THE GLOBAL HISTORY
OF PALEOPATHOLOGY
To J. Lawrence Angel and Calvin Wells,
who inspired this volume.
This volume took inspiration from an informal discussion that we had while participating in a symposium on repatriation sponsored by the Museum of London in March 2007. Over lunch in a local public house, Charlotte lamented that a proper biography—richly deserved—of the late Calvin Wells and his seminal contributions to paleopathology had not yet appeared. At that stage she was thinking only of a single paper that would be submitted to a prominent journal or edited volume. She would never have imagined something so extensive as this 76-chapter tome! Meanwhile, Jane responded that she had collected considerable primary documentation of J. Lawrence (Larry) Angel’s distinguished life and works in the National Anthropological Archives while preparing for a plenary lecture at the 2006 European Paleopathology meeting in Santorini, Greece. We both agreed that these two biographies should be published.

As we began to expand our vision, we discussed our definition of paleopathology as well as who should be considered a paleopathologist. In a strict sense paleopathology is, of course, the study of ancient disease, and both of us situated paleopathology within bioarchaeology, due to that field’s contextual emphasis (Buikstra 1977; Buikstra and Beck 2006). In many other circumstances, however, paleopathology is considered a subfield of physical anthropology, itself a subdiscipline of anthropology, along with archaeology, sociocultural anthropology, and linguistic anthropology. While many paleopathologists are anthropologists, others are found in clinical practice and in departments of anatomy, pathology, radiology, and related biomedical fields. Recognizing this breadth and long-term history, we began to muse about a larger project.

Our concept quickly developed a life of its own, leading to this edited volume. Initially the editors generated an international list of deceased paleopathologists deserving biographic credit for their pioneering, seminal contributions to paleopathology. Some scholars had had a career-long dedication to the field; others had made one or two key contributions while generally pursuing other professional interests and vocations. We therefore divided the list into full biographies and briefer “moments.” We initially discussed limiting the volume to researchers who were no longer living in 2007, but then decided to include individuals who were retired or nearing retirement age. Our logic was that nobody would be foolish enough to attempt another such volume for some time, and we wished key contributors to paleopathology such as Arthur Aufderheide, Don Brothwell, Domingo Campillo, Keith Manchester, Charles Merbs, Donald Ortner, and Eugen Strouhal to be recognized. Interviews frequently enriched these chapters, and we encouraged authors of biographies for deceased paleopathologists to consult with former students and descendants, while also mining previously published obituaries and biographies, along with archival materials.

We deeply regret that three paleopathologists died during the production of this volume (2007–2010): Mahmoud El-Najjar, Shelley Saunders, and Philip Walker. Each has received biographic treatment here. Walker was to author the chapter on Charles Merbs (Chapter 8), a task he was unable to finish. Buikstra and McBride completed the manuscript for this chapter, working with text and notes provided by Cynthia Brock, Phil’s partner.

Readers will notice that we have not standardized the use of last vs. first names within our biographical chapters; we have allowed our authors to make individual choices. Many biographies were written by former students or close colleagues, who chose to address their subjects in familiar...
terms. Others were further removed from their subjects and therefore chose to refer to individuals by their last names, occasionally embellished by professional titles. Some also felt that reporting personal details, such as the names of spouses and other family members, was intrusive. Others even let their subjects read their efforts! Upon perusing his biography, Charles F. Merbs requested that he be referred to as “Chuck.”

As with all endeavors of this nature and magnitude, choices had to be made. For individual biographies, we included paleopathologists who we felt had made lasting contributions, as measured by their impact on the field of paleopathology through direct study of ancient disease in human remains. We therefore decided, for example, that historians of medicine were outside the scope of this volume. As the first person to coin the term “paleopathology,” we have included Robert Wilson Shufeldt (Chapter 29), though his career and especially his personal life was no role model for future generations.

We realize that not all would agree with our choices, although we have made every effort to be as inclusive and fair as possible. We hope that those who identify what they believe to be omissions will publish other histories and thus lend further visibility to this vital field.

After selecting individuals for stand-alone biographies and moments, we turned to other prospective sections, which ultimately included: the history of paleopathology in specific geographic regions with traditions in paleopathology; relevant overarching topics such as nonhuman paleopathology, dental anthropology, and mummy studies; chapters on organizations, key congresses, and education in paleopathology; and past and future trends (methods). Again, we tried to be inclusive and fair during all selection processes, including those for authors of these various contributions.

THE VOLUME, THE CONTRACT, AND THE EUROPEAN PALEOPATHOLOGY MEETINGS SYMPOSIUM
We recruited authors beginning in March 2007 and extending throughout the year. By early 2008 the current list of contributors was nearly in place, and the editors were recruiting papers for the European Paleopathology Meetings to be held in Copenhagen during late August 2008. This effort, we believed, would lend important visibility to the project. As we were allotted only two-and-a-half hours, we were able to sample only a small portion of the chapters that would ultimately comprise this volume. Ten excellent papers were presented in Copenhagen—four biographies: Auferheide, Moodie, Putschar, Stewart; 4 regions: Australia, Israel, Japan, Sweden; one organization: the Paleopathology Association; and one method: imaging.

Meanwhile, the editors explored publishing options. Following prospectus preparation and submission to four presses during the spring of 2008, we were pleased to hear (April 12) from Peter Prescott, senior editor for Life Sciences of Oxford University Press (OUP). Thus began the conversations that ultimately led to a contract being offered by OUP on September 31, 2008. During October 2008, having signed our contract, we issued letters of instruction to authors, including standard advice concerning fonts, style, and especially chapter lengths. Most contributors followed much of our advice, though a few chapters arrived well beyond word counts, one being three times the recommended size; negotiations ensued.

STRUCTURE OF THE VOLUME

For the biographies, we have adopted a model drawn from Women in the Biological Sciences: A Biobibliographic Sourcebook (Grinstein, Bierman, and Rose 1997). We circulated an entry for Barbara McClintock (Buckner 1997), which illustrated the separation of the biographical information from her professional contributions. This model had served well in a previous set of biographies in which the senior editor had participated (Powell et al. 2006), and it was therefore adopted here.

The structure for the topical, organizations, key congresses, education, and future trends (methods) is also relatively straightforward. The authors chosen to develop these chapters are eminent paleopathologists, intimately associated with their subject matter, organizers and other key players in symposia, short courses, congresses, and organizations. The regional histories proved more challenging, however, for a number of reasons.

We attempted to achieve global coverage (Figures P.1 and P.2), with a primary goal of engaging authors from within the targeted world areas. We felt that such contextualized perspectives were more desirable than prioritizing scholars—however qualified—from Western or Anglo academic traditions. Copyediting frequently proved challenging in circumstances where English was not a first language (and occasionally when it was), but we firmly believe this was the right approach. The editors frequently bantered about quaint statements in British “English” and “Americanisms,”
and we ultimately adopted American spellings for our central topic (paleopathology) and other similar terms. We retained original spellings, of course, in the bibliographies. We cautioned our authors that this was not a history of disease nor of physical anthropology, although for countries such as China (Chapter 41) and Mongolia (Chapter 51), for which there is little English language literature in paleopathology and related fields, we allowed a measure of latitude.

Where regional developments appeared to have commonalities, coauthors were solicited. In pairing Brazil with nearby Argentina (Chapter 40), the editors discovered that two distinctive regional traditions were represented. Paleopathology in Brazil is anchored by a biomedical focus that extends a Portuguese tradition. Argentina, on the other hand, represents a paleopathology rooted in social science. These contrastive traditions within eastern South America represent an important case study whereby colonial histories shape paleopathology as it is conducted today. We also integrated Germany with Austria due to their shared 19th century traditions, including the influence of Virchow. In both countries, even though clinicians and anatomists charted the early course...
of paleopathology, as in most other regions, such research was usually in the context of the study of human variation (part of physical anthropology).

We urged our regional contributors, trained abroad or locally, not only to identify key contributors to paleopathology, but also to place them within local, national, and international academic developmental trajectories, as appropriate. We asked that biographic materials focus upon paleopathologists who fit the criteria used in Part I: Biographies and Moments, but we also encouraged brief, perhaps tabular treatment of more recent work, e.g., Oceania (Chapter 62). As contributors submitted chapters, our concepts organically grew to suggestions that authors also include brief statements about current training programs in paleopathology, locations of important research collections, key methodological and conceptual contributions of international significance, and current and future prospects. Some authors responded to our additional requests, which we think enhance the value of this volume. Others chose to remain focused upon key figures in paleopathology. The editors do not fault the latter for their adherence to our original vision and instructions, but we want to recognize that this process explains the variety of approaches taken in our regional histories.

As noted above (Figures P.1, P.2), we have attempted a global coverage, grouping our regional presentations within four regions. These include Africa, America (arbitrarily ordering chapters from north to south), Eurasia, and Oceania, including Australia and the Pacific. In Africa and Eurasia, chapters tend to follow country boundaries due to distinctive historical traditions in paleopathology and linguistic boundaries. For North America, we used a mixed approach, with individual contributions from Mexico and Canada, and those from the United States representing regions that characterize the longest traditions in paleopathology: the Southeast, the Midwest, and the Southwest. South American contributions reflect both country boundaries in a unified chapter: Argentina/Brazil and an Andean complex from Peru and northern Chile. The Oceania section includes the island continent of Australia and a treatment of the many smaller islands within the Pacific Ocean.

Thus, our approach has been transnational by design, beginning with the collaboration of the editors, citizens of the United States and the United Kingdom, and extending throughout the fabric of the volume. While most of the biographies were written by citizens of the same country as the person of interest, this is not always the case, as with Chapter 16 (Strouhal, Czech Republic, authored by Albert Zink, a German currently working in Italy). Binational authorship occurs in Chapters 1, 4, 23, 41, 44, 64, 68, 69, 75, and 76. Global coverage is well documented in Part II: Regions, while the international membership of the Paleopathology Association, attendance at congresses devoted to mummy studies and investigations of infectious disease, and Short Courses in Paleopathology are intellectually enriching and another indication of the vitality of this field with its long and distinguished history that we document here.

EDITORS’ NOTE
At every stage, we have sought to avoid “historical presentism,” that is, judging historical figures as our contemporaries rather than considering the period in which they lived (Fischer 1978). Therefore, we have retained terms such as “race,” when today we would be much more likely to reference “ancestry,” similarly, “Eskimo” rather than “Inuit.” Some earlier paleopathologists, even eminent ones such as T. Dale Stewart (Chapter 15), used “prevalence” and “incidence” for frequency rates interchangeably, an error we would not make today. Where we would reference “cranial modification” today, many used “cranial deformation” in the past.

In other cases we have tried to standardize terminology, recognizing that words and their usage may change over time. Commonly accepted expressions of today are introduced parenthetically in literature wherein other names were applied, e.g., osteoporosis symmetraca (porotic hyperostosis). In other cases, however, we have retained authors’ terms when these are synonyms, e.g., trephination vs. trepanation. We have, however, encouraged authors to substitute “human remains” for “specimens” when speaking of pathology in an individual. We feel that the latter term is dehumanizing and demeaning to the past peoples whom we have the privilege of studying and from whom we learn.

ACKNOWLEDGMENTS
We first wish to recognize the contributors who have responded expeditiously and thoughtfully to the editors’ many comments. To a small number of others, who met fewer deadlines—though all finally came through—we say “well done, in
the end.” Our contacts at OUP deserve special credit for their patience and timely responses to our queries. Peter Prescott, who handled contract negotiations, left OUP in early February 2009, with his role being ably filled by his former assistant, Tisse Takagi, now associate editor for OUP. A very special thanks is owed to Stephanie McBride-Schreiner, who has assisted both editors enormously in both editorial tasks and in creating the biographies for Hrdlicka and Merbs. Nicole Haas nimbly and cheerfully handled final editing and submission of the manuscript, and Sarah Harrison completed the index.

The editors would also like to acknowledge each other’s contributions to the volume and emphasize that we are still friends after more than three years on task. Through concept development, recruitment, negotiations with publishers, guidance to authors, and copy/content editing—sometimes extending to five full reviews by both editors—we have maintained a collegial relationship. Many times our schedules were complimentary and the one would take up responsibilities when the other was frantic for other professional or personal reasons. While occasionally remarking that “sleep is for sisses,” we have managed to cope, due in large part to the support of friends and family. Charlotte would like especially to recognize her partner Stewart in this regard, and the canine members of the family (Joss and Cassie), and Jane, her ever effervescent canid, Abdulina (Abby). We are proud of this product of our labors, which we now present to you. We hope that you will find this volume useful in your research, teaching, and in recalling valued colleagues and friends.

Jane E. Buikstra and Charlotte A. Roberts

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Portuguese Developments in Paleopathology: an Outline History

ANA LUÍSA SANTOS AND EUGÉNIA CUNHA

There are many definitions for paleopathology, all referring to the origin, evolution, and progress of diseases in humans and other animals throughout time (e.g., Ubelaker 1982; Manchester 1983; Armelagos 1997; Cockburn 1997; Auferheide and Rodriguez-Martin 1998; Lovell 2000; Ortner 2003). However, a cutoff date for distinguishing “paleopathology” from “pathology” is ill defined. How many years should separate the date of death of the individual or population from the date of observation in order to be considered paleopathology? For this contribution, publications were excluded that concerned pathological evidence in autopsy cadavers or in surgical patients, even though these are described and included in pathological collections in faculties of medicine and/or museums in Portugal. Nevertheless, papers written by physicians at the beginning of the 20th century analyzing contemporaneous skeletal collections were taken into account. Thus, the criteria for data selection are not completely uniform. Keeping these facts in mind, the aim of this paper is to present the history of paleopathology in Portugal and the state of the art today.

TRACKING THE PAST: 1884–1988

The end of the 19th century and the early 20th century were both particularly rich for the sciences, including paleopathology. During this period several landmark studies in human paleopathology appeared (Ortner 1991; Armelagos 1997; Cockburn 1997; Auferheide and Rodriguez-Martin 1998). In Europe, the Americas, and Africa, researchers wanted to know about the antiquity of their ancestors as well as their anatomical and cultural differences. By that time in Portugal, the first paleopathological and archaeological studies were conducted as an avocational activity by physicians (Santos 1999, 2000; Grauer 2008), natural philosophers, and geologists, among others (Umbelino and Santos 2001). The first published work referring to human paleopathology dates back to the end of the 19th century. Néry Delgado (1884), an engineer and director of the geological institute (Direcção-Geral de Trabalhos Geodésicos), described a trepanation in a skull from Casa da Moura (Cesareda) and another from Furninha Cave (Peniche), both Neolithic sites (Table 55.1). He presented these cases to participants of the “Congrès International d’Anthropologie et d’Archéologie Préhistoriques” that took place in Lisbon in 1880, and he considered possible evidence of anthropophagy (cannibalism) at Furninha Cave. The opinion of most of the participants was that it was practiced among the ancient inhabitants of Portuguese caves.

As in other countries, in Portugal the first paleopathological and archaeological studies were conducted as an avocational activity by physicians (Santos 1999, 2000; Grauer 2008), natural philosophers, and geologists, among others (Umbelino and Santos 2001). The first published work referring to human paleopathology dates back to the end of the 19th century. Néry Delgado (1884), an engineer and director of the geological institute (Direcção-Geral de Trabalhos Geodésicos), described a trepanation in a skull from Casa da Moura (Cesareda) and another from Furninha Cave (Peniche), both Neolithic sites (Table 55.1). He presented these cases to participants of the “Congrès International d’Anthropologie et d’Archéologie Préhistoriques” that took place in Lisbon in 1880, and he considered possible evidence of anthropophagy (cannibalism) at Furninha Cave. The opinion of most of the participants was that it was practiced among the ancient inhabitants of Portuguese caves.

The history of paleopathology in Portugal cannot be separated from the existence of documented collections that had been established by the end of the 19th century and continue today. In Lisbon, the physician Francisco Ferraz de Macedo, a disciple of Broca, was the first to make a collection of human
In 1918 he started research on the Ferraz Macedo Collection and in 1924 became a second teaching assistant of anthropology (segundo assistente de antropologia) in the Faculty of Sciences at the University of Lisbon (Moura 1986). According to Moura, besides teaching anthropology, Barbosa Sueiro taught anatomy and the history of medicine, among other courses at the Faculty of Medicine, also being editor of the journal *Archives of Anatomy and Anthropology* (*Arquivos de Anatomia e de Antropologia*). The studies of Barbosa Sueiro and coauthors reflected their background in comparative anatomy and congenital conditions. In 1924 he analyzed in detail the septal aperture and discussed its etiology, saying it occurs in adulthood, due to bone reabsorption, in both sexes and with no relation to occupation of the individuals. It is also worth mentioning that his dissertation, in the same year, was also about the septal aperture. He published on the frequency of atlas occipitalization, congenital variation in vertebral number, sacralisation and lumbarisation (Sueiro 1926), and morphological variation and spina bifida in the atlas, both from the Ferraz Macedo identified collection and Neolithic collections (Sueiro 1930, 1933, 1934). He also presented a very detailed description of lumbarization and sacralization of lumbar and coccygeal vertebrae in the sacrum of a Mesolithic individual (1932) and irregular sacralization of two coccygeal vertebrae (Sueiro and Macieira 1938) in both identified and archaeological collections. Based upon materials from a Neolithic site called Fontainhas Cave, Sueiro (1934) described five (of nineteen) skulls with incomplete trepanations, two previously described by Néry Delgado (1884) along with three new examples. Sueiro wrote about the possible techniques and instruments used to perform these trepanations as well as synthesizing work that tried to explain this practice across Neolithic populations. In a posthumous publication, Sueiro (and Moura 1988) considered the classification of cranial deformation, discriminating between artificial and pathological etiologies (Table 55.1).

In studies of ancient skeletal remains, Sueiro and Frazão (1956, 1957, 1959) also reported caries, ante- and postmortem tooth loss, and dental wear in Mesolithic populations. So far, this is the first paper, published in two journals, that employed the definition of paleopathology according to Ruffer (1914; Chapter 13) and also referenced Palès’ book (1930; Chapter 43) on paleopathology. The authors also reviewed, beginning with Esper (1774), paleopathological studies in both humans and animals. The word “paleopathologist”

skulls in 1875 and 1877. He included skeletal material from two Lisbon cemeteries (Rocha 1995). However, the studies published by Ferraz de Macedo were essentially on morphometrics and human evolution. In Coimbra, Bernardino Machado began building a medical school collection (“Colecção Escolas Médicas”) of human skulls. Following the scientific movement in other European countries, he also established in 1885 the discipline of “Anthropology, Human Palaeontology and Pre-Historic Archaeology” at the faculty of Natural Philosophy at the University of Coimbra (Areia and Rocha 1985). Besides being a professor in anthropology, Machado was a natural philosopher and politician who became president of Portugal twice. Afterward, Machado’s successor, Eusébio Tamagnini, built the International Exchange (“Colecção de Trocas Internacionais”) and the Identified Skeletal (“Colecção de Esqueletos Identificados”) collections (Areia and Rocha 1985).

After the creation of Machado’s course, students started analyzing skeletal samples (Table 55.1). Studying the collection termed today the “Medical School Collection,” along with unidentified skulls recovered from Coimbra Cathedral, Menezes (1898) classified the anomalies of the skull into two types: fusion and division. As an example of division anomalies, the persistence of the metopic suture was discussed and interpreted by the author as the result of a larger brain, more common in “superior races.” Nevertheless, some anthropologists noticed a high percentage of skulls with metopic sutures in mentally ill patients (“alienados”). Menezes (1898:104) questioned whether this could be a proof that madness can result in “excessive brain development.” Another student at the University of Coimbra, Ferreira (1898), related premature synostosis to abnormal cranial shape, e.g., plagiocephaly. This etiology was among the hypotheses proposed by Teixeira (1946) for metopism. Additional authors that published on human paleopathology of archeological and identified materials are shown in Table 55.1, which illustrates that trepanation was the condition most commonly identified in the first half of the 20th century. Interest continued, however, as illustrated by the fact that in 1969, Veiga Ferreira discussed this practice in a paper about surgery and medicine in antiquity.

These earliest Portuguese publications were classic anthropological works, mainly based on craniometry and following the lead of other countries such as France and Spain. However, the physician and anatomist Manuel Bernardo Barbosa Sueiro (1894–1974) may be considered an exception.
### TABLE 55.1 SUMMARY OF WORK IN PALEOPATHOLOGY IN PORTUGAL FOR 1884–1987 (ORGANIZED CHRONOLOGICALLY).

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casa da Moura (Cesareda) Furninha Cave (Peniche)</td>
<td>Trepanation</td>
<td>Neolithic</td>
<td>Delgado, 1884</td>
</tr>
<tr>
<td>Lapa da Galinha IC-UC</td>
<td>Trepanation</td>
<td>Neolithic</td>
<td>Vasconcelos, 1897/1913</td>
</tr>
<tr>
<td>IC-UC Coimbra Cathedral, Anatomical collections</td>
<td>Congenital, plagiocephaly</td>
<td>16th–20th centuries</td>
<td>Menezes, 1898</td>
</tr>
<tr>
<td>Alqueves Cave</td>
<td>Skull with trauma or trepanation. Ante- and postmortem tooth loss and caries</td>
<td>Neolithic</td>
<td>Carrisso, 1909</td>
</tr>
<tr>
<td>IC-UL, IC-UC, Anatomical and Archeological samples (Convento Cristo de Tomar, Conv. de Jesus de Lisboa, among others) and radiographs. Mammals IC-UL</td>
<td>Congenital conditions in the column</td>
<td>19th–20th centuries</td>
<td>Sueiro, 1926</td>
</tr>
<tr>
<td>IC-UC Museum of the Institute of Anthropology, University of Porto</td>
<td>Occipitalization of the atlas</td>
<td>19th–20th centuries</td>
<td>Correia, 1927</td>
</tr>
<tr>
<td>IC-UL</td>
<td>Spina bifida</td>
<td>Neolithic 19th–20th centuries</td>
<td>Sueiro, 1930; 1933/1934</td>
</tr>
<tr>
<td>Alcácer do Sal</td>
<td>Discriminated between ante and postmortem trauma in a skull</td>
<td>Iron Age</td>
<td>Correa, 1931</td>
</tr>
<tr>
<td>Cabeço da Arruda</td>
<td>Lumbarisation or sacralisation of lumbar and coccygeal vertebrae</td>
<td>Mesolithic</td>
<td>Sueiro, 1932</td>
</tr>
<tr>
<td>Fontainhas cave</td>
<td>Five skulls with incomplete trepanation</td>
<td>Neolithic</td>
<td>Sueiro, 1934</td>
</tr>
<tr>
<td>IC-UL</td>
<td>Irregular sacralization of two coccygeal vertebrae</td>
<td>19th–20th centuries</td>
<td>Sueiro and Macieira, 1938</td>
</tr>
<tr>
<td>Castelo de Pragança IC-UC, Faculty of Medicine-UC</td>
<td>Trepanation</td>
<td>Bronze/Iron Age</td>
<td>White, 1946</td>
</tr>
<tr>
<td>Eira Pedrinha</td>
<td>Metopism</td>
<td>19th–20th centuries</td>
<td>Teixeira, 1946</td>
</tr>
<tr>
<td>Silveirona</td>
<td>Neoplastic disease and trauma on skulls</td>
<td>Neolithic</td>
<td>Júnior, 1947</td>
</tr>
<tr>
<td>Dolmen da Capela</td>
<td>Trepanation</td>
<td>Neolithic</td>
<td>Rocha, 1949</td>
</tr>
</tbody>
</table>

(Continued)
was used in this paper and the authors said that (p. 198): “within certain limits, on the basis of the knowledge of osseous lesions, both in humans and animals, we can obtain interpretations on paleopathology according for example the environmental influence, diet, and other life conditions.”

According to Armelagos (1997), a new era of paleopathology started in the 1960s. By then interpretation became the key feature, the English physician Calvin Wells being one of the best known proponents (Waldron 1994; Chapter 18). His 1964 book Bones, bodies and disease, was translated into Portuguese in 1971 and remains, thus far, the only book in paleopathology ever translated in this country.

In the early stages of paleopathology’s development in Portugal, several isolated examples of pathological conditions in individual skeletons were described and diagnosed. The majority of the authors limited their contributions to either mentioning the detection of pathological lesions or excluding them from their morphological analysis, which was the main objective of physical anthropological studies at that time. Among the authors mentioned, the most relevant figure was Barbosa Sueiro, both because of the variety of pathological conditions he reported and the number of publications.

### The Last Two Decades

In the last twenty years, paleopathology has had an important impact on other sciences (Armelagos 1997). The study of patterns of mortality and morbidity in past populations is essential to our evaluation of the susceptibility of specific populations to certain diseases and disorders (Pfeiffer 1991), and it also contributes to modern medical knowledge and diagnosis (Møller-Christensen 1953), including the forensic sciences.

### Excavation

The increasing number of skeletons recovered from archaeological contexts has also played an important role in the expansion of paleopathology.

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**TABLE 55.1 (CONTINUED)**

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silveirona</td>
<td>“[T]he femora have an exaggerated curvature, and the cranium presented a pathological character”</td>
<td>Visigothic</td>
<td>Serra et al., 1952:204; Cunha and Neto, 1953; 1955</td>
</tr>
<tr>
<td>Cabeço da Arruda, Moita do Sebastião, Cova da Onça</td>
<td>Caries, ante- and postmortem tooth loss and dental wear</td>
<td>Mesolithic</td>
<td>Sueiro and Frazão, 1956; 1957/1959</td>
</tr>
<tr>
<td>Bugio cave (Sesimbra)</td>
<td>Dental pathologies, a bony exoskeleton on a humerus, exostoses in several vertebrae, and sacralization of the 5th lumbar vertebra.</td>
<td>Neolithic</td>
<td>Isidoro, 1964</td>
</tr>
<tr>
<td>IC-UL</td>
<td>Men who had died from tuberculosis had longer heads and faces than the surviving populace.</td>
<td>19th–20th centuries</td>
<td>Olivier and Almeida, 1972</td>
</tr>
<tr>
<td>Gruta da Lapa do Suão (Bombarral)</td>
<td>Although dental wear is not a pathological condition, it started to be seen as an occupational marker.</td>
<td>Upper Paleolithic</td>
<td>Rocha, 1978</td>
</tr>
<tr>
<td>Necropolis in Marvão</td>
<td>Bone fractures and “spondyloarthrosis”</td>
<td></td>
<td>Fernandes and Mendes, 1985:229.*</td>
</tr>
<tr>
<td>Lugar do Canto (Alcanede)</td>
<td>Trauma, infectious and joint diseases, trepanation</td>
<td>Neolithic</td>
<td>Leitão et al., 1987</td>
</tr>
</tbody>
</table>

**Legend:**

IC-UC: Identified Collection, University of Coimbra; IC-UL: Identified Collection, University of Lisboa

* Since images of these bones were not presented, it was impossible to confirm these diagnoses.
Paleopathological analysis should ideally begin during fieldwork since pathological lesions may frequently only be observable when the bones are first uncovered because of their fragility and subsequent deterioration when they are removed from the earth (Santos 2000). In other words, since excavation is always an invasive process, some observations cannot be repeated later due to the often fragile nature of bones affected by disease. Caria Mendes (1989) published one of the very first bioanthropological guides in Portugal for the study of human remains from a necropolis that included “paleopathological aspects.” By the late 1980s, in the extinct Serviço Regional de Arqueologia do Sul (Évora), archeologist Rui Parreira coordinated a research team that included Teresa Matos Fernandes as a specialist in physical anthropology. Among the sites excavated by these researchers were S. Manços Chapel (Évora) and Santiago Church (Monsaraz). The human remains from these two sites were later studied respectively by Abelho (1990) and Santos (1990), and both of these works provided brief descriptions of skeletal disease. Later, in July 1999, the Portuguese Assembly passed a national law (Diário da República) that required the participation of a physical anthropologist in any excavation that reveals human remains. Later, more intense research on past human populations started and, subsequently, published studies of archaeological samples, including paleopathological analyses, increased significantly. More than seventy unpublished, primarily descriptive technical reports on skeletal remains have been produced by staff members, students, and collaborators of the former Department of Anthropology (currently Department of Life Sciences) at the University of Coimbra (Cruz 2012) and at the University of Évora.

A few international excavations and specific laboratory teams should also be mentioned. For example, in Baixo Alentejo, the Archaeological Campus of Mértola (http://www.camertola.pt/) integrates Portuguese, Spanish, and French researchers from different disciplines, including physical anthropology, to focus on paleopathological analysis of skeletal remains. In Alto Alentejo, Torre de Palma, where Roman to medieval occupations have been identified, a team of researchers from the United States and Portugal includes American Mary Lucas Powell, who heads the paleopathological analysis. More recently, the most important paleoanthropological find in Portugal, the Gravettian human skeleton from the Abrigo do Lagar Velho, was also subjected to paleopathological analysis by an international group of researchers (Trinkaus et al. 2002).

Teaching

Paleopathology is today considered a subdiscipline of biological/physical anthropology (Buikstra and Ubelaker 1994; Roberts and Manchester 2005; Buikstra and Beck 2006) and, in Portugal, paleopathology has developed mainly in relationship to the teaching of anthropology. A significant event in the professional development of paleopathology was the creation of a discipline of paleodemography, which included paleopathology (1995, 1996) within the anthropology degree (1992, 1993+) in the Faculty of Sciences and Technology at the University of Coimbra. Later, paleopathology was taught in the master’s course in human evolution (started in 1998) and in its successor, the master’s in evolution and human biology (2007/2008-), under the name “Paleopathology of human populations.” The subject is also taught in short courses such as biological anthropology (2006-) and in paleoepidemiology, by Adauto Araújo from the Oswaldo Cruz Foundation, Brazil (2007), in seminars at the Department of Anthropology at the University of Coimbra, and in summer courses at the New University of Lisbon (2008-). At the University of Évora it is taught in the discipline “Human Paleoecology and Paleopathology” in the degree programs of Biology and Environmental Sciences.

Research

Partially in relationship to the increased teaching discussed above, several academic works directly and indirectly related to paleopathology have appeared. Approximately fifty undergraduate theses, thirty master’s theses, six of them studying specific pathological conditions (Table 55.2), and nine PhD theses have dealt with paleopathology to date, and another six will be finished in the next year (Table 55.3). For example, in 1993, Cidália Duarte studied oral pathology in individuals from the Neolithic/Chalcolithic site of Tojal de Vila Chã Artificial Caves for her master’s degree at the University of Alberta (Canada). The first PhD thesis that focused on paleobiology and paleopathology was completed in 1994 wherein Eugénia Cunha finished a systematic paleodemographic and paleopathological analysis of two Portuguese medieval populations. Similar studies considered the Neolithic/Chalcolithic (Silva 2002) and Medieval periods (Garcia 2007; Fernandes 2008). Thus, the trend identified by Roberts and Manchester (2005:264), which suggests that since 1995, an increasing number of “population-based studies of heath” have been apparent and that “there is more consideration for placing health data in cultural context” also applies to Portugal. However,
### TABLE 55.2  MASTER’S THERSES ON SPECIFIC PALEOPATHOLOGICAL CONDITIONS (ORGANIZED CHRONOLOGICALLY).

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
</table>

### TABLE 55.3  PHD THERSES DEALING WITH PALEOPATHOLOGY, COMPLETED BY PORTUGUESE RESEARCHERS (ORGANIZED CHRONOLOGICALLY).

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
</table>

*(Continued)*
TABLE 55.3  (CONTINUED).

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>São Julião Church necropolis (Constância) and IC-UC and IC-UL.</td>
<td>Paleohistology: specific and nonspecific bone infections</td>
<td>14th–20th centuries</td>
<td>Assis, [2012]</td>
</tr>
<tr>
<td>Hospital archives and IC-UC Ca. 70 sites</td>
<td>Syphilis, Infectious, oral, and joint diseases, trauma, among others.</td>
<td>19th–20th centuries</td>
<td>Lopes, [2012]</td>
</tr>
<tr>
<td>Hospital archives and IC-UC</td>
<td>Trauma</td>
<td>19th–20th centuries</td>
<td>Peneda, [2012]</td>
</tr>
</tbody>
</table>

Legend:
IC-UC: Identified Collection, University of Coimbra; IC-UL: Identified Collection, University of Lisboa
* Thesis from Durham University, U.K.

theses have also focused on specific conditions, such as oral health (Duarte 1993; Wasterlain 2006), tuberculosis (Santos 2000; Matos 2003), indicators of “stress” (Cardoso 2001), bone loss and osteoporosis (Curate 2005; 2010), spondyloarthropathies (Marques 2007), markers of “occupational stress” (Assis 2007; Cardoso 2008), leprosy (Matos 2009), neoplastic disease (Marques 2012), syphilis (Lopes 2012), and trauma (Peneda 2012).

Other recent trends include the use of new methodological approaches for understanding certain pathological conditions. These studies have developed in collaboration with foreign colleagues and laboratories. Thus, aDNA (Santos 2000) and mycolic acids of Mycobacterium tuberculosis (Redman et al. 2009) were sought in skeletons from the Coimbra Identified Skeletal Collection. Umbelino (2006) used trace element and stable isotope analyses to reveal the diet of Mesolithic and Neolithic/Chalcolithic populations. Roman cremated materials have been studied by Silva (2012) using three-dimensional computed tomography, and paleohistology has been applied to periostitis in trying to distinguish among specific and non-specific infectious diseases as its etiology (Assis 2012).

Since 2001, from its very beginning, Portugal has been involved with the Global History of Health Project: European Module (http://global.sbs.ohio-state.edu/). This is an important international research program on health in the past that emphasizes the use of a uniform methodology for data collection and the creation of international databases, which through a comparative approach allows the study of the evolution of health and disease through time in many different countries. Research and teaching based on the well-documented large identified skeletal collections at the University of Coimbra (Rocha 1995; Santos 1999, 2000; Cunha and Wasterlain 2007), and more recently at the Museum Bocage within the National Museum of Natural History at the University of Lisbon (Cardoso 2006), have been contributing significantly to paleopathology. The more relevant papers based on identified and archaeological skeletal samples are summarized in Table 55.4.

Moreover, intense fieldwork on sites from periods from the Mesolithic to recent times provides skeletal samples from the whole of Portugal. These facilitate population-based studies, including paleopathological analyses, allowing an evolutionary perspective to be explored. The modern study of the history of disease follows a bioarchaeological approach—biological data are interpreted within appropriate cultural contexts, which include relevant details of historical development, local geography, and material culture of the people whose remains are under examination (Manchester 1983; Roberts and Manchester 2005). This represents a recent development of a multi-disciplinary approach to paleopathology (Santos 1999, 2000). Furthermore, differential diagnosis has become a mandatory step whenever a specific cause for pathological lesions is considered. However, this approach is not followed by all the researchers. Examples include publications by the dentist Santinho Cunha, and colleagues, including the historian Rodrigues Ferreira (1998) and the geologist Telles Antunes. An example of a paper with questionable assumptions and conclusions considered the Muge Mesolithic populations wherein Antunes and Cunha (1992, 1993) described, among other practices, ablation of the tongue, slaughter of the individuals by an “execution platoon,” and human sacrifice, namely of sterile women and young males, among other
### TABLE 55.4  MAIN CONTRIBUTIONS ON PALEOPATHOLOGY PUBLISHED FROM 1993 TO 2011 (ORGANIZED CHRONOLOGICALLY).

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. João de Almedina (Coimbra) and IC-UC</td>
<td>Diffuse idiopathic skeletal hyperostosis (DISH)</td>
<td>Medieval and 19th–20th centuries</td>
<td>Cunha, 1993</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Harris lines</td>
<td>19th–20th centuries</td>
<td>Cunha and Gomes, 1994</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Stress indicators</td>
<td>19th–20th centuries</td>
<td>Cunha, 1995</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Enthesopathies</td>
<td>19th–20th centuries</td>
<td>Cunha and Umbelino, 1995</td>
</tr>
<tr>
<td>Aljubarrota</td>
<td>Trauma</td>
<td>Medieval</td>
<td>Cunha and Silva, 1997</td>
</tr>
<tr>
<td>Évora</td>
<td>Trauma</td>
<td>Medieval</td>
<td>Santos et al., 1998</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Tuberculosis</td>
<td>19th–20th centuries</td>
<td>Santos and Roberts, 2001</td>
</tr>
<tr>
<td>Muge and Sado shell middens</td>
<td>Oral disease, trauma, stress indicators, trepanation, among others</td>
<td>Mesolithic</td>
<td>Cunha et al., 2003</td>
</tr>
<tr>
<td>Eira Pedrinha</td>
<td>Trepanation</td>
<td>Neolithic</td>
<td>Gama and Cunha, 2003</td>
</tr>
<tr>
<td>Furninha, Casa da Moura, Lapa das Galinhas,</td>
<td>Trepanation</td>
<td>Neolithic to Bronze Age</td>
<td>Silva, 2003</td>
</tr>
<tr>
<td>Castelo de Pragância, among others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atapuerca (SH)</td>
<td>Enamel hypoplasias</td>
<td>Middle Pleistocene</td>
<td>Cunha et al., 2004</td>
</tr>
<tr>
<td>Hipogeu São Paulo II (Almada), Serro da Roupa</td>
<td>Non-osseous calcaneonavicular coalitions</td>
<td>Neolithic/Chalcolithic</td>
<td>Silva, 2005</td>
</tr>
<tr>
<td>(Columbeira)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quinta da Torrinha (Monte da Caparica)</td>
<td>Trauma</td>
<td>Roman</td>
<td>Assis, 2005/2006</td>
</tr>
<tr>
<td>Alcác er do Sal</td>
<td>Brucellosis</td>
<td>Medieval-Medieval</td>
<td>Curate, 2006</td>
</tr>
<tr>
<td>IC-UL</td>
<td>Tuberculosis</td>
<td>19th–20th centuries</td>
<td>Matos and Santos, 2006</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Spondyloarthropathies</td>
<td>19th–20th centuries</td>
<td>Martin-Dupont et al., 2006</td>
</tr>
<tr>
<td>Church of Sacramento (Lisboa)</td>
<td>Tuberculosis</td>
<td>19th–20th centuries</td>
<td>Santos and Roberts, 2006</td>
</tr>
<tr>
<td>Muge and Sado shell middens, Cabeço da Arruda,</td>
<td>Oral and joint diseases, trepanation, trauma, among others</td>
<td>Mesolithic and Neolithic/</td>
<td>Cunha et al., 2007</td>
</tr>
<tr>
<td>Cova da Moura, Dolmen Ancião, among others</td>
<td></td>
<td>Calcific</td>
<td></td>
</tr>
<tr>
<td>IC-UC</td>
<td>Oral pathologies</td>
<td>19th–20th centuries</td>
<td>Dias et al., 2007</td>
</tr>
<tr>
<td>Estremoz</td>
<td>Klippel-Feil Syndrome</td>
<td>Medieval</td>
<td>Fernandes and Costa, 2007</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Oral pathologies</td>
<td>19th–20th centuries</td>
<td>Wasterlain and Dias, 2007</td>
</tr>
<tr>
<td>Samarra</td>
<td>Trauma</td>
<td>Neolithic Calcific</td>
<td>Silva and Ferreira, 2008</td>
</tr>
<tr>
<td>Cacela Velha (Algarve)</td>
<td>Os odontoides</td>
<td>Medieval</td>
<td>Curate, 2008</td>
</tr>
<tr>
<td>IC-UL</td>
<td>Rib trauma</td>
<td>19th–20th centuries</td>
<td>Matos, 2009</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Oral pathology</td>
<td>19th–20th centuries</td>
<td>Wasterlain and Dias, 2009</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Oral pathology</td>
<td>19th–20th centuries</td>
<td>Wasterlain et al., 2009</td>
</tr>
<tr>
<td>Constância</td>
<td>Neoplastic disease</td>
<td>14th–19th centuries</td>
<td>Assis and Codinha, 2010</td>
</tr>
<tr>
<td>Olival (Ourem)</td>
<td>Dystocia</td>
<td>19th century</td>
<td>Cruz and Codinha, 2010</td>
</tr>
<tr>
<td>Santa Clara-a-Velha (Coimbra)</td>
<td>Osteoporosis, trauma</td>
<td>14th–17th centuries</td>
<td>Curate et al., 2010</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Syphilis</td>
<td>19th–20th centuries</td>
<td>Lopes et al., 2010</td>
</tr>
<tr>
<td>Lapa do Bugio (Sesimbra)</td>
<td>Oral and neoplastic diseases</td>
<td>Neolithic</td>
<td>Silva and Wasterlain, 2010</td>
</tr>
</tbody>
</table>

(Continued)
Portugal

**TABLE 55.4** MAIN CONTRIBUTIONS ON PALEOPATHOLOGY PUBLISHED FROM 1993 TO 2011 (ORGANIZED CHRONOLOGICALLY).

<table>
<thead>
<tr>
<th>Skeletal series/sites</th>
<th>Main contribution</th>
<th>Chronology</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tholos of Paimogo I, Paradela, Santarém, Constância, Juncal, Seixal</td>
<td>Hip fractures</td>
<td>3000–2500 BC to 19th century</td>
<td>Curate et al., 2011</td>
</tr>
<tr>
<td>São Miguel (Castelo Branco)</td>
<td>Infectious disease</td>
<td>13th and 19th centuries</td>
<td>Matos et al., 2011</td>
</tr>
<tr>
<td>Praça do Comércio (Coimbra)</td>
<td>Neoplasia</td>
<td>15th–20th centuries</td>
<td>Wasterlain et al., 2011</td>
</tr>
<tr>
<td>IC-UC</td>
<td>Periodontal disease</td>
<td>19th–20th centuries</td>
<td>Wasterlain et al., 2011</td>
</tr>
</tbody>
</table>

Legend:
IC-UC: Identified Collection, University of Coimbra; IC-UL: Identified Collection, University of Lisboa

statements very difficult to confirm using the skeletal remains. Another example is that of Mendes and Oliveira (1990) who referred to the skeletons from an ancient necropolis as the link between archaeology and history with bioanthropology and paleopathology. Following this interesting observation, the authors used the paleopathological study of sixteen skeletons found in Mértola as an example of this interdisciplinarity, describing fractures and their medical treatment. However, their conclusions must be called into question at the point when the authors said that they could see in the skeleton an “expression or feeling of horror” (Mendes and Oliveira 1990:207).

Apart from the study of disease from the perspectives of the history of medicine and archaeological contexts, it is important to note that, since 1997, paleopathological studies have also been linked to work in forensic contexts. In that year, collaboration between the National Institute of Forensic Medicine (Instituto Nacional de Medicina Legal) and the Department of Anthropology at the University of Coimbra began. Since then more than 100 forensic cases have been analyzed and reported, and pathological analysis is also mandatory as can be seen (Cunha 2006; Cunha and Pinheiro 2009). Analysis of pathological conditions has helped, in many cases, to establish a positive identification. In the meantime, further efforts to bridge the gap between past and present have been achieved (Pinheiro et al. 2004).

**Scientific Meetings and Associations**
Portuguese paleopathologists are now keen to share and discuss their results with their international peers. This can be witnessed by the fact that many researchers are members of different paleopathology associations, for example the Asociación Española de Paleopatología (AEP; Chapter 58), the Paleopathology Association (PPA; Chapter 67) and the Paleopathology Club. Several researchers have also participated in the meetings of the PPA since 1996, in Maastricht, and later in the United States and South America. Due to the proximity of Portugal and Spain, the biennial meeting of the AEP is particularly frequented by Portuguese members and their students. According to Gonzalez and coauthors (2007), 11 percent (38 out of 343) of the papers published in the proceedings of the meetings from 1988 to 2001 were from foreign researchers, and in particular from Portugal (14 papers, or 37 percent).

The first scientific meeting centered on human paleopathology organized in Portugal was the 14th European Meeting of the Paleopathology Association, held between August 28 and 31, 2002, at the University of Coimbra. One hundred and ninety-six participants from more than twenty-two different countries (Cunha and Santos 2003) presented and discussed approximately 160 papers and posters (EMPPA 2002). Twenty-one of the presentations were published in special issues of *Antropologia Portuguesa* (volume 19, 2002) and the *International Journal of Osteoarchaeology* (volume 13(5), 2003). Six years later, on June 6, 2008, the Department of Anthropology, University of Coimbra, hosted the "I Jornadas Portuguesas de Paleopatología" ("1st Portuguese Meeting of Paleopathology"). Organized by seven PhD students in biological anthropology, thirty-three presentations were made to the eighty-eight participants (Santos 2008). The second meeting was held in 2010 (http://www.uc.pt/en/cia/events/meetings, Santos 2011) and the third is plan for fall 2012.
On July 2–3, 2009, the “Workshop in Musculoskeletal Stress Markers (MSM): limitations and achievements in the reconstruction of past activity patterns” (http://www.uc.pt/en/cia/msm/) took place (Santos et al. 2009; Jurmain 2010; Santos et al. 2011). This was a more focused meeting that aimed to contribute to the development and standardization of protocols in MSM research. Three lectures, sixteen podium presentations, ten posters, and two syntheses on research in this area as well as discussions were presented to the seventy-five researchers from twenty-one countries. The institutional assistance for all these events comes from the University of Coimbra, the former Department of Anthropology, and the Research Centre for Anthropology and Health (Centro de Investigação em Antropologia e Saúde, or CIAS; www.uc.pt/en/cia). The Populations and Cultures of the Past research group of the CIAS has more than twenty-five members who focus on the relevance of skeletal remains to the study of human paleopathology.

CONCLUSION
A review of paleopathology in Portugal presents some difficulties since a broad range of publications in archaeology, anthropology, and related sciences existed by the end of the 19th and the beginning of the 20th century. Once those sources had been analyzed, the challenge was to balance the quantity and depth of the available information on paleopathology. With the completion of this task, we believe that this outline of the history of Portuguese paleopathology is just a starting point. Continuing research on this subject will bring new evidence for the antiquity of paleopathological studies in Portugal.

Furthermore, since the very earliest work in paleopathology, Portuguese scientists have published in international outlets. For decades, however, craniometry and “race” determinations dominated contributions from physical anthropology, and pathological bones tended to be analyzed by physicians, natural philosophers, and by other researchers linked to archaeological and anthropological studies. From the 1880s to 1950s, trepanation was the most commonly reported condition. The physician Barbosa Sueiro published many paleopathological studies from the 1920s to the 1950s. By the 1950s the word paleopathology started to be used for the first time in Portugal by Sueiro and Frazão (1956, 1957, 1959).

During the last century both case and population-based approaches to paleopathology were common, with some attempts to contextualize the data. This panorama changed considerably after the 1990s, when formal education in paleopathology began. Since then the dominant trends have included biocultural approaches to the study of disease in the past. Additionally, the potential of identified skeletal collections has been explored, namely to attempt to create new methods for the diagnosis of infectious, metabolic, and neoplastic diseases. Moreover, the classic macroscopic observations have been complemented with new techniques such as the application of stable isotope and aDNA analyses, computed tomography and paleohistology to skeletal remains in national and international partnerships. Above all, paleopathology proceeds as a multidisciplinary endeavor (Roberts and Manchester 2005; Cook and Powell 2006) and “international in its scope as we begin the 21st century” (Cook and Powell 2006:322). Thus, it has an enormous potential. As Roberts and Manchester (2005:274) stated “[p]aleopathology has an excellent future, backed up by a solid base of research that is increasing by the day.”

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