoretical and methodological approach (how "animal studies" study "the animal"). Authors such as Derriba and Baudrillard argue (*in* Cadman, 2016), for example in fiction, that the act of representing animals leads to the end of animal subjectivity as we speak of an existence that refuses to be conceptualized (Cadman, 2016). How then should anthropologists speak for other animals? (DiNovelli-Lang, 2013). As Ittner (2006) says, when we think of an animal, we build this animal

in our consciousness, and this is reflected around and our own existence. Our representations of other animals are based on an analogous connection between humans and them. This line of thought that emerged emphasizes the false discontinuity between humans and other beings (Spannring, 2019; Calarco, 2020; Dapra and Casanova, 2020).

In fact, it is important not to forget that throughout the evolutionary processes of both humans and nonhumans, human agency was important during the domestication process but the same can also be said about nonhuman agency. So, it is not acceptable anymore to argue that only humans have agency (Edmund, 2011). We are far from the days where nonhumans were just seen as "lumbering robots" (Dawkins, 1976).

Amongst the most brilliant works on agency and nonhuman subjectivity, the studies by Hoffmanet al.(2018) on agency in rhesus macaques (*Macaca mulatta*) or the works by Irene Pepperberg (1995; 1996; 2002) with gray parrots from Gabon stand out. Pepperberg explores the relationships between three individuals: Alex, Kyaro and Alo and the emergence of subjectivities between the different individuals around the classifications of food, colors, shapes, and other variables.

I this new line of thought, in an Anthropology beyond humans, humans along with other animals are seen as belonging to multiple ecologies that are in constant flux and mutation over the centuries, where non-human animals have gone from creatures seem as totally disconnected and distinct from human beings to instigators of our own political, ethical, and ontological reflections (Kirksey and Helmreich, 2010).

Humans and nonhumans inhabit the sameworld sharing sensory perceptions. There is an ontological proximity between all livingbeings, and this is a fundamental starting point to see the similarity between different species and therefore the foundation of connection and communication.

In fact, in this new paradigm, there are more *avant-garde* authors such as Herman (2018) or Kooij (2020) who even claim that it is irrelevant that this interaction (between humans and nonhumans) means the same for both species, since the driving force for current post-humanistic thinking about interconnectivity among all animals (humans included) is the shift from the rational thinking to accepting bodily perception and experience as a valid starting point for the production of knowledge. The human measure is thus no longer an accepted standard for checking the state of mind of a nonhuman (Herman, 2018; Glock, 2019;Kooij, 2020). This positioning supposes leaving behind the old aphorism that argues that the human being is the measure of all things and that the nonhuman is signified and makes sense based on the human scale, even more so in the context of traditional epistemologies, they constructed a notion of restricted, hierarchical, and exclusive humanity.

In conclusion, and in line with the *Cambridge Declaration* (Low et al., 2012), nonhumans are conscious beings who form their own perception of the worlds of life in which they exist and according to which they act in relation to their species and other species. This profound transformation in social research gave rise to individuals who were previously seen as passive or subjugated objects and how they became active subjects: Velden's (2017) work on dogs (*Canis lupus familiaris*) as fundamental actors decisive in the encounters between the Puruborá and the Karitiana in the state of Rondônia before and after the arrival of the Europeans is just one example if this investigation.

Regarding the role of dogs as agents and actors, it is also important to mention the study by Kohn (2013) in Amazonia (Brazil) where lives of dogs and people mixed together via the dogs' dreams that are inseparable of the Runa ethnic group.

Conclusions

The path walked from the beginning of Anthropology until today is complex and full of contradictions that are the result of different paradigms and schools of thought, and the evolution of science itself within specific historical, philosophical, political, and other context that revolutionized the way science evolved (Kuhn, 1962). In that sense, Anthropology is like other sciences (Kuhn, 1962). A long way has come up from a subject that had its foundation in alterity (that was provided by colonialism itself) to the *avant-gard* position occupied today by many anthropologies, that are at the forefront of the defence of minority groups, or the anthropologists that recognize agency and subjectivity in other animals.

The Anthropology beyond humans tries to be free of prejudice (but we argue that all people, even anthropologists have a specific world view, with particular prejudices), free of racism, colonialism and neocolonialism, and free of gender biased approaches harbouring more ecocentric views of shared and co-build ecosystems and where ethical concerned and inequalities between people (and other nonhuman species) have to be overturned. Environmental racism and environmental justice and the responsibilities by the "Global North" must be assumed.

This new line of thought owes a lot, initially, to the feminist and radical studies, which were followed by twists that brought out nonhuman agency and its subjectivity.

In human-other animal relationships, despite the power imbalance, animals are not mere objects but agents. They shape our material world and our encounters and influence our way of thinking about the world and about ourselves.

Human life in modernity — particularly in the "Global North" — has been and is shaped by sentience, autonomy, and physicality of various kinds (Räsänen and Syrjämaa, 2017). Given the advances in the scientific areas mentioned along this work, these issues are no longer contro-

versial for many anthropologists. But, of course, despite the advances in the scientific areas mentioned throughout this work, some issues may still be controversial for some anthropologists. However, returning to the idea that the forms of representation of the world are translated into forms of intervention in it, the possibilities offered by these new perspectives of relationships, more egalitarian and fair between human beings and the rest of the nature, are worth the attempt to reformulate the principles with which anthropology was founded, which, many years after its origin, seeks alternatives that give viability to the anthropological project, but also to the future of the beings that populate this planet.

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Dating death: *post mortem* interval estimation of human skeletal remains

Datando a morte: estimativa do intervalo *post mortem* de restos humanos esqueletizados

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Abstract Estimation of *post mortem* interval (PMI), particularly the late time since death, is crucial when dealing with human remains. Its establishment is an important task for forensic scientists since it has important legal implications such as identifying a decedent or prosecuting an offender. However, estimating time of death is a very complex and challenging task due to the amount of intrinsic and extrinsic factors influencing the rate and nature of body decomposition. Several methods have been used to estimate PMI, including decomposition, entomological, botanical, or, more recently, physics and biochemical methods. This paper reviews current forensic methods, focusing especially on forensic anthropological techniques for date of death

Resumo A estimativa do intervalo *post mortem* representa uma tarefa crucial quando lidamos com restos humanos, particularmente quando falamos de restos humanos esqueletizados ou em decomposição avançada. A sua estimativa constitui um trabalho importante para os cientistas forenses, já que dela advêm importantes implicações a nível legal, como a identificação ou a condenação de criminosos. Porém, datar a morte tem-se revelado uma tarefa muito complexa, pela quantidade de fatores intrínsecos e extrínsecos que podem influenciar a decomposição cadavérica. Variados métodos têm sido usados numa tentativa de estimar o intervalo *post mortem*, desde métodos clássicos baseados nos estados de decomposição a métodos entomológicos ou botânicos, e mais

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purposes. The literature is insufficient showing lack of methods to achieve an accurate and reliable PMI, meaning further investigation is required. A holistic approach, where every element is considered, is key to achieving a reliable PMI estimation.

Keywords: *Post mortem* interval; time since death; skeletonized remains; forensic anthropology; forensic taphonomy.

recentemente métodos físicos e bioquímicos. Este artigo pretende apresentar uma revisão dos métodos forenses usados para estimar o tempo decorrido desde a morte, com especial foco nas técnicas empregues em antropologia forense. Contudo, reforçamos que a literatura existente é até à data insuficiente, denotando a falta de métodos capazes de alcançar uma estimativa precisa do tempo decorrido desde a morte, sendo necessários estudos mais aprofundados nesta temática. Só uma abordagem holística, em que todos os elementos sejam considerados, poderá ser a chave para uma estimativa precisa do intervalo *post mortem*.

Palavras-chave: Intervalo *post mortem*; tempo decorrido desde a morte; restos humanos esqueletizados; antropologia forense; tafonomia forense.

1. *Post mortem* interval

Estimation of *post mortem* interval (PMI) corresponds to the time interval since death until the body is found. It imposes a challenge for forensic anthropologists, since it aims to answer one of the questions when a human body is found, "When did it happen?". An accurate estimation of time since death may prevent impunity of criminals and may determine whether or not a crime has prescribed. It may contribute to narrowing down the list of missing people and, therefore may contribute to identification.

Over the last decades, there has been an increase in the number of studies aimed at finding appropriate and accurate methods for time since death estimation. However, the attempt to establish a PMI in human remains with an advanced state of decomposition is still a challenge. Only a combination of different methods, taking into consideration the influence of intrinsic and extrinsic factors, can result in a more accurate estimation of PMI. It is also important to keep in mind that the longer the time since death, the harder it is to estimate PMI.

In a forensic context, PMI estimation begins with the macroscopic analysis of

human remains, due to the appearance of *post mortem* phenomena when the vital functions cease. According to Di Maio and Molina (2021), several phenomena can contribute to time elapsed since death estimation, for example, *livor*, *rigor* and *algor mortis*, digestion of stomach contents, and potassium content in the vitreous humor or in synovial fluid, on the fresh cadaver (Henssge and Madea, 2004; 2007; Madea, 2005; Madea et al., 2019; DiMaio and Molina, 2021). After the initial period, other changes can take place and aid the estimation of the time since death, such as circumstantial factors, the body´s degree of decomposition, entomological activity, or chemical and immunological changes. These factors are more variable, since these are influenced by intrinsic factors, such as cause-of-death, sex, age of the individual, lifestyle, pathological changes, percent body fat/body mass index. Extrinsic factors such as the presence or absence of clothes, indoor or outdoor decomposition, type of soil, depth of burial, pH, fauna and flora, temperature, oxygen partial pressure, sunlight or humidity are also influential in the rate of decomposition (Buchan and Anderson, 2001; Vass, 2011; Wilson-Taylor, 2012).

This work intends to describe the state of the art of different approaches to PMI estimation of human skeletal remains or bodies in advanced state of decomposition.

2. PMI assessment during recovery of human remains (stratigraphy and circumstantial factors)

For PMI analysis, a holistic and interdisciplinary analysis must start at the scene. The presence of circumstantial factors, such as letters, newspapers, notes, or receipts, testimonies of friends, family or neighbour's about the last time they have seen the decedent, or day-to-day routines constitute an unscientific but effective method of date of death estimation. Food leftovers, dirty dishes, and its state of decomposition, can also be taken into consideration. The analysis of clothes, through the identification of brands or models and their date of manufacture, or even through their degree of degradation, can also be relevant to establish date of death intervals (Buchan and Anderson, 2001; Wilson-Taylor, 2012; Ciaffi et al., 2018; Di Maio and Molina, 2021) and have been paramount in many routine forensic cases.

In the event that human remains are buried, during their exhumation it is essential to keep the stratigraphic record, which will help to estimate the time elapsed since death. The stratigraphic method, widely used in Archaeology as a relative dating method to date sites and finds, is based on a series of principles, such as superposition (in a succession of strata, the lower ones are older and the upper ones more recent) and inclusion (the layer that includes the inclusion is newer) (Paskeyand Cisneros, 2020).

3. Body decomposition

After death, body composition and structure undergo significant changes, resulting from a complex succession of biochemical processes. The human body decomposition is dictated by destructive processes: autolysis and putrefaction. These two processes lead to cellular death, and leach enzymes, bacteria, and other microorganisms to feed on the unprotected body (Knight, 1996; Wilson-Taylor, 2012).

Autolysis results from the collapse of tissues through an aseptic chemical process, caused by intracellular enzymes, culminating in self-digestion. As a chemical process, it is accelerated by heat and delayed by cold (Clark et al., 1997; Iqbal et al., 2020).

Putrefaction rapidly follows, being closely related to temperature, humidity, and to the physical state of the body (Vass et al., 2002; Hayman and Oxenham, 2016). Putrefaction is often wrongly used as synonymous of decomposition, since it is the one that manifests itself in most cases. It results from the bacterial expansion from the gastrointestinal flora throughout the body, which causes disintegration of the molecules through oxidation and reduction reactions. It is accelerated in septicaemic individuals before death (Pinheiro, 2006).

Skeletonization occurs as soft tissues disappear through putrefactive processes. Over time, the bones and teeth themselves are also degraded, providing information about PMI, for example through the presence or absence of ligaments and the leaching rates of fats and other organic matter (Introna et al., 1999).

Occasionally, the body can undergo conservative processes, caused essentially by environmental conditions or the cadaver physical state, leading to a delay in the decomposition process and resulting in mummification, adipocere or freezing. The evaluation of these modifications can work as an auxiliary method in determining the time elapsed since death, since they tend to happen in an orderly manner (Pinheiro, 2006).

Mummification typically occurs in hot dry environments, even though it can also happen in cold regions with arid conditions (Clark et al., 1997). It refers to the process of desiccation of the soft tissues, causing significant loss of body weight. The skin becomes leathery and hard (Byard, 2020). Mummification frequently takes some time to develop, however it can differ according to influencing factors.

On the other hand, the formation of adipocere, also known as corpse wax, usually occurs in cold wet conditions, when adipose tissues decompose, by the hydrolysis of triglycerides into glycerine and fatty acids (Byard, 2016). It is a soft greyish white waxy consistence substance that becomes an armour-like solid and resistant mass over time, as the fatty acids crystallize (Fiedler and Graw, 2003). Females and obese individuals are more prone to develop adipocere due to its different fat distribution and higher fat content (Dix and Graham, 1999). It takes months or

years to occur, although it is occasionally possible to develop within days, emphasizing again the variability that characterizes biological processes (Byard, 2017).

As mentioned before, the action of various extrinsic and intrinsic factors can heavily influence the decomposition process, creating "microenvironments" that lead some bodies to reveal different states of preservation at the same time (e.g. skeletonization of the head, mummification of the limbs, and adipocere in the trunk). These alterations affect the PMI estimation, due to the many possible interconnections between states.

3.1. Stages of decomposition

The decomposition process can be divided into different stages, which vary according to the authors. For example: fresh, bloated, active decay, advanced decay, and dry to skeletonization (Iqbal et al., 2020).

There are successive studies based on cadaveric decomposition. A carrion study of a baby pig was conducted by Payne (1965) recognizing six stages of decomposition for carrion exposed to arthropods and five stages of decomposition for carrion protected from arthropods. Behrensmeyer (1978) described the weathering processes on mammals' bones in Kenya and produced a timetable of weathering, based on her descriptions. Rodriguez and Bass (1983, 1985) stood out for their investigation with human cadavers, and Mann et al. (1990) conducted studies on the impact of carrion insect activity, carnivores, clothing, temperature, rainfall, body weight, trauma, burial depth and body contact surfaces on bodily decay.

Galloway and colleagues (1989) and Galloway (1997) proposed an original method developed on bodies found in the desert, mountains or indoors, providing guidelines to date death based on average decay rates indoor or in open environments. In this regard, five stages were considered within decomposition (fresh, early decomposition, advanced decomposition, skeletonized and decomposition of the skeletonized remains) and, for the first time, descriptive subcategories were listed within each stage (Hayman and Oxenham, 2016).

Fitzgerald and Oxenham (2009) developed a degree of decomposition index (DDI) based on quantifying stages of decomposition. It takes changes in the decomposition process over time into account, assuming that climate variations are already incorporated into the equation (Marhoff et al., 2016).

Janjua and Rogers (2008) and Ross and Cunningham (2011) focused their studies on estimating the PMI using skeletal human remains, an area with fewer studies and more difficulties. They have established, respectively, four and five stages of bone degradation, with different conditions.

Yet, dating time since death through stages of decomposition methods is not suitable for general application, since some decomposition conditions are spe-

cific to geographic regions where those studies were conducted. Thus, specific taphonomic data is required to accurately correlate PMI and decomposition (Marhoff et al., 2016).

3.2. The accumulated degree days

Megyesi et al. (2005) published a fundamental study where decomposition was quantified by stages, for the first time, using a scoring system based on Galloway et al. (1989) and on a total body score (TBS), where decomposition was divided into four stages (fresh, early decomposition, advanced decomposition, and skeletonization). The degree of decomposition was scored for different anatomical regions, such as the head and neck, trunk, and limbs. The scores for each region were summed to achieve TBS. For this method, a regression equation was calculated to predict accumulated degree days (ADD) from the TBS (Megyesi et al., 2005). The average daily temperatures of the place where the body was found is crucial for this method (the decomposition of the soft tissues ends when they reach 1285 ± 110ADD), since the day of death is found by the sum of those same temperatures, until reaching the ADD value. Yet, this is a disadvantage for this method, since the temperature provided by the meteorological stations is different from the temperature at the ground surface, the correct one for the application of the formula (Ferreira, 2012). This method should only be used on non-buried, submerged, or burned complete adult human remains. Several other studies predicting ADD for PMI estimation have been conducted, as for example Simmons et al. (2010), Sutherland et al. (2013), Marhoff et al. (2016), and Moffatt et al. (2016).

3.3. Decomposition in aquatic environments

In the United Kingdom, Heaton et al. (2010) aimed to increase the accuracy of *post mortem* submersion interval (PMSI) estimation. They have concluded that the duration and temperature of body's submergence in water had a significant effect on the decomposition process. A single linear regression model (TADS – total aquatic decomposition score) for predicting ADD from observed decomposition resulted from this study. However, this study is strictly related to specific geographical areas and climates (Palazzo et al., 2020). In 2017, van Daalen et al. developed another aquatic decomposition scoring (ADS) method to estimate PMSI of cadavers recovered from salt water, describing specific aquatic decomposition phenomena. Reijnen et al. (2018) investigate if van Daalen et al. (2017) ADS method could be used to estimate PMSI in bodies recovered from fresh water, since decomposition may be affected by salinity or water depth. They have concluded that this method can be accurately used in cadavers discovered in fresh water, emphasizing, however, that bodies found in this context are exposed to more diverse conditions that the ones found in salt water.

3.4. After all, how long does it take for a body to skeletonize?

Time since death can be reasonable accurately estimated through stages of decomposition. Still, the use of these stages can be problematic, since it misleads to the thought that body decay occurs in continuum definable sequences (Byard, 2017; Fitzgerald and Oxenham, 2009). Although decomposition had been considered as exclusively time dependent, it can be affected by several features such as anatomical variation, lifestyle, injuries or environmental conditions.

The major factors influencing the rate of body decay are described by Vass (2011) as being moisture, pH, oxygen partial pressure and temperature.

Temperature is widely considered the most important factor affecting decomposition. It is influenced by depth of burial, indoor or outdoor scene, humidity, elevation, seasons, air movement, presence or absence of clothes, among other factors, namely, humidity, the presence of insects and other fauna (scavenging activity), vegetation development, bacterial growth and the presence of adipocere and mummification (Vass, 2011; Ceciliason et al., 2018). Vass et al. (1992) and Megyesi et al. (2005) suggested that decomposition could be more correctly measured as dependent on accumulated temperature, described as accumulated degree days, in order to achieve a more accurate PMI estimation. Accumulated degree-days are described as the necessary heat energy units to push a biological process, combining chronological time and temperature. Concerning the decomposition process, Vass et al. (1992) established that, assuming that decomposition essentially stops at 0ºC, volatile fatty acids are no longer present in the soil after 1285 ADD, concluding that remains were mainly skeletonized by that time, since muscle and fat had decomposed. They have also highlighted that bone exposure in most of the cadaver occurs around 1200 ADD.

The existence of water close to the human remains can also enhance the decomposition due to the ability of moderating pH changes (acts like a buffer) and acts as a diluent. It is also a source of hydrogen, essential for numerous biochemical reactions (Vass, 2011). According to Mann et al. (1990) it is also positively correlated with insect activity. On the other hand, fast desiccation due to dry environments or extremely wet environments can inhibit decomposition and lead to the preservation of a cadaver (mummification or adipocere, respectively) (Carter and Tibbett, 2008).

In 2011, Vass published "The elusive universal *post mortem* interval formula". This method requires the pre-skeletonization of the remains, in an attempt to develop empirical universal formulae that are based on decomposition and environmental parameters to estimate PMI for surface and burial decomposition.

Decomposition rate may be greatly accelerated by many other factors such as

the absence of clothing or bedding, open wounds, endogenous infectious, metabolic conditions or free access of fauna and flora to the cadaver (Byard, 2017). Although very little studies have been carried out concerning decomposition in indoor settings, it is known that, due to the absence of changes in temperature and humidity, and the difficult access by fauna, the decomposition of the remains is slowed down (Ceciliason et al., 2018).

The physical, chemical, and biological characteristics of the soil can also affect body decomposition, whether in case of buried corpses as well as in those left on the surface. The presence of a cadaver disturbs the ecosystem, through changes in the concentrations of chemical compounds such as ammonia, nitrates and sulphates, and variations in the succession of the communities (Carter and Tibbett, 2008).

In addition, late conservative processes such as adipocere (wet conditions and high temperatures) and mummification (dry air and high or low temperatures) turn this dating process even more difficult. While it supposedly takes months, or even years, to occur, sometimes it develops within days after death.

A particularly interesting case of super-fast skeletonization occurred in Amazonia (Brazil). According to Valente-Aguiar et al. (2021), all the muscles and viscera were consumed by action of scavenger ichthyofauna in a few hours, leading to complete skeletonization.

After all, for an accurate estimation of *post mortem* interval, is essential to consider that, regarding the decomposition process, the exception is the rule, meaning that all decaying processes are different.

3.5. Bone weathering

Soft tissue decomposition has been extensively studied in relation to time since death estimation, yet body decay is not finished with skeletonization. Bones' structural breakdown through time has also been investigated, although less information is known regarding this subject (Jaggers and Rogers, 2009). It is a process that comprises the appearance of cracking along the bone and leads to its complete loss of shape and integrity (Ross and Cunningham, 2011).

Macroscopic studies are mainly non-destructive, being able to be repeatedly performed. There are several taphonomic factors leaving strong macroscopic evidence on the skeletal remains, including deposition on or below the surface, burial soil content and pH, vegetation, scavenging fauna, or climatic conditions, like temperature and humidity, affecting bones' rate and extent of decomposition (Haglund, 1997a; 1997b).

The process in which bones are destroyed by natural weather-related phenomena is called weathering. Surface weathering can be a very useful taphonomic process in dating PMI, since bones are exposed to environmental processes like temperature, sunlight, or humidity (Janjua and Rogers, 2008). For example,

uncovered skeletonized remains on the ground surface tend to undergo faster decomposition changes. On the contrary, bones buried need more time to breakdown, as the most damaging decaying agents are not acting.

Soil environment has also a significant impact on bone degradation and, consequently, on PMI estimation. The composition and soil moisture can disturb the leaching of bone chemicals, increase the loss of bone mineral and enable the ions exchange to the soil (Jaggers and Rogers, 2009). According to Behrensmeyer (1978), a soil with alkaline pH can also increase bone weathering.

Most of all, it is essential to study weathering by geographical region, as weathering rates differ with environmental changes. The length of time that a skeletonized body takes to decompose is heavily influenced by its micro-environment and context.

Bone size, shape and density are also factors to be considered in weathering rates (Henderson, 1987; Janaway, 1996; Micozzi, 1991). Still, there are evident inconsistencies in the literature relating to this topic and further research on weathering patterns is needed. However, skeletal remains from juveniles seem to breakdown easier than bones of adults, according to Behrensmeyer (1978).

4. Forensic entomology

Forensic entomology is a discipline in which biological and ecological data from arthropods are studied in the investigation of death. One of the usual applications of forensic entomology is the estimation of PMI. Forensic entomologists estimate the time it took for a corpse to become infested by insects and use that information to infer the minimum PMI (Prieto et al., 2004).

Post mortem interval can be calculated through the study of carrion fauna, using developmental data of certain species of insects, like its growth rates, arthropod community composition, dynamics and succession sequence, that are attracted by organic matter decomposition or by putrefaction derived products (Early and Goff, 1986; Tullis and Goff, 1987; Richards and Goff, 1997; Amendt et al., 2007; García-Rojo et al., 2009; Prado e Castro et al., 2011). The first method tends to be applied in initial decomposition stages, with Diptera species as the main indicators, whereas arthropod community composition and succession, mainly represented by Coleoptera species, is usually used in longer PMI (Lane, 1975; Catts and Goff, 1992; Shean et al., 1993; Prado e Castro et al., 2012). The bio-geoclimatic zone has a major impact on the species of insects present, its patterns of succession, their seasonal availability, as well as the periods of time each life stage spends on a cadaver (Prado e Castro et al., 2013; Anderson, 2019).

A comparison of fauna collected in controlled studies in similar environments with the fauna collected on a body at the time of discovery can often deliver information when no other evi-

dence is available, allowing a minimum PMI estimation.

5. Forensic botany

Forensic botany, the analysis of plants in forensic contexts, is a recent discipline and not yet widely used. Nevertheless, botanical trace evidence has been showing its value in legal cases since the presence of plants can be a valuable source of information.

Forensic botanical traces analysis is largely based upon established knowledge of classic techniques of plant ecology, morphology, or biomolecular investigation (Caccianiga et al., 2021; Spencer, 2021). Traditional analysis includes stomach contents analysis for last meal determination and digestion time, pollen analysis, fungal and algae analysis, and DNA (Courtin and Fairgrieve, 2004; Coyle, 2004; Coyle et al., 2005).

The majority of plant studies with forensic interest have been aimed at dating death, since climatological and interspecies variations result in variations in rates and growth patterns (Caccianiga et al., 2021; Courtin and Fairgrieve, 2004). Shedding of leaves, pollination, growth of branches or even the presence of leaves, flowers or fruits, or its decomposition, may be a time indicator (Ciaffi et al., 2018).

Forensic botanists can sometimes estimate the time that a corpse had been in a present location, based on plant anatomy in situ and its stages of development. Although, a maximum time can never be established. The study of growth patterns of vegetation can also be useful in PMI estimation by establishing time windows related to broken tops, lack of chlorophyll, or the length of new shoots at the base of the plant (Coyle et al., 2001).

Palynological evidence has also been studied to establish time since death. After a careful removal from the corpse, pollen residues are identified by forensic palynologists and, according to its life cycle, it is possible to determine the period in which death occurred (Swift, 2006; Lancia et al., 2013; Hayman and Oxenham, 2016). Pollen is a natural seasonal marker, and it can be a valuable record when the season of death is uncertain. However, the airborne pollen grains depend on the local flora, the flowering season of the species, and also on meteorological conditions. Therefore, airborne pollen calendars can be a valuable resource (Montali et al., 2006).

Useful accurate methods for dating cases over years to decades fill a gap in existing techniques. Dendrochronology, which refers to a tree-ring dating, is a well-known and a useful dating method (Speer, 2010). It may be applicable in forensic contexts with plant roots that grow through or over cadavers. An estimation of the minimum *post mortem* interval can be given by counting the root rings associated with the remains (Lancia et al., 2013; Ciaffi et al., 2018; Pokines, 2018).

Bryophytes are particularly advantageous for crime scene investigations since many of them occur in all types

of environments (Margiotta et al., 2015). Moss, green algae and lichens growth on skeletonised remains and associated tree roots have similarly been used to establish timeframes (Spencer, 2021).

Mycology studies have collected substantial data relevant to body decomposition, showing that certain chemo ecological groups of fungi can act as aboveground grave markers in forest ecosystems. These fungi undergo a "succession" of fruiting where one set of fungi is later replaced by another which can provide the basis for estimating the *post mortem* burial interval (Carter and Tibbett, 2003; Lancia et al., 2013).

6. Physical and biochemical methods

Over the last decades, new approaches have been developed to accurately estimate PMI in skeletonized remains, using chemical, physical, and immunological techniques. In these cases, attention is drawn to the fact that the bones to be analysed should not undergo any previous treatment, such as maceration.

According to Knight and Lauder (1967; 1969), several chemical methods have been explored, such as nitrogen content, amino-acid quantification, mineral acid reaction, benzidine reaction and bone lipids, based on its decrease on the skeleton over time. However, its application has not been useful in discriminating between bones of forensic or archaeological nature (Forbes and Nugent, 2016).

Facchini and Pettener (1977) suggested a new procedure, built on the measurement of supersonic conductivity and specific gravity of the bone. Castellano and colleagues (1978a; 1978b;1984) evaluated several biochemical characteristics of recent bones such as the amount of total lipids, triglycerides, free fatty acids, cholesterol, total proteins, zinc, manganese, phosphorus, and iron. However, due to the sensitivity of the techniques, and to environmental factors, they were deemed as unreliable and, therefore, the direction of the investigations changed.

The *post mortem* alteration of bone microstructure by the actions of fungi, bacteria and microflora was investigated by Yoshino et al. (1991) as a potential indicator of PMI, but Bell et al. (1996) observations countered the findings.

The residual serological activity (gel diffusion testing), other immunological test, as well as histological tests, were tested and abandoned, due to their susceptibility to soil contamination and high number of false positives (Forbes and Nugent, 2016).

The investigation of metabolic body fluids and biochemical methods, through the study of biomarkers using Nuclear Magnetic Resonance and Mass Spectrometry, can provide valuable information concerning PMI estimation, if the markers in question are properly identified, studied, and documented. However, although they offer advantages over conventional methods, due to the decrease of subjectivity by the

observer, becoming more accurate and specific, they require a highly specialized skill set and well-equipped laboratories (Donaldson and Lamont, 2014).

Several studies of PMI estimation based on the citrate content of bone have been proposed (Schwarcz et al., 2010; Kanz et al., 2014; Wilson and Christensen, 2017). The concentration of citrate, which is present in a living human at a uniform concentration, decreases linearly in skeletal remains. It appears to be independent of temperature and rainfall and its precision of determination slightly decreases with age.

6.1. Radiocarbon and other isotopic methods

The only technique capable of providing an unambiguous result estimating PMI, although expensive and elaborated, is radiocarbon dating (Cappella et al., 2018). It is widely accepted as a method for dating skeletonized material with archaeological interest. Between 1950 and 1963, thermonuclear devices, such as the atomic bomb, produced high artificial levels of Carbon 14 in humans and other terrestrial organisms ("bomb pulse"), through the food chain. In 1963, the peak of C14 levels was reached, followed by a reduction of this levels, even though remaining above those existing previously. Thus, by comparison of the "bomb-curve" values, it is possible to distinguish individuals whose death occurred before 1950 from those who were still alive after this increase. This method is particularly valuable for the study of human remains in a high state of decomposition and it can reveal relevant information for determining the date of death of an individual (Ubelaker, 2014). Latest studies suggested the possibility of dating bones from a period after 1950 until today (modern period), using the Carbon 14 method, since C14 levels still remain above those existing previously, and are not yet stabilized (Ubelakerand Buchholz, 2005). If the remains analysed prove to be from the modern period, interpretation can be improved by analysing different types of tissues within a single skeleton, due to the known variability of its formation age and remodelling rates (Ubelaker et al., 2006; Fournier and Ross, 2013), positioning the date of death on the early rising side of the bomb-curve (before 1963) or in the falling side (after 1963). Unfortunately, there are not many studies available providing C14 values for specific skeletal tissues. However, some studies suggested that dense cortical bone, like midshaft femur diaphysis, take longer to remodel than trabecular bone, such as vertebral bodies. Thus, samples taken from these different areas, with varying rates of remodelling, should enable placement on the right side of the bomb-curve (Ubelaker et al., 2022). Nevertheless, this technique shows some difficulties related to the complexity of bone formation. It is reliant on extrinsic and intrinsic factors like environmental conditions, diet, and age at death of the individual (Ubelaker and Buchholz, 2005; Ubelaker et al., 2006).

According to Ubelaker and Parra (2011), age at death represents a feature that needs to be taken into consideration, since it influences tissue's renewal speed (Ubelaker et al., 2015), slowing down with advancing age. C14 values in bones from individuals with older ages at death show a substantial "lag time" between the actual time of death and the bomb curve year correspondent to the radiocarbon value. On the other hand, in younger individuals, the "lag time" is minimal, due to the fastest remodelling rates and recently bone formation (Ubelaker et al., 2022). In addition to Carbon 14, nuclear tests in the 1950s caused an increase in the levels of other radionuclides in the atmosphere, like tritium, caesium-137 and strontium-90. Investigations were carried out to test their usefulness in addressing this issue. However, contamination after burial by groundwater proved to be a problem, since isotopes infiltrating through the soil are absorbed by bones, affecting PMI estimation (Maclaughlin-Black et al., 1992; Forbes, 2004). Its high cost, extremely elaborate methodology and the need for equipped laboratories are also disadvantages (Ramsthaler et al., 2011).

Another major focus of interest is the study of isotopes of elements such as lead-210 (210Pb) and polonium-210 (210Po), radioactive members of uranium-238 (238U), that are widely distributed within the environment. A significant radiation exposure occurs through inhalation and by ingestion of these isotopes within food and water. As these primordial elements are not associated to nuclear explosions, uptake remains relatively constant throughout life, decaying exponentially after death (Swift, 1998; Swift et al., 2001; Forbes, 2004). Swift and collaborators (2001) evaluated the potential of 210Po and 210Pb nuclides usage to deliver an accurate method for PMI estimation. Their study used a sample of male adults, collected from a Lisbon cemetery, and demonstrated a correlation between radionuclide content and time since death. However, antemortem date were unavailable, which meant that factors known to increase 210Po during lifetime (smoking, shellfish consumption, etc.) could not be considered, leading to significant errors. Although these methods seem to provide valid information, they are expensive and must integrate diagenesis effects, cultural differences between regions, and individual variation in lead metabolism (Swift, 1998; Ramsthaler et al., 2009).

6.2. Fluorescence and chemiluminescence

UV-fluorescence has also been investigated to date time since death. According to Ramsthaler et al. (2011), UV reflection proved to be a good forensic exclusion test. When exposed to UV light, recent bone material emits fluorescence, showing a good correlation between the extent of fluorescence and the PMI. When exposed to UV radiation, the most recent bones emit a blue/whitish colour, unlike older remains that acquire a yellow/brownish or grey colour (Hoke et al., 2013;

Swaraldahab and Christensen, 2016). It is a method whose application is designed not only for a widely equipped laboratory, but also to apply in the field, since it only requires a saw and sandpaper for skeletonized remains preparation and a common UV lamp (Hoke et al., 2011). Thus, although for its own it does not present enough scientific value for a safe conclusion, it can easily be used as a presumptive test. Combining UV-induced fluorescence and 490 nm-induced fluorescence was reported by Sterzik et al. (2016) as able to distinguish recent from historical human skeletal remains, being the correlation between time since death and UV-fluorescence colour very similar to the results described in Hoke et al. (2013). UV-fluorescence was also applied by Boaks et al. (2014) to quantify the degradation of bone collagen in order to estimate PMI.

Luminol technique has also been considered as a presumptive test. The chemical reaction that occurs in the presence of Luminol is called chemiluminescence, which refers to the emission of light (Ermida et al., 2017). Luminol has a high affinity for the haemoglobin present in bones, that contains in its composition iron ions, capable of catalysing both the peroxide decomposition reaction and the oxidation of Luminol. The observed light ranges between violet and a blue background (Introna et al., 1999; Creamer et al., 2003; Barni et al., 2007; Creamer and Buck, 2009). Therefore, it would be expected a decrease in the intensity of chemiluminescence reaction with the increase of the PMI (Ramsthaler et al., 2009). One limitation of Luminol technique, as well as other blood detection tests, is its lack of specificity, making it possible to catalyse the chemiluminescence reaction with substances other than blood (Quickenden and Cooper, 2001; Creamer et al., 2005). On the other hand, the fact that it is considered a fast, inexpensive, and simple technique, along with its enormous sensitivity in a dilution scale of 1:100.000 to 1:5.000.000, have strongly contributed to its investigation and application (Ramsthaler et al., 2009).

However, the above mentioned investigations are based on a subjective component. Sarabia et al. (2018), presented an objective low-cost additional technique, using a luminometer to obtain accurate measurements of the chemiluminescence in relative light units (RLU). Through this new approach, it is possible to achieve precise quantification of data to distinguish between forensic interest remains and archaeological remains.

6.3. X-ray diffraction and spectroscopy

X-ray diffraction has been suggested as a hypothesis for many different objectives, being PMI estimation one of them (Prieto-Castelló et al., 2007). Studies indicate that the older the bone, the higher its crystallinity index and, consequently, the sharper the patterns resulting from X-ray diffraction. Based on this assumption, it is possible to develop methods for dating the time since death through X-ray

diffraction (Bartsiokas and Middleton, 1992). This is an easy, quick, and economical technique that uses equipment commonly present in laboratories. Also, it values the integrity of the bones, being less invasive.

Numerous studies mention vibrational spectroscopy, particularly Fourier Transform Infrared Spectroscopy (FTIR) and Raman Spectroscopy as reliable to contribute to an accurate PMI estimation (Creagh and Cameron, 2017; Wang et al., 2017; Ortiz-Herrero et al., 2021). Vibrational spectroscopy appears to be a very suitable technique for the analysis of solid materials like bone tissue with forensic purposes, although it largely depends on taphonomic changes (Patonai et al., 2013). It allows the detection of vibrational movements of functional molecular groups and extracts spectral information from compounds directly. It is quick and cost effective, yet sensitive enough, with a simple preparation and a small amount of non-destructed samples (Baker et al., 2014; Kumar et al., 2015; Butler et al., 2016). FTIR delivers auspicious results concerning PMI estimation of powdered bones as it uses infrared radiation, which takes the molecular bonds to vibrate at different wavelengths in the IR region, producing unique vibrational patterns for each functional group (Leskovar et al., 2022). Properties of the remains such as the crystallinity index (CI), mineral-to-matrix and the carbonate-phosphate index of FTIR spectra allow the distinction between archaeological and forensic human bone fragments (Howes et al., 2012; Longato et al., 2015; Wang et al., 2017). Baptista et al. (2022) analysis spreads beyond those previously reported on estimating time since death using FTIR (CI and carbonate/phosphate ratio) since spectroscopic indices such as A-type carbonate content ratio (API), B-type carbonate content ratio (BPI), and carbonate (A + B) to carbonate B-type relationship (C/C) were interpreted. Raman Spectroscopy analysis is also sensitive to *post mortem* changes in bone on a scale of days (McLaughlin and Lednev, 2011; Delannoy et al., 2016). However, a strong fluorescence interference, which can be held by photobleaching (a destructive process), is a disadvantage to this technique. Infrared microscopic imaging techniques, such as IR reflection, ATR, and Raman microscopic imaging, were combined by Woess et al. (2017) to accomplish a more accurate PMI estimation method.

7. DNA

Few investigations have been carried out in order to estimate the PMI through the analysis of the *post mortem* level of DNA degradation. DNA molecule has been recognized to be valuable to investigate early time of death, since DNA denaturation by autolysis begins immediately after death and DNA fragmentation lasts for three days at a constant rate seemingly unaffected by environmental temperature and death mechanisms (Di Nunno et al., 1998; Zapico and Adserias-

Garriga, 2022). Estimating PMI requires a parameter that evolves constantly with a linear process, but some essential aspects are still unknown or less explored, like the definition of target organs for standardization, as well as the influence of *ante* and *post mortem* factors on DNA degradation (Tozzo et al., 2020). Moreover, very little research has been conducted for estimating later *post mortem* intervals.

Although it is no longer used today, the RFLP-DNA method, based on Southern blotting and radioactive probe detection, was the first DNA degradation method used for dating time since death (Bär et al., 1988; Perry et al., 1988).

The usage of dental pulp tissue for flow cytometric estimation of time since death was explored by Boy et al. (2003) for the first time. Although this method proved to be unreliable to estimate early PMI, it appears that DNA degradation is slowed down by factors within the surroundings of the dental pulp, which can be of greater value in studies of the later stages. Long et al. (2005), on the other hand, discovered a correlation between DNA degradation and time since death in dental pulp cells for a longer period, using the same technique.

Real-Time Quantitative Polymerase Chain Reaction methods development in the last years lead researchers to verify if this method could be applied to estimate PMI, due to their highly accurate results. A semi-quantitative multiplex PCR-based analysis was conducted by Alaeddini et al. (2011) in order to evaluate DNA degradation in human ribs. Still, this is a relatively new method on regard to PMI estimation, being too early to establish whether or not it can be valuable to accurately date time since death.

8. Final remarks

PMI estimation is one of the most challenging and complex issues assigned to forensic sciences, as it is an example of an extensively studied process but yet poorly applied to specific cases, especially involving old remains.

In figure 1, we present our proposal approach for cases when the time of death is unknown. In all, a holistic approach is the key role to achieve a reliable estimation of *post mortem* interval. As cadavers may be discovered in numerous decay conditions and circumstances, like inside buildings or cars or in gardens or streets or even floating or under water etc., the importance of a multidisciplinary team, involving professionals from various areas such as forensic anthropologists and pathologists, is crucial to achieve better results. For the same reason, ideally, the forensic pathologist and anthropologist should be able to undertake their human remains examination *in situ*, since the importance of the context should never be disregarded. However, remains are most likely used to be collected by the police. Therefore, it is mandatory that all the team members are aware of their duties and that the chain of custody is respected and no contaminations occur.

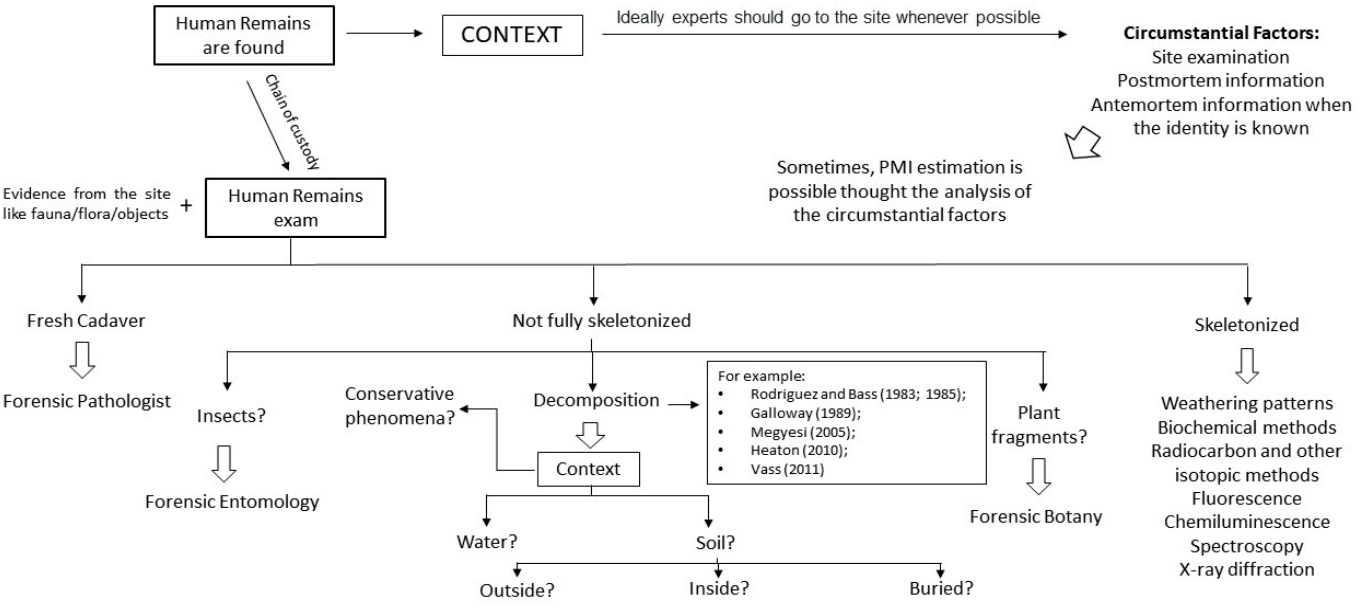

Figure 1. Decision support scheme for PMI estimation.

The decision of the methods selected for estimating PMI, in each particular case, should always be based on the state of decomposition of the human remains. As numerous environmental and intrinsic factors can affect the decomposition process, it is extremely difficult to develop reliable methods to be applied in these cases. Even though the vast literature is still increasing, and several authors have proposed promising results, the majority of these methods never gained practical relevance, since they are not reliable and precise, limiting to describe *post mortem* changes, not providing yet scientific methods to be applied in forensic cases. Thus, most of these investigations end being only of academic interest. It is necessary to make the highest number of thanatological and environmental observations to obtain accurate methods, permitting a quantification of PMI estimation of human skeletal remains. Reliable methods will only gain practical relevance with statistical description and declaration of precision, taking into consideration influencing factors. Forensic anthropologists must continue collecting data and investigating further promising accurate methods to properly estimate late PMI.

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List of abbreviations

PMI – *Post mortem* interval
DDI – Degree of decomposition index
TBS – Total body score
ADD – Accumulated degree days
TADS – Total aquatic decomposition score
ADS – Aquatic decomposition score
PMST – *Post mortem* submersion interval
RLU – Relative light units
CI – Crystallinity index
FTIR – Fourier transform infrared spectroscopy
IR – Infrared

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Relationality and uprooting: towards a Caribbean reading of ex-Soviet Central Asia

Relacionalidade e desenraizamento: para uma leitura caribenha da Ásia Central ex-soviética

Soledad Jiménez-Tovar[1a*]

Abstract This article offers a new way of understanding ex-Soviet Central Asia based on the intersection between my own ethnography and the thought of Édouard Glissant, who elaborates on Deleuze and Guattari's concept of rhizome. My argument is that it is possible to analyze Central Asian identities, how they are lived and displayed, politically without recourse to the role that the State plays in everyday life, turning the approach centered on the anthropology of the State on its head. Relationality is presented as the rhizomatic alternative in a non-essentialist analysis of identities that function independent of any State influence from above.

Keywords: Soviet Union; creolization; relationality; rhizome; Dungans; Uighurs.

Resumo Este artigo oferece uma nova forma de entender a Ásia Central ex-soviética a partir da intersecção entre a minha própria etnografia e o pensamento de Édouard Glissant, que elabora o conceito de rizoma de Deleuze e Guattari. O meu argumento é que é possível analisar as identidades da Ásia central, a forma como elas são vividas e exibidas, politicamente sem recorrer ao papel que o Estado desempenha na vida cotidiana, virando do avesso a abordagem centrada na antropologia do Estado. A relacionalidade é apresentada como a alternativa rizomática numa análise não essencialista de identidades que trabalham de forma independente de qualquer influência de cima para baixo vinda do Estado.

Palavras-chave: União Soviética; crioulização; relacionalidade; rizoma; Dungans; Uigures.

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1. Introduction[1]

The principal aim of this article is to provide a sociolinguistic approach that lets the reader engage with me in a novel exploration of identities in contemporary Ferghana Valley. I will show how the sense that people seen in Ferghana as "coming from China" is the result of an emic perspective.

What follows is a South-South conversation (Caribbean-Central Asian) that, while it does not neglect Madeleine Reeves' (2014) critical vision of State-Society interactions in border zones, explores the issue differently. Though her critique of romanticization by anthropologists who follow a logic of "people against the State" is very relevant, the State is not everything that exists. In order to move beyond the classification of States according to Global Northern Standards (as if Global Northern States never incurred in "failures" to citizenship), I prefer a Mexican perspective, namely "people despite the State". Whether that is a marker of "failure" or not, is not even relevant to this article.

Let me start with some ethnographic comments that better explain why I became interested in the Ferghana case. In the summer of 2016, I arrived in the southern Kyrgyzstani city of Osh, where the first national congress of Kyrgyzstani anthropologists was to take place. There were few foreign academics, I was the only Mexican at the event. I was staying in an apartment that my anthropologist colleagues and I rented together.

I do not speak Kyrgyz, the language I usually communicate with my colleagues in Central Asia is Russian. However, because my colleague-roommates were all Kyrgyz, at home everyone spoke Kyrgyz and I was totally immersed in this Turkic language during the days I spent in Osh. This served me well because, unlike the region where I did my fieldwork in previous years, the border region between Kazakhstan and Kyrgyzstan (Jiménez-Tovar, 2014), where Russian is the lingua franca used for interethnic communication, in the city of Osh, Southern Kyrgyzstan, Russian was only heard in specific contexts. Uzbek is the predominant language, even more than Kyrgyz, the "national" language since 1991. In other words, Osh, despite being a frontier city with diverse populations, showed no similarities in terms of linguistic landscape with my previous research area in the border region of southern Kazakhstan and northern Kyrgyzstan. These differences are in part connected to regional variations. In geographical terms, the north and south of Kyrgyzstan are very different (Figure 1). The north is "rich" and has common borders with Kazakhstan, a neighbor whose economy has greatly expanded in recent years. Southern Kyrgyzstan, where the city of Osh is located, is poorer and shares borders with countries that are not very affluent (Tajikistan and Uzbekistan), or else have experienced political instabil-

[1] Terms in Russian are romanised using the ALA-LC system. For terms in *putonghua* I use the system *hanyu pinyin*.

Figure 1. Political map of Kyrgyzstan. Source: http://legacy.lib.utexas.edu/maps/commonwealth/kyrgyzstan_trans-2005.jpg; accessed 10 July 2021.

ity (especially in the case of Tajikistan and the Xinjiang Uighur Autonomous Region of the People's Republic of China [PRC]).

My visit to the city of Osh occurred at a time when I was researching a concept that has permeated the entire ex-Soviet[2] region since the 1990s: *evroremont*, which refers to a type of interior decorating using a style, materials, and furnishings from Western Europe. I was told by my colleagues that I should go to the Taatan market, where construction materials were sold and where most of the traders were from the PRC. When I arrived in Taatan, I found a rather large complex two thirds of which was occupied by traders from the PRC. Figures 2-7 show that some of the recent changes in this part of ex-Soviet Kyrgyzstan are evident in the Taatan market area. While there are vendors of all ethnicities and one is generally made aware of the linguistic diversity of the region, the food, the language,

[2] Although over the course of this century the word "post-Soviet" has become the standard term for talking about the former territories belonging to the Soviet Union, I prefer to avoid it in my own work. More generally, post-Soviet is confined to a broader body of scholarship on those regimes where "actually existing socialism" occurred. The term post-Soviet, however, seeks to emphasize a specificity that prolongs an internal colonialism within the ex-socialist bloc. Within the former Soviet Union, the *pre-* and *post-*Soviet are confused in a very complex way. There are people who never properly felt part of the Soviet project and there are people who still consider themselves Soviet. In this sense, the prefix *ex-* is the most neutral option (cf. Jiménez-Tovar, 2021).

Figure 2. Arriving at the Taatan market. Osh, Kyrgyzstan, 2016.

Figure 3. Parking lot in theTaatan market. Osh, Kyrgyzstan, 2016.

Figure 4. Advertisement offering *evroremont* in front of a Chinese truck. Osh, Kyrgyzstan, 2016.

Figure 5. Passage with containers in the Taatan market. Osh, Kyrgyzstan, 2016.

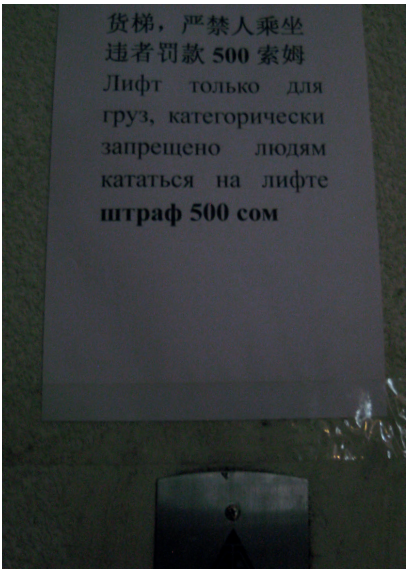

Figure 6. Warning in Chinese and Russian: "The elevator is for cargo only. It's strictly forbidden for people to ride in the elevator. Fine: 500 som." Taatan market. Osh, Kyrgyzstan, 2016.

Figure 7. Chinese characters written in the dust on a window in the Taatan market. Osh, Kyrgyzstan, 2016.

the smells, and the Chinese graffiti taken together gave more of an impression of being in the PRC than in Kyrgyzstan.

I went into a textile shop, where some old women were asking the saleswoman questions about a quilt. The old women, one Ukrainian, one Tatar, were born in Uzbekistan, but had been settled in Osh for a long time. Both women spoke Russian, the saleswoman spoke *Putonghua* (Mandarin Chinese). The Russian speakers asked about materials and prices, the Sino-speaker said she did not speak Russian, that her husband, who was usually there, had fallen ill, and they could come back later if they wanted. But the old women did not understand *Putonghua*, so they kept insisting. In desperation, the vendor called the owner of the neighboring stall, who understood *Putonghua* but spoke another language, also Sinitic, which I was able to identify as gansu Dungan.[3] The "translator" finally informed the two old women about materials and prices. Then the old women, who lived in a nearby missionary community, took the opportunity to give all of us some leaflets with evangelical propaganda. The Chinese woman said she was not interested because she was a communist

[3] The Dungans speak pidgins that incorporate elements of Russian and Sinitic languages and have also borrowed terms from local Turkic languages, especially Kazakh and Kyrgyz. I will go into further detail on the Central Asian Dungans below. But the reader should note that, in referring to them and their history, I use capital letters to refer to place names (Gansu, Shaanxi, Ili, Osh) and lower case letters to refer to Dungan groups (*gansu*, *shaanxi*, *ili*, *osh*).

and an atheist. The Dungan "translator", for his part, did not take any leaflets because he declared he was a Muslim. As for myself, I accepted the brochures and told the women that I would visit them later. I asked the Dungan about himself. He came from Bishkek, as his accent indicated, but worked as a trader transporting kitchen materials from the PRC to the Dordoi bazaar in Bishkek, and from there to Osh, where traders from the Uzbekistan side of the border bought various consumer goods and took them to markets all over Uzbekistan. Osh is crucial for Uzbekistanis to source all kinds of Chinese goods (Chen and Jimenez-Tovar, 2017). He would not give me more information about himself; instead, he gave me the phone number of a local Dungan named Umid.

After the market, I visited the two evangelical elderly women, and they invited me for lunch. They told me that they liked that evangelical community because its members came from all over the world and because it offered an opportunity to meet people with similar religious beliefs and different ways of being from those of the Soviet period. Later, I had a dinner with Umid, a tall, dark, slim man. We hit it off right from the beginning. His openness stood in stark contrast to the suspicious attitude of other Dungans I had encountered before and with whom I usually needed more time before starting to converse in a relaxed manner. He was born in Osh, part of the small community of Dungans who had come as far south as Kyrgyzstan when they started moving away from the territory of the Chinese Qing empire in the nineteenth century. After having dinner with Umid's family, I returned to the apartment I shared with my colleagues. Thus ended my day exploring the city of Osh.

What I have described so far offers a snapshot of the complex ethnic and linguistic realities of this part of Southern Kyrgyzstan and more generally of many parts of the ex-Soviet region of Central Asia. The dissolution of the Soviet Union led to the creation of new states and to tighter border control between countries, and this led anthropologists who study Central Asia to approach the reconfiguration of the multi-ethnic landscape of the region through the lens of the anthropology of the State, especially with regard to questions related to the everyday consequences of new institutional structures and new nationalist discourses (Jiménez-Tovar, 2017). As I mentioned earlier, the aim of this article is to move away from a state-centered study of Central Asia (Reeves, 2014; Reeves et al, 2014) in order to offer an alternative reading of the multiethnic environment of the Ferghana Valley, where the city of Osh is located.

Reeves (2014) has provided us with a magnificent ethnographic account of Ferghana Valley, where nomadic and sedentary worlds have been meeting since ancient times. As relevant as her work is, it is Soviet-biased and looks to the linkage of Ferghana with Moscow and other parts of the Russian Federation seeking "continuities" with the immedi-

ate Kyrgyzstani past at the expense of "Persian" and "Chinese" connections that have played such a large role from antiquity up to and beyond the disintegration of the Soviet Union. I am more interested in how diversity creates even more complex identity-making and negotiation on an everyday basis. Focusing on the state is of little help in our attempt to embody a historically constituted and diversified geo-body. It is high time to broaden the anthropology of Central Asia.

This new reading will draw on the work of influential figures in Caribbean social thought and cultural commentary. The late Édouard Glissant (1928-2011) is certainly one of them. His work is particularly fertile in the discussion of the cultural effects of colonialism. Likewise, such a reading would necessarily align itself with the World Anthropologies approach proposed by Gustavo Lins Ribeiro and Arturo Escobar (2009 [2006]), which questions the centrality of Northern academic discourses in shaping the direction of the social analysis of the Global South. The World Anthropologies approach encourages anthropologists based in Southern regions to break away from the vertical discourses set by Northern Euro-American institutions in order to develop more horizontal South-South scholarly conversations. My approach is not that of an anthropologist of the North going South, but rather, my interpretation involves a South-South intellectual dialogue.

In section 2, I will present the general theoretical framework that will be used to analyze the diversity of the Ferghana Valley, drawing particular attention to the notion of rhizome in Glissant's interpretation of Deleuze and Guattari's famous conceptualization. In section 3, I move on to consider the way in which the Soviet Union managed its cultural diversity; and in the following sections (4-6), I will offer an ethnographic analysis of contemporary ex-Soviet realities that draws on Glissant's theoretical framework. In the final section, section 7, I would like to provide some concluding reflections on the importance of South-South conversations and the relevance of combining Caribbean social thought with Central Asianist anthropology.

2. Uprooting

The first trap of studying identities is that they are understood in terms of "belonging" and as processes of identification. Here we need to think "belonging" as a relation of alterity, or the way that otherness is produced and managed. In the production of otherness, the differentiation is about who "belongs to us" and who "belongs to them". But the distinction between "us" and "them" is neither absolute nor pristine or clear. We can belong differently throughout our lives depending on a whole web of social relations. Chun (2017) has shown us that a process of identification, or the way that identity is produced, is when the sense of "belonging to us" means that people included in that category see themselves as "being

the same." The one who constitutes "the other" is the one who is not the same, the one who "belongs to them." I just said that there are degrees and ways of belonging, since alterity is contextual, and identities change across time and space throughout our lives. Anthropology is full of studies that pay attention to this. In this article I propose to see, not the degrees of belonging, but the lack of it.

The trap of belonging obeys a cognitive dichotomy, whose poles, Deleuze and Guattari (2004[1988]) call the arborescent and the rhizomatic. The arborescent refers to universalist, homogenizing, and prescriptive thought; the rhizomatic refers to thinking which is particular, heterogeneous, and diverse. The contrast between the arborescent[4] and the rhizomatic[5] produces a tension that reveals very different perspectives of the world. Belonging, then, is arborescent: within the rhizomatic there are no fixed belongings. Roots and rhizomes can be both identified with the origin, but origin and belonging are rather different things.

I take advantage of the tension between arborescent and rhizomatic perspectives but following another author. For Édouard Glissant (2017 [1990]), a Martinican author, Black, and simultaneously "French" by citizenship, this dichotomy speaks to two types of nomadism, one "circular" and the other "arrowlike." In the first case, circular nomadism is one which obeys the needs of a productive cycle adapted to the environment and could well be applied to the Turkic peoples of the Kazakh-Kyrgyz steppe,[6] a region where pastoral nomadism has traditionally been practiced. Reeves (2014) mentions that several cities in the Ferghana Valley were well known as nodes of the trade routes of linked to known as "the Silk Road." Sima Qian, Historian of the Han Dynasty (206 B.C.–220 A.D.), mentioned the "Celestial Horses," also known as "Ferghana Horses," that were much appreciated among the Chinese. Ferghana horses were tamed by nomads and were traded to sedentary people and traveled as far as Xi'an (cf. Watson, 1961). This trade followed a kind of circular logic.

On the other hand, "arrowlike" nomadism is one of expansionism, of colonial domination, and extension into new territories as an act of collectivere affirmation and the need to subordinate the Other as an indispensable requirement for the configuration of the self. Arrowlike nomadism obeys an arborescent logic; circular nomadism would be considered

[4] The one that has a unique root, ultimately definable and defined through this rootedness, seemingly based on an "essence".

[5] A subterranean plant that produces both roots and shoots; the new roots give place to a new rhizomatic structure, like ginger. Rhizome, a "mass of roots," is a sort of compound without a defined root because it is made up of several roots and shoots that intertwine, connect, and communicate.

[6] This was the denomination of this area of the world when the first Russian imperial explorers arrived during the 19th century; before Kazakhs and Kyrgyz were classified as two different ethnicities during the Soviet period (1922-1991) (Levshin, 1996 [1832]).

as part of a rhizome.[7] Colonial expansion and the administration of cultural diversity in Central Asia, the process deeply discussed by Reeves (2014), is an arborescent phenomenon; the convergence of nomadic and sedentary traditions, in a context of religious, linguistic and lifestyle diversity is a rhizomatic phenomenon that has been taken for granted only as a historical outcome, but has not been theorized as I am doing in this article. We can see the rhizomatic explanation as a reading that is alternative to the kind of approach offered by Reeves.

Glissant's work (2010 [1991]) has its origins in the islands invaded and colonized by France, especially Martinique, which, as an overseas department, seems to be a French "anomaly", although, he does not claim that to be a prerogative of that particular region or case. Ultimately, one of the premises here is what I would call absolute uprooting. Uprooting, losing any sense of roots, would be rhizomatic. The uprooting of a people is to suppress a sense of clear or defined origin. For Glissant, creolization is the rhizome of absolute uprooting, which leads to the absence of any roots at all. Absolute uprooting is the principal constituent of the Glissantian rhizome: it starts from the traffic of slaves, who, coming from various regions of Africa, were denied the right to a memory or the ability to have nostalgia for a place of origin. The result of this was to generate a common language, inside the ships, that would disrupt French and become the language of this new community (Glissant, 1997 [1969]).

Paul Gilroy's work on the slave trade, which had a wide resonance during the 1980s and 1990s, particularly because it presented a different vision for the study of diasporas,[8] deals with similar topics, but following a theoretical path alternative to Glissant's view of creolization as a product of this forced displacement. In Gilroy's (2014[1993]) work such displacement led to the formation of a sense of community among English-speaking Blacks who, in their resistance to racial oppression, developed common cultural traits. Although both authors start from the same premise, their interpretations are different. This is clearly demonstrated in the reading of a specific device: the ship. For Gilroy, the ship is where a new identity would be forged, Anglophone negritude, which would involve mixing and in which Africa as a general root common to all slaves would be preserved. Moreover, the "slave" ship for Gilroy is the laboratory of European

[7] These kinds of nomadism are of a different nature than the nomadism mentioned by Deleuze and Guattari (2004 [1988]), who consider everything nomadic to be rhizomatic.

[8] The diasporic condition has to do with the feeling of a "lost home," the "broken" origins that become the framework of interpretation and interaction that diasporic people have to face on a daily basis (Safran, 1991; Tölölyan, 1991; Cohen, 2008 [1997]). During this century, the study of migration from this perspective has received harsh criticism and began to be seen, mainly, as a political expediency (Brubaker, 2005; Mavroudi, 2007; Diener, 2008; Lainer-Vos, 2010; Jiménez-Tovar, 2016).

modernity. Overcoming Eurocentrism in the interpretation of the relations of domination would be an act of vindication, whose possibilities of freedom are accessible to all of humanity, not only to Anglophone Blacks, but the vindication is something that started amongst Blacks. The paradigmatic case that Gilroy offers us is Black music and its profound influence on popular culture around the world: it is easy to hear "Africa" in rap, jazz, blues, ska or reggae.

Glissant's ship is of a different kind. It is a womb that simultaneously contains life and death, a womb that breaks with "the origin" and transports the slaves to Caribbeanness as it travels over an abyss (the sea). Unlike Gilroy, Glissant (2009) leaves no room for diaspora of any kind, thus, absolute uprooting should not be thought of retrospectively and from a theoretical point of view as a tragedy or a motif of sociohistorical trauma; on the contrary, the arrow (the motif of uprooting) needs roots, identities, and belongings to justify its existence. Thus, denying roots and embracing the rhizome is an emancipation from the oppression that represents feeding the desire to embody well defined identities. In this, Glissant owes much to Franz Fanon, but his solution is not to analyze racial humiliation by the white and the colonizing, but the overcoming of such a dichotomy. Such humiliation is dangerous when it is normalized and internalized in the subjectivity of the (ex)colonized. Fanon "denounces", but Glissant "heals" the humiliation by concluding that the ex-colonized have no need for the recognition of the ex-colonizer. On the contrary, both ex-colonizer and ex-colonized are part of a network of relations that transcends each of them in their chaotic nature and frees them from any rigidity in the way of displaying the self. The Antillean rhizome is seen as the overcoming of hierarchical cultures and cultural hierarchies.

Caribbeanness requires a mixture of dissimilar, sometimes even contradictory elements, but not in the way of "hybridization",[9] rather through the key category in Glissant's work: the Relation (Glissant, 2010 [1991]).[10] Through the Relation, the heterogeneous communicates and combines, always in an unpredictable way, and gives rise to something new, in a chaotic sense of unanticipated and non-hierarchical recombination called the "Whole-World" (Glissant, 2017 [1990],

[9] This can be viewed as a critique of Homi Bhabha's (2002 [1994]) decolonial reading of Fanon's work. The decolonial is a denunciation of the colonial relations of domination. It contains a wide-reaching description of the victimization vis-à-vis the crimes of the "white man". Bhabha's notion of hybridization points to an uncomfortable mixture, but it is an effect of the colonial enterprise. For his part, Glissant's reading of Fanon's work, in which the ex-colonized would have greater power of agency, is anti-colonial. Creolization is not a mixture-assimilation as in Bhabha, but a transcendence of the relations of domination where the "white" is but one more component in a Whole-World. Hybridization is arborescent because it seeks the origins of each mixed element; creolization is rhizomatic and diverse.

[10] I write "Relation" with a capital letter to refer to the Glissantian category, the lower case is used for relationships such as contact or interaction in general.

2020[1997]). Glissant says: "You speak to me in your language, but I understand you in mine". Whole-World is the concept used to describe the fact that in each individual the whole world is present, human and non-human, tangible and intangible, in a series of relationships that we cannot define, because trying to define them requires an arborescent logic. Instead, they are part of a subjective, poetic experience particular to each person. The mechanics of the Whole-World is Relation. The right to intuit things, not to seek to define them with an objectivist language, is what Glissant (1997 [1969], 2009) calls "opacity". The clear, the defined, the arborescent, is, in Glissant's view, continental thought. The rhizomatic, the opaque, the creolized, he terms "archipelagic" thought (Glissant, 2010 [1991]). Something that the reader should not lose sight of is the tension between the interpretations of Gilroy and Glissant regarding forced migration and the uprooting it produces. Gilroy, in contrast to Glissant, employs a motif of another type, diasporic rootedness: a lost root that does not correspond to the Caribbean region but to Africa, which becomes a macro-root whose expression is blackness. In Glissant, uprooting actually allows the construction of a non-predictable dialogue, where heterogeneous elements do not merge, but interact and (re)combine constantly and chaotically.

In her ethnography *Border Work: Spatial Lives of the State in Rural Central Asia*, Reeves (2014) tells us the story of what people have to do to live in a border region in which distribution of water can be the origin of violence. The immediate cause would seem to be ethnic. Ferghana's porous borders are presented as the consequence of Soviet actions. Ferghanians themselves are presented in a way similar to the way Gilroy presents Africans affected by the slave trade, both groups now configured in a diaspora whose individuals recall a macro-root, a black diaspora on the one hand, and a pre-Soviet identity on the other. Ferghanians are marked by a violence perpetrated by the Soviet State and the difficulties that they have to overcome in a colonial situation under the failed strong state.

Even though one constantly hears about the Soviet past while doing fieldwork, I was able to find many individuals for whom that memory is not inherently related to their own identity and, by embracing diversity, situate themselves in a more Glissantean framework. The description I provided in my introduction of the Taatan market shows us something closer to Glissant's framework than to Gilroy's. An arborescent reading of Ferghana is problematic. When looking at Central Asia, we need to imagine an archipelago whose ocean is the immense steppes and deserts that surround inhabited zones (Boulnois, 2004). We need to see Ferghana as a small sample of this larger archipelago, recognizing the existence of significant variations from "island" to "island".

3. Soviet? Rooting as uprooting and rerooting

The year of 1917 is very difficult to interpret. It can be seen as the consummation of the communist-oriented revolution in the former Russian empire, or as the beginning of one of the greatest political-social experiments in history. 1917 represented the beginning of an alternative to the capitalist system (Fitzpatrick, 2015[1994]; 2016[2015]). I should mention two additional dates to make it clear why 1917 should be relativized when viewed retrospectively. The first of these dates is 1919, when the Third International, or *Komintern*, to use the Russian abbreviation, threw over the Second International's more orthodox form of Marxism. Second International was not against colonialism because it would be a mean to spread capitalism all over the world and, by doing so, to spread the revolution. Leninism saw in anticolonial struggle a way to spread Marxism and Socialist regimes in those places where capitalism was not properly developed. The *Komintern* had a very clear objective: to export the revolution to other parts of the world. It was with Komintern money that Communist Parties were founded all over the world. Between 1919-1922, the *Komintern* held an annual congress to discuss possible strategies to bring the revolution to places where capitalism had not fully developed (Schlesinger, 1977 [1967]). The Komintern supported the rise of various "national liberation movements" around the world, as well as the development of social theories based on Marxist revolutionary ideals (Schram and D'Encausse, 1974 [1965]). These developments culminated in the creation of the Union of Soviet Socialist Republics (USSR) in 1922, our second additional date, and one that is particularly important when it comes to relativizing the significance of 1917.

The year of 1922 can be interpreted as the beginning of a decolonial experiment, but it can also be read as the beginning of a new arborescent process of domination. One of the reasons for creating the USSR was that it was necessary to develop a new political framework to accommodate diversity. After the revolution, one could not artificially preserve the map of what was once called the Russian empire and mechanically decree that this would now be "Russia". 1922 demonstrates the willingness of the new Soviet elites to "decolonize" the Russian Empire, although sovietization was, in many ways, of a coercive nature. The design of the Soviet Union was full of violence towards Soviet population, violence whose wounds are still fresh. It is a pain that is far from healing.

Soviet authorities had little information about the ethnic and cultural diversity within its borders because the only imperial census, taken in 1897, only included questions on local spoken languages and practiced religion. This meant that the Soviets had to create new tools to measure ethnic and cultural diversity, and as Cadiot (2007) shows,

Soviet censuses was more complete and included questions on language of birth, language of parents, languages spoken at home, ethnic self-ascription, religion practiced, and place of origin of the respondent and his or her parents, among others. All these questions would serve as a basis for at least getting an idea of the ethnic and cultural diversity within the Soviet territory.

In this way, a sophisticated census design was put in place, by trial and error, creating a complex system of new ethnic categories. These categories placing Soviet ethnicities on a scale of social "evolution," in which they would be further away from or closer to being able to assume communist status, the ultimate goal.

These categories served as a guide for the Soviet authorities to "grant" the right to a people of a territory of their own. I list them from the most "evolved" to the most "backward": *natsiya* (nation), *natsional'nost'* (nationality), *narodnost'* (the closest in English would be "peoplehood") and *plem'ya* (tribe) (Hirsch, 2005).[11] These ethnic categories were part of a progressive assimilation plan (*plem'ya* into *narodnost'*, then to *natsional'nost'*, and finally into *natsiya*). Once all Soviet citizens were, culturally, part of one *natsiya*, they would be ready to eradicate the "national stage". The "national stage" was the period during which nationalism could be seen as an aspect of the democratic-bourgeois revolution, which, as long as it obeyed a capitalist logic, sooner or later, would need to be suppressed before reaching communism.

In the meantime, all traditional arts and cultural performances were encouraged in the USSR, as long as they were "national in form, but socialist in content". This has led several authors, such as Terry Martin (2001), to look at the USSR as a regime where affirmative action was practiced. Of all these categories, only *natsiya* and *natsional'nost'* had the "right" to have "their own republic" in those regions where they constituted a demographic majority. Some *narodnost'* were able to have autonomous regions, but they were not granted the right to secession. This very complex process took a couple of decades, the 1920s and 1930s (Hirsch, 2005; Fitzpatrick, 2016[2015]).

In the same period, in addition to censuses and maps, a campaign was carried out that investigated the languages and traditions of each ethnicity living within the USSR. After this campaign, languages began to be standardized and the folklores studied by Soviet ethnographers became "official" (Hirsch, 2005; Pavlenko, 2008). The name given to this campaign is disturbing: *korenizatsiya*. The suffix *-zatsiya* denotes a process; it is equivalent to the suffix "-tion" in English. *Koren'* means "root" in Russian. So, while in English this term is usually translated as "indigenization", in this article I opt for the most literal translation possible: rooting. *Korenizatsiya* as rooting entails both a

[11] Given the specificity of these terms, I will continue to use the Russian version and not its English translation, which may be imprecise.

process of uprooting from the pre-Soviet past and a process of re-rooting in the new Soviet present and future.

It should not be forgotten that the creation of the USSR was a bid to invent a new human being, the *sovetskii chelovek* (the Soviet human being) (Shteiner, 2002), who, regardless of his ethnic and cultural specificity, would follow a very particular type of ethics: Marxist-Leninist. In turn, all Soviet citizens were grouped under the term *sovetskii narod* (the Soviet people) (Hirsch, 2005). The root created by the *korenizatsiya* was the Soviet one. At first glance, it would seem that the *sovetskii narod* is a sort of rhizome, however, to the extent that its elements, although heterogeneous, had been previously delimited, this umbrella category lacked opacity. Moreover, this heterogeneity was conceived in order for it to disappear. This has served as the basis for contemporary nationalism throughout the ex-Soviet region. Such nationalisms tend to reproduce the aforementioned arboreal identities within the borders drawn during Stalinism (1927-1953), period during which global communism was renounced in 1943, when *Komintern* was suppressed to implement Stalin's Socialism in One Country. Today, the Soviet vocabulary based on ethnicity is still used and there is a mixing between the meanings given by Soviet ethnographers and the new requirements of present-day "capitalist" nationalisms (Davenel, 2012).

For the purpose of this article, I must mention one last historical element, also from the Stalinist period. During World War II, the fear that the different peoples of the USSR would collaborate with the Germans or the Japanese led to mass deportations to Central Asia, Kazakhstan being the main destination. Entire peoples of the most diverse ethnic origins and affiliations — including Koreans from Siberia and the Russian Far East, Germans settled in the Volga region since the 18th century, Turks, various Caucasian ethnicities — were deported to Central Asia (Diener, 2004; Westren, 2012; Fietzpatrick, 2016[2015]). After the war, some of these migrant populations did not receive permission to return to their places of origin, especially populations coming from the Caucasus — the "historical enemies" in the Classical Russian literature.[12]This very brief historical sketch suggests that there is in Central Asia a breeding ground of diversity that is similar to the one described by Glissant and Gilroy in their work on the forced displacement of Africans to the Caribbean, which created a diverse and culturally chaotic region. I now turn to the story of displacement of the Dungansat Taatan market to begin sketching out a Caribbean interpretation of local frameworks of ethnic and cultural diversity.

4. The Dungans

The Dungans are Sinophone Muslims who came to the former Russian Empire

[12] A wonderful example of this can be found in the novel *A Hero of Our Time*, published in 1839-1841 by Mikhail Lermontov.

as refugees after their flight from Qing Dynasty China (1644-1911). During the last third of the 19th century there were several Muslim rebellions in the northwest and south of the empire. While the rebels shared the same religion, among them, they created a multicultural mosaic. In the first ethnic classification in Qing China, in which five "peoples" (min, 民) had been identified as Muslim, regardless of their particular history or the language they spoke, all were grouped under the name *hui* (*huimin*, 回民) (Jiménez-Tovar, 2016). The Muslim rebellions were, above all, among those *huimin* who spoke Sinitic and Turkic languages. These rebellions were not motivated by cultural, but rather social factors related to the Qing Empire having been very much weakened after two opium wars and a series of internal difficulties. Nor were Muslims the only ones to rebel. A very complex history of ethnic classifications has meant that, today, the Sinophone *Huimin* are now called, on the Chinese side of the border, *Huizu* (回族) and, on the ex-Soviet side, Dungan (дунгане).[13] For their part, the Turkic-speaking *Huimin* have now been classified, on both sides of the border, as Uighurs. Although there was a wave of migration from the Qing Empire to the Russian Empire, these *Huimin* have a complex history of migration between the two parts of Asia, so it is very difficult to claim that they are entirely "Central Asian" or entirely "Chinese".

Ding Hong (2005) said that in the case of Sinophone Muslims, on the Chinese side of the border, their main distinguishing feature is Islam, while on the ex-Soviet side it is language. When I did my own research on the Dungans of Kazakhstan, I was able to identify three main sub-groups, depending on the province of origin, which implied that they spoke different Sinitic languages and, also, had some ritual differences that, although very subtle, were very significant in the internal differentiation among the Dungans (Imyarova, 2019). These groups are the *gansu Dungans* (located in Zhalpaktobe, Kazakhstan, and in the Dungan communities settled around Bishkek, Kyrgyzstan); the *shaanxi Dungans*, whose epicenter is the city of Tokmok, in northern Kyrgyzstan, and who live on both sides of the border be-

[13] When Dungans arrived in Semirech'e Province, Russian officials recorded their presence with the word *dungane*, and the ethnonym was made official in 1924 by Soviet authorities. There are many hypotheses about the origin of this ethnonym, which can be classified into two main groups: a) *Dungan* is a phonetic derivation of a term used by Dungans themselves when they arrived in the Russian Empire. Hypotheses based on this assertion further suggest the possibility that the term was a geographical reference to the route of migration from Gansu and Shaanxi into Central Asia along the east coast (*dong'an*东岸); east of Gansu (*donggan*东甘); past Tong (*Tongguan* 潼關 or *Dunhuan*敦煌), or to the agricultural military colonies (*tunken* (屯垦) created as the Qing Empire expanded into Xinjiang in the mid-eighteenth century; b) *Dungan* is a phonetic derivation of two possible Turkic terms: *tunggan,* a phonetic adaptation of the Chinese *tunken* (屯垦) described above or, *turupqalghan* (to leave behind) and its short version, *tughan*, both of which are translations of the Chinese word *hui* meaning 'go back, come back' (cf. Jiménez-Tovar, 2014).

tween Kazakhstan and Kyrgyzstan; and the *ili Dungans*, who live in Zaria Vostoka, a neighborhood in Almaty, Kazakhstan. The *ili* Dungans were originally installed in the form of a military colony (*tunken*) near the Ili river in Xinjiang. They had been sent from Gansu by Qing imperial authorities to guard the border, which had been invaded during the 18th century by Turkic-speaking *Huimin*. In Kyrgyzstan there are Dungan communities in Karakol (Figure 8), located in the east of the country, near the border with China, but these Dungan communities are a mixture of *gansu* and *shaanxi*.

The description above refers to the region where I have been doing ethnographic research since 2008, with field research stays in Kazakhstan (2008, 2011-2012, 2013), Kyrgyzstan (2008, 2013, 2016) and the PRC (2012). During this research, the Dungans of Osh were always described to me as very different from those settled on the Kazakh-Kyrgyzstan border, both *gansu* and *shaanxi*. First of all, the Dungans of Osh, who arrived there in the last third of 19th century from Shaanxi, no longer speak a Sinitic language, but have assimilated, linguistically speaking, to the Ferghana valley, meaning that depending on the family, they speak Uzbek, Kyrgyz, or both languages, but not *shaanxi* Dungan or Russian, although in school they would acquire some knowledge of the Russian language.

This state-of-affairs stands in stark contrast with the situation of the communities I investigated in other areas,

Figure 8. Dungan communities in Central Asia.

where Sinitic languages are still spoken, though in fact, there are some Dungans whose everyday language is now Russian with the Sinitic language subordinate. Along with language, their oral tradition is also different. Dungan oral traditionis a mixture of Chinese, Persian and Turkic compound. Due to linguistic loss, the Dungans of Osh no longer have the Chinese component. In addition, the specific features of Chinese Islam, with all its complexities and internal divisions, are not found among the Dungans of Osh. When it comes to food, the Dungans of Osh bring to their tables dishes from Uzbek and Kyrgyz culinary culture.

It is important to note that during the *korenizatsiya* of the Soviet period, when the Dungans of Osh were classified as a *narodnost'*, the folklore and language that were recognized as "official" was gansu. At the time, children had a few hours of weekly classes studying Dungan language in school and that language was gansu. It was in this way that the *gansu* aspect of Dungan culture became arborescent, leaving the *shaanxi* and *osh* dimensions in a situation of opacity. It is evident in the internal division among the Dungans that there are two tendencies: anarborescent one, represented by the *gansu*, and a rhizomatic one, represented by the *shaanxi* and the *osh*. The forced migration in the 19th century, during the particularly harsh winter of 1877-78, in which many people died crossing the Tian Shan mountain range by foot, was extremely traumatic for Dungans. This certainly recalls the abyss that Glissant speaks of, except that, instead of the sea, the Dungan abyss is a mountain range which has become very important in the worldview of the nomadic and sedentary peoples of the region.

The Dungan migration was so traumatic that it severed ties with "China" for more than a century. There is no Gilroy-style diasporization here, but absolute uprooting, Glissant-style. During the Soviet period, the *gansu* were the only ones to receive their own root, leaving the *shaanxi* and the *osh* in the same rootlessness with which they first arrived in the Russian empire. Although it happened differently for each, the *shaanxi* and the *osh* entered into a relationship that creolized them. In the case of the *shaanxi*, they preserved more features of the Islam practiced in China in the 19th century, but, at the same time, incorporated Kazakh, Kyrgyz and Russian characteristics into their diet, language and kinship system. Therefore, even though shaanxi Dungans understand each other, their language presents dramatic variations from village to village.

In the case of the *osh*, they left the category "Dungan" empty as a marker of a particular ethnicity, which has served as a "refuge container" for other ethnicities. However, even though the *osh* Dungans no longer have "Chinese" features in their culture, and, despite many decades of inter-ethnic marriage with local peoples, they are still seen in Ferghana as "coming from China". Let us have a look of how it works in Ferghana.

5. Ferghana in the heart

Ferghana is a place of creolization whose common thread is the Glissantean Relation. First of all, Central Asia is the area through which, historically, multiple trade routes have passed. These routes have often been portrayed as a space where cultural exchanges between empires took place. This position is in line with civilizing discourses that attribute superiority to centers of imperial formations. The problem with thinking about cultural zones in this way is that it follows a center-periphery logic, and in this logic, central Asia occupies a peripheral position in a passive relationship.

However, historians of Central Asia have raised the question of whether the region examined in this article is merely a periphery of the empires that surround it or whether, on the contrary, these empires were able to shape themselves and acquire power precisely because of the exchange that Central Asia favored (cf. Frank, 1992). Like Braudel's Mediterranean, it has even been suggested that the Central Asian steppe is a kind of sea that interconnected the vast Eurasian continental plateau (Boulnois, 2004). That is, with its oasis cities located between steppes and deserts, Central Asia can be thought of as an archipelago (Glissant, 2009).

If only one word could be used to define Ferghana, it would be "heterogeneity", which was the result of, yes, the imperial expansions towards Central Asia: of Persia, Alexander the Great, the Chinese empire, the Mongol empire, the Russian empire, etcetera. On the other hand, we must also recognize a rhizomatic mobility whose protagonists would be merchants, present at all stages of these trade routes. Other rhizomatic characters would be Muslim, Buddhists, Manichaeans, Orthodox Christians, and Zoroastrians pilgrims, just to mention some of the religions that have intercommunicated through this region. These merchants and pilgrims, naturally, would each speak a particular language. All these differences and diversities obliged Central Asians to learn how to communicate among each other, a process in which each group would try not to lose their own specificity while still trying to influence each other.

In her major work historicizing the category of "Central Asia", Svetlana Gorshenina (2014) shows how these "centers of culture" also needed Central Asia as the zone to designate as "barbarian", and upon which the arrow, the invasion, the domination, had to be imposed. Circularity, in Glissantean terms, in early 20th Century Central Asia, however, seemed to continue to function harmoniously given the absence of an identitarian need to expand via conquest, rather, local population was used to be subject of big empires. Social flux there was based on an impulse to exchange. In other words, given the diversity described here, the Relation in Central Asia would admit opaque identities rather than clear ones. It is contemporary na-

tionalism that has sown the "need" for arborescent identities.

At the time of mapping the territory, the Soviet authorities decided to "split" the Ferghana Valley in such a way that the borders between present-day Kyrgyzstan, Tajikistan, and Uzbekistan converged at this area (Reeves, 2014). Giving it ethnic regional autonomy was not even contemplated because there was no ethnic group in the valley that appeared to be a majority, the only valid criterion for granting autonomy (Hirsch, 2005). The inhabitants of the valley did not try to lay claim to such autonomy either. For although the valley belonged to several federated republics, all of them were part of the USSR. In other words, the valley was simultaneously part of several separate countries and of a larger unit, the USSR, an entity that contained them all. These borders did not echo much in the lives of the valley's inhabitants even after the USSR disintegrated (1991). The problems began at the turn of the millennium when the countries in question began to control of their national borders more rigorously. Families started to be cut off from each other by borders and had to go through passport control to visit each other.

The partitioning of Ferghana by more strictly controlling borders, i.e., the taking away of territoriality from local populations to give primacy to the nationalisms of Kyrgyz, Uzbeks, and Tajiks, represents the confluence of three arborescences that threaten the contemporary Ferghanese rhizome. The ethnography of this process of convergence offered by Reeves (2014) became a classic in Central Asian studies, but this reading has limitations, as I have been mentioning throughout this article. Studies like Reeves's fail to account for the very unique modes of interaction in the Ferghana Valley because they are too focused on the arborescent while offering an ethnography that describes a very rhizomatic logic. Reeves's focus on trajectories of individuals is fascinating and provides a wonderful overview of international mobility, but it is too Russia-centered. The reader gets the impression that Moscow is the destiny of Ferghanian migrants even though Taatan market shows a much wider interconnexion.

Such an arborescent approach neglects the fact that survival is not a mere exercise in belonging. Stated plainly: Ferghana makes more sense if it is understood in terms of its Caribbeanness and its rhizomatic elements. Given the context of this Ferghanian Caribbeanness, the solution to the interethnic conflict, produced and reproduced by a discourse of arborescent identities, will only be found in the rhizomatic relations that make the valley a creolized space.

In 2010 it was reported that the Tokmok and Bishkek regions were undergoing inter-ethnic confrontations involving Kyrgyz and Uzbeks. A few days later, clashes of a similar nature, but on a larger scale, were reported in Osh. A study giving the details of the incident in Osh is discussed at length by Akiner (2016). For

purely analytical purposes, I will outline some information that I was able to collect in my fieldwork in Tokmok (2011) and in Osh (2016).

In the Tokmok area, the testimonies I collected in 2011 indicated that the aggressions were indeed orchestrated by Kyrgyz, but that they were not against Uzbeks, but against Uighurs. It turns out that a dairy plant that provided work for several families on both sides of the border between Kazakhstan and Kyrgyzstan was burned down. People who had cows at home sold milk to the factory; also, many inhabitants of the neighboring multiethnic villages went to the plant daily to work. It took a couple of decades (from the disintegration of Soviet Union, in 1991) to build up the factory, which was founded by an Uighur. Before the fire, it supplied fermented milk, sour cream, butter, and cheeses to the whole region on both sides of the border. After the Kyrgyz attacks on the plant (my informants said that it was Kyrgyz nationalism that provoked envy at the success of an Uighur), the Uighur and his family left the town, and the former employees went in search of the perpetrators.

I believe that in the case of the Tokmok area, the conflicts are related, at least covertly, to the fact of "coming from China", a stigma that affects Dungans and Uighurs alike throughout the Central Asian region. In Kyrgyzstan, the reason for this comes down to a poem. *Manas*, an epic recounting the war between the Chinese, the Uighurs, and the Kyrgyz in the 10th century, has made the Chinese and the Uighurs the historical enemies of the Kyrgyz. *Manas* became the pillar of Kyrgyz nationalism after independence (1991) (Gullette, 2010). Uighurs and Dungans are seen as the enemies, but in different ways. The Uighurs are seen in a worse light than the Dungans because, militarily, they came close to dominating the Kyrgyz. On the other hand, while the Dungans are also viewed as "coming from China" by locals, they are not equated to the Chinese in the poem, who are now classified as Han, the ethnic majority in the PRC.

The conflicts in Osh are equally complex as those in Tokmok. According to my discussions with colleagues and my own fieldwork in Osh, conflict is constant in Ferghana. In addition to the above, the conflict between the Kyrgyz and Uzbeks can be extended to the Uighurs. For historical reasons that, for brevity, I will not outline here, there is quite a number of cultural similarities between Uzbeks and Uighurs. The animosity is more exacerbated in the case of the Uighurs: both because of their Uzbek "affinity" and "coming from China", as well as being the historical enemy in the poem *Manas*. Due to the systematic oppression of the Uighurs in the PRC, it is better for local governments to use the word "Uzbek". A colleague told me that in the Osh conflicts, the attacks were carried out, for the most part, against the Uighurs.

We should remember, however, as I have already pointed out, the Caribbeanness of the Ferghana Valley means that

in daily life there is great flexibility in the way ethnicity is displayed in this region. So that while there is an official system of classification, there is also a high degree of flexibility in the ways in which ethnic labels can be used or deployed. This is greatly facilitated by the large number of intermarriages that, historically speaking, have been the norm in the valley.

This disrupts the "ethnicity" of the Dungans of Osh, who, as I have already mentioned, have suppressed their "Chineseness" and have "assimilated" to the Kyrgyz and Uzbeks, so that they can no longer be linked to the enemies of the Kyrgyz hero Manas. Absolute uprooting: "coming from China", but not being Chinese, nor Kyrgyz or Uzbek either. The Dungans of Osh are the epitome of the rhizome. In fact, after the 2010 conflicts, many Uighurs and Uzbeks have preferred to declare themselves Dungans in everyday life in Osh. This is not the case in northern Kyrgyzstan, where Dungans face considerable animosity from their Kazakh and Kyrgyz neighbors.

6. The luxury of the steppe: Umid

To return to the opening of my story at the Taatan market, I had been given the phone number of Umid, a Dungan from Osh who took me to his village. Like Dungans in other parts of Central Asia, the *osh* prefer to live "compactly"[14] and remain a community. Despite intermarriages, patrilineality has been the way of deciding the ethnicity to which a person is ascribed since the Soviet period: a person, regardless of his or her mother's ethnicity, will be officially registered in his father's ethnic group. At the same time, patrilocality ensures that people officially classified as Dungans live in the same place. One characteristic that the Dungans borrowed from their Turkic neighbors is the tradition that the youngest male child, whether married or not, is the one who will have the obligation to take care of the parents in their old age. This gives him the right to inherit the parental home. The older siblings, male and female, will have to look for another place to live. At the same time, the other children do not have to face the economic burden of supporting and caring for the parents. This trait is shared among all Dungan sub-groups in Central Asia.

Umid is the youngest son in his family. A man who, in 2016, looked about thirty years old. Both his parents are Dungan, although his father was born in Tashkent, the capital of Uzbekistan. Umid's father was still young when his grandfather moved to Osh. His mother was born in Osh. Umid's father says that he did speak

[14] I use this emic term employed by Dungans when they explained their society to me. It is a literal translation of the Russian *kompaktno*. This term refers to the fact that they like to live together in the same place. The osh are the only Dungans who do not practice widespread endogamous marriage. Although marriages between cousins do occur, as is the case especially among the shaanxi dungans, interethnic marriages are more common in Osh as long as the couple is Muslim.

some Dungan with his grandparents, but at home they spoke mostly Uzbek. Once in Osh, he learned to speak Kyrgyz. Both being Turkic, the switch between languages is not that complicated. Umid's father writes poetry, but in Uzbek: "if it is written by a Dungan, it is Dungan poetry, even if it is written in Uzbek", says Umid's father, whose poem in a local newspaper can be seen in Figure 9. As for Umid, he speaks Uzbek with his father, but is much more comfortable speaking Kyrgyz. I spoke with them in Russian and could not help but notice that the father's command of this language was much better than his son's. Although, as Umid later told me, his Russian has improved over the years due to his job trading used cars.

Traditionally, Dungans were peasants, but the disintegration of the Soviet Union brought with it the challenge of subsistence in a chaotic context in which states could do little to support their citizens. In addition to the weakness of the new states, a production and trade network that interconnected the entire former USSR collapsed and it took several years for that network to reconfigure and facilitate economically beneficial exchange. In that context, vegetable production allowed Dungans to position themselves quite well during the 1990s in local markets: the Dungans produced food, something that everyone needed. With the turn of the century, the situation started to change. It was then that the Chinese began to fill the vacuum left by Soviet Russia and to view the whole of the former USSR as a market. Since they speak Sinitic languages, the Dungans began to collaborate with the Chinese and act as their translators. Then the Dungans — the Uighurs followed a similar path — began taking advantage of their family networks in Xinjiang, Gansu and Shaanxi in order to become petty traders. Umid followed a similar pattern as his contemporaries. He became a trader, though he declined to work with Chinese goods. This decision was influenced by the fact that his mother tongue was not Sinitic. Instead, Umid found a growing niche throughout Central Asia: cars.

Figure 9. Publication by Umid's father in a local newspaper: a Dungan poem written in Uzbek. Osh, Kyrgyzstan, 2016.

I mentioned at the beginning of this article that during my 2016 trip I was interested in exploring a kind of taste in interior decoration, something known throughout the Russian-speaking sphere as *evroremont*, which, as I indicated above, is thought of as "European". *Evroremont* began to affect tastes in other things as well, including cars. In the beginning, there was a particular thirst for German cars, with Mercedes Benz being the most coveted. Owning a Russian car, for example, was considered to be a marker of poverty, or being ignorant about automobiles. While German cars were the most sought-after during the 1990s, tastes began to change around the turn of the century. A second wave of used cars began to arrive in massive volumes, first from Japan and later from South Korea. These are the cars Umid specialized in. He even knows some Japanese, and he speaks perfect Korean. He learned Korean while living in Japan, telling me that the Japanese language was too difficult for him, not to mention the fact that Korean was easier to learn through his interaction with the car traders from Korea that he met in Japan.

Umid said that the Japanese began to put more restrictions on dealers buying their cars, even if they were used. In addition to the legal paperwork, the taxes that Umid and other car dealers in Asia had to pay increased exponentially so that traveling to Japan ceased being a viable option. So, Korea became the main hub for buying the Japanese cars that Umid and his colleagues then sold in ex-Soviet Central Asia. When he started, he would transport the cars himself by driving them with his assistants all the way from Russia to Kyrgyzstan, preferring to travel through Russia rather than through the PRC. The cars were delivered from South Korea to Russia by sea.

Within five years, Umid was performing the transactions remotely and the cars were shipped by the same partner Korean company. That was in the first decade of this century. By the time I interviewed Umid in 2016, the used car trade in Kyrgyzstan was no longer as profitable as it once was. The Kyrgyz economy had entered an extreme depression after 1991, when industrial activity ceased and the only natural resource the country could exploit was water. The country's citizens could no longer afford to buy Umid's cars. Moreover, the market had become saturated. In any case, Umid continued to take advantage of his contacts in Japan and Korea and longed to take his family to live in Korea once his parents passed away.

– "Everything is modern there", he told me, convinced.
– "And why not China?" I asked him.
– "It does not have the technology that Japan and Korea have, and the Chinese are less civilized".
– "But you are Dungan, don't you come from China?"
– "That was many years ago. I have nothing to do with that. Besides, I am Muslim. I care about my connection with Allah. I do not care about nationalities or languages".

7. Belonging: that impossible wish

The elements are now laid out to allow us to return to the counterposition of the two authors I began to discuss above who have based their thinking on absolute uprooting: Paul Gilroy and Édouard Glissant. Gilroy represented a new way of thinking about roots. Africa would become the macro-root of a diaspora made up of English-speaking Blacks. Glissant opted for the renunciation of any root whatsoever. For him, it is the Relation and creolization that allow access to the Whole-World. Gilroy, in this counterposition, continues to insist on belonging at a macro scale. In Glissant's notion of arborescence there is no room for belonging: it is a fetter that limits the individual from exercising the Whole-World.

In the ethnographic analysis presented in this article, the Ferghana Valley is described as a space of creolization in Glissant's terms. I decided to explore a "problematic identity" in contemporary Central Asia: that of people broadly seen as "coming from China".It is my belief that the rhizome of what Chineseness is constitutes a key to understanding the arborescences of current nationalisms in Central Asia. In a former section I compared Gilroy's thought with Glissant's; both of them have produced models that mirror what it means to be someone "coming from China" in the Central Asian context. Let me explain.

During the 1990's, theories of the "Chinese" diaspora were based on the framework of Gilroy's "Black diaspora". Tu Wei-ming (1991), produced a parallel reading that equated the experience of former slaves with the experience of the coolies and their descendants in the Americas. The experience of slavery inherent in black identities, as well as the accompanying stigmatization of racism, was compared to the stigmatization that Chinese in the Americas had suffered. Chinese presence around the world, according to Tu, needs to be understood in terms of that stigmatization, something that "binds" people of Chinese descendance around the world. FollowingTu Wei-ming, Chinese diaspora studies broadened in scope to include all areas of the globe. Tu's particular interpretation of overseas Chinese, however, has created a deep divide in the study of "Chinese" identities (Ang, 2000; Chow, 2000; Chun, 2017). One point that most critics take up is that it is not possible to speak of a Chinese diaspora in Gilroyian terms because the cases taken as examples are not the product of forced displacement and in many places there is not necessarily a sense of community to be had. "China" is an empty term that denotes a space, a civilization, and a culture, but it is so broad — as an analytical term — that it defines nothing at all, says Chun (2017), so, we have to "forget Chineseness".

The critique among scholars against using the criterium of Chineseness, however, is not directed at Gilroy, but rather at Tu Wei-ming. New approaches to Sinophone (Shih, 2011) as an open signifier that would replace the relative vacuity

of Chineseness rely a lot on Glissant as the key author. Gilroy and Glissant are opposite theoretical foundations in the current debate of what "China" and "Chineseness" constitutes. It makes a lot of sense to bring them to Central Asia when we try to explain the theoretical complexities of the meanings and implications of being someone "coming from China". I mentioned two cases of that category: Uighurs and Dungans, though my ethnography pays more attention to Dungans.

Osh Dungans broke off from using "China" as their origin, although they look at it as part of themselves, along with other identities (Islam, Central Asia, etc.). As for other Dungans in Kazakhstan and Kyrgyzstan, we can see two tendencies: those who were re-rooted after having been derooted in Soviet times, along with other ethnicities, during the *korenizatsiya*, and the ones that were derooted and whose rerooting was not their own. The first ones were the gansu, the second ones were the shaanxi. According to *korenizatsiya* premises, the shaanxi would need to assimilate into gansu culture. In turn, from Soviet times onwards, the gansu became the cultural elite, and, so far, they have kept this place. Talking to gansu Dungans, they usually tried to show me how "culturally advanced" they are in comparison to shaanxi Dungans, who they described as "savages" (ru. *dikii*). Gansu intellectuals often told me that they had a more cosmopolitan, urban, "soviet" culture. Shaanxi Dungans, in turn, complained often that they were never entitled to write in their own language, and that the classes in Dungan they had at school were useless, since they never used the language again and simply forgot what they had learned. The loss of the Sinitic component, in the case of the osh Dungans, made both gansu and shaanxi Dungans to describe them as "poor" (ru. *bednii*) because "they had no culture already: they are Kyrgyz". The division inside the Dungan universe, however, is something that other identities around are not aware of. Gansu, osh and shaanxi Dungans, all of them, "come from China". Nonetheless, my ethnography shows that "coming from" does not equate to "belonging".

The Gilroyian-inspired "Chinese diaspora" does not apply in the case of Umid and the osh Dungans. Umid does not feel he belongs to an original root in China; he is part of a series of local relations (in Osh as his city of residence, and in Kyrgyzstan as his country) and a series of transnational relations (with other ex-Soviet ethnicities, and in his travels to Korea and Japan). Umid speaks whatever language the context demands and has abandoned the folkloric requirement of holding on to an "official identity". It is the same with the whole household and it is also common in the whole village. In fact, there is a rupture of identity in the sense of imagined community: to be recognized by the Other as oneself, or to look at Others as one's own. Umid's "identity" — along with osh Dungans' identity — is Whole-World.

Knörr (2010) added to the criticisms of the way creolization was discussed in

Caribbean thought, in particular, when she states that they sound more like "good intentions". Glissant falls into those good intentions when he tries to defend Martinique's creolized culture while denouncing the identitarian subordination of Martinicans who want to become Frenchified. In Glissant's view, Martinicans suffer because they do not belong, however they might try, to the arborescence that dominates them. Belonging is an arborescent trap, I conclude from Glissant's comments.

Glissant (2009) tells of having discovered the Relation when he first arrived in Paris and lived with other "French" colonial subjects: Vietnamese, Senegalese, Moroccans, Martinicans, Guadeloupeans. This intellectuality constituted a rhizome. But the ordinary Martinican described by Glissant sounds quite arborescent. That is why someone like Umid is so relevant in his "exceptionality". Umid is representative of himself, although he is quite similar to other osh Dungans, and, at the same time, does not embody the characteristics of all Central Asian Dungans. Umid is a Whole-Worlder. Ferghana was already a creolized space to which creolized identities of Muslims "coming from China" arrived, none of this has to do with clearly defined, arborescent identities. There are other actors who choose to be rhizome, or archipelago, and therein lies their true freedom.

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Joyful singing in parks: encounters, appropriations, and contradictions in the dynamic of state governance in urban China

Cantando alegremente em parques: encontros, apropriações e contradições na dinâmica da governança estatal na China urbana

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Abstract Older citizens engaging in casual choral singing in public parks — a form of "social nonmovement" — can serve as a locus to show how cultural and spatial strategies of state governance become entangled, not without friction, in a Chinese city. Marginalized by the new urban economy, the choral singing participants appropriate an older socialist form of state-orchestrated public culture — which has shaped their bodily habitus during the earlier stages of their lives — for fun and socialization. In turn, the central government appropriates this leisure form of choral singing to re-animate Party public culture as a means to secure political legitimacy and promote a harmonious society. Such state-orchestrated public culture, with its implicit spatial order, justifies mass gatherings in public spaces and legitimizes the choral participants' claim of

Resumo Cidadãos mais velhos que se envolvem em práticas casuais de canto coral em parques públicos — uma forma de "não-movimento social" — podem se tornar num ponto de enfoque para mostrar como as estratégias culturais e espaciais da governança estatal se enredam uma na outra, não sem atrito, numa cidade chinesa. Marginalizados pela nova economia urbana, os participantes nestas práticas de canto coral estão a apropriar-se de uma forma socialista mais antiga de cultura pública orquestrada pelo estado — que moldou os seus hábitos corporais durante os estágios iniciais de suas vidas — por razões de diversão e socialização. Por sua vez, o governo central apropria-se desta forma de lazer para tentar reanimar a cultura pública do Partido como meio de fortalecer a sua legitimidade política e promover uma sociedade harmoniosa. A

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public space, even though the post-socialist urban economy has given rise to a new spatial order that marginalizes such activities. This article shows how different state governing strategies designed to govern different aspects of life with different concerns formulated at different times intersect with one another and with ordinary citizens' quotidian practices. Such encounters of governing strategies create space, albeit vulnerable, for creativity in the everyday life of the ordinary.

Keywords: Social nonmovement; mundane lives; public culture; embodied practice; spatial politics..

reanimação desta cultura pública do estado, com a sua ordem espacial implícita, justifica a realização de reuniões em massa em espaços públicos e legitima a reivindicação do espaço público pelos participantes nos coros, apesar da economia urbana pós-socialista ter dado origem a uma nova ordem espacial que marginaliza tais atividades. Este artigo mostra como diferentes estratégias de governança estatal desenhadas para governar diferentes aspetos da vida com diferentes preocupações formuladas em diferentes momentos se cruzam entre si e com as práticas quotidianas dos cidadãos comuns. Tais encontros de estratégias de governança criam um espaço, ainda que vulnerável, para a criatividade no quotidiano do comum.

Palavras-chave: Não-movimento social; vidas mundanas; cultura pública; prática corporizada; política do espaço.

Introduction

In her late 40s, Aunt Ye was laid off when her work unit, like many other state-owned enterprises (SOEs), went bankrupt in the late 1990s because of the economic reforms in China. She was struggling in all aspects of her life. In the mid-2000s she gradually became a regular participant in a choir group in White Cloud Mountain Park, a public park in the city of Guangzhou in southern China. The choir was mostly made up of similarly aged individuals with similar work experience. Aunt Ye would get up very early in the morning and head to the park, then hike up a trail to reach a flat, open space where the choir group would meet. Approaching midday, the group, having done several hours of singing, would part ways. Aunt Ye and her acquaintances often brought their own lunchboxes and ate together after the singing, but, occasionally, they would treat themselves with an inexpensive meal at a restaurant. Afterward, Aunt Ye would head home and let household chores and sewing work keep her busy for the rest of the day. At first, Aunt Ye went to the park once a week; the frequency gradually increased. For several years before her grandson was born in 2014, Aunt Ye attended the choir group five days a week.

Aunt Ye has consistently told me that joining and continuously participating in choir singing made her feel happy and relaxed, and that was why she had been so committed to it. I found this somewhat puzzling: Most of the songs the choral group sang were the so-called "red songs" (*hongge*[1]), which glorified the Communist Party and the socialist revolution, praised the Party's political leadership, and promoted patriotism. But the state-led economic reforms broke the socialist promise and brought them unemployment and hardship. Why is it that people like Aunt Ye, who have been marginalized in the new political economic order of the Reform era, still engage happily with the socialist public culture of "red songs"? The answer to this question quickly became clear as I started to realize that this practice of singing "red songs" in public parks was a widespread form of leisure that reflected a shared set of generational experiences.

Aunt Ye's commitment to choral singing is by no means unique amongst her generational peers, particularly women, in contemporary urban China. In Guangzhou, open spaces in major public squares and parks are usually occupied by groups of middle-aged or older women singing and quite often dancing in the mornings and evenings.[2] These collective leisure activities are not always well received by other urban residents. Many complain about the singing or music as noise, saying that such choral and dancing groups should not occupy leisure space that is meant for the general public.[3] Older women who participate in collective leisure activities in public spaces are called "*dama*", a term that is used to refer to older women in general but that is now imbued with derogatory connotations — loud, unpolished, and old-fashioned; they have become objects of ridicule in the media and among the younger generations (Wang, 2015; Huang, 2021).

The visibility of leisure activities in public spaces reflects a significant change in urban life in China over the past decades. In fact, urban residents, especially the older ones, have long participated in various forms of leisure activities such as *taiji* in public parks and squares; what has newly emerged in the past two decades are the sheer scale and predominant presence and involve-

[1] The official pinyin system for romanizing Chinese characters is used throughout the text.

[2] Covid-19 has brought tremendous interruptions in leisure activities in public spaces in China since 2020. Nonetheless, according to my interlocutors, many older citizens continued their leisure activities whenever local government relaxed the control of outdoor activities (mostly in 2021).

[3] In a few cases in some cities, the fight over who had access to specific public spaces led to violent confrontations. See, for example, 'Guangchangwuchongtupinfa' (Conflicts over square dance frequently occurred), *ZhongguoQingnian Bao*, November 24, 2013, news.xinhuanet.com/politics/2013-11/24/c_125751851.htm, accessed March 4, 2017; Zhao, Kiki, 2016, 'China's "Core Socialist Values", the Song-and-Dance Versions', *The New York Times*, September 2, www.nytimes.com/2016/09/02/world/asia/china-dance-socialist-values.html?_r=0 , accessed March 4, 2017.

ment of women.[4] To put this scale into perspective: some have estimated that collective dancing had by 2015 amassed more than 100 million participants (*The Paper*, 25 Nov. 2020). Unlike in the Maoist years (1949–1976) where one's life was constantly under the gaze of the party-state through various state-affiliated institutions from schools to work units, in the reform era, urban residents have much more autonomy in deciding how to lead their lives and to use their free time (Rolandsen, 2011). That said, anthropologists who study public leisure activities in Chinese cities have suggested that public spaces are "tightly controlled by the city and the state" (Farquhar, 2009: 559; see also Huang, 2016). If the state's control of public spaces is indeed tight and large groups that engage in collective activities are under constant surveillance, then why does the government tolerate such a highly visible, large-scale way of claiming public space, organized neither by the government nor by state-affiliated organizations?

Existing studies read these leisure activities as "a form of peopling the city" (Farquhar, 2009: 559), a "non-political social collective" outside the reach of the state (Huang, 2016), or an alternative form of social space to the ideal space intended by urban planners and leaders (Oakes and Yang, 2020). While existing studies of collective leisure activities offer plenty of insight, their analysis may give the impression that the state imposes its control in a top-down manner and follows only a singular, coherent logic of governance. Drawing on long-term fieldwork with older women in Guangzhou, this article suggests that mundane practices such as collective singing among older citizens in public spaces do not simply defy or exist as an alternative to the state-sanctioned social-spatial order.[5] Rather, they are integral to the complex dynamic of state governance.

This approach reverses the conventional analytical tendency to find agency only in practices that explicitly defy a given, suppressive political authority or system. The women in these choral groups have agency but the agency of their actions is not explicitly defined in opposition to the party-state. This article draws upon anthropological scholarship of the state to focus on mundane action as the locus to unpack the multi-dimensionality, inconsistency, and dynamics of state governance. This approach takes note of the risk of interpreting agency in the re-

[4] This gender dimension of these leisure activities can be contextualized in a range of important social, economic and political forces, which will be addressed in a different article. For existing analysis focusing on gender, see (Wang, 2015; Yang and Feng, 2017; Huang, 2021).

[5] I started to pay attention to park choral groups in Guangzhou in the mid-2000s. I spent a substantial amount of time observing the singing practices and listening to the stories of some participants. I studied the collective singing more systematically in the summer of 2013 when I lived in a low-income neighborhood and tried to understand the impacts of the new urban development regime on the lives of low-income residents. I continued such observation and conversations with my interlocutors through regular short field visits in Guangzhou between 2014 and 2019.

sistance-domination dichotomy without contextualizing local practices that are historically and culturally specific (Abu-Lughod, 1990; Ortner, 1995). This is a bottom-up approach, and such an approach is important because it provides a more nuanced understanding of the larger political implications of non-politically-motivated mundane action, especially in countries like China ruled by powerful authoritarian regimes with a clearly-articulated agenda of governance and an unquestionable capacity for imposing their will on society and citizens.

Rather than focusing on the subjectivities of individuals, this article pays more attention to practice and impact. This by no means tries to downplay subjective experiences or to separate practice from subjectivity. As will be shown later, how individual choral participants feel is crucial to understanding the complex role that individual subjectivities play in the multi-dimensional dynamics of state governance. Individuals are often inadvertent political actors, and their actions are often open for interpretation. The action and the ensuing interpretations affect both lives and social order at multiple levels and scales. This is particularly true of the action performed by large collectives of people. The notion of collective action is particularly intriguing in the Chinese context because of the importance of collectives during the Maoist decades. Present-day collectives like choral groups have little to do with Maoist collectives but they also have a large number of participants. I use "collective singing" and "choral singing" interchangeably to acknowledge the scale of action and the socialization dimension of these group activities.

Drawing on Asef Bayat's work (2013), I approach the choral singing of older citizens in public spaces as a form of "social nonmovement," bringing to the forefront the generational dimensions and pragmatic concerns of choral singing participants and the political potential resulting inadvertently from the scale of their collective leisure practices. Meanwhile, this nonmovement shall be understood as a space for encounters. Collective singing in public by older citizens is an embodied practice that evokes an earlier form of state-orchestrated public culture emerged during the Maoist period. Collective singing in public spaces was a key part of the fabric of daily life under Mao and an important cultural strategy of state governance to establish and reproduce political legitimacy. After decollectivization, the practice of choral singing lost much of its cultural and political salience in the public sphere before being revived at the turn of the millennium. It was in this context that officials and local governments re-appropriated this earlier form of Maoist public culture and capitalized on its authority to further their ends. Such re-appropriation can be seen as a cultural strategy of state governance, but it also legitimized older citizens' massive presence in public spaces, even though the new spatial order under the contemporary state-led model

of urban governance marginalizes the value of such noisy, collective activities in public spaces.

This ethnographic study conceptualizes collective singing among older citizens as a space in which different state governing strategies — designed to govern different aspects of lives with different concerns formulated at different times — intersect with one another and with the quotidian practices of ordinary citizens. Such encounter manifests the multi-dimensionality, temporalities, hidden contradictions, and multiple appropriations in the workings of state governance, as governing strategies, some clearly articulated and some inherent, permeate everyday life. This bottom-up approach shows that, for an in-depth understanding of how state governance works, it is not enough to focus only on the rationale and objective of specific governing strategies, as the unfolding of everyday life often complicates the operations of governing strategies in unintended ways.

Deconstructing the monolithic state: the quiet encroachment of the ordinary

Anthropologists and social scientists working on contemporary China are sensitive to questions of power and domination and many are inclined to look at the authoritarian state as *the* defining structure that directly configures everyday life. Some researchers may emphasize the suppressive and controlling dimension of the state (for example, studies concerning civil society), while others focus on the productive side of state power (for example, those following the Foucauldian line of biopolitics). This concern with state power is very insightful when it comes to making sense of the relatively subtle forms of politics that permeate the fabric of urban lives and landscapes, but it can also be somewhat misleading because it often leads researchers to make sense of mundane practices like choral singing primarily in relation to state power and without unpacking the complexities and contradictions of state-led practices of governance.

Let me elaborate this point by zooming in on three studies on collective leisure activities in public spaces in Chinese cities. Having conducted ethnographic research in the city of Chengdu in the mid-2010s, Claudia Huang (2016) attends to the collective dimension of older women dancing together. She suggests that this collective activity cannot be seen as the practitioners' endeavor to re-activate the collective ideal from the Maoist years; instead, collective dancing shall be seen as a venue through which the practitioners cultivate individual identities "through consumer choices" (p. 238). With emphasis placed on individualized choices, the collective in collective dancing is therefore understood as a co-presence of individuals rather than a social form inherent in the socialist state. Huang thus sees collective dancing as "a large-scale, non-political social collective … one of the only means through which people can

participate in large-scale groups outside of the grip of state control" (p. 238).

Working in the city of Beijing, Judith Farquhar (2009; also 2002) is equally sensitive to the state but in a different manner. She conducted research on leisure activities in Beijing in the 1990s and early 2000s. This was a time when a series of social and economic reforms, in which the centrally planned economy was gradually replaced by a market-oriented economy, extended from rural areas to the cities, bringing a sea of changes that Yan (2010) calls "individualization." In this context, many scholars observed the retreat of the state and the de-politicization of everyday lives. Yet, Farquhar cautions against a narrowly defined concept of the political. Shifting from politics in terms of state-individual relationships to politics in other social and political arrangements such as the rural-urban divide, Farquhar suggests that the "ordinary action of the people" can be understood as "quiet politics" (p. 559).

Like Farquhar, cultural geographers Tim Oakes and Yang Yang (2020) also attend to the ordinary people's experience but from a spatial perspective. Drawing on fieldwork in Guizhou province, an area of southwestern China with many ethnic minority groups, they suggest that collective dancing here expresses a form of "vernacular urban modernity". This vernacular form emphasizes the urban as "a developed, non-ethnic space of civilised modernity" against the perceived backward rural spaces, which differs from the "hyper-visualized" one that is designed and envisioned by planners and officials with ethnic tourism in mind (p. 64). Yet, the kind of social space produced by collective dancing should not be seen as a challenge to the state's spatial order, but rather an alternative way in which ordinary residents imagine how city life should look or sound like.

These works provide vivid descriptions and plenty of insight to understand the leisure activities and their participants. Looming in the background is the party-state: in Huang's account, the state is presented as tight control of large social groups, in Farquhar's, surveillance of public space, and in Oakes and Yang's, officials in pursuit of hyper-visualized, civilized urbanism. Each of these representations portrays state governance in a somewhat static and one-dimensional manner, with a single rationale and functional coherence in its governing strategy or practice. These representations are very insightful, but as I will show later, they do not capture the messiness, ambiguities, and dynamics of state governance on the ground. Building on the insights of these studies, this article proposes a practice-oriented approach to state governance and collective leisure activities in public spaces that reverses the order of the analysis. Rather than reading the meanings of mundane action against a presumed order imposed by the state, I take mundane action as the focal point to understand state governance.

Critical studies of the state in anthropology and the social sciences have carefully unpacked the concepts of the state and governance. Instead of being one holistic entity, the state is a machine with layered structures and institutions, the operation of which is made possible and complicated by politicians, bureaucrats, experts, and ordinary people holding different socio-economic positions under historically specific conditions (see, for example, Gupta, 2012). The state is as much about its institutions, bureaucracy, and paperwork as it is about ideas and imaginations with discrete temporal and spatial dimensions (Hansen and Stepputat, 2001; Ferguson and Gupta, 2002; Hull, 2012). If governance is understood as "all endeavours to shape, guide, direct the conduct of others", as Rose suggests (1999: 3), the study of state governance is to investigate political reasons and technologies that contour various forms of state discourses, institutions, apparatuses, and practices (Barry et al., 1996). State governance is heterogeneous (Rose, 1999). Political governance emerges out of the recombination of heterogeneous elements that may not have functional coherence (Collier, 2009). Meanwhile, the formation and re-formation of the state unfold on the legal-institutional level as well as in the lives and everyday encounters of ordinary citizens (Navaro-Yashin, 2002; Santos, 2021). This study takes mundane practices — in this case, choral singing among older women — as a key domain in which various logics of governance and technologies of state power have been deployed and the incoherence if not contradiction of these logics and technologies becomes visible, negotiated, compromised, and sustained.

Here I see choral singing as a form of "social nonmovement," a term that sociologist Asef Bayat (2013) proposes in his nuanced analysis of street politics in which marginalized groups illegitimately occupy streets for their own use in Middle Eastern societies. With attention to actions and effects rather than articulations and subjectivities, Bayat coins the term "social nonmovement" to refer to "the collective actions of noncollective actors" (p. 15). The "nonmovements are made up of practices that are merged into, indeed are part and parcel of, the *ordinary* [sic] practice of everyday life" (p. 21) such as the poor selling goods on sidewalks. They do so out of everyday pragmatics to "survive and improve life" (p. 48). Such nonmovement is thus a "quiet encroachment" of public spaces. As in the "quiet politics" suggested by Farquhar (2009) in her analysis, "quiet" here does not refer to the sonic scape of these collective actions. One could easily imagine the lively cacophony in the streets and other public spaces with people selling merchandizes or singing and dancing.[6] "Quiet" here is used metaphorically, hinting at the nature of the action of occupying public space being illegitimate or without prior official approval. "Quiet" also refers to the

[6] For an exploration of the sonic dimension of park activities in Chinese cities, see Richaud (2021).

fact that participants of the nonmovement are not ideologically driven and do not pursue a clearly articulated political agenda. This is not a "movement," as is usually understood in social activism and movements. As suggested in Huang's (2016) observation of collective dancing as co-presence, the collective dimension of the nonmovement is a result of convergence rather than intentional organization. The "power of nonmovements rests on the power of big numbers, that is, the consequential effect on norms and rules in society of many people simultaneously doing similar, though contentious, things" (Bayat, 2013: 21).

Like the subjects described in Bayat's writings, older women like Aunt Ye, rendered marginal in the new political economy of the Reform period, gather to sing in public spaces voluntarily without formal mobilization or organization. They do so because of the need to get out and to socialize without any clear intention to either show allegiance to the state or challenge it. That said, there are also important differences between the Middle East and China, and these differences need to be taken into account. Bayat makes the case that nonmovements in the Middle East are possible because regimes "lack capacity, consistency and machinery to impose full control" (p. 28), but the state apparatus in China does not have this problem. In fact, increasing control of public spaces and large-scale gatherings has been one of the key tasks of the Chinese government. Moreover, as Bayat focuses on the topography of social nonmovements, the link between these nonmovements and state power has not been sufficiently analyzed. So what makes Aunt Ye and her peers' "noisy" encroachment of public spaces possible? What does this not-so-quiet "quiet encroachment" entail for the norms and practices associated with state power? More broadly, how does choral singing as a form of nonmovement contribute to an in-depth understanding of state governance?

The not-so-quiet encroachment of the ordinary: singing and the politics of life

An urban forest park on a hill not far from the city center, White Cloud Mountain Park has been popular among urban residents wishing to get some fresh air and physical exercise upon an easy hike. This was where one of the earliest choral groups in the city emerged in the mid-1990s. According to Aunt Ye and her acquaintances, that choral group was started by several regular park visitors, all of whom laid off by SOEs, gathered to sing where there was a relatively open platform but shaded by trees from direct sunlight. Very quickly the group attracted other passers-by and exercisers. As the number of participants grew, the group gradually took the shape of a choir. One participant volunteered to handwrite the lyrics and musical notations in big fonts on large newsprint paper, hung up for participants to follow along as they sang. Some took

Figure 1. A choral group with its own ensemble. Photo by the author in 2017.

turns to be the conductor; some chipped in to buy stereo equipment for accompaniment. The singing could begin as early as 7:30 in the morning, and many would stay on for hours. The peak time was roughly between 10 am and noon. Some participants would bring lunchboxes and hang around until early afternoon. On some weekends in the late 2000s and early 2010s, there were more than a hundred participants gathering at the forest park (Figure 1). Similar choral groups can be seen in other urban parks in the city and anyone can join in at any time. In some other parks, choir groups even had their own instrumental ensembles.

The choral groups I have observed over time have comprised mostly people born in Guangzhou in the 1940s and 1950s, with their teenage/formative years shaped by waves of political movements, including the Cultural Revolution in the 1950s and 1960s. Upon graduating from middle school or high school, many were sent by the government to rural areas for "re-education", living and working in collective farms for various lengths of time, some over a decade.[7]

When they returned to the city in the late 1970s and early 1980s, many became workers in state-run work units. These were mostly SOEs and some government-affiliated institutions. While the

[7] The government, motivated by ideological, political and socio-economic reasons, had sent young people from the cities to the countryside for re-education. For detailed discussions on the sent-down movement, see Honig and Zhao (2019).

economic reforms were already underway in the rural areas, lives in the cities remained heavily shaped by the centrally planned economy. Throughout the 1980s and early 1990s, employment in a state-run work unit was stable with a welfare package unavailable to people running a small business in the city or registered in a rural area.

In the mid to late 1990s, the economic reforms shifted focus from the rural to the urban areas, and the government began to pressure many SOEs to reduce their workforce, later even letting many go bankrupt. Many of the choral participants were among the workers who were laid off during this period, and they were in their late 40s or early 50s at the time. Many had tremendous difficulty finding a new job, especially the women. The state-led economic restructuring had led to a huge number of people, who were still in working age, becoming "surplus labor," a supposedly neutral description in the official narrative.

People like Aunts Huang and Ye experienced this process as displacement and disorientation. Many of them suddenly found an everyday void — that they had nowhere to go. This was the time when choral groups, with a substantial number of participants, gradually took shape in urban public parks. In this specific context, choral singing, as it emerged, may not necessarily be considered as a form of leisure activity from the perspective of the participants. To categorize an activity as leisure presumes the existence of formal or informal work arrangement in one's life in a modern society (Turner, 1982; Rolandsen, 2011), but most participants of choral singing I encountered did not have a formal job. As they tried to make a living, they often picked up gig work and worked from home.

Uncle Tan and his wife, founding members of one choral group, lost their jobs in the 1990s. With their meagre severance pays they opened a small tailor shop, offering sewing service, earning just enough to get by. Another former SOE worker, Aunt Huang lost her job when her son was in middle school. Her husband, who used to work in the same factory, also lost his job. While he managed to find employment elsewhere with his engineering skills, it was much harder for Aunt Huang. She took piecework from contractors, doing some knitting and sewing at home. During fieldwork, I saw Aunt Huang carefully mounting her beautifully hand-crafted ladybugs, flowers, and other knitted pieces to clothing items bearing international fashion labels such as GAP. Aunt Huang had neither heard those brands nor set foot in their shops, and these work orders came irregularly. Sometimes Aunt Huang had to work long hours in order to finish all the pieces on time, while there would be days for which she had no order at all.

A conversation in the mid-2000s I had with Aunt Lin, one of Aunt Ye's companions in the choral group at White Cloud Mountain Park, well captured the feelings of many women in her position.

Aunt Lin was talking about the days not long after she got laid off:

"We were stuck at home all the time. Our attention was all on our family members. Even though I didn't like the TV drama my mother-in-law was watching at the time, I wouldn't change the channel. I just sat in the living room. My son's clothes simply didn't look right to me. I wanted to know what he was doing at school, but he wouldn't talk to me. He said I wouldn't understand. I spent time cleaning the apartment, but how big was the apartment? I cleaned it every day, so how dirty could it be? I went to the market twice a day and cooked three times. But what was the point?"

For many participants, choral singing enabled them to get out of their home and find a way to let off some steam. Aunt Lin joined the choral group in the forest park after a former colleague convinced her to give it a try. Aunt Lin then brought Aunt Ye to the group. The singing gatherings provided an opportunity to get out of home and re-socialize into circles beyond one's immediate family. People like Aunt Lin and Aunt Ye reconnected with former colleagues and made new friends.

Choral singing as a large-scale social gathering is indeed a result of convergence of individuals from the same age group navigating life difficulties. Participants gather to sing, because singing cheers them up and relaxes them. Many of my interlocutors have separately told me that their bodies feel very good, as if they can release from the body not only merely the sounds but also the unhappiness. In addition to singing, they gather together to talk about what would be considered the nitty-gritty of life: which fresh market has the cheapest vegetables, how to cook a specific dish or clean a stain off a shirt, how their spouse or children have upset them at home, and so on. This form of sociality brings about a sense of community in life for individuals who share the experience of having no choice but to handle the ruptures. The sense of collectivity that manifests in choir groups differs from the high socialist sense of collective experienced in work units in urban areas and communes in rural areas. People like Aunts Ye and Huang are not organized in choir group collectives placed under a single authority capable of imposing work routines and controlling everyday life. Yet, while the singing and the gathering may be mundane, it is not just the sheer number of participants in public spaces but also the songs they sing that get them entangled in the complex operations of the state and its governing practices.

Red songs: habituated practice, bodily performance, and public culture

Choral singing by older women like Aunt Ye in public parks has a visible feature: while the repertoire has a wide range of songs including pop songs, folk songs, scenes and numbers from Cantonese operas, many of the songs are

so-called "red songs" (*hongge*; see also Qian, 2014). The lyrics of these songs encourage people to love the country, the Chinese Communist Party (CCP) and its leaders, to embrace socialism and revolution, and to take pride in being workers, peasants and soldiers. Typical titles and lyrics include "No new China without the CCP"; "This is a beautiful homeland where I grew up … This is the homeland of heroes where I grew up …"; "The east is red where the sun rises; China has Mao Zedong; He brings happiness to the People; He is the people's savior; He is our shepherd … leading us forward …"; and "socialism is good; people in socialist countries have high social status … socialism is destined to triumph; communist society is bound to arrive …"

Having listened to their conversations and talked to them many times during longitudinal fieldwork, I have come to realize that many choral singing participants often have an ambiguous and sometimes cynical attitude towards the party, the government, and the past. Some of them told me that they used to genuinely believe in socialist ideals and the party. However, having experienced being sent to remote farmlands for re-education and later being laid off, many no longer believed in the content of the lyrics they sang. I remember vividly that in one lunch gathering among choral participants in the late 2000s, one woman angrily said: "It was a lie that people in socialist countries have high social status! CCP has betrayed us!" She was in her early 50s. Both she and her husband had gotten laid off, her child was still at school age, and her mother-in-law suffered from a chronic disease. She was struggling financially, physically, and emotionally. Other participants chimed in, for they in many ways shared similar predicaments. They were fully aware of the fact that workers no longer had the same coveted status as before, and that as laid-off workers they did not fit into the new economy. The choral group participants pointed out that the government had broken its promise and caused them to lose their jobs. While they had to make do with meager compensations, officials' corruption went rampant and government-level state employees were incredibly well paid. Even though choral group participants would admit that they loved their country, their attitude toward the party, the government and the past was often ambiguous at best, if not cynical. Their anger and frustration receded substantially from the 2000s to the 2010s as they gradually got into the usual retirement age. With their children joining the work force, they felt less financial stress and started to enjoy the free time. Nonetheless, they often preferred not to talk about the government, most of the time not because of self-censorship but because "it is hard to say," as several of them told me.

Knowing their attitude, I felt puzzled: they knew that the state-led economic reforms had broken the socialist promise and brought them unemployment and

hardship, causing them to be marginalized in the new political economic order, so why would they still voluntarily sing these songs? How could they feel happy and relieved when they sang these songs?

"We don't think; we just sing", Aunt Ye and other participants told me. "I don't need to look at the lyrics. I remember them well. They are our songs!" Aunt Lin said. Aunts Ye, Lin and others have pointed out an important dimension in choral singing that observers often overlook. Singing is not just about the lyrics (meaning the text); it is corporeal and aesthetic. One's preference for a certain musical genre is an obtained taste acquired through exposure and repetition. Aunts Ye, Lin and their acquaintances were involved in collective activities of singing red songs when they were teenagers and they developed an embodied sense of fondness for this musical genre. Just as many teenagers outside China back in the 1960s and 1970s became fans of the music of rock bands like The Beatles, so Aunt Ye and her peers listened to red songs and performed these songs regularly as these were a key part of the public culture of Chinese cities in that period.

Here, public culture includes music, dance, symphony, ballet, and other cultural forms and performances. By using the term "public" rather "political", in line with Brownell (1999: 208), I emphasize the "communicative structures" and "discursive spaces" that these cultural forms provide (see also Appadurai and Breckenridge, 1988).[8] As many scholars have shown, the party-state has actively designed and deployed cultural performances to shape the mass's perception on history, boost nationalism, wield popular support for the party and socialism, and reproduce political legitimacy (Wang, 1997;Brownell, 1999; Hung, 2011; Wilcox, 2016). As part of the public culture, red songs were first composed in the 1930s and 1940s to bolster morale during the Sino-Japanese War and civil wars. The Maoist era, particularly the Cultural Revolution, saw the burgeoning of red songs composed or adapted in films, symphonies, ballets, and other stage performances. New themes for the red songs emerged in the 1980s and 1990s, celebrating the reforms and the late leader Deng Xiaoping, while patriotism continued to permeate the lyrics.

The period from the 1950s to 1970s was a peak time when cultural performances were heavily used for propaganda. My interlocutors, who were coming of age then, listened to them on the radio, and watched choir performances of red songs. They sang red songs at school, at home and in the streets where they played with their friends. When they were working and living in the collective farms, they still sang those songs. After they returned from the countryside, participating in or watching choral singing of red songs on

[8] The term "political culture" in the Chinese context often refers to unspoken rules and practices in high politics.

national holidays remained part of their lives in the state-run work units. Some of my interlocutors described their connection to the songs this way: "My body feels it. When the music plays, I automatically sing along". Singing these songs for the choral participants is about aesthetics as much as a cultivated form of embodied practice and a way of inhabiting public spaces without having to ponder any deeper meanings. Such bodily habits and aesthetics were acquired through rehearsing state-orchestrated bodily movements and choreographies as well as through participating in the social and human interactions that the public culture had dictated and fostered during the early period of their lives.

Meanwhile, choral singing is also a form of performance. Depending on the occasion, it involves singing techniques, collaboration among different sections of the choral group guided by a conductor, stage setting, costumes, makeup, and many other things. Some choral singing participants take this seriously and would participate in red song singing competitions and performances organized by the government or a private entity to provide entertainment on special occasions such as a company's anniversary. Some interlocutors have told me that they do it because they like the performance aspect (*xihuan biaoyan*). They enjoy singing and being on stage under spotlight. By emphasizing singing as performing and acting, my interlocutors implicitly maintain a distance from the official meanings of the songs or the performances. This is not to deny that official meanings embedded in the public culture have no impact on my interlocutors.[9] However, those meanings have been challenged and negotiated through different stages of their lives. What often goes unnoticed is how the form and the aesthetics of the public culture of a certain period have a lasting influence on embodied practices.

By noting the importance of form and aesthetics, I want to highlight that the act of participating in red song choral groups is not necessarily politically motivated; if these collective singing activities in public parks have a political association, it is inadvertent and largely beyond the participants' control. As mentioned earlier, supporting the construction of particular forms of public culture was a cultural strategy of governance for the party-state under Mao. The beginning of the reforms in the late 1970s led to a sea of changes in the industry of cultural productions including the commercialization of cultural institutions, industrialization of cultural practices, and diversification of cultural forms. However, the state apparatus has continuously engaged in public culture as one of the discursive domains to rebuilding political legitimacy. On the one hand, the state-controlled broadcast authority has continued to practice censorship, regularly issuing orders and compiling lists that forbid cer-

[9] See Qian (2014) for a diverse interpretation of the song lyrics among choral singing participants.

tain topics and genres to be mentioned in various cultural performances and entertainment shows in the market-driven mass media. On the other hand, the central government has actively promoted specific songs, dances, and other cultural performances through the official New Year's Eve gala and other galas on public holidays during the year.

Red songs took center stage in the late 2000s and early 2010s when they became a tool for political competition at the top level of the state apparatus. Bo Xilai rose to political stardom in the 2000s. Bo's father was a war hero and important political leader who endured much hardship during the Cultural Revolution, and the young Bo, being part of the family, was influenced by the public culture of that period. In 2007, after Bo became the party secretary of Chongqing, one of the biggest cities in China, he deployed rhetoric that echoed what Mao utilized to launch the Cultural Revolution, a rhetoric that emphasized the significance of cultural construction.[10] Bo launched a "red song campaign" as one of his initiatives to revive the "red revolutionary culture," through which the term "red song" became popular. The use of red song campaigns became a tool for Bo to assert political orthodoxy following Mao's path so as to compete for power in the political system. Local television channels in Chongqing were ordered to replace popular soap operas and sitcoms with red song shows and censored dramas.

Red song campaigns went viral in the country roughly between 2008 and 2012 (see also Qian, 2014; Kipnis, 2016, chapter 5). Such campaigns were held on college campuses, as red songs "had great educational and moral value" for the youth. Government agencies, SOEs and state-affiliated organizations (such as hospitals) allocated work time for employees to practice singing red songs.[11] All efforts culminated in the grand red song competitions in 2011, with choral groups from different institutions and self-organized groups including park choral groups gathering to celebrate the 90th anniversary of the CCP. The fall of Bo Xilai in the early 2010s has since entailed a disappearing of large-scale red song campaigns. Nonetheless, local officials found a renewed interest in the collective singing and dancing activities. As such activities seemed to keep people happy, they saw in the self-organized choral groups as an opportunity to push the agenda of community building, an agenda that upper-level officials regard as crucial to a broader

[10] For more detailed discussion on Bo's strategies aiming at the top leadership position, see Zhang (2021).

[11] Unlike older choral singing participants in parks, the younger generations employed in these workplaces were not enthusiastic about the practice of red song singing. My younger interlocutors clearly did not feel the same kind of corporeal and aesthetic attachment to the red songs that I encountered amongst the older generations. For the younger generations, the red song singing campaigns only prolonged working hours and caused work delays. Sometimes workplaces had to award gift cards or cash to employees as a way to motivate them to join red song singing activities.

agenda of building a harmonious society and maintaining stability (Qian, 2014).[12]

Some of my interlocutors and their choral groups had participated in some officially staged shows. As mentioned earlier, many of them did not care about the high politics involved or the specific agenda that the local government had. Collective singing and square dancing in public spaces clearly bear the imprint of an earlier period of revolutionary state politics involving the political mobilization of the masses, the production of loyal subjects, and the tight management of collectives around work units. As forms of public culture, collective singing and square dancing are undeniably political and ideological. However, the way people related to these earlier revolutionary forms of public culture changes over time.

That said, the form itself — mass singing of red songs — is instrumental for the choir groups to be incorporated into the government's grand narrative of governance. The government and official media use photos of the park choral singers' participation in official celebration in its narrative to illustrate the ordinary citizens' devotion and love for the country and the party. The enthusiasm and engagement of the choral participants thus have the effect of keeping the state-orchestrated cultural form alive. Intriguingly, while choral participants' singing practices have the unintentional effect of contributing to the resurgence of an earlier form of public culture, the government's exploitation of theses practices of voluntary choral singing among ordinary citizens also has its own unintended consequence in complicating spatial governance.

Same parks, different spatial orders

The state-orchestrated forms of public culture have a spatial dimension: not only have they been performed in theaters, cultural halls, and other confined spaces, but they have also been spectacularly staged and displayed in public spaces. They need to be seen publicly so that what messages need to be related to the masses can be conveyed. The public space, since the CCP came into power, has gradually become (re)purposed for monuments, state rituals, symbols, and political mobilization.[13]

This is well illustrated in Tian'anmen Square in the capital city of Beijing. Originally conceived as an open space where thoroughfares intersected, Tian'anmen Square was built during the early twentieth century near the Gate of Heavenly Peace (Tian'anmen) in front of the Forbidden City. Under the CCP's lead-

[12] See also Huang (2016) and Oakes and Yang (2020) regarding how local governments seek to incorporate collective dancing into their social engineering programs in a pursuit of modernity and development.

[13] From a Habermasian framework emphasizing rational debates to a Foucauldian approach relating the production of space to the production of proper citizen-subjects, different theories highlight different kinds of social and political significance of public space. For detailed discussions, see for example, Low and Smith (2006).

ership, buildings were torn down to make room for one of the biggest squares in the world. On one side of the square the Great Hall of the People was built, where the People's Congress would take place. On the opposite side now stands the Museum of Chinese History, which projects a revolutionary history in which the CCP saved a ravaged country and led the people to triumph. At the center stands the Monument to the People's Heroes dedicated to martyrs who gave their lives to the new China. After the death of Mao Zedong, a mausoleum was added to the square in memory of this great leader. During the Maoist years, Tian'anmen Square was the center of political mobilization. Political leaders would stand atop the Gate of Heavenly Peace to accept cheers from thousands of ordinary citizens in relatively peaceful times or the red guards during the Cultural Revolution. The military marched and paraded along the street between the Forbidden City and Tian'anmen Square on important occasions. Public space as such enables a "sacralization of power" (Lee, 2011), lending legitimacy to the party and the social revolution. While Tian'anmen Square is exceptional in terms of scale and richness of symbols and rituals, many Chinese cities have similar public squares where state-sanctioned narrative of history, images, and iconography are displayed, and cultural performances performed on special occasions. Public culture and public space have been mutually embedded.

At the local level, building public parks and squares have had another layer of spatial-political significance. Many of my older interlocutors remembered that their parents participating in the building of public parks — opening up the land and digging into the ground to make lakes — in Guangzhou in the Maoist years. This kind of work by ordinary citizens is called "voluntary labor" (*yiwulaodong*). Typically performed in their non-work time, voluntary labor was a result of mass mobilization rather than individuals' choice (Rolandsen, 2011). Such voluntary labor included all kinds of activities, from constructing parks and buildings to cleaning streets. On the one hand, the imposition of voluntary participation could be a strategy for the local government, short of money and resources, to build the new socialist cities. On the other hand, by mobilizing ordinary citizens — men and women alike, the CCP government gave ordinary Chinese — to borrow Spotts' (2002) eloquent words on architecture and other art forms in Nazi Germany — a "meaningful sense of political participation, transforming them from spectators into participants in [the] National Socialist theatre" (p. xii). In this sense, such participation in the making of public space is as much material and physical as is symbolic. While it is true that the party-state has monitored and controlled large-scale gatherings in public spaces to prevent or control protests, it is also the case that public spaces have long been intentionally used by the party-state for mass gatherings.

It should be noted that this spatial dimension of governance was not explicitly formulated or clearly articulated as a spatial strategy of governance. Instead, it is an inherent feature that comes with the coming into being of state-orchestrated forms of public culture and other forms of mass mobilization. In this sense, space has not been governmentalized; the specific spatial order has emerged as a feature and an effect of state-led strategies of cultural governance. Nonetheless, the repeated performances of the state-orchestrated public culture have inscribed into public places a spatial order that allows for certain forms of collective presence.

Many of my choral participants-interlocutors have vivid memories of rallying in parks and squares during their teenage and adolescent years in the 1950s, 1960s, and 1970s. Their schools usually organized a day-tour to parks annually. Under the national flag and banners with official slogans, they pledged to serve the party and country, often accompanied by singing and dancing in the style of the state cultural forms, not to suggest that public parks were an exclusively political space. Many of my older interlocutors remembered going to parks with their parents for fun, but, for many, this seemed more like a privilege, as parents were usually busy and entertainments such as having a boat ride cost money. The intertwining of public culture and public space fostered specific ways of inhabiting, experiencing, and sensing public spaces. Through their repeated visits to public spaces since childhood, my older interlocutors got used to hearing loudspeakers blasting music or speeches, watching others perform, working and performing collectively in public spaces. For them, the presence of many people engaged in some group activity in a public space has been normalized into "just the way it is" (*jiushi zheyangzi de*).

But many younger urban residents do not perceive this as normal usage of public spaces. National development started to gravitate toward cities, and urbanization became the strategy to stimulate economic growth since the 1990s (Hsing, 2010). In this development paradigm, not only have cities grown rapidly both in terms of territory and population size, but urban space has also been reconfigured according to a different set of rationales, narratives, and technologies, which I call the new urban development regime (Santos and Zhang, 2021). This new urban development regime is not unique to China. As cities have been perceived and operated as a "growth machine" (Molotch, 1976), urbanization has been recommended as a development strategy by international organizations such as the World Bank for the developing world (Escobar, 2012). The urban development regime takes on new features in the past decades, as aesthetics and the narrative of sustainability have been integrated into the urban political economy (Ghertner, 2015; Isenhour et al., 2015). In line with this globalized regime of urban development, Chinese cities have adopted strategies to produce neatly or-

ganized, functionally divided, and hypervisualized urban space in the process of urbanization (Abramson,2007; Oakes and Yang, 2020; Zhang, 2016; 2022). One could say that space has been governmentalized under this global regime.

Public parks and squares have become a quintessential part of the spatial strategy of urban governance. In Guangzhou, urban planners and officials have increasingly emphasized the notions of "ecocity" (*shengtai chengshi*) and "livable city" (*yiju chengshi*), notions that are associated with sustainable development and city branding.[14] Parks and squares are deemed enablers of a "harmonious symbiosis of humans and nature" in a beautiful city.[15] The municipal government increased the number of public parks substantially from 24 in 1990 to 239 in 2014 as the city more than doubled its size (GSYB, 2003-2014). The municipal government also gradually abolished entrance fees to most public parks. By the mid-2010s, most public parks have been made free to the public. In tourism promotion materials, public parks or squares, with carefully curated green space but with no or only a few individuals, are often juxtaposed with high-rises to highlight the city that is technologically modern, spatially organized, and aesthetically pleasing. For the growing middle-class families, adjacency to a park or a park view is understood as a feature that adds extra value to their housing properties, as the park is supposed to bring tranquility, fresh air, and open horizon in a crowded city.

Public spaces — parks and squares — are spaces of production in terms of capital accumulation as well as spaces of reproduction due to their function as leisure spaces. The vision of leisure space embedded in the new urban development regime in contemporary Chinese cities is probably aligned with Frederick Law Olmsted's vision of New York's Central Park as a "refuge" from the chaotic, polluted urban environment of the then industrializing Manhattan. As Sevilla-Buitrago (2017) argues, Olmsted's Central Park was meant to produce civic citizen-subjects with middle-class propriety, with emphasis on self-discipline and orderliness. The younger, educated, and relatively affluent part of the urban population in present-day Chinese cities has gradually become receptive to this kind of civility that emphasizes moderation and control of individual behavior in public spaces. In their eyes, modern cities are supposed to be associated with shiny high-rises, smartphones, and shared bicycles (Zhang, 2022), and trendy, "cool" activities such as skateboarding and training for a

[14] See "*Guangzhou chengshizongtiguihua* (2001–2010)" [Master Plan of Guangzhou (2001–2010)], "*Guangzhoushichengshizongtiguihua* (2011–2020)" [Master Plan of Guangzhou (2011–2020)], and the draft of "*Guangzhoushichengshizongtiguihua* (2017–2035)" [Master Plan of Guangzhou (2017–2035)], all issued by the Guangzhou municipal government and the first two approved by Guangdong provincial government and the State Council of China.

[15] See the draft of "*Guangzhoushichengshizongtiguihua* (2017–2035)" [Master Plan of Guangzhou (2017–2035)].

marathon. Singing, dancing, or exercising (except for running) should be done in private or semi-private spaces such as karaoke bars and gyms. Music should be enjoyed via headphones, and playing music through loudspeakers constitutes a nuisance. Thus, older women's collective singing and dancing are not perceived as the right kind of activity in the supposedly orderly and tranquil public spaces.

The stigmatization of older women in public spaces embodies the conflicts between the old and new spatial orders.[16] Associated with different codes of conduct and sensorial expectations, these two spatial orders are produced with different governing agendas. Under the older spatial order, public space is highly politicized as a space of mobilization and performance of state-orchestrated forms of public culture for the purpose of (re) producing political legitimacy. The newer spatial order comes with a series of technical developmental interventions which emphasize economic growth and improvement of life quality while, as many development studies scholars argue (Ferguson, 1994; Escobar, 2012), downplaying the politics involved in these interventions. The older spatial order is meant to invoke passion on a mass level, while the newer one expects individualized civility and middle-class respectability. Both spatial orders are powerful in shaping how individuals from different generational and class backgrounds inhabit and understand public space. While the new well-to-do middle class is highly educated and is able to use media resourcefully and fluently to voice their opinion against the unruly use of public spaces, older women continue their not-so-inconspicuous presence in public spaces, singing and dancing together, as long as the party-state continues to support them and see the relevance of using public culture as a core governing strategy to produce political legitimacy and social stability.

[16] There is also a gender dimension involved in the multiple spatial orders in public space, which will be discussed in a separate article.

Conclusion: the art and politics of occupying public space

This article has taken a form of social nonmovement — collective singing by older women in public spaces—as a key node to illustrate the multi-dimensionality and heterogeneity of state governance as well as the intricate involvement of ordinary, even marginalized, citizens in the workings of state governance. Seeing this specific form of collective singing as a social nonmovement offers an analytical advantage: it acknowledges the mundane, pragmatic aspects of getting together — particularly pertaining to people from socially and economically marginalized groups — without losing sight of its political significance. Noticing the mundaneness is not to automatically assume that such an activity has been taken to oppose the state. As my interlocutors insist, they participate in choral singing by choice, with low expenditure,

and they do so to have fun and meet friends, all of which are mundane life matters. They come together as a result of chance and biographical convergences rather than of willful politically motivated congregation. They sing a lot of Maoist red songs, but this does not mean that their actions are politically motivated. In fact, they have diverse understandings of the past actions of the government and the party-state, and these understandings can be aligned or not with the political messages that the red songs originally intended to convey. By and large, choral group participants have no intention to engage politically; they sing red songs because the music and rhythm are aesthetically appealing and familiar, and the activity of singing itself is cathartic.

Yet, such mundane practice has been intricately interwoven into the deployment and negotiation of a series of state governing practices. Choral singing and red songs bear the imprint of an earlier form of state-orchestrated public culture that was a strategy of cultural governance aiming at mass mobilization and the production of political legitimacy. Within this framework of governance, state-orchestrated cultural performances have shaped the aesthetics, the bodily practices, and the ways that citizens — who have grown up living monotonically through these cultural forms — inhabit and perceive public spaces. While many of these citizens, now in the later stages of their lives, re-appropriate these cultural forms to fit their own purposes, in recent years, officials and governments at all levels have in turn re-appropriated the revived performance of these Maoist cultural forms to construct a new form of state-orchestrated public culture to compete for political power or to promote "a harmonious society".

As public culture is state-orchestrated to be performed *by* the masses *for* the masses, mass public presence is its inherent feature. The continuous deployment of public culture as a governing strategy thus provides a sanctioned ground for choral participants to gather in public spaces. While this article cannot detail every contradiction in the usage and surveillance of public space in Chinese cities, it is worthwhile to note that multiple governing strategies with different if not conflictual rationales and purposes are involved in the usage of public space. As public spaces have become an integral component of the spatial strategy of urban governance, a new spatial order has gradually come into being with the new urban economy. Unlike the spatial order associated with the deployment of earlier Maoist strategies of public culture manufacturing, the new spatial order emphasizes modernity and development, and is encoded with middle-class civility — the new spatial order marginalizes "old-fashioned" users of public spaces such as the choral singing participants, subjecting them to stigmatization. Yet, the choral singing participants' noisy encroachment persists not because the Chinese government does not have the

capacity to control it, as it seems to be the case in Middle Eastern political regimes (Bayat, 2013),but because public culture and ordinary people's participation share a symbiotic relationship.

This article is not meant to provide an exhaustive analysis of all possible state governing strategies involved in conditioning, challenging, or sanctioning choral singing practice in public spaces; for example, one may add "therapeutic governance" (Yang, 2015; Zhang, 2020). The point is to highlight how multiple strategies of state governance become entangled as they are practiced in everyday life. Strategies governing different aspects of social and political lives may appear to be separate from one another. Tracing the rationales and purposes of a specific state governing strategy is relatively straightforward (not that it is easy), yet governing strategies that differ in political ideas, development priorities, and governing concerns do co-occur; governing strategies and their effects have a spatial as well as a temporal dimension. Each governing strategy, on its own, may be coherent, but when multiple governing strategies are applied in conjunction to regulate the conduct of everyday life, they may clash. This adds significant complexity to the analysis of state-society relations and state governance. Instead of simple domination or resistance, one has to deal with a situation where multiple appropriations take place: not only do ordinary citizens appropriate official cultural practices for their own pleasure, the government also in turn appropriates ordinary citizens' practices to give new life to its governing strategies. Such encounters and frictions create space for creativity in the everyday life of ordinary citizens in a country with a powerful state regime. Such space is undoubtedly fragile and unstable, yet it enables (marginalized) people like the choral singing participants to inhabit places where they, in the eyes of many, do not belong.

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RECENSÃO

BOOK REVIEW

(Página deixada propositadamente em branco)

Unveiled "intimate choices" in rural and urban China

Gottschang, Suzanne. 2018. *Formulas for motherhood in a Chinese hospital*.
Ann Arbor, University of Michigan Press.
ISBN: 9780472130757, 258 pp., $79.95

Santos, Gonçalo. 2021. *Chinese village life today: building families in an age of transition*.
Seattle, University of Washington Press.
ISBN: 9780295747385, 320 pp., 33,46€

DOI: https://doi.org/10.14195/2182-7982_39_6

Reproductive practices like childbirth cannot be simple and take place only within households and communities when science and technology become solutions to social issues. Science and technology bring not only choices to reproductive consumers but also challenges. However, we know very little about how people actually make decisions when it comes to reproductive matters. Santos' *Chinese village life today* and Gottschang's *Formulas for motherhood in Chinese hospital* generously discuss this issue of reproductive choices and struggles in a context — China — that has been undergoing profound large-scale social and cultural transformations since the 1980s and 1990s. Santos' monograph is not just about matters of reproduction, but this theme is central to the main argument of the book regarding the increasing role of science and technology in the governance of family and community life. I chose these two books because they speak to each other in the way they approach the increasing medicalization and technologization of reproductive practices (such as family planning, pregnancy, childbirth, and/or postpartum recovery) from the perspective of women and their families. The two books provide a highly detailed and nuanced ethnographic picture of women's reproductive experiences and changing

notions of motherhood in different parts of China, bringing together rural and urban areas, community-based and hospital-centered modalities of maternal and reproductive health management.

Santos carried out his long-term ethnographic fieldwork in the rural township of Yellow Flower in Guangdong province, southern China. He has been visiting a local village since the 1990s, building a close relationship with village families and witnessing longitudinal changes in intimate practices like family planning, marriage, childbirth, and childrearing in a context of agrarian transition and widespread circular labor migration. Gottschang's research is based on long-term fieldwork in the 1990s in a Baby Friendly Hospital Initiative (BFHI) Hospital in urban Beijing, where she had opportunities to work with medical staff in prenatal and maternity wards. The two authors share the same interest in analyzing recent developments in China through the lens of mundane everyday life practices and political subjectivities rather than through the perspective of grand political and economic projects. Gottschang shares the stories and the challenges faced by thirty women achieving motherhood in a BFHI Hospital in Beijing. Her book shows how the implementation of UNICEF and WHO supported public health policies aimed at reorganizing hospitals and re-training health care workers to promote breastfeeding played an important role in influencing how women negotiate and make decisions regarding motherhood, from pregnancy to infant feeding. This is not to say that there is only one formula for motherhood; the book highlights the creative strategies of women in the face of larger forces. Santos explores this creative work of individual and collective strategizing in various kinds of reproductive practices in rural contexts that have been subject to larger civilizing forces of technocratic governance pushing for the modernization of how village life should be conducted and managed. He shows that ordinary people are not passive recipients of larger forces of governance; they actively engage with these forces, resisting them, reconfiguring them, and/or adjusting them to local histories and frameworks of meaning.

The two monographs provide insightful ethnographic analyses of the contradictory effects of far-reaching national policies of reproduction and family modernization on the ground, but they also make the case that such national policies — including the Birth Planning Policy (launched in 1979) and the Baby Friendly Hospital Initiative (BFHI, launched in the 1990s) — cannot be separated from larger global agendas supported by powerful organizations like the World Health Organization and the United Nations. China's engagement with such global agendas was not just motivated by a desire to open to the outside world and modernize society; there was also the desire to benefit from international funding to undertake reforms and upgrade resources. Santos shows that the implementation of the Birth Planning Policy in

rural areas did not follow the one-child model applied to most urban areas, but was more flexible, allowing some room for negotiation and for the occurrence of "frictions" of various kinds. The Birth Planning Policy clashed with long-standing local patriarchal reproductive values and aspirations (for example, in terms of number of children and their gender), and this opened the way for some resistance to the Birth Planning Policy, especially during the 1990s and the 2000s. Strategies of resistance included bribing officials, not reporting the birth of a child, and practicing IUD device withdrawal, and the aggregate effect of these strategies was a more flexible policy model that tolerated two to three children per woman, sometimes even more (chapter 2). At the same time, these negotiations did not prevent the rise of technocratic modernity (Santos, 2021: 68) as the loosening of birth quotas was accompanied by the routine application of IUDs and sterilization procedures on women's bodies. In other words, villagers gradually normalized the use of medical technologies and health science in their reproductive life.

This increasing engagement with the scientification and technologization of reproduction also had an impact on women's childbirth practices, especially the younger generation (chapter 4). In accounting for the generational tensions shaping local women's techno-moral views on the routine use of cesarean deliveries, Santos finds that the older generations tend to discourage cesarean section because they experienced low-tech childbirth practices conducted by practical knowledge of local midwives. For them, the C-section is a lifesaving method, and it should not be used as a routine practice. This view is less marked amongst the younger generations. Some young mothers agree that vaginal birth is better than cesarean birth, but they insist that the safety of the mother and the infant should take priority and that cesarean sections should be practiced whenever there is a medical indication. Some young mothers go as far as claiming that cesarean section can be used as a pain relief method or as a path to avoid side effects from vaginal birth. The central government is worried about the negative impact of excessive medicalization on the well-being of pregnant women and is trying to curb rising cesarean rates. Some hospitals have implemented a cesarean quota system to reduce C-section rates, but this system dismisses women's rights to demand a C-section, and the author presents a tragic story to illustrate this point in chapter 4. Santos proposes that the childbirth experiences of the older generation matter in the process of childbirth medicalization because these experiences highlight the value of low-tech practical knowledge and benefits women with qualitative care.

In urban areas, the launching of the Birth Planning Policy took the form of a One-child Policy, and this policy together with other state initiatives like the BFHI committed to promoting breastfeeding for the sake of the well-being of infants

only contributed to making the only child precious. Gottschang shows that urban women as mothers are caught in transnational consumerist networks under the discourse of BFHI, but there is a more. BFHI discourses on how to be a good mother of the "only child" place women under new cultural pressures, family responsibilities, state policies, and global public health agendas. Gottschang draws on the idea of "potentiality", which means "a future for the state, the family, and the child (Zhu, 2013 *in* Gottschang, 2018)", as it is an essential principle for mothers to navigate. Moreover, it is a primary framework for state policy and medical staff to react and internalize the global health agenda. Yet, Gottschang draws attention to the existence of a blurred line between "nature" and "science" in the second chapter. An interesting example of this blurred line is that women receive "natural" breastfeeding classes in the BFHI Hospital where she developed fieldwork, but "scientific" and healthy formula milk is also promoted in the same BFHI Hospital as part of an initiative that involves state actors, hospital authorities, and private companies.

The contradictory realities of the hospital between nature and science provide flexible room for individual women to choose and negotiate. Motivated by the moral duty to protect "the future of the child" Chinese women follow a tradition of postpartum confinement called "sitting the month" (chapter 4). Some women are able to tolerate exhausting physical conditions while insisting on natural breastfeeding. Yet, some women choose a postpartum recovery center where both infants and women could receive good and scientific care. The center also frees women from generational conflicts with mothers/mothers-in-law, allowing young mothers to skip "traditional" rules like not brushing the teeth during the "sitting-the-month" period. At the same time, the center places young mothers under a new form of "maternal governance" mediated not just by state policies and global political agendas but also by market forces, consumerism, and the authority of medical expertise (Gottschang, 2018: 4). For instance, infant formula embodies a complex process of coproduction between international stakeholders, local hospitals, medical science and technology, and the Chinese state. Technological and scientific governance over women is even more apparent in Santos' account of changing childbirth practices in rural areas.

It is enjoyable to read the two books. I highly recommend them to audiences interested in China studies, women's studies, studies of family and reproduction, science and technology studies, and more generally to anyone who want to learn about ordinary people's lives in contemporary China. The two authors describe and discuss with great detail the struggles and subjectivities of everyday life in specific contexts. Students can find creative frameworks and theoretical approaches to analyzing daily life experiences. *Formulas for motherhood in a Chinese hospital* provides a comprehensive analysis of wom-

en struggles and strategies as they strive to follow the path of becoming a morally good mother. Readers would benefit more if the author shed light on how medical staff conduct childbirth classes in the BFHI Hospital. Even though Gottschang explains the absence of childbirth in her book, readers are left with curiosity. Readers can explore more aspects of daily life in *Chinese village life today*, such as how to deal with questions of personal hygiene and human excrement management under technocratic governance. It would further the audience's curiosity about the relation between village life and technocratic governance if the author used the word "technocracy" in the book title.

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