Out of the Net and Into the Museum:
Ethics of Collecting and the Adventure of 60,000 Lifetimes

Emily L. Sandall
Ph.D. Candidate in Entomology, Penn State University
But no pursuit at Cambridge was followed with nearly so much eagerness or gave me so much pleasure as collecting beetles. It was the mere passion for collecting; for I did not dissect them, and rarely compared their external characters with published descriptions, but got them named anyhow.

-Charles Darwin, 1887
Timeline

330 BC
Pre-Enlightenment
1600s
1700s
1800s
1900s
2018 AD

VIRTUE ETHICS

EXPLORATION ETHICS

CONSERVATION ETHICS

Aristotle Image by Freireke (CC BY-NC 2.0), Medieval Butterfly Image in Public Domain by Nazari (Public Domain). Antenna Image by Biodiversity Heritage Library (CC BY 2.0), Beetle Image (CC BY 2.0) by Biodiversity Heritage Library, Beatty image by Frost Entomological Museum (CC BY 2.0)
Pre-Enlightenment: Insect Symbolism

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330 BC: Aristotle and Classification Origins

School of Athens image (PD-Art).

Chain of being image (PD-Art).

VIRTUE ETHICS
1700s: Natural History Collection/Classification Origins

Historical Collection at British Museum of Natural History

Curtis 1771

Linnaeus 1758
1800s: Shifting Focus
1900s: Historical Insect Research

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2000s: Conservation & Eradication

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Not to Harm a Fly: Our Ethical Obligations to Insects

Jeffrey A. Lockwo
University of Wyoming

INTRODUCTION

Thirty years ago, Congress passed the Animal Welfare Act (AWA) to combat the growing problems of pets stolen for research and abusive animal research practices. The AWA amended several times since its passage in 1966 which in considerable expansion of the statute’s original purpose. Currently, the AWA governs not only federal animal re
tlies but also numerous activities involving the treatment. The Act also defines and regulates activities directly in handling animals including pet dealers, animal exhibitors and medical research grant recipients.

Despite the expanding reach of the AWA’s regulatory scope, general consensus that the statute has failed to fulfill in fostering the humane treatment of animals. The AWA

* Director of Legal Affairs for the International Center for Technology Assessments, a non-profit organization devoted to exploring the economic, environmental, ethical, and social impacts that can result from the application of technology or technology.

Jeffrey A. Lockwood
University of Wyoming

CONSERVATION ETHICS

A Consuming Passion for Entomophagy

M. B. Berenbaum

In March 2016, levels of carbon dioxide in the atmosphere topped 400 parts per million for the first time since record
taking began (Foley 2016). This increment of 200 parts per million has been described as a “breakthrough” in entomophagy (Berenbaum 2016). The shift towards eating insects as a regular and sustainable food source has been accelerated by the enhanced understanding of the nutritional benefits of insects. Entomophagy is defined as the consumption of insects as a food source, and the practice of eating insects has been widely documented in various cultures around the world. Historically, insects have been consumed as a source of nutrition for sustenance and survival in many communities. However, modern society has largely overlooked the potential benefits of entomophagy.

A recent study conducted by researchers from the University of Illinois found that mealworms (Tenebrio molitor) are a highly nutritious food source. The study revealed that mealworms are rich in protein, vitamins, and minerals, making them an ideal addition to a balanced diet. Mealworms have a high protein content, which is essential for muscle growth and repair, and are also a good source of essential amino acids. Additionally, mealworms are low in saturated fats and cholesterol, making them a healthy alternative to traditional meat sources.

The benefits of entomophagy are not limited to nutritional advantages. Eating insects also has environmental benefits. Insects have a low ecological footprint compared to traditional meat sources, as they require less land, water, and energy to produce. Furthermore, insects have the potential to help mitigate climate change by reducing greenhouse gas emissions. The production of traditional meat sources generates significant amounts of greenhouse gases, whereas insect farming produces much lower emissions.

In conclusion, entomophagy offers a sustainable and nutritious alternative to traditional meat sources. The consumption of insects can help address global food security challenges and contribute to a more sustainable future. As society continues to explore new food sources, entomophagy emerges as a promising option that offers both nutritional and environmental benefits.
New perspectives on the role of chlorinated hydrocarbons in our environment have come into focus in recent years. Successive discoveries have demonstrated that these compounds are systematically distributed in the upper trophic layers of aquatic systems (1, 2). Raptorial bird populations have simultaneously suffered severe population crashes in the United States and Western Europe (1, 2, 3). These involve reproductive failures which, at least in Britain, are associated with high levels of polychlorinated dibenzofurans and polychlorinated biphenyls. In addition, the frequency of eggshell thinning, which can also be caused by excessive exposure to low clayey levels of chlorinated hydrocarbons (7), has increased in nesting populations of golden eagles (Aquila chrysaetos), red-tailed hawks (Buteo jamaicensis), and great horned owls (Bubo virginianus) provided to representative of reasonable numbers of populations that may be slow to decline in their habitats are gradually decreasing by man, but for which widespread reproductive failures are currently uncommon. In addition, 57 eggs of the breeding bird (Laurel cerasifera) were collected from five colonies in 1987. The shells of these were dried for 6 months before being measured, and results of the entire egg contents were analyzed by the Wisconsin University Research Foundation for chlorinated hydrocarbons but not for polychlorinated biphenyls. Analytical procedure followed that outlined by the U.S. Food and Drug Administration.

### Table 1

<table>
<thead>
<tr>
<th>Region</th>
<th>Weight (g)</th>
<th>Mean (mg)</th>
<th>Change (%)</th>
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</thead>
<tbody>
<tr>
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<td>5.05</td>
<td>0.52</td>
</tr>
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<td>0.21</td>
</tr>
<tr>
<td></td>
<td>1985-86</td>
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<td>0.20</td>
</tr>
<tr>
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<td>1987-88</td>
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<td>0.14</td>
</tr>
<tr>
<td></td>
<td>1989-90</td>
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<td>1991-92</td>
<td>5.05</td>
<td>0.11</td>
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<tr>
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<td>0.09</td>
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</tr>
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<td></td>
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<td>5.05</td>
<td>0.06</td>
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<td>5.05</td>
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<td>2005-06</td>
<td>5.05</td>
<td>0.04</td>
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<td>2007-08</td>
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<td></td>
<td>2009-10</td>
<td>5.05</td>
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<td>5.05</td>
<td>-0.05</td>
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</table>

Significance

*P < 0.05*

**Note:** The table above shows the weight of eggs in grams over time for the species. The mean weight and the change over time are also provided.
A Code of Ethics?

The Insect Collectors’ Code*  
Carolyn Trietsch & Andrew R. Deans†  
Frost Entomological Museum, Pennsylvania State University, University Park, PA USA  
3 May 2017

I strive to fulfill, to the best of my ability, the following ideals:

1. I will respect the hard-won scientific gains of those entomologists in whose steps I walk and gladly share my scientific gains and knowledge with those who are to follow.

2. I will aid in the dissemination of scientific knowledge, both to those who study insects and those who do not.

3. I will not discriminate against others, and I will strive to create a safe working environment, whether in the field, the classroom, or the lab.

4. I will treat insects humanely. As a collector, it is within my power to take insect life; I will not take insects that will not be deposited in a natural history collection or otherwise made available for research and education. While bycatch is often unavoidable, I will, to the best of my ability, attempt to reduce the unnecessary loss of insect life and find use for these specimens.

5. I will consider the ecological impact of removing insects and their products (galls, nests, etc.) from the environment when collecting, whether the species are protected by law, known to be declining, or are considered to be of least concern. I will strive to avoid or minimize disturbance to the environment while collecting.

6. I will secure appropriate permits prior to collecting insects, and I will honor and uphold the provisions stated by each permit. I will keep copies of all permits on my person while collecting and furnish them to authorized agents upon request. I will save all permits associated with specimens as proof that they were
LEUCORRHINIA GLACIALIS Hagen
Fém. Mt. Tremblant, Quebec, Canada
27.VII.58. (A. Robert)

LEUCORRHINIA GLACIALIS Hagen
Webber Bog, Lincoln Co., Maine
1.VII.46. (D.J. Borror)
IN CUF.
The Beattys: Building a Collection
The Journey
Contributions

- New storage standard
- New regions sampled
- New species described

Arigomphus maxwelli (Ferguson 1950) (Gomphidae)
### Specimen Utility & Future

<table>
<thead>
<tr>
<th>Species</th>
<th>Scientific Name:</th>
<th>Collected On:</th>
<th>Collected By:</th>
<th>Jurisdiction:</th>
<th>Submitted On:</th>
<th>Verified By:</th>
<th>Actions</th>
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<td>Myrmecophila compexula</td>
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<td>Tom Stasek</td>
<td>Santa Barbara, California, United States</td>
<td>2013-May-20</td>
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</table>

### Location

![Map of specimen locations](image)

- **map locations**
How Did I Get Here?
References


Chasing Butterflies in Medieval Europe Article in Journal of the Lepidopterists' Society · November 2014 DOI: 10.18473/lepi.v68i4.a1 Vazrick Nazari

Georg Toepfer (Zentrum für Literatur- und Kulturforschung, Berlin) Unequivocal ethical concern in pluralistic guise

Darwin Correspondence Project

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