

- What type of person was Mrs. Baker?
- Mrs. Baker was a short, stout woman.
- What was Mrs. Baker's philosophy of life?
- Mrs. Baker believed in spending an active and struggling life.
- Why was Mrs. Baker confined to bed?
- At the age of eighty, she had a bad fall. Her son left her in a nursing home for care.
- What feelings did Mrs. Baker have in her old age?
- She had feelings of fatigue and loneliness.
- How did Mrs. Baker try to recapture happiness in her old age?
- She tried to recapture happiness by recalling events of the past.
- Comment on the title of the lesson: "In My Day".
- Parents tell tales of their hard work to their children. They usually start with "In my day...". Hence the title is "In My Day".

## 19- THE MARVEL OF AN INSECT

۱۹۔ ایک کیڑے کا عجوبہ

by Alan Devos

سبق کا خلاصہ:

”ایک کیڑے کا عجوبہ“ ہمیں کیڑوں کی اقسام، عادات اور طرز زندگی کے متعلق حیران کن معلومات بہم پہنچاتا ہے۔ یہ ان کے متعلق دلچسپ حقائق ظاہر کرتا ہے۔ وہ اپنے آپ میں ایک دنیا ہیں جس کی اپنی دلفریبی اور کشش ہے۔ ان کے مطالعہ سے ان کی جسمانی بناوٹ اور سگنے اور دیکھنے کی غیر معمولی قوتوں کے متعلق پتہ چلتا ہے۔ ہمیں یہ بھی معلوم ہوتا ہے کہ ان میں پرواز کی حیران کن صلاحیت ہے۔ ان کے متعلق جاننا زندگی کے معجزہ سے متعلق تھوڑا سا غور و خوض کرتا ہے۔

کیڑوں کی قریباً ساڑھے سات لاکھ اقسام معلوم ہوئی ہیں قریباً چار ہزار نئی اقسام ہر سال معلوم ہوتی ہیں۔ ان کی شکلیں اور عادات انہیں کسی بھی حالات میں زندہ رہنے میں مدد دیتی ہیں۔ ایک بھنورا سرخ مرج پر زندہ رہتا ہے۔ دوسرے کیڑے ہیں جو کھیتوں کی زہانوں پر زندگی گزارتے ہیں۔ ایسے کیڑے بھی ہیں جن کے نہ منہ نہ پیٹ ہوتے ہیں۔ وہ قطعاً کچھ نہیں کھاتے۔

متنوع ہونے کے باوجود ان کی کچھ باتیں مشترک ہیں۔ بڑے پتے، پتوں اور کھیاں ادھر ادھر تیزی سے اُچھل کود کرتی ہیں۔ بکتے کے بالوں میں یا شام کے دھندلکے میں ندی نالہ پر ان کی بناوٹ یا خدوخال بڑی حیرانی کا معاملہ ہے۔ ایک کیڑے کی ہڈیاں نہیں ہوتی ہیں اس کا ہر کاڈا چنچہ ہوتا ہے اس کا دل اوپر کمر کے نزدیک ہوتا ہے۔ اس کی ٹانگیں نکلی نما ہوتی ہیں۔ اس کے پٹھے، شریانیں اور نرم ریشے اندر کی طرف ہوتے ہیں۔ ایک رے کی ٹانگ اس کے لئے مضبوط ترین سہارا یا ذریعہ یا آلہ ہوتے ہیں ایک اوسط انسان اپنے وزن سے ڈرا زیادہ دو تہائی وزن اٹھا سکتا ہے۔ لیکن ایک بھنورا بغیر باندھے اپنے وزن سے 850 گنا وزن اٹھا کر لے جاسکتا ہے۔

Q.2 After studying this essay, can you tell how many different kinds of insects are there in the world? Have all our earth's insects been discovered so far?

Ans. There are nearly seven hundred and fifty thousand species of insects in the world. They have variety of shapes, habits and sizes. Although about four thousand new varieties are found every year, yet all our earth's insects have not been discovered so far. Whatever has been discovered about them, now we describe something of that in detail.

(Summary)

Q.3 Have you noticed something peculiar and strange about the insects, pointed out by Allan Devoe?

Ans. Allan Devoe has excellently observed peculiar and strange things about the insects. Insects have variety of kinds, shapes, sizes and habits. Strongly, they have no brains, no lungs and no veins. We are wonder struck at their power, strength and durability. Their sensor gifts give us an enlightened surprise. Now discuss their points in detail.

( Summary)

### SHORT QUESTIONS

Q.1 How many species of insects have been discovered?

Ans. Nearly seven hundred and fifty thousand species have been discovered.

Q.2 What things are common in insects?

Ans. All insects have these things in common: external skeleton, blood circulation system, ear openings, wings and sensory gifts.

Q.3 What do you know about the skeleton of an insect?

Ans. An insect has no bones. Its heart is on top near its back. Its legs tubular.

Q.4 How does blood circulation occur in an insect?

Ans. It occurs through veins. An insect has a great blood vessel that from the heart to the chest. Blood is forced to the far tips of its fine extremities by booster hearts which work like pump static



sections of its skin-skeleton plate armour with muscles, nerves and soft tissues carried protectedly inside. The engineering of an insect's leg makes it, for its size, the strongest supporting device possible. In a recent experiment in which an entomologist gradually piled tiny weights on a scarab beetle, he was able to get his little porter to move about under a load of eight hundred and fifty times its own weight without buckling. An average man, straining, can lift a little more than two thirds his weight.

This strong, pliable external skeleton provides even the most fragile-looking insects with astounding durability.

Monarch butterflies, seeming as insubstantial as blown thistle seed, make migratory round trip flights of three thousand miles and more. Painted lady butterflies, tagged for scientific identification, have been found to make a gigantic journey from North Africa to Iceland, although storm-tossed, lashed by rains and gales.

They often reach their destinations with their wings in tatters.

With an outside skeleton there is no room for expansion. Growing insects must periodically moult. The horny casing splits and the insect creeps out in such a soft skin that temporarily it is almost "boneless". To make its new skeleton form in a suitably bigger size, the insect swallows air or water. Gulping and swelling until it is the required new size, it waits while its roomier skeleton hardens round it.

The insect's blood is not confined by any system of veins, as ours is. From its single great artery, which runs from the heart through the chest, the blood surges and seeps through the whole body. The blood is forced to the far tips of thread-fine extremities by little auxiliary hearts—pumping stations with sets of powerful muscles, located wherever there is difficult booster job to be done. A cockroach has one in its head, to pump blood through its long feelers. Water insects have booster hearts to ensure perfect circulation in their legs.



## The Marvel of An Insect

ALAN DEVOE

A naturalist might conclude that God takes an exuberant joy in creating insects, for our earth so teems with the complex little creatures that no one knows how many different kinds there are. Nearly seven hundred and fifty thousand species have been classified. About four thousand new varieties are found every year. Awed entomologists predict that when all our earth's insects have been discovered the final tally may be in millions.

The members of this vast and amazing group of living things have assumed countless strange shapes and habits enabling them to cope with life under almost any circumstances. There is a beetle that thrives in red pepper. There are insects so tiny, and so intensely specialized, that they live on the tongues of horse-flies. There are others whose shimmering lives under the sun are so brief that they have neither mouths nor stomachs and never eat at all.

Despite this immense diversity, all insects have certain things in common.

The lovely giant moths that enchant us when they come beating their beautifully patterned wings at our windows in summer seem utterly unlike the pinhead-size flea hopping about in our dog's hair or the gauzy-winged may-flies whirling in a lyrical spring dance over a brook pool in the dusk. But basically they are all a similar kind of living machine.

To learn something of their make-up is to be introduced to extraordinary wonders.

An insect has no bones. It wears its skeleton externally. From man's point of view, it is built inside out and upside down. Its heart is on top near its back. Its legs are tubular



insect. A kind of butterfly can make a flight of three thousand miles. Growing insects periodically (مخصوص عرصہ کے بعد) moult (غول اُترتا). Their outer casing breaks and a soft insect creeps (ریکتا) out. With the passage of time, its skeleton hardens round it.

The insect's blood circulation does not occur through veins. An insect has a great blood vessel (تلی) that runs from the heart to the chest. Blood is forced to the far tips (دور سرے) of thread-fine extremities (پیشانی پر یک سرے) by booster (مددگار) heart which work like pump stations. A cockroach has one booster heart in its head, to pump blood through its long feelers (ماتے).

An insect has no lungs, nor does it breathe by mouth or nostrils (نخے). Along its sides, there are rows of tiny openings of air ducts (تالیان). Inside the body, these ducts are linked into two main trunk-lines, which branch into hundreds of air lines running to every area of its body. The insect can open or close its air ducts. Insects need more oxygen while flying.

The wings of all insects have remarkable power. They have wonderful beating speed. A dragon-fly has wings thinner than fine paper, yet it can hit forty miles an hour. A mosquito can beat its wings more than three hundred times a second. Similarly, the insects that do not fly display a wonderful power. A flea, for example, can jump hundred times its own height. Bees and butterflies can live even in a vacuum (خلا).

Insects do not have any developed brains. They are guided by surprising sensory (حیات والے) gifts. They hear sounds with the help of hair or tympanic membrane which are located on different areas of the body. Many insects hear sounds outside our human range. Insects see by small eyes on top of their heads, by compound (مرب) eyes at the sides and by light sense. For taste and smell, insects have unbelievable sensitivity. Butterflies and bees can taste with both their mouths and their feet. They can easily find out slight traces of eatables. The writer rightly says:

"To know something of the wonder of insects is to contemplate (غور و خوض کرتا) a little of the miracle (معجزہ) of life."

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بادشاہ تتلیاں تین ہزار میل یا زیادہ کا واسطی کا سفر کرتی ہیں رنگ دار مادہ تتلیاں شمالی افریقہ سے آئیں ایک کھمبہ پر لٹکتی ہیں۔ طوفانوں، بارشوں اور آندھوروں کے باوجود کرتی ہیں۔ کیڑا ایک نیا ڈھانچہ حاصل کرنے کے لئے ہوا یا پانی اکٹھا ہے۔ اس کا خون دل سے نکلتا ہے۔ پانی کے کیڑوں کے مددگاروں کے لئے یہ منہ یا ناک سے سانس نہیں لیتا۔ اپنے پہاڑوں کے ساتھ چھوٹے چھوٹے سوراخوں سے سانس لیتا ہے۔ یہ اپنے ہوائی راستے کھول اور بند کر کے ہوا کے بہاؤ کو کنٹرول کرتا ہے۔ آرام کے وقت کیڑے کو آکسیجن کی ضرورت ہوتی ہے۔ پرواز میں اسے آکسیجن کی عام مقدار سے 50 گنا ضرورت ہوتی ہے۔

ایک کالی کبھی 40 میل فی گھنٹہ سے سفر کرتی ہے ایک مچھر اپنے پر 300 دفعہ فی سیکنڈ سے زیادہ مارتا ہے۔ تتلی اپنے بالوں ہزار دفعہ سے زیادہ فی سیکنڈ پھڑپھڑاتی ہے۔ ایک چھوٹا سا بچہ اپنے قد سے 100 گنا زیادہ اچھل سکتا ہے۔ کیڑے نازک ٹھنڈے سے بچ سکتے ہیں۔ حیران کن طاقت رکھتے ہیں۔ کیڑوں کے ابتدائی دماغ ہوتے ہیں ان کی رہنمائی حیاتی قوتیں کرتی ہیں۔

کیڑے زندگی کی آوازیں نازک بالوں سے سنتے ہیں جو آواز کی لہروں کیلئے حساس ہوتے ہیں۔ مزید یہ کہ ان کے دماغی حلقے کان کے ڈھول ہوتے ہیں۔ جھینگروں کے کان ان کے گھٹنوں پر ہوتے ہیں۔ مڈیوں کے کان ان کے پیٹ میں ہوتے ہیں۔ پانی کی پھینکنا پانی چھاتی سے سنا ہے۔ جھاڑی کے جھینگروں کی آواز سے تیز شنوائی رکھتے ہیں۔ بہت سے کیڑے انسانی وسعت سے بڑھ کر آوازیں سنتے ہیں۔ ہمیں خیال ہو کر خاموشی ہے تو بھی ماحول کیڑوں کے شور سے بھرپور ہوتا ہے۔

کیڑے چھوٹی آنکھوں سے، مرکب آنکھوں سے اور روشنی کے فہم سے دیکھتے ہیں، کیڑا روشنی یا سائے تلاش کرتا ہے۔ سائنہاں کمال کے ذریعے بھی دیکھتا ہے۔ مرکب آنکھیں تصاویر کی دنیا دیکھنے میں مددگار ہوتی ہیں۔ کالی کبھی کی آنکھ کے 23 ہزار سے زیادہ رنگ ہوتے ہیں کیڑے سو گھنٹے اور ذائقہ کی قوتوں میں بازی لے جاتے ہیں کیڑے کے منہ میں ذائقہ کے حصے ہوتے ہیں تتلیاں اور شہد کی مکھیاں اپنے تہ اور پاؤں سے چکھ لیتی ہیں۔ کچھ پتے اور تتلیاں چینی کی موجودگی کو معلوم کر سکتی ہیں جب تین لاکھ میں ایک حصہ بھی ہو۔ کچھ پتے ذکر پہنچے ہوئے 9 میل دور مونٹ پینٹے کی خوشبو حاصل کر سکتے ہیں۔

ہم کیڑوں کی حیران کن دنیا کا جتنا زیادہ مطالعہ کرتے ہیں اتنے ہی ہم رعب اور حیرانی سے لبریز ہو جاتے ہیں وہ ہمارے لئے خوشی اور تکلیف کا باعث ہیں۔ لیکن ہم ان کے بڑے بڑے کاموں پر حیرانی کا اظہار کرتے ہیں۔ فطرت نے ان کو عظیم صلاحیتوں سے نوازا ہے وہ قد میں تو معمولی ہیں لیکن کارناموں میں بلند ہیں۔

Q.1 What are common things among all insects, despite diversity?

Ans. God has created insects so wonderfully that only He knows their number and kinds. Nearly seven hundred and fifty thousand species have been discovered. About four thousand new varieties are found every year. These living creatures have variety of shapes, habits and sizes. Yet all insects have certain things in common. Now we discuss them in detail.

All insects have external skeletons. They have no bones. An insect has its heart on top near its back. Its legs are tubular (نیوب نما) and have muscles, nerves and soft tissues. They provide a good support. A scarab beetle (ایک قسم کا کیڑا), for example, can move about under a load of eight hundred and fifty times its own weight. The skeleton provides durability (پائیداری) to an



In its capacities to taste and smell, an insect achieves perhaps the most remarkable sensitivity of all.

It has taste organs in its mouth, but it also has the sense of taste extended in unimaginable other ways and with incredible keenness. Butterflies and bees can taste not only with their mouths but with their feet. The insect's detection of microscopically slight traces of edible material amounts to a sensory miracle. The extreme limit at which human taste can detect sweetness is in a solution of one part sugar to about one hundred parts of water. Some moths and butterflies can detect the presence of sugar when it is one part in three hundred thousand.

As with taste, so with scent.

An insect experiences the world as a "smellscape" of titillating vividness. Some male moths are able to catch the scent of a female nine miles downwind.

In addition to such sense powers—which, fantastic though they are, fall within our theoretical understanding—insects also show signs of other sensings, the nature of which has not been fully fathomed. Experiments have been made with beetles to try to discover how they find a hidden bit of meat. With every known sense organ put out of action, and with shellac applied all over their bodies, legs and feelers, the beetles still make their unerring way to the hidden treasure.

To know something of the wonder of insects is to contemplate a little of the miracle of life.

### Captain B.Sc. English

Q.5 How does an insect breathe?

Ans. An insect has rows of tiny openings of ear ducts along its sides. Inside the body, these ducts are linked into two main trunk lines, which have further branches. The air can pass through these lines.

Q.6 How do insects see things?

Ans. Insects see by small eyes on top of their head, by compound eyes at the sides and by light sense.

Q.7 What is the importance of difference of shapes and habits for insects?

Ans. The difference of shapes and habits enables insects to survive almost in any circumstances.

### **20- TV ADDICTION**



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Dr. F. E. Lutz of the American Museum of Natural History sealed bees and butterflies in a tube, then pumped out the air to make a vacuum. Even the insects' body moisture was sucked out of them. His "fragile" little prisoners survived unharmed even when the tube was broken and normal pressure suddenly restored. The toughest elephant would have died instantly.

Insects have only rudimentary brains; they are guided through their lives by strange and lavish sensory gifts. They listen to life with two kinds of ears: delicate hairs sensitive to sound waves, or tympanic membrane like our own eardrums; but these are distributed on many areas of the body, and are tuned to prodigies of special reception. Crickets have ears on their knees. Cicadas have ears in their abdomens. A water beetle hears with its chest. Bush-crickets have been found to have supersonic hearing. Acute human hearing seldom ranges above about twenty thousand vibrations per second. Bush-crickets can hear forty-five thousand. Many insects hear sounds outside our human range.

Entomologists believe the whole world outside our doors may be ringing with an insect chorus of mating calls and interchanged messages when we think there is only silence.

Insects see by small eyes called ocelli on top of their heads, by great compound eyes at the sides and by kind of all-over "invisible eye" or light sense. With its eyes completely covered, a light-loving insect still moves unerringly towards brightness and a dark-loving one seeks the shadows. It literally sees through its skin.

With its compound eyes the insect sees a world of extraordinary composite vignettes. Several ingenious technicians have succeeded in taking photographs through an insect's eye. The world thus revealed is a landscape of finely patterned mosaic, each tiny piece of it caught by one facet of the eye. Fitted together, the pieces make a picture something like a stained-glass window. The eye of a dragon-fly has more than twenty-five thousand such facets.



For an insect, drawing the breath of life involves another remarkable process, because it has no lungs, nor does it breathe by mouth or nostrils. Along its sides are symmetrical rows of tiny perforations. Each of these is an air duct. Inside the body they link into two main trunk-lines, which branch into hundreds of air lines running to every area of its body.

Thus the whole insect is continuously ventilated by a flow of air, which it controls by opening and closing its air ducts as an organist pulls out stops.

Resting, an insect needs relatively little oxygen; but in flight it must breathe prodigiously. It must be able suddenly to call upon as much as fifty times the normal amount of oxygen. Its beating wings bring this about; as the wing muscles contract, they force out almost all the air in the system; as they relax, fresh air rushes into the ducts. The oxygenation provided to a flying insect is so complete that even in its wing muscles there occurs an almost complete change of air at every wingbeat.

No aspect of the dynamics of an insect's body presents more striking powers than its wings. A dragon-fly, carrying its long body on wings thinner than fine paper, can hit forty miles an hour. A mosquito, gorged on blood, performs the extraordinary aerodynamic feat flying off carrying a load twice its own weight. To do so, it beats its wings more than three hundred times a second.

Such a furiously rapid wing-beat is by no means a unique performance. When we hear the high thin whine of a midge—so small that it is almost invisible—the midge's wings are beating more than a thousand times a second.

In insects that do not fly, the blaze of energy is concentrated in special adaptations that result in equally impressive displays of power. The little flea that hops aboard our dog is able to do so because it can make a leap of a hundred times its own height. If man had the flea's jumping power, proportionately, he could jump over the Houses of Parliament.

Insects may look fragile, but their strength is as deceptive as the lacy engineering of a suspension bridge.