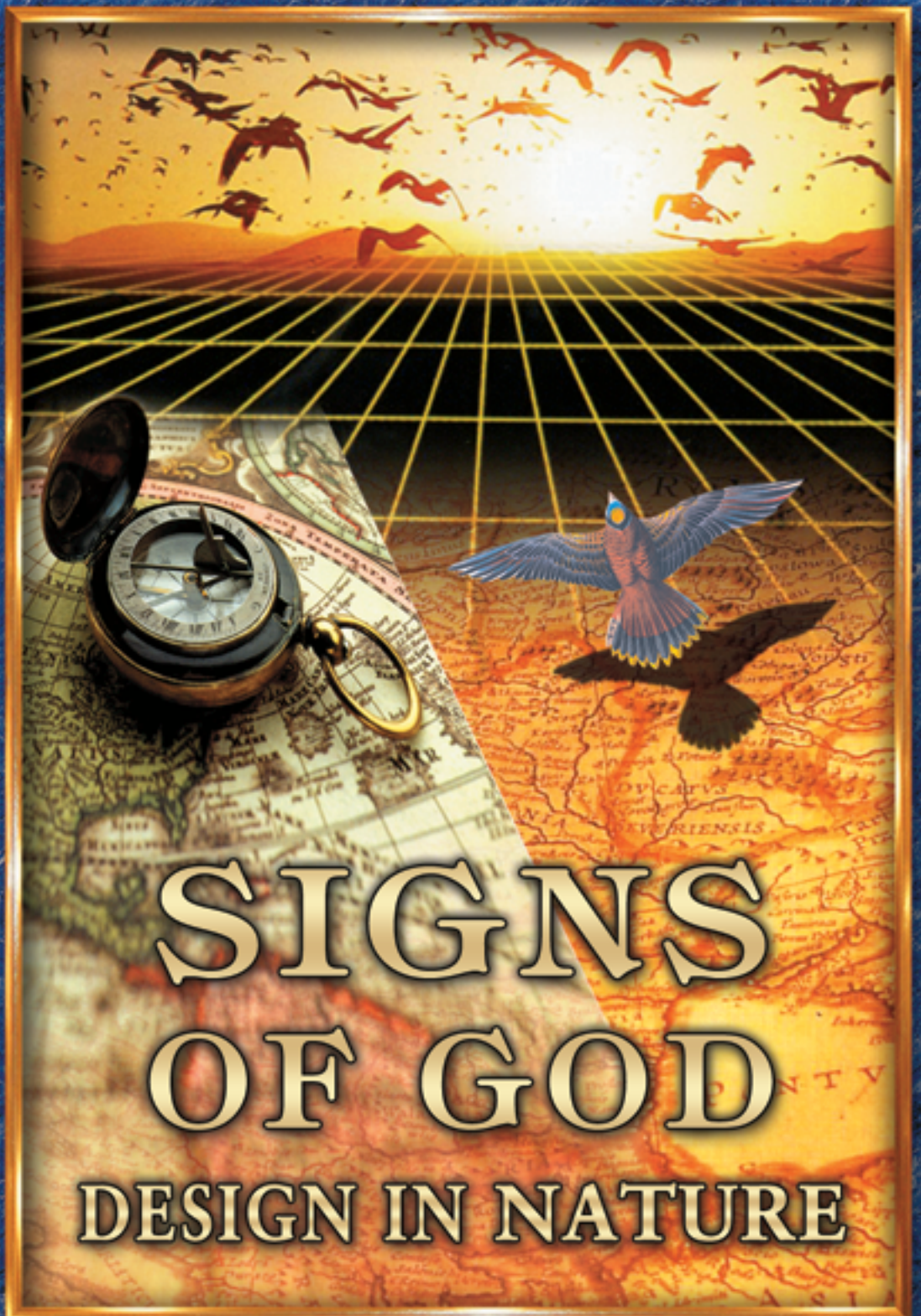
HARUN YAHYA



SIGNS OF GOD

DESIGN IN NATURE

Foreword by Michael V. Petrovich

Darwin said: "If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down." When you read this book, you will see that Darwin's theory has absolutely broken down, just as he feared it would.

Creatures in nature have extremely complex body systems. A thorough examination of the feathers of a bird, the sonar system of a bat or the wing structure of a fly reveals amazingly complex designs. These designs clearly indicate that all living things are flawlessly created by God.

The theory of evolution advanced by Charles Darwin in the 19th century denies creation and suggests that design in nature came into existence "spontaneously and accidentally" through natural processes. According to the theory of evolution, the basic mechanism of this phenomenon is "gradual development."

Scientific developments in the 20th century, however, have shown that designs in creatures cannot be attributed to "gradual development." Living bodies consist of organs made up of intricate components, the absence of even one of which would render that organ useless. Even these "irreducibly complex" organs alone clearly prove that life cannot be accounted for by natural causes but was flawlessly created by God.

In this book, you will see the proofs of God's perfect creation.

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Foreword

We live in a time marked by unprecedented scientific achievements. Every day we hear news about remarkable discoveries in the field of electronics, genetics, physics, astronomy and other fields. Cutting age technology teaches us that it is almost impossible to have the best computer, because what is considered to be the best technology today may be obsolete tomorrow. We pride ourselves on our expensive cars, airplanes that are invisible to radar, and spacecrafts that are able to explore the vast reaches of our universe.

But it is interesting to note the fact that very few people are aware that the most sophisticated and the most complex piece of technology is not invented by man and cannot be purchased in computer stores. All around us in nature there are such complex and intricate organisms which with their structure and design surpass the best piece of technology ever designed by man. One simple, trivial, ant is a billion times more complex than the latest model of a Mercedes Benz automobile. Plastic airplanes that are used as toys by many children and the modern spacecraft are just as simple compared to the insignificant and unimportant fly. The world's top engineers use the structure and design of an insect as a model to construct the modern airplanes and helicopters.

Cities such as New York, Tokyo, Paris, London and other mega cities of the world with all their infrastructure are infinitely simpler than a one cell organism such as a bacterium. The information encoded in the genetic code of a single macroscopic bacterium is incomparably more complex than any

computer program that has ever been invented.

It is impossible to list all the wonders that surround us when we visit the nearest park or forest. To analyze and describe the function and design of the living things in nature would be certainly an enjoyable, but a rather lengthy, task.

However, a far more important question is not how the living systems function, but how they came into being. The implications of our answer are far reaching.

In general there are three possible answers:

1. They created themselves.
2. They were created by an intelligent Being.
3. We do not know how they came into existence.

It would be extremely ludicrous and preposterous for any scientist to believe that the computers, airplanes and spacecrafts are not the product of a highly intelligent mind, yet paradoxically, the same scientists claim that far more complex organisms are a by-product of blind, natural forces. Many people are under the influence of these scientists whose credibility is reinforced by academic titles obtained from the world's leading universities.

The book that you are about to read invites you to observe the living beings in nature, to analyze them and then to reconsider the question of how they came to be. If these tiny organisms were created by Someone, then this Someone is able to recreate them if He so desires. It further means that if Someone has created the most complex systems in nature—a man—then this Someone is also able and willing to create him again after death.

Let us begin with the definition that science is applied logic and let us immerse ourselves into the world of living beings as explained and illustrated in this book. If we apply basic logic, we will come to the conclusion that will fundamentally change our lives.

Michael V. Petrovich
Sacramento, California

Introduction

Let us for a moment think of an aspirin; you will immediately recall the mark in the middle. This mark is designed to help those who take a half dose. Every product that we see around us, even if not as simple as the aspirin, is of a certain design, from the vehicles we use to go to work, to TV remote controls.

Design, in brief, means a harmonious assembling of various parts in an orderly form designed for a common goal. Going by this definition, one has no difficulty in guessing that a car is a design. This is because there is a certain goal, which is to transport people and cargo. In realisation of this goal, various parts such as the engine, tires and body are planned and assembled in a factory.

However, what about living creatures? Can a bird and the mechanics of its flight be a design as well? Before giving an answer, let us repeat the evaluation we did in the example of the car. The goal, in this case, is to fly. For this purpose, hollow, light-weight bones and the strong breast muscles that move these bones are utilised together with feathers capable of suspension in the air. Wings are formed aerodynamically, and the metabolism is in tune with the bird's need for high levels of energy. It is obvious that the bird is a product of a certain design.

If we leave aside the bird and examine other forms of life, we encounter the same truth. In every creature, there are examples of extremely well-conceived design. If we continue further on this quest, we discover that we

ourselves are also a part of this design. Your hands that hold these pages are functional as no robot hands could ever be. Your eyes that read these lines are making vision possible with such focus that the best camera on earth simply cannot achieve.

Hence one arrives at this important conclusion; all creatures in nature, including us, are of a design. This, in turn, shows the existence of a Creator, Who designs all creatures at will, sustains the entire creation and holds absolute power and wisdom.

However, this truth is rejected by the theory of evolution that was formed in the middle of the 19th century. The theory set forth in Charles Darwin's book *On the Origin of Species* asserts that all creatures evolved by chains of coincidences and mutated from one another.

According to the fundamental premise of this theory, all life forms go through minute random changes. If these random changes improve a life form, then it gains an advantage over the others, which in turn is carried onto following generations.

This scenario has been passed around for 140 years as if it is very scientific and convincing. When scrutinised under a larger microscope and when compared against the examples of the design in creatures, Darwin's theory paints a very different picture, i.e. Darwinism's explanation of life is nothing more than a self-contradictory vicious circle.

Let us first focus on the random changes. Darwin could not provide a comprehensive definition of this concept due to lack of knowledge of genetics in his time. The evolutionists who followed him suggested the concept of "mutation". Mutation is arbitrary disconnections, dislocations or shifts of genes in living things. Most importantly, there is not one single mutation in history that has been shown to improve the condition of a creature's genetic information. Nearly all the known cases of mutations disable or harm these creatures and the rest are neutral in effect. Therefore, to think that a creature can improve through mutation is the same as shooting at a crowd of people hoping that the injuries will result in healthier improved individuals. This is clearly nonsense.

As importantly, and contrary to all the scientific data, even if one assumes that a certain mutation could actually improve a being's condition, Darwinism still cannot be delivered from inevitable collapse. The reason for

this is a concept called "irreducible complexity." The implication of this concept is that the majority of systems and organs in living things function as a result of various independent parts working together, the elimination or disabling of even one of which would be enough to disable the entire system or organ.

For example, an ear perceives sounds only through a sequence of smaller organs. Take out or deform one of these, e.g. one of the bones of the middle ear, and there would be no hearing whatsoever. In order for an ear to perceive, a variety of components – such as external auditory canal, tympanic membrane, bones in the middle ear, that is, the hammer, anvil and stirrup, fluid-filled cochlea, hearing receptors or hair cells, the cilia which help these cells to sense the vibrations, the net of nerves that connect to the brain and hearing centre in the brain – have to work together without exception. The system could not have developed in segments because none of the segments could possibly function alone.

Hence, the concept of irreducible complexity demolishes the theory of evolution at its foundations. Interestingly, Darwin also worried about these very prospects. He wrote in *On The Origin of Species*:

> If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.[1]

Darwin could not, or might not have wanted to, find such an organ at the premature levels of 19th century science. However the science of the 20th century did study nature in minute details and proved that the majority of living structures embody irreducible complexity. Therefore, Darwin's theory has "absolutely" collapsed just as he feared.

In this book, we are going to explore various examples of systems in living beings that demolish Darwin's theory. These mechanisms will be found anywhere from in the wings of a bird to inside a bat's skull. As we examine these examples we will not only see the immense error Darwinism makes but also witness the greatness of the wisdom with which these systems were created.

Hence, we will see the indisputable evidence of God's flawless creation.

An Example of Irreducible Complexity: The Eye of the Lobster

There are many different types of eye in the living world. We are accustomed to the camera-type eye found in vertebrates. This structure works on the principle of the refraction of light, which falls onto the lens and is focused on a point behind the lens inside the interior of the eye.

However, the eyes possessed by other creatures work by different methods. One example is the lobster. A lobster's eye works on a principle of reflection rather than that of refraction.

The most outstanding characteristic of the lobster eye is its surface, which is composed of numerous squares. As shown in the picture on the next page, these squares are positioned most precisely.

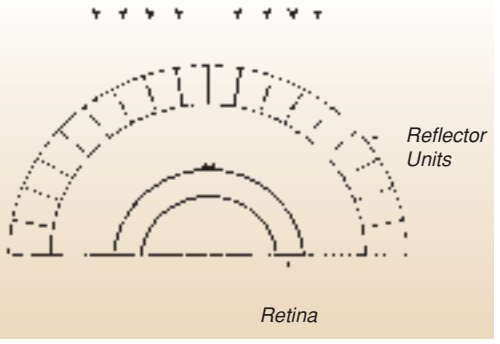
> The eye of a lobster shows a remarkable geometry not found elsewhere in nature - it has tiny facets that are perfectly square, so it "looks like perfect graph paper."[2]

These well-arranged squares are in fact the ends of tiny square tubes forming a structure resembling a honeycomb. At first glance, the honeycomb appears to be made up of hexagons, although these are actually the front faces of hexagonal prisms. In the lobster's eye, there are the squares in place of hexagons.

Even more intriguing is that the sides of each one of these square tubes are like mirrors that reflect the incoming light. This reflected light is focused onto the retina flawlessly. The sides of the tubes inside the eye are lodged at such perfect angles that they all focus onto a single point.[3]

The extraordinary nature of the design of this system is quite indisputable. All of these perfect square tubes have a layer that works just like a mirror. Furthermore, each one of these cells is sited by means of precise geometrical alignments so that they all focus the light at a single point.

It is obvious that the design in the lobster eye presents a great difficulty for the theory of evolution. Most importantly, it exemplifies the concept of "irreducible complexity." If even one of its features – such as the facets of the eye, which are perfect squares, the mirrored sides of each unit, or the retina layer at the back – were eliminated, the eye could never function. Therefore, it is impossible to maintain that the eye evolved step-by-step. It is scientifically unjustifiable to argue that such a perfect design as this could



The lobster eye is composed of numerous squares. These well-arranged squares are in fact the ends of tiny square tubes. The sides of each one of these square tubes are like mirrors that reflect the incoming light. This reflected light is focused onto the retina flawlessly. The sides of the tubes inside the eye are lodged at such perfect angles that they all focus onto a single point.

have come about haphazardly. It is quite clear that the lobster eye was created as a miraculous system.

One can find further traits in the lobster's eye that nullify the assertions of evolutionists. An interesting fact emerges when one looks at creatures with similar eye structures. The reflecting eye, of which the lobster's eye was one example, is found in only one group of crustaceans, the so-called long-

bodied decapods. This family includes the lobsters, the prawns and the shrimp.

The other members of the crustacea class display the "refracting type eye structure", which works on completely different principles from those of the reflecting type. Here, the eye is made up of hundreds of cells like a honeycomb. Unlike the square cells in a lobster eye, these cells are either hexagonal or round. Furthermore, instead of reflecting light, small lenses in the cells refract the light onto the focus on the retina.

The majority of crustaceans have the refracting eye structure. On the contrary, only one group of the crustaceans, namely the long-bodied decapods, have reflecting eyes. According to evolutionist assumptions, all the creatures within the class Crustacea should have evolved from the same ancestor. Therefore, evolutionists claim that reflecting eye evolved from a refracting eye, which is far more common among the crustacea and of a fundamentally simpler design.

However, such reasoning is impossible, because both eye structures function perfectly within their own systems and have no room for any "transitional" phase. A crustacean would be left sightless and would be eliminated by natural selection if the refracting lens in its eye were to diminish and be replaced by reflecting mirrored surfaces.

It is, therefore, certain that both of these eye structures were designed and created separately. There is such superb geometric precision in these eyes that entertaining the possibility of "coincidence" is simply ludicrous. Just like the rest of the miracles of creation, the lobster's eye structure is an open testimony to the Creator's boundless power to create flawlessly. This is nothing but a manifestation of God's endless knowledge, wisdom and might. We can encounter such miracles as these regardless of what we examine in the world of creation.

CHAPTER 1

THE MIRACULOUS DESIGN IN THE FLIGHT OF INSECTS

When the subject of flight is considered, birds immediately come to mind. However, birds are not the only creatures that can fly. Many species of insects are equipped with flight capabilities superior to those of birds. The Monarch butterfly can fly from North America to the interior of Continental America. Flies and dragonflies can remain suspended in the air.

Evolutionists claim that insects started flying 300 million years ago. Nonetheless, they are not able to provide any conclusive answers to fundamental questions such as: how did the first insect develop wings, take flight or keep suspended in the air?

Evolutionists only claim that some layers of skin on the body probably could have turned into wings. Aware of the unsoundness of their claim, they also assert that the fossil specimens to verify this assertion are not available yet.

Nevertheless, the flawless design of insect wings leaves no room for coincidence. In an article entitled "The Mechanical Design of Insect Wings" the English biologist Robin Wootton writes:

> The better we understand the functioning of insect wings, the more subtle and beautiful their designs appear... Structures are traditionally designed to deform as little as possible; mechanisms are designed to move component parts in predictable ways. Insect wings combine both in one, using components with a wide range of elastic properties,

> elegantly assembled to allow appropriate deformations in response to appropriate forces and to make the best possible use of the air. They have few if any technological parallels–yet.[4]

On the other hand, there is not a single fossil evidence for the imaginary evolution of insects. That is what the famous French zoologist Pierre Paul Grassé referred to when he stated, "We are in the dark concerning the origin of insects."[5] Now let us examine some of the interesting features of these creatures that leave the evolutionists in complete darkness.

The Inspiration for the Helicopter: The Dragonfly

The wings of the dragonfly cannot be folded back on its body. In addition, the way in which the muscles for flight are used in the motion of the wings differs from the rest of insects. Because of these properties, evolutionists claim that dragonflies are "primitive insects".

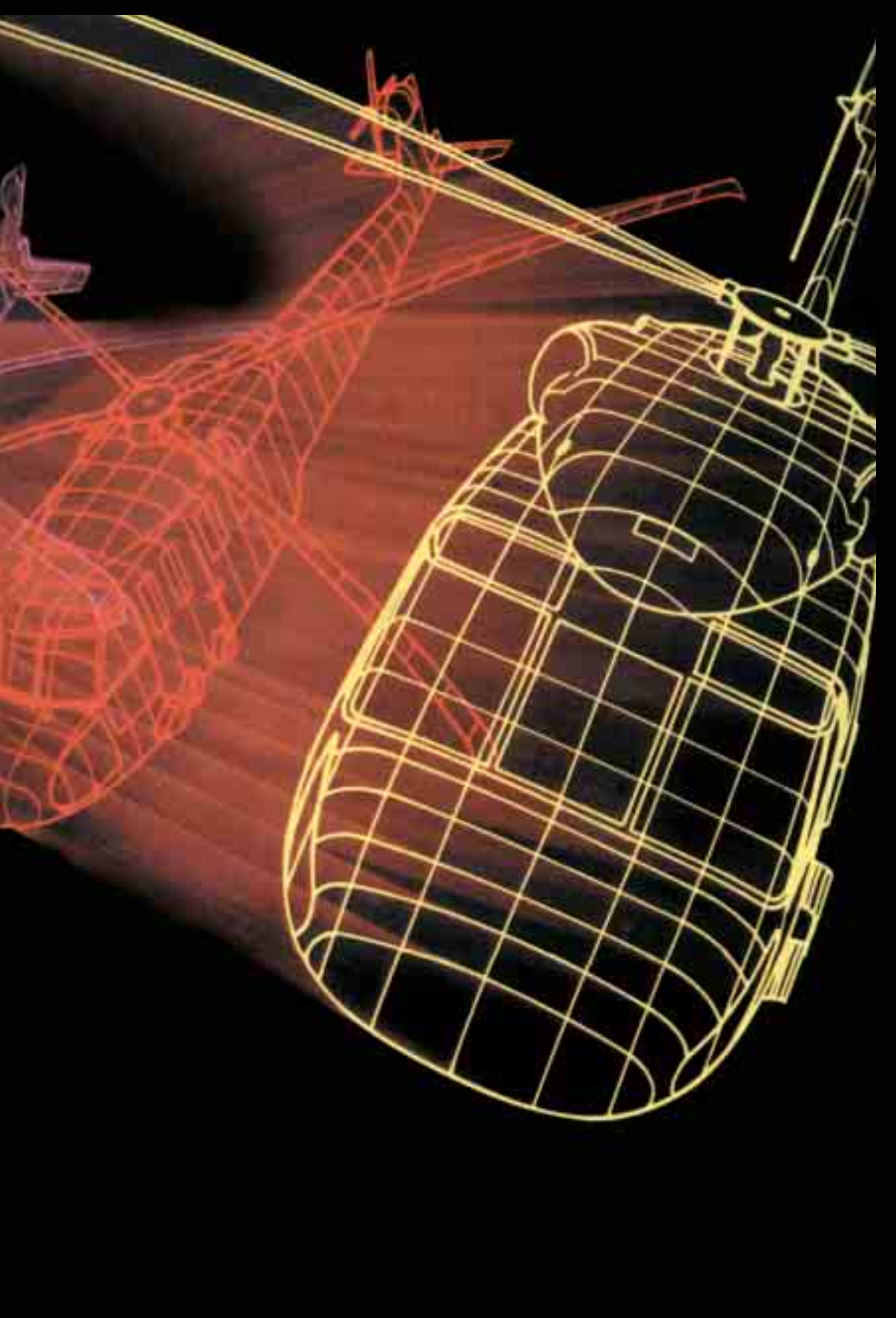
Nature photographer Gilles Martin observing dragonflies.

In contrast, the flight system of these so-called "primitive insects" is nothing less than a wonder of design. The world's leading helicopter manufacturer, Sikorsky, finished the design of one of their helicopters by taking the dragonfly as a model.[6] IBM, which assisted Sikorsky in this project, started by putting a model of a dragonfly in a computer (IBM 3081). Two thousand special renderings were done on computer in the light of the manoeuvres of the dragonfly in air. Therefore, Sikorsky's model for transporting personnel and artillery was built upon examples derived from dragonflies.

Gilles Martin, a nature photographer, has done a two year study examining dragonflies, and he also concluded that these creatures have an extremely complex flight mechanism.

The body of a dragonfly looks like a helical structure wrapped with metal. Two wings are cross-placed on a body that displays a colour gradation from ice blue to maroon. Because of this structure, the dragonfly

Sikorsky helicopters were designed in imitation of the flawless design and manoeuvr ability of a dragonfly.



is equipped with superb manoeuvrability. No matter at what speed or direction it is already moving, it can immediately stop and start flying in the opposite direction. Alternatively, it can remain suspended in air for the purpose of hunting. At that position, it can move quite swiftly towards its prey. It can accelerate up to a speed that is quite surprising for an insect: 25mph (40km/h), which would be identical to an athlete running 100 metres in the Olympics at 24.4mph (39km/h).

At this speed, it collides with its prey. The shock of the impact is quite strong. However, the armoury of the dragonfly is both very resistant and very flexible. The flexible structure of its body absorbs the impact of collision. However, the same cannot be said for its prey. The dragonfly's prey would pass out or even be killed by the impact.

Following the collision, the rear legs of dragonfly take on the role of its most lethal weapons. The legs stretch forward and capture the shocked prey, which is then swiftly dismembered and consumed by powerful jaws.

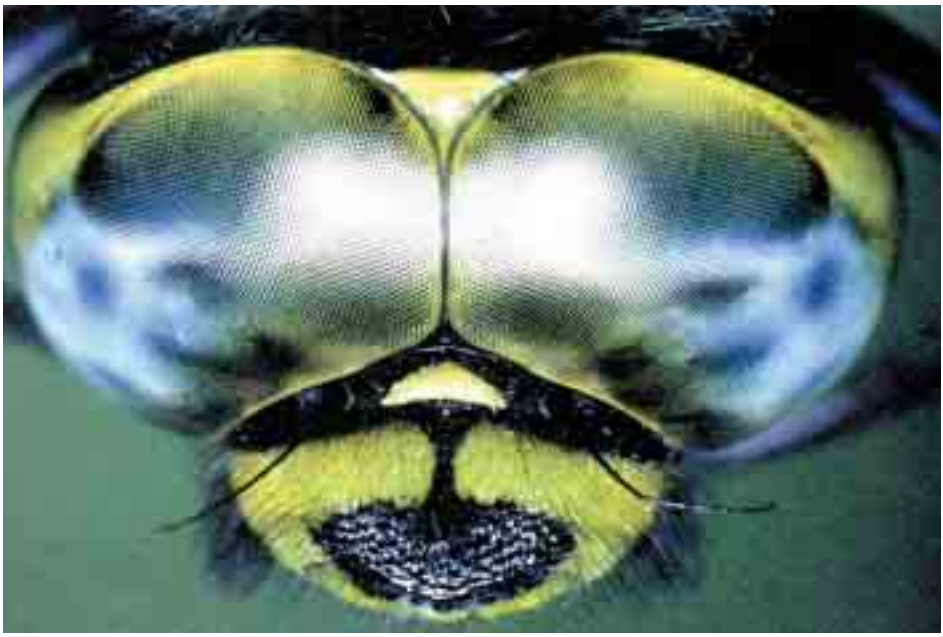
The sight of the dragonfly is as impressive as is its ability to perform sudden manoeuvres at high speed. The eye of the dragonfly is accepted as the best example among all the insects. It has a pair of eyes, each of which features approximately thirty thousand different lenses. Two semi-spherical eyes, each nearly half the size of the head, provide the insect a very wide visual field. Because of these eyes, the dragonfly can almost keep an eye on its back.

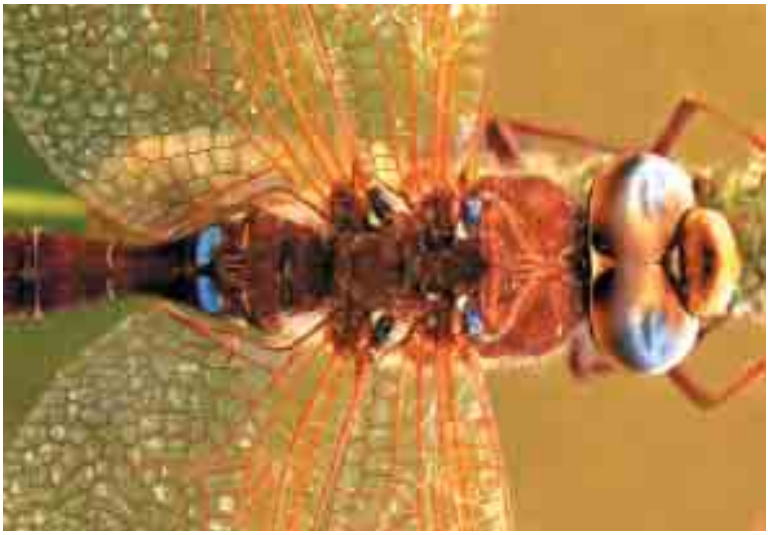
Therefore, the dragonfly is an assemblage of systems, each of which has a unique and perfect structure. Any malfunction in any one of these systems would derail the other systems as well. However, all of these systems are created without flaw and, hence, the creature lives on.

The Wings of the Dragonfly

The most significant feature of the dragonfly is its wings. However, it is not possible through a model of progressive evolution to explain the flight mechanism that enables the use of the wings. First, the theory of evolution is at a loss on the subject of the origin of wings because they could only function if they developed altogether at once, in order to operate correctly.

Let us assume, for a moment, that the genes of an insect on land underwent a mutation and some parts of the skin tissue on the body showed





The eye of a dragonfly is considered the world's most complicated insect eye structure. Each eye contains about thirty thousand lenses. These eyes occupy about half the area of the head and provide the insect with a very wide visual field because of which it can almost keep an eye on its back. The wings of a dragonfly are of such a complex design that they make any conception of coincidence's involvement in their origin nonsense. The aerodynamic membrane of the wings and each pore on the membrane is a direct result of plan and calculation.

an uncertain change. It would be quite beyond reason to suggest that another mutation on top of this change could "coincidentally" add up to a wing. Furthermore, neither would the mutations to the body provide a whole wing to the insect nor would it do any good but decrease its mobility.

The figure above shows the wing movement of a dragonfly during flight. The front wings are marked with red dots. A close examination reveals that the front and back pairs of wings are flapped to a different rhythm, which gives the insect a superb flight technique. The motion of the wings is made possible by special muscles operating in harmony.

The insect, then, needs to carry extra load, which does not serve any real purpose. This would put the insect at a disadvantage against rivals. Moreover, according to the fundamental principle of the theory of evolution, natural selection would have made this handicapped insect and its descendants extinct.

Mutations, moreover, occur very seldom. They always harm the creatures, leading to deadly sicknesses in most cases. This is why it is impossible for small mutations to cause some formations on the body of a dragonfly to evolve into a flight mechanism. After all this, let us ask ourselves: even if we assume, against all odds, that the scenario suggested by evolutionists might have been real, why is it that the "primitive dragonfly" fossils which would give substance to this scenario do not exist?

There is no difference between the oldest dragonfly fossils and the

Supposedly 250 million-year-old fossil dragonfly and a modern dragonfly

dragonflies of today. There is no remains of "a half-dragonfly" or a "dragonfly with newly emerging wings" that predates these oldest fossils.

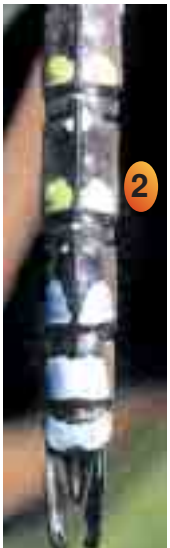
Just as the rest of the life forms, the dragonfly, too, appeared all at once and has not changed to this day. In other words, it was created by God and never "evolved".

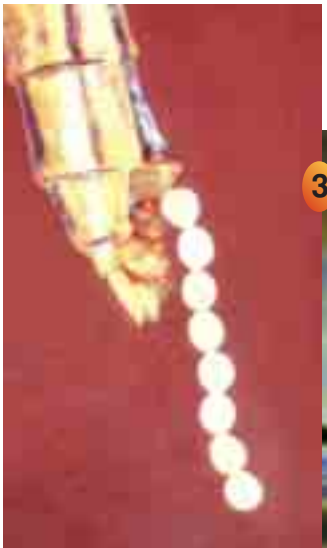
The skeletons of insects are formed by a tough, protective substance, called chitin. This substance was created with enough strength to form the exoskeleton. It is also flexible enough to be moved by the muscles used for flight. The wings can move back and forth or up and down. This motion of wings is facilitated by a complex joint structure. The dragonfly has two pairs of wings, one in a forward position with respect to the other. The wings operate asynchronously. That is, while the two frontal wings ascend, the back pair of wings descend. Two opposing muscle groups move the wings. The muscles are tied to levers inside the body. While one group of muscles pull up a pair of wings by contracting, the other muscle group opens the other pair by reflexing. Helicopters ascend and descend by a similar technique. This allows a dragonfly to hover, go backward, or quickly change direction.

The chitin substance surrounding the body of insects is strong enough to act as a skeleton, which in this insect, is formed into a very eye-catching colour.

Metamorphosis of the Dragonfly

Female dragonflies do not mate again after fertilisation. However, this does not create any problem for the males of the Calopteryx Virgo species. By using the hooks on its tail, the male captures the female by the neck (1). The female wraps her legs around the tail of the male. The male, by using special extensions on its tail (2), cleans any possible sperm left from another male. Then, he injects his sperm into the female's reproductive cavity. Since this process takes hours, they sometimes fly in this clenched position. The dragonfly leaves the mature eggs in the shallows of a lake or a pool (3). Once the nymph hatches from the egg, it lives in water for three to four years (4). During this time, it also feeds in water (5). For this reason, it was created with a body capable of swimming fast enough to catch a fish and jaws powerful enough to dismember a prey. As the nymph grows, the skin wrapping its body tightens. It sheds this skin at four different times. When it is time for the final change, it leaves the water and starts climbing a tall plant or a rock (6). It climbs until its legs give in. Then, it secures itself by help of clamps at the tips of its feet. One slip and a fall means death at that point.





This last phase differs from the previous four in that God moulds the nymph into a flying creature through a wonderful transformation.

The back of the nymph cracks first (7). The crack widens and becomes an open slot through which a new creature, totally different from the preceding, struggles to get out. This extremely fragile body is secured with ties that stretch from the previous creature (8). These ties are created to have ideal transparency and flexibility. Otherwise they would break and not be able to carry it, which could mean that the larva could fall into the water and perish.

In addition, there are a series of special mechanisms that help the dragonfly to shed its skin. The body of the dragonfly shrinks and becomes wrinkled in the old body. In order to "open" this body, a special pump system and a special body fluid are created to be used in this process. These wrinkled body parts of the insect are inflated by pumping body fluid after getting out through the slot (9). In the meantime, chemical solvents start to break the ties of the new legs with the old ones

without damage. This process takes place perfectly even though it would be devastating if only one of the legs were stuck. The legs are left to dry and harden for about twenty minutes before any testing.

The wings are fully developed already but are in a folded position. The body fluid is pumped by firm contractions of the body into the wing tissues (10). The wings are left drying after stretching (11).

After it leaves the old body and dries out completely, the dragonfly tests all the legs and wings. The legs are folded and stretched one by one and wings are raised and lowered.

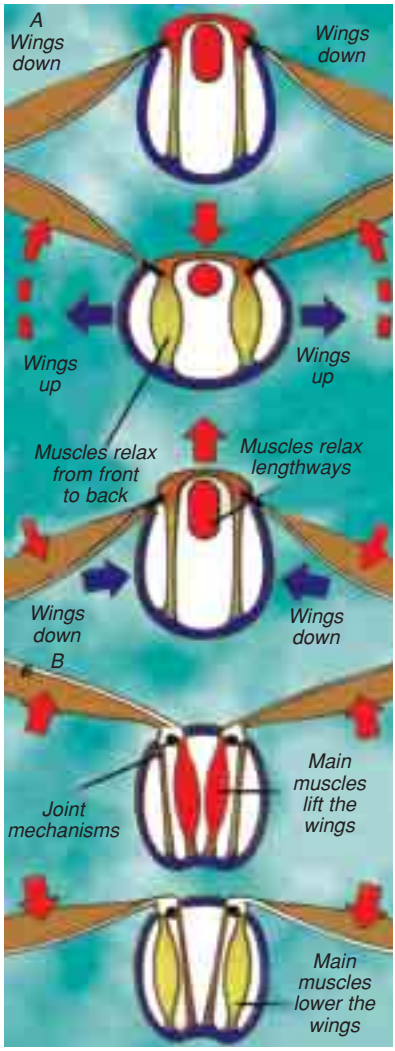
Finally, the insect attains the form designed for flight. It is very hard for anyone to believe that this perfectly flying creature is the same as the caterpillar-like creature that left the water (12). The dragonfly pumps the excess fluids out, to balance the system. The metamorphosis is complete and the insect is ready to fly.

One faces the impossibility of the claims of evolution again when one tries by reasoning to find the origin of this miraculous transformation. The theory of evolution claims that all creatures came about through random changes. However, the metamorphosis of the dragonfly is an extremely intricate process that leaves no room for even a small error in any phase. The slightest obstacle in any one of these phases would cause metamorphosis to be incomplete resulting in the injury or death of dragonfly. Metamorphosis is truly an "irreducibly complex" cycle and therefore is an explicit proof of design.

In short, the metamorphosis of dragonfly is one of the countless evidences of how flawlessly God creates living things. The wonderful art of God manifests itself even in an insect.

Mechanics of Flight

The wings of flies are vibrated according to the electric signals conducted by the nerves. For example, in a grasshopper each one of these nerve signals results in one contraction of the muscle that in turn moves the wing. Two opposing muscle groups, known as "lifters" and "sinkers", enable the wings to move up and down by pulling in opposite directions.



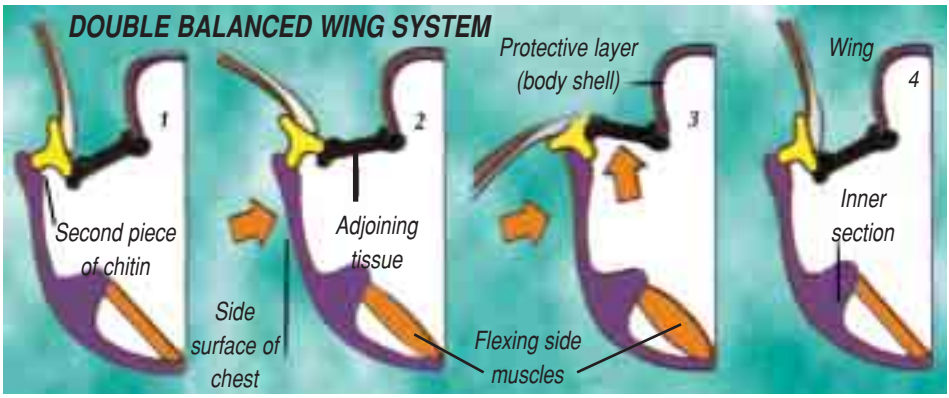
The double balance wing system is found to function in insects with less frequent flapping.

Grasshoppers flap their wings twelve to fifteen times a second but smaller insects need a higher rate in order to fly. For instance, while honeybees, wasps and flies flap their wings 200 to 400 times per second this rate goes up to 1000 in sandflies and some 1mm long parasites.[7] Another explicit evidence of perfect creation is a 1mm long flying creature that can flap its wings at the extraordinary rate of one thousand times a second without burning, tearing or wearing out the insect.

When we examine these flying creatures a little closer, our appreciation for their design multiplies.

It was mentioned that their wings are activated by means of electrical signals conducted through the nerves. However, a nerve cell is only capable of transmitting a maximum of 200 signals per second. Then, how is it possible for the little flying insects to achieve 1000 wing flaps per second?

The flies that flap wings 200 times per second have a nerve-muscle relationship that is different from that of grasshoppers. There is one signal conducted for each ten wing flaps. In addition, the muscles known as fibrous muscles work in a way



Some flies flap their wings up to a thousand times per second. In order to facilitate this extraordinary movement, a very special system was created. Rather than directly moving the wings, the muscles activate a special tissue to which the wings are attached by a pivot-like joint. This special tissue enables the wings to flap numerous times with a single stroke.

different from the grasshopper's muscles. The nerve signals only alert the muscles in preparation for the flight and, when they reach a certain level of tension, they relax by themselves.

There is a system in flies, honeybees, and wasps that transforms wing flaps into "automatic" movements. The muscles that enable flight in these insects are not directly tied to the bones of the body. The wings are attached to the chest with a joint that functions like a pivot. The muscles that move the wings are connected at the bottom and top surfaces of the chest. When these muscles contract, the chest moves in the opposite direction, which, in turn, creates a downward pull.

Relaxing a group of muscles automatically results in contraction of an opposite group followed by relaxation. In other words, this is an "automatic system". This way, muscle movements continue without interruption until an opposite alert signal is delivered through the nerves that control the system.[8]

A flight mechanism of this sort could be compared to a clock that works on the basis of a wound spring. The parts are so strategically located that a single move easily sets the wings in motion. It is impossible not to see the flawless design in this example. The perfect creation of God is evident.

System Behind the Thrusting Force

It is not enough to flap wings up and down in order to maintain smooth flight. The wings have to change angles during each flap to create a force of thrust as well as an up-lift. The wings have a certain flexibility for rotation depending on the type of insect. The main flight muscles, which also produce the necessary energy for flight, provide this flexibility.

For instance, in ascending higher, these muscles between wing joints contract further to increase the wing angle. Examinations conducted utilising high-speed film techniques revealed that the wings followed an elliptical path while in flight. In other words, the fly does not only move its wings up and down but it moves them in a circular motion as in rowing a boat on water. This motion is made possible by the main muscles.

The greatest problem encountered by insect species with small bodies is inertia reaching significant levels. Air behaves as if stuck to the wings of these little insects and reduces wing efficiency greatly.

Therefore, some insects, the wing size of which does not exceed one mm, have to flap their wings 1000 times per second in order to overcome inertia.

Researchers think that even this speed alone is not enough to lift the insect and that they make use of other systems as well.

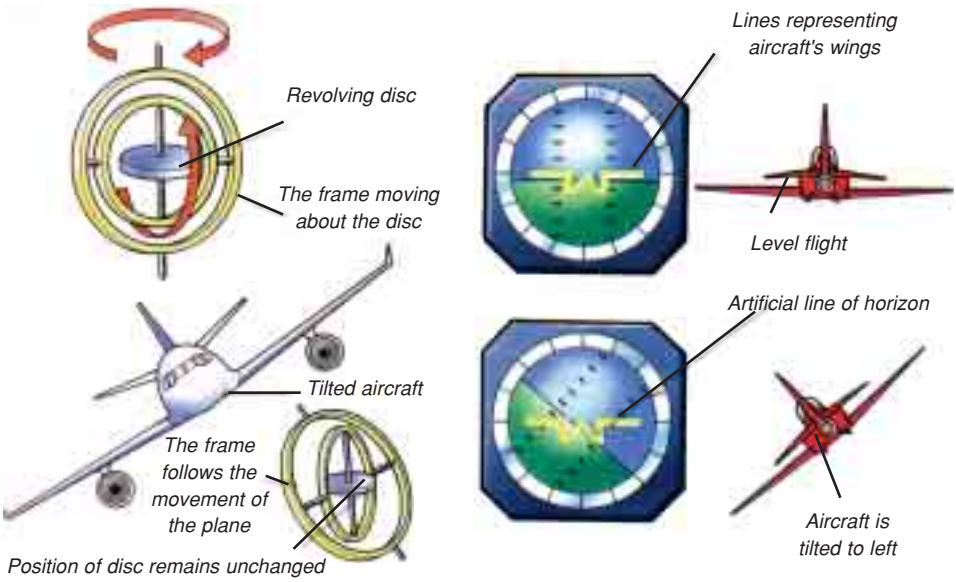
As an example, some types of small parasites, Encarsia, make use of a method called "clap and peel". In this method, the wings are clapped together at the top of the stroke and then peeled off. The front edges of the wings, where a hard vein is located, separate first, allowing airflow into the pressurised area in between. This flow creates a vortex helping the up-lift force of the wings clapping.[9]

Encarsia

There is another special system created for insects to maintain a steady position in the air. Some flies have only a pair of wings and round shaped organs on the back called halteres. The halteres beat like a normal wing

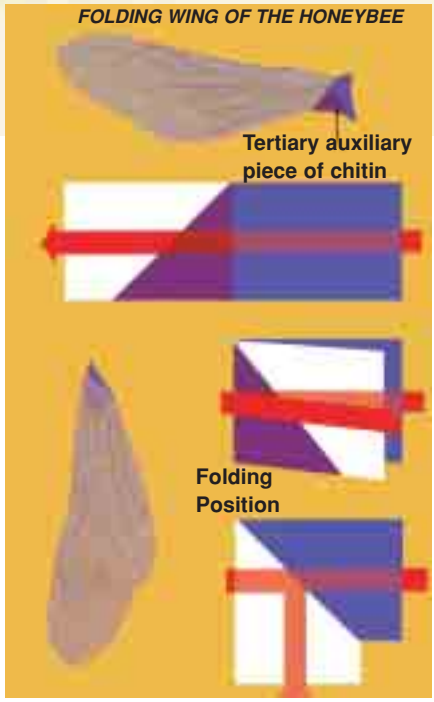
Dust flies require large amounts of energy in order to maintain 1000 flaps per second. This energy is found in the carbohydrate-rich nutrients they gather from flowers. Because of their yellow and black stripes and their resemblance to bees, these flies manage to avoid the attention of many attackers.

during flight but do not produce any lift like wings do. The halteres move as the flight direction changes, and prevent the insect from losing its direction. This system resembles the gyroscope used for navigation in today's aircraft.[10]



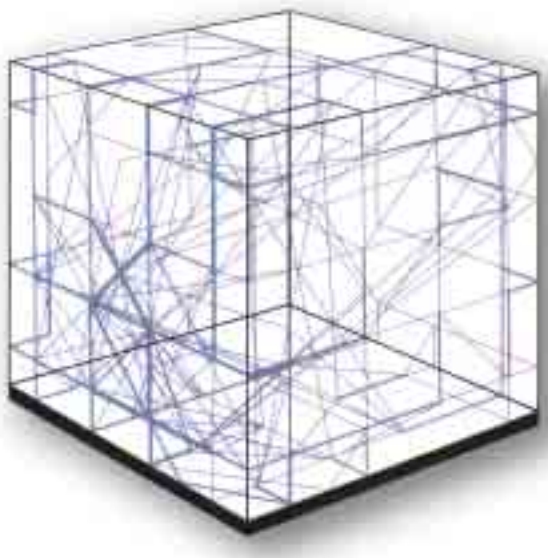
A fly is 100 billion times smaller than an aircraft. Nevertheless, it is equipped with a complex device functioning just like a gyroscope and a horizontal leveller, which are vitally important for flying. Its manoeuvrability and flight techniques, on the other hand, are far superior to those of the plane.

Many insects can fold their wings. When folded, the wings are easily manoeuvred by the help of auxiliary parts on their tips. The U.S. Air Force has produced E6B Intruder aircraft with folding wings after being inspired by this example. While bees and flies are able to fold their entire wings onto themselves, the E6B can only fold one half of its wing over the other.

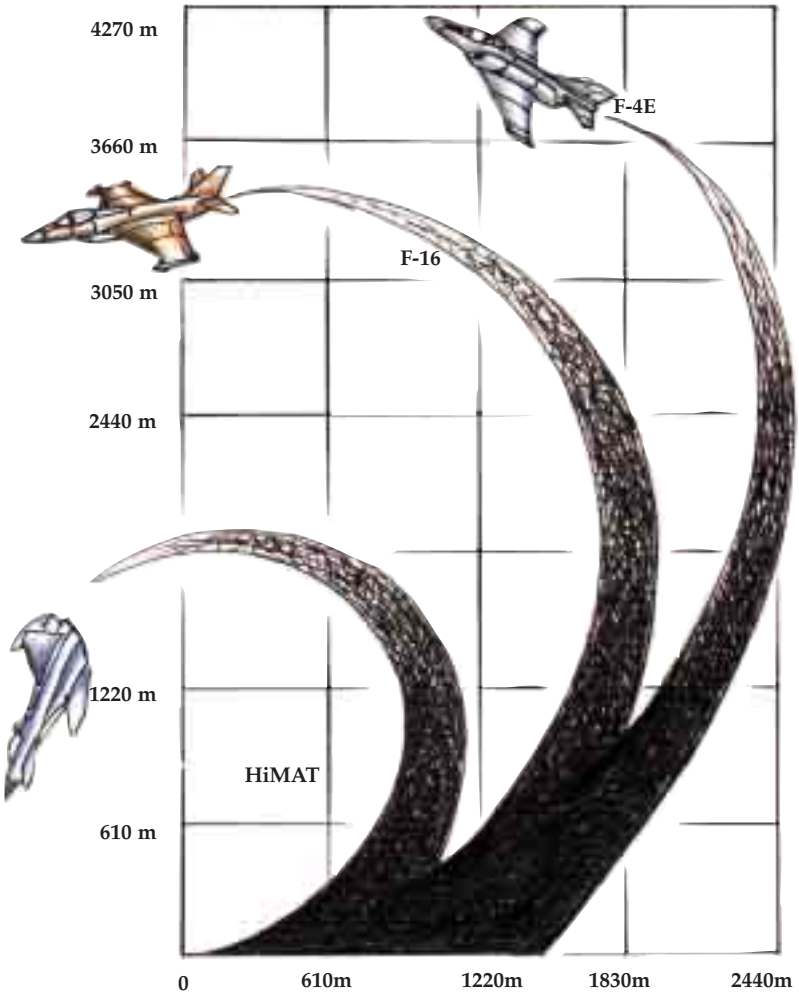


Resilin

The wing joint is comprised of a special protein, called resilin, which has tremendous flexibility. In laboratories, chemical engineers are working to reproduce this chemical, which demonstrates properties far superior to natural or artificial rubber. Resilin is a substance capable of absorbing the force applied to it as well as releasing the entire energy back once that force is lifted. From this point of view, the efficiency of resilin reaches the very high value of 96%. This way, approximately 85% of the energy used to lift the wing is stored and reused while lowering it.[11] The chest walls and muscles are also built to help this phenomenon.



The figure, which indicates the route travelled by a bee placed inside a glass cube, shows how successful the bee is in flying in any direction including upward and downward, in landings and take offs.



The figure on left shows the manoeuvring capability of three aircraft that are considered the best in their categories. However, flies and bees are able to suddenly change course in any direction without reducing speed. This example clearly demonstrates how weak the technology of jet planes is in comparison with bees and flies.

The Respiratory System Special to Insects

Flies fly at extremely high speeds when compared to their size. Dragonflies can travel as fast as 25 mph (40 km/h). Even smaller insects can reach up to 31 mph (50km/h). These speeds are equivalent to humans travelling at the speed of thousands of miles per hour. Humans can only reach these speeds using jet planes. However, when one considers the size of jet planes in comparison to the size of humans it becomes clear that these flies actually fly faster than aeroplanes.

Jets use very special fuels to power their high-speed engines. The flight of flies, too, requires high levels of energy. There is also a need for large volumes of oxygen in order to burn this energy. The need for great amounts of oxygen is satisfied by an extraordinary respiratory system lodged within the bodies of flies and other insects.

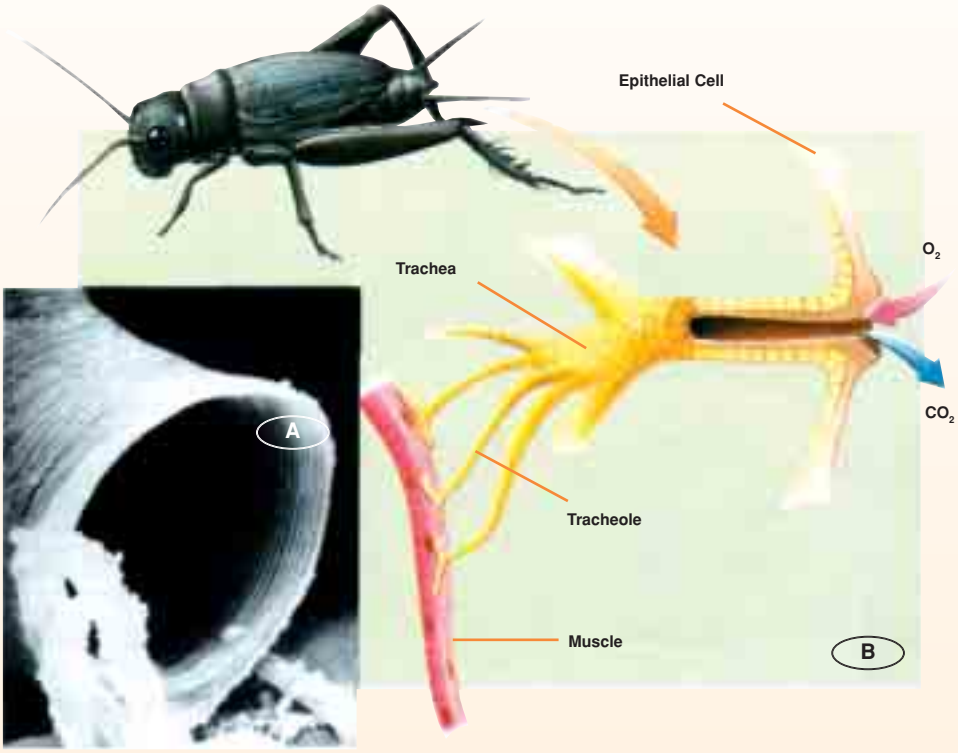
This respiratory system works quite differently from ours. We take air into our lungs. Here, oxygen mixes with the blood and then is carried on to all parts of the body by the blood. The fly's need of oxygen is so high that there is no time to wait for the oxygen to be delivered to the body cells by the blood. To deal with this problem, there is a very special system. The air tubes in the insect's body carry the air to different parts of the fly's body. Just like the circulatory system in the body, there is an intricate and complex network of tubes (called the tracheal system) that delivers oxygen-containing air to every cell of the body.

Thanks to this system, the cells that make up the flight muscles take oxygen directly from these tubes. This system also helps to cool down the muscles which function at such high rates as 1000 cycles per second.

It is evident that this system is an example of creation. No coincidental process can explain an intricate design. It is also impossible for this system to have developed in phases as suggested by evolution. Unless the tracheal system is fully functional, no intermediate stage could be to the advantage of the creature, but on the contrary, would harm it by rendering its respiratory system non-functional.

All of the systems that we have explored so far uniformly demonstrate that there is an extraordinary design to even the least significant of creatures such as flies. Any single fly is a miracle that testifies to the flawless design in

the creation of God. On the other hand, the "evolutionary process" espoused by Darwinism is far from explaining how a single system in a fly develops.



There is an extraordinary system created in the bodies of flies and other insects in order to meet the need for a high oxygen supply: Air, just as in blood circulation, is carried directly into tissues by means of special tubes.
Above is an example of this system in grasshoppers:
A) The windpipe of a grasshopper pictured by an electron microscope. Around the walls of the pipe, there is spiral reinforcement similar to that of the vacuum cleaner hose.
B) Each windpipe tube delivers oxygen to the cells of the insect's body and removes carbon dioxide.

"... THEY ARE NOT EVEN ABLE TO CREATE A SINGLE FLY..."

Even a single fly is superior to all the technological devices that mankind has produced. Furthermore, it is a "living being". Aircraft and helicopters are of use for an appointed time after which they are left to rust. The fly, on the other hand, produces similar offspring.

The housefly uses the labellum in its mouthpart to "quality test" food before feeding. Unlike many creatures, flies digest their food externally. It applies a solvent fluid to the food. This fluid dissolves the food into a liquid that the fly can suck. Then, the fly takes the liquid nutrients into itself by means of the labella which gently dabs liquids into its proboscis.

A fly can easily walk on the most slippery surfaces or stand still on a ceiling for hours. Its feet are better equipped to hold on to glass, walls and ceilings than those of a climber. If the retractable claws are not enough, suction pads on its feet attach it to the surface. The holding strength of the suction has been increased with a specially applied fluid.

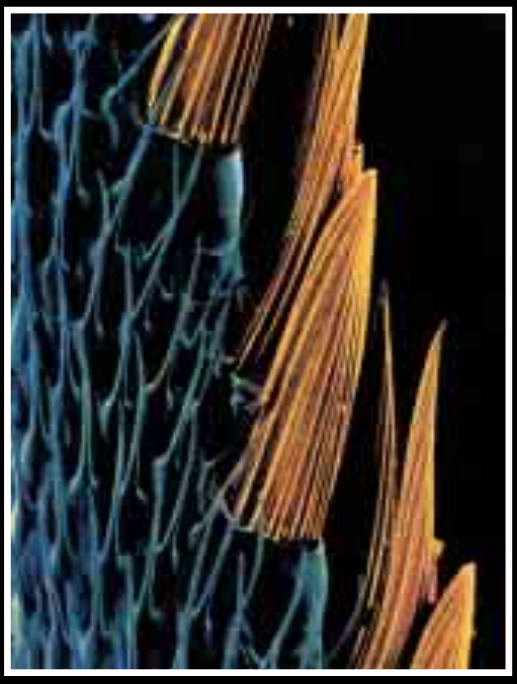
The flight of a housefly is an extremely complex phenomenon. First, the fly meticulously inspects the organs to be used in navigation. Then, it takes position ready for flight by adjusting the balancing organs in front. Lastly, it calculates the angle of take-off, dependent on wind direction and velocity, by means of the sensors on its antennae. Then it takes flight. But, all of these happen within one hundredth of a second. Once airborne, it can accelerate rapidly and reach a speed of 6 mph (10 km/h).

For this reason, we could well use the nickname "master of acrobatic flight" for it. It can fly in extraordinary zigzags through the air. It can take off vertically from where it stands. No matter how slippery or uninviting the surface, it can land successfully anywhere.

Another feature of this magical master of flight is its ability to land on ceilings. Because of gravity it shouldn't hold on but fall down. However, it has been created with certain systems to render the impossible possible. At the tip of its legs, there are minute suction pads. In addition, these pads exude a sticky fluid when in touch with a surface. This sticky fluid enables it to remain attached to a ceiling. While approaching ceiling, it stretches its legs forward and as soon as it senses the touch of a ceiling it flips around and takes hold of the ceiling's surface. The housefly has two wings. These wings, that are halfway merged in the body and are comprised of a very thin membrane intersected by veins, can be operated independently from one another. However, while in flight they move back and forth on one axis just as in single-winged planes. The muscles enabling movement of the wings contract at take-off and relax on landing. Although controlled by nerves at the beginning of

The housefly's eye is composed of 6000 hexagonally arranged eye structures, called ommatidia. Since each ommatidium is directed in different directions, e.g. forwards, backwards, beneath, above and on all sides, the fly can see everywhere. In other words, it can sense everything within a 360-degree visual field. Eight photo receptors (light-receiving) neurons are attached to each one of these units therefore the total number of sensor cells in an eye is about 48,000. This is how it can process up to one hundred images per second.

The design of its wings gives a fly its superior flying skills. The edges, surfaces and veins of these wings are covered with highly sensitive sensory hairs which enable the fly to detect airflow and mechanical pressures.



flight, these muscles and wing movements become automatic after a while.

Sensors under the wings and on the back of its head send information about the flight immediately to its brain. If the fly encounters a new airflow during flight, these sensors promptly send the necessary signals to the brain. The muscles, then, start to direct the wings according to the new situation. That is how a fly can detect another insect creating extra airflow and can escape to safety most of the time. The housefly moves its wings hundreds of times a second. The energy spent during flight is roughly a hundred times that spent during rest. From this point of view, we can say that it is a very powerful creature because human metabolism can only spend ten times as much energy in emergency situations in comparison to during the normal tempo of life. In addition, a human can maintain this energy expenditure for a maximum of only a few minutes. In contrast, the housefly can sustain that rhythm for up to half an hour and it can travel up to a mile at the same speed.[12]

CHAPTER 2

Flawless Flying Machines: Birds

Because they believe that the birds must have somehow evolved, evolutionists assert that birds are descendants of reptiles. However, the progressive model of evolution cannot explain any of the body mechanisms of birds, which have a completely different structure from land-dwelling animals. First, the primary feature of birds, i.e. wings, is a great obstacle for the theory of evolution to explain. One evolutionist makes the following confession in reference to the impossibility of the evolution of wings:

> The common trait of eyes and the wings is that they can only function if they are fully developed. In other words, a halfway-developed eye cannot see and a bird with half-formed wings cannot fly. How these organs came into being is one of those mysteries of nature that has still to be accounted for.[13]

The question of how the flawless structure of wings might have been formed through a series of consecutive random mutations remains completely unanswered. The process in which the front leg of a reptile could transform into a flawless wing seems to be as inexplicable as ever.

Furthermore, the existence of wings is not the only prerequisite for a land creature to become a bird. Land-dwelling animals totally lack a number of mechanisms that are used by birds in flying. For example, the bones of

birds are considerably lighter than those of land-dwelling animals. Their lungs are of a different structure and function as well as are their skeletal and muscular structures. Their circulatory systems are much more specialised than those of land animals. All of these mechanisms could not possibly come into existence over time through an "accumulative process". Assertions of the transformation of land-dwelling animals into birds are, therefore, only nonsensical claims.

Structure of Bird Feathers

The theory of evolution, which claims that birds are descendants of reptiles, is not able to explain the colossal differences between these two classes of beings. Birds display properties distinct from reptiles in having a skeletal structure composed of hollow, extremely lightweight bones, and a unique respiratory system and in being warm-blooded creatures. Another structure unique to birds, which places an unbridgeable gap between birds and reptiles, is the feather.

Feathers are the most important of the interesting aesthetical aspects of birds. The phrase "light as a feather" depicts the perfection in the intricate

structure of a feather.

Feathers are constructed of a protein substance called keratin. Keratin is a hard and durable material that is formed by the old cells that migrate away from the nutrient and oxygen sources in the deeper layers of the skin and die in order to give way to new cells.

The design in bird feathers is so complex that the process of evolution simply cannot explain it. Scientist Alan Feduccia says feathers "have an almost magical structural complexity" which "allows a mechanical aerodynamic refinement never achieved by other means".[14] Although he is an evolutionist, Feduccia also admits that "feathers are a near-perfect adaptation for flight" because they are lightweight, strong, aedodynamically shaped, and have an intricate structure of barbs and hooks.[15]

The design of feathers also compelled Charles Darwin ponder them. Moreover, the perfect aesthetics of the peacock's feathers had made him "sick" (his own words). In a letter he wrote to Asa Gray on April 3, 1860, he said "I remember well the time when the thought of the eye made me cold all over, but I have got over this stage of complaint..." And then continued:

> ... and now trifling particulars of structure often make me very uncomfortable. The sight of a feather in a peacock's tail, whenever I gaze at it, makes me sick![16]

Small Barbs and Hooklets

One encounters an incredible design if the feather of a bird is examined under the microscope. As we all know, there is a shaft that runs up the centre of the feather. Hundreds of small barbs grow on either side of this shaft. Barbs of varying softness and size give the bird its aerodynamic nature. Furthermore, each barb has thousands of even smaller strands attached to them called barbules, which cannot be observed with the naked eye. These barbules are locked together with hooklike hamuli. The barbules hold on to one

Feathers spring from a hollow cylindrical structure of the skin.

A chick that is 2-3 hours old primarily has feathers for warmth.

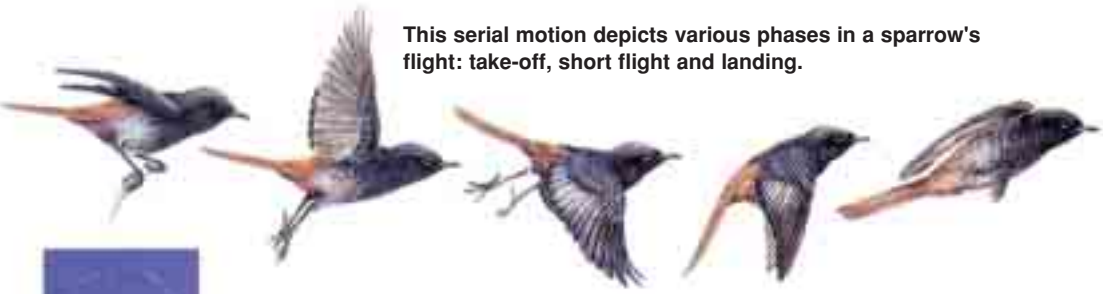
another like a zip with the help of these hooklets. For example, just one crane feather has about 650 barbs on each side of the shaft. About 600 barbules branch off each of the barbs. Each one of these barbules are locked together with 390 hooklets. The hooks latch together as do the teeth on both sides of a zip. These barbules interlock so tightly that even smoke blown at the feather cannot penetrate through it. If the hooklets come apart for any reason, the bird can easily restore the feathers to their original form by either shaking itself or by straightening its feathers out with its beak.

In order to survive, birds have to keep their feathers clean, well-groomed and always ready for flight. They use an oil-gland located at the base of their tails for the maintenance of their feathers. They clean and polish their feathers by means of this oil, which also provides water proofing when they are swimming, diving or walking and flying in rain.

In addition, in cold weather the feathers prevent the body temperature of birds from falling. The feathers are pressed closer to the body in hot weather in order to keep it cool.[17]

Types of Feather

Feathers take on different functions depending on where on the body they are located. The feathers on a bird's body have different properties from those on the wings or tail. The full-feathered tail functions to steer and brake. On the other hand, wing feathers have a distinct structure that enables the surface area to expand during beating in order to increase forces of up-lift. When the wing is flapped downward, the feathers come closer together, preventing the through passage of air. When the wing is in an upward movement the feathers open up, to give way to the passage of air.[18] Birds shed their feathers during certain periods in order to maintain their abilities to fly. Worn or damaged large feathers are renewed immediately.



This serial motion depicts various phases in a sparrow's flight: take-off, short flight and landing.

THE ARTISTRY OF THE WINGS

There are primarily three forms of flight (from top to bottom): Serial flight, V-formation and group flight.

The majority of birds can fly, but not all move the same way. Some birds have such advanced flying skills that they can fly very close to the earth. The shape of the wings depends on the species.

The feather of a long-tailed and radiant American Parrot.

The feather of a falcon.

Feathers function to serve a variety of duties. Wing structure is designed specifically for flight. The tail, on the other hand, is designed for steering and for braking when the bird lands.

The wing of an albatross.

The albatross, with the help of its long narrow wings, flies across oceans. A falcon can easily make use of hot air currents. Flying birds can stay aloft in air due to the wavy structures of their wings.

Old feathers of birds are replaced with new ones with different frequencies in different species. The renewal of feathers is called moulting, which happens before migration.

Feathers on the head, body and wings protect the birds from moisture and cold. They also help in the bird's soaring in the air. Feathers on the side cover the delicate skin that helps regulate body temperature.

The wing feather of a jay.

The feather of a lovebird.

The feather of a seagull

Due to the curvature of the wing, air pressure on the upper surface is weaker than on the under surface, which in turn lifts the bird into the air (bottom left). If the wing is curved, further airflow at the top increases the pressure creating a downward force. This way the bird stalls (right bottom).

The wing of a falcon.

The wing of a goatsucker.

Yellow lines indicate the curvature of the wing.

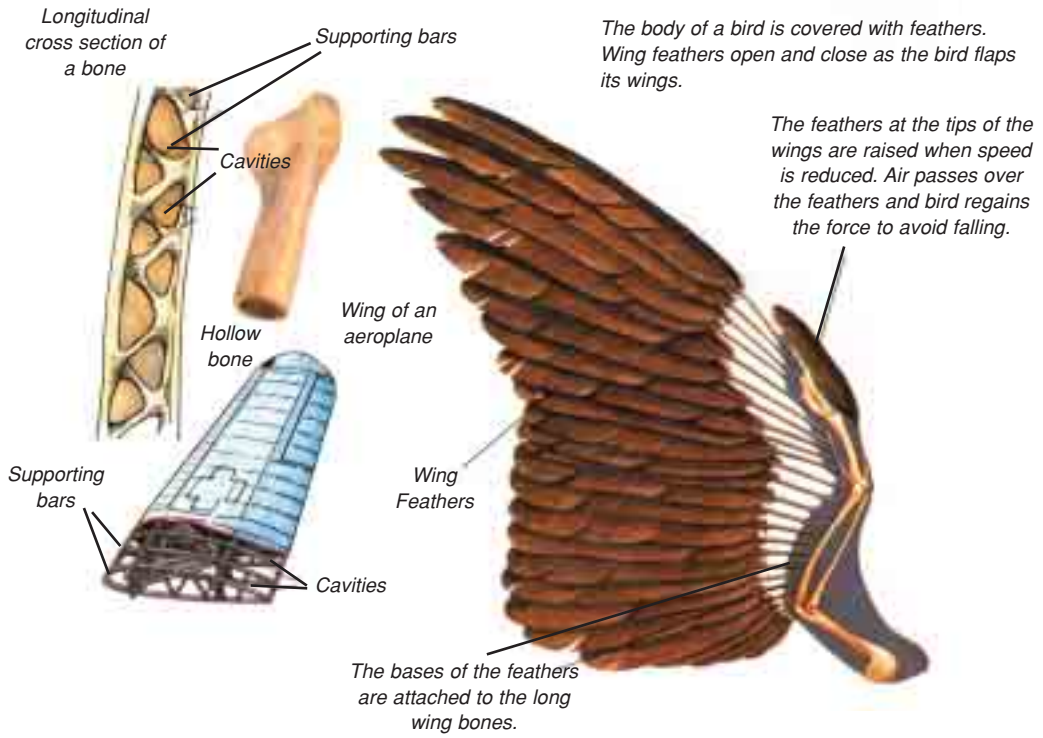
FEATURES OF THE FLYING MACHINES

A close examination of birds reveals that they are designed specifically for flying. The body has been created with air-sacs and hollow bones in order to reduce body mass and overall weight. The fluid nature of their wastes ensures that excess water in the body is disposed of. Feathers are extremely light structures in comparison to their volume.

Let us examine these special structures of birds one by one:

1- The skeleton

The strength of a bird's skeleton is more than adequate even though the bones are hollow. For example, a hawfinch 7 inches long (18 cm) exerts about 151 lbs. (68.5 kg) pressure in order to crack open an olive seed. Better "organised" than land animals, the shoulder, hip and chest bones of birds are

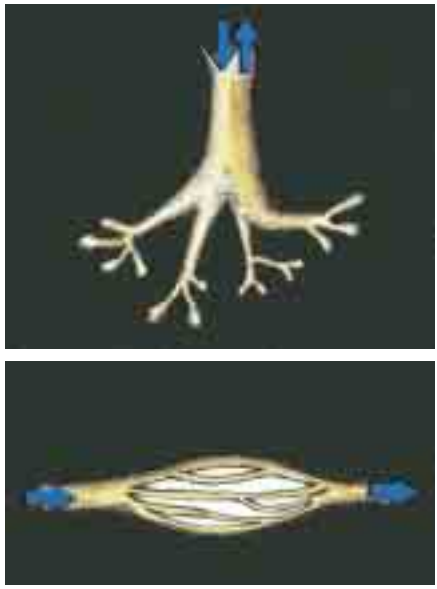


Bird bones are extremely light but sturdy, largely because they are hollow. There is air inside the cavities where supporting bars stiffen the bones. These hollow bones are the main inspirations for the design of modern aeroplane wings.

fused together. This design improves the strength of the bird's structure. Another feature of the skeleton of birds, as mentioned previously, is that it is lighter than in all other land-dwelling animals. For instance, the skeleton of the dove weighs only about 4.4% of its total body weight. The bones of the frigate bird weigh 118 gr, which is less than the total weight of its feathers.

2- Respiratory System

The respiratory system of land animals and birds operate on completely different principles, primarily because birds need oxygen in much greater quantities than do land animals. For example, a certain bird could require up to twenty times the amount of oxygen necessary for humans. Therefore, the lungs of land animals cannot provide oxygen in the quantities required by birds. This is why the lungs of birds are created upon a much different design.

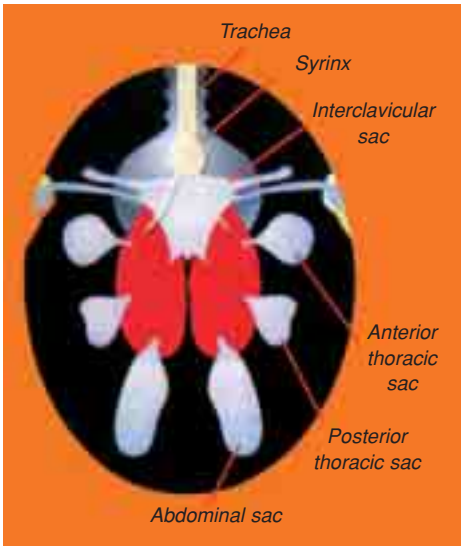


THE SPECIAL LUNGS OF BIRDS
Birds have a very different anatomy from their alleged ancestors, the reptiles. Bird lungs operate in a completely different fashion from those of land animals. Land animals inhale and exhale air through the same windpipe. In birds, however, the air enters and exits through opposite ends. A special "design" such as this has been created to provide for the high volumes of air needed during flight. Evolution of such a structure from that of reptiles is not possible.

In land animals, air flow is bidirectional: air travels through a network of channels, and stops at the small air sacs. Oxygen-carbon dioxide exchange takes place here. Used air follows a reverse course in leaving the lung and is discharged through the windpipe.

On contrary, in birds, air flow is unidirectional. New air comes in one end, and the used air goes out the other end. This provides an uninterrupted supply of oxygen for birds, which satisfies their need for high levels of energy. Michael Denton, an Australian biochemist and a well-known critic of Darwinism, explains the avian lung in this way:

> In the case of birds, the major bronchi break down into tiny tubes which



Unidirectional airflow in the bird's lungs is facilitated by a system of air-sacs. These sacs collect air and then pump it regularly into the lung. In this way, there is always fresh air in the lungs. A complex respiratory system such as this has been created to satisfy birds' needs for high quantities of oxygen.

permeate the lung tissue. These so-called parabronchi eventually join up together again, forming a true circulatory system so that air flows in one direction through the lungs.... Although air sacs occur in certain reptilian groups, the structure of the lung in birds and the overall functioning of the respiratory system is quite unique. No lung in any other vertebrate species is known which in any way approaches the avian system. Moreover, it is identical in all essential details in birds…[19]

In his book *A Theory in Crisis*, Michael Denton also points out to the impossibility of formation of such a perfect system through progressive evolution:

> Just how such an utterly different respiratory system could have evolved gradually from the standard vertebrate design is fantastically difficult to envisage, especially bearing in mind that the maintenance of respiratory function is absolutely vital to the life of an organism to the extent that the slightest malfunction leads to death within minutes. Just as the feather cannot function as an organ of flight until the hooks and barbules are coadapted to fit together perfectly, so the avian lung cannot function as an organ of respiration until the parabronchi system which permeates it and the air sac system which guarantees the parabronchi their air supply are both highly developed and able to function together in a perfectly integrated manner.[20]

In short, the transition from terrestrial lung to avian lung is impossible due to the fact that the lung that would be in a transitional developmental stage would have no functionality. No creature without lungs can live for

even a few minutes. Therefore, the creature simply would not have millions of years to wait for random mutations to save its life.

The unique structure of the avian lung demonstrates the presence of a perfect design that supplies the high levels of oxygen required for flight. It only takes a little bit of a common sense to see that the unparalleled anatomy of birds is not an arbitrary result of unconscious mutations. It is clear that the lungs of a bird are another of the countless evidences that all creatures have been created by God.

3-The System of Balance

God has created birds without flaw just as He has the rest of the creation. This fact is manifest in every detail. The bodies of birds have been created to a special design that removes any possible imbalance in flight. The bird's head has been deliberately created light in weight so that the animal does not lean forward during flight: on average, a bird's head weight is about 1% of its body weight.

The aerodynamic structure of the feathers is another property of the system of balance in birds. The feathers, especially in the wing and tail, provide a very effective system of balance for the bird.

These features ensure that a falcon maintains absolute balance while diving for its prey at a speed of 240 mph (384 km/h).

4- The Power and Energy Problem

Every process in the form of a sequence of events, i.e. in biology, chemistry or physics, conforms to the "Principle of the Conservation of Energy". In short, one can summarise this as "it takes a certain amount of energy to get a certain work done".

A significant example of this conservation can be observed in flight of birds. Migrating birds have to store enough energy to take them through their trip. On the other hand, another necessity in flight is being as light as possible. No matter what the results, extra weight has to be done away with. In the meantime, the fuel has also to be as efficient as possible. In other

words, while the weight of fuel has to be at a minimum, the energy output from it has to be at a maximum. All of these problems have been solved for birds.

The first step is to determine the optimum speed for flight. If the bird is to fly very slowly, then a lot of energy has to be spent to remain aloft in the air. If the bird is to fly very fast, then fuel will be spent in overcoming air resistance. It is therefore obvious that an ideal speed has to be maintained in order to spend the least amount of fuel. Depending on the aerodynamic structure of the skeleton and wings, a different speed is ideal for each kind of bird.

Let us examine this energy problem as it relates to the Pacific golden plover (Pluvialis dominica fulva): this bird migrates from Alaska to Hawaii to spend its winters there. There are no islands on its route. Therefore, it has no possibility for rest. The flight is 2500 miles (4000 km) from start to finish and this roughly means 250,000 wing beats without break. The trip takes more than 88 hours.

The bird weighs 7 ounces (200g) at the start of the journey, 2,5 ounces (70g) of which is fat to be used as fuel. However, scientists, after calculating the amount of energy the bird needs for an hour of flight, determined that the bird needed 3 ounces (82g) of fuel for this flight. That is, there is a shortage of 0.4 ounce (12g) of fuel and the bird would have to run out of energy hundreds of miles before reaching Hawaii.

In spite of these calculations, the golden rain birds unfailingly reach Hawaii every year. What could the secret of these creatures be?

The Creator of these birds, God, inspires them with a method to make their flight easy and efficient. The birds do not fly haphazardly but in a flock. They follow a certain order and form a "V" shape in the air. This V formation reduces the air resistance that they encounter. This flight formation is so efficient that they save about 23% of their energy. This is how they still have 0.2 ounces (6-7g) of fat when they land. The extra fat is not a miscalculation but a cushion to be used in case of encountering reverse air currents.[21]

This extraordinary situation brings the following questions to mind:

How could the bird know how much fat is needed?

How could the bird manage to acquire all this fat before flight?

How could it calculate the distance and the amount of fuel it needs to burn?

How could the bird know that conditions in Hawaii are better than Alaska?

It is impossible for birds to reach this knowledge, to make these calculations, or to make group flights according to these calculations. This is an indication that the birds are "inspired" and directed by a superior power.

Birds prefer to travel in flocks on long trips. The "V" formation of the flock enables each individual bird to save about 23% energy.

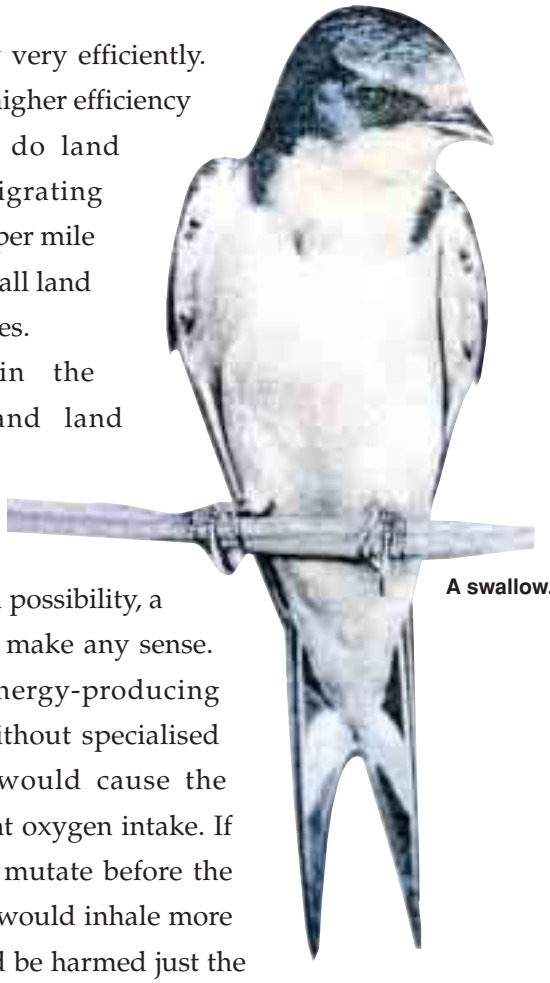
5. Digestion System

Flight requires a great deal of power. For this reason birds have the largest muscle-tissue/body-mass ratio of all creatures. Their metabolism is also in tune with high levels of muscle power. On average, a creature's metabolism doubles as the body temperature increases by 50^0F (10^0C). The sparrow's 108^0F (42^0C) body temperature and a fieldfare's 109.4^0F (43.5^0C)body temperature indicate how quickly their metabolism functions.

The sparrow's heart beats 460 times per minute. Its body temperature is 108^{0}F (42^{0}C). Such a high body temperature, which would mean certain death for a land creature, is vitally important for a bird's survival. The high level of energy birds require for flight is generated by this rapid metabolism.

Such a high body temperature, which would kill a land creature, is vitally important for a bird's survival by increasing energy consumption and, therefore, power.

Due to their need for a lot of energy, birds also have a body that digests the food they eat in an optimum fashion. Birds' digestive systems enable them to make the best use of the food they eat. For example, a baby stork puts on 2.2 lbs (1 kg) body mass for every 6.6 lbs (3 kg) food. In land animals with similar food choices, this ratio is about 2.2 lbs (1 kg) to 22 lbs. (10 kg). The circulatory system of birds has also been created in harmony with their high energy requirements. While a human's heart beats 78 times a minute, this rate is 460 for a sparrow and 615 for a humming bird. Similarly, blood circulation in birds is very fast. The oxygen that supplies all of these fast working systems is provided by special avian lungs.



A swallow.

Birds also use their energy very efficiently. They demonstrate significantly higher efficiency in energy consumption than do land animals. For instance, a migrating swallow burns four kilocalories per mile (2.5 per kilometre) whereas a small land animal would burn 41 kilocalories.

Mutation cannot explain the differences between birds and land animals. Even if we assume one of these features to occur through random mutation, which is not a possibility, a single feature by itself does not make any sense. The formation of a high energy-producing metabolism has no meaning without specialised avian lungs. Moreover, this would cause the animal to choke from insufficient oxygen intake. If the respiratory system were to mutate before the other systems then the creature would inhale more oxygen than it needs, and would be harmed just the same. Another impossibility relates to the skeletal structure: even if the bird somehow obtained the avian lungs and metabolic adaptations it still could not fly. No matter how powerful, no land creature can take off from the ground due to its heavy and relatively segmented skeletal structure. The formation of wings also requires a distinct and flawless "design".

All of these facts take us to one result: it is simply impossible to explain the origin of birds through accidental growth or a theory of evolution. Thousands of different species of birds have been created with all their current physical features in "a moment". In other words, God has created them individually.

PERFECT FLIGHT TECHNIQUES

From albatrosses to vultures, all birds have been created equipped with flying techniques that make use of winds.

Since flying consumes a lot of energy, birds have been created with powerful breast muscles, large hearts and light skeletons. The evidence of superior creation in birds does not end with their bodies. Many birds have been inspired to use methods that decrease the energy required.

The kestrel is a wild bird that is well-known in Europe, Asia and Africa. It has a special ability: it can maintain its head in a perfectly still position in the air by facing the wind. Though its body may sway in the wind, its head remains motionless, which increases the excellence of its vision in spite of all the motion. A gyroscope, which is used to stabilise the weaponry of battleships at sea, works very similarly. This is why scientists usually label the bird's head "a gyro-stabilised head".[22]

Timing Techniques

Birds regulate their hunting schedules for optimum efficiency. Kestrels like to feed on rats. Rats typically live underground and surface every two hours to feed. Kestrels' feeding coincides with the rats'. They hunt during the day but eat their kill at night. Therefore, during the day, they fly on empty stomachs with less weight. This method cuts down the energy required. It has been calculated that the bird saves about 7% energy this way.[23]

Soaring in the Wind

Birds further reduce the energy consumed by utilising winds. They soar by increasing airflow on their wings and they can remain "suspended" in sufficiently powerful air currents. Up-drafts are an added advantage to them.

Making use of air currents in order to save energy in flight is called "soaring". The kestrel is one of the birds with this capability. The ability to soar is a sign of birds' superiority in the air.

Soaring has two major benefits. Firstly, it conserves energy needed to stay in the air while searching for food or defending the feeding ground. Secondly, it enables the bird to significantly increase its flight distances. A seagull can save up to 70% of its energy while soaring.[24]

Energy from Air Currents

Birds use air streams in different ways: A kestrel gliding down a hillside or a seagull diving along coastal cliffs make use of airstreams, and this is called "slope soaring".

When a strong wind passes over a hilltop, it forms waves of motionless air. Birds can soar on these waves as well. The gannet and many other seabirds make use of these motionless waves created by islands. Sometimes they use the currents generated by smaller obstacles such as ships, over which seagulls soar.

Fronts generally create the currents providing uplift for birds.

Fronts are interfaces between air masses of different temperatures or densities. The soaring of birds on these interfaces is referred to as "gust gliding". These fronts, which are especially formed at coasts by air currents coming from the sea, have been discovered by means of radar, through the observation of sea birds in flocks gliding in them. Two other kinds of soaring are known as thermal soaring and dynamic soaring.

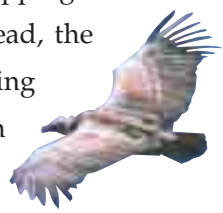
Thermal soaring is a phenomenon observed especially in warm inland areas of the globe. As the sun heats the ground, the ground in turn heats the air above it. As the air gets warmer, it gets lighter and starts to rise. This event can also be observed in dust storms or other wind whirls.

The Soaring Technique of Vultures

Vultures utilise a special method in order to scan the earth below from an appropriate height riding rising columns of warm air, called the thermals. They can continuously make use of different thermals to sustain their soaring over very large areas for very long times.

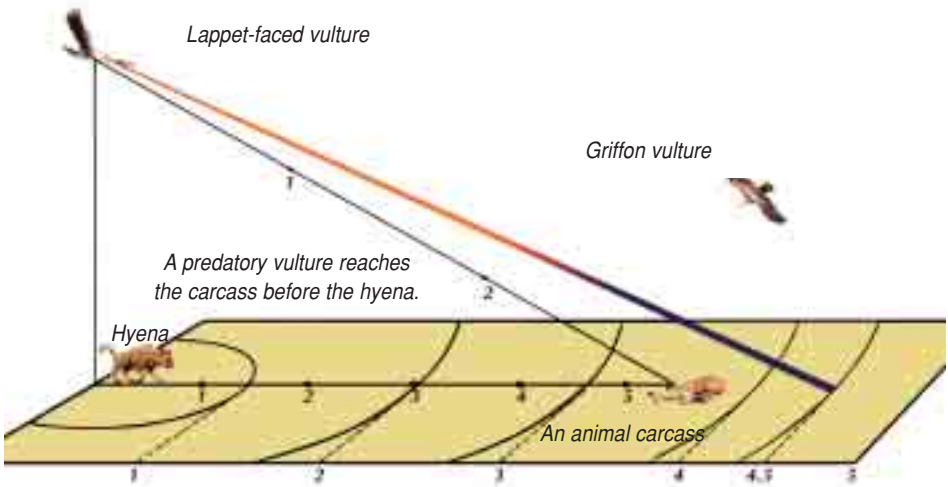
At dawn, airwaves start rising. First, smaller vultures take off, riding weaker currents. As currents become stronger, larger birds take off as well. Vultures almost float upward in these ascending currents. The fastest rising air is located in the middle of the current. They fly in tight circles in order to balance uplift with gravitational forces. When they want to ascend, they draw closer to the centre of the currents.

Other hunting birds use thermals as well. Storks make use of these warm air currents, especially when migrating. The white stork lives in central Europe and migrates to Africa for winters on a journey of about 4350 miles (7000 kilometres). If they were to fly solely by flapping their wings, they would have to rest at least four times. Instead, the white storks complete their flights in three weeks by utilising warm air currents for up to 6-7 hours a day, which translates into big energy savings.



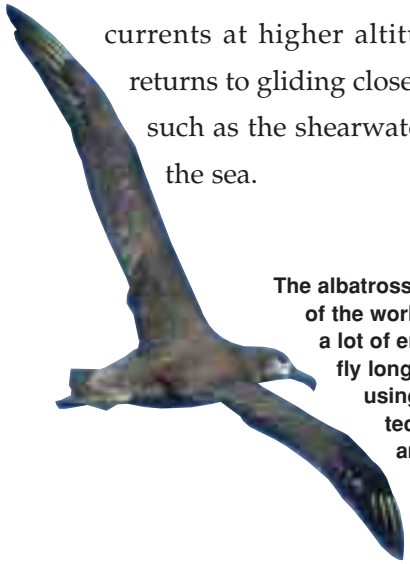
Since the waters warm up much later than the land, warm air currents are not formed over the seas, which is why birds that migrate over long distances do not choose to travel over water. Storks and other wild birds migrating from Europe to Africa choose to travel either over the Balkans and the Bosphorus, or over the Iberian Peninsula over the Gibraltar.

The albatross, gannets, seagulls and other sea birds, on the other hand, use the air currents that are created by high waves. These birds take advantage of the uplift of air directed upwards on the tips of waves. While soaring on the air currents, the albatross frequently turns and heads into the wind and swiftly rises higher. After ascending 30-45 feet (10-15 metres) into the air, it changes direction again and continues soaring. The bird gains energy



Vultures can reach their food before their rivals, the hyenas, due to their flight techniques. In the figure above, the griffon vulture feeding on a carcass catches the attention of a lappet-faced vulture and a hyena. However, even the hyena's highest speed of 25 mph (40 km/h) is not enough to reach the carcass in time. The hyena can reach a carcass 2.2 miles away (3.5 kilometres) in 4.25 minutes whereas the lappet-faced vulture reaches the carcass in three minutes at a speed of 44 mph (70 km/h).

from changes in wind directions. The air currents lose speed when they hit the surface of the sea. This is why the albatross encounters stronger currents at higher altitudes. After attaining adequate speed, it returns to gliding close to the surface of the sea. Many other birds such as the shearwater use similar techniques while soaring on the sea.

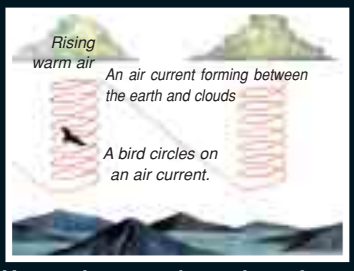


The albatross with a wingspan of 10 feet (3 metres) is one of the world's largest birds. Such a large body requires a lot of energy for flight. However, the albatross can fly long distances without flapping its wings by using the dynamic soaring method. This technique saves this creature tremendous amounts of energy.

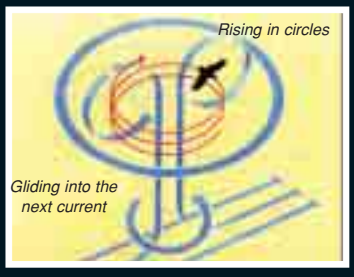
The skimmer lacks oil protecting its feathers from water. Therefore, it does not dive for its prey. Its lower bill is longer and sensitive to touch. Its wings are shaped such that it can fly very close to the surface of the water for a long time without flapping its wings. It dips its lower bill in the water and flies while using this technique. It captures any prey that its lowered bill hits.

Wild geese climb up to 5 miles (8 kilometres). However, at about 3.1 miles (5 kilometres), the atmosphere is 65% less dense than at sea level. A bird flying at this height has to flap its wings much faster, which would require much more oxygen. In sharp contrast to land animals, the lungs of these creatures have been created to make best use of the sparse oxygen supply at these altitudes.

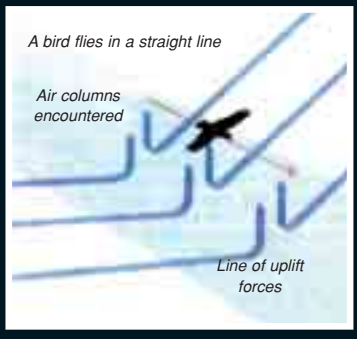
Slope soaring depends on the movement of air rising to the hilltop.



Vortex ring type thermal soaring takes place under the base of a big cumulus cloud.



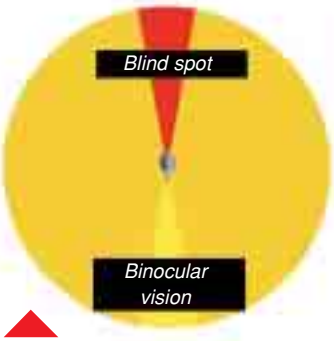
Columnar type thermal soaring is only possible in warm regions.



Gust soaring is possible where two fronts meet.

DESIGN IN BIRDS

The woodpecker can easily reach larva hidden in tree trunks by its tongue. Humming birds can collect flower nectar by using their slim, forked tongues.



Eyes located on both sides of head provide the pigeon with a very wide visual field (orange and yellow areas).

The rain bird moves extremely fast with swift manoeuvres in the air, which requires an even wider visual field than most birds. Large eyes located on both sides of its head provide this field of vision.

The eyes of an owl are located to the front of its head. This design provides the bird with a superb "binocular" vision. Yet it also creates a wide blind field. This blind field is by no means disadvantageous to the bird since it can rotate its head 270 degrees and look behind itself easily.

The most advanced senses of birds are vision and hearing. Birds that usually hunt by day have better visual faculties. The hearing of birds that prey at night is superior to other faculties.

Some birds that hunt by diving, such as herons and cormorants, are equipped with eye structures that enable them to see effectively in water. The cornea of their eyes is flatter, which gives refraction and better vision.

The eyes of most birds are located on both sides of the head. Hence, they have a wide angle of view.

The frontal location of the eyes of wild birds that prey at night is another flawless design because these birds require "binocular" vision more than a wide angle view, and binocular vision (the area in which both eyes can see an object) has a narrow angle of view but more depth and focus just as does human vision.

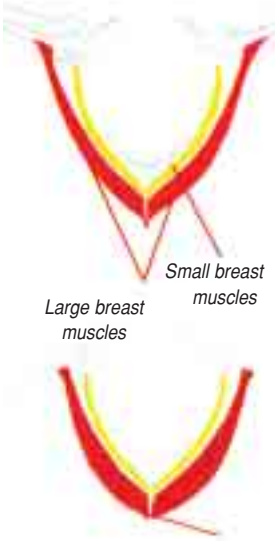
Birds have other interesting senses as well, which enable them not only to perceive vibrations in the air but also to navigate their routes by following the magnetic fields of the earth.

For some birds, a keen sense of smell is vitally important. The black vulture can locate carcasses from great distances because of its advanced sense of smell.

The skull structures of birds are of a flawless design. The skull is light; most bones are fused except in young, orbits for the eyes are large and olfactory organs are limited to save weight in the skull. The beak is a bird's primary tool and some are modified for digging, probing, piercing, chiseling, straining, cracking, pecking etc.

The visual faculties of birds hunting during the daytime are far superior to humans. A human can see a rat in the distance as a blur without focus, whereas a falcon can see the same animal at same distance in much greater detail.

PERFECT DESIGNS FOR FLYING, SWIMMING AND RUNNING

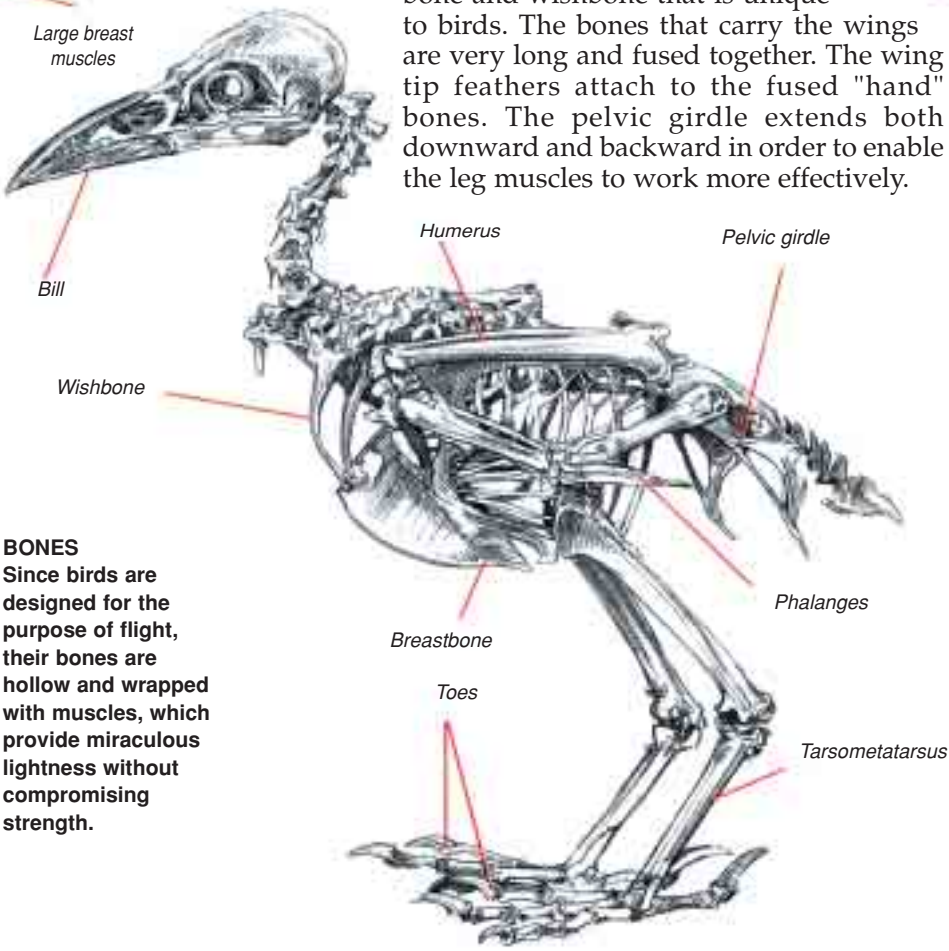


The wings are pulled downward by the contracting muscles. When the wings are raised and the small breast muscles (supracoracoideus) are contracted, the large breast muscles (pectoralis major) are flexed. When the large breast muscles are contracted and the small breast muscles are flexed, the wings are lowered.

The skeletons of birds are designed to effectively enable them to fly, walk and even swim in the fastest and most efficient way.

All flying birds are equipped with an extremely strong breastbone (sternum) which has a large flattened plate, called a keel, for the attachment of flight muscles. The muscles wrapping this bone facilitate flight.

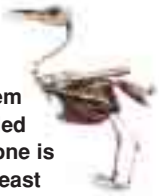
The part of the skeleton called the breast plate constitutes a very sturdy support for the wing bones, and is comprised of the breast bone and wishbone that is unique to birds. The bones that carry the wings are very long and fused together. The wing tip feathers attach to the fused "hand" bones. The pelvic girdle extends both downward and backward in order to enable the leg muscles to work more effectively.



BONES
Since birds are designed for the purpose of flight, their bones are hollow and wrapped with muscles, which provide miraculous lightness without compromising strength.

The outspread wings of the stork in the figure show the composition of its various feathers. Shorter feathers layered one on top of another give the bird aerodynamic advantages.

Sparrows have keeled sternum that enables them to fly for extended periods. This bone is covered with breast muscles.



RIB CAGE

The breast bones of birds are relatively inflexible for protection of the body when the wings are closed. That is, the volume of the rib cage does not change during flight, inhalation or exhalation.

Shoulder feathers

Wing primaries

Wing secondaries

Wing feathers

Lung

Air sac

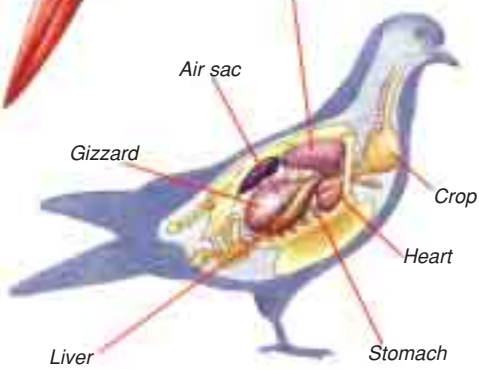
Gizzard

Crop

Heart

Liver

Stomach



"Running birds", such as the ostrich, have long legs and strong muscles that function in running, whereas predator birds have shortened bodies and relatively spinal cord sloped, which enables them to move more swiftly.

Bird of prey

Running bird

The flight of birds is a wonderful type of movement. Their speed in flight is far beyond what one could achieve by running or swimming. Furthermore, the energy spent per unit distance is also far less than in running and swimming.

Humankind made a tremendous leap in flight technology in the 20th century. One of the key ingredients in this advance was the study by scientists of the designs found of the bodies of birds. In the design of aircraft, many aerodynamic principles found in birds are implemented, leading to very successful applications. This is due to the flawless creation of birds, just as in the perfection evident in the rest of the creation.

A night owl, with a wingspan of 21.7 inches (55 centimetres), is an ideal night hunter. Its large eyes are lodged in the front its head. This location is very advantageous in its finding its prey. Another property of its eyes is the capability for night vision.

In addition, owls can rotate their heads three-quarters of the way around, which further adds to the size of their visual field. The ears of this bird are also very sensitive. It can hear from its place on the branch of a tree the quite noises that a rat makes in the bushes. It can flap its wings virtually without a sound. The owl latches on to trees or to its prey with large and powerful claws. One easily sees that this creature is created as the ideal night predator.

DESIGN IN BIRD EGGS

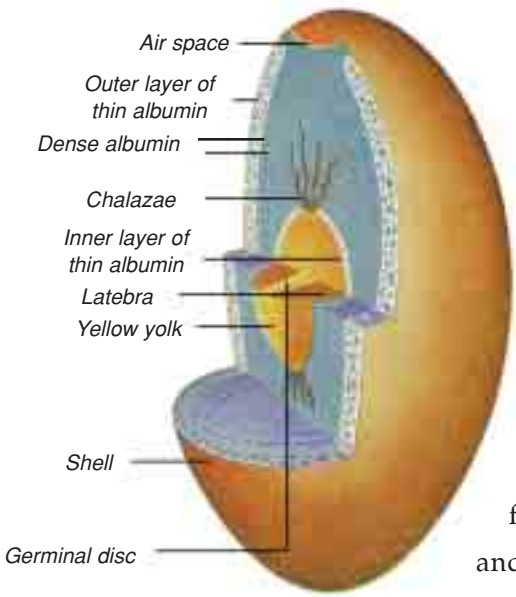
The miraculous creation of birds does not end with wings, feathers or their migration skills. Another extraordinary design feature of these creatures is in their eggs.

However ordinary it may seem to us, the egg of a chicken has about fifteen thousand pores resembling dimples on a golf ball. The spongy structure of smaller eggs can only be observed under the microscope. These spongy structures give eggs added flexibility and increase their resistance to impact.

An egg is a miracle of packaging. It supplies all the nutrients and water that the developing foetus needs. The yolk of the egg stores protein, fats, vitamins and minerals, and the white works as a reservoir of fluid.

The developing chick needs to inhale oxygen and exhale carbon dioxide. It also requires a source of heat, calcium for its bone development, protection of its fluids, protection against bacteria and physical impact. The eggshell provides all of these for the chick, which breathes through a membranous sac that develops in the embryo. Blood vessels in this sac bring oxygen to the embryo and take carbon dioxide away.

Eggshells are amazingly thin and sturdy, and so transmit the body heat of the brooding parent.



Section of egg

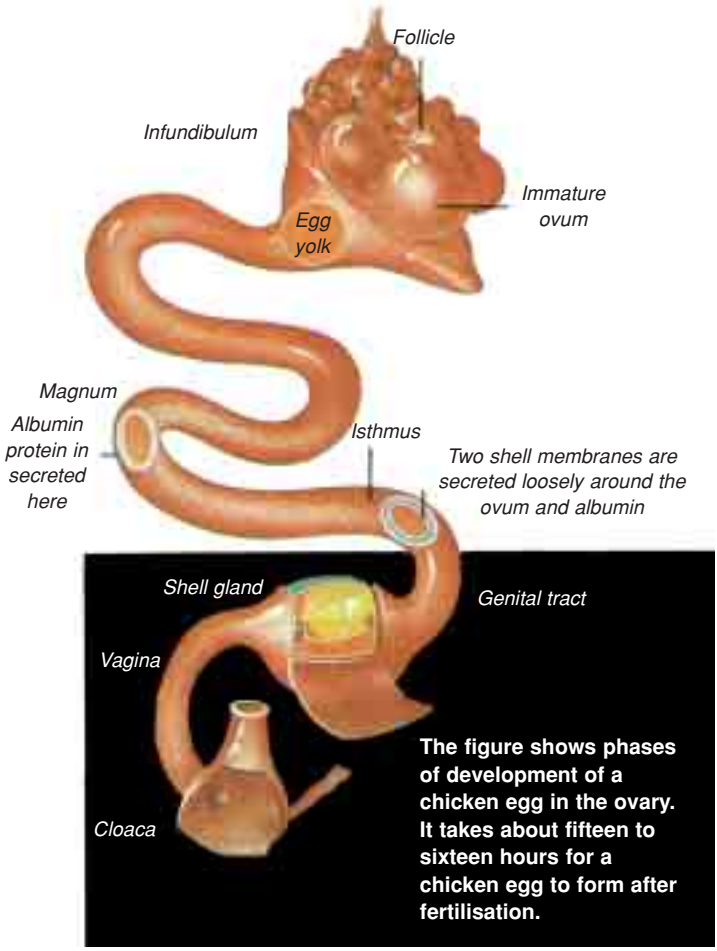
A Necessary Loss

During incubation, the egg loses 16% of its water content in the form of evaporation. Scientists long believed this to be harmful and due to the porous structure of the eggshell. However, the most recent research shows this loss to be necessary for the chick to emerge from the egg. The chick needs oxygen and space to be able to move its head just enough to crack the shell while hatching. The evaporation of water creates the room and oxygen required.

Furthermore, water loss ratio is adjusted to vary between 15 to 20% for ideal conditions depending on the type of eggshell. For instance, water loss in the eggs of loons is a few times higher than in others that incubate under dryer conditions.

Chicks have a special "egg tooth" that they use only to hatch the egg. This tooth is formed just before hatching and, amazingly, disappears after hatching.

The eggshell is strong enough to protect the embryo during twenty days of incubation. However, it is also easily breakable so that the chick can emerge.

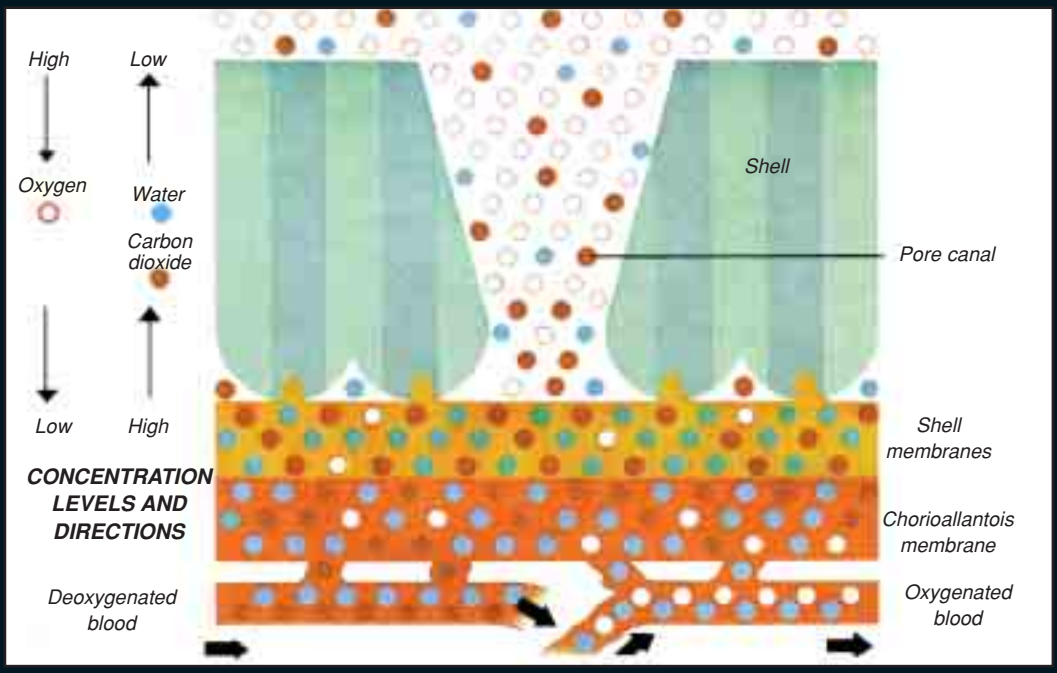


The Design of an Egg for Durability

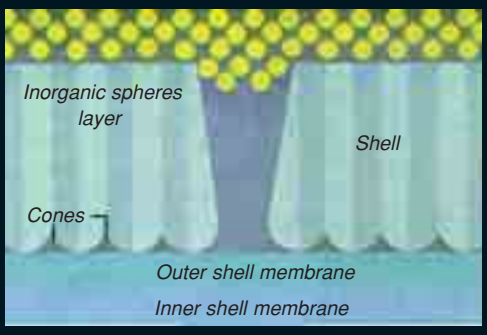
The durability of an eggshell is as crucial as its functioning in terms of air, water and heat. It has to withstand external impact as well as the weight of the incubating parent.

A closer examination reveals that eggs are designed for sufficient durability. God created smaller and larger eggs different from one another. Eggs of larger birds are usually harder and less flexible whereas eggs of smaller birds are softer and more elastic.

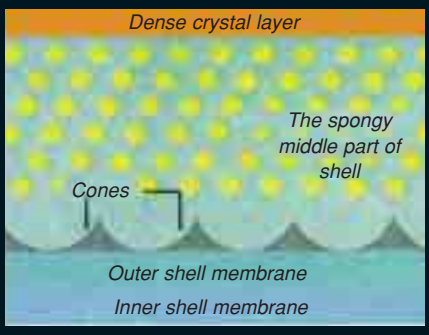
Chicken eggs are rigid and rough, but they do not break when falling over one another. The rigid shell also protects them from attack. If smaller eggs were to be as rigid and rough as the chicken egg, they would have broken much easier. Studies show smaller eggs are not rigid, but sturdy and flexible, which prevents them from breaking under impact.



Eggshells are created in such a way as to supply oxygen to the chick inside through the porous holes. The figure above illustrates the passage of carbon dioxide, water and oxygen through the pores.



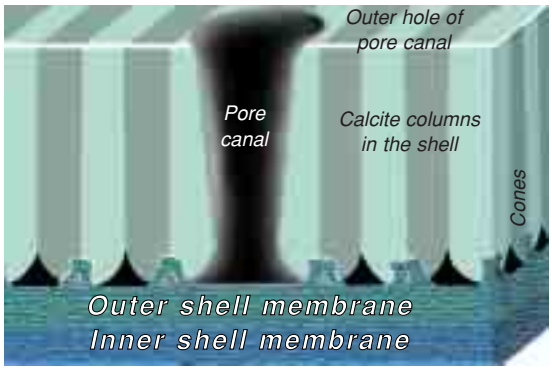
The figure above shows the shell of the loon egg laid on wet and muddy ground. The shell is covered with a layer called the "inorganic spheres layer", which prevents the pores from closing and the chick from suffocating.



The eggs of birds living under different conditions vary as well. The figure above shows the section of an eggshell of the egg of a rainbird. The specially crystallised outer layer protects the egg, where it is laid in a gravel bed, against impact and scratches.

Eggs of many birds are created with camouflage colours. Loon eggs resemble the form of a pear, which is the ideal shape for sharp rock formations. When they receive an impact, they do not fall easily but roll around in circles.

The flexibility in the structure of an egg not only serves to protect the chick but also determines the way that the chick hatches it. A chick that will come out of a rigid and rough shell only needs to open a couple of holes at the blunt end of the egg before pushing its head and legs out. The chick meets the world by lifting the hat-shaped end cover that is formed by the cracks connecting these holes.[25]



The diagram to the side depicts the structure of the eggshell.

CHAPTER 3

Communication and Target Location Systems

ECHOLOCATION OF BATS

Bats are very interesting creatures. The most intriguing of their abilities is their extraordinary faculty of navigation.

The echolocative ability of bats was discovered through a series of experiments conducted by scientists. Let us take a closer look at these experiments in order to unveil the extraordinary design of these creatures:[26]

In the first of these experiments, a bat was left in a completely dark room. On one corner of the same room, a fly was placed as a prey for the bat. From then on, everything taking place in the room was monitored with night vision cameras. As the fly started to take into the air, the bat, from the other corner of the room, swiftly moved directly to where the fly was and captured it. Through this experiment, it was concluded that the bats had a very sharp sense of perception even in complete darkness. However,

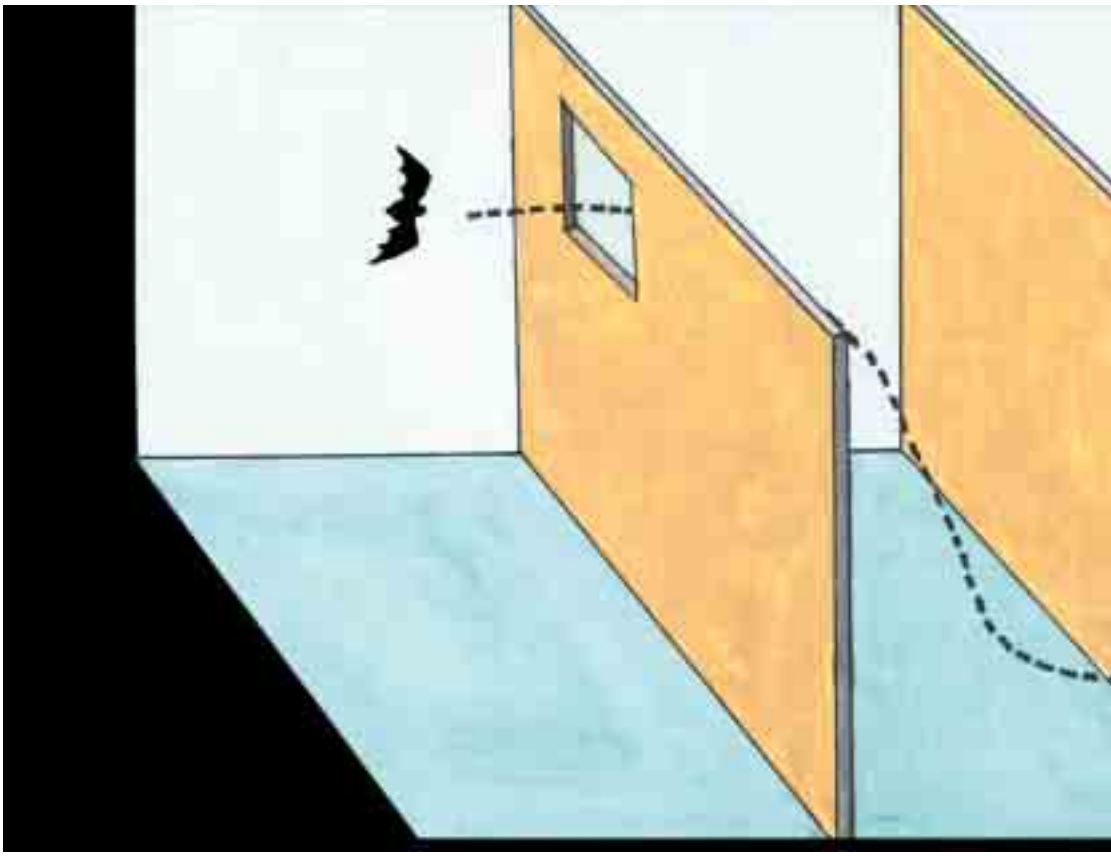
was this perception of the bat due to the sense of hearing? Or, was it because it had night vision?

In order to answer these questions, a second experiment was carried out. In a corner of the same room a group of caterpillars were placed and covered under a sheet of newspaper. Once released, the bat did not lose any time in lifting the newspaper sheet and eating the caterpillars. This proved that the navigational faculty of the bat has no relationship with the sense of vision.

Scientists continued with their experiments on bats: a new experiment was conducted in a long corridor, on one side of which was a bat and on the other a group of butterflies. In addition, a series of partition walls were installed perpendicular to the sidewalls. In each partition, there was a single hole just big enough for the bat to fly through. These holes, however, were located in a different spot on each partition. That is, the bat had to zigzag its way through them.

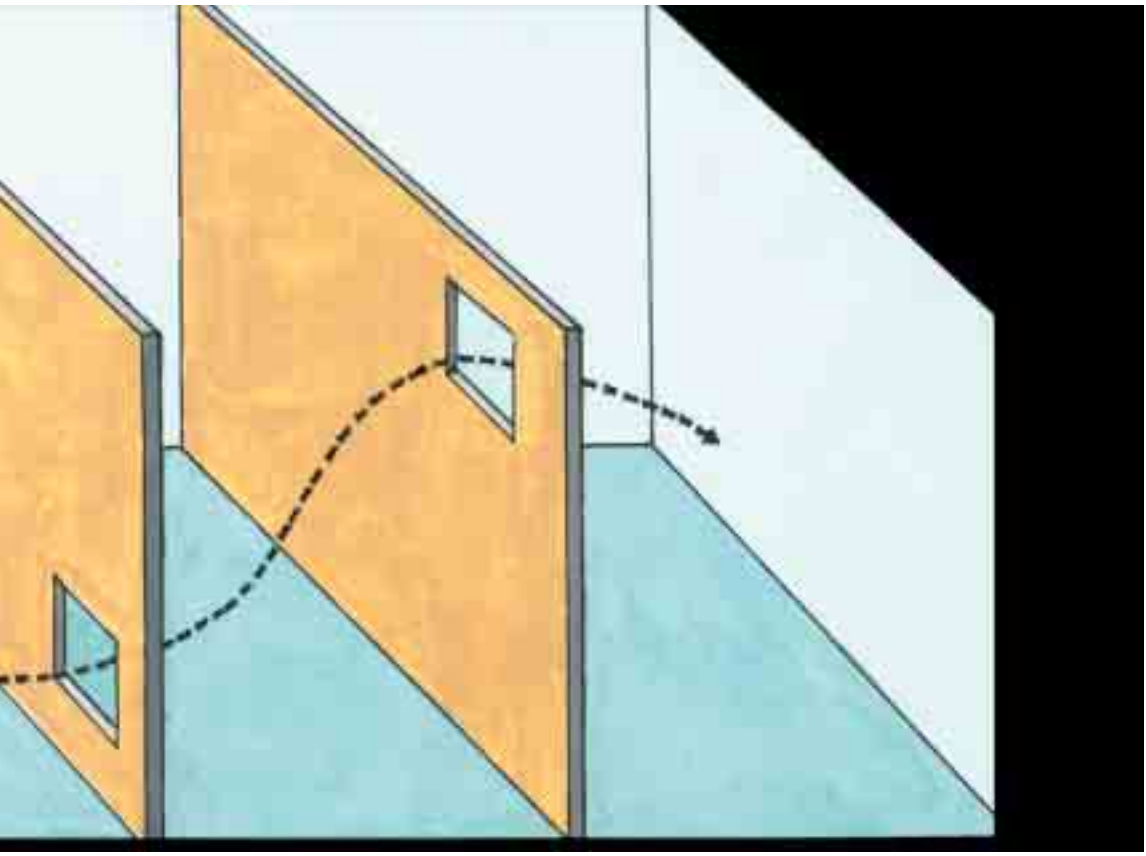
Scientist started their observations as soon as the bat was released into the pitch darkness of the corridor. When the bat came to the first partition it located the hole easily and passed right through it. The same was observed at all partitions: the bat appeared not only to know where the partition was but also where exactly the hole was. After going through the last hole, the bat filled its stomach with its catch.

Absolutely stunned by what they observed, the scientists decided to conduct one last experiment in order to understand the sensitivity of the bat's perception. The goal this time was to determine the bat's perceptual limits more clearly. Again, a long tunnel was prepared and steel wires of 3/128-inch (0.6 mm) diametre were hung from ceiling to floor and placed randomly throughout. Much to the observers' astonishment, the bat completed its journey without tripping over a single obstacle. This flight showed that the bat is able to detect obstacles of as little as 3/128-inch (0.6 mm) thickness. The research that followed revealed that the bat's incredible perceptual faculty is linked to their echolocation system. Bats radiate high frequency sounds in order to detect objects around them. The reflection of



Experiments show that bats are able to easily locate and fly through the passageways in the walls even in complete darkness.

these sounds, which are inaudible to humans, enables the bat to get a "map" of its environment.[27] That is, the bat's perception of a fly is made possible by the sounds reflected back to the bat from the fly. An echolocating bat registers each outgoing sound pulse and compares the originals to returning echoes. The time lapsed between generating the outgoing sound and receiving an incoming echo provides an accurate assessment of a target's distance from the bat. For example, in the experiment where the bat caught the caterpillar on the floor, the bat perceived the caterpillar and the shape of the room by emitting high pitch sounds and detecting the reflected signals. The floor reflected the sounds; hence, the bat determined its distance from the floor. On the contrary, the caterpillar was about 3/16-inch (0.5 cm) to 3/8-inch (1 cm) closer to the bat than was the ground. In addition, it made minute moves and this, in turn, changed the reflected frequencies. This way,



a bat could detect the presence of a caterpillar on the floor. It emitted about twenty thousand cycles in a second and could analyse all the reflected sounds. Furthermore, while it carried out this task, the bat itself travelled. Careful consideration of all these facts clearly reveals the miraculous design in their creation.

Another stunning feature of bats' echolocation is the fact that the hearing of bats has been created such that they cannot hear any other sounds than their own. The spectrum of frequencies audible to these creatures is very narrow, which would normally create a great problem for the animal because of the Doppler Effect. According to the Doppler Effect, if the source of sounds and the receiver of sounds are both relatively stationary, the receiver will detect the same frequency as the source emits. However, if one or the other is moving, the detected frequency will be different than the emitted frequency. In this case, the frequency of the reflected sound could fall into the spectrum of frequencies inaudible to the bat. The bat, therefore,

	BAT (Eptesicus)	RADAR (SCR-268)	RADAR (AN/APS-10)	SONAR QCS-T
Weight of system (kg)	0.012	12,000	90	450
Peak Power Output (W)	0.00001	75,000	10,000	600
Diametre of Target (m)	0.01	5	3	5
Echolocation Efficiency Index	$2x10^{9}$	$6x10^{-5}$	$3x10^{-2}$	$2x10^{-3}$
Relative Figure of Merit	1	$3x10^{-14}$	$1,5x10^{-11}$	10^{-12}

The system used by bats to locate their prey is millions of times more efficient and accurate than manmade radar and sonar. The table above clearly illustrates these properties. "Echolocation efficiency index" is range divided by the product weight times power times target diametre. "Relative figure of merit" compares the echolocation efficiency indexes with the bat as 1.

faces the potential problem of not being able to hear the echoes of its sounds from a fly that moves away.

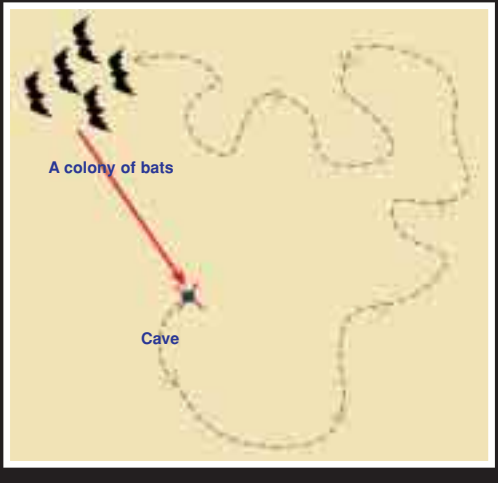
Nevertheless, this is never a problem for the bat because it adjusts the frequency of sounds that it sends towards moving objects as if it knows about the Doppler Effect. For instance, it sends the highest frequency sounds to a fly moving away so that the reflections are not lost in the inaudible section of the sound spectrum.

So, how does this adjustment take place?

In the brain of the bat, there are two kinds of neurons (nerve cells) that control its sonar systems; one perceives the reflected ultrasound and the other commands the muscles to produce echolocation calls. These two neurons work in such complete synchrony that a minute deviation in the reflected signals alerts the latter and provide the frequency of the call to be in tune with the frequency of the echo. Hence, the pitch of the bat's ultrasound changes in accordance with its surroundings for maximum efficiency.

It is impossible to overlook the blow that this system deals to the explanations of the theory of evolution through coincidence. The sonar system of bats is extremely complex in nature and cannot be explained by evolution through arbitrary mutations. The simultaneous existence of all components of the system is vital for its functionality. The bat has not only to release high pitch sounds but also to process reflected signals and to manoeuvre and adjust its sonar squeals all at the same time. Naturally, all of

The largest bat colony on earth, with a population reaching 50 million, lives in America. Freetails ride 60 mph (95 km/h), and fly as high as 10,000 feet (3050 metres). It is so large that it can be easily observed by airport radar.[28]



It is discovered that bats wander in many different ways once they leave their cave. However, they always fly back to it on a straight route from wherever they are. It is still not clear how they are able to navigate the return journey to the cave.

this cannot be explained by coincidence and can only be a sure sign of how flawlessly God created the bat.

Scientific research further reveals new examples of the miracles of creation in bats. Through each new miraculous discovery, the world of science attempts to understand how these systems work. For example, new research on bats has had very interesting findings in recent years.[29] A few scientists, who wanted to examine a group of bats living in a certain cave, installed transmitters on some of the group members. Bats were observed to leave the cave at night and feed outside until dawn. Researchers kept detailed records of these journeys. They discovered that some bats travelled as far as 30-45 miles (50-70 kilometres) from the cave. The most astonishing finding was the return flight, which started shortly before sunrise. All bats flew straight back to the cave from wherever they were. How can bats know where they are and how far away they are from their caves?

We do not yet have detailed knowledge of how they navigate their return flight. Scientists do not believe the auditory system to have a big impact on the return journey. Reminding us that bats are completely blind to light, scientists expect to encounter another surprising system. In short, science continues to discover new miracles of creation in the bats.

ELECTRIC FISH

The Electroshock Gun in the Electric Eel

The electric eels, whose lengths sometimes exceed 6.6 feet (2 metres), live in the Amazon. Two-thirds of the bodies of these fish are covered with electrical organs, which have around 5,000 to 6,000 electroplaques. Thus, they can produce charges of 500 volts of electricity at about two amperes. This is roughly equivalent to more power than a conventional TV set utilises.

The faculty of generation of electricity has been given to these creatures for purposes both of defence and offence. The fish uses this electricity to kill its predators by giving them an electric shock. The electric shock generated by this fish is enough to kill cattle from a distance of 6.6 feet (2 metres). The electricity-generating mechanism of this fish is capable of engaging as quickly as in two to three thousandth of a second.

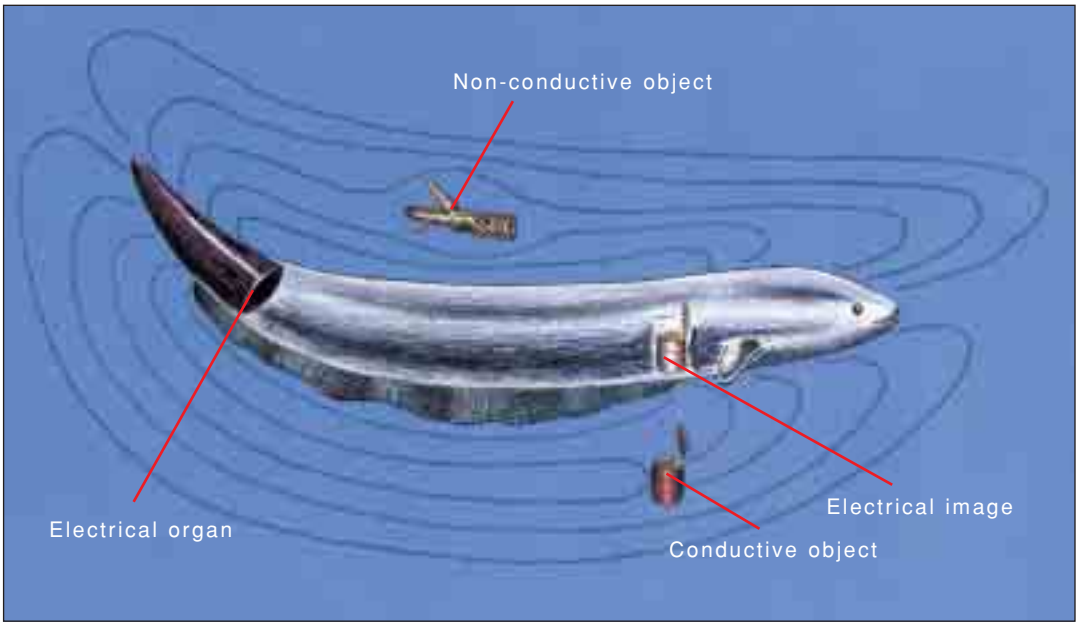
Such an immense power in a creature is a tremendous miracle of creation in itself. The system is quite complex and cannot possibly be explained through "step by step" development. That is because an electrical system without full functionality could not bring the creature any advantage in terms of survival. In other words, all components of the system must have been created perfectly at the same time.

Fish that "See" By Means of an Electrical Field

Apart from fish armoured with potential electric charges, there are other fish that generate low voltage signals of two to three volts. If these fish do not use such weak signals for hunting or defence, for what could they be possibly used?

Fish utilise these weak signals as a sensory organ. God created a sensory system in the bodies of fish, which transmits and receives these signals.[30]

The fish produces emissions of electricity in a specialised organ on its tail. The electricity is emitted from thousands of pores on the creature's back



in the form of signals that momentarily create an electrical force field surrounding it. Any object within this field refracts it, by which the fish is informed of the size, conductivity and movement of the object. On the body of fish, there are electrical sensors that continuously detect the field just as do radar.

In short, these fish have a radar that transmits electrical signals and interprets the alterations in the fields caused by objects interrupting these signals around their bodies. When the complexity of radar used by humans is considered, the wonderful creation in the body of fish becomes clear.

Special Purpose Receptors

In the bodies of these fish, there are various types of receptors. Ampullary receptors detect the low frequency electrical signals given off by other swimming fish or insect larvae. These receptors are so sensitive that they can even detect the magnetic field of the earth as well as gather information on prey and predators.


Gnathonemus Petersi

The ampullary receptors cannot perceive the high frequency signals transmitted by the fish. This is accomplished by a tubular receptors. These sensors are sensitive to fish's own discharge and they work to map the surroundings.

By means of this system these fish can communicate and warn one another against any threats. They also exchange information about species, age, size and gender.

Signals Describing Gender Differences

Each species of electric fish has a unique signature signal. Furthermore, there can be differences among the individuals of a species. However, the general structure remains unchanged. Some details are particular to the individual. When a female runs across a male fish it immediately senses it and behaves accordingly.

Signals Describing Age

Electrical signals also carry information on the age of these fish. A newly hatched fish bears a different signature from an adult. The signals of the newly hatched fish maintain their characteristic until the fourteenth day

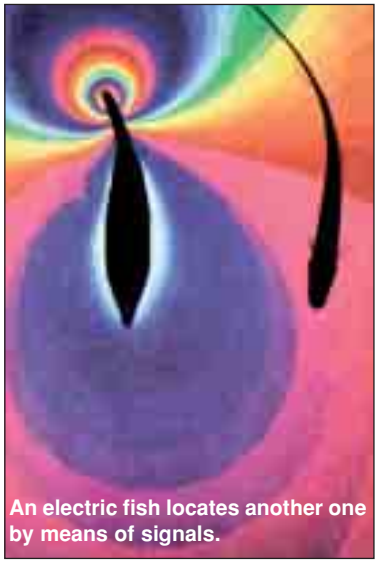
after its birth, when they change and become like the normal signals of an adult. This plays a great role in regulating the complex relationships of motherhood and fatherhood. A father can recognise his infant, and bring it home to safety.

Living Activities Communicated Through Signals

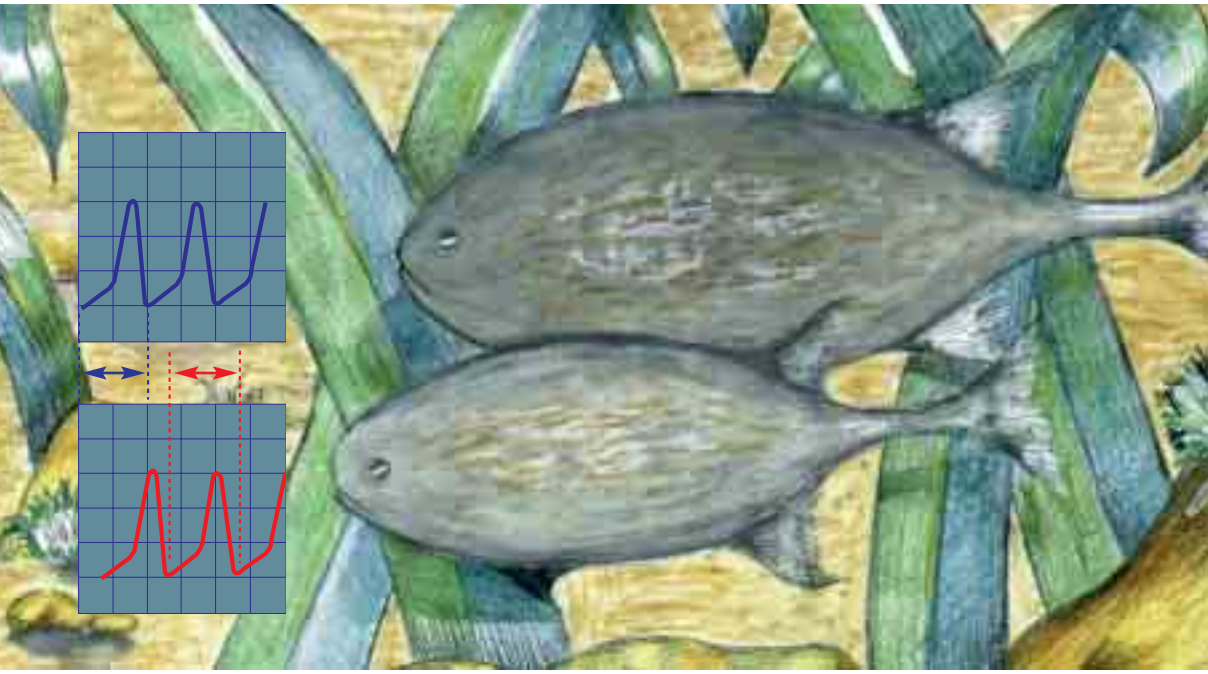
Fish can also communicate information other than gender and age. In all the species of electrical fish, frequency hikes transmit alerting messages. For instance, a Mormydae normally transmits electrical signals with a frequency of 10 Hz. i.e.10 vibrations per second, which it can easily increase up to 100-120 Hz. A motionless Mormydae warns opponents of an attack. This behaviour resembles the tightening of fists before a fight. Most of the time, this warning is powerful enough to discourage the opponent. After a fight, the wounded party, in an electrical silence, stops sending signals for about 30 minutes. The fish that calms down or leaves the fight usually remains motionless. The purpose behind this is to make it harder for the others to find them. Another purpose is to avoid hitting surrounding objects since they become electrically blind due to lack of signals.

Special System for Non-Confusion of Signals

So then, what happens when an electric fish comes near another producing the same signals? Does this not interfere with both their radars? Interference would be a normal consequence here. However, they have been created with a natural defence mechanism that prevents this confusion.



An electric fish locates another one by means of signals.



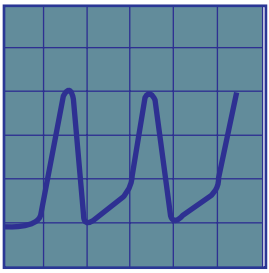
The fish that transmit electrical waves communicate through these waves. Members of the same species use similar signals. Due to their communal life, they change frequencies in order to prevent confusion, which enables similar but distinct signals to be distinguished.

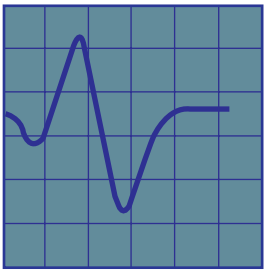
Experts name this system "Jamming Avoidance Response" or JAR for short. When the fish encounters another at the same frequency, it changes its frequency. This way confusion is avoided early and it, therefore, never reaches any further.

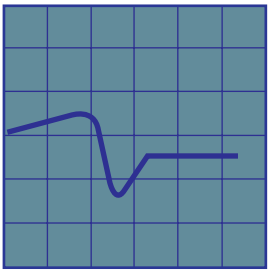
All of this confirms the extremely complex systems in electrical fish. The origin of these systems cannot be fully explained by evolution. Likewise, Darwin in his book, *The Origin of Species*, admitted the impossibility of explaining these creatures by his theory in a chapter called "Difficulties of the Theory".[31] Since Darwin, the electrical fish have been shown to have much more complex systems than he thought.

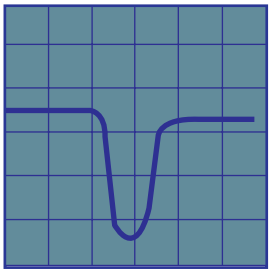
Just like all other forms of life, electric fish were also created flawlessly by God as a demonstration for us of the existence and infinite knowledge of God Who created them.

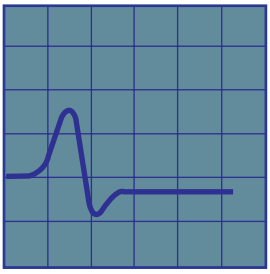
Types of signals emitted by different species of fish

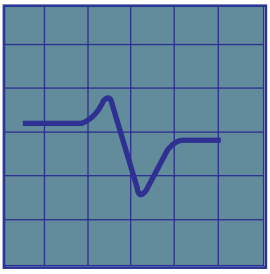

Gymnarchus nilotikus

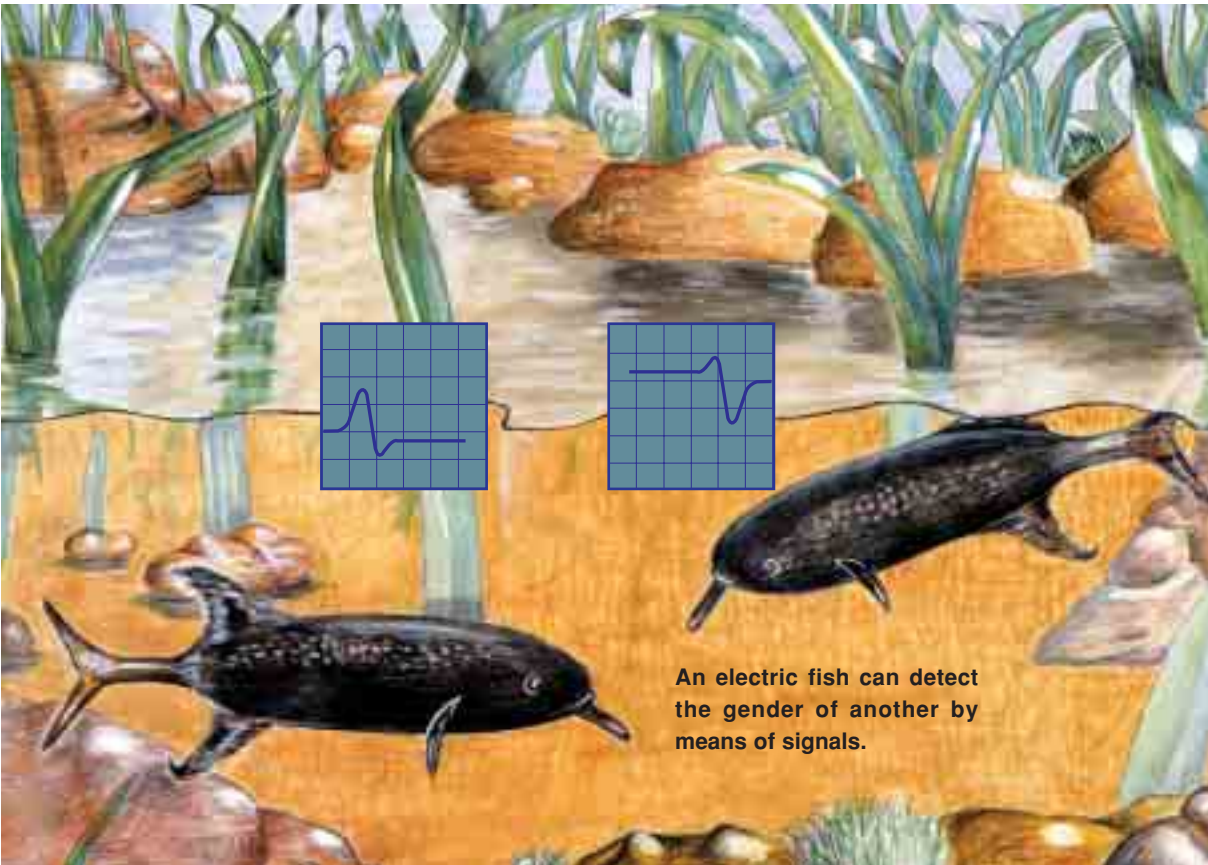

Gnathonemus pertersii


Gnathonemus moori


Mormyrus rume


Gnathonemus moori


Mormyrops deliciosus



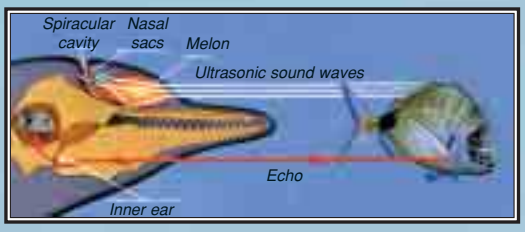
An electric fish can detect the gender of another by means of signals.

SONAR INSIDE A DOLPHIN'S SKULL

A dolphin can distinguish between two different metal coins under water in complete darkness and up to 2 miles (3 kilometres) away. Does it see that far? No, it does this without seeing. It can make such accurate determinations by means of the perfect design of an echolocation system inside its skull. It gathers very detailed information on shape, size, speed and structure of near objects.

It takes some time for a dolphin to master the skills needed to use such a complicated system. While an experienced adult dolphin can detect most objects through a few signals, a juvenile has to experiment for years.

Dolphins do not use their echolocation just to detect their surroundings. Sometimes they group during feeding and emit high-pitched sounds so powerful that they dazzle their prey, which are then ready to be picked up. An adult dolphin produces sounds inaudible to humans (20,000 Hz. and above). The focusing of soundwaves is done in several areas of the



An adult dolphin radiates sounds inaudible to humans (20,000 Hz. and above). These waves are released from the lobe, called "melon", in front of their heads. It can direct these waves at will by moving its head. The sonar waves are immediately reflected when they encounter any obstacle. Lower jaw acts as a receptor, which transmits the signals back to the ear. Ear forwards the data to the brain, which analyzes and interprets the meanings.

dolphin's head. The melon, which is a fatty structure in the dolphin's forehead, serves as an accaustical lens and focuses the clicks of the dolphin into a narrow beam. Therefore, the dolphin can direct the clicks at will by moving its head. It can direct these waves at will by moving its head. The clicks immediately echo back when they hit any obstacle. The lower jaw acts as a receptor, which transmits the signals back to the ear. On each side of the lower jaw is a thin bony area, which is in contact with a lipid material. Sound is conducted through this lipid material to the auditory bullae, a large vesicle. Then the ear forwards the data to the brain, which analyses and interprets the meanings. A similar lipid material also exists in the sonar of whales. Different lipids (fatty compounds) bend the ultrasonic (sound waves above our range of hearing) sound waves traveling through them in different ways. The different lipids have to be arranged in the right shape and sequence in order to focus the returning sound waves. Each separate lipid is unique and different from normal blubber lipids and is made by a complicated chemical process that requires a number of different enzymes. This sonar system in dolphins could not possibly have developed gradually, as claimed by the theory of evolution. That is because only by the time the lipids would have evolved to their final place and shape, could the creature have made use of this crucial system. In addition, support systems like the lower jaw, the inner ear system and the analysis centre in the brain would all have to be fully developed. Echolocation clearly is an "irreducibly complex" system, which for it to have evolved in phases is simply impossible. Hence, it is obvious that the system is another flawless creation of God.

THE STORY OF A MOMENT'S COMMUNICATION

Everybody can remember a time when his or her eyes met with an acquaintance's eyes and they greeted one another. Would you believe that this communication of a brief moment has a long story?

Let's assume that on a certain afternoon two men are situated apart from one another. In spite of their close friendship, they have not yet recognised one another. One of these men, turning his head in the direction of his friend, whom he has not yet recognised, starts a chain of biochemical reactions: the light reflected from the body of his friend enters the eye lens at a speed of ten trillion photons (light particles) per second. Light travels through the lens and the fluid that fills the eyeball before falling on the retina. On the retina there are about hundred million cells called "cones" and "rods". Rods differentiate light from dark and cones perceive colours.

Depending on the external objects, varying light waves fall on different places on the retina. Let's think about the moment the person in our assumed situation sees his friend. Some features on his friend's face cast different intensities of light on his retina e.g. darker facial features such as eyebrows would reflect light at much lower intensities. Neighbouring cells on the retina, however, receive stronger intensities of light reflected from the forehead of his friend. All of his friend's facial features cast waves of various intensities on the retina of his eye.

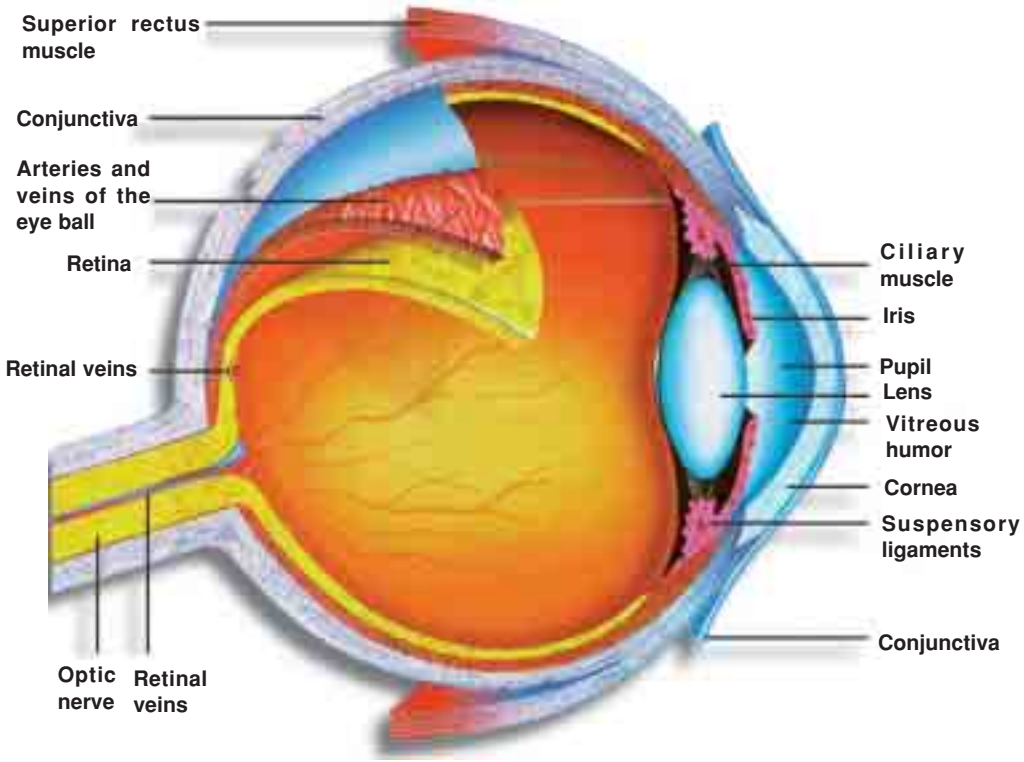
What kind of stimuli do these light waves provoke?

The answer to this question is, indeed, very complicated. Nevertheless, the answer has to be examined to fully appreciate the extraordinary design of the eye.

CORNEA AND IRIS

The cornea, one of the 40 basic components of the eye, is a transparent layer located at the very front of the eye. It allows light through as perfectly as does window glass. It is surely not a coincidence that this tissue, found at nowhere else in the body, is situated just at the right place, that is, the front surface of the eye. Another important component of the eye is the iris, which gives the eye its colour. Located right behind the cornea, it regulates the amount of light admitted into the eye by contracting or expanding the pupil – the circular opening in the middle. In bright light, it immediately contracts. In dim light, it enlarges to allow more light to enter the eye. A similar system has been adapted as a basis for the design of cameras in order to adjust the amount of light intake, but it is nowhere near as successful as the eye.

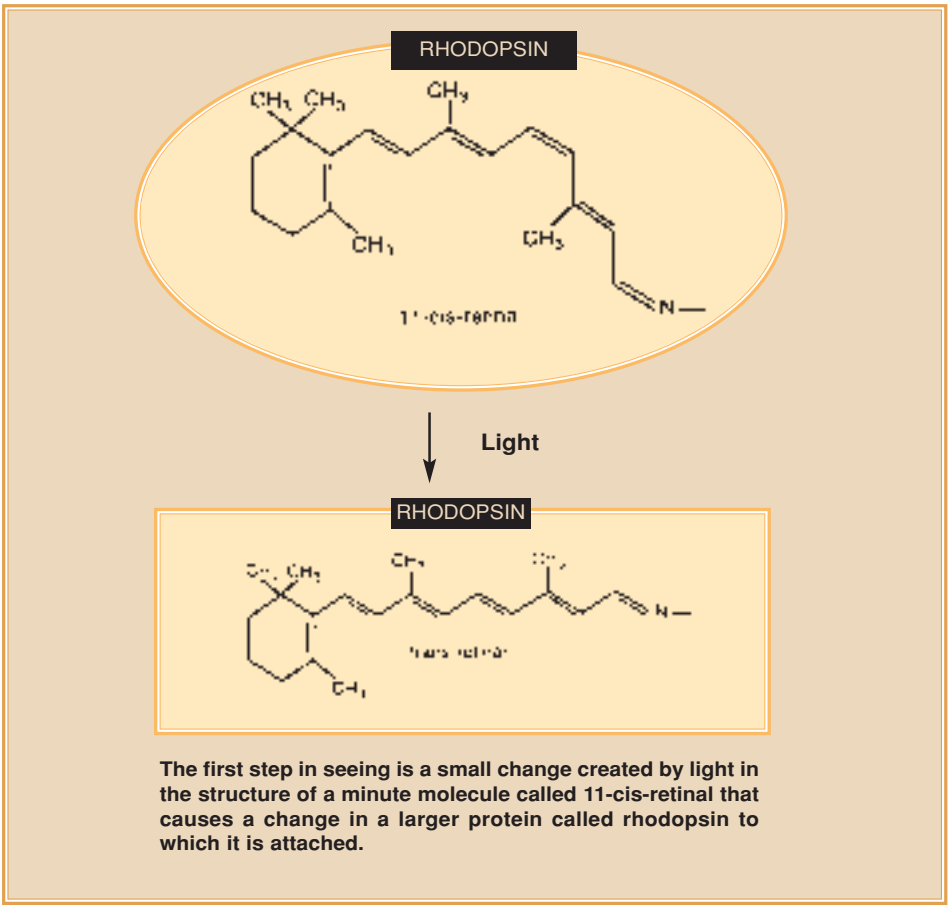
The human eye functions through the harmonious working of about forty different components. In the absence of even one of these components would make the eye useless. For instance, in the absence of even tear gland alone, the eye would eventually dry out and cease to function. This system, which is irreducible to simplicity, can never be explained by "gradual development" as is claimed by evolutionists. This shows that the eye emerged in a complete and perfect form, which means that it was created.



The Chemistry of Seeing

When photons hit the cells of the retina, they activate a chain reaction, rather like a domino effect. The first of these domino pieces is a molecule called "11-cis-retinal" that is sensitive to photons. When struck by a photon, this molecule changes shape, which in turn changes the shape of a protein called "rhodopsin" to which it is tightly bound. Rhodopsin then takes a form that enables it to stick to another resident protein in the cell called "transducin".

Prior to reacting with rhodopsin, tranducin is bound to another molecule called GDP. When it connects with rhodopsin, transducin releases the GDP molecule and is linked to a new molecule called GTP. That is why the complex consisting of the two proteins (rhodopsin and transducin) and



The first step in seeing is a small change created by light in the structure of a minute molecule called 11-cis-retinal that causes a change in a larger protein called rhodopsin to which it is attached.

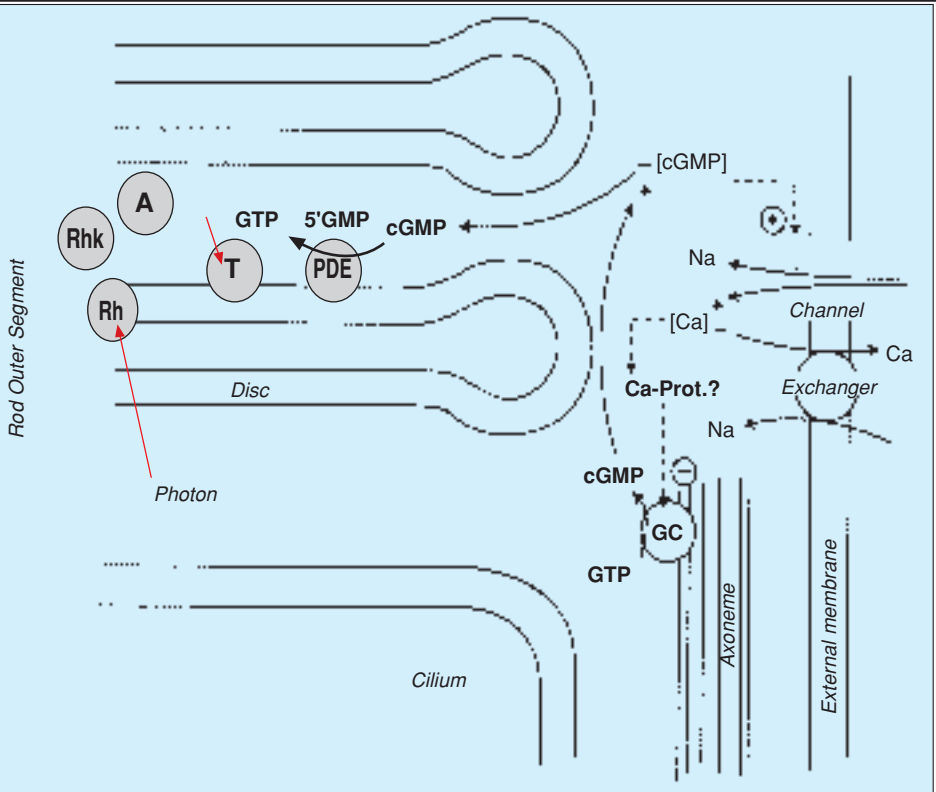
a smaller chemical molecule (GTP) is called "GTP-transducinrhodopsin".

The new GTP-transducinrhodopsin complex can now very quickly bind to another protein resident in the cell called "phosphodiesterase". This enables the phosphodiesterase protein to cut yet another molecule resident in the cell, called cGMP. Since this process takes place in the millions of proteins in the cell, the cGMP concentration is suddenly reduced.

How does all this help with sight? The last element of this chain reaction supplies the answer. The fall in the cGMP amount affects the ion channels in the cell. The so-called ion channel is a structure composed of proteins that regulate the number of sodium ions within the cell. Under normal conditions, the ion channel allows sodium ions to flow into the cell, while another molecule disposes of the excess ions to maintain a balance. When the number of cGMP molecules falls, so does the number of sodium ions. This leads to an imbalance of charge across the membrane, which stimulates the nerve cells connected to these cells, forming what we refer to as an "electrical impulse". Nerves carry the impulses to the brain and "seeing" happens there.

In brief, a single photon hits a single cell and, through a series of chain reactions, the cell produces an electrical impulse. This stimulus is modulated by the energy of the photon, that is, the brightness of light. Another fascinating fact is that all of the processes described so far happen in no more than one thousandth of a second. Other specialised proteins within the cells convert elements such as 11-cis-retinal, rhodopsin and transducin back to their original states. The eye is under a constant shower of photons, and the chain reactions within the eye's sensitive cells enable it to percieve each one of these photons.[32]

The process of sight is actually a great deal more complicated than the outline presented here would indicate. However, even this brief overview is sufficient to demonstrate the extraordinary nature of the system. There is such a complicated, finely calculated design inside the eye that chemical reactions in the eye resemble the domino shows in the Guinness Book of



The figure above illustrates the biochemistry of vision. Symbols indicate; RH=Rhodopsin, Rhk=Rhodopsin Kinase, A=Ariestin, GC=Guanylate Cyclase, T=Tranducin, PDE=Phosphodiesterase.

World Records. In these shows, tens of thousands of domino pieces are so strategically placed that tipping the first piece activates the entire system. In some areas of the domino chain, many apparatuses are installed to start a new sequences of reactions, e.g. a winch carrying a piece to another location and dropping it exactly at the place necessary for a further sequence of reactions.

Of course, nobody thinks that these pieces have been "coincidentally" brought to their precise locations by winds, quakes or floods. It is obvious to everyone that each piece has been placed with great attention and precision. The chain reaction in the human eye reminds us that it is nonsense to even entertain the thought of the word "coincidence". The system is composed of

a number of different pieces assembled together in very delicate balances and is a clear sign of "design". The eye is created flawlessly.

Biochemist Michael Behe comments on the chemistry of the eye and the theory of evolution in his book *Darwin's Black Box*:

> Now that the black box of vision has been opened, it is no longer enough for an evolutionary explanation of that power to consider only the anatomical structures of whole eyes, as Darwin did in the nineteenth century (and as popularizers of evolution continue to do today). Each of the anatomical steps and structures that Darwin thought were so simple actually involves staggeringly complicated biochemical processes that can not be papered over with rhetoric.[33]

Beyond Seeing

What has been explained so far is the first contact of photons, reflected off a friend's body, with a man's eye. The retinal cells produce electrical signals through complicated chemical processes as described above. In these signals there exists such detail that the face of the man's friend in the example, his body, hair colour and even a minute mark on his face have been encoded. Now the signal has to be carried to the brain.

Nerve cells (neurons) stimulated by retinal molecules show a chemical reaction as well. When a neuron is stimulated, protein molecules on its surface change shape. This blocks the movement of the positively charged sodium atoms. The change in the movement of the electrically charged atoms creates a voltage differential within the cell, which results in an electrical signal. The signal arrives at the tip of the nerve cell after travelling a distance shorter than a centimetre. However, there is a gap between two nerve cells and the electrical signal has to cross this gap, which presents a problem. Certain special chemicals between the two neurons carry the signal. The message is carried this way for about a quarter to a fortieth of a millimetre. The electrical impulse is conducted from one nerve cell to the next until it reaches the brain.

These special signals are taken to the visual cortex in the brain. The

visual cortex is composed of many regions, one on top of the other, about 1/10 inch (2.5 mm) in thickness and 145 square feet (13.5 square metres) in area. Each one of these regions includes about seventeen million neurons. The 4th region receives the incoming signal first. After a preliminary analysis, it forwards the data to neurons in other regions. In any phase, any neuron can receive a signal from any other neuron.

This way, the man's picture forms in the visual cortex of the brain. However, the image now needs to be compared to the memory cells, which is also done very smoothly. Not a single detail is overlooked. Furthermore, if the friend's perceived face looks slightly more pale than normal then the brain activates the thought, "why is my friend's face so pale today?"

Greeting

That's how two separate miracles happen within a period of time less than a second, which we refer to as "seeing" and "recognising".

The input that arrives in hundreds of millions of light particles reaches the mind of the person, is processed, compared to the memory and enables the man to recognise his friend.

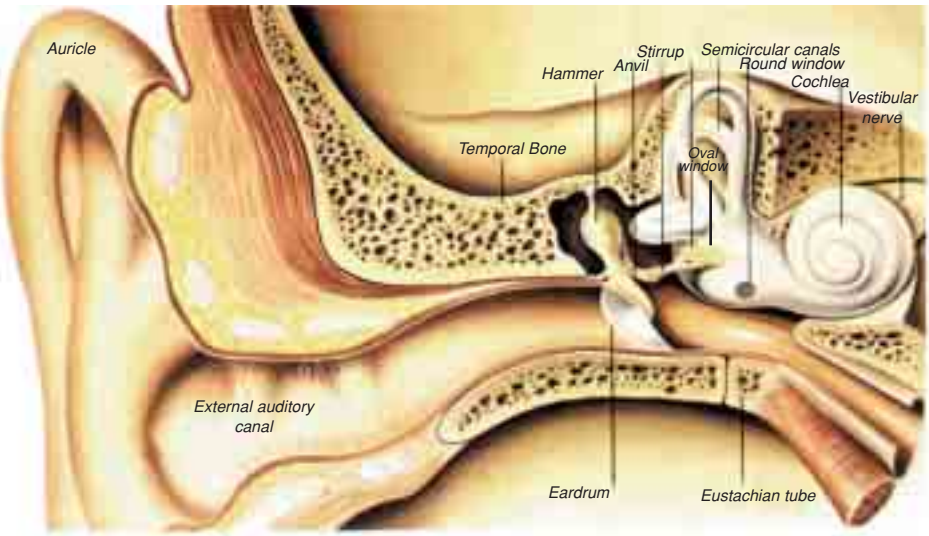
A greeting follows recognition. A person deduces the reaction to be given to acquaintances from within the memory cells in less than a second. For example, he determines that he needs to say "greetings" upon which the brain cells controlling facial muscles will command the move that we know as a "smile". This command is similarly transferred through nerve cells and triggers a series of other complicated processes.

Simultaneously, another command is given to the vocal cords in the throat, tongue and the lower jaw and the "greetings" sound is produced by the muscle movements. Upon release of the sound, air molecules start travelling towards the man to whom the greeting is sent. The auricle gathers these sound waves, which travel at approximately twenty feet (six metres) per one fiftieth of a second.

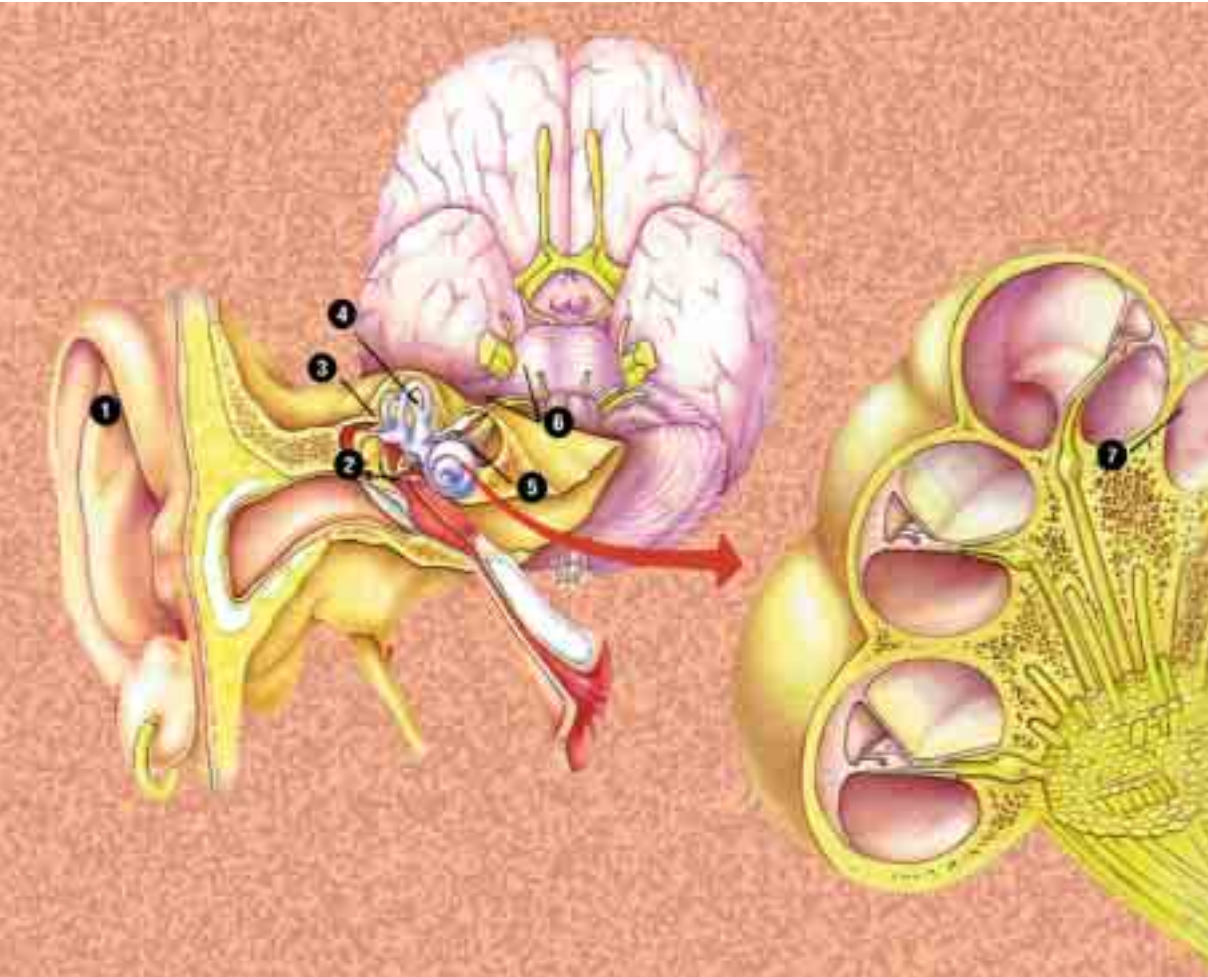
The vibrating air inside both ears of that person rapidly travels to his

middle ear. The eardrum, 0.30 inch (7.6 millimetre) in diametre, starts vibrating as well. This vibration is then transferred to the three bones in the middle ear, where they are converted into mechanical vibrations that travel to the inner ear. They then create waves in a special fluid inside a snail shell-like structure called the cochlea.

Inside the cochlea, various tones of sound are distinguished. There are many strings of varying thickness inside the cochlea just as in the musical instrument, the harp. The sounds of the man's friend literally play their harmonies on this harp. The sound of "greetings" starts from a low pitch and rises. First, the thicker cords are rattled and then the thinner ones. Finally, tens of thousands of little bar-shaped objects transfer their vibrations to the auditory nerve.



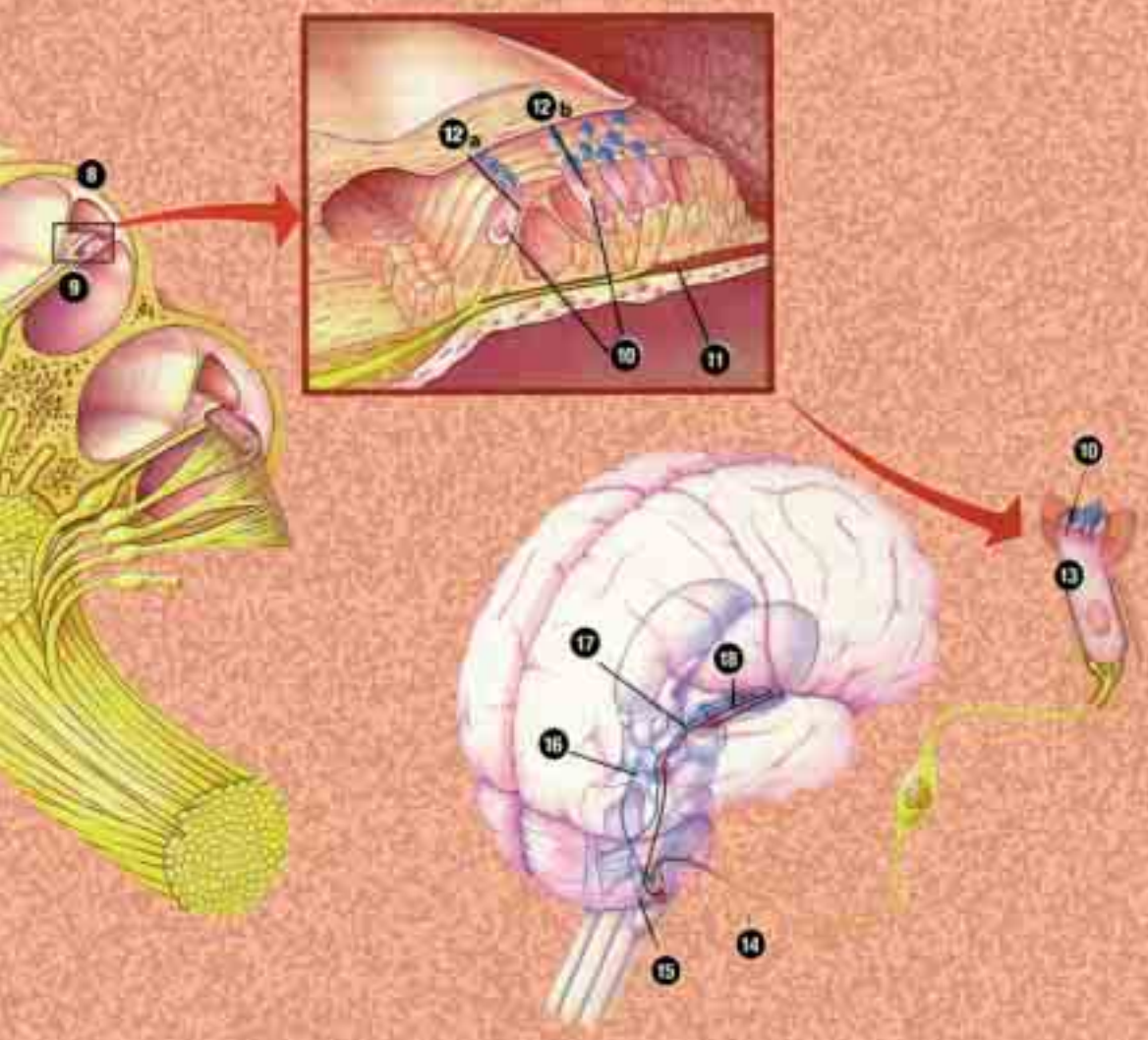
The auricle is designed to collect and focus sounds into the auditory canal. The inside surface of the auditory canal is covered with cells and hairs that secrete a thicle waxy product to protect the ear against external dirt. At the end of the ear canal towards the start of the middle ear is the eardrum. Beyond the eardrum there are three small bones called the hammer, anvil and stirrup. The eustachian tube functions to balance air pressure in the middle ear. At the end of the middle ear is the cochlea that has an extremely sensitive hearing mechanism and is filled with a special fluid.



THE TRAVELLING OF THE SOUND FROM EAR TO BRAIN

The ear is such a complex wonder of design that it alone nullifies the explanations of the theory of evolution in regards to a creation based on "coincidence". The hearing process in the ear is made possible by a completely irreducibly complex system. Sound waves are first collected by the auricle (1) and then hit the eardrum (2). This sets the bones in the middle ear (3) vibrating. Thus sound waves are translated into mechanical vibrations, which vibrate the so-called "oval window" (4), which in turn sets the fluid inside the cochlea (5) in motion. Here, the mechanical vibrations are transformed into nerve impulses which travel to the brain through the vestibular nerves (6).

There is an extremely complex mechanism inside the cochlea. The cochlea (enlarged figure in the middle) has some canals (7), which are filled with fluid. The cochlear canal (8) contains the "organ of corti" (9) (enlarged figure on far right), which is the sense organ of hearing. This organ is composed of "hair cells" (10). The vibrations in the fluid of the cochlea are transmitted to these cells through the basilar membrane (11), on which the organ of corti is situated. There are two types of hair cells, inner hair cells (12a) and outer hair cells (12b). Depending on the frequencies of the incoming sound, these hair cells

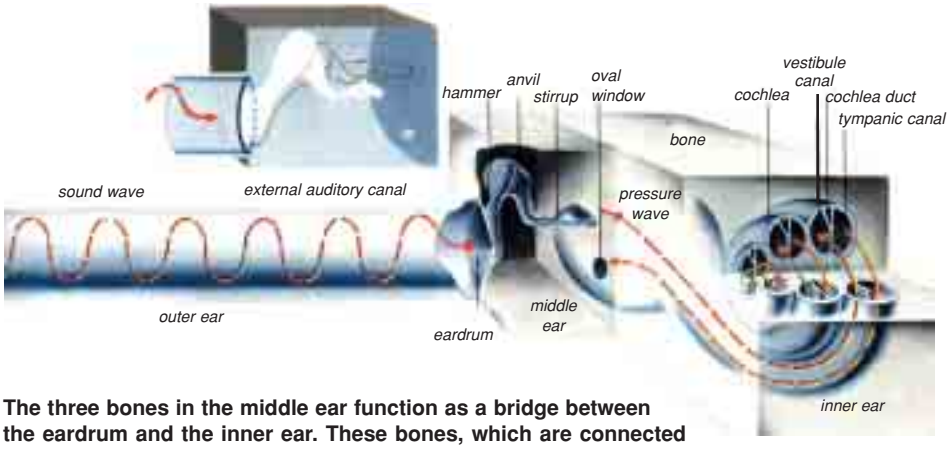


vibrate differently which makes it possible for us to distinguish the different sounds we hear.

Outer hair cells (13) convert detected sound vibrations into electrical impulses and conduct them to the vestibular nerve (14). Then the information from both ears meet in the superior olivary complex (15). The organs involved in the auditory pathway are as follows: Inferior colliculus (16), medial geniculate body (17), and finally the auditory cortex (18).[34]

The blue line inside the brain shows the route for high pitches and the red for low pitches. Both cochleas in our ears send signals to both hemispheres of the brain.

As is clear, the system enabling us to hear is comprised of different structures that have been carefully designed in the minutest detail. This system could not have come into existence "step by step", because the lack of the smallest detail would render the entire system useless. It is, therefore, very obvious that the ear is another example of flawless creation.

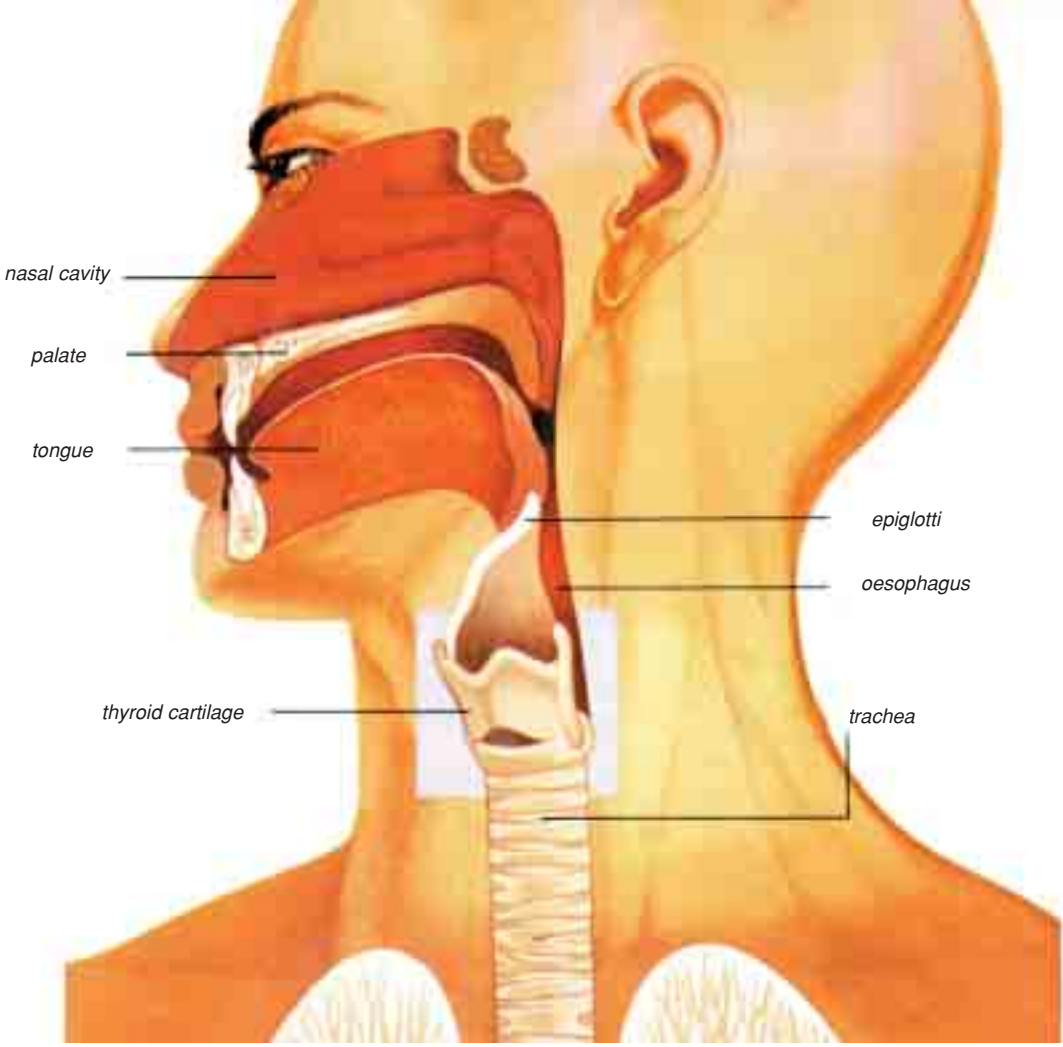


The three bones in the middle ear function as a bridge between the eardrum and the inner ear. These bones, which are connected to one another by joints, amplify sound waves, which are then transmitted to the inner ear. The pressure wave that is created by the contact of the stirrup with the membrane of the oval window travels inside the fluid of the cochlea. The sensors triggered by the fluid start the "hearing" process.

Now the sound "greetings" becomes an electrical signal, which quickly travels to the brain through the auditory nerves. This journey inside the nerves continues until reaching the hearing centre in the brain. As a result, in the person's brain, the majority of the trillions of neurons become busy evaluating the visual and audio data gathered. This way, the person receives and perceives his friend's greeting. Now he returns the greeting. The act of speaking is realised through perfect synchronisation of hundreds of muscles within a minute portion of a second: the thought that is designed in the brain as a response is formulated into language. The brain's language centre, known as Broca's area, sends signals to all the muscles involved.

First, the lung provides "hot air". Hot air is the raw material of speech. The primary function of this mechanism is the inhalation of oxygen-rich air into the lungs. Air is taken in through the nose, and it travels down the trachea into the lungs. The oxygen in the air is absorbed by the blood in the lungs. The waste matter of blood, carbon dioxide, is given out. The air, at this point, becomes ready to leave the lungs.

The air returning from the lungs passes through the vocal cords in the



In order to facilitate speech, not only do the vocal cords, nose, lungs and air passages have to work in harmony, but also the muscle systems that support these organs. Sounds created during speech are produced by air passing through the vocal cords.

throat. These cords are like tiny curtains, which can be "drawn" by the action of the small cartilages to which they are attached. Before speech, the vocal cords are in an open position. During speech they are brought together and caused to vibrate by the exhaled air passing through them. This determines the pitch of an individual's voice: the tenser the cords, the higher the pitch.

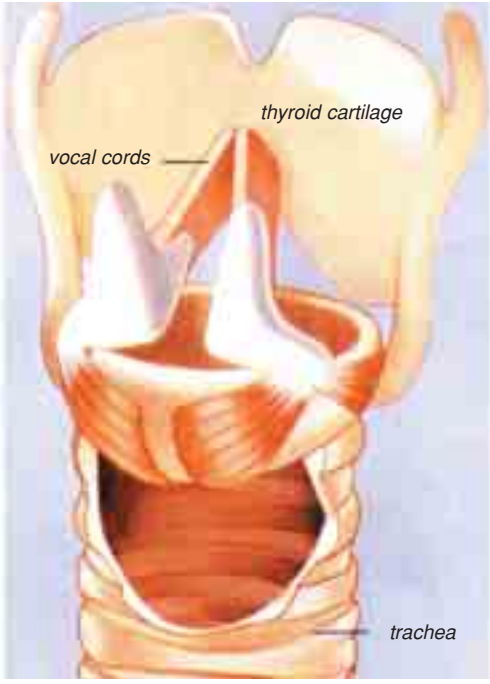
The air is vocalised by passing through the cords and reaches to the surface via the nose and mouth. The person's mouth and nose structure adds personal properties unique to him. The tongue draws near to and away from the palate and the lips take various shapes. Throughout these processes,

many muscles work at great speed.[35]

The person's friend compares the sound he hears to others in his memory. By comparing, he can immediately tell if it is a familiar sound. Therefore, both parties recognise and greet each other.

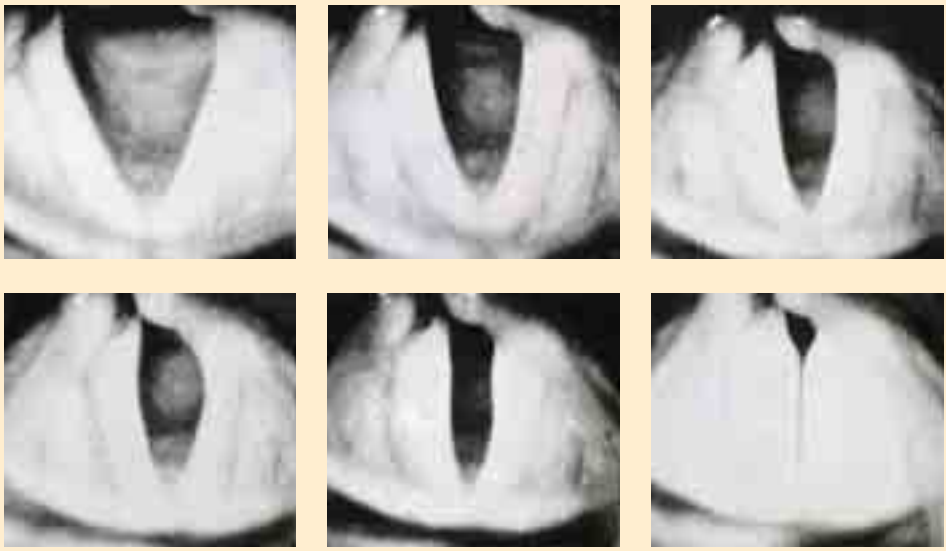
All the above takes place during two friends noticing and greeting one another. All of these extraordinary processes happen at incredible speeds with stunning precision, of which we are not even aware. We see, hear and speak so very easily as if it is a very simple thing. However, the systems and processes that make them possible are so unimaginably complex.

This complex system is full of examples of unparalleled design that the theory of evolution cannot explain. The origins of vision, hearing and thinking cannot be explained by the trust of evolutionists in "coincidences".



Vocal cords are comprised of flexible cartilages tied to muscles on the skeleton. When the muscles are at rest, the cords are open (left). The cords close during speech (below). The tenser the cords, the higher the pitch.

On the contrary, it is obvious that all of them have been created and given to us by our Creator. While the human cannot even understand the working mechanism of systems that enable him to see, hear and think, the infinite wisdom and power of God Who created all these from nothing is apparently obvious.



The operation of the vocal cords has been photographed by means of high-speed cameras. All of the different positions seen above take place within less than one tenth of a second. Our speech is made possible through the flawless design of the vocal cords.

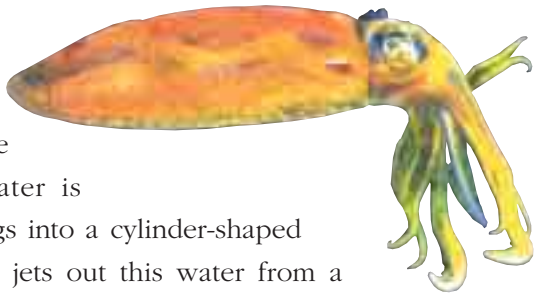
CHAPTER 4

Reactive Swimming Systems

Vertebrates are the fastest running, best swimming and farthest flying creatures on earth. The main factor underlying all of these abilities is the presence of skeletons made of hard materials such as the bones that do not lose their shape. These bones provide tremendous support for contracting and flexing muscles, which bring about continuous movements through moving joints.

However, invertebrates move at much lower speeds, in comparison with vertebrates, due to their boneless structures.

Cuttlefish are invertebrates that do not have bones in their bodies despite being called fish. They have extraordinary abilities to manoeuvre because of a very interesting system. Their soft body is covered with a thick mantle under which large amounts of water are drawn and flushed out by strong muscles and that enables them to escape backwards.



This mechanism in cuttlefish is highly complex. On both sides of the animal's head are pocket-like openings. The water is drawn in through these openings into a cylinder-shaped cavity inside its body. Then, it jets out this water from a narrow pipe immediately under its head with great pressure, which enables

Cuttlefish receive great help during hunting from the tentacles in its mouth. These whiplike tentacles normally remain coiled in pouches beneath its arms. When the fish encounters a prey, it unleashes them and snatches up the prey. The fish relies on its adequately designed arms (eight in total) to take care of the rest. It can easily tear a crab to bits by using its beak. The cuttlefish uses its beak with such mastery that it can neatly puncture the shell of a crab and rasp out the meat with its tongue.[36]

The cuttlefish whose scientific nomenclature is Loligo Vulgaris are the smallest among their species. Their reactive swimming system enables them to move at speeds in excess of nineteen mph (30 km/h). [37]

it to move swiftly in the opposite direction due to reactive forces.

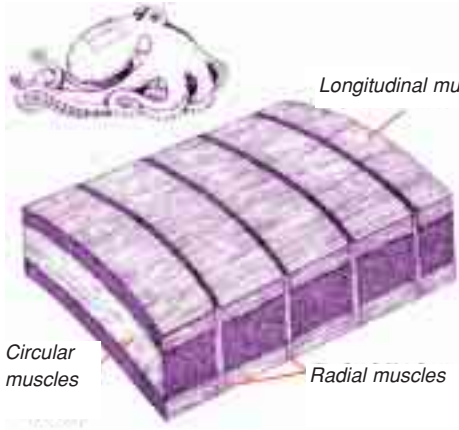
This swimming technique is highly appropriate in terms of both speed and durability. A Japanese cuttlefish, called Todarodes Pacificus, in their migration of 1250 miles (2000 kilometres) travel at about 1.3 mph (2 km/h). For short distances, it can accelerate up to 7 mph (11 km/h). Some species are known to exceed 19 mph (30 km/h).

The cuttlefish can avoid its predators through very swift movements as a result of these fast muscular contractions. When their speed alone is not enough for safety, they squirt a cloud of dense, dark coloured ink that is synthesised in their bodies. This ink surprises their predators for a few seconds, which is usually enough for them to escape. The undetectable fish behind the ink cloud leaves the area immediately.

The defence system and reactive swimming styles of cuttlefish also work for them during hunting. They can attack and chase their prey at high speeds. Their immensely complicated nervous system regulates the contractions and flexing necessary for their reactive swimming. Accordingly, their respiratory systems are also in ideal condition, which provides the high metabolism that is needed for the jet propulsion.

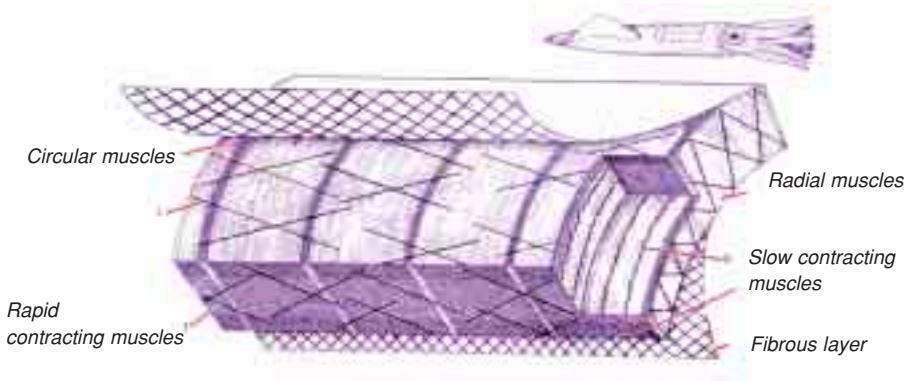
The cuttlefish is not the only animal swimming by means of a reactive system. Octopuses also utilise this system. However they are not active swimmers; they spend most of their time wandering over rocks and gorges in the deep sea.

The inner skin of the octopus is composed of many layers of muscles one on top of another. They constitute three different types of muscles called longitudinal, circular and radial. These structures enable various movements of the octopus by balancing and supporting one another.

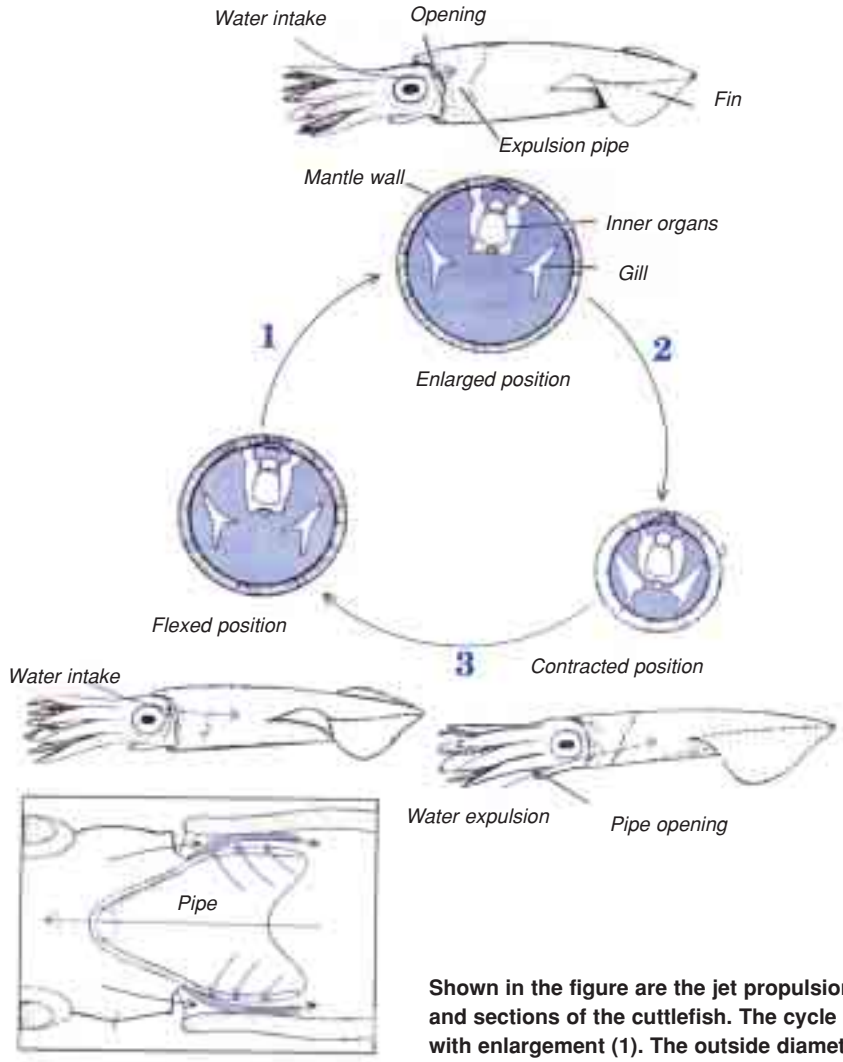


The octopus bends its body by contracting either one of the two longitudinal muscles, which enables it swim in the water.

When flushing water out, the circular muscles contract lengthwise. However, since they have the tendency to maintain their volume, their width increases, which would normally elongate the body. In the meantime, the stretching longitudinal muscles prevent the elongation. The radial muscles remain stretched during these happenings that cause the mantle to thicken. After the jet propulsion, the radial muscles contract and shrink the length, which causes the mantle to become thinner, and the mantle cavity to be filled with water again.



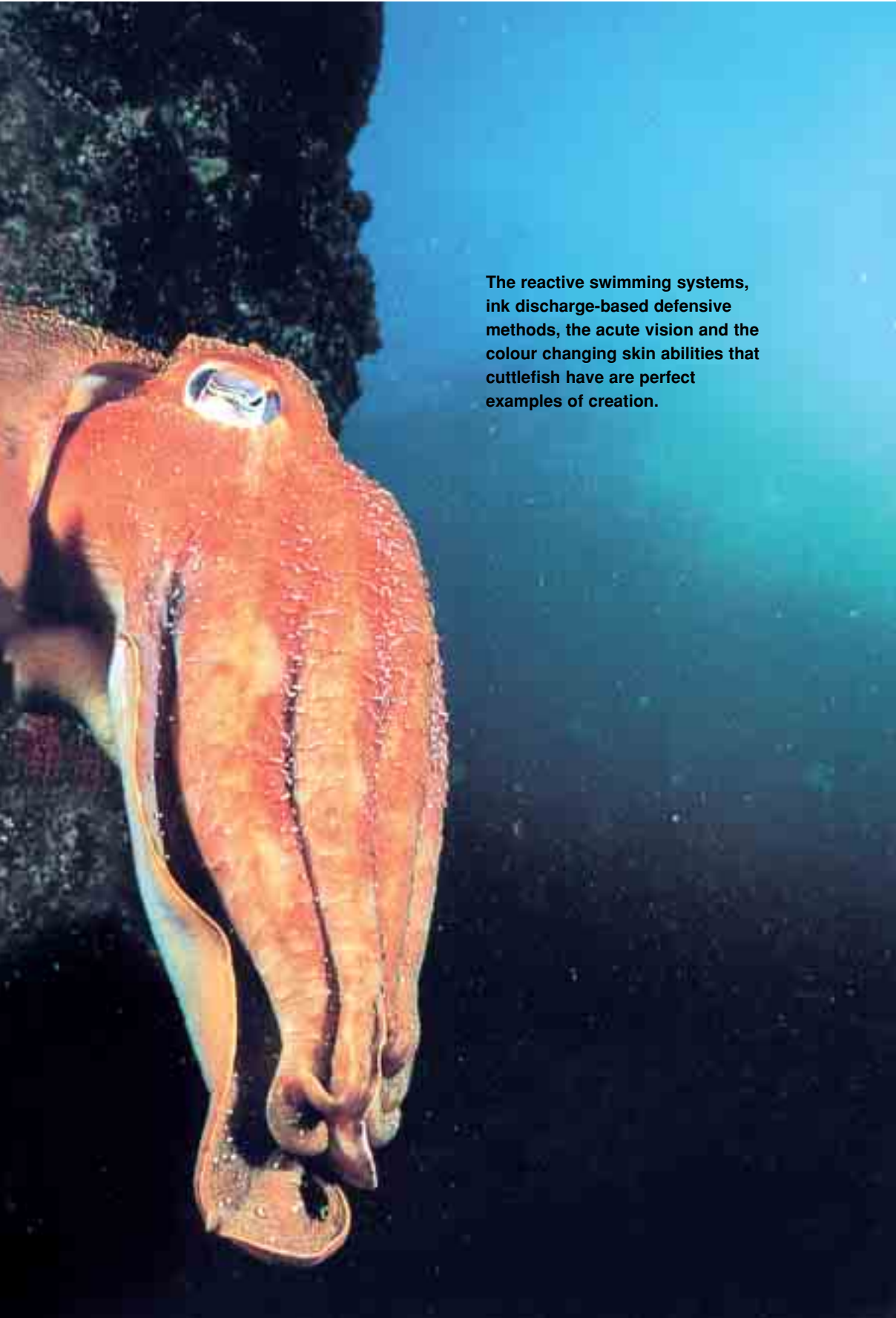
The cuttlefish also has radial and circular muscles as in the octopus, but instead of the octopus' longitudinal muscles there is a fibrous layer in the cuttlefish. This layer prevents its body from elongation when both the muscles contract as well as providing a sturdy base for the radial muscles.



Shown in the figure are the jet propulsion cycle and sections of the cuttlefish. The cycle begins with enlargement (1). The outside diameter of the body is enlarged by 10% of the normal size, which increases the volume of the mantle cavity by about 22%. Water enters from the openings on both sides of the head passing through the funnel-shaped pipe. When the maximum enlargement is reached, the diameter of the body is reduced to 75% of normal size (2). Pressure in the cavity suddenly increases and pushes the inner tap on the mouth of flushing-out pipe, which closes the water intake. Nearly all the water (approximately 60% of normal body size) is forcefully expelled out through the pipe. The body recovers its normal shape by the intake of water (3). Any further contractions could easily harm the creature. The jet propulsion lasts about one second and can be repeated 6 to 10 times in a row, including suction time. When swimming slowly the body of the cuttlefish contracts to 90% of its original size.

The muscular system in the cuttlefish closely resembles that of the octopus. However, there is an important difference: the cuttlefish has a layer of tendons, called the tunic, instead of the longitudinal muscles of an octopus. The tunic is composed of two layers that cover the inside and outside of the body just like the longitudinal muscles. In between these layers are the circular muscles. The radial muscles are situated in between these, in a perpendicular orientation.

The eye structure of a cuttlefish is extremely complex. It can focus the pupil by bringing the lens nearer to the retina. It can also adjust the volume of light taken into the eye by closing or opening the little lids beside the eye. The presence of such highly complex organs in structures of two completely distinct species such as humans and cuttlefish cannot possibly be explained by evolution. Darwin also spoke about this impossibility in his book.[38]



The reactive swimming systems, ink discharge-based defensive methods, the acute vision and the colour changing skin abilities that cuttlefish have are perfect examples of creation.

Under the skin of the cuttlefish is arrayed a dense layer of elastic pigment sacs called chromatophores. By using this layer, they can change the apparent colour of their skin, which not only helps in camouflage but also acts as a way to communicate. For instance, a male fish can take on a different colour when mating than that it would take on when in a fight with a challenger.

When a male flirts with a female, it takes on a bluish colour. If another male comes by during this, it gives a reddish colour to the half that faces the other male. Red is the warning colour used during a challenge or an aggressive action.

A thin layer of skin that surrounds the arms and the body further supports the reactive swimming system of the cuttlefish. The fish floats in the water by means of waving this curtain-like membrane. The arms, on the other hand, function to balance the body during the floating. They also work for braking during stopping.

The reactive swimming systems of the octopus and the cuttlefish actually function according to a principle that resembles jet planes. Through a closer examination, it is obvious that their muscular systems have been designed in the way most suited to them. It is, of course, absurd to assert that such complex structures could have been formed through coincidences.

There is an equally flawless design in the reproductive systems of cuttlefish. The eggs of these fish have sticky surfaces that enable them to adhere to cavities in the deeps of the sea. The embryo consumes the nutrients provided inside the egg until it is ready to hatch. The embryo breaks the egg casing with a small brushlike patch on its tail. This feature disappears shortly after hatching.[39] Every little detail has been designed and functions as it is designed to do. All of this miraculous creation is nothing but an expression of the infinite knowledge of God.

CHAPTER 5

The Termite Colony and Its Chemical Defensive Systems

Termites are small, ant-like creatures that live in crowded colonies. They build surprising nests that tower above the ground, which are in themselves wonders of architecture. What's even more interesting is the fact that the builders of such grandiose towers, the worker termites, are totally blind.

The structure of the termite nest demonstrates extraordinarily complex systems. There are special soldier units in the termite colonies that are responsible for defence. Soldier termites are equipped with wonderful artillery. While some are warriors, some are patrolling termites and yet others are "suicide commandos". From the incubation of the queen to the construction of tunnels and walls or the harvesting of the cultivated mushrooms, every affair inside a termite nest depends on the performance in defence of the soldiers.

The queen termite becomes extremely immobile as her body reaches 3.5 inches (9 centimetres) in length. Therefore, a special crew is responsible for her feeding, cleaning and safeguarding.

The survival of the colony is

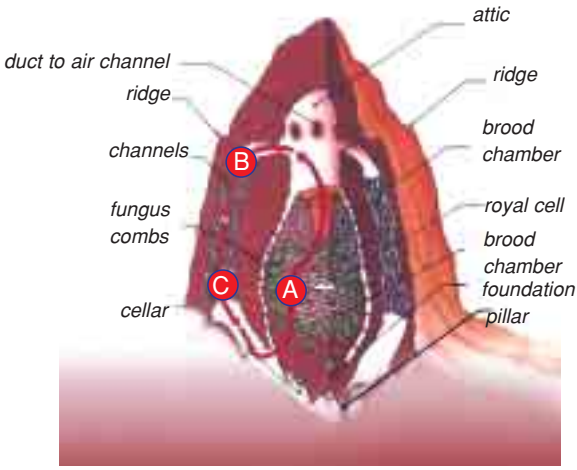
Termites start building their nests at ground level. As the population of the colony expands, in time the termite nest is enlarged accordingly. Its height can reach up to 13-16 feet (4-5 metres).

dependent upon the existence of the king and queen who engage in reproduction. The queen starts expanding after the first fertilisation. Its length can reach up to 3.5 inches (9 centimetres), and it looks exactly like a reproductive machine. It cannot move around easily. Since she does not do anything other than lying eggs, there is a special crew only to take care of her by feeding and cleaning her. She lays about thirty thousand eggs in a day, which means close to ten million eggs in her lifetime.

Being barren, the worker termites take care of housekeeping in the colony. Their lifespan ranges from two to four years. A certain group constructs and maintains the termite nest. Another group watches over the eggs, the newborn termites and the queen.

All members of the termite colony live together in organised communities. The members of these communities communicate through senses such as smell and taste, where chemical signals are exchanged. These deaf, dumb and blind creatures perform and co-ordinate such complicated duties as, building, hunting, stalking, security alerts and defence manoeuvres, by means of chemical signals.

The worst enemies of the termite colonies are ants and anteaters. When



In the construction of the termite nest, there are supplementary systems such as air-conditioners, humidifiers and ventilators. Furthermore, for the different parts of the nest, different temperatures are set and maintained. The temperature and carbon dioxide content of circulating air vary depending on location within the termite nest:[40]
A: 86^{0}F (30^{0}C) – 2.7% CO_2
B: 77^{0}F (25^{0}C) – 2.7% CO_2
C: 75^{0}F (24^{0}C) – 0.8% CO_2

a colony comes under attack by one of these predators, a special suicide arm is launched. African termites are excellent warriors equipped with razor-sharp teeth. They tear the attacker's bodies into pieces.

The only connection of a termite nest to the world outside is through tunnels that are the size of a single termite. Passing through any one of these tunnels requires "permission". The "guard" soldier termites at the door easily detect if the intruders are in fact residents of the colony from their smells. The head of a single termite can also work as a cap for any one of these tunnels, which are exactly same size. In case of attack, termites actually use their heads to close off these holes by entering backwards and becoming stuck in these doorways.

The Sacrifice of Termites

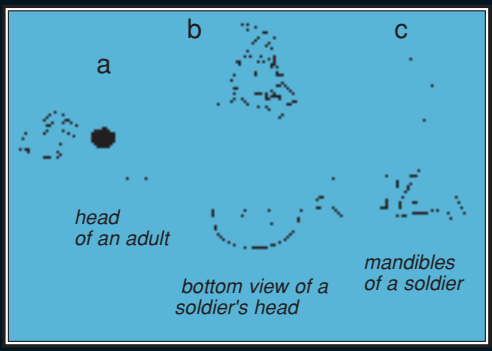
Another one of the methods of defence that termites often use is to willingly sacrifice their lives in order to secure the colony and harm the enemy. Various species of termites achieve these suicide attacks in different ways, e.g. a certain species living in the rainforests of Malaysia is particularly interesting. These termites are like "walking bombs" due to their anatomy and behaviour. A special sac within their bodies holds a chemical

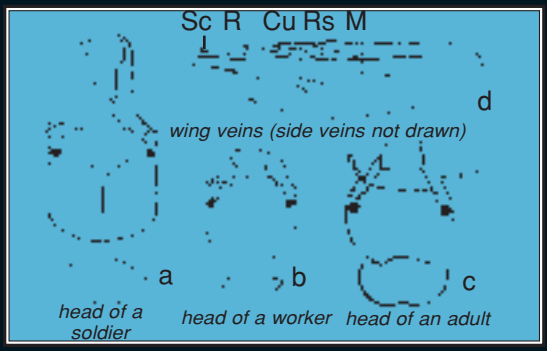
Termites conduct extremely organised battles against their worst enemies, the ants and ant-eating animals. They are so determined in their defences that even the blind workers throw themselves on the intruders in order to help the soldiers to overcome the enemy. Above, the picture shows workers dedicated to helping soldiers with distinctly large heads.

compound that renders their enemies ineffective. In case of attack, when squeezed harshly by an ant or any other intruder the termite contracts its stomach muscles and raptures the lymph tissues, which saturates the predator with a thick, yellow-coloured fluid. Worker termites in Africa and South America utilise a similar method. This is exactly a suicide attack since the internal organs of the creature are fatally damaged and the creature dies shortly thereafter.

If the offensive attack is very strong, then even the workers enter the battle in order to help the soldiers.

Termites' teamwork and such sacrifice destroys the fundamental assertion of Darwinism that "every creature lives for its own interest". Furthermore, these examples show these creatures to be organised in a very amazing way. For instance, why should a termite want to be a guardian? If





it had an option, why would it choose to have the heaviest and most self-sacrificing job? If, in fact, it could choose, it would have chosen the easiest and least demanding duty. Even if we assume that it decides to sacrifice itself in defence, then it is still impossible for it to pass this behaviour down to succeeding generations through its genes. We know that worker termites are barren and are not able to produce any descendent generations.

Only the Creator of termites could have designed such a perfect colony life and given constituent termite groups distinct responsibilities. Guardian termites, too, diligently execute the duty that God inspires in them.

Systems Preventing Coagulation

Termites utilise special systems created in their bodies in implementing inborn defensive and instinctive sacrifices. For instance, some termites spray poisonous chemicals into the scars inflicted as a result of bites. Some apply an interesting "brushing" technique; they paste the poison onto the offender's body by using the upper lip like a brush. Some termites apply an infectious adhesive onto the attacker by a "spraying" method.

Defence of the termite nest is the responsibility of a group of females in a species of African termite. These females are barren and relatively smaller soldiers. Royal guardians, which are much larger in size, safeguard the young larvae and the royal couple by preventing any intruders from

A termite defends its colony even at the price of its own life. In the picture is a termite spraying adhesive fluid on an attacking ant.

entering the royal cell. Smaller soldiers help the workers in food gathering and repair of the nest.

The royal guards have been created for battle; they have shield-like heads and razor-sharp mandibles designed for defence. 10% of the body weight of the large soldiers is comprised of special fluids. These fluids are composed of open-chain hydrocarbons (alkenes and alkanes) and are stored inside sacs located to the front of their bodies. Royal guards inject these chemical fluids into wounds inflicted on enemies by means of their lower jaws.

What exactly do these fluids applied to enemies do? Researchers encountered a very astounding fact in answering this question. The fluids applied by the termites act to prevent the enemies' blood from clotting. In the bodies of ants there is a fluid called "haemolymph" which acts as blood. When there is an open wound in the body, another chemical starts

coagulation and enables the wound to heal. The chemical fluid from termites renders this clot-forming chemical useless.

The presence of a coagulation system inside the body of a minute insect like the ant is another testimony to the creation. It is simply miraculous not only that termites produce a fluid that can neutralise this system but also have organs that can deliver the fluid effectively. Certainly, a perfect harmony such as this cannot possibly be explained through coincidence in any way. Termites are surely not chemists, who understand the details of the coagulation system in ants or synthesise a compound formula to neutralise this system. This flawless design is without a doubt another clear evidence that these creatures have been created by God.

Weapons of Termites

One can find many other similar examples of flawless design in the world of termites. The soldier termites of a termite family kill their enemies by rubbing poison onto their bodies. In order to accomplish this more effectively, they are given smaller mandibles and brush-like upper lips. These soldiers can also synthesise and store insecticide chemicals. A typical soldier can store defensive fluids that comprise up to 35% of its body weight, which is enough to kill thousands of ants.

Florida resident Prorhinotermes are created possessing a poison rubbing technique. They make use of chemicals called "nitroalkane" as poisons. Many other termites also use methods involving the application of poisons, but the amazing point is the different chemical structures of all these poisons. For instance, an African Schedorhinotermes utilise "vinyl ketones". Guyanan termites have "B-ketoaldehydes" and Armitermes termites

A soldier termite patrols in front of the termite nests. These termites spray a certain infectious and adhesive fluid, which is a type of chemical weapon.

have a "molecular string" as poison and chemicals called "esters" or "lactones" as their weapons. All of these poisons immediately react with biological molecules and cause death.

On the foreheads of members of a Nasutitermitinae termite family are hose-like projections that have special sacs inside. In case of danger, the termite points this projection towards the enemy and sprays an infectious fluid. This weapon works just like a chemical bazooka.[41]

According to the theory of evolution, one has to accept the assumption that "primitive termites" had no chemical production systems in their bodies and that it somehow formed later as a result of a series of coincidences. However, such an assumption is totally illogical. For the poisoning system to work properly, not only the chemical itself but also the organs to handle these chemicals need to be totally functional. Furthermore, these organs have to be adequately isolated so that no poison spreads within the body. The dispensing organ has to be properly formed and isolated as well. The spraying pipe further requires a mechanical system that is powered by a separate muscle.

All these organs could not possibly have formed in a process of evolution over time since the lack of a single component would render the whole system useless causing the extinction of the termite. Therefore, the only logical explanation would be: the "chemical weapon system" has been created altogether in the same moment. And this would prove that there is a deliberate "design" in all of these, which is called "creation". Just like all the other creatures in the nature termites have been created in a moment. God, Lord of the Worlds, fabricated the poison production centre in their bodies and inspired in them the best way to utilise their faculties.

CHAPTER 6

Blood: Life-giving Fluid

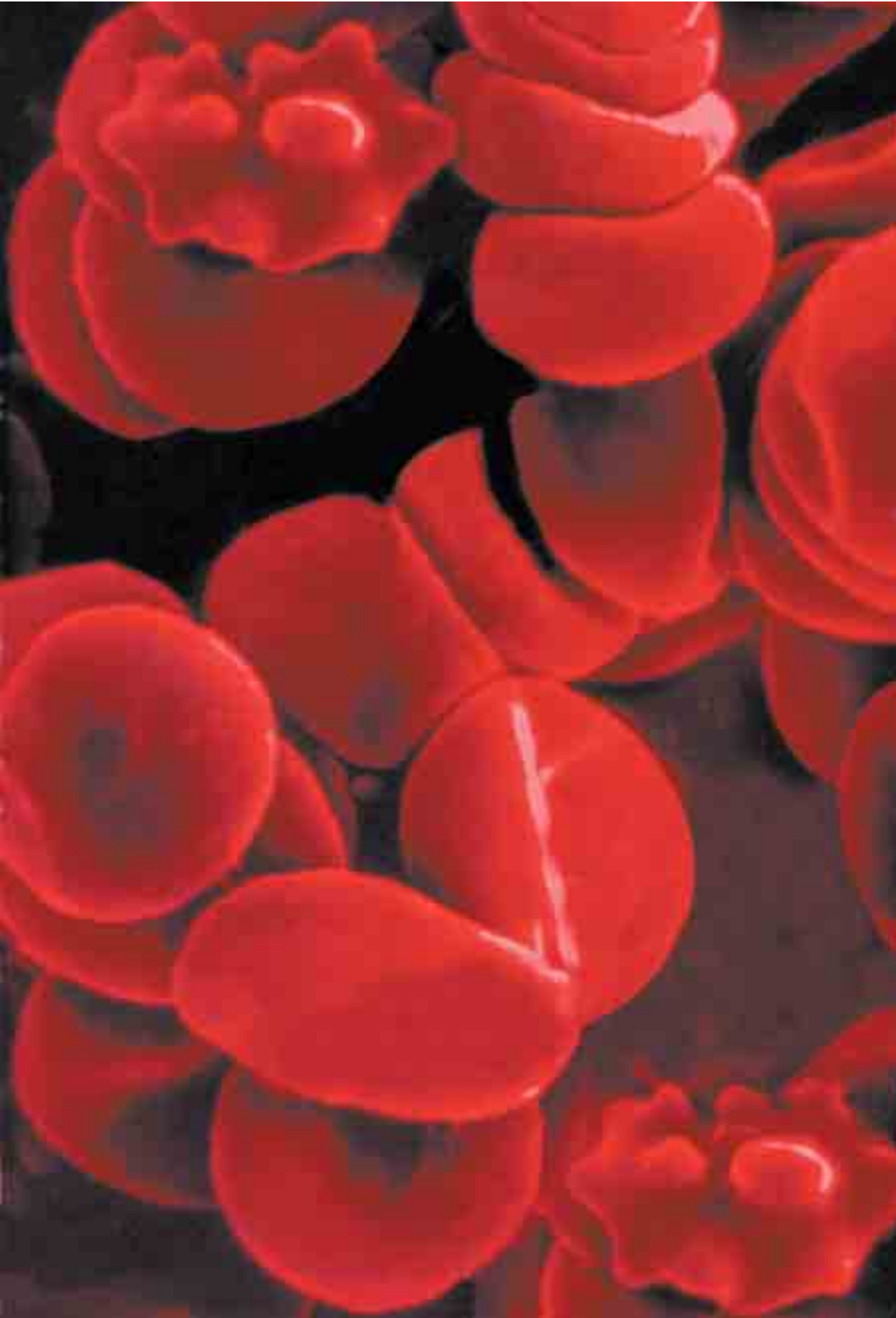
Crucial Functions of Blood

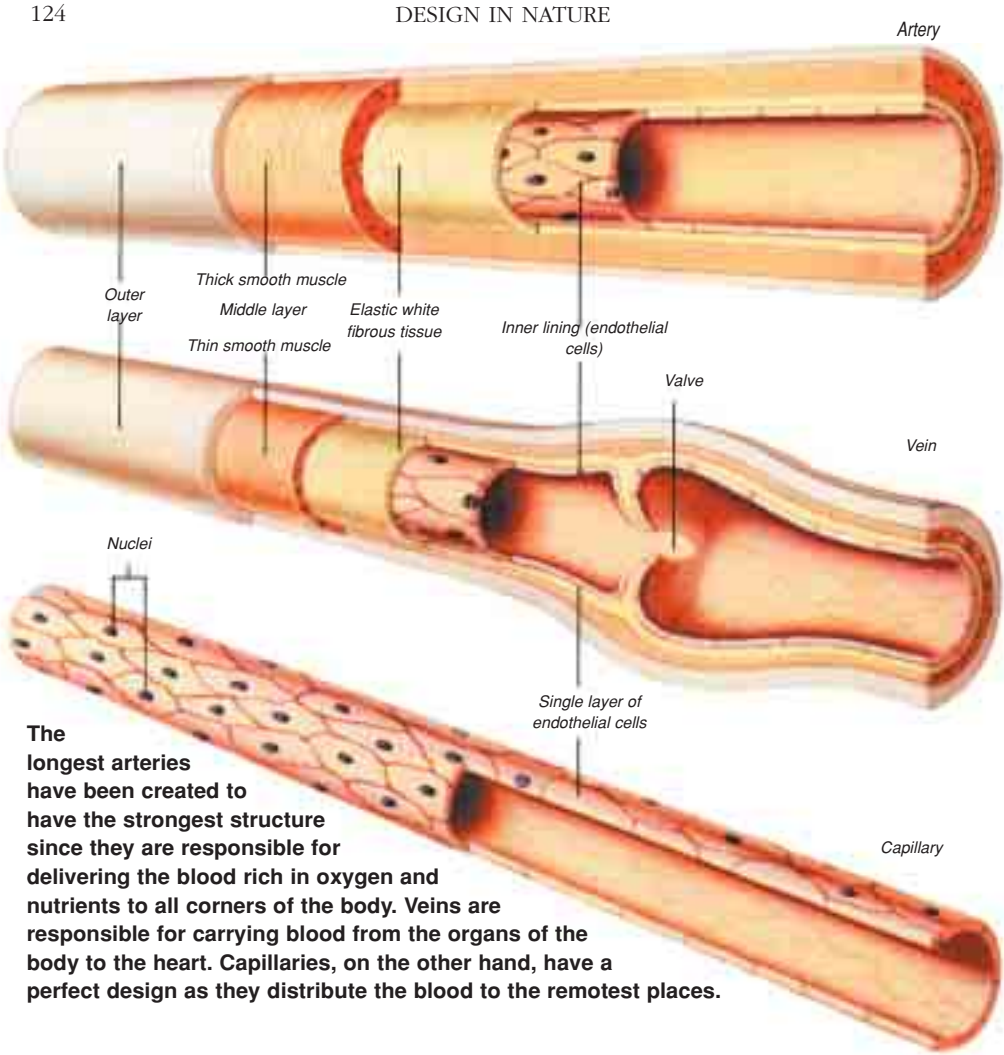
Blood is a liquid that is created to give our bodies life. As long as it circulates within the body, it warms, cools, feeds and protects by cleansing the body of toxic substances. It is almost solely responsible for communication within our bodies. In addition, it immediately repairs any fractures in the walls of veins and so the system is rejuvenated.

On average, there is 1.32 gallons (5 litres) of blood in the body of a human weighing 132 pounds (60 kilograms). The heart can make this amount of blood circulate in the body easily within a minute. However, while running or exercising, this rate of circulation can increase to five times as high. Blood flows everywhere: from the roots of the hair to the toes, inside veins of varying sizes. The veins have been created of such a flawless structure that no clogging or sediments are formed. A variety of nutrients and heat are carried through this complex system.

Oxygen Carrier

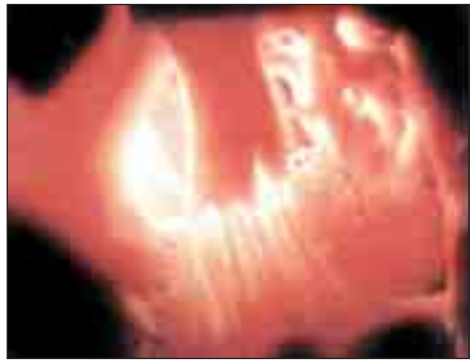
The air that we breathe is the most crucial substance for our survival. The oxygen is as necessary for the cells' burning of sugars in energy production as it is for setting a log on fire. This is why oxygen has to be carried from the lungs to the cells. The blood circulatory system, resembling a complicated network of pipelines, serves this very purpose.





The longest arteries have been created to have the strongest structure since they are responsible for delivering the blood rich in oxygen and nutrients to all corners of the body. Veins are responsible for carrying blood from the organs of the body to the heart. Capillaries, on the other hand, have a perfect design as they distribute the blood to the remotest places.

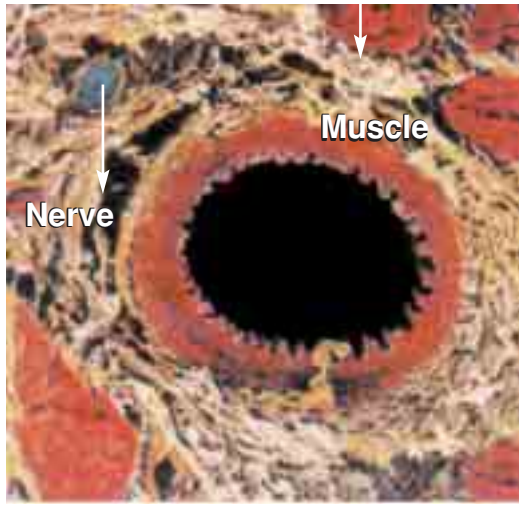
Haemoglobin molecules inside the red blood cells carry the oxygen. Each one of the disk-shaped red blood cells carries about three hundred million haemoglobin molecules. The red blood cells display a flawless working order. They not only carry the oxygen, but also release it wherever it is necessary, e.g. in a working muscle cell. Red blood cells deliver oxygen to tissues, carry the carbon dioxide, which is produced after the burning of sugar, back to the lungs and then leave it there. Following this, they again bind to oxygen and take it to the tissues.



If it were not for the heart, blood would have been a stale, thick red fluid (above). However, the heart pumps blood into the remotest portions of the body (left).

A Pressure Balanced Fluid

Haemoglobin molecules also carry nitrogen monoxide (NO) gas in addition to oxygen. If this gas were not present in blood, its pressure would change constantly. Haemoglobin also regulates the amount of oxygen to be delivered to tissues by means of nitrogen monoxide. Amazingly, the source of this 'regulation" is nothing but a molecule, i.e. a mere collection of atoms that does not have a brain, eyes or conscious mind. Regulation of our bodies by a collection of atoms, of course, is a sign of the infinite wisdom of God Who created our bodies without flaws.



A layer of special muscle tissue wraps the blood vessels. When the muscle contracts, the vessel becomes narrower and increases the blood pressure. The picture to the right is a section of a narrowed vessel. This is why the interior of the vessel is corrugated (above). Around the vessel, there are muscle tendons (red) and a nerve (blue).

Cells of Ideal Design

Red blood cells make up the majority of all blood cells. An adult male blood contains thirty billion red cells, which would be enough to cover almost half the surface of a soccer field. These cells give colour to our blood and therefore to our skin.

Red cells look like discs. Due to their incredible flexibility, they can squeeze through capillaries and the minutest holes. If they were not so flexible, they would surely be stuck in various areas of the body. A capillary is normally four to five micrometres in diametre, whereas a red cell is about 7.5 micrometres (one micrometre is one thousandth of a millimetre, which is 0.000039 inch).

What would happen if red cells were not created with such flexibility? The researchers of diabetes gave some answers to this question. In diabetic patients, red blood cells loose their flexibility. This situation frequently gives way to clogging with inflexible red blood cells in the delicate tissues of the patients' eyes, which can lead to blindness.

Automatic Emergency System

The lifespan of a red blood cell is about 120 days after which they are removed by the spleen. This loss is balanced by the continuous production of new cells. Under normal conditions, 2.5 million red blood cells are generated per second, a number which can be increased if necessary. A hormone called 'erythropoietin" regulates the rate of generation. For example, as a result of heavy bleeding due to accident or nose bleeds, the loss is immediately balanced. In addition, the rate of generation is increased if the oxygen content of the air is reduced. For instance, while climbing at very high altitudes, due to the continuously declining oxygen content, the body automatically takes this action in order to make the most efficient use of the oxygen available.

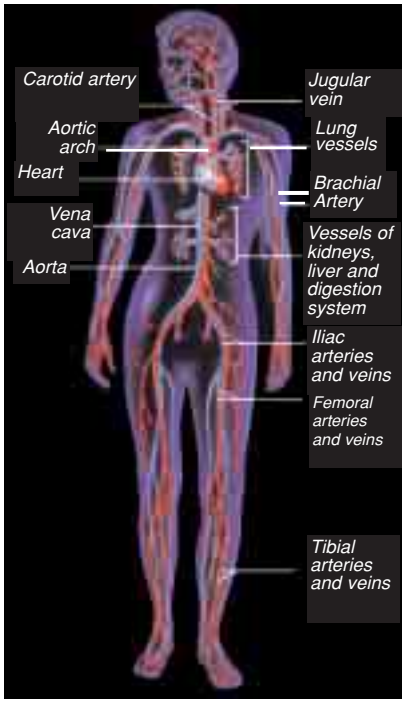
Perfect Transportation System

The fluid portion of blood called plasma carries numerous other substances present in the body apart from just blood cells. Plasma is a clear

yellowish fluid, which comprises 5% of the normal body weight. In this fluid, 90% of which is water, salts, minerals, carbohydrates, fats and hundreds of different types of proteins are suspended. Some of the proteins in the blood are transport proteins, which bind lipids and carry them to tissues. If the proteins did not in this way carry the lipids, the lipids would randomly float anywhere, giving way to fatal health problems.

Hormones in the plasma take on the role of special couriers. They facilitate communication between organs and cells by means of chemical messages.

Albumin is the most populous hormone in the plasma, which is in a sense a transporter. It binds lipids such as cholesterol, hormones, billirubin, a toxic yellow bile pigment, or medicines like penicilin. It leaves the poisonous substances in the liver and takes other nutrients and hormones to wherever they are needed.



The circulatory system feeds each one of the hundred trillion cells that constitute the human body. In the figure, the red vessels represent oxygenated blood and the blue depict the deoxygenated blood.

When all these things are considered, it becomes clear that the body is created in an extremely detailed way. The abilities of a single protein to distinguish between lipid, hormone and medicine, and to determine not only the locations in need of them but also the amounts to be delivered, are all indications of flawless design. Furthermore, these surprising examples are only few out of dozens of thousands of different biochemical events taking place in a body. All of the trillions of molecules in the body work in a marvellous harmony. And, in fact, all of these molecules spring from the division of a single cell that forms in the womb of a mother. It is clear that this miraculous system of the human body is a wonderful artistry of God, Who created man from a single drop of water.

Special Control Mechanisms

If a blood clot (above) forms in the coronary veins of the heart and continues to enlarge, it leads to a heart attack. In some situations due to blood pressure, heart tissue is ruptured. Blood gushes out of the heart as if spraying from a hose (below).

Nutrients have to cross from the arteries through the artery wall, in order to penetrate into the necessary tissues. Although the artery wall has very small pores, no substance can penetrate it by itself. It is the blood pressure that facilitates this penetration. However, nutrients crossing over into the tissues in larger quantities than necessary causes inflammation in the tissues. Therefore, there is a special mechanism instituted for balancing blood pressure and withdrawing fluid back to the blood. This is the responsibility of albumin, which is larger than the pores in the artery wall and numerous enough in the blood to suck up the water like a sponge. If there were no albumin in the body, it would swell like a dry bean left in water.

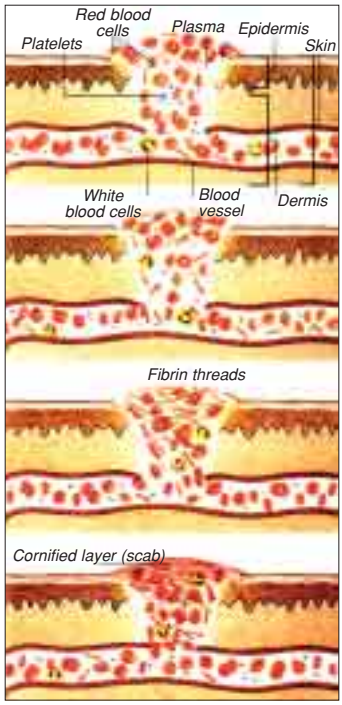
On the contrary, materials in the blood should not enter the tissues of the brain uncontrolled, since unwanted substances can severely damage nerve cells (neurons). Therefore, the brain is protected against all possible scenarios of harm. Dense cell layers close off pores. All substances are required to pass through these layers as if passing through a security checkpoint, which facilitates a balanced flow of nutrients into the most sensitive organ of the whole body.

Thermostat in the Body

Apart from toxins, red blood cells, vitamins and other substances, blood also carries heat, a by-product of energy generation in the cells. Distributing and balancing body heat in accordance with the outside temperature is vitally important. If there were no heat distribution system in our bodies, our arms would overheat and the rest of the body would be cool when the arm muscles are used, which would greatly damage the metabolism. This is why heat is evenly distributed throughout the body, which is facilitated solely by the circulatory system. In decreasing the body-

heat that is distributed all over the body, the perspiration system is activated. In addition, blood vessels enlarge under the skin, enabling excess heat in the blood to be transmitted to the outside air. This is why when we run or do other high-energy activities, our faces become red. Blood circulation is as responsible in preservation of the body heat as in cooling. In colder temperatures, the blood vessels under our skin shrink, which serves to reduce the amount of blood in the area where heat escape is most probable and hence to keep cooling to a minimum. The reason for a person's face turning white when cold is the precaution that the body automatically takes.[42]

Everything taking place in the blood is extremely complicated and intertwined. Everything has been created flawlessly down to the smallest detail. In fact, there is such a wonderfully intricate balance in the bloodstream that the smallest breakdown could potentially cause very serious complications. Blood has been created with all its necessary properties by the One Creator in a moment. This Creator, the owner of superior knowledge and power, is God.



The Blood Clotting Mechanism: When a wound starts bleeding on our bodies, an enzyme called thromboplastin that is released from damaged tissue cells combines with the calcium and prothrombin in the blood. As a result of the chemical reaction, the resulting mesh of threads form a protective layer, which solidifies eventually. The top layer of cells eventually die, becoming cornified, so forming the scab. Underneath the scab, or protective layer, new cells are being formed. When damaged cells are completely replaced, the scab drops off.

A System Without Room for Smallest Error: Blood Clotting

Everybody knows that bleeding will eventually stop when there is a cut or when an old wound starts bleeding again. Where the bleeding is, a blood clot forms that hardens and heals the wound in due time. This may be a simple and normal phenomenon for you, but biochemists have shown through their research that this actually is the result of a very complicated system at work. The lack of any one component of this system or any damage to it would render the whole process useless.

Blood has to coagulate in the right time and place and when normal conditions are restored, the clot should vanish. The system functions flawlessly down to the minutest detail.

If there is bleeding, the clot should form immediately in order to prevent the creature from dying. Furthermore, the clot should cover the entire wound and, more importantly, should only form over, and remain right on top of, the wound. Otherwise all the blood of the creature could coagulate and cause its death, which is why the clot should form at the right time at the right place.

The smallest elements of the bone marrow, the blood platelets or thrombocytes, are crucial. These cells are the main elements behind the coagulation of blood. A protein, called the Von Willebrand factor, ensures that, in their continuous patrol of the blood stream, these platelets do not miss the place of the

injury. The platelets that become entangled in the location of the injury release a substance that collects countless others to the same place. These cells eventually shore up the open wound. The platelets die after performing their duty in locating the wound. Their sacrifice is only a part of the coagulation system in the blood.

Thrombin is another protein that facilitates coagulation of blood. This substance is produced only at the location of the wound. This production must be neither more nor less than necessary, and has also to start and stop exactly at the required times. There are more than twenty body chemicals called enzymes that have roles in the production of thrombin. These enzymes can trigger its reproduction or halt it. The process is under so much scrutiny that thrombin only forms when there is a real wound to the tissues. As soon as the enzymes of coagulation reach a satisfactory level in the body, fibrinogens that are composed of proteins are formed. In a very short while, a mesh of fibres form a web, which is formed at the location of the escaping blood. In the meantime, patrolling platelets continue to become entangled and accumulate at the same location. What is called a clot is the plug that is formed due to this accumulation.

When the wound totally heals, the clot dissolves.

The system that enables formation of the clot, determining its extent, strengthening or dissolving the formed clot undoubtedly, has an absolute irreducible complexity.[43]

The system works flawlessly down to the minutest detail.

What would happen if there were small problems within this perfectly functioning system? For example, if there was coagulation in the blood even without a wound, or if the clot could easily break off from the wound? There is a single answer to these questions: in such cases the bloodstream to the most vital and intricate organs, such as

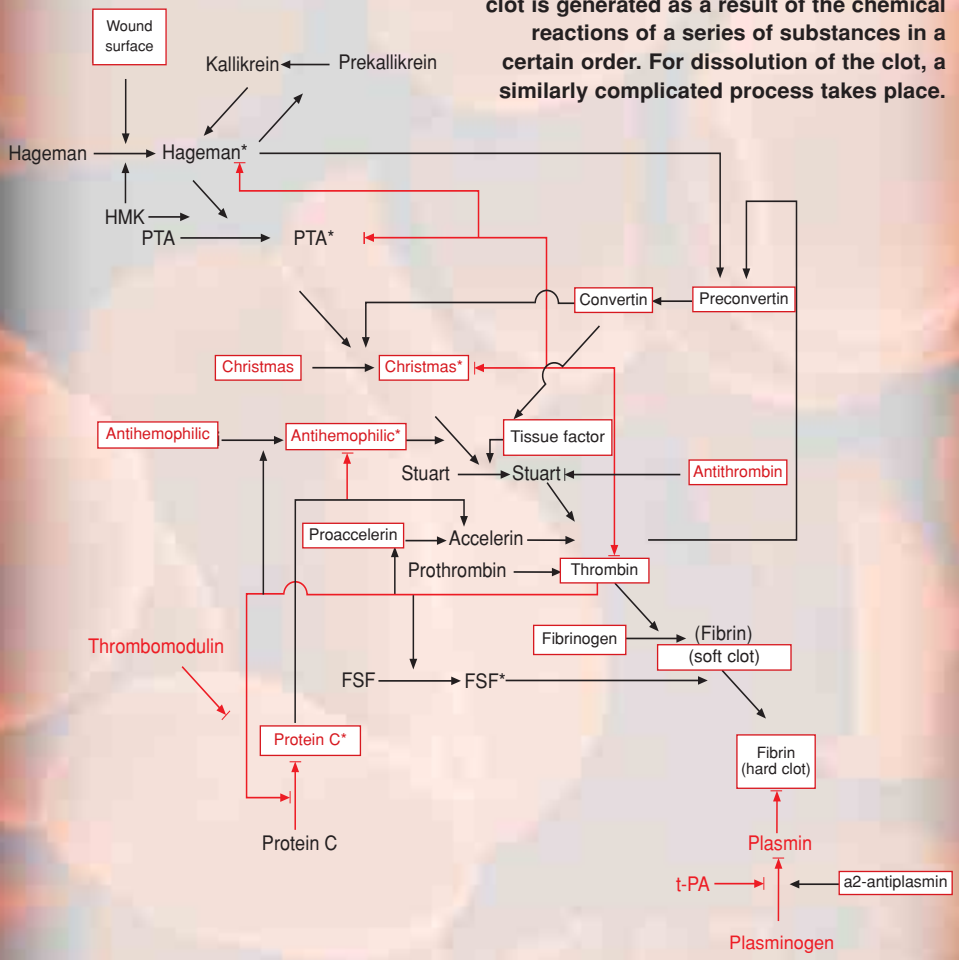
heart, brain and lungs, would be clogged with clots, which would inevitably bring death.

In reality, this shows us one more time that the human body is flawlessly designed. It is impossible to explain the clotting system of the blood through the hypothesis of coincidence or "gradual development" as asserted by the theory of evolution. Such a carefully engineered and calculated system as this is indisputable evidence of the perfection in creation. God, Who created us and placed us on this earth, has created our bodies with this system, which protects us in many cases of injury that we encounter throughout our lives.

The clotting of blood is very important not only for visible injuries but also for the ruptures of capillaries in our bodies that happen all the time. Although unnoticed, there are continuously small internal bleedings. When hitting an arm against a door or sitting down too heavily, hundreds of capillaries are ruptured. These bleedings are immediately stopped by means of the clotting system and the capillaries are reconstructed in their normal condition. If the impact is more serious, then the internal bleeding is stronger, giving way to the bruising commonly termed "turning purple". A human lacking the coagulation system would have to avoid even the smallest impacts. Haemophilic patients, having defective coagulation systems, live their lives like that. Patients with advanced haemophilia unfortunately do not survive too long. Even small internal bleedings, inflicted by a simple slip and fall, could be enough to end their lives. Due to this simple reality, each individual should consider the miracle of creation within his/her own body and be thankful to God, Who created that body flawlessly. This body is a blessing to us from God, a single cell of which we cannot even reproduce.

The Blood Coagulation Mechanism

The figure below[44] illustrates the coagulation mechanism of the blood. The clot is generated as a result of the chemical reactions of a series of substances in a certain order. For dissolution of the clot, a similarly complicated process takes place.



●	→	*Proteins that are involved in promoting clot formation*
●	→|	*Proteins that are involved in the prevention, localization, or removal of blood clots.*

CHAPTER 7

Design and Creation

A designer designs models by means of sketching on blank paper. Everything that the designer has seen up to that point constitutes the base of the idea from which his current design is derived. That is because every form and shape in nature is a design. No human designer can design something that they have never seen or never known.

Let us examine the way that a design follows in the formation of a new design: first, the designer determines the material and purpose of the design. Then the designer determines the potential user, the needs of the user and therefore the parametres of the design.

Among all career groups in the world, industrial product designers are probably those who need the least material while working. That is because besides hard work, a good design requires primarily devising clever ideas or subsidiary details during the process. At the beginning, a designer needs nothing more than a clean sheet of paper and a pen. While forming his design, he of course reviews and takes precedent examples as models.

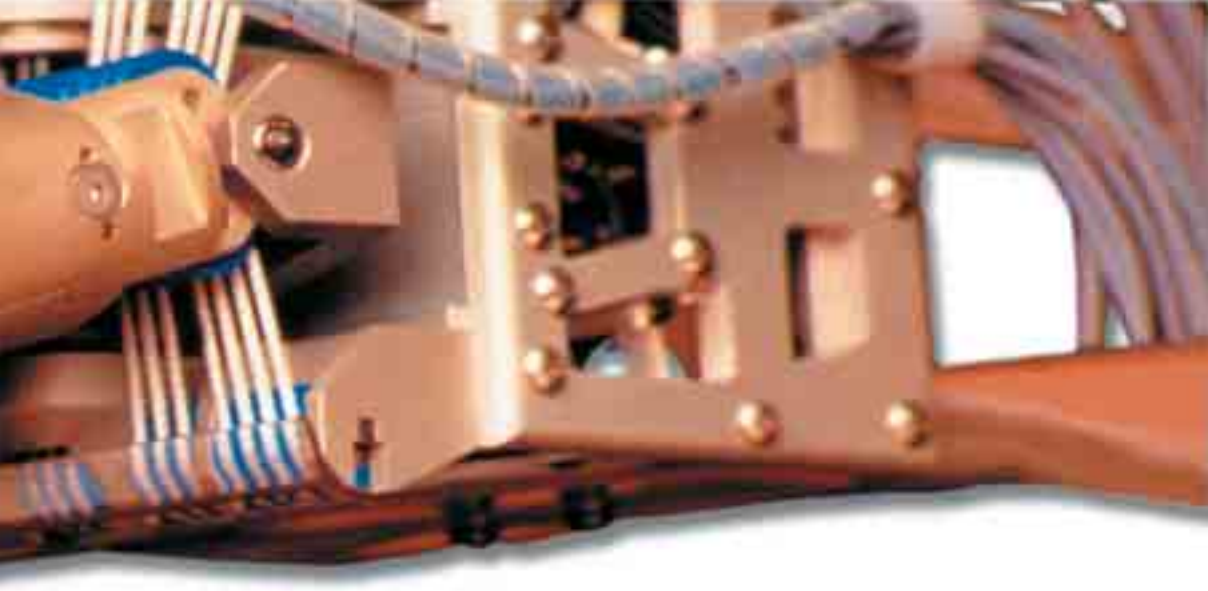
The designer sketches hundreds of different alternatives for months.

No industrial design can compete with nature. No robotic hand can match the flawlessly functional creation of a human hand.

Then these ideas are reviewed and, from among them, the most functional and aesthetic is selected for production, after which details of feasible production are studied.

First, a scale model of the product is made, which transfers two dimensional ideas into three dimensions. After further refinements, an actual size model of the product can be constructed. All of these processes may take years. During this time, the model is also experimented with and tested for user friendliness.

A new design introduced into the market is naturally first evaluated by its appearance by consumers. In general the primary factor in the sales of a product is appearance, i.e. shape, colour, etc. and second, functionality.



Therefore, the process from initial conception to production is quite extensive. In fact, the Sole Owner of all designs is One Who has power over all things. God creates all creatures flawlessly through a single command: "be".

The faculty of creating from nothing and without precedent belongs to God alone. Humans just copy these examples. Furthermore, the human designer is himself a wonderful creation. God created creatures and humans from nothing and bestowed on humans the skills for designing.

For many things that we think are the result of human design there are precedents in nature. The structures and technological products that emerge after years of research had already been present in nature for millions of years.

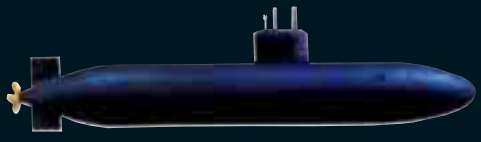
Aware of these facts, designers, architects and scientists choose to follow the exemplary properties of God's creations in designing new products.

DESIGN EXAMPLES FOLLOWED BY HUMANS

Designs in nature are always an endless source of inspiration. The majority of the products of modern technology imitate designs found in nature.

Dolphins and Submarines

The snout of dolphins has been a design model for the bow in modern ships. By the help of this structure, ships save almost 25% of their fuel consumption. After a four-year research, German submarine engineers managed to make a synthetic coating having the same feature as that of the dolphin's skin. A 250% increase in the speed of submarines was observed in those in which these coatings were used.



Whales and Flippers

Whales have two horizontally flattened divisions in their large tails. Monofins facilitate a similar swimming style as whales, which is ideal for scuba diving.

Mountain Goats and Boots

The feet of mountain goats are perfect for climbing rocky hills even under snowy and icy conditions. Many hiking boots and climbing shoes are designed with inspiration from the hoofs of these animals.

Rabbits and Snowshoes

The North American rabbit has large feet covered with fur, which prevents it from getting stuck in the snow. Snowshoes essentially do the same thing for humans.

Velcro Bandages and Burrs

The Swiss engineer Georges de Mestral invented a new buttoning system called the Velcro Bandage by imitating burrs (burdock seeds).
After spending a great deal of effort in getting rid of these parts of plants sticking to his clothes, Mestral thought to use the system of these plants in the clothing industry.
He formed the same clasping system in an overcoat, which consists of one strip of nylon with loops, and another with hooks.
Due to the flexibility of the loops and curls, the system attaches and detaches easily, without wearing out. This is why the suits of astronauts are today equipped with Velcro bandages.

Forearm System and Robots

Many of today's industrial institutions utilise machinery instead of manpower.
Especially popular are the robotic arms that imitate the mechanism of the human arm, which can repeatedly and unceasingly make the same movement.
Human muscular and skeletal system are taken as a model in the production of these robots.

Bone Structure and Architectural Structures

The porous inner structure of bones makes them resistant to pressure, especially at the joints where the bone structure is enlarged. This special design of bones creates both lightness and durability. Architects copy this system in many structures.

DESIGN EXAMPLES IN INSECTS

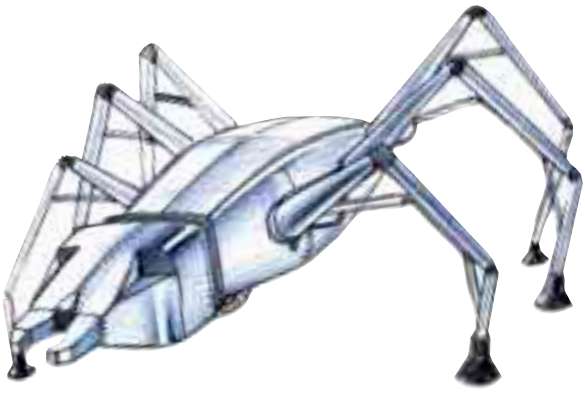
From an Insect to a Modern Train Station
In 1987, French politicians commissioned the architect Santiago Calatrava to design Lyon-Stolas, the station for the TGV super fast train. They aimed at expressing the structure of the station in a way which would make it a glamorous, attractive and landmark symbol. Concrete columns support this dinosaur rib-cage like structure, the inspiration for which comes from an insect. Green and blue lights that could easily be found on an insect's shell highlight the structure. Since the grand opening in July 1994, the station has been recognised as a masterpiece.

Insects and Robot Technology

It is not only architects who benefit from study of the creation. The engineers who developed robot technologies examined insects for inspiration. Robots constructed upon the model of insect legs prove to stand with better equilibrium. When suction pads are installed on the feet of these robots, they can climb walls just like flies. A particular robot constructed by a Japanese corporation can walk on the ceiling just like an insect. The corporation utilises this robot to inspect under bridges by means of sensors attached to its body.[45]

The American army has been known to be exploring micro machines for a long time. According to Professor Johannes Smith, a motor smaller

than 0.039 inch (one millimetre) can drive a robot the size of an ant. A robot such as this is under consideration for use in a small army of ant-like robots in order to penetrate behind enemy lines undetected and damage jet engines, radars and computer terminals. Two of Japan's largest industrial corporations, Mitsubishi and Matsushita, have already taken the first steps in collaborating on the subject. The outcome of this collaboration is a minute robot weighing 0.015 ounce (0.42 gram) and walking 13 feet (4 metres) a minute.



Chitin: Perfect Cladding Material

Insects are the most populous creatures on earth, which is largely because their bodies are very resistant to many adverse conditions. One of the factors in their resistance is the chitin substance that forms their skeletons.

Chitin is extremely lightweight and thin. Insects never face hardship maintaining it. Although it wraps the body externally, it is sturdy enough to act as a skeleton. At the same time, it is outstandingly flexible. It can be moved by means of muscles attached to it from inside the body. This not only improves the rapid movement of the insects but also decreases the impact of external blows. It is waterproof because of a special exterior coating, which doesn't allow seepage of any body fluids.[46] It is unaffected by heat or radiation. Most of the time, its colour fits the surroundings perfectly. Sometimes it signals warnings through bright colours.

What would happen if such a substance as chitin were used in aircraft and space ships? In fact, this is the dream of many scientists.

The Abdomen of the Desert Scorpion

The abdomens of insects are created to different designs depending on body structure and activity. For example, the desert scorpion is covered with highly sensitive organs called rake, with which scorpions sense the hardness of the soil and determine the most appropriate place to lay eggs.

Chitin, which forms the exoskeletons of many insects, is an ideal material. It is strong, flexible and has insulation features.

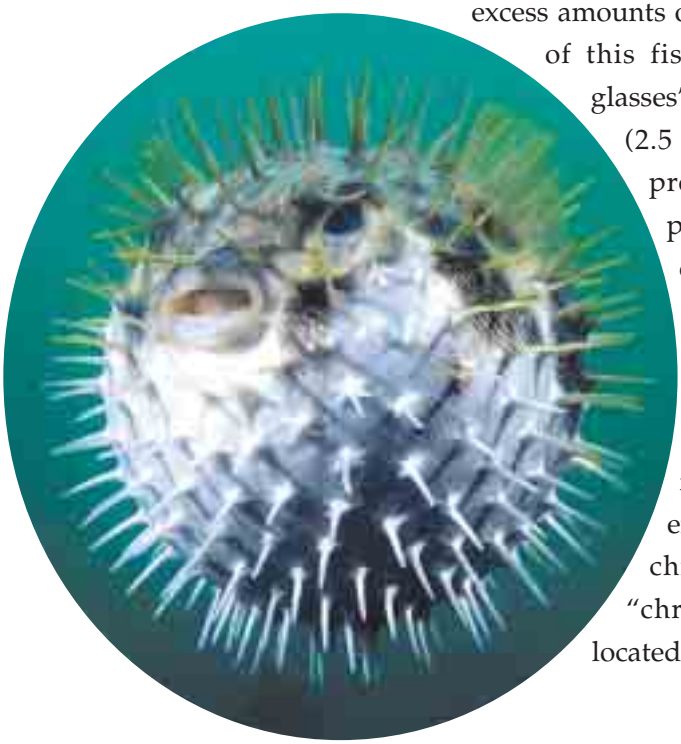
The Ideal Shape of Red Blood Cells


Red Blood Cells

Red blood cells have the responsibility of carrying oxygen in the blood. Oxygen is carried in the blood by haemoglobin which is stored in the red blood cells. The larger the surface of this cell, the more oxygen is carried. Since red blood cells have to travel inside capillaries, their volume has to be minimal i.e. they have to have the maximum surface with minimum volume. Hence, red blood cells are specially designed to fit these criteria: they are structured as flat, round and pressed in on both sides, and resemble a wheel of Swiss cheese that is squeezed on both sides. This is the shape that has the largest surface possible with the smallest volume. Each red cell can carry 300 million haemoglobin molecules due to this shape. In addition, red cells can pass through the narrowest capillaries and tightest pores because of their flexibility.[47]

The Chromatic Eyes of Balloon Fish

Balloon fish reside in the warm seawaters of South-eastern Asia. When excess amounts of light fall on them, the eyes of this fish act as a "chemical sun-glasses". The eyes of this 1 inch long (2.5 centimetre) fish show properties similar to photochromic lenses, the colours of which can become more or less intense depending on the strength of the light.



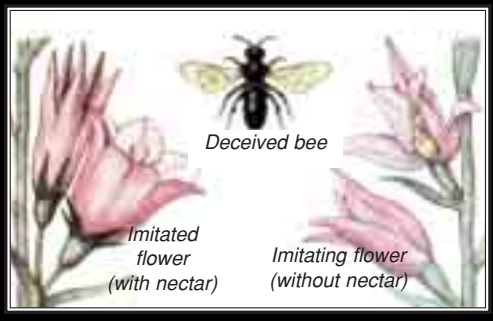
The system functions as follows: when the fish encounters excessive light, the chromatic cells called "chromatophore", which are located around the transparent layer

(cornea) of the eye, start to release a yellowish dye (pigment). This pigment covers the eye and acts as a filter reducing the intensity of light, which enables the fish to see more accurately. In dark waters, this pigment disappears and the eye receives the maximum possible amount of light.[48]

It is obvious that this system is a product of conscious design. These cells releasing or clearing pigments is regulated consciously and cannot be considered as a product of coincidence. It is an expression of the perfection in the creation of God that an irreducibly complex organ structure such as the eye should be equipped with such a flawless chromatic system.

Design in the Rock Cactus

Some plants are created with special properties for defence from plant-eating predators and rodents. Some of these plants display properties miraculously similar to the surrounding environment in which they grow. The best example of these similarities is found in the South African rock cactus. Due to drought, the surfaces of these plants are extremely wrinkled. When these wrinkles are filled with dust, it becomes impossible even for humans to distinguish these plants from rocks. If it were not for this property, this plant would become an irresistible target for insects and rodents. Another speciality of the rock cactus is the fact that it blossoms with very brightly coloured flowers at the end of the season of drought. Since the majority of creatures are absent at that time, it reduces the risks brought about by the flowers, which could nullify the camouflage.



The nectar-containing violet-coloured bellflowers (Campanula persicifolia) and non-nectar containing red-coloured orchid flowers (Cephalanthera rubra) live together in the Mediterranean region. A species of solitary bee (Chelostoma fuliginosum) first visits the bellflower and extracts the nectar. Then it travels to the orchid flowers that have the same colour as the bellflower. However, there it finds no nectar. The orchid flower achieves cross-pollination by this method.

A Special Design for Plants: Leaves

Leaves are the respiratory organs of trees: they inhale oxygen and exhale carbon dioxide. Upon close examination, leaf structure appears extraordinarily thin, light and taut, but also very sturdy. They are very resistant to rain and wind. A leaf is covered with vessels that decrease in size from the largest at the stem to the smallest, which are particularly visible on the underside. This structure not only facilitates circulation of substances but also functions as a skeleton ensuring rigidity.

MECHANIC SYSTEM DESIGN OF CREATURES

Often, the design of moving systems is much more challenging to designers than stationary structural systems. For instance, the problems encountered in the design of a hand-drill are much more numerous than in that of a jug. This is because the former is based on functionality but the latter on form, and function oriented designs are more complicated. Each component of design should serve a purpose for a specific goal. Absence or malfunction of a single component renders the system useless.

Designs with such errors are doomed to failure. Mechanical systems designed by humans generally have more flaws than commonly believed. Many of these systems have been designed by trial and error. Although some defects are eliminated during the prototyping phase prior to the product's introduction to the market, not every defect can be prevented.

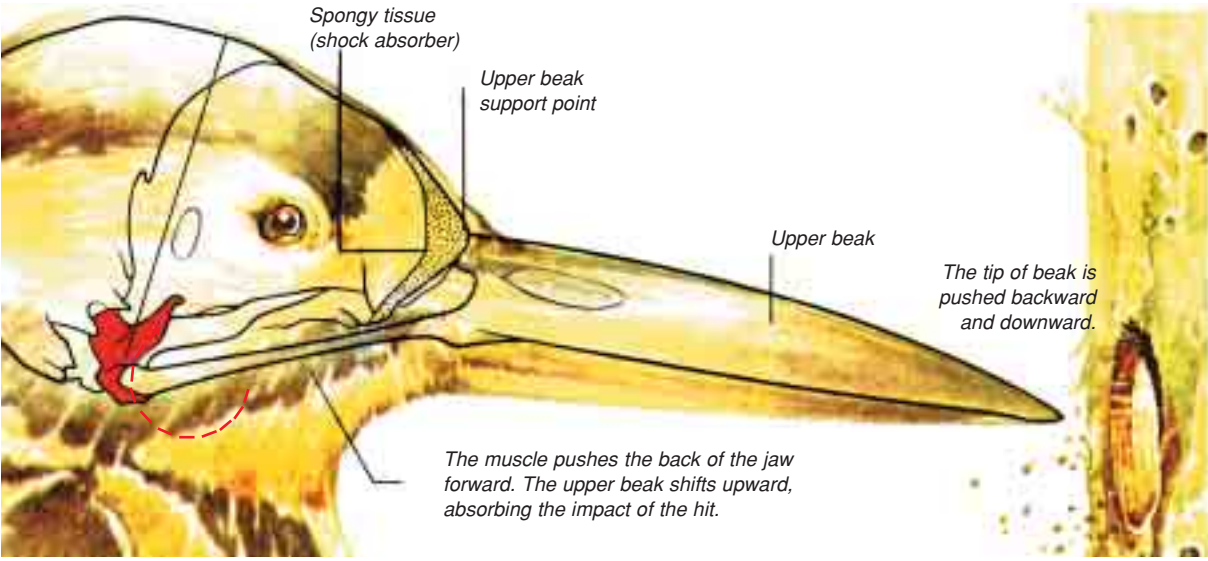
The same argument cannot be made for mechanical systems in nature. All the mechanical systems in all creatures are perfect. God has created all creatures flawlessly. Let us take a closer look at some of the examples of this perfect creation.

The Skull of Woodpecker

Woodpeckers feed on insects and larva, laid inside tree trunks that they uncover by pecking. They carve their nests in living healthy trees, which takes carving skills just as great as those of carpenters.

The great spotted woodpecker can make up to nine or ten strikes per second. This number increases to fifteen to twenty in smaller species of woodpeckers, one of which is the green woodpecker.

While the green woodpecker drills for a nest, the working speed of its beak can exceed 62 mph (100 km/h). This does not affect its brain in any way, which is the size of a cherry. The time lag between two consecutive strikes is less then one thousandth of a second. When it starts pecking, head



In the upper beak movement of a woodpecker, when the beak hits the tree, the bird experiences a tremendous impact. However, there are two mechanisms created to absorb this impact. The first is the spongy connective tissue between the skull and the beak, which softens the impact greatly. The second mechanism is the tongue of the woodpecker. The tongue circles around inside the skull to attach to the top of the woodpecker's head. This arrangement of the tongue muscle is a bit like a sling and may reduce the shock of each beak-to-tree impact. Therefore, the impact (softened by the spongy tissue) is almost reduced to nothing.

and beak line up perfectly on a straight line, but the smallest deviation could cause severe ruptures in the brain.

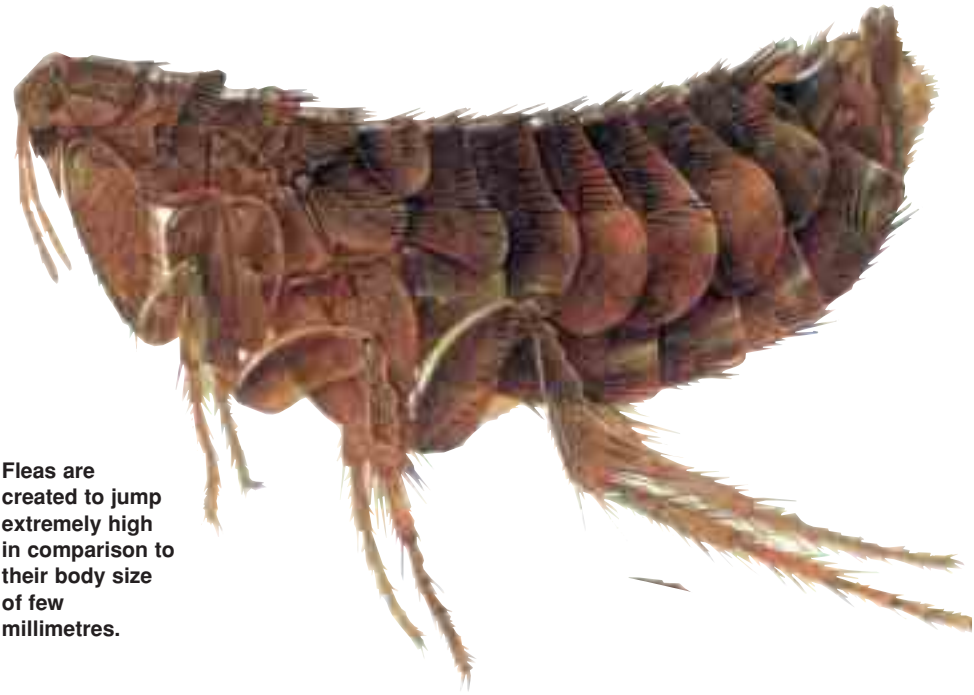
The impact of this kind of hitting is in effect no different from banging the head against a concrete wall. It takes extraordinary design for the bird's brain not to be injured. The skull bones of the majority of birds are joined together, and the beak functions with the motion of the lower jaw. However, the beaks and skulls of woodpeckers have been separated by a spongy tissue that absorbs the shocks of impact. This flexible substance works better than shock-absorbers in automobiles. The excellence of this material derives from its capability of absorbing impacts of very short duration and then restoring itself its to original condition immediately. This performance is maintained even where nearly nine to ten hits are made per second. This material is far superior to materials developed by modern technology. The isolation of the beak from the skull by this extraordinary method enables the compartment holding the woodpecker's brain to move away from the upper beak during hits, and this works as a secondary mechanism for absorbing shocks.[49]

The Flea: the Ideal Design for High Jumps

A flea can jump more than 100 times its own body height, which is equivalent to a human jumping 660 feet (200 metres) high. Furthermore, it can continue jumping like this without rest for 78 hours. In general, the flea does not fall onto its legs after the fifth jump, it lands either on its back or head. However, it neither becomes dizzy nor gets injured, which is due to the design of its body.

The skeleton of the insect is not inside its body. It is composed of a hard layer of a compound called sclerotin, which wraps the entire body and is attached to the chitin. Numerous armoured plates with limited movement form this outer skeleton, which absorbs and eliminates the shock of jumping.

On the other hand, fleas do not have any blood vessels. The inside of the entire body floats in a clear and fluid blood, which acts as a cushioning around all the internal organs and makes them immune to sudden pressure jumps. The blood is cleaned by means of air vents scattered throughout the



Fleas are created to jump extremely high in comparison to their body size of few millimetres.

body. This eliminates the need for a giant pump to continually pump oxygen. Its heart is shaped like a tube and beats at such a low rate that the jumps do not affect it at all.

Scientists discovered through research that the leg muscles of fleas are not as strong as the jumps would really require. The extraordinary performance enjoyed by fleas is made possible by a kind of spring system that is added to its legs, which works because of a rubberlike protein called "resilin", where the flea stores mechanical energy. The outstanding property of this substance is its ability to release in stretching up to 97% percent of the energy that is stored in it. The most flexible material in the market today has a ratio of 85%. This elastic material is located at the base of the large hind legs of the animal in tiny pads. The flea takes a few tenths of seconds to compress this material as it folds it s legs in preparation for a jump. A ratchetlike structure holds the leg folded until a muscle is relaxed and the spring-like structure powers the jump through stored energy in the resilin which translates into tremendous leaps.

Another creature as interesting as the flea, is a species of minute insect living on the flea. These microscopic creatures reside under the armoured plates of the flea.

The acorn weevil which is created with a special "drilling pipe", has an extraordinary reproduction system.

The Acorn Weevil and its Drilling Mechanism

The acorn weevil lives on the acorns of an oak tree. There is a moderately long snout on the head of this insect, which is actually longer than its own body. At the end of this snout, it has small but extremely sharp saw like teeth.


An oak tree and acorns.

At other times, the insect holds this snout horizontal, in line with its body, so that it does not interfere when it walks. However, when it is on an acorn, it tilts this snout towards it. Then the insect looks very much like a drilling machine. It leans the saw-like teeth at the tip of its snout against the acorn. The insect turns its head from one side to the other, moving the snout, which starts to drill the acorn. The head of the insect is of a perfect design for the job and displays an extraordinary level of flexibility.

While drilling with its snout, it also feeds on the fruit inside the acorn. However, it saves the largest portion for its offspring. After drilling, the insect leaves a single egg in the acorn, dropping it there through the hole. Inside the acorn, the egg becomes a larva and starts eating it. The more the larva eats, the more it grows; the more it grows, the more it eats.

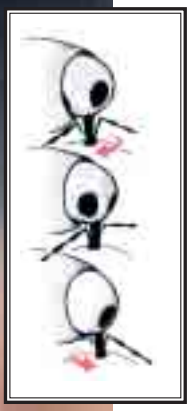
This feeding continues until the acorn falls from the branch, which is

Larva of the acorn weevil.



The acorn weevil uses its head during drilling, just as is shown in the figure above.

the signal for the larva that it is time to leave. By means of its strong teeth, it enlarges the hole that its mother made. The extremely fat larva gets out of the acorn with a great deal of struggle. Now the goal for the larva is to tunnel down about 10-12 inches (25-30 centimetres) under the ground. There it goes through pupation and waits for one to five years. When it becomes a full grown adult, it climbs up and starts drilling acorns in turn. The time differential in the pupation period depends on the new growth of the acorns on the tree.[50] The interesting life cycle of the acorn weevil is another evidence of the flawless creation of God, and it nullifies the arguments of the theory of evolution. Each mechanism of the insect



has been designed within a certain plan. The drilling snout, the cutting teeth on the tip, the flexible structure of the head which helps drilling, cannot all be explained solely by coincidences and "natural selection". The long snout would have been nothing more than a great burden and a disadvantage if it weren't successfully used for drilling, which is why it cannot be argued to have evolved "phase by phase".

On the other hand, the organs and instincts of the larva illustrate the "irreducible complexity" of the process. The larva has to have teeth powerful enough to cut its way out of the acorn, has to "know" to dive deep into the ground and has to "wait" there patiently.

Otherwise, the creature could not survive but would become extinct. All of these cannot be explained by coincidence, but show that the creation of these beings displays a superior wisdom.

The acorn becomes a nest for many other creatures after being used by the acorn weevil. Numerous other insects use acorns during their caterpillar phases and pupation.

MECHANICAL TRAPS

Genlisea

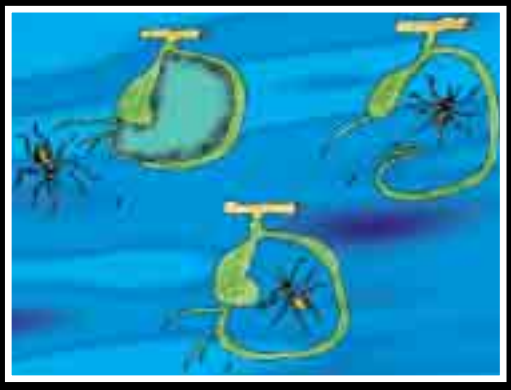
The trap of the genlisea resembles animal intestines. The roots that branch out under the ground are hollow swollen tubes. Water is pressured to seep into these tubes. Through the slits in the tubes, there is a flow towards the inside of the plant, which is triggered by little interior hairs. Insects and other small organisms float inside due to the flow of water. All the sections through which the flow passes are covered with bristly hairs that point downward. Along the way, the prey encounters a series of digestive glands, which act like a valve and form a second force pushing the insects into the plant. Finally, the captives become the food of the genlisea.[51]

The Trap of the Bladderwort

The bladderwort is a sea plant commonly referred to in the scientific world as Utricularia.

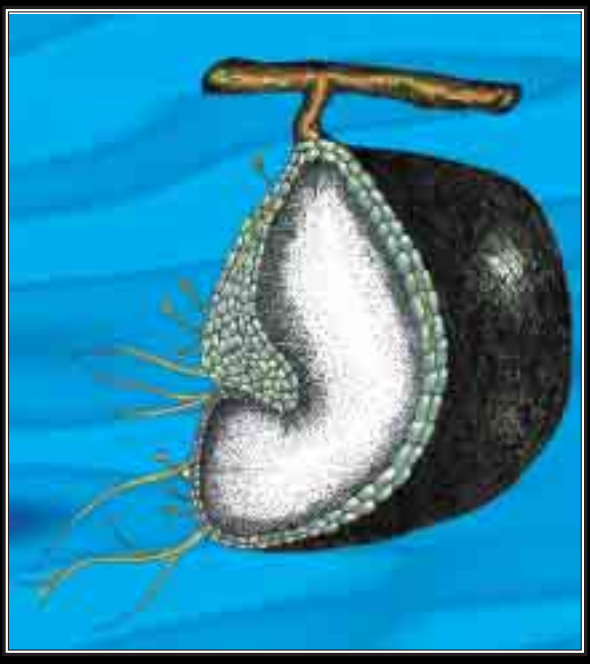
There are three kinds of gland in the trap of the bladderwort: first, the spherical glands located outside the trap; the others, the "four-pointed gland" and "two-pointed gland" are inside. The plant uses these glands as different phases of a trap.

The amazing structure of genlisea leaves: a cylindrical stem (A) is located after an onion portion (B) followed by another cylindrical stem (C), at the end of which is a fissured mouth (D).



The section of the bladderwort and functioning of the trap: 1- The prey touches the hairs of the trap, 2- The trap opens immediately and the prey enters inside, 3 - The gate closes behind the prey.

First, the glands activate the extensions attached to them, which start pumping the water out. A very important void forms in the plant. At the mouth is a trap door that keeps water from coming inside. The hairs on this trap are very sensitive to touch. When an insect or organism touches these hairs, the trap opens immediately. Naturally, this creates a strong flow of water towards the inside of the bladderwort. The trap closes behind the prey in a flash. Immediately after this event, which takes place within one thousandth of a second, the digestive glands start releasing digestive secretions.[52]



The Bacterial Flagellum

Some bacteria use a whip-like organ called a "flagellum" to move about in a liquid environment. This organ is embedded in to the cell membrane and enables the bacterium to move at will in a chosen direction at a particular speed.

Scientists have known about the flagellum for some time. However, its structural details, which have only emerged over the last decade or so, have come as a great surprise to them. It has been discovered that the flagellum moves by means of a very complicated "organic motor" and not by a simple vibratory mechanism as was earlier believed.

Sperm cells, too, use a flagellum in order to move about.

The propeller-like engine is constructed on the same mechanical principles as an electric motor. There are two main parts to it: a moving part ("the rotor") and a stationary one ("the stator").

The bacterial flagellum is different from all other organic systems that produce mechanical motion. The cell does not utilise available energy stored as ATP molecules. Instead, it has a special energy source: bacteria use energy from the flow of ions across their outer cell membranes. The inner structure of the motor is extremely complex. Approximately 240 distinct proteins go into constructing the flagellum. Each one of these is carefully positioned. Scientists have determined that these proteins carry the signals turning the motor on or off, form joints to facilitate movements at the atomic scale, and activate other proteins that connect the flagellum to the cell membrane. The models constructed to summarise the working of the system are enough to depict the complicated nature of the system.[53]

The complicated structure of the bacterial flagellum is sufficient all by itself to demolish the theory of evolution, since the flagellum has an irreducibly complex structure. Even if one single molecule in this fabulously complex structure were to disappear, or become defective, the flagellum would neither work nor be of any use to the bacterium. The flagellum must have been working perfectly from the first moment of its existence. This fact again reveals the nonsense in the theory of evolution's assertion of "step by step development".

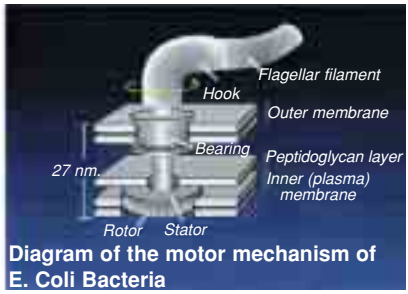
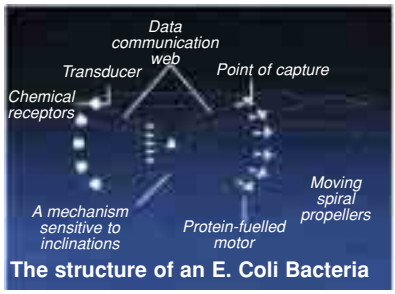
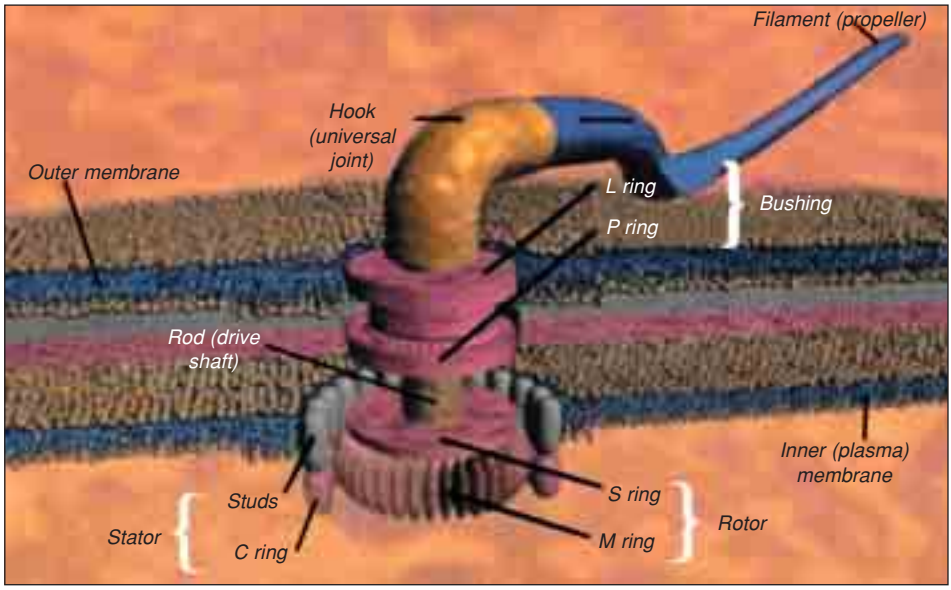


Diagram of the motor mechanism of E. Coli Bacteria



The structure of an E. Coli Bacteria

The bacterial flagellum is clear evidence that even in supposedly "primitive" creatures, there is an extraordinary design. As humanity becomes more deeply immersed in details, it becomes increasingly obvious that the organisms scientists of the 19th century, including Darwin, considered to be the simplest, are in fact just as complex as any others. In other words, as the perfection of the creation becomes clearer, the senselessness of the struggle to find alternative explanations for the creation is much more obvious.



There are amazing designs even in the creatures that evolutionists regard as "simple". The bacterial flagellum is one of countless examples. Bacteria travel in water by moving this organ on their membrane. When the inner details of this well-known organ were revealed, the scientific world was extremely surprised to find that bacteria had an extraordinarily complicated electric motor. The electric motor, which is comprised of about fifty different molecular parts, is a wonder of design as shown above.

Design in Dolphins

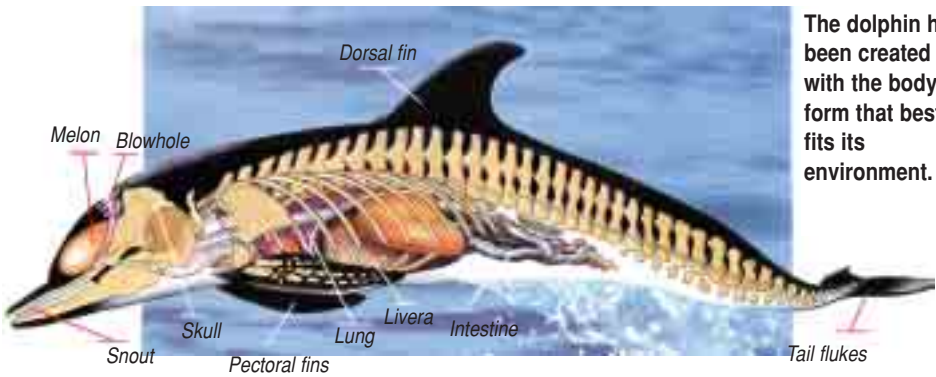
Dolphins and whales breathe using their lungs just like other mammals, which means they cannot breathe in the water like fish. This is why they regularly visit the surface. The blowhole which is situated on top of their heads work for air intake. This organ is designed in such a way that when the animal dives into water, the opening closes automatically with a special cap in order to prevent water from entering. The cap automatically opens again when the dolphin surfaces.

A System that Facilitates Sleep without Drowning

Dolphins fill 80-90% of their lungs with air every time they breathe. However, in many humans this ratio is about 15%. The breathing of dolphins is a conscious act and not a reflex as it is with other land mammals.[54]

In other words, dolphins consciously decide to breathe as we make the choice to walk. There is a system created to prevent the death of the creature during its sleep under water. The sleeping dolphin uses the right and left hemispheres of its brain alternatively for periods of about fifteen minutes. While one hemisphere sleeps, the dolphin uses the other to surface for air.

The snout of dolphin's beak is another feature that improves their swimming. The animal uses less energy in cutting through the water and swimming at higher speeds. Modern ships, too, make use of a bow like the dolphin's snout, hydro-dynamically designed to increase the speed of ships just like dolphins.



The dolphin has been created with the body form that best fits its environment.

Social Life of Dolphins

Dolphins live in very large groups. For protection, females and offspring are located in the centre of the group. The sick are not left alone but are kept in the group until they die. The ties of interdependence are formed from the first day a new offspring joins the group.

Dolphin calves are born tail first. This way the infant is provided with oxygen throughout delivery. When at last the head is released, the newly born dolphin rushes for the surface for the first gasp of air. Generally, during delivery another female accompanies the mother giving birth.

Mothers start to nurse their young immediately after birth. The new dolphin, lacking lips to suck, receives milk through two sources coming out of a slit on the mother's ventral surface. When it taps gently on this section, the milk is sprayed out. The young dolphin consumes dozens of quarts (litres) of milk every day. 50% of the milk is composed of fat (compared to 15% in cattle milk), which promptly works towards building the skin layer necessary to regulate body temperature. Other females also help the young dolphins during rapid dives, by pushing them down. Newly born dolphins are also taught how to hunt and use their echolocation sonar, which is an educational process continuing for years. In some cases, young dolphins may never leave a particular family member for up to thirty years.

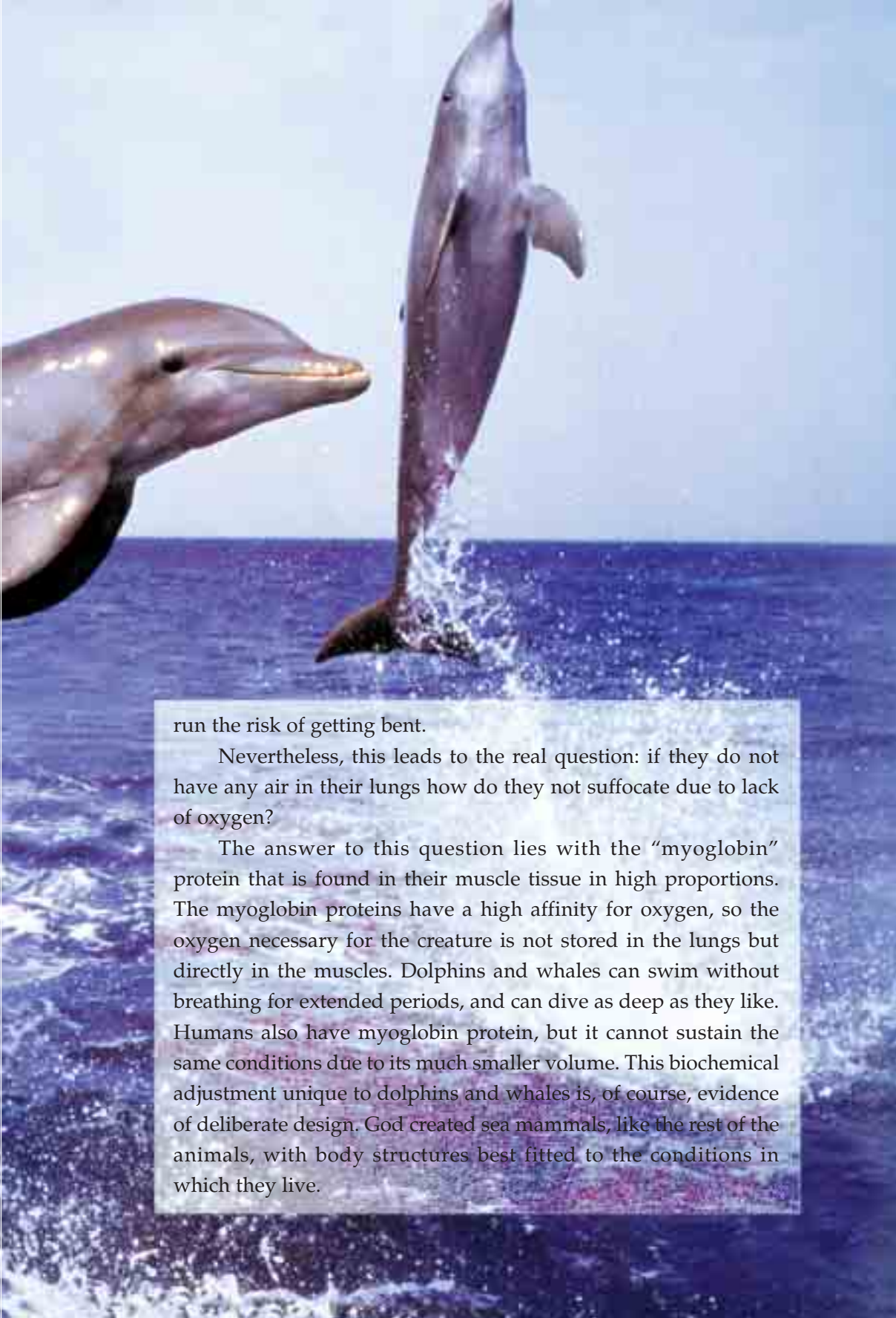
The System Preventing the Bends

Dolphins can dive down to depths that cannot be matched by humans. The recordholder in this category is a species of whale that can dive down to 9900 feet (3000 metres) on a single breath. Both dolphins and whales are created appropriately for these kinds of dives. The tail flukes make diving and surfacing much easier.

Another aspect of the design for diving is in the lungs of these animals:

as the animal descends the weight of the water column above, i.e. the pressure, increases. The pressure inside the lungs is increased to balance the outside pressure. If the same pressure were to be applied to human lungs, they would easily disintegrate. In order to overcome this danger, there is a special defensive system lodged in a dolphin's body: the bronchi and air cells (alveoli) inside the dolphin's lungs are protected by rings of cartilage that are extremely durable.

Another example of the perfection of creation in the bodies of dolphins is the system that prevents the bends. When divers ascend to the surface too quickly, they face this danger. The reason for the bends is the entrance of air directly into the blood and formation of air bubbles in the arteries. These air bubbles can cause death by preventing blood circulation. Whales and dolphins, however, do not face similar dangers, although they breathe using their lungs. This is because they dive with lungs not full of air but empty. Since there is no air in their lungs, they do not

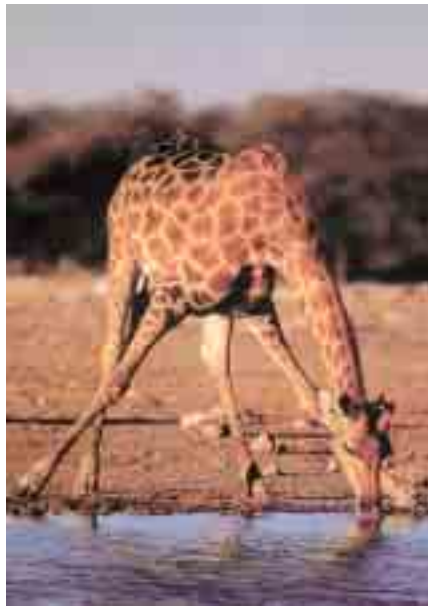


run the risk of getting bent.

Nevertheless, this leads to the real question: if they do not have any air in their lungs how do they not suffocate due to lack of oxygen?

The answer to this question lies with the "myoglobin" protein that is found in their muscle tissue in high proportions. The myoglobin proteins have a high affinity for oxygen, so the oxygen necessary for the creature is not stored in the lungs but directly in the muscles. Dolphins and whales can swim without breathing for extended periods, and can dive as deep as they like. Humans also have myoglobin protein, but it cannot sustain the same conditions due to its much smaller volume. This biochemical adjustment unique to dolphins and whales is, of course, evidence of deliberate design. God created sea mammals, like the rest of the animals, with body structures best fitted to the conditions in which they live.

The Pump in a Giraffe



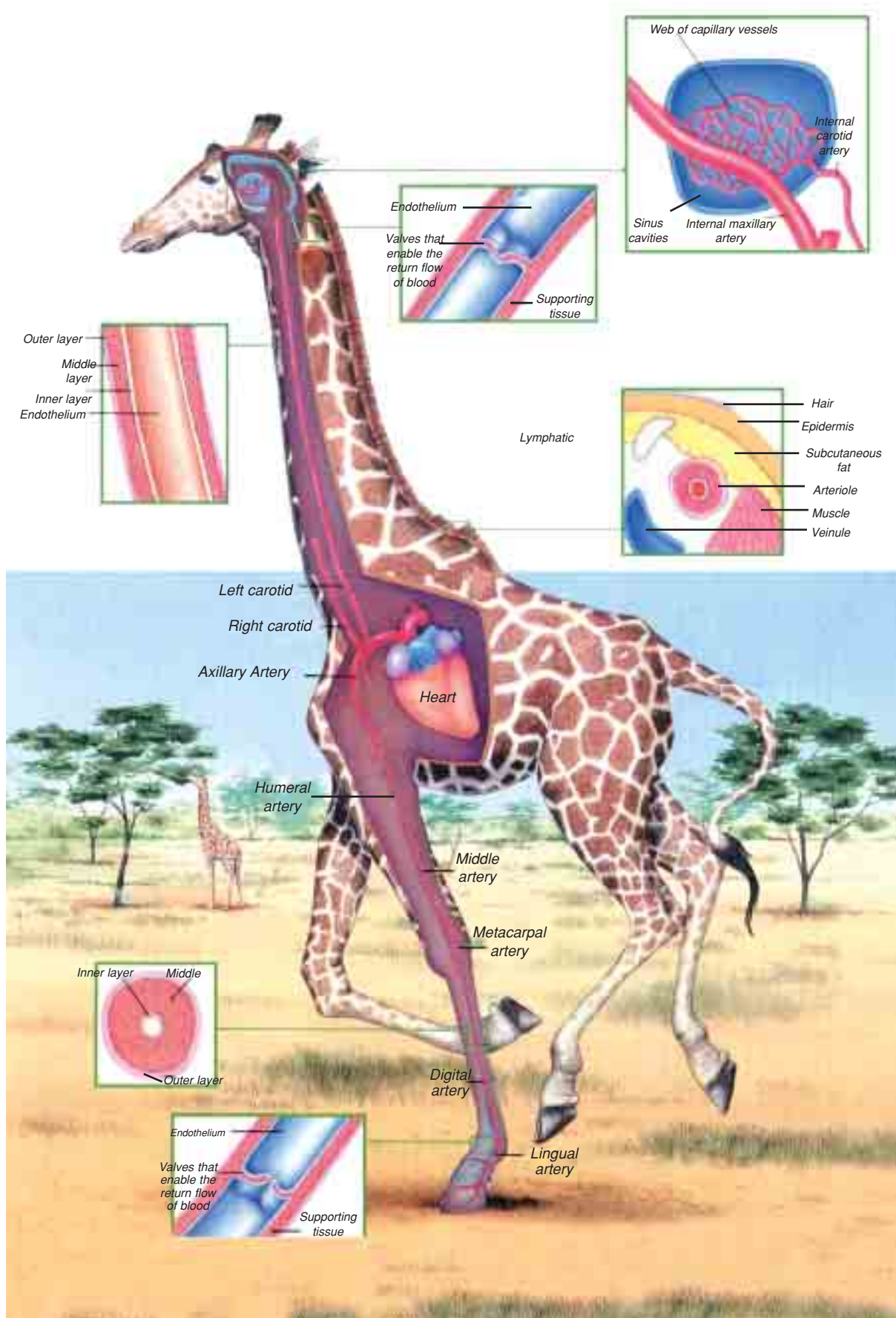
A giraffe, with its height nearly 16.5 feet (5 metres), is one of the largest creatures. In order to survive, the animal has to send blood to a brain located approximately 6.6 feet (2 metres) above the heart. This requires an extraordinary heart structure. Consequently, the heart of the giraffe is strong enough to pump blood at a pressure of 350 mmHg.

Such a powerful system, which would normally kill a human, is contained within a special chamber, and has been wrapped with a web of capillaries in order to reduce the deadly affects.

In the section between the head and the heart there is a U-shaped system, comprised of an ascending and descending vessel. The blood flowing in vessels of opposite direction balances itself, which saves the animal from dangerously high blood pressures that can cause internal bleeding.

The portion below the heart, especially legs and feet, needs special protection. The extra thickness of giraffe skin on legs and feet prevents adverse affects of high blood pressure. In addition, there are valves inside the vessels that help regulate the pressure.

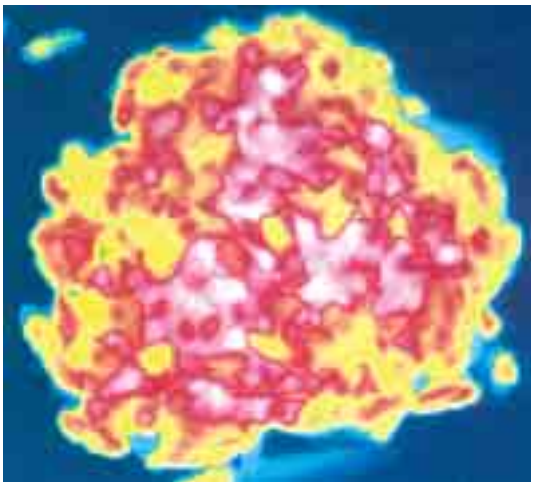
The biggest danger is when the animal lowers its head to the ground in order to get a drink of water. The blood pressure, which is normally high enough to cause internal bleeding, now increases even more. However, there a measure has been taken against these affects. A special fluid called cerebrospinal fluid, which bathes the brain and the spinal column itself, produces a counterpressure to prevent rupture or capillary leakage. In addition, there are one-way check valves which close when the animal lowers its head. These valves reduce the flow of blood significantly, and the giraffe can safely drink and raise its head. As a caution against dangers of high blood pressure, the vessels of the giraffe are very thick and created in multiple layers.


Web of capillary vessels
Internal carotid artery
Sinus cavities
Internal maxillary artery
Endothelium
Valves that enable the return flow of blood
Supporting tissue
Outer layer
Middle layer
Inner layer
Endothelium
Lymphatic
Hair
Epidermis
Subcutaneous fat
Arteriole
Muscle
Veinule
Left carotid
Right carotid
Axillary Artery
Heart
Humeral artery
Middle artery
Metacarpal artery
Inner layer
Middle
Outer layer
Digital artery
Endothelium
Valves that enable the return flow of blood
Supporting tissue
Lingual artery

The Design of Honeybees' Defence Strategy

Giant hornets in Japan are perfect enemies for the honeybees of Europe. 30 hornets attacking a hive can exterminate about 30,000 bees in three hours. But the honeybees are created with a perfect defence mechanism.

When a hornet discovers a new bee colony, it communicates the news to others by secreting a special smell. The same odour is also detected by the honeybees, which start congregating at the entrance of the beehive for defence. When a hornet draws near, approximately 500 honeybees immediately surround it. They start vibrating their bodies and increase their body temperatures. This, to the wasp, feels like being stuck in an oven and at the end of this the wasp dies. In the heat sensitive photograph of such an attack, the temperature of the white areas can reach 118^0F (48^0C). Such a high temperature is bearable for honeybees but lethal to the hornets.[55]



The defence weapon of the honeybees is their sting. However, when their sting is not effective, they can use increased body heat to kill their enemies. Similarly, honeybees can kill a hornet by using their bodies. In the heat sensitive photograph of such an attack, the temperature of the red areas can reach 118^0F (48^0C).

Miracles of Reproduction in Frogs

Many suppose that frogs multiply through hatching eggs and developing "tadpoles". However, there are many other types of frog reproduction of which some are quite surprising.

Frogs have been created with traits that enable them to survive in a variety of environments. Therefore, they can live in every continent apart from Antarctica; there are species of frogs living in deserts, forests, meadows and the Himalayas and Andes, where altitudes exceed 16,500 feet (5000 metres). The densest populations are scattered throughout the tropical regions. Approximately forty species of frogs have been identified within a 0.8 square mile (2 square kilometre) piece of rain forest.

In some species of frogs, only males care for the newly born, whereas in others only females do or both partners do. For example, males of the "dart-poison frog" of Costa Rica keep watch, waiting for the eggs to hatch, for up to 10-12 days. Through great efforts, the newly born tadpoles climb and hold on to the back of the mother so tightly that they appear to have been welded on. Then the mother climbs onto a bromeliad in the forest. The flowers of this tree are shaped like goblets pointing skyward, and are filled with water. The mother releases the newly born frogs into these flowers, where they grow safely.

Since there is no food in these waters, the mother frequently lays unfertilised eggs in the flowers for the newly born frogs. The tadpoles feed on these eggs, which are rich in protein and carbohydrates.[56]

The "gladiator frog" is another species that defends the area in which are the eggs. The males of these frogs have been created with pin-like extensions under their thumbs, with which they rip the skin off an intruder male.

The male small African toad (Nectophyrne afra) constructs

Frogs leave their fertilised eggs in damp places. Out of these eggs hatch tadpoles that have large heads and tails. In time, the tadpoles develop arms and legs and the infants take on the shape of frogs. Finally, development ends as the tails disappear.

Dart-poison frogs live in Costa Rica. (1) Male frogs keep watch waiting over the eggs until they hatch. The newly born tadpoles start to climb on to the back of their mothers with extraordinary efforts. (2)

The climb ends when they finally make it to a special pouch on the mother's back, in which the tadpoles become as if one with her. (3) Then the mother herself begins a trying climb. This phase ends when she reaches the flowers of the bromeliad. The flowers of this tree are shaped like goblets pointing skyward, and are filled with water. The mother releases the tadpoles into these flowers where they grow safely. (4)

nests out of mud, which are filled with water to form ponds, on the coasts of lakes or slow flowing rivers. The frog makes a fragile layer of film on the surface of the water to which the eggs attach themselves. This way, the eggs stay on the surface of the water in order to inhale oxygen. Since a minute vibration caused by another frog or a dragonfly's flying past can destroy this film and send the eggs to the bottom of the water, where they would be left to die without oxygen, the male frog guards the eggs. While waiting, it kicks its feet in the water in order to increase oxygen flow through the membranes of the eggs.

Another species, called the glass frog due to its transparency, does not keep watch over its eggs. God inspires another method in these frogs; they leave groups of eggs on the rocks

Glass Frogs

and plants of the tropical lakes or rivers. When the eggs hatch, the tadpoles drop into the water.

All of these various conscious and self-sacrificing behavioural patterns, displayed by different species of frogs as acts of defence for the newly born tadpoles, demolish the fundamental assumptions of Darwinism. The assertion of Darwinism that all creatures are in an individual and selfish struggle for survival comes to an inevitable dead end in the face of the efforts of a single frog to defend its newly born offspring. Furthermore, the intelligent behaviour shown by these creatures cannot be explained away as occurring through coincidence as argued by Darwinism. These are clear signs that living things have been created by God and are directed by the instincts inspired in them.

Frogs Reproduced in the Stomach

The extraordinary reproduction method of a species of frog called *Rheobatrachus silus*, is another example of the superb design in the creation of God. Female *Rheobatrachus* frogs swallow their eggs after fertilisation, not to eat them but to protect them. The hatching tadpoles remain and grow in the stomach for the first six weeks after hatching. How is it possible that they can remain in their mother's stomach that long without being digested?

A flawless system has been created to enable them to do so. First, the female ceases to feed for those six weeks, which means the stomach is reserved solely for the tadpoles. However, another danger is the regular release of hydrochloric acid and pepsin in the stomach. These chemicals would normally quickly kill the offspring. However, this is prevented by a very special measure. The fluids in the stomach of the mother are neutralised by the hormonelike substance prostaglandin E_2, which is secreted first by the egg capsules and then by the tadpoles. Hence, the offspring grow healthily, even though they are swimming in a pool of acid.

There is a fierce battle for territory between spiders and frogs. However, spiders generally prefer to retreat when they encounter these poisonous frogs, which are even capable of easily killing human beings.

How do the tadpoles feed inside the empty stomach? The solution to this has been thought of, too. The eggs of this species are significantly larger than those of others, as they contain a yoke very rich in proteins, sufficient

to feed the tadpoles for six weeks. The time of birth is designed perfectly as well. The oesophagus of the female frog dilates during birth, just like the vagina of mammals during delivery. Once the young have emerged, the oesophagus and the stomach both return to normal, and the female starts feeding again.[57]

The miraculous reproductive system of *Rheobatrachus silus* explicitly invalidates the theory of evolution, since this system is irreducibly complex. Every step has to take place fully in order for the frogs to survive. The mother has to swallow the eggs, and has to stop feeding completely for 6 weeks. The eggs have to release a hormonelike substance to neutralise stomach acids. The addition of the extra protein-rich yolk to the egg is another necessity. The widening of the female's oesophagus cannot be coincidental. If all these things failed to happen in the requisite sequence, the froglets would not survive and the species would face extinction.

The *Rheobatrachus* frog giving birth from its mouth.

Therefore, this system cannot have developed step-by-step, as asserted by the theory of evolution. The very first frog of the *Rheobatrachus silus* species existed with this complete flawless system. All of the creatures examined throughout this book prove the same fact: there is a supreme design in creation encompassing all nature. God created all living things with irreducible complexity, in which His infinite power and knowledge are illustrated for those who examine them.

THE LIVING MACHINE: "HUMAN

THE BRAIN / COMPUTER

Each neuron cell contains units that are only responsible for transferring information. A single brain can process work equivalent to that of 4.5 million transistors on a modern microprocessor. The millions becomes insignificant in comparison with ten billion, highly capable neurons transmitting information in the brain. In addition, there is not a single industrial product that can imitate the faculties of taste and smell in the brain.

HORMONES / MAIL

Everything in the body is in a state of communication. Many messages are in the form of hormones composed of large molecules. There is no receiver on the packages of messages carried by the hormones that freely wander in the circulatory system and among the neurons. However, the package always gets to its place because the organs receiving the messages are equipped with special sensors.

MUSCLE AND PERSPIRATION / AIR CONDITIONING

Muscle movements contribute to warming up of the body in cold weather. Muscles can provide up to 90% of body heat in this way. Perspiration, on the other hand, functions as the ideal cooling mechanism against overheating. These two balancing systems work together to maintain a steady body temperature. This system works much more swiftly and with more precision than any other air conditioning system.

THE IMMUNE SYSTEM / ARMY

Our organisms are defended by roughly 200 billion white blood cells. Just like soldiers, these blood cells have an intelligence system, lethal weaponry and special battle strategies. However, no other army on earth is as punctual, perfect and successful as the immune system.

CELL / ENGINE

The cell is a very energy efficient engine. It consumes small molecules called ATP for fuel. Its efficiency in burning this fuel is much greater than any other engine known to mankind. In addition, the cell simultaneously performs a diverse variety of tasks, such as no manmade device can handle.

ARM / EXCAVATOR

The arm works like a lever. The supporting pivot is the elbow, about which the muscles facilitate movement through contractions and flexions. Excavators also work on the same principles. While the excavator exerts the same force under all loads, the muscles of the arm control the intensity of forces.

SKELETON / CHASSIS

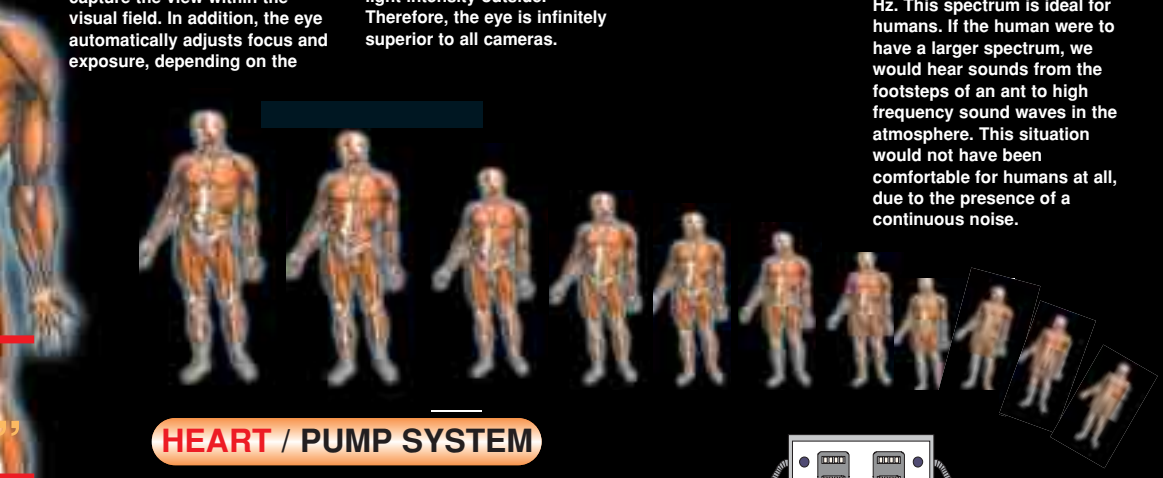
There are two main possible outcomes for any system receiving impacts. It will either cause a dent or cause some parts to break away. The skeletons of creatures and the chassis of the car have been designed to minimise the impacts on the bodies. However, the chassis lacks the ability of bones to repair themselves.

EYE / CAMERA

The retina of the eye is the most light-sensitive among all known substances. Various types of sensor cells have been arranged in the best position to capture the view within the visual field. In addition, the eye automatically adjusts focus and exposure, depending on the light intensity outside. Therefore, the eye is infinitely superior to all cameras.

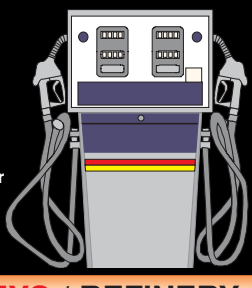
THE EAR / HI-FI STEREO

The minute hairs in the inner ear of a human convert sounds into electric signals just as do a microphone. The ear can only sense sounds between the frequencies of 20-20,000 Hz. This spectrum is ideal for humans. If the human were to have a larger spectrum, we would hear sounds from the footsteps of an ant to high frequency sound waves in the atmosphere. This situation would not have been comfortable for humans at all, due to the presence of a continuous noise.



HEART / PUMP SYSTEM

The heart starts beating in the mother's womb and continuously beats at a rate varying between 70-200 without rest for a whole lifetime. During each beat, it can rest up to half a second. It beats about 10,000 times a day. The heart of a 132 pound (60 kilogram) human pumps about 1.7 gallons (6.5 litres) of blood daily. In a lifetime, the heart pumps enough blood to fill 500 swimming pools each of a capacity of 300 cubic metres. Artificial pumps could never work so long without major repairs.



KIDNEYS / REFINERY SYSTEMS

The human kidneys filtering units about 37 gallons (140 litres) of blood everyday, through one million small filtering units called nephrons, and that continues for about eighty years without rest. Refinery pants designed for industrial wastes can hold much greater quantities, but their lifespan is considerably less. Furthermore, the chemical composition of the substances they filter are much less complicated in comparison to blood. A kidney is far more complex and efficient than any refinery plant.

Greatest Design: Universe

There are unchangeable fundamental laws in the universe, which affect all animate and inanimate beings alike. These laws are proofs that illustrate the perfection in the creation of the universe just as are the flawless creatures that live therein. Today, these hints are presented to us as laws of physics as discovered largely by physicists. The laws ordinarily accepted as "laws of physics" are nothing but the evidence of the perfection in creation of God.

Let us give just a few examples of the perfection of design in the universe.

For instance, let us examine one of a dozen crucial properties of rainwater: the "viscosity of water".

Different liquids have different degrees of velocity. However, the viscosity of water is perfect for the use of all creatures. If it was a little higher than it is, plants could not have used it for transporting the nutrients vitally important for survival within their capillary tubes.

If the viscosity of water were lower than it is, the flow of rivers would have been a great deal different, hence the mountain formations would have changed, valleys and plateaus would not have formed, and rocks could not have disintegrated to form soil.

Water also facilitates the circulation of the red blood cells that defend our bodies against microbes and dangerous substances. If water's viscosity were greater, the movement of these cells within the vessels would have been totally impossible, the heart would have been overwhelmed in pumping the blood and would possibly have failed to obtain the energy necessary for this job.

Even these few examples sufficiently illustrate that water is a fluid that has been especially created for living beings.

Balance of Forces

What would happen if the gravitational force were greater than it is today? Running or walking would be impossible. Humans and animals would spend much more energy moving about, which would diminish the energy resources of the earth. What if gravity were less powerful? Light objects could not maintain their state of balance. For instance, dust particles picked up by breezes would float in the air for long periods. The speed of raindrops would decrease, and they possibly would evaporate before reaching the ground. Rivers would flow more slowly and hence electricity would not be generated at the same rate.

All this is rooted in the property of the gravitational pull of masses.

Newton's law of gravitation states that the force of the gravitational attraction between objects depends on their masses and the distance between them. Hence, if the distance between two stars is increased three times, the gravitational force is decreased by a factor of nine, or if the distance is decreased to half, the force of gravity is increased four times.

This law helps explain the current positions of the earth, moon and planets. If the law of gravitation were different, for example, if the gravitational force were increased as the distance increased, the orbits of the planets would not be elliptical and they would collapse into the sun. If it were weaker, the earth would be set on a course steadily away from the sun. So, if the force of gravity did not have precisely the value it does, the earth would either collide with the sun or be lost in the depths of space.

What if Planck's Constant were Different?

We encounter different forms of energy all the time. For instance, even the heat that we sense in front of the fire has been created with intricate balances.

In physics, energy is assumed to radiate not as a wave but in small particular amounts called "quanta". In calculating the radiant energy, a certain unchanging value called Planck's Constant is used. This number is generally small enough to be considered negligible. This number is one of the fundamental and unchanging indices in nature, which is approximately expressed as 6.626×10^{-34}. In any situation involving radiation, if the energy of

a photon is divided by its frequency the result will always equal this constant. All forms of electromagnetic energy, i.e. heat, light, etc. are governed by Planck's Constant.

If this minute number were a different size, then the heat we sense in front of a fire would have been much stronger. Either, at one extreme, the smallest fire could have contained enough energy to burn us up or at the other extreme, even a giant fireball the size of the sun would not have been sufficient to warm the earth.

Frictional Force

Frictional forces are generally considered inconveniences, as they are encountered especially while moving things in our daily lives. However, what would the world be like if frictional forces were completely eliminated? Pens and papers would slip out of our hands and fall down from the table to the floor, tables would slide

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All products of technology make use of friction in one form or the other. The engine of a vehicle functions by help of friction.

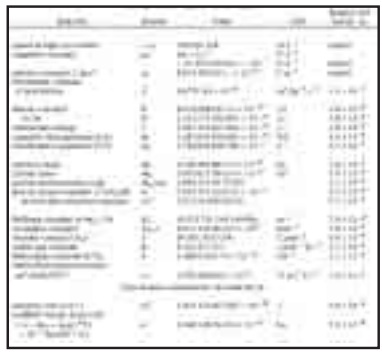
to the corners of rooms, and in short all objects would fall and roll until everything finally came to a stop at the lowest point. In a frictionless world, all knots would untie, screws and nails would come off, no cars could ever brake, while sounds would never die but echoe endlessly.

All of these laws of physics are clear proofs that the universe, just like all the creatures within it, is a product of divine design. In fact, the laws of physics are nothing but human explanations and descriptions of the divine order that God has created. God has created the unchanging laws of order in the universe and put them in the service of humans so that man will reflect upon and understand the Sovereignty of God and give thanks for His blessings.

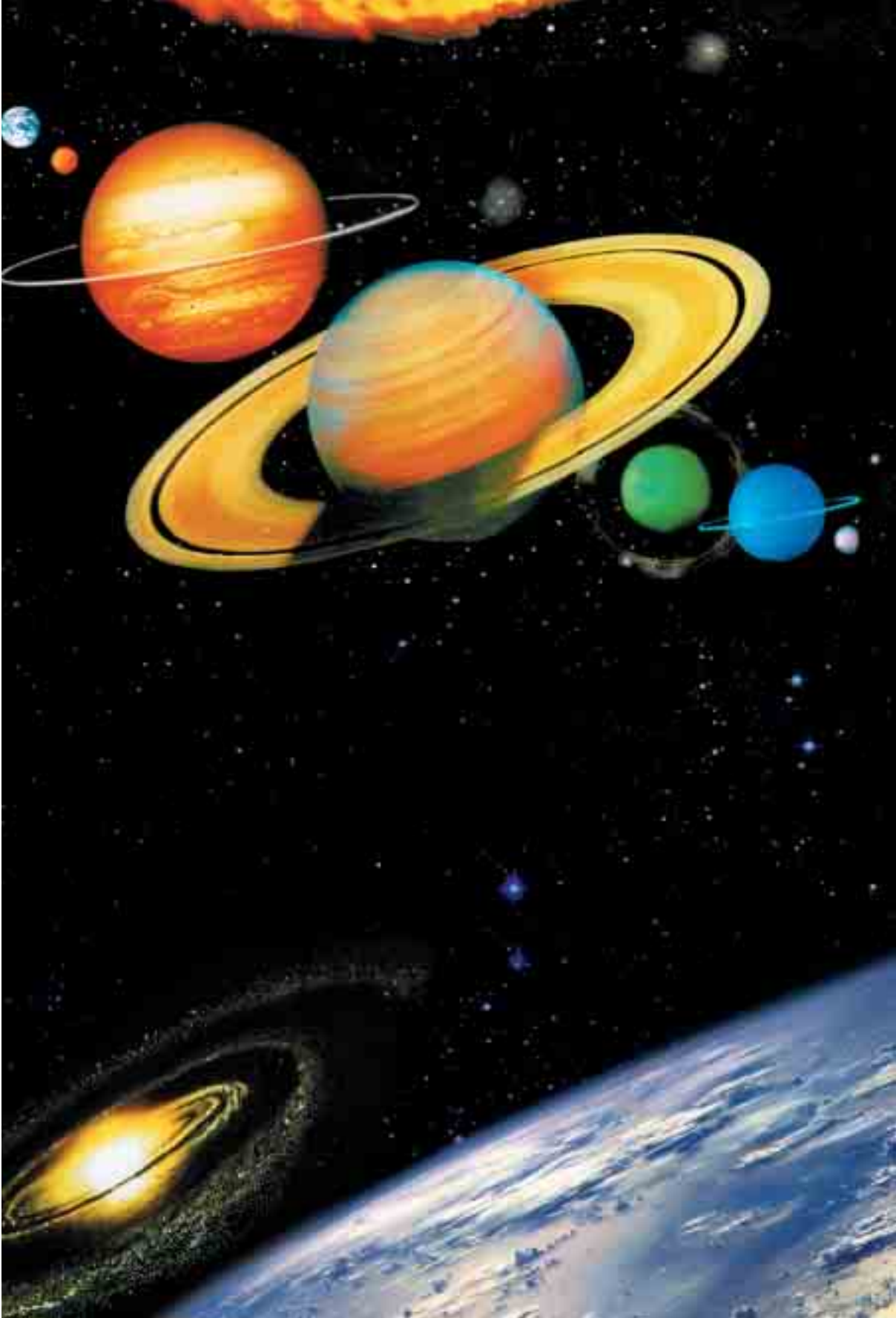
One can continue giving countless examples in illustration of the order in the creation of God. Every created thing since the formation of the universe millions of years ago has been brought into existence by nothing other than the Omniscience and Sovereignty of God.

SOME FUNDAMENTAL CONSTANTS OF PHYSICS

In the universe there are unchanging laws that affect all animate as well as inanimate things. Physicists use various constants of physics to explain these unchanging laws. These constants are among the evidence



that illustrate the perfect creation of the universe just as it does the perfect creation evident in the beings living therein. If these constants were to change slightly, neither the earth on which we live nor the universe could have existed.



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