

Book Reviews

Archaeofauna 10 (2001): 213-214

THE COMPARATIVE OSTEOLOGY OF EUROPEAN CORVIDS (AVES: CORVIDAE), WITH A KEY TO THE IDENTIFICATION OF THEIR SKELETAL ELEMENTS. Polish Academy of Sciences, Institute of Systematics and Evolution of Animals, Krakow, 102 pp., 148 fig., XX tabl. ISBN 83-907187-8-2. T. Tomek & Z.M. Bochenski 2000.

Cet ouvrage étudie les caractères ostéologiques distinctifs des Corvidés d'Europe, c'est à dire des espèces suivantes: *Corvus corax*, *C. corone*, *C. frugilegus*, *C. monedula*, *Pyrrhocorax pyrrhocorax*, *P. graculus*, *Garrulus glandarius*, *Pica pica*, *Nucifraga caryocatactes*, *Cyanopica cyanus* et *Perisoreus infaustus*. Et il donne également les mesures de tous les principaux éléments du squelette, crânien et post-crânien. Le plus grand nombre possible de squelettes de ces espèces a été examiné et mesuré, provenant des plus importantes collections ostéologiques d'Europe. Ceci est important pour les espèces qui sont relativement peu représentées dans les collections de référence, comme *Cyanopica cyanus*, *Perisoreus infaustus*, *Pyrrhocorax pyrrhocorax*.

Ce travail sera particulièrement utile pour tous les archéozoologues et les paléontologues spécialistes d'oiseaux, car les Corvidés sont toujours bien représentés dans les gisements. Certaines espèces de taille voisine comme les deux Corneilles, noire et mantelée, *Corvus corone corone* et *C. corone cornix*, d'une part, et le Corbeau freux, *Corvus frugilegus*, d'autre part, sont très difficiles à distinguer et pourtant leur identification est importante car les corneilles correspondent à un environnement plus forestier que celui du Corbeau freux. Pour les petits Corvidés, l'identification précise de *Perisoreus infaustus*, le Mésangeai imitateur, et de *Nucifraga caryocatactes*, le Cassenoix moucheté, apporte des éléments indiquant la présence de grandes forêts, surtout de conifères, sous un climat froid, tandis que celle de *Cyanopica cyanus*, la Pie bleue, récemment trouvée à l'état fossile à Gibraltar (Cooper & Voous, 1999), a permis de

résoudre un problème biogéographique qui était longtemps resté sans réponse.

Tous les éléments du squelette ont été passés en revue, y compris ceux qui sont rarement étudiés, tels que le carré, la furcula, la scapula ou la première phalange du doigt majeur de l'aile, et tous les caractères distinctifs sont illustrés par des schémas.

Mais le plus grand mérite de cet ouvrage, à mon avis, est d'avoir montré que les caractères ostéologiques distinctifs ne sont pas toujours obligatoirement présents chez tous les individus d'une même espèce, et d'avoir quantifié leur variabilité. Cependant, lorsque un caractère n'est pas parfaitement exprimé, mais s'il y a d'autres caractères présents et concordants, on peut considérer qu'il y a une bonne probabilité pour que l'os examiné appartienne à une espèce donnée. Les auteurs insistent sur la nécessité de ne pas se contenter des dessins pour déterminer une pièce, mais de la comparer avec une collection de référence d'espèces actuelles, afin de bien repérer le caractère indiqué sur le schéma. Les caractères n'étant pas toujours présents sur tous les individus d'une même espèce, il est également nécessaire d'avoir des collections de référence comportant plusieurs individus. Cette réflexion sur le nombre minimum d'individus nécessaire pour déterminer des restes d'oiseaux avait déjà fait l'objet d'un article des mêmes auteurs (Bochenski & Tomek, 1995).

L'étude biométrique a permis de montrer que les sept espèces pour lesquelles il y avait un matériel de comparaison important présentaient un dimorphisme sexuel. L'analyse des caractères ostéologiques a permis en outre de tirer des conclusions sur les relations de parenté entre les différents genres étudiés. *Perisoreus*, par exemple, présente un plus grand nombre de caractères communs avec *Garrulus* et *Cyanopica* qu'avec les autres genres, et *Pyrrhocorax* présente plus de caractères communs avec *Corvus*.

En conclusion cet ouvrage constitue un outil vraiment précieux pour la détermination des avifaunes pléistocènes d'Europe et je remercie très sincèrement T. Tomek et Z. M. Bochenski d'avoir réalisé ce travail extrêmement minutieux et détaillé.

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Archaeofauna 10 (2001): 215-217

THE ARCHAEOLOGY OF ANIMAL BONES. Stroud, Gloucestershire (U.K.): Sutton Publishing Limited. 206 pp. (Price £30.00). *Terry O'Connor* 200

Among the zooarchaeological (or archaeozoological, if you so prefer!) fraternity, Professor Terry O'Connor is widely recognized and respected as one of the established experts in the field, with over twenty years of research and teaching experience behind him. Having such a sound professional background it comes as no great surprise that O'Connor has written a splendidly lucid book and one which provides a good overview of current theories and methodological procedures in faunal studies. It is however not written for the benefit of fellow professionals but is instead clearly intended as an introductory guide for undergraduate students, providing them with a series of up-to-date critical reviews of many of the core themes familiar to more advanced faunal analysts. As a beginner's handbook, it fulfils this role admirably while avoiding any tendency towards becoming a tiresome, didactic instructional workbook directing *how* animal bones from archaeological sites *ought* to be examined, analysed and interpreted. This point is specifically highlighted by O'Connor in the preface and reinforced by his declared objective to "give sufficient detail about the development of methods and ideas to allow readers to draw informed conclusions about the best way to proceed" in their own studies.

All the methods and theories covered in this book are arranged in a straightforward format under well-defined broad-headings, and supported by a comprehensive index; enabling readers to directly access particular information they are seeking – allowing them to delve into the text as required, skipping past sections not of immediate concern. For readers requiring an overview of zooarchaeology, however, and who are prepared to read through the book as a whole, the topics taken collectively will indeed seem to have "coherence as a single work", as O'Connor claims. Although the case studies chosen to illustrate the topics covered do include those from a wide geographical and temporal distribution (ranging from Pleistocene Africa to Post-Medieval England) there is an apparent and inevitable bias towards those from British and north-western European Roman and

Medieval contexts (as admitted by O'Connor himself in the preface), which is entirely understandable given the author's professional background. This in no way detracts from the value of the book as a more general introductory guide to the subject as irrespective of their origins, the methodologies and theories expounded will have wide applicability whether the student eventually finds him/herself working as a faunal analyst on material from Europe, North America, Near East or further afield.

The book begins (Chapter 1) with a brief personal account of how Professor O'Connor came to be involved in zooarchaeology. It is fascinating to learn that an eminent pioneer figure in this field, Ian Cornwall, played a role in influencing the author's early studies. Although O'Connor makes no mention of the fact, it is perhaps worth noting in this review that Cornwall's book *Bones for the Archaeologist*, first published as long ago as 1956, represented the nascent prototype for many successive (more comprehensive) handbooks (published in Britain) dedicated to the specialist field of zooarchaeology. O'Connor's book follows in this tradition set by Cornwall – and comparison of the two works reveals just how far the field has developed as a scientific discipline in its own right since those early days forty five years ago. For those of us who first entered this field in the early 1970s, there was still a relative dearth of available reference books to guide our researches, a situation partially remedied by the publication in 1971 of Raymond Chaplin's *The Study of Animal Bones from Archaeological Sites*, a somewhat slender volume of 170 pages but nevertheless useful especially when used in conjunction with relevant chapters in the massive tome *Science in Archaeology* edited by Brothwell and Higgs (first published in 1963 and subsequently revised and updated in 1968) which in that same year (1971) had been re-released in a reprint edition. Interestingly, O'Connor fails to include Cornwall's book in his bibliography but does include Chaplin's. This is perhaps not all that unexpected given that even at the time of its publication in 1956 Cornwall's book was regarded by many as too elementary and noticeably lacking in any consideration of osteometric analytical methods (see Juliet Clutton-Brock's comments made in *Circaea*, in 1993).

Chapter 2 considers the composition, form and growth of bone and examines skeletal structures in mammals, birds and fishes. Taphonomic processes are then reviewed in some detail in Chapter 3, with

an explanation of how these may have impacted and modified the formation and ultimate composition of animal bone-assemblages found at archaeological sites. Aspects of sampling strategies and recovery procedures during the excavation phase are explored in Chapter 4, with medieval Fishergate, York quoted as a case study, showing how mesh size of sieved samples greatly influences the recovery of for example the bones of the smaller bird taxa. O'Connor makes the important observation that although the finer mesh sieve (2 mm) resulted in the recovery of a greater range of species, the additional species so collected over those from the coarser (12 mm) sieve, were "mostly small commensal birds of little archaeological significance" (at least in the context of this particular project), leading him to acknowledge that the selection of a "recovery method [has to be] a compromise between the desire to recover as much as possible of what is in the deposit, and the need not to build up a logistically impossible backlog of material to sort, identify and record". This fundamental and sensible dictum is sometimes unheeded even by the more advanced practitioner in zooarchaeology in the enthusiasm following discovery of a particularly bone-rich deposit – and its emphasis in O'Connor's book is therefore fully justified.

Chapters 5 to 10 form the bulk of the book and cover the principal methodological themes which characterize zooarchaeological research: identification, recording and measuring bone specimens; quantification (including establishing the minimum number of individuals/ body-part representation in a particular species); ways of estimating age at death and sexing bones; recognising and describing evidence of pathologies; investigating and understanding non-metrical traits. In Chapter 5 O'Connor rightly emphasizes the importance to future colleagues of properly curating and storing animal-bone assemblages once a study is completed; pointing out that the bones will be far more valuable to them than any paper or electronic database of the material produced. Based upon his own experience, O'Connor believes that reinterpreting someone else's records is a poor substitute for going back to the actual bones themselves (the primary record) in order to investigate in greater depth aspects perhaps not fully considered or which may even have been overlooked entirely by the original researcher.

In Chapters 11 – 14, O'Connor demonstrates using case studies how application of zooarchaeo-

logical theories and methodologies is not merely confined to providing information about the animals themselves but often extends to addressing archaeological questions about the relationships between those animals and their human contemporaries. Among the topics chosen to illustrate this aspect is the role of humans as predators/big-game hunters. This is examined with reference to Paleoindian bison kills on the North American Plains and the hunting of large ungulates (red deer and reindeer) in late Pleistocene and early Holocene northern Europe. Also reviewed is how animal bone studies contribute to our understanding of the development of animal husbandry and the origins of the major domestic animals. While these domesticated animals played a positive role in the lives of humans, other animals who became associated with the inhabitants of the early agricultural settlements were to prove not so beneficial – and even harmful. Among this latter group were the commensal rodent species, particularly rats which were destined to become "mankind's worst enemy", and as O'Connor outlines in his book, these unwelcome pests later spread globally, a process unwittingly facilitated by humans themselves as a consequence of their expansion in trading contacts. It was from bones excavated from urban refuse deposits in York and London that faunal analysts first discovered that the black rat had spread to Britain as early as the Roman period (contrary to earlier held notions that this species had been brought back in the ships of returning crusaders in the medieval period). Urban refuse deposits have also provided insight into the economic relationship between the towns/cities and their respective rural hinterlands, a topic examined in depth by O'Connor in Chapter 14 with particular reference to case studies from Britain.

The final chapter in the book (Chapter 15) briefly considers the future direction of zooarchaeological studies and the contribution new scientific advances (e.g. analyzing ancient DNA) may make to these.

In summary, this book is highly recommended to all archaeological students who have aspirations of later specializing in studying animal bones – for whom this book should be considered as essential (required) reading. It is then recommended that the novice zooarchaeologist then reads Reitz and Wing's *Zooarchaeology* (1999) which will provide insight into more advanced methodological procedures and theories not covered in O'Connor's

book. It is perhaps unfortunate that O'Connor's book does not have the same quality of line drawings, schematic diagrams and tables as those in Rietz and Wing's work.

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Archaeofauna 10 (2001): 218-219

PREHISTORIC AGRICULTURE IN SOUTHERN SPAIN DURING THE NEOLITHIC AND THE BRONZE AGE. THE APPLICATION OF ETHNOGRAPHIC MODELS. B.A.R (International Series) 818. Archaeopress. Oxford, 167 pp., ISBN 1 84171 031 8. *Leonor Peña-Chocarro* 1999.

A novel approach to the study of prehistoric agriculture in a small region of the inner Andalucía is presented. The subjects of this study are two different sites in this area, one from Neolithic and Calcolithic levels at Cueva de los Murciélagos, and the other is a Bronze one at Peñalosa. The understanding of the daily farming works of the inhabitants at these sites was approached in a well differentiated two steps project. First, comprises the careful collection and analysis of the botanical macroremains (fruits, seed and parenchymous tissues of roots and tubers) using a rigorous methodology. The second, and more innovative, means to apply the existing ethnographic documentation about crop processing, especially wheat, in some restricted areas of the Mediterranean basin, where nowadays still carry on this process in a non-mechanical way.

Most of the archaeobotanic researches working in Spain, independently on their specialisation subject (pollen, seeds, fruits, textile plants, phytoliths or charcoal), have been trained outside Spain. The author is not an exception. She followed her PhD training at the *Institute of Archaeology of London*.

During the first half of present century, the references to macrobotanical remains are very scarce, however fruits and seeds are not so infrequent when a methodical search is done. Tellez & Ciferrí (1954) could be considered the pioneers, after publishing the *corpus* of Spanish archaeological wheats. In the following three decades, most of the fruits and seeds recovered from peninsular sites were studied by Hopf (1987), unfortunately the vast majority of these materials were sampled with no-systematic criteria. The goals of this early works was mainly to identify the different species, establish presence/absence patterns, as well as origin and the diffusion paths. On the other hand, almost nothing is said about the agrarian practices that could be suggested by these findings.

In this book Peña-Chocarro follows the steps of G. Hillman, who during the early 80's starts a new research line, that propose the use of ethnographic models to understand the meaning of archaeobotanical remains.

Ethnographic models had focused on Eastern Mediterranean (Turkey, Greece, Syria), in some geographic, cultural and politic isolated areas, where traditional agrarian practices survive throughout centuries. The main interest of this book, as the author point out, is to be the first for the Western Mediterranean. In fact, the first and the latest until today, in spite of the five years from the submission as doctoral thesis, until now that come to us in a book format.

Following a conventional thesis style, the work is structured in 9 chapters. The terseness is greatly appreciated unless some part could be considered brief in excess, like chapter 1, where objectives are exposed in terms of to interpret archaeobotanical remains according with the presumed human activities, or the final conclusion.

After briefly, but correct exposition about the present state of research on prehistoric agriculture in Spain (Chapter 2), come the presentation of the chosen sites: Cueva de los Murciélagos and Peñalosa (3). In the fourth is outlined the methodology procedure in the recording the ethnographic information as well as archaeobotanic material. The need of the application of a rigorous sampling of the site, and the utilisation of flotation systems, to maximise the recovery of macrobotanical remains, is strongly emphasized.

In the most innovative chapter (5), the results of ethnographic fields studies are displayed after several months of consultations, coexistence with the farmers and even participation in the agrarian work, which was carried out, following the traditional way, in rural areas of South Asturias, and provinces of Cádiz, Córdoba and Jaén. Furthermore, the author brings forward an excellent photographic collection about the different phases involved in the glume-wheats processing, although, the quality of impression is no as good as desired.

The main body of the book are chapter 6 and 7, which are divided into several sections. In the first one, and with the support of a large number of tables, the results of the archaeobotanical analysis from Cueva de los Murciélagos and Peñalosa are presented. In the second one, the author examines the results of ethnographic observations recovered in Spain, based exclusively in the processing of

hulled wheats, like einkorn, emmer and spelt. In the followings sections an approach between archaeobotanical and ethnographical data is attempted. The problem comes later on, as the identified cereal species from both sites, are chiefly barley and free-threshing wheats. As the own author says (p: 110), the application of Spanish ethnographic model is not useful to illustrate the main cereal findings from Cueva de los Murciélagos and Peñalosa. To sort this handicap, the author resorts to apply the model proposed by Jones (1984) for free-threshing wheats in Greece. The identification of different agrarian process is possible by the statistical comparison between archaeobotanical samples, and the ethnographic data (Chapter 7).

Finally, the author reviews individually the species that has been identified, as well as the roll played by these species in the ancient human communities. The possibility to trace the different agrarian works at the sites is also reviewed, according with the finded remains.

In Cueva de los Murciélagos the low number of items do not allow the needed statistical treatment, but shows the main trend, that seems a rule in the Western Mediterranean during Neolithic Age, were free-treshing wheats are predominant (Buxo 1997). A key contribution is the first evidence of poppy's use. The documented seeds of *Papaver somniferum* from Los Murciélagos gives the oldest European chronology for de human use of poppy.

The range and number of plants identified at Peñalosa is significant, but not enough to get a final conclusion about the agricultural practices followed at the site (p: 136). This is much due to the needed of fire, spontaneous or provoked by man, to preserve the plants remains by charring, but also is affected by depositional factors. Anyhow, the author evaluates a number of evidences that shows Peñalosa as an agrarian processing centre, always after Hillman's premises.

The use of ethnographic models in archaeology renders interesting results (Hillman, 1984; Jones, 1984) in order to state if a site is a production centre or not, it also allows to differentiate between the diverse practices, crop systems, etc. On the other hand the use of theese models has a number of limitations, pointed out in this book. First of all,

in order to use an ethnographic model, is needed to have it available, but also is needed that the quantity and quality of the remains allow a statistical treatment. There are a number of reasons that make it difficult to put both requirements together.

In brief, the book offers a novel treatment of achaeobotanical remains from two Spanish sites, but at the same time shows the difficulties in the use of ethnographic models in order to give a full meaning to these remains. Perhaps the mayor contribution of this work is the detailed documentation about glume-wheats processing, from the seeding planning to final consumption, according with traditional procedures, in a country like Spain, where is rare to find areas where this process is still carry on in a non-mechanical way. Unfortunately, the chances to collect these informations are day by day reduced. This is why this work is so valuable.

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Archaeofauna 10 (2001): 220-223

FISCHEREI UND FISCHHANDEL IM MITTELALTER. Wirtschafts- und sozialgeschichtliche Untersuchungen nach urkundlichen und archäologischen Quellen des 6. bis 14. Jahrhunderts im Gebiet des Deutschen Reiches. Matthiesen Verlag, Husum. *Angelika Lampen*, 2000.

Die Fischereigeschichte und Teichwirtschaft im Mittelalter ist in Deutschland bis jetzt kaum eingehend erforscht worden. Einzeluntersuchungen sind zwar vorhanden- insbesondere der hansische Herings- und Stockfischhandel-, aber keine Arbeit, in der urkundliche und archäologische Quellen des 6. bis 14. Jahrhundert dargestellt werden. Diese Arbeit, zusammen mit der Ichthyologischen Auswertung über die Fischerei in der Nordsee von Bødker Enghoff (2000) erlauben es, über umfassende überregionale Studien zu verfügen und Forschungslücken zu schliessen.

Ziel der Arbeit von A. Lampen war nach Ursachen für die Entstehung des überregionalen und internationalen Fischhandels zu forschen und zu prüfen, ob traditionelle Forschungstopoi, wie z.B. christliche Fastengebote, als der eigentliche Grund für den Aufschwung der Fischerei weiter anzusehen ist.

Unter anderem werden 2200 Urkunden des ostfränkischen-deutschen Reichs, sowohl herrscherliche, städtische wie auch adelige Diplome mit einer Datenbank erfasst, um Aussagen über den Bedarf des Fischkonsums, der Fangtechniken und der Entstehung des Marktes zu erhalten. Die Herrscherurkunden zur Fischerei erfassen die rechtlichen Verhältnisse und die herrschende Rechtspraxis und bestätigen häufig ältere Rechte der Empfänger, hauptsächlich italienische und alpine Klöster und Kirchen. Bei den städtischen Urkunden wurden norddeutsche und süddeutsche Städte betrachtet, um Vergleiche zwischen Küstenregionen und Binnenland herzustellen. Es wird auch in klösterliche und adelige Haushaltsverzeichnisse eingesehen die Auskunft über die Fischerei geben.

In der Völkerungswanderzeit und im Mittelalter waren Fische eine geschätzte Nahrung. Neben dem Hauptnahrungsmittel Getreide waren sie, zusammen mit Fleisch und Laktazinien ein wichtiger Eiweisspender. Ihr reichhaltiges Vorkommen an Küsten, in Flüssen und Seen bot eine sichere Zusatzversorgung, die nicht, wie andere Tier- oder Pflanzenarten, abhängig von klimatischen Sch-

wankungen, Kriegs- oder Seuchenzüge waren. Um den Wert der Fische innerhalb der Nahrungsmittel zu erkennen, greift die Autorin zu den verfügbaren Preislisten, die für Deutschland erst seit Mitte des 14. Jahrhunderts vorliegen. Zusammen mit Angaben aus anderen Ländern ergab sich, dass konservierte Fische wie Hering und Stockfisch auch im Binnenland noch erschwinglich waren, während andere Fischarten, wie Hecht, Lachs oder Stör sogar als *Herrenspeise* galten.

Im Mittelalter gab es ca. 150 Fasten- bzw. Abstinenztage im Jahr. Ein grosser Teil der Bevölkerung nahm an normalen Fastentagen Nahrungsmittel wie Getreide, Hülsenfrüchte, Hering oder Stockfisch zu sich. Klöster galten traditionell als Hauptabnehmer für Fische im Mittelalter, da die Benediktsregel verbot, vierbeinige Tiere zu konsumieren, Einfluss der sich noch auf spätere Orden wie die Zisterzienser oder die Cluniazenser bemerkbar machte. Fische galten als *Flussgemüse* und waren daher als Fastenspeise erlaubt. Viele Klöster bestrebten sich ausreichende Fischmengen anzuschaffen und ausserdem Ihre Fischereirechte schriftlich zu fixieren, da die Anzahl der Mitglieder ständig stieg, insbesondere in der Karolingerzeit, wo die Grossklöster bis zu 600 Mönche und die *familia* dieser Abteien mehrere tausende Personen umfassen konnten. Nutzniesser dieser Verleihungen waren hauptsächlich die Klöster, wie auch Bistümer, Domkapiteln und Kirchen, während Laien selten genannt wurden.

Um die Nahrungswohnheiten nicht nur anhand der schriftlichen Quellen zu analysieren, können Heutzutage einige archäologische Funde aufschlussreiche Information liefern. Speiseabfälle aus den Abfallgruben, Latrinen und Küchen der Klöster erlauben es zu überprüfen, in wie weit das Fleischverbot eingehalten wurde, ob es interne Standesunterschiede gab oder ob es sich dabei um Süsswasserfische aus der Umgebung, oder um importierte Arten handelt.

Leider sind bis jetzt vorbildliche Grabungsmethoden mit Schlammverfahren in zahlreichen Klosteranlagen nur in einigen Ländern durchgeführt worden. Ichtyoarchäologische Analysen sind von England, Niederlanden und Belgien bekannt. Im deutschen Bereich haben solche Auswertungen kaum stattgefunden, deshalb sind Vergleichsbeispiele aus den benachbarten Ländern vorgestellt worden. Auch wenn in den Funden aus dem Westminster Abbey Salzwasserfische, wie Stockfisch und Hering überwiegen, nutzte die lokale Fischerei kaum. Das Konvent von Utrecht in Niederlan-

den und das Benediktinerkloster Ename in Ostflanden benutzten, trotz importierter Ware auch ihre einheimische Ressourcen, während im französischen Kloster Charité-Sur-Loire nur Süßwasserfische identifiziert wurden.

Die Fische in nichtchristlichen Siedlungen waren auch aufgrund ihrer Nahrhaftigkeit und reichen Vorkommens ein wichtiger Bestandteil der Grundernährung. Die Siedlungen ergaben verschiedene Resultate in ihren Auswertungen: in Ralswiek in Rügen war die bevorzugte Fischart der Hering, der in Menzlin auch verarbeitet wurde, während in Mecklenburg eher Süßwasserfische konsumiert wurden. Angelika Lampen besteht in ihrer Arbeit darauf, das nicht nur die Fastengebote für den Aufschwung der Fischereiwirtschaft verantwortlich waren sondern auch der ständige Bevölkerungszuwachs und die steigende Stadtentwicklung, die seit dem 12. Jahrhundert neue Bevölkerungsstrukturen aufweist. In diesen neuen Zentren, wie auch in kleineren Siedlungen, belegen die Urkunden, dass Fisch ein Hauptbestandteil der Nahrung war.

Die rechtlichen Voraussetzungen des Fischereihandwerks ist ein anderer interessanter Aspekt, der untersucht wird. Es hat sich herausgestellt, dass das Recht zum Fischfang meistens als ein unabhängiger Rechtstitel galt, insbesondere auf königlichen Gütern. Es konnte aber auch als Bestandteil des Grundeigentums vergeben werden. Andernfalls, die Nutzungsrechte in grossen Wasserläufen durch den Bau von Fischwehren verursachten Komplikationen mit der Schifffahrt und wurden anders geregelt. Für den behandelten Zeitraum muss für das deutsche Reich hervorgehoben werden, dass es kein einheitliches Fischereirecht für die Binnenfischerei gab. Die Fischereirechte konnten sowohl räumlich- in Form von einzelnen Netzfängen-, wie auch zeitliche Einschränkungen (einzelne Wochentage, auf Lebenszeit) oder mengenmässig, d. h. für den Eigenverbrauch beschränkt werden.

In Bezug auf die Geräte der Binnenfischerei stehen diese im Zusammenhang mit dem rechtlichen Status des Betreibers. Es gibt für diese Zeit kaum schriftliche Quellen, sondern die Hauptinformation stammt von der Archäologie. Da in den verschiedensten Kulturkreisen sich selbständig ähnliche Fangmethoden entwickelt haben, ist es möglich, Analogieschlüsse herzustellen. Hinzu kommt die geringe Entwicklung der Geräteformen seit der Steinzeit. Erst die Technik im 20. Jahrhun-

dert hat die Fischerei grundlegend verändert. Die Fangtechnik ist abhängig von der Fischart und seinen Lebensweisen. Schwarmfische werden vor allem mit grossen Netzen gefangen. In Bodennähe schwimmende oder einzelne Fische werden geangelt und Wanderfische wie Aale, Lachse, Forellen und Störe mit Fischwehren und Reusen gefangen. Bei den Methoden werden Speerfischerei, die für das Mittelalter keine grosse Rolle mehr spielte, die Angelfischerei mit Haken, Knebeln oder Legangel, die Netzfischerei (Stocknetz, Wurfnetz, Schleppnetz), Fanggeräte wie Fischfallen und Wehren beschrieben. Über die Organisation der Fischerei mit Wehren sind besonders die Aussagen der Herrscherdiplome und die städtischen Urkunden wichtig. Bei den ersten scheint es meistens um Schenkungen an die Klöster zu handeln, aber später ab dem 12. und 13. Jahrhundert wurden Fischwehre auch an Bürger verkauft oder verpachtet.

Fischer als Berufsbezeichnung taucht in den Urkunden seit dem Frühmittelalter auf. Es handelt es sich sowohl von den Klöstern, Adelshöfen oder auch von Städten abhängige Fischer. Die abhängigen Fischer von Klöstern gehörten als Laien zur *familia* der klösterlichen Haushalte und wurden von diesen versorgt und untergebracht. Obwohl die klösterliche und adelig abhängige Fischer z. T. wie ihre Anlagen selbst bei Güterschenkungen übertragen werden konnten, scheint doch dieser Berufstand über gewisse Rechte verfügt zu haben. Fischer, die zu städtischen Berufsgruppen gehörten, lebten in Wohngebieten die über ihren Beruf Auskunft gaben. Reminiszenzen dieser Aktivität werden z.B. heutzutage durch Strassennamen wie *Fischerstrasse* in Lübeck, Schleswig, Ulm oder Minden belegt. Es gab aber auch freie Bürger, die auf eigene Kosten Fischwehre von Städten pachteten und sogar eigene Fischereiunternehmen aufbauten.

Über 10% der ausgewerteten Urkunden beschäftigen sich mit der Teichwirtschaft. In bisherigen Forschungen galt, dass die Karpfendomestikation und Zucht in aufwendigen Teichanlagen ein Höhepunkt klösterliches Wissen- und Wirtschaftslebens darstellte. Diese These stimmt nur zum Teil. Die Analyse der Urkunden zeigen zwar, dass die kirchlichen Institutionen die Wegbereiter der Teichwirtschaft in engem Zusammenhang mit der Einführung im 9. Jh. von Wassermühlen stehen, aber bereits ab dem 13. Jahrhundert wird die Karpfenzucht vom Adel als lukrative Einnahmequelle erkannt und weiter ausgebildet. Auf diese Weise wurde der Karpfen der

wichtigste Teichfisch Europas. Die domestizierte Form konnte die ursprüngliche Länge (50 cm) verdoppeln und das Gewicht von ca. 1 kg auf 30 kg erreichen. Dokumentation und Befunde von Karpfen gibt es in Europa erst ab dem 13. Jahrhundert. Ein Jahrhundert später tauchen Karpfenknochen sowohl in Siedlungen, in Klöstern, als auch in Adelssitzen auf, wo die Teichzucht den Kauf von Seefischen weitgehend ersetzt, während die Städte die Nutzungsrechte gegen die Hälfte des gefangenen Fisches verpachteten aber durch die grosse Nachfrage auf den Handel von konserviertem Seefisch angewiesen war.

In Bezug auf die Seefischerei werden vom historischen und archäologischen Standpunkt die Fangmethoden und Konservierungstechniken einiger Handelsplätze besprochen: die dänische Halbinsel Schonen und Bergen an der Westküste Norwegens und die Insel Rügen. Der enorme Fischreichtum an den Küsten dieser Handelsplätze, -Schonen wegen den grossen Herinfängen, -Bergen wegen des Kabeljaus, ergaben eine Produktion, die weit über den Eigenverbrauch stieg und erlaubte, wichtige Nahrungsmittel wie Getreide und Salz einzutauschen. Es entwickelte sich ausser dem zum Mittelmeer bezogener Handel ein neuer Markt, der die skandinavische Handelskreise die Nord- und Ostsee umschloss und dessen Zentrum Lübeck und die Vereinigung der Hansen wurden. Diese Stadt verfügte über weitverzweigte Handelssysteme mit zahlreichen Absatzmärkten, die ihr eine Monopolstellung garantierten. Zudem war sie der Haupthändler der bedeutenden Salzvorkommen der Stadt Lüneburg, die in Skandinavien fehlten. Eingetonnertes Salz wurde zu den grossen Heringsmessen gebracht und als Rückfracht die gleichen Tonnen mit einsalzenem Hering gefüllt. Das Leben der fremden Kaufleute spielte sich innerhalb zugewiesenen Vitten ab, die von den dänischen Königen vergeben wurden und ein Ausmass von sechs bis zehn Hektar hatten. In diesen Arealen konnten Buden, Lagerhäuser, Schuppen in denen die Heringe zugerichtet, verpackt und gekennzeichnet wurden. Die Ausgrabungen belegen diese Einrichtungen bis ca. 1300 als sehr provisorische und spärlich eingerichtete Installationen.

Über den Fang und die Verarbeitung des Herings geben die schriftlichen Quellen kaum Hinweise. In diesen wird aber in Schonen ausdrücklich zwischen Fischfang, der von dänischen Fischern ausgeübt wird und Fischverarbeitung, die von deutscher Hand erledigt wurde.

Die Archäologischen Quellen haben jedoch interessante Resultate erbracht: in Roskilde (Seeland) konnte eindeutig zwischen konsumierten Fischen für Eigenverbrauch in der Wikingerzeit und Schlachtabfälle durch das Auskehlen der Heringe differenziert werden, was für eine industrielle Verarbeitung spricht, zwei Jahrhunderte bevor diese rationelle Schlachttechnik von dem offiziellen Erfinder *Willhelm Beukels* dokumentiert wurde. Auch in anderen Städten wie Kolberg haben die Funde gezeigt, dass schon seit dem 9. Jahrhundert Heringsknochen überwiegen, wie auch Stettin oder Danzig. Die Heringe wurden nicht nur gesalzen oder getrocknet, sondern auch geräuchert, wie es die Räuchergruben aus Wollin belegen. In dieser Hinsicht sind wir der Meinung, dass es mit zukünftigen Funden auch interessant wäre, festzustellen, ob nicht einige von der Antike bekannten Fischkonservierungs- und Verarbeitungstechniken in römischen Siedlungen in Niederlanden und Belgien bis ins Mittelalter überlebt haben könnten, oder ob diese Techniken im Norden nur einem vollkommen lokalen Ursprung haben.

Es wird anderseits auch der Handel des Herings und Stockfisches entlang der Nord- und Ostsee ins Binnenland untersucht. Dabei fungiert Lübeck als Hauptumschlagplatz und kontrolliert einen Dreieckshandel zwischen Skandinavien, England und Flandern der wiederum den internationalen Fischhandel dominiert. Gegen Salz für Schonen bzw. Hopfen und Getreide nach Bergen, transportierten lübecker Kaufleute Hering und Stockfisch, um sie gegen Tuche einzutauschen. In Deutschland entwickelten sich verschiedene Zentren des Binnenhandels, durch den auch von der Küste entfernte Städte, Klöster oder Adelsitze mit konservierten Fischen versorgt wurden, wie z.B. Köln, Frankfurt, Mainz oder Nürnberg. In den Städten sorgte ein spezialisiertes Gewerbe wie die Heringsträger- makler- wäscher und Stockfischaufweicher für die Aufbewahrung und Weiterverarbeitung. Die Heringshäuser, wo die Fische gewaschen und ensalzt wurden, lagen meistens am Hafen, obwohl bald, wegen der Geruchsbelästigung, diese Installationen aus den Städten verbannt wurden. Von dort aus gelangte der Fisch durch die Heringswäscher - oder träger auf die städtischen Märkte, wobei es in vielen Städten neben Getreide- und Viehmärkte auch Fischmärkte gab, wie z. B. in Hamburg oder Köln. In einigen Städten wie Lübeck, versuchte der Rat Kontrollmassnahmen durchzuführen. Es gab für die Fis-

cher einen Marktzwang, d.h. der Verkauf ihrer Waren war ausserhalb des beaufsichtigten Marktgeschehens verboten. Damit wurde der Fisch für alle zugänglich und zu festgesetzten Preisen verkauft.

Zahlreiche Zollurkunden, die die Abgaben für Hering und Stockfisch auflisten, sind für flandrische und holländische Städte bekannt. Aber auch andere deutsche Städte wie Hamburg, Braunschweig, Halle oder Magdeburg importierten konservierten Fisch. Die Summe der Abgaben und die Form der Verzollung hing von jeder Stadt selber ab und lassen, sowohl für den geläufigen Stockfisch und Hering, wie auch für die restlichen Fischarten keine Verallgemeinerungen zu.

Da bei steigender Nachfrage sich die Fischbestände reduzierten, bedingt durch eine Überfischung, Veränderungen der Flussläufe, wie auch Wasserverschmutzung durch verschiedene Gewerbe, wurden im 14. Jahrhundert Hegemassnahmen durchgeführt, die sowohl die Fangzeiten, wie auch die Fangutensilien einschränkten. Unter anderem, wurden auch Mindestgrössen für die einzelnen Arten festgelegt, die auf den Märkten durch Fischmeister und Marktaufseher kontrolliert wurden. Ein Jahrhundert später übernahmen die Fischerzünfte diese Aufgaben.

Ohne Zweifel handelt es sich um eine sehr ausführliche Arbeit in der, von einem interdisziplinären Standpunkt aus, die schriftlichen Quellen mit all den von der Autorin besprochenen Limitationen, doch sehr ausgiebige und ins Detail gehende Information geliefert haben. Die ausgehenden Fragestellungen über die grosse Nachfrage des Fischkonsums, Fang und Verarbeitungstechniken und des intensiven Handels konnten auch Dank der archäologischen Quellen in vielen Hinsichten alte Thesen widerlegen, womit dieses Werk ein für den heutigen Forschungsstand der mittelalterlichen Fischerei in Deutschland eine obligatorische Lektüre und Nachschlagewerk darstellt.

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Archaeofauna 10 (2001): 224-227

DOGS THROUGH TIME: AN ARCHAEOLOGICAL PERSPECTIVE. Proceedings of the 1st ICAZ Symposium on the History of the Domestic Dog; Eighth Congress of the International Council for Archaeozoology (ICAZ 98), August 23-29, 1998 Victoria, B.C., Canada edited by *Susan Janet Crockford*. ISBN 1 84171 089 X 47.00. BAR (International Series) 889, 2000.

Dogs being the first species domesticated by man and also one that has followed him throughout the world constitute "... the *only* animal that prehistorians around the world have in common" (vii). Very many good books about dogs have been written in the recent past a good example being the multi-authored volume edited by Serpell (1995) but the one here is a completely different publication. *Dogs through Time* brings together twenty nine contributions of original research presented to the first monographic session ever devoted by an ICAZ Conference to a domestic species. The aim there, as in this book, was twofold: (a) an exchange of information about the history of the dog at a truly global scale and (b) a plea for a more consistent collection and reporting of dog archaeological remains than has been the rule until present. For such reasons this is neither a textbook nor a comprehensive review but instead a seminal contribution intended to enlighten "... what is presently known (and *not* known) about the history of dogs ..." (vii) and to focus future research on particular "hot" issues.

Partly due to the reasons just mentioned, and except for a few cases such as those of Armenia (Manaserian & Antonian) or prehispanic México (Valadez), regional surveys have been only occasionally conducted and then only on a restricted temporal scale such as the Neolithic for Japan (Shigehara & Hongo), roman Britain (Cram) and Hungary (Bartosiewicz) or slightly larger periods in the case of prehistoric Britain (Clark), Italy (Mazzorin & Tagliacozzo) or the northeastern United States (Handley). This is also the reason for some apparent geographical biases with nine contributions from european sites and none from such emblematic places as China, India, Australia or Africa.

The book has been organized into seven parts that reflect areas of special interest, namely: (1) Evolution & early dogs (seven contributions), (2)

Interpreting roles: early practical and ritual uses of dogs (six contributions), (3) Interpreting skeletal variation: the roman influence on breed development (four contributions), (4) Interpreting skeletal variation: non-roman contexts (four contributions), (5) Modern primitive dogs represented by a single contribution reporting on the status of the New Guinea singing dog, (6) Archaeozoological analysis: methods and results (five contributions) and (7) Discussion and additional references which, in addition to a review paper by the editor, includes an extremely useful listing of references on dogs and wolves "... stressing archaeological occurrences, hybridisation and the process of domestication" (ix). Since this arrangement is, of necessity, arbitrary, many papers cutting across boundaries, we will mention them not in the order they appear but when addressing specific issues that, in a somewhat simpler way, we have re-organized under the three headings of (a) origins, (b) intraspecific variability (breed would be a misleading term in our context!) and (c) roles.

The introductory chapter by Juliet Clutton-Brock is far more than what one would derive from its title, a "... fascinating and quite personal overview of the history of research on dog evolution ..." to paraphrase the editor once again (vii). Indeed. Through its mere five pages, though backed by a personal experience of more than forty years in the field, Clutton-Brock uses the dog as an "excuse" to reflect on past errors and achievements as well as on the nature of the domestication process as recapitulated through the domestication of the dog. In so doing, she warns us on the dangers of a die-hard behaviorism, the politics of scientific research and the false dichotomies divorcing man from nature setting the stage for what will surely become a radical new vision of archaeozoology in a not too distant future. Clearly, this work transcends the discourses of the papers that are to follow.

The issue of dog origins touches upon a wealth of questions, ideological, methodological and analytical which range from the nature of the agriotype (now resolved at the species level despite authors like Manaserian & Antonian still unsure on whether jackals should still be granted genealogical credit) the problems of hybridisation and introgression and the sequence of earliest claims throughout the world. The most encompassing paper here is the first one contributed by the editor where she argues on the central role played by thyroid hormone in selecting subsets of wolves less

prone to stress caused by the presence of man and in mediating in the appearance of a large series of traits, both somatic (eg., skeletal proportions, colour disruption) and physio-ethological (eg., alterations of reproductive cycles, tameness) without purposeful selection on the part of man. This hypothesis is attractive in that it elaborates on the idea of "... *understanding the initial stage of domestication as an evolutionary, rather than a cultural, process*" (p.11). It is also scientific in the sense that it gives rise to testable predictions (postdictions!) such as the need of humans to be settled in order for a new kind of (anthropic) environment to arise selecting wolves "...*which possessed a similar genetic phenotype for thyroid hormone physiology...*" (p.11). Thus, independent of how well it will fare in the long run, the value of the hypothesis lies in the way it promises to frame research from here onwards.

One major concern in this conflictive issue of dog origins has to do with the difficulty of finding unequivocal signatures of status (ie., domestic vs. wild). Osteological traits, for example, are most subtle and for such reason the short paper by Yates is a most welcomed addition to this kind of literature. Through diagnostic features in the mastoid region, this author is able to separate wolf from dog with an accuracy rate of <95% and wolf from wolf-dog hybrids with an accuracy rate of 88%. In view of this, one is left wondering why traits have not been illustrated more adequately (the only photo provided is very difficult to interpret) and also how good the method is for setting apart dog from wolf-dog hybrids though with respect to the latter comment one should keep in mind that this is just a preliminary study.

At the genetic/molecular level diagnostic traits are equally elusive. Since dogs and wolves presumably belong to the same species (a hotly debated issue that has more to do on how does one define "species" than with controversy about the agriotypic species itself!) one can not properly speak of hybridisation in the conventional sense, a problem compounded by the reproductive compatibility all *Canis* species exhibit (Wayne, 1993). Notwithstanding these and other constraints, the paper by Koop *et al.* shows that the coyote, once invoked as a putative agriotype for North American dogs, stays clearly outside the wolf-dog clade (Figure 5: 278). In addition, one out of the five groups with dog mtDNA sequences is uniquely constituted by Indian dogs and some of the North American wolves, lending preliminary support for an indepen-

dent origin of dogs in the Americas. The sharing of haplotypes by so many of the sampled individuals, on the other hand, suggests a recent ancestry of dogs from wolves whereas three unique wolf sequences indicate the existence of additional, and rare, ancestral lineages within the agriotype. The presence of both dogs and wolves together in four of the groups means that using a "molecular clock" method for estimating the timing of dog domestication from wolf ancestors with this kind of data, as Vilà *et al.* (1997) did, would be not only inappropriate but also unscientific. As a corollary of this, the date of 135,000 years ago for the initial domestication event, suggested by Vilà *et al.* for dogs, is not supported, because it should never have been done in the first place (the dataset of Koop *et al.* included **all** of Vilà *et al.*'s sequences, plus several others). The data presented by Koop *et al.*, on the other hand, can be taken to support either a monophyletic origin of dogs (the presence of a large and exclusive dog group with introgression between distinct genetic lineages explaining the presence of multiple haplotypes) or a polyphyletic one. The problem here might still be strictly methodological in that ancient mtDNA segments short enough to be easily extracted and amplified (ie., 300bp or less) may not provide enough variability for conducting reliable phylogenetic analyses. Such limitation can be hinted at when one realises that in all the studies carried out thus far, low bootstrap values (ie., less than 50%) indicate that groupings had very low levels of confidence (Okumura *et al.* 1996; Tsuda *et al.*, 1997; Vilá *et al.*, 1997). A more serious problem has to do with introgression. Crockford (p.309) contends that rare but recurring hybridisation episodes during prehistory involving bitches could have moved distinctive dog mtDNA haplotypes into local wolf populations throughout the Northern Hemisphere. If this has been so recent wolves might not be adequate for phylogenetic analyses at the molecular level and one should know first the genotypic peculiarities of wolves before dogs came into existence if one hopes "... *to untangle the mess of dog genetic history: multiple origins and widespread dispersal, accidental and deliberate lineage crosses and interspecific (our bold) hybridisation with wolves*" (*Ibid.*). The paper by Clutton-Brock & Kitcheners insists on some of these issues while stressing how simplistic interpretations of osteological data (shortening of the muzzle in their case) and lack of reliable reference collections can lead into greater confusion.

In the archaeozoological record problems relating to dog origins are most vividly expressed when deciding on what side of the line a particular specimen falls. The Pre-Pottery Neolithic canids of Atlit-Yam reported by Dayan & Galili conform to dogs when considering their shortened jaws and reduced bulla yet exhibit only slight metric differences in comparison with recent Israeli wolves thus pointing to a rather slow rate of change for thousands of years since first domesticated.

Matters are more contentious when ambiguous data are interpreted in straightforward ways. Thus, Musil's Magdalenian "domestic wolves" from central European sites often stand "... *at the lower limit of the range of variation for "typical" wolves* ..." (p.23) so that resolving their status on metrical grounds requires no small amount of subjective reasoning. It is rare when one finds, as Chaix has done with a Preboreal dog from the French Alps, a complete specimen exhibiting a whole set of unequivocal traits but it is precisely this kind of data, properly dated, that we should seek for establishing a reliable chronology of domestication events.

The issue of dog breed development is another hotly debated phenomenon of a rather futile nature. From an osteological standpoint, unless one is able to link discrete traits with specific breeds as Valadez manages to do in the case of the hairless Mexican Xoloitzcuintle thanks to a mutation linking this trait with a loss of cheek teeth, one is often forced to leave matters at the rather uninformative level of metrics where terms such as "large", "medium" and "small" remind us on the pressing need for a more operative, hopefully standardized, nomenclature in the future. Standardization based on a more sensible choice of criteria, including measurements that correlate well with particular features of the animals as well as standard metric dimensions, is also the plea of Clark in her reassessment of the variability of prehistoric British dogs.

Several papers evidence the coexistence of dogs of different sizes from early times onwards. Traditionally, in Europe the burst in variability (again, mostly size differences) is attributed to the Romans and, indeed, different papers in the book evidence the homogeneity of Iron Age dogs (eg. Galik) whereas papers reporting trends, like those of Mazzorin and Tagliacozzo (Italy) and Cram (Britain) do point to larger ranges of variation during Roman times. But matters might not be as

simple. Bartosiewicz, in his comparative analysis of dogs from the Roman province of Pannonia and the non-Roman territories of the *Barbaricum* in Hungary, stresses that significant differences in dog skulls are only to be spotted through statistics (ie., mean values) and are not so readily apparent when ranges are inspected by the eye. This implies that dog variation, though undoubtedly more restricted in non-Roman settlements, was still evident. Such pre-Roman variation transpires also in the paper by Clark (prehistoric Britain) and is expressed in prehistoric Armenia (no less than two types of dogs; Manaserian & Antonian). That Romans have nothing to do with this phenomenon is also evident in the papers describing dog types in the Americas not only with most distinctive features such as wool, curly tails, hairlessness and the like (Koop *et al.*, Schwartz, Valadez) but also with two, or perhaps up to three, size groups being reported in the same area (Handley). In strong contrast, Jomon dogs appear to remain unmodified during a protracted time lapse of some 10,000 years that Shigehara & Hongo speculate was caused by "... *the Japanese tendency to accept nature as it was*" (p.65) meaning that certain traditions may go back to the Pleistocene!

Unless traditional osteological data are combined with alternative methodologies, and from such standpoint the paper by Ryder on hair traits from selected dog breeds looks promising, we fear that developments in the field of dog breed studies is reaching an impasse which may last for quite a long time.

Which brings us to the topic of dog use, also subjected to no small amount of speculation unless exceptional contextual or complementary evidence is readily available. In this way, cut marks are taken to indicate butchery of the animals but proceeding beyond that loose process characterization is often difficult. For this reason, several papers, mostly from pre-Roman European sites, describe traces of this kind without reaching clear-cut conclusions on whether these mean consumption, skinning or less parsimonious alternatives (eg. Hrisu *et al.*). Horard-Herbin, however, is able to make a more compelling case by combining such traces with a demographic analysis of dog remains based on a wear calendar she has compiled for the lower carnassial. Her analysis, despite a scarcity on data for certain cohorts, evidences a selective culling of dogs of very similar nature to that recorded for the domestic ungulates but, more importantly, uncovers a potentially fruitful field of

analysis in addition to the standarization of recording procedures it introduces. These papers assess the role of dogs as a marginal food item for humans, the ritual nature of which is only resolved, partially, through the use of written sources, art or ethnohistorical records (Schwartz).

Ritual uses have also been proposed in the case of dog burials and two papers, one by Olsen (Kazakhstan) and another one by Yohe II & Pavacic (northwestern United States), discuss these matters in detail. Once again, despite much speculative effort, it is context and complementary data what eventually allow one to put forward the most compelling hypotheses although in some cases one can have difficulties in devising ways for refuting them.

Paleopathology is another tool that can, in theory, provide clues for inferring uses and it has, for example, been invoked by Warren to postulate about the role played by certain Indian dogs as sledge haulers. The truth of the matter is that very seldomly (for dogs, that is) has a particular pathology been unequivocally attributed to a specific "activity" among other things because no comparative analysis has been ever attempted to systematically record what kinds of osteological signatures do specific "activities" leave on the bones (another area where standarization would be most welcomed). At times, the most one can say, as Cram does after finding that fully 22% of the skulls at Silchester exhibit healed fractures, is that ill-treatment of dogs on the part of man appears to be a routine in the past.

As stated at the beginning, future research on archaeological dogs will not only require more data but also more careful retrieval and recording. Crockford argues that treating dog remains with the same care and attention devoted to human remains should solve many of the problems we now face concerning the resolution of the data available. Perhaps this is unrealistic or perhaps not but changing the present day "frame" will require a lot of standarization for which several of the contributions here may pave the way (Meadow, Ryder, Horard-Herbin, Clark).

Another critical aspect to be taken into consideration is comparative analysis, in particular, transcending the local or regional sphere where patterns and trends are extremely difficult to spot. At the "show & tell" session held during this dog symposium, when specimens from all over the world were placed together, interesting patterns appeared.

In her last contribution to the volume, Crockford comments how it was noticed that patterns of tooth wear run parallel to the gum line in European dogs but were clearly concave in all Pacific Rim dogs available. A coincidence? Evidence of independent origins? The specimens assembled were too few to decide but, in addition to its anecdotal nature, this example is indicative of the type of research that should start to develop from here onwards.

Perhaps, when our agenda is finally met, a future book on the archaeology of dogs will be a much more balanced and comprehensive treatment of issues that the one we now have. If this is so, it will mean that many of the loose ends mentioned here have been finally brought under control and that would be good news for everybody. We rather fear that this will never be the case for science is designed in such a way that the more effort one puts into it more effort is demanded and as more problems get solved, an ever increasing range of problems appear. No need to worry, though this is actually the fun of the whole business!

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