Human fears of animals

A Manchester Museum teaching resource for AS/A2 Psychology students

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MANCHESTER 1824
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Background for teachers

Manchester Museum is the UK's largest university museum and it has huge and diverse collections of archaeological items, fossils, Egyptian mummies, animals and plants. As such, Manchester Museum is keen to help schools and colleges access and use their resources. For educational institutions close to Manchester this can be achieved by a visit of course but what about institutions further away? The Department of Entomology at the Museum has begun to produce resources for schools and colleges, from Key Stage 1 to A Level, which will utilize material in the collections that is not normally on view.

The first resource to be produced is one for AS/A2 students of Psychology and is focused on human fears of animals. Human fear/phobia of objects or situations is a topic on the AS/A2 specifications of the examination boards and our resource specifically targets those of Edexcel and the Welsh Board as the Bennet-Levy and Marteau study (1984) is one of the key studies students need to be familiar with. The resource suggests a suitable practical investigation for AS/A2 students to carry out on human fears of animals and is detailed below.

We hope teachers find the resource valuable and we would be very keen to receive feedback from anyone who uses it in their Psychology lessons. Evie Bentley, past President of the Association for the Teaching of Psychology (ATP), reviewed it for us and said, "I loved the practical, it is fun and appropriate for A Level".

1. Relevant research

This resource is a suitable practical activity that might be undertaken by A Level Psychology students. It is based on a study found on both specifications, viz. that conducted by Bennett-Levy and Marteau (1984) concerning human fears of animals. They looked at how certain fear-evoking properties of animals, viz. ugliness, sliminess, and their speed and suddenness of movement, might be influential in the fearful response of participants to a list of 29 animals. This practical looks at how fearful humans are of fourteen species of animals and seeks to determine if their fear is associated with the perceived `ugliness` of the animal.

There is, of course, a continuum of responses to organisms, or situations, that may be harmful to us. A few people may be delighted to see a spider or a snake, a greater number may be indifferent to them, more would probably be apprehensive about them and a few would be fearful or phobic about them, see Figure 1.

Two of the characteristics of human phobias are that the fearful response is both disproportionate and consistent whenever the fear-provoking stimulus is perceived. As a consequence, a phobic is often unable to live a `normal` life, as she/he endeavours to avoid all potentially threatening situations. Another feature of phobias is that the response to the fearful image is rapid (Öhman & Mineka 2001), since reacting quickly to the perceived threat is beneficial. Advances in medical analysis using functional magnetic resonance imaging (fMRI) has shown (Larsen *et al*. 2006) that a fearful response to a stimulus is rapid. The team believed that the activation of the amygdala (one of the major structures of the human limbic system) would allow the response to be detected. They compared spider phobics with non-phobics (all American female undergraduates) and found the former group showed a strong amygdala response to a visual stimulus whereas the non-phobic group showed a significantly weaker response. A rapid response to a threat would clearly be an evolutionary advantage to any animal.

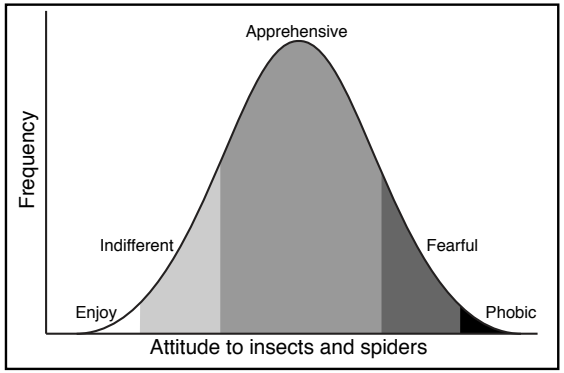

Figure 1 Estimated relative frequency distribution of attitudes towards insects and spiders. [Based on Figure 1, page 66 in the article Entomophobia: The case for Miss Muffet by Tad, N. Hardy in the *Bulletin of the Entomological Society of America*, 1988, **34**, 64 - 69.]

How do people acquire fears and phobias of animals? Seligman (1971) suggested that humans may have evolved to be fearful of certain animals as they are potentially dangerous. This readiness to be fearful was termed `preparedness`. So humans might be expected to be fearful of crocodiles, sharks and tigers as they could attack and kill them: equally, they may fear venomous snakes and spiders as their bite could kill a human. Studies of primates in the 1980s and 1990s by Mineka, Davidson, Cook & Keir (1984), Mineka & Cook (1986), Cook and Mineka (1989) and Mineka & Cook (1993) provided support for this biological preparedness. These studies showed that rhesus monkeys could learn to be afraid of moving stimuli such as snakes and crocodiles (termed `fear-relevant` stimuli by Ohman *et al*. in 1985) but not to fear-irrelevant stimuli such as flowers and a toy rabbit. Studies of wild monkeys, such as vervet monkeys (Cheney & Seyfarth, 1990), has revealed that although young vervet monkeys appear able to produce calls and adopt defensive postures when adults give alarm calls to predators such as leopards, snakes and eagles, the young vervets have to learn to link a specific signal with a particular predator, so the appropriate behaviour is not pre-wired at birth.

It is also possible for humans for fears and phobias to be learnt, as was shown by Watson & Raynor (1920) and Ohman *et al*. (1976). More recently, Askew & Field (2007) investigated vicarious learning in the development of fears in 9 year old children in UK. In this study they used photographs of Australian marsupials (since the children would probably be unfamiliar with these animals) paired with human faces showing emotions, either fear or smiling. They found that the children's self-reported fear of the animals increased if they had

seen scared faces paired with the animals, so mild fear can be learned vicariously. Further, on re-testing, the mild fear persisted for a week and was evident again three months later.

Huijding *et al*. (2011) also showed that children (9 – 11 years old), through a training regime, reported a greater fear of the animal they had been trained to avoid than one they had been trained to approach. The training also made the children seek more positive information about the animal they approached than the one they avoided, which suggests a training programme could influence children's fears of animals. A similar approach was followed by Broeren *et al*. (2011) but in their study the children (8 - 10 years old) watched a peer interacting positively or negatively towards a novel animal. They found that the children who watched film of positive peer modelling showed significantly less fear of the novel animal whilst those who witnessed film of negative modelling showed an increase in fear. This suggests peer modelled interventions may be successful in reducing fears of animals in children. As might be expected, fear and distress in young children is strongly influenced by adults, and their mothers in particular. McMurtry *et al*. (2010), in a Canadian study, showed that 5 – 10 year olds produced higher fear ratings during a painful medical procedure when parents gave reassurance than when they tried to distract their child. They found that parental facial expression, tone of voice and verbal content were important in their child`s reaction. The effect of maternal modelling on the acquisition of fear and avoidance behaviour in Australian toddlers to a model snake and spider was clearly demonstrated by Gerull and Rapee (2002). The youngsters (15 – 20 months old) were shown a rubber snake and spider at the same as their mother gave a positive or negative facial expression. A short time later the youngsters were re-presented with the models but this time their mothers showed a neutral expression. The children showed significantly greater fear and avoidance of the models following the negative reaction from their mothers. This acquisition of fear through observational learning from a highly significant model shows how animal fears in young children can arise.

Matchett and Davey (1991) suggest that fears of animals may not just be limited to the fear of actually being injured by an animal but by a fear of disease, contamination or disgust concerning certain animals, termed disgust-relevant animals, such as maggots and slugs. Disgust seems to be a universal reaction to some animals, as evidenced in a cross-cultural study by Davey *et al*. (1998) carried out across 7 Western and Asian countries. Their participants responded to how fearful they were of 51 animals, with a 4 point scale being used to express their fear of each. There was considerable agreement in the fears of individuals across all seven countries concerning their disgust-relevance towards certain animals, including cockroaches, leeches, rats and worms. Webb and Davey (1992) showed that watching video film could be influential too. Their participants (university undergraduates 19 – 25 years old) watched either a video showing extreme violence, or one showing scenes of revulsion in hospital or one showing neutral landscape scenes. They found that showing violent videos increased the fear ratings of animals such as lions, tigers and sharks, and that watching revulsive film increased the fears of not only lions, tigers and sharks but also highly revulsive animals such as maggots, slugs and snails. So disgust and fear-relevant stimuli seem correlated. Researchers have also investigated how the potential danger and movement of animals may be related to fear. Armfield (2008), for example, compared the uncontrollability, unpredictability and dangerousness of a spider by comparing the fearful response of participants in imaginal and in vivo encounters with a spider. The fearful response by participants in the in vivo encounters was significantly greater than that in imaginal encounters with a spider.

A further factor that may influence the fear of animals is novelty (Hinde 1974). Hinde suggested that exposure to a new animal may bring about a fearful response. This is because the unfamiliar animal triggers a wariness as it does not fit in with (or is discrepant with) a person`s current knowledge of animals and thus it might cause a fear or phobia.

[For a detailed consideration of the Bennett-Levy & Marteau study see the work of Dr Julia Russell on the Uniview Worldwide website (the website address is http://www.uniview.co.uk/pdf/newphobiamerge.pdf and Chapter 6, Core Studies in Physiological Psychology, the text for the Edexcel A Level Psychology specification. The refer-

2. The investigation

ence is Edexcel Psychology, Pearson, Brain, Russell & Smith (2009).]
The specific suggestion in this practical is for A Level students to investigate the fear of participants (other A Level students in their own college or school) to fourteen British animals. The animals selected are all small (most are < 20 cm in length) and all but a wasp and a bee are non-dangerous to humans. These animals are:

ladybird	**newt**
wasp*	**slug**
cockroach	**earthworm**
butterfly	**lizard**
dragonfly	**bird**
spider	**rat**
bee*	**moth**

[*On average, there are 5 deaths per year in UK due to wasp and bee stings. These people die after going into anaphylactic shock from being stung. In the UK, wasp stings cause about twice as many anaphylactic deaths as do bee stings.]

The Bennett-Levy & Marteau investigation used two questionnaires and their participants (N = 113) provided responses using either a 3 point or a 5 point scale of measurement (Likert-type scales). We suggest students use a 3 point scale, as Bennett-Levy and Marteau did, to indicate both the degree of fear and how `ugly` they believe each animal to be. To assess fear: 1 – not afraid; 2 - quite afraid; and 3 – very afraid. For `ugliness` the scale would be: 1 – not ugly; 2 – quite ugly; and 3 – very ugly. [`Ugliness` was just one of the variables investigated by Bennett-Levy and Marteau in their research.] The participants will respond under one of two conditions when cards are presented to each person individually. One condition (Condition A) will use a set of fourteen cards and each card will have the name of the animal, such as `rat`, printed on it. The other set of cards (Condition B) will also have the name of the animal, together with a photographic image of the creature. Hence the only difference between the two conditions is that one set of cards has an image of the animal. So the research question the study will pose is, `Will the image of the animal have an effect on the degree of fear and `ugliness` of the animal?`

The respondents will need to be divided into two groups and a random allocation of people to the two conditions would be fairly easy to carry out. If the students were able to arrange for their sample to be made up of roughly equal numbers of female and male participants then gender differences might be an additional avenue for analysis. So a sample of 40 students (ten male and ten female students under each of the two conditions, A and B) would be good: more would be better!

The stimulus material is provided in the Appendix, with both a full colour and a black and white version available. Students would need to devise their own set of standardized instructions to read to each participant and they should aim to read them with a clear but neutral voice: they should also read the animal name on each card in a similar manner. We have provided a check sheet which each respondent could use to indicate their fear and `ugliness` score. The total fear and `ugliness` score for each animal for each student can be determined from the check sheets (each student should have a fear and `ugliness' score between 14 and 42). After completing their check sheet each student should be de-briefed, thanked for their participation and told they can contact a team member to receive their scores if they so wish.

[For greater rigour, a third set of cards could be used i.e. cards with just images of the animals. However, this would mean another means of analysis would need to be used if differences between the groups were being tested: this is probably beyond the requirement of most A Level Psychology specifications.]

3. Analysis

In the Bennett-Levy and Marteau study their data were analysed using a correlation coefficient and the same approach can be adopted here. The Spearman rank correlation coefficient would be appropriate as an ordinal scale of measurement was used to collect the data. A scattergraph, showing the fear and `ugliness` scores of all participants, would be a suitable graph to use to represent the data if this was desired. However, the data could be analysed for differences in the scores if gender differences were being sought, in which case a Mann-Whitney test (for independent or unrelated samples) would be appropriate.

4. Discussion

Students could use scattergraphs and their correlation coefficients to assess whether there are significant correlations between the fear and `ugliness` scores. The scattergraphs may be helpful in drawing attention to any outliers, i.e. respondents whose scores were very atypical. If analysis had focused on looking for any significant differences in fear and `ugliness` between the two conditions and/or gender differences then students could usefully comment on why these may have been found. Are the findings the same as Bennett-Levy & Marteau found? If not, why not? Do the fear and `ugliness` ratings of some of the twelve animals show that they may have some characteristics in common, such as long antennae or movement in a quick or haphazard manner. The protocol followed in this investigation is not exactly the same as in the Bennett-Levy and Marteau study, nor are the participants and the study will be carried out nearly thirty years later. All these differences may be influential. Also, whilst questionnaires are relatively easy to carry out and provide quantitative data they are unable to identify why individuals are fearful of certain animals.

Students may be able to pick out from their data that certain animals, such as spiders and wasps, since they carry venom, were perceived as more fearful. If so, this finding would agree with that found by Gerdes *et al*. (2009). They projected pictures of spiders, beetles, bees/wasps and butterflies/moths to undergraduates and found that spiders were rated highest on fear (and disgust and danger too) followed by bees/wasps. These findings may suggest that such responses to spiders and bees/wasps may support the biological preparedness hypothesis of Seligman (1971).

A limitation of this investigation is that some respondents may have been unfamiliar with some of the animals so may have `guessed` how fearful of them they were or how `ugly` they perceived the animals to be. Davey (1992) found that although a fear of spiders is widespread, less than 10 % of participants could actually recall a traumatic experience with a spider. Knowledge of the animals may be especially relevant (Kellert 1993). Kellert studied not only a sample of members of the general public but also samples of farmers, members of conservation organizations and scientists. He found that most invertebrates were viewed fearfully by the general public and farmers but those interested in conservation and especially the scientists were much less fearful and held more positive attitudes towards invertebrates. [Most of the animals listed in this practical are invertebrates.]

4. Discussion

A fear of insects and/or spiders invariably begins in childhood (Marks and Gelder 1966). However, Agras *et al*. (1969) believe that animal fears may develop during early adulthood, as well as childhood, and participants in this practical could perhaps come into this category. Another relevant factor is gender. Agras (1985) found nearly twice as many women as men indicate fearful feelings towards animals and this may be evident in the data collected by the students. Davey (1992) found that up to 1 in 3 females and 1 in 4 males may show a fear of spiders. Gullone & King (1993) studied 918 Australian children aged 7 – 18 years of age and found that girls report more fears than boys. Interestingly, Liddell *et al*. (1991) found, in a study of Canadian participants over 50 years of age, that gender differences evident at adolescence, girls having more fears than boys, held up into old age.

Gender differences were also investigated by Prokop & Francovicova (2010) who studied disgust and the fear of animals, specifically macroparasites, in children in primary and secondary schools (age range 8 – 15 years) in Slovakia. They found that disgust, fear and danger were all higher for parasites and disease-relevant insects (like mosquitoes) than adult insects or insect larvae and that females rated all the animals higher than males for each attribute. Prokop and Francovicova believe this is further evidence for an evolutionary explanation for the propensity for disgust in humans, thus supporting Seligman`s biological preparedness hypothesis. However, Carroll & Ryan-Wenger (1999) found no significant differences in the number of fears (though these were not exclusively animal fears) between boys and girls of secondary school age and believe this may be a function of the method they used. The children in their study responded to a question without any prompting cues or a list of animals. So when children are not given a list the number of fears recorded are fewer, which effectively eliminates the gender difference.

Animal fears and phobias are clearly widespread and persistent and can make life difficult for a sufferer. Even individuals suffering milder fears of animals can be influenced. Ceriaco (2012) found negative values, and even folklore, can influence how people respond to animals connected with conservation issues. Their questionnaire study of people in Portugal (age range 14 – 81 years) showed that negative values could predict persecution and anti-conservation attitudes towards reptiles and amphibians. In a Canadian study, Ashley *et al.* (1974) used fake snakes and turtles placed on roads, both on the main part of the road heavily used by vehicles and on the edges. They found that motorists would make deviations in order to drive over the models of turtles and snakes and that drivers would be more vigorous in their aim to drive over snakes rather than turtles.

5. Ethical issues associated with this practical

The Subject Officer for WJEC Psychology (Elin Angharad) has confirmed that this practical suggestion would be suitable for use by those teaching their A Level Psychology specification. No deception is involved and the participating students could readily come across pictures of the selected animals in newspapers, magazines, popular television programmes, books, You Tube, Facebook, etc.. However, teachers would need to bear a number of things in mind.

It would clearly be vital to ensure that no student who is known to be fearful of any animal, no matter how mild, should be a participant. Teachers would also need to seek, in advance, parental permission for their sons/daughters to participate. Further, teachers would need to consult any protocols for carrying out research for A Level Psychology that are relevant to their school/college/local authority.

Any student who could be a potential participant in the practical must also be given the opportunity to opt out of taking part. The students who do volunteer should be de-briefed after their participation to ensure they do not feel any more fearful of any of the animals included in the questionnaire than previously. Participants should also be assured that the data collected would be treated with the utmost confidentiality.

Acknowledgements

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	FEAR			UGLINESS		
ANIMAL	**Not afraid**	**Quite afraid**	**Very afraid**	**Not ugly**	**Quite ugly**	**Very ugly**
Ladybird						
Wasp						
Cockroach						
Butterfly						
Dragonfly						
Spider						
Bee						
Newt						
Slug						
Earthworm						
Lizard						
Bird						
Rat						
Moth						

Participant	Fear score	Ugliness score
1		
2		
3		
4		
5		
6		
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11		
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15		
16		
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19		
20		

Participant	Fear score	Ugliness score
21		
22		
23		
24		
25		
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40		

MOTH

BEE

NEWT

SLUG

EARTHWORM

RAT

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LADYBIRD

COCKROACH

WASP

DRAGONFLY

BUTTERFLY

LIZARD

SPIDER

MANCHESTER 1824
The University of Manchester
The Manchester Museum

BIRD

MOTH

BEE

NEWT

SLUG

EARTHWORM

RAT

MANCHESTER 1824
The University of Manchester
The Manchester Museum

LADYBIRD

COCKROACH

WASP

DRAGONFLY

BUTTERFLY

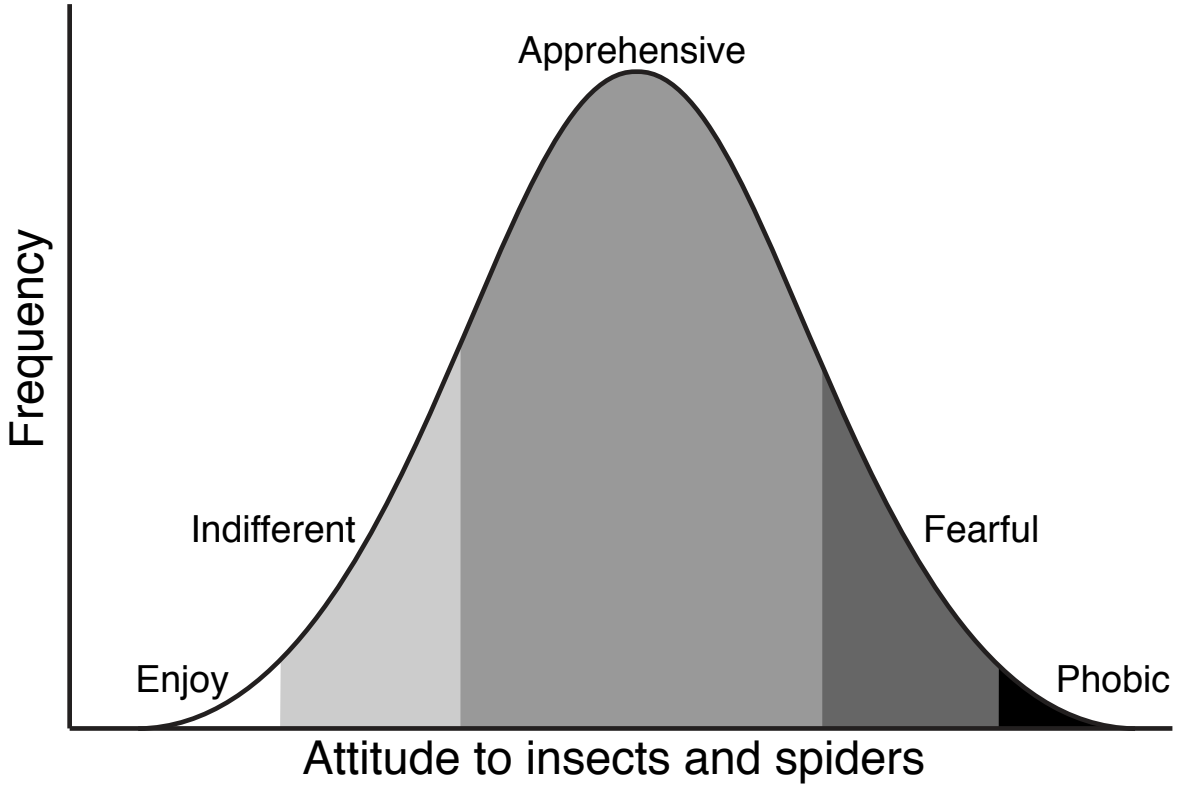
LIZARD

SPIDER

MANCHESTER 1824
The University of Manchester
The Manchester Museum

BIRD

Larger version of Figure 1, Page 2



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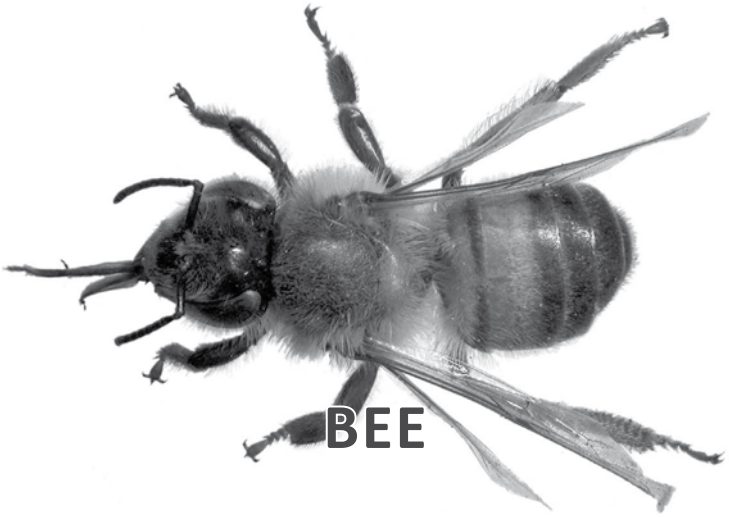

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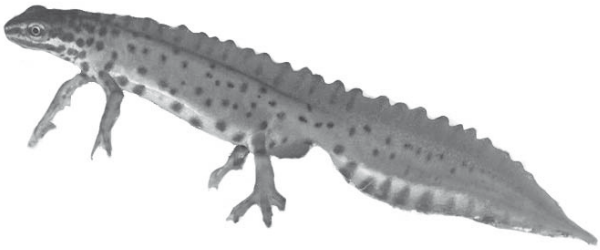

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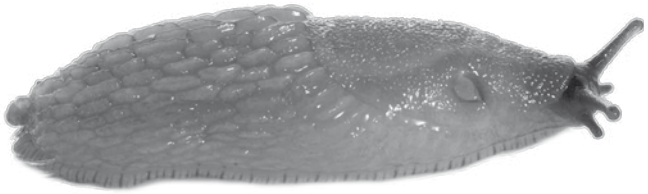

SLUG

EARTHWORM

RAT

MANCHESTER
1824
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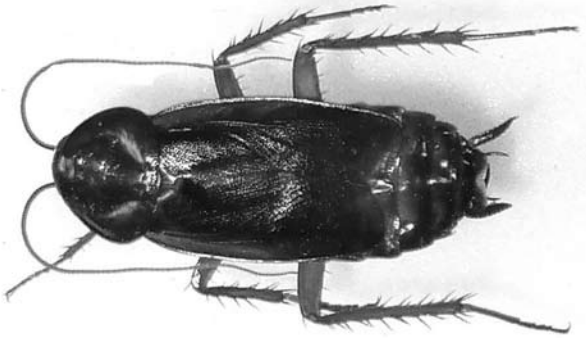
LADYBIRD



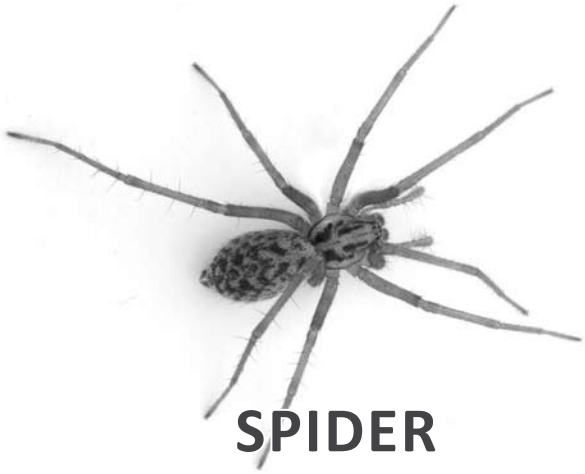
COCKROACH

WASP

DRAGONFLY

BUTTERFLY

LIZARD



SPIDER

MANCHESTER 1824

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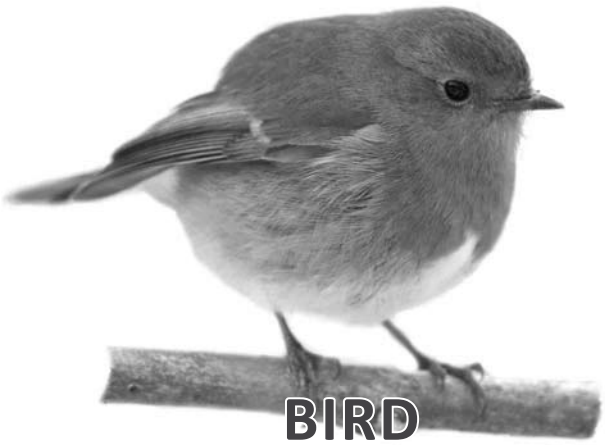

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