Review of: Lesnik, J. J. (2018). Edible insects and human evolution. Gainesville, FL: University Press of Florida. Hardcover, 208 p. ISBN 978-0-813056-99-9

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Julie J. Lesnik presents in this book an exciting new view on hominid (and human) evolution in relation to diet, giving particular attention to the role that insects could have had in the process and making a statement towards their integration into our regular diet in the future. In order to do this, the author deconstructs several preconceptions in Western thinking of, firstly, what is edible (insects are eaten by a billion of people worldwide, mostly in areas close to the tropics) and, secondly, the meat-paradigm that has traditionally been linked to key evolutionary processes such as brain size increase. By shifting both concepts, Lesnik connects the important role of women in daily survival through intensive gathering with the harvesting of insects, in order to prove their essential role at least in certain seasons of the year, and hence their strategic contribution to human evolution. Finally, the book devotes some worthy efforts to convince the reader that insects are a sustainable food resource that should be seriously considered for the future.

The book is structured in short chapters that have very clear goals and navigates from anthropological aspects of insect consumption to the ethnographic record, the role of insects in nutrition, and then moves on to insect foraging and consumption in primates, hominids, and humans in the past and present. The author illustrates the book mostly with own graphic material, which makes it a real treat for the reader. The text is written for the general public, but it includes over 300 citations for those who want to learn more about what is described in it.

The book starts with a simple premise: if humans and chimpanzees eat termites nowadays, our common ancestor and subsequent hominid species could have eaten them too. One of the most interesting revelations in this chapter is that the Western culture has triggered a reduction in insect consumption in non-Western areas where they used to be regularly consumed, which means that their visibility at a global scale has been reduced in many regions under the influence of Western culture. Lesnik eventually makes the point that the study of the dietary role of insects in the past is a very complex issue, victim of current taboos, and that one of the few possible ways to approach it is through the study of primates and current or historically documented hunter-gatherer populations. One final argument concerns the fact that food is intrinsically related to society, since it involves tasks and people performing them: by ignoring certain foodstuffs (e.g. gathered plants) we may be ignoring those involved in it (usually women), thus perpetuating a bias that should have never existed in research and must certainly be avoided at present and in the future.

Chapter 2 explores the perception of insects as a food resource. There is no deeply rooted reason that explains why insects are not widely consumed by humans. Lesnik reports that insects (more than 2000 species) are consumed by half of the world's countries, mostly in tropical areas, and particularly in rural areas of many countries, while citizens tend to abandon their consumption. Urbanisation processes might be among the main factors in the reduction of the consumption of all types of wild resources.

Chapter 3 shows ethnographic evidence of the harvesting of insect fauna, mostly by women, usually relying upon the most abundant resources, often available year-round, such as termites. Lesnik also describes how they are cooked and sold in the market nowadays, by presenting own ethnographic observations. According to Lesnik, ethnographic data on insect harvesting and consumption is unfortunately scarce and not very reliable due to the bias mentioned before and the few hunter-gatherer populations that have survived to our days. Lesnik presents a selection of examples based on the completeness of the information available (namely: species harvested, harvesting technique, processing and storage methods and perception of insects as food resource), yet there is probably no reason not to provide a full list of examples known worldwide, which would have been greatly appreciated. Among the examples that would have been interesting to treat are the Koryak, reindeer herders from Kamchatka Peninsula (Russia), thus outside of the tropical areas, who still nowadays keep their traditions despite generations of admixture with other ethnic groups.

In chapter 4 one of the key statements of the book is presented. Lesnik proposes that insects could have been an essential contribution to the diet, particularly for pregnant women, in key moments of our evolution, especially as a substitute for meat when it was not available. A better diet would have made the reproduction process more efficient and thus contributed to the evolutionary success of hominids. In order to prove this, Lesnik starts by providing the reader with some basic concepts around diet and the dietary

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requirements of pregnant or lactating women, particularly regarding protein intake. Women gather most of the insects, according to ethnographic records. They also consume more insects. Lesnik suggests that maybe insect consumption is a practice that results from generations of natural selection of a successful behaviour. Finally, the nutritional benefits of different insect species in different stages of their life cycle is described and discussed. In general, they tend to provide proteins or fats, but, as highlighted by the author, a lot of research on their nutritional value for humans (i.e. how they are digested) is still needed.

Ethologic observations on the use of insects among primates, as presented in chapter 5, are not only helpful for the understanding of insect consumption and harvesting techniques but also for the observation of sexual differences in the realisation of some of these tasks. Because of the larger brains of their offspring, female primates must invest more time than other female animals in their raising, and biparental care is more common in primates. According to Lesnik, this could have led to early sexual division of labour and a preference among female primates to eat insects, since its beneficial results would have been favoured by natural selection. Unfortunately, good data only exist for chimpanzees.

Chapter 6 tries to demonstrate the importance of insect consumption among hominids. Nevertheless, the line of argumentation is slightly odd:

1. early hominids were intelligent enough to use tools and harvest insects;
2. they actually had tools and insects were available in the environment;
3. they were not great hunters;
4. insects must have been more frequently consumed than meat.

Unfortunately, the best supporting evidence comes from digging implements with polished surfaces that most likely were multifunctional. Even nowadays, the tools used are often made of perishable materials, such as tree branches, but the focus of Lesnik is on what is archaeologically preserved: bone tools. Lesnik misses here the opportunity to draw archaeologists' attention to wooden tools in those rare cases when they are preserved. The dietary approach is more useful in order to generate a well-funded hypothesis: hominin diet was likely to be protein-poor and insects could have been a reliable source of protein and fats for those individuals who invested more time on gathering (namely mostly females). It could have been a seasonal activity, depending on the availability of other resources and insects themselves, yet a key resource during that time of the year. This could have been a major step forward in hominin diet that could have allowed brain increase (with its consequent higher caloric demand), mostly as a result of female behavioural change and innovation capacity in relation to insect consumption and probably other resources. It is just a pity that none of this has been supported by archaeological investigations, but it is an interesting scenario for future research!

Subsequently, Lesnik provides a very broad overview of the consumption of insects by the genus *Homo* in chapter 7. This chapter feels slightly simplistic. *Homo erectus* would be responsible of taking insect harvesting and consumption to the level known today in ethnographic examples. Lesnik pushes here the boundaries of our imagination by relating Acheulean axes to woodworking and, why not, to the production of carrying vessels, which would have significantly improved harvesting and storage capacity. No further discussion on tool use is done for Neanderthal populations, although evidence for wooden tools is slightly more abundant than for previous hominin species. The big change in Neanderthals is the introduction of shells and snails in the diet, which according to Lesnik has been largely overlooked in the archaeological record, in favour of meat consumption. About four pages of text are dedicated to modern humans, with only minor references to coprolite and gut content analyses as hard proof of insect consumption in different societies around the world in the more recent past.

Chapter 8 sums up the main hypotheses of the book and reviews some methodological improvements needed in the study of insect consumption practices in the past. Lesnik does not mention the importance of sites with waterlogged preservation in order to produce high-quality data that can be used for such reconstructions. Indeed, it is in this type of sites where the greatest chances for the preservation of identifiable insect remains are given and where a longer tradition in their study has been established. Unfortunately, the study of insects in archaeology still suffers from lack of expertise, and scattered reference collections. Lesnik does make a good contribution here towards different fields such as lipid residue analyses, dental calculus, use-wear analyses and archaeoentomology in order to design possible lines of research for the recognition of insect consumption, which is probably not even considered as a possibility by most researchers.

The last chapter summarises the main take-home messages of the book and makes an impor-

tant declaration against what is currently known as Palaeo diet, a protein- and fat-rich diet based on supposed archaeological evidence against the consumption of starchy foods in the Palaeolithic. Lesnik points out that Palaeo diets should be more seasonal, and not the same all year round, and more diverse in food resources, including of course insects.

Given the limited amount of archaeological evidence of insect consumption, the book would have benefited from a more thorough ethnographic review, a larger effort in the integration of archaeoentomological data from Holocene sites and a more rigorous research into the textual evidence for insect consumption in other cultures. Despite these understandable drawbacks, Lesnik presents a challenging view of human evolution that will probably gain more and more acceptance, particularly among new generations of archaeologists. In addition to this, all readers will be convinced that insects could become part of our diets in a not so distant future. Whether this happens through a renaturalisation of cities and a restructuration of our economy, with a broader incorporation of wild food resources in our diet, or through their acquisition as highly-processed and intensively-produced foodstuffs in supermarkets, is our choice.

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