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Introduction

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The recreational dimensions of insects have been described in entomological texts, edited volumes (see *Grzimek's Animal Life Encyclopedia: Insects* by Hutchins (2003)), cultural entomology (Chevancy *et al.* 2004; Hogue 1987), and various books such as Berenbaum's (1995) *Bugs in the System*, Kritsky and Cherry's (2000) *Insect Mythology* and Mitchell and Lasswell's (2005) *A Dazzle of Dragonflies*. More recently, social scientists like Preston (2006) and Sleigh (2003) have examined human–insect encounters by focusing on specific insect species, while Brown's (2006) *Insect Poetics*, Motte-Florace and Thomas' (2003) cultural study of insects, Parikka's (2010) examination of technology and animals, Raffles' (2010) anthropological study, and Rodger's (2008) examination of social theory and social insects have examined human–insect interactions from various disciplinary perspectives. This book is an attempt to build on these works by incorporating dimensions of leisure and tourism in human–insect interactions from an interdisciplinary perspective, as this topic is sorely lacking in leisure and tourism research (Fennell 2012).

While the link between insects and leisure may at first glance appear to be dubious, these links, as Klein (2007) explains, are deeply embedded within the socio-economic fabric of human history, for we have domesticated insects, exploited their products (e.g., silk, beeswax, honey, cochineal, lacquer), and deliberately introduced them in biocontrol measures for agriculture. These contributions were estimated at US $57 billion annually (Losey and Vaughan 2006). These figures do not, however, include the contributions of insects to forensic

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entomology (the use of insects in crime scene investigations), entomophagy and leisure and tourism. In other instances, we have polluted or radically altered their habitats in attempts to attract, repel or extinguish certain species of insects (Russell 2001). Some insects, in return 'use our homes for shelter, parasitize our bodies, spread pathogens and allergens, and feed on our resources and excrement and remains' (Klein 2007: 1).

From socio-cultural perspectives, insects have long inspired writers and poets (Tennyson 2004), musicians (see Nikolai Rimsky-Korsakov's *Flight of the Bumblebee*) and artists (van Gogh and Picasso) (Laufer 2009). In contemporary times, artists and craftsmen still use insects as fabric motifs, models in painting, sculpture, jewellery, furniture, household items, toys and tattoos (Samways 2005). In the sciences, dragonflies have inspired 'ornithopters' (Thomas *et al.* 2004), while termite mounds have inspired the exoskeletal skyscraper designed for the city of Cheonga in South Korea (Ball 2010).

One of the oldest documented recreational activities associated with insects in Europe is the collection of specimens. Dürer's watercolour of the stag beetle (1505) is regarded as the first formal portrayal of the insect as specimen, setting the convention for many subsequent portrayals (Neri 2011). Early evidence of the promotion of insect collection as a valuable leisure pursuit was noted in 1766 when Drury, an insect enthusiast, wrote, 'if you have curiosity enough to employ an hour in this amusement [capturing and examining insects], permit me to say you will have a scene of wonders opened to you in the insect world, you will have such a number of objects of speculation present themselves, that will amaze you' (Drury 1837: viii). Six decades later, documenting the first insect craze in Europe in 1836, John James Audubon noted that 'the world is all agog… for *Bugs* the size of *Water Melons*' (Clark 2009: 8, original emphasis).

Modern art exhibits, movies, festivals and books all dedicated to insects are testaments to this long, diversified and ongoing relationship between humans and insects (Laufer 2009). In the United States alone, US $46 billion annually is spent on hunting, fishing, and wildlife viewing (US Fish and Wildlife Service 2006). A substantial proportion of this spending goes directly into observing insects which have been facilitated in part through landscape transformation (pollinator gardens, dragonfly ponds) and by easier access to information through the web and various technological innovations.

Figure 1.1 Katydid. Photo by Elaine Wiersma.

THE ROLE OF TECHNOLOGY AND ASSOCIATIONS IN HUMAN–INSECT ENCOUNTERS

As Dodd (this volume) explains, the invention of the microscope in Victorian England brought about a scalar revolution in which the world of insects and insects themselves were now visible and subject to human curiosity and investigation. More recent advances in technology have stimulated on-line chat groups (e.g., Odonata Central; The North American Butterfly Association), on-line verification of specimens (e.g., Digital Dragonflies). Personal Digital Assistants (PDAs) and Global Positioning System (GPS) have further facilitated experiential interactions with insects, and even in some cases, encouraged non-researchers to participate in citizen science (Johansen and Auger, this volume). Digital images suggest Mitchell, Rykken and Farrell (this volume) have helped to capture and depict the beauty and the deadly appeal of some insects. These digital images have in some instances replaced specimen harvest and could result in a visual renaissance in insect interests (Cheesman and Key 2007).

Further facilitating this emergence in insect interest, Pearson (this volume) argues, is the availability of books, field guides and various associations such as the Amateur Entomologists' Society (AES) in

the UK, and the Young Entomologists' Society in the United States. The Xerces Society, the largest insect organisation in North America, is estimated at 6000 members while Buglife: The Invertebrate Conservation Trust in the UK has over 1192 members. While the number of organizations and participants affiliated with entomological associations has been difficult to estimate, authors Pearson and Shetterly (2006) suggest that according to the 1999 Directory of Entomological Societies (1999: 246–247):

> 514 organized associations worldwide have insects and spiders as their primary focus; of these associations, 194 are interested in general entomology. The others have more focused missions: pest control (99), honeybee business (79), forensics (1), or a single taxonomic group (Lepidoptera, 45; spiders, 38; Odonata, 15; Coleoptera, 11; and fewer for Diptera, Orthoptera, Hymenoptera, Isoptera, Heteroptera, Neuroptera and Ephemeroptera). According to their Websites and mission statements, 107 of the general entomology associations are primarily for professionals, 85 are for professionals and amateurs, and 2 are expressly for amateurs. The membership of most of the 130 associations with a single taxon as the focus is a combination of professionals and amateurs, but amateurs make up the bulk of the membership.

Many of these national and regional entomological societies also have researchers and staff, or committees promoting insect awareness through educational strategies, festivals, citizen science projects and conservation initiatives.

AIM OF THE BOOK

This book was written in order to illustrate human–insect interactions from historical to contemporary perspectives, and highlight the opportunities and contributions from the realms of leisure, tourism and experiential education. It is an attempt to focus on the innovators, the educators, the dedicated researchers and activists who, through various collaborative approaches, have brought insects from the recreational fringes to the forefront, in many cases, of conservation and leisure initiatives. Through the work of these individuals and their supporters, the importance of bees and the migratory patterns of butterflies and some dragonflies are now known; in some instances, policies and conservation strategies to protect these animals and their habitats have been enacted (see New, Samways and Spevak, this volume).

Figure 1.2 Youth interacting with insects at an insectarium. Photo by Elaine C. Wiersma.

The book presents the first synthesis of insect–human interactions in various and international settings, and highlights ways in which leisure, education and tourism can provide greater protection of insects. As Lewis *et al.* (2007: 432–433) suggest,

> public perceptions of insects are a key facet of conservation – much of the value of butterflies as flagships stems simply from their intrinsic appeal for many people. Conversely, many people admit to not liking moths, cockroaches and other insects, and any moves to redress this perception imbalance through education (particularly of young people) are important.

By illustrating a myriad of human–insect encounters from interdisciplinary perspectives, the book is also meant to challenge the notions that animals lacking anthropomorphic features have little to no appeal for humans. Two central questions aim to be answered in this volume: (1) what are the biggest challenges to human-insect interactions? (2) what techniques, strategies, and/or activities have insect proponents (researchers, amateur entomologists, managers) used to encourage human–insects encounters in leisure and tourism settings?

A critical overview of the social constructs of entomophobia (the fear of insects) and anthropomorphism (the human predisposition to favour human-like animals); taxonomic bias and arthropod discourse disorder (the intentional or unintentional exclusion of arthropods and insects in human–animal studies (Leather 2009); the extinction of experience or nature deficit disorder (the loss of ecological knowledge through urbanization) (Louv 2008) is provided, along with a discussion of how these concepts actually deter our understandings of insects. Also examined are approaches and situations that hold the best prospects for advancing our understanding of insects in leisure and recreational settings.

COMING TO TERMS WITH A FEW TERMS: DEFINING THE CONTEXT

Insects are members of the animal kingdom; in 'Latin, animals are referred to as (*animans)* 'animate beings', because they are 'animated' (animare) by life and moved by spirit' (Fennell 2012: 12). An animal is a 'living organism which feeds on organic matter, typically having specialized sense organs and a nervous system and are able to respond rapidly to stimuli' (Fennell 2012: 12). Insects or *insectare* which literally means cut into pieces, are members of the arthropod phylum, and usually have an exoskeleton, a three-part segmented body (head, thorax and abdomen), three pairs of jointed legs, compound eyes and two antennae. Insects are among the most diverse groups of animals, and can be found in nearly all environments (Morris 1998).

A bug is loosely defined as a creeping, crawling invertebrate with many legs, which can in some instances disturb or annoy people (Thone 1949). Bugs, from an entomological perspective, refer to insects in the order Hemiptera. Derived from the Greek, hemiptera means half-winged, and is descriptive of typical true bugs like stink-bugs, assassin-bugs and bed-bugs, which have shorter fore-wings than hind-wings, and specialized mouthparts which have evolved into a 'piercing sucking beak, which can be sunk' (Thone 1949: 334) into food.

The 'pest' label is often used to incorporate invasive creatures (cockroaches, flies), biting creatures (mosquitoes, horse flies) or parasites (lice, ticks, bed-bugs). An animal can be considered a pest when it causes damage to agricultural, silvicultural and structural processes, parasitizes livestock or becomes a vector of human disease. The irony is that insect pests represent a minute portion of all insects, yet it is

this tiny minority which is responsible for spreading numerous pathogens and causing untold damage to food crops and property (Fichter *et al.* 1987; Gurr *et al.*, 2012). In a study of public perceptions of pests and subsequent use of pesticide use in American homes, Baldwin *et al.* (2008) suggest that the role of the pesticide industry is quite pervasive and influential. The power of this industry in fuelling various fears and phobias associated with insects in leisure and tourism cannot be underestimated (Russell 2001). While all insects are animals, not all insects in the true entomological sense are bugs, nor are all insects pests. In this volume, the discussion, apart from a few examples of spiders, is largely relegated to insects and a few bugs, but no pests.

Many researchers within the realms of social science use a process called researcher disclosure. This process is used to situate objectivity and contextualize the research approach. I am not an entomologist, I have no training in biology nor do I have any ecological background. My training is in the social sciences, more specifically sociology, anthropology and the human dimensions of wildlife management. Like my uncles in the prologue, I also, in my youth, chased butterflies and accumulated grasshoppers and fireflies, but somewhere something changed, and I began to fear and dislike insects, and often indiscriminately killed them for no particular reason. This abhorrence of insects continued unabated until I was conducting my master's research and a Mohawk Elder, in his taciturn way, pointed out how irrational my behaviour was. Henceforth, my interactions with these animals were tempered somewhat (i.e., usually through avoidance). Approximately 6 years ago, my wife and I participated in the Great Lakes Odonata Meeting (GLOM) which was held in Fort Francis, Northern Ontario, Canada. Armed with a net, identification guides and GPS, I chased one of the most elusive creatures I have ever met. When I captured my first emerald and I gazed into those multi-faceted eyes, I was mesmerized, and enthralled. In many ways, I had an epiphany that would transform my own research and activism, and persuade me to research and educate others on the wonders of these animals. Part of this epiphany was facilitated by the fact that the entomological realm was very supportive. Coming from the world of polar bears, where research is politically charged, territorial and competitive, I found the passion, collaboration and dedication of the volunteers, professional amateurs and researchers at the GLOM, a refreshing change of pace.

Since then I have been learning about insects and researching human–insect encounters in various settings. In addition to visiting eight insectariums and butterfly pavilions throughout North America

and Western Europe, and participating in five insect festivals (two of which I have organized), I have published three peer-reviewed publications, two conference proceedings, one encyclopaedia entry and a book chapter on human–insect interactions (Lemelin, 2007, 2009, 2012). Through a mixed-method approach consisting of participant observations and 20 semi-structured interviews, I describe the findings acquired from attending two dragonfly symposiums held in Northern Canada (2007, 2009). Consisting of 47 structured internet surveys, two structured telephone interviews, and four structured face-to-face interviews with managers, researchers and professional amateurs, my (2011) study examined current insect management and conservation strategies from an international perspective. The 2011 study revealed that few respondents mentioned or attributed any value to recreation and leisure as opportunities to increase our awareness or knowledge of insects. With the help of the Personal Meaning Map (PMM), I am currently conducting inductive studies on human perceptions of insects; so far over 50 PMMs with university undergraduate and graduate students have been administered.

I cannot call myself an entomophile, for I do not love and revere all insects. Some, like dragonflies, tiger beetles, wasps and mantises, fascinate me; some like ants and bees, I admire; and others, like blackflies, ticks and mosquitoes, I loathe. This doesn't mean I want to eradicate all of the latter, but I prefer to minimize my contact with them whenever possible. Living in Northern Canada, this is virtually impossible, so I have learnt to tolerate them.

A criticism of the book may be that it focuses too much on the charismatic micro-fauna of the insect world, that is, bees, beetles, butterflies and dragonflies. Considering that insects and other invertebrates are often overlooked in favour of vertebrates, a process that Leather (2009) labelled as taxonomic bias, or that arthropods are deliberately or inadvertently excluded from human–animal narratives since they are not, in the words of one social scientist, 'animals', a symptom that I named Arthropod Discourse Disorder (ADD) (Lemelin, 2012), I make no apologies for the focus on the charismatic micro-fauna of the insect world. The fact that these animals, as highlighted next, have been featured in books and documentaries, and incorporated in leisure and conservation strategies, suggest that large, conspicuous, colourful, mostly diurnal insects such as bees, beetles, butterflies and dragonflies are excellent subjects for conservation strategies, nature interpretation and public education (Cardoso *et al.* 2011; Snaddon and Turner 2007).

Human–insect interactions

A chalk drawing dated 8000 BP depicts a woman gathering honey (Cave of the Spider, Spain) (Klein 2007). Similar images of bee-handling were painted on rocks in Africa and advanced beekeeping was depicted in an ancient Egyptian tomb (2626 BP.) (Klein 2007). More recently, tourism activities featuring bees include beekeeping museums found throughout North America, South America, Europe, Australia, Israel and Japan, and incorporating the art of beekeeping in tourism strategies at larger apiaries (see the Galil Apiary in Israel) and at various hotels and resorts throughout Canada, the United States and Kenya (Lemelin 2012). Tourists have joined the Mowalis, the honey gatherers of Sunderbans (India, Bangladesh), and the Rai, the honey collectors of the Himalayas in Nepal on their honey hunting excursions for the Giant Rock bee (*Apis dorsata*) (Kakani 2011; Shahwahid *et al*. 2008; Spevak, this volume).

In China, the domestic silkworm (*Bombyx mori*) has been cultivated for silk production since at least 2700 BC (New, this volume), while, as the painting of 'La chasse aux papillons' by Manet depicts, viewing and collecting butterflies is a well-established leisure activity practised by numerous cultures across the world (Russell 2003). Butterflies in the words of Samways (2005) continue to be the biggest draw of insect-related leisure and tourism activities. In fact:

> Many tourists now wish to see butterflies in the wild and increased leisure and wealth in the 'affluent world' may engender tropical butterfly-watching safaris in addition to the more widespread bird-watching and 'wildlife' vacations which have proliferated in recent years (New 1997: 207).

Butterfly tourism opportunities offered in Costa Rica and in Taiwan attract nearly 500 000 butterfly tourists per year (Samways 2005), while the Sierra Madre Biosphere Reserve in Mexico, home of the monarch butterfly (*Danaus plexippus)* aggregations, is visited by 250 000 people per season (Barkin 2000). A more specific example of a micro-fauna being used as flagship species for tourism strategies includes the rare and threatened Karkloof blue (*Orachrysops ariadne*) found in southern Africa. A reserve, complete with a Karkloof blue logo, was created especially for this particular flagship species (Samways 2005). Elsewhere, butterfly festivals such as the 9th Annual Texas Butterfly Festival of Mission, Texas, and the El Cieolo Butterfly Festival in Cd. Mante, Tamaulipas, Mexico, attest to the popularity of these animals in recreation and

tourism activities (Lemelin 2009). As stated earlier, there are over 250 insectariums and butterfly pavilions and 20 butterfly ranches worldwide. The butterfly exhibit at the Oakland Mall, Michigan, the National Butterfly Center in Mission, Texas, the butterfly garden at the Changi Airport in Singapore, the Penang Butterfly Farm in Malaysia (the world's 'first tropical live butterfly and insect sanctuary'), the Butterfly Park and Insect Kingdom Museum in Sentosa, Singapore, the Museum of World Insects and Natural Wonders in Chiang Mai, Thailand, and the insect exhibition featuring a butterfly garden and farm and insectarium in Phuket, Thailand, are all multi-purpose facilities showcasing butterflies and other insects (Lemelin 2012).

One of the most remarkable initiatives involving butterflies is the butterfly gardens of Batticaloa, Sri Lanka. The programme, which began in 1994, offers children affected by war the opportunity to interact and learn about butterflies through play and art activities (music, arts and crafts) (Chase 2000). Similar therapeutic approaches involving butterfly gardens have also been used for people living with Alzheimer's disease (Tyson 2002).

Recently, in order to meet the growth in popularity of collecting, butterfly exhibits and even the release of live butterflies at weddings, several butterfly farms and insect ranches have been established, catering to these demands (Laufer 2009). As Veltman (this volume) explains, butterfly farming is now practised throughout the world since it requires little investment, uses locally available tools and materials and the skills to raise butterflies can be learned relatively quickly (Gordon and Ayiemba 2003). A review of the International Association of Butterfly Exhibitors and Suppliers revealed that 250 insect and butterfly exhibits (more than 60 of these are located in North America alone), 20 butterfly ranches and 107 festivals and special events celebrating insects and butterflies, are located throughout the world (Hvenegaard *et al.* and Veltman, this volume). According to Parsons (1992) and Slone *et al.* (1997), the worldwide retail sales of butterflies may be as high as US $100 million per annum. The butterfly industry is also estimated to employ 20 000 people (Parsons 1992).

Each year thousands of visitors travel to rural areas in North America, Japan and Malaysia to view fireflies, while glow-worm cave aggregations in Australia and New Zealand attract 63 000 visitors (Hall, this volume). The glow-worm visitation figures, argues Hall, are comparable to whale-watching operations in Hervey Bay, Australia. In Japan, South Africa and Taiwan, visitors can explore the Nakamura Dragonfly Reserve, the dragonfly awareness trails at the National