Entomophobia

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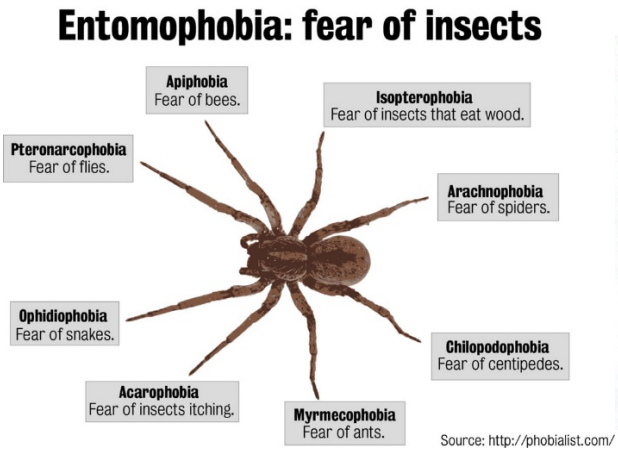
The transmission of disease by insects to humans has resulted in more deaths than from all of the wars conducted in the history of the world. Even in the recent Vietnam-American War, there were more casualties on both sides from insect-transmitted disease than from battle. Likewise, massive starvation has resulted from insects devastating agricultural production. However, most people are unaware of this or feel it is a problem of the past and it does not shape their perceptions of insects. In fact, most people are neutral about insects or being near them. They likely enjoy beautiful butterflies and dislike mosquitoes, wasps, and large numbers of ants at picnics or cockroaches in the kitchen.

Far fewer people embrace insects as an enjoyable part of their lives and these are at one extreme of the population. They often begin this interest as children and end up having satisfying hobbies as lifelong collectors or photographers of insects, or may even choose entomology--the study of insects--as a profession.

However, there are some people at the other extreme. They have a strong or even an overwhelming fear of having insects near them. This essay is about these people, those who suffer from an irrational fear of insects. When the fear becomes an emotional burden, it is described as entomophobia.



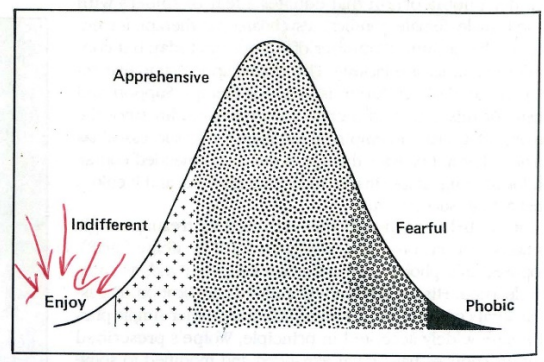


Fig. 1. *Estimated relative frequency distribution of attitudes toward insects and spiders in the general population.*

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Jeffrey Lockwood described a personal, extreme example about how this fear can affect a person's life in his recent book *The Infested Mind: Why Humans Fear, Loathe, and Love Insects*. As an academic entomologist at the University of Wyoming, he worked on chemical control of pest grasshoppers, a group that can be devastating to agricultural crops. On a field trip to survey grasshoppers, he came upon a population with unexpected and extremely high densities. They surrounded him, covered his body and clothes, and caused him to panic, bringing back childhood fears that he had learned to control. After this traumatic experience, he chose to leave his position and career in entomology. Because he had tenure, he was able to move his appointment from the Entomology Department to the Philosophy and Creative Writing Departments at the University.

What is the origin of this severe, irrational reaction to insects? Is it curable? Is it cultural or is there some evolutionary advantage in wanting to avoid insects? In this essay, I will examine this topic from literature, psychology, art, and other perspectives.

Phobias

Anxieties are a universal part of human life. In fact, general anxiety is the single most common mental health problem in the US and the fourth reason why people go to physicians, after hypertension, cuts and bruises, and sore throats. However, when anxieties go beyond normal worries and develop into phobias, which are an extreme, irrational fear or aversion, the cost can be high both emotionally and economically.

Fear of animals (about 20% of which are specific to insects) and fear of heights are the most common anxieties that develop into phobias. As many as 1-in-10 people will develop a phobia during some time of their life but these differ among groups. Phobias are 60% more common in Mexican Americans than those born in Mexico, and occur in higher than average proportions among African Americans and in women than men. Religious people tend to have more phobias and this has been found to be true internationally. Education may make things worse. One-half of college freshman who have taken a biology course describe themselves as afraid of spiders compared to only one-third who have not taken one.

As they grow older, children tend to outgrow their fears even if they develop into phobias. Animal phobias typically start about age 10, intensify to 20, and peak from 25-54. Without treatment, such phobias tend to last an average of 22 years before they lessen (but often remain as less-extreme fears).

An estimated 6% of Americans have entomophobia. Their suffering and that of their families is real and sometimes catastrophic both economically and emotionally. Clinical treatment is over 90% effective but only about 12% of entomophobes actively seeks help. Hypnosis, examining repressed desires, exposure therapy, relaxation techniques, group therapy, cognitive behavioral therapy, and anxiety-reducing drugs can work to lessen this phobia.

Responses of people who are entomophobic involve terror, panic, and revulsion when encountering insects, followed by confusion and anxiety. It is often difficult for them to name the emotions that they feel because so many of them are happening at the same time. They typically report that insects evoke fear in them from their perceived capacity of insects to invade (or the opposite, evade) them, reproduce in large numbers, and both disturb and cause them harm. Moreover, insects seem to defy our attempts to control or eliminate them. The odd projections from the bodies of many insects, their bizarre eyes, hairy bodies, and strange body proportions are also identified as frightening to these sufferers.

Because entomophobic fears can be so powerful, exploitation of them can occur. In April of 2009, CIA documents revealed that interrogations of some high-ranking Al Qaeda prisoners involved placing them in boxes containing large numbers of insects. Perhaps more shocking, ants were placed on and crawled over children whose fathers were suspected to be terrorists to get them to reveal their locations. The report's conclusion was that these measures to obtain information were inhumane.

The presence of insects can produce both proximate and ultimate fears. The proximate fear could be a person being startled by the scurrying of a cockroach; the ultimate fear could be that the cockroach will spread disease or enter that person's body. Both may lead to fear of entering possible places (e.g. kitchen or basement) where cockroaches could reside. The typical response of an entomophobe to either proximate or ultimate fears is to fight, flee, freeze, or foster (look after another with them, for example a parent for a child).

Spiders are a common cause of entomophobia (specifically called arachnophobia). Sufferers fear a high likelihood of being bitten and that the bite will cause a catastrophic injury. Even when shown that this injury will not occur, they still feel that their fears are justified. When they view spiders in a container, arachnophobes describe the spiders as larger than they are, more aggressive, and nimbler than do non-sufferers. In contrast, non-arachnophobes tend to underestimate the risk or consequences of being bitten by a spider!

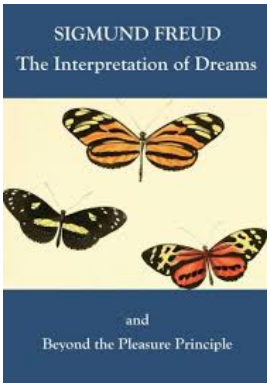
Spiders, grasshoppers, ants, beetles, moths, butterflies, and caterpillars are all described as fearful to entomophobes. Interestingly, bees and wasps are not highly identified as agents of their fears. This is surprising because allergic reactions from their stings cause far more animal-related deaths than dog attacks. Moreover, snake-related deaths are only 10% of bee-caused deaths, even though snake-phobias are slightly higher than phobias of insects. It is interesting that over 50% of the public describe themselves as allergic to bee stings. The true figure is actually less than 1%.

How do psychologists test if a person is entomophobic? The classic test is to measure how close someone will meet their object of fear. This is sometimes done by seeing how close the person being tested will approach a container on a table containing a feared insect in a bedroom-sized room. Other tests include having a spider walk across a cookie and ask whether they would then eat the cookie. However, more telling is asking whether they would eat a new version of the same type of cookie that they observed the spider cross.

It is not surprising that there is a long-running argument about the genetic predisposition to phobias compared to a cultural basis for them. Do parents pass on their fears to their children? Agorophobia (the fear of being in situations where escape might be difficult or that help to escape would not be available if things go wrong) is 67% related (i.e. a parent's fear compared to a child's fear) suggesting a possible hereditary link. However, fear of spiders is less than 47% related.

Freud and Jung

Perhaps not surprisingly to us, much of the interpretation of insects by these pioneering psychologists involve sexual imagery. Freud linked fears of insects to the deeper levels of human memory and not simply as representative of fears triggered by events that occurred during their lifetime. Supporting this idea, today only about 10% of entomophobic individuals remember a specific incident that evoked their fears. To Freud, cockroaches were the archetypal image of darkness associated with the unconscious power of the Id, the personality component of unconsciousness that works to satisfy basic urges, needs, and desires. To him, fear of being bitten by a spider represented fear of being reprimanded or punished by a father. More recently, some psychologists propose that this is a reflection of a devouring, castrating mother, linked to the behavior of some female spiders cannibalizing their mates. A sexual link was also suggested by Freud and other psychologists who suggest that the opening and closing of butterfly wings is reflective of a women opening and closing her legs. The stick-like projections from the swallowtail butterfly wings represent genitals.



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Right: paraphilia with ants
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Unlike Freud, Carl Jung emphasized primal, collective memories or what he termed archetypes, which he described as "inherited memories from the evolutionary past of the race". Like Freud though, he also believed that insects represent the inherited memories of our collective past. To him, ants reflect transference, the redirection of our own feelings toward another. The queen ant is the equivalent of the father who manipulates his daughters "like puppets" to impede their sexual and emotional

maturation. Dream dictionaries have many entries about insects. Few are positive but butterflies and crickets in dreams typically symbolize the human soul and happiness. In contrast, larval caterpillars reflect unrealized potential.

Some associations with insects directly relate to sexual arousal. Paraphelia is the term to describe people who use insects crawling on their bodies for increased sexual arousal. Crawling ants are used commonly for this purpose and the often-maligned Cleopatra supposedly went further by keeping a box of bees for personal arousal.

The entomologist Kirkwood describes his personal fears of grasshoppers as similar to the description of insects by the anthropologist Hugh Raffles. "There is the nightmare of fecundity and the nightmare of the multitude. There is the nightmare of the uncontrolled bodies and the nightmare of inside our bodies and all over our bodies…There is the nightmare of beings without reason… there is the nightmare of too many limbs." (Lockwood 2014).

Delusory Parasitosis

Sufferers from delusory parasitosis feel that imaginary insects are crawling on their skin causing itching, bites, and rashes. However, when examined, no insects or other parasites are found. Although a variety of medical conditions can lead to these responses, the cause can also be stress, drugs (especially methamphetamines or "crank"), skin cancers, and diabetes (but then the term "illusory parasitosis" is applied). The delirium tremors experienced by alcoholics typically involve hallucinations, often insects crawling on walls and tingling or itchy feelings as they imagine them crawling on their bodies. Drug users have specific names for the "insects" they typically see under the influence such as "cocaine bugs" and "crank bugs".

For some reason, the 1960s were a very common time for reports of delusory parasitosis. Some explanations offered were that the chads from computer punch cards, often referred to as "paper lice", landed on computer operators causing rashes as did the electrostatic charges from wearing silk or reactions to polyester clothing. Incidences tended to be higher in drab or unaesthetic working conditions, which also suggests psychological factors involved.

A common response to the delusion of insects on skin is self-administrated pesticides. Occasionally, pest control operators apply pesticides to a dwelling as a placebo even though they found no insects there. This sometime works but it is now outlawed—if there is no evidence of an insect pest, there can be no legal application of pesticides.

The signs of delusory parasitosis include repeatedly collecting samples by scraping the skin but on inspection there are no animals present, only perhaps lint and fibers. Sufferers provide vivid accounts of seeing insects crawling on their skin. When results are negative, there is an unshakable belief among them that procedures were incorrect (e.g., the microscope was not working). Unfortunately, these sufferers often apply chemicals or deeply scratch themselves that result in significant damage to their skin. In 10-25% of the cases, delusory parasitosis is shared among individuals living in the same household.

Freud's explanation of delusory parasitosis was that it represented the reflection of the sufferer's body image (especially for women) and Superego (the internalized ideals acquired from parents and society) as punishment for sexual guilt. Therefore, this condition can result from prudish parents. As he wrote, "Unconscious sexual guilt with an attempt to ward off feared, and at the same time, hoped for invasion of a sexual nature. The problem of intromission by the male organ may be symbolically displaced upon insects which cannot be eradicated, just as guilt-sexual impulses cannot be eradicated." (Mumford 1982).

Art

Salvador Dali, the renowned surrealist painter, had a self-described, uncontrollable fear of insects--especially grasshoppers. He regularly incorporated these his objects of fear into his paintings. He maintained that his father created this fear of grasshoppers. When fishing with him, Dali described, "catching a slimy fish". His father told him to hold it and look at how it's face was "slobbering". Dali made the association of the face of this fish with the face of a grasshopper he had seen earlier. Moreover, he (as many others) was disgusted by the grasshoppers response of regurgitating "tobacco juice" and defecating when handled.

During childhood, schoolchildren tormented Dali over this fear, regularly throwing grasshoppers at him and taunting him with these insects. Even a mention of the word grasshopper caused him anxiety.

In Dali's dreams and paintings, grasshoppers became oversized and symbols of waste and destruction. In his painting "The Great Masturbator", they were symbols of mortality and decay. Dali wrote "Even today if I were on the edge of a precipice and a large grasshopper sprang on me and fastened itself to my face I should prefer to fling myself over the edge than endure the frightful thing." Reflecting this comment, he once

jumped out a window while fleeing a grasshopper that had gotten into his house. The praying mantis, a taxonomic relative of grasshoppers, was also a favorite symbol for Dali and other surrealists because of the popular image of the male being devoured by the female immediately after copulation.

Left: Salvador Dali. The Great Masturbator 1929; Salvador Dali and Luis Bunuel (1930

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Right: Salvador Dali and Luis Bunuel (1930)

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Dali's fear included other insects as well. The Spanish filmmaker Luis Buñuel who collaborated with Dali on the short, classic film "The Andalusian Dog (Un Chien Andalou, 1929) described a visit with Dali: "I found him stripped to the waist, an enormous bandage on his back. Apparently, he felt a 'flea' or some other strange beast and he had attacked his back with a razor blade. Breeding profusely, he got the hotel manager to call a doctor only to discover that the flea was in reality a pimple." (Buñuel quoted by Berenbaum 1995).

However, insects are generally absent from paintings with the exception of "vanitas" works, which remind us that our vanity, material possessions, and pursuits will not preclude us from the inevitability of death. The image of insects crawling on a piece of rotting fruit, for example, symbolizes corruption of the body and/or the onset of

disease and death. These representations, which have been used since the early 17th century, further perpetuate insects in a negative light.

Left: Balthasar van der Ast (1593/94-1657) — Study of Flowers and Insects.
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Right: https://api.time.com/wp-content/uploads/2014/10/you-asked-fruit-flies.jpg?quality=85&w=1200&h=628&crop=1

Even earlier, the horrific paintings of 15th century artist Hieronymus Bosch such as the "Garden of Earthly Delights" used symbolic, narrative renditions of the link between heaven and hell by creating biblical-themed landscapes with a revolving cast of fantastical and often macabre humans, animals, monsters, and make-believe creatures. Many of the monsters are composed of body parts resembling those of insects.

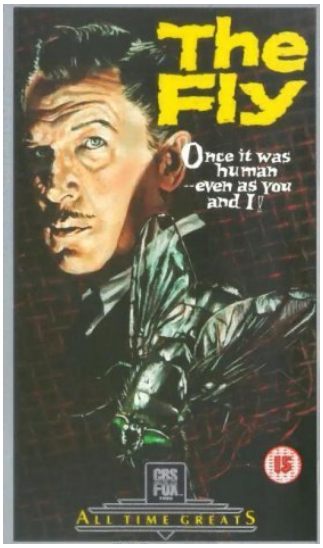
Popular culture

Recent television series with descriptive titles such as "Billy the Exterminator" (on A&E), "Infested" (Animal Planet), "Dirty Jobs" (Discovery Channel), "Fear Factor" (NBC), and "Natures Nightmares" (National Geographic channel) have not helped reduce the fears of entomophobes and perhaps insects in general. Moreover, the depictions in these shows easily undo the positive examples of insects shown in children's stories, poems and folklore tales such as "Itsy Bitsy Spider", "Little Miss Muffett", and Jiminy Cricket from "Pinocchio".

Over 300, mostly horror, movies emphasize the "bad" side of insect-human interactions (Berenbaum and Leskosky 2010). The two versions of "The Fly" (1956 with Vincent Price and 1986 with Jeff Goldblum as the scientist) depict the transformation of the scientist to an insect both psychologically and morphologically. In the recent "Wasp Woman" (2018), a woman taking insect enzymes for youthfulness

shows how insects, when combined with vanity, can produce a vicious killer. But perhaps the most successful of insect movie is the Academy Award-winning "Them!" (1954), where ants transformed by atomic testing inhabit the water system of Los Angeles, wreaking havoc everywhere. Of course, there are presentations of "good" insects in movies—Jiminy Cricket, who serves as the conscious in "Pinocchio" (1940, 2019), "Antz" (1998), and "A Bugs Life" (1998). Depictions of insects in these latter movies have them as more human like--standing upright with two of their six legs enlarged as arms, and human like-heads and large eyes. "Bad" insects in movies always have six obvious legs.

Insect documentaries tend to emphasize the more bizarre aspect of insect behavior, typically involving mating rituals and often the devouring of the male at the end of the sequence. Green Porno is a series of short films, begun in 2008 on The Sundance Channel, by Isabella Rossellini, the daughter of actress Ingrid Bergman. In these films, Rossellini enacts rituals of various insects with cardboard cut-outs and foam-rubber sculpture



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Social insects, like ants, are often considered as examples of the consequences of a totalitarian state. Several years ago, I was asked to lead a discussion about the movie "Phase Four" (1974) at a series on environmental-disaster films held at the Pacific Film Archive in Berkeley. As it turned out, I could not obtain the movie to see before the night its showing. Becoming increasingly panicked about the post-screening discussion while watching the movie, I frantically took notes to sound at least semi-intelligent. Nervously, I opened the discussion with a statement that "Many people view ants in movies as a metaphor for communism". The Berkeley audience responded immediately and I never had to say another word in the one-hour discussion that followed!

Bedbugs are the current bête noire of the insect world. Perhaps unbelievable, ~20% of Americans indicate that they have changed some aspect of their travel plans (e.g. switching hotels) because of fear of bed bugs. However, bed bugs do have a redeeming side—they are the only blood-sucking insects that have never been demonstrated to transmit any disease to humans! But still, bed bugs are a chimera of nocturnal cockroaches and feeding mosquitoes. Comparison to vampires are inevitable--both typically attack a person in bed, do so at night, and even "penetrate us"!

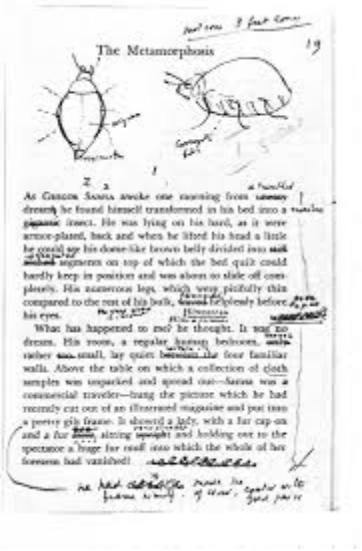
Literature

Insects in literature have a long history and contribute to our anxieties about insects. Of the 120 mentions of insects and other arthropods in the King James Version of the Bible (and 98 in The Revised English version), 46 are clearly negative allusions and only four are positive. For example, there is Beelzebub, the Lord of the Flies!

https://qph.fs.quoracdn.net/main-qimg-faf97373bf9478b4564d70ed4a820c9d

But some of the most dramatic depictions of the terrible consequences of insects are the 10 plagues described in the book of Exodus. Many have either definite, likely, or possible insect or arthropod links: **2. Frogs:** "Frogs swarmed forth, covering every inch of land and entering houses and bedrooms". In the river, frogs keep insects in check but, in leaving for land, the river insects normally controlled would increase, perhaps even massively, setting the stage for later plagues. **3. Lice**: "All over Egypt, bugs crawled forth from the dust to cover the land". **4. Wild animals** "Hordes of wild animals destroyed everything in their path". This was likely the result of the rinderpest virus spread via secretions from the eyes, nose, or mouth and transmitted by flies. **5. Pestilence**: "A fatal pestilence killed most of the domestic animals of the Egyptians." Insects are major veterinary pest and the sickness that killed the beasts may have been Bluetongue or African horse sickness (AHS), both spread by biting insects. **6. Boils** "The Pharaoh, his servants, the Egyptians and even their animals developed painful boils all over their bodies." Again, insects are likely primary or secondary influences in this scenario, such as stable flies or other "filth flies" transmit bacteria such as *Staphylococcus aureus*, a common cause of boils **8. Locusts** "The locusts covered the face of the land and swallowed up every crop and all the fruits of the trees." **9. Darkness** "A thick darkness over the land of Egypt, so total that the Egyptians had to feel their way around". Swarms of locusts darkening the sky still produce conditions resembling nightfall throughout Africa.

Horrific descriptions of insects in literature go back to Matthias Greunewald's "Dead Lovers" in 1480, in which insects spawn from pockets of sin within cadavers. But perhaps the most famous insect depiction in literature appears in Franz Kafka's (1915) "Metamorphosis", providing one of the greatest opening lines in literature: "One morning, upon awakening from agitated dreams, Gregor Samsa found himself, in his bed, transformed into a monstrous vermin." Later in the book, the main character Gregor is described as a bedbug and a cockroach. Although his imagery may not have originated from the author's own existential fear of insects, his influence persisted, and arguably reappears in many of the more psychologically based horror movies (e.g. The Fly).

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In Lewis Carroll's (1871) "Through the Looking Glass", Alice is asked "What sort of insects do you rejoice in where you come from, the Gnat inquired? "I don't rejoice in insects at all" she explained "because I'm rather afraid of them". The famous Ogden Nash poem: "God in his wisdom made the fly; and then forgot to tell us why." even questions their existence and complements his "A Flea and a Fly in a Flue".

Insect Stories in the News Don't Help Much

I have been collecting news and popular-media articles about insects that appear over the past several years, and the nature of these stories clearly has contributed to at least some maintaining exaggerated fears about insects, even among non-entomophobes. For example in mid-March, The Guardian Australia covered a story about the floods in New South Wales with a banner headline "'Horrific" swarms of spiders flee into homes and up legs---to escape NSW floods"! Also, consider recent stories about disease outbreaks transmitted by mosquitoes: the Zika virus that causes birth defects; major outbreaks of dengue and chikungunya viruses that can be fatal and often produce long-term arthritis-like symptoms; and Lyme disease, transmitted by ticks, is a public health concern throughout the United States and Europe. We now understand that the iconic cowboys in the "Wild West" actually spent most of the time removing screw worm

maggots from cattle wounds. These same insects are now infesting endangered deer populations in Florida.

Bees had largely positive images until the mid-20th century (e.g. to Mormon settlers the symbol of the beehive reflected industriousness) but then films such as "The Swarm" (1978) overemphasized their danger. The toil of worker bees, the sacrifice of the individual for the group, and the organization of the beehive often serve as parallels to communism and oppression. The recent addition to the Insect-Horror Hall of Fame is the Asian giant hornet or the "murder hornets" that are regularly in the news!

https://cms.accuweather.com/wp-content/uploads/2020/05/Invasive-Asian-giant-hornet-discovered-in-Washington-state.jpg?w=916

Entomophilia: the Love of Insects

Professional entomologists are often described as being part of the "Peter Pan Syndrome" in that their childhood fascination with insects results in a career that allows them to never grow up. While I think this is an unfair characterization, it is useful to look at the factors that entomologists have identified in surveys as to what influenced them to choose their profession: parents that are supportive of their interests; a keen

interest in insects' social behavior; not thinking of insects as the "other"; and making their work more as a continuation of a hobby. Ironically, a phobia about snakes is common among entomologists.

In the US, there are ~10x as many pest exterminators as beekeepers yet the value of beekeeping is at least 25x that of pest extermination! Pest exterminators often have fears related to insects but they describe getting over them by desensitizing themselves through repeated exposure, switching to thoughts about positive experience when anxious, refocusing their attention to tasks, and believing that they are in a "helping profession".

People, whether entomologists or interested naturalists, that describe themselves as being "insect lovers" list several reasons for doing so:

1. *Utilitarian reasons*. They emphasize what insects do for us: pollination, seed, dispersal, decomposition, biological control of pests
2. *Naturalistic affection*. Fascinated by insects, often from early youth and experiences observing and collecting them
3. *Scientific affection*. Fascinated by their complex biology
4. *Aesthetic affection*. Fascinated by their beauty
5. *Symbolic affection*. Inspired by aspects of their sociality or other traits
6. *Humanistic affection*: Care for all life forms as in "Brother grasshopper, sister cockroach"
7. *Moralistic affection*: ethical reasons related to beliefs (e.g. animal rights) or religion
8. *Doministic* affection: The need to control such as raising honeybees and silkworms, control of disease vectors

In conclusion, our human nature and the differences among us allows for an acceptable range of seeing insects as awful, "awesome", or something in between. However, it is neither morally or ecologically acceptable to have as our first option to choose to kill insects because we are ignorant of the lack of threat they pose to us or because we are unjustifiably afraid of them. Tolerance is the minimum we should strive for if infatuation is not possible. However, I think we can go beyond this minimum level.

In talking to or being asked for advice from entomophobes, I am reminded of an adage that most of us probably heard repeatedly when we were growing up from our mothers or other adults. I think this is an appropriate way to end this essay: "Don't worry about them. If you don't bother them, they won't bother you."

Thank you.

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