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Henning Wiesner
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Henning Wiesner
Günter Mattei (Illustrations)
The Big Book of Animals

Translated by Sally-Ann Spencer

[Plate 2]

The word 'mhorr' comes from the Arabic and is used to describe the animal's chestnut topcoat. To a casual observer, the mhorr's combination of brown back and pale underbelly may seem visually striking, but its two-tone colouration is an ideal form of camouflage. In the arid plains of the Sahara its brown-and-white outline effectively 'disperses' in the heat haze.

Reintroducing the Mhorr Gazelle

At one time the semi-desert shrubland of the outer Sahara was home to three sub-species of dama gazelle. The main sub-species, the strikingly beautiful and elegant mhorr gazelle, was declared extinct in the wild in 1968. Three years later a contingent of just eleven young mhorrs was admitted to the Centre for Saharan Fauna in Almeria, Southern Spain. Nowadays over two hundred mhorrs – the result of Almeria's captive breeding programme – can be seen in zoos around the world.

An initiative was launched at Hellabrunn to reintroduce captive mhorr gazelles into game reserves in Morocco and Tunisia. Thanks to the reintroduction programme – a joint campaign conducted by Hellabrunn, the GTZ (German Corporation for Technical Cooperation), Berlin Wildlife Park and Frankfurt Zoo – over sixty mhorrs are now at home in their natural habitat. Even though our mhorrs

had been born, bred – and in some cases, bottle-fed – in Europe for several generations, they soon adapted to their new surroundings. The specially constructed watering stations went unused – like true desert dwellers, our mhorrs gain their water from their food. Plants that help to meet their water needs include the Indian fig cactus and the wild pumpkin, whose acrid taste makes it unpalatable to domesticated animals. Negotiating the sharp spines of the acacia with ease, the mhorrs graze on its delicate leaves, feeding on a type of foliage that sustained their forebears generations before them.

The mhorr's display of genetic 'knowledge' becomes all the more striking when you consider its fussy attitude towards most European vegetation. Only a day after their release, our zoo-raised mhorrs fled whenever a human came within less than a hundred metres of the herd. Hellabrunn's mhorrs were clearly well on the way to reclaiming their stamping grounds.

[Plate 6]

Using a blowgun takes a good deal of practice, but for zoo keepers and veterinarians it is well worth the effort. In the hands of an experienced marksman, the blowgun is an invaluable tool.

Poison Darts and Blowguns

The art of hunting with blowpipes was developed simultaneously but independently by a number of different cultures. Blowpipes are used by the indigenous peoples of South America, as well as by the Dayak tribe of Borneo. The Piaroa Indians in the Orinoco Basin fashion their blowpipes from a perfectly smooth reed of the genus carex which grows to over six metres in length. The mouthpiece is affixed with resin and wax. Finished blowpipes are valuable instruments of precision with a firing range of thirty to forty minutes. The shaft of the dart is made from the stem of a palm leaf, whilst woven leaf fibres make up the quiver.

The forty-centimetre dart soars through the air almost noiselessly, hitting its targets with incredible accuracy. Poison is applied to its tip and dried over a fire, then the process is repeated. The hunter cuts a nick in the shaft approximately two centimetres behind the tip to ensure the poison remains in the animal's body even when the dart is pulled out or broken off. This silent method of hunting enables the Piaroa Indians to hunt entire flocks of parrots or troupes of howler monkeys, firing one shot after another without scaring the animals away. A photoelectric sensor in Munich measured the velocity of the one-and-a-half-gram dart at a hundred-and-eighty kilometres per hour.

The make-up of the toxin differs from tribe to tribe. The skin glands of the poison dart frog are a notorious source of poison. In situations of stress, the frog produces a glandular secretion noxious enough to kill twenty thousand mice or ten human beings. Frogs bred in captivity do not secrete the toxin, leading scientists to believe that bacterial organisms present in their natural habitat play a part in producing the poison.

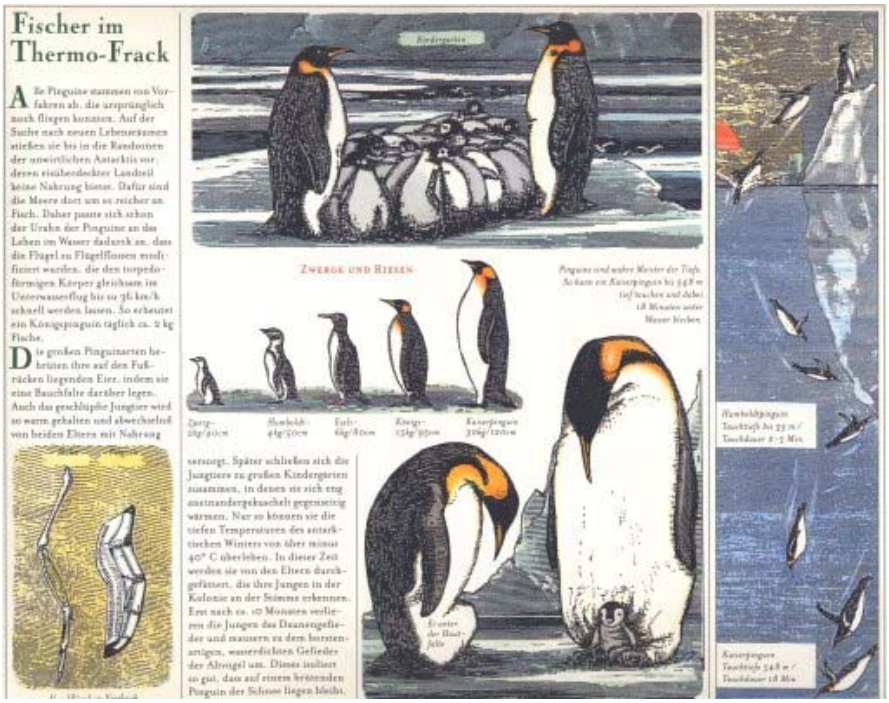
The sap and rind of the Strychnine tree (Strychnos nux-vomica) are the main ingredients of curare, a poison prepared in accordance with a secret recipe by another indigenous tribe. The darts are dipped in the poison, which paralyses the animal's nervous system. The toxin cannot be reabsorbed during consumption of contaminated flesh, meaning hunters can eat their prey with impunity.

The darts used by zoologists weigh approximately six grams. An able marksmen can fire a tranquillizer dart from a Telinject blowpipe at roughly ninety-two kilometres per hour. The dart contains compressed air that pushes the plunger – and hence the tranquillizer fluid – through the barrel of the syringe. On impact with the animal's body, the cap is pushed back and the contents of the syringe released. The concentration and dose of the tranquillizer depend on the species and weight of the animal in question. Hellabrunn Zoo has developed its own tranquillizer preparation,

Hellabrunn Blend. The tranquillizer dart can be reused like an ordinary syringe. With a little skill and practice, a zoologist can anaesthetize a red deer from a distance of twenty metres without causing the animal pain. Alternatively, the Telinject rifle – a rifle powered by carbon dioxide capsules in the stock – can hit targets at distances of over sixty metres with remarkable precision.

[Plate 10]

The feathers in a penguin's outer plumage are like delicate bristles. They do such a good job at protecting the penguin's downy undercoat that the skin stays dry underneath. The feathers also serve to trap air within the plumage, helping to insulate the penguin and save energy while it swims. The layer of air forms bubbles underwater, reducing the penguin's drag.



Fishermen in Thermal Dinner Jackets

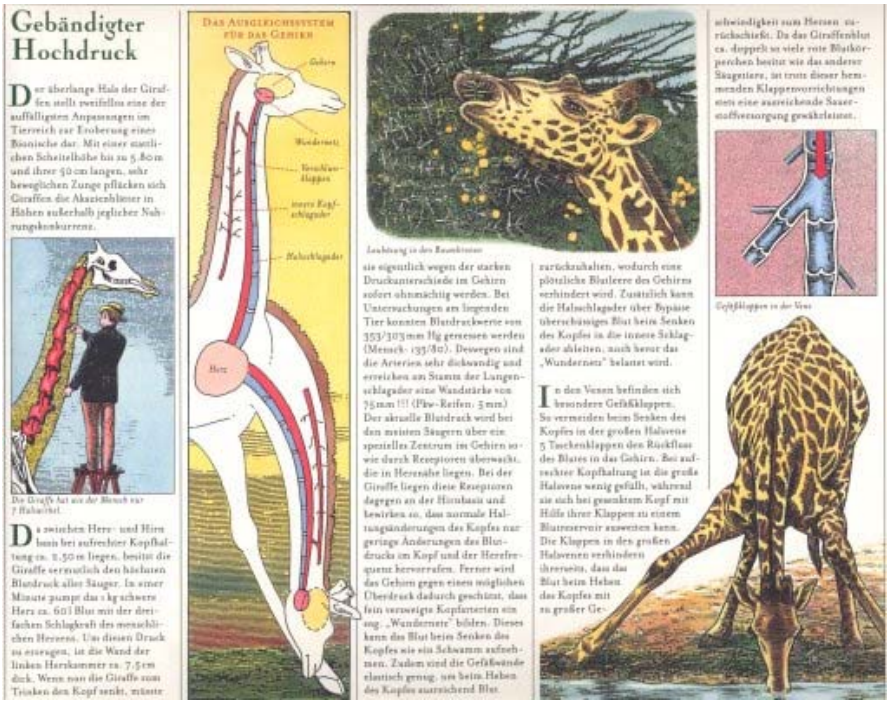
The modern penguin evolved when a species of flying bird arrived in the outer reaches of the Antarctic in search of new territory. While food was scarce on the inhospitable frozen continent, the waters of the Antarctic teemed with fish. The forerunners of the penguin adapted to life in the oceans, developing flippers instead of wings. Propelling their torpedo-shaped bodies through the water, they reached speeds of thirty-six kilometres an hour. These days the king penguin catches

approximate two kilograms of fish per day.

The larger and heavier species of penguin incubate their eggs by balancing them on their feet and covering them with a layer of abdominal skin. The same technique is used to protect newly hatched penguins from the elements, whilst the parents take turns to supply them with food. After a few months the chicks huddle together in crèches, snuggling up to one another for warmth. For the young penguins, the crèche is the only chance of surviving the harsh Antarctic winter, during which temperatures sink to below minus forty degrees. The parents continue to feed their young, recognizing their offspring by their calls. It takes ten months for a chick to lose its downy feathers and gain the bristly waterproof overcoat of a fully-grown adult. An adult penguin's outer plumage provides such effective insulation that snow settles on the feathers without melting.

[Plate 14]

Thanks to its unique circulatory system, the giraffe spends most of its life standing up. Even during deep sleep a giraffe will spend no more than thirty to fifty minutes lying down. The female giraffe remains upright whilst giving birth – before the calf has time to take its first breath, it falls to the ground from a considerable height. Giraffes must always make allowances for their peculiar cardiovascular systems. Lying down to give birth would be a sheer impossibility.



Healthy Hypertension

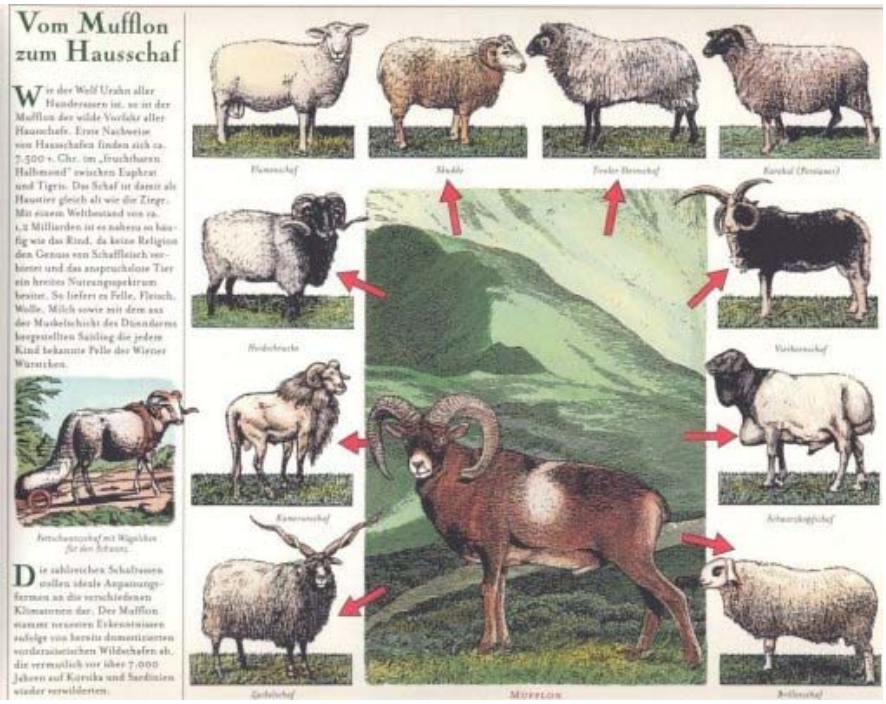
The giraffe's abnormally long neck is one of the most striking examples of anatomical adaptation enabling an animal to fill an ecological niche. Standing an impressive 5.8 metres tall and with an incredibly flexible tongue measuring almost half a metre, the giraffe eats acacia leaves far above the heads of any rival grazer.

With 2.5 metres between its brain and heart, the giraffe has the highest known blood pressure of any mammal. Its ten-kilogram heart beats with three-times the power of a human heart, pumping sixty litres of blood per minute. In order to generate this kind of pressure, the wall of the left ventricle is 7.5 centimetres thick. When a giraffe lowers its head to drink, the change in blood pressure is so great that it would cause any other mammal to faint. Tests conducted on reclining giraffes measured blood pressures of up to 353/303 mm Hg (compared to 135/80 mm Hg for humans).The walls of the giraffe's arteries are correspondingly thick, with the wall of the pulmonary artery measuring an impressive seventy-five millimetres. Standard car tyres are just five millimetres thick! Most mammals have special receptors near the heart that work together with a specific part of the brain to regulate blood pressure. In the case of the giraffe, however, the receptors are located in the brain stem, serving to ensure that movements of the head cause only negligible changes in heartbeat and in the flow of blood to the brain. The brain is further protected from excess blood flow by a complex of tiny blood vessels, the rete mirabile or 'wonderful net'. When the head is lowered, the net of vessels absorbs the excess blood flow like a sponge. The walls of the vessels are also sufficiently flexible to retain blood, thereby maintaining the blood supply as the head is raised. The carotid artery also plays a role in combating excess blood flow during lowering of the head. Even before the blood reaches the rete mirabile, the carotid artery diverts part of its flow to the vertebral artery.

The veins of a giraffe are regulated by a special type of valve. Five one-way valves in the jugular vein prevent back-flow into the brain when the animal's head is lowered. In the upright position, the jugular vein is relatively empty, but it fills with blood when the animal stoops, forming a reservoir of blood. The valves also reduce the speed with which the blood flows back to the heart when the animal raises its head. Giraffes have almost double the number of red blood cells as other mammals, so there is always an adequate supply of oxygen, despite the blood flow being restricted by the valves.

[Plate 45]

Unlike pigs, sheep aren't subject to any major religious taboos, and mutton and lamb are a key source of protein. In the age of man-made materials wool remains an important fabric, and lanolin – fat extracted from the fleece – forms a skin-friendly basis for ointments.



Moufflons and Sheep

Just as dogs were descended from a single species of wolf, so sheep evolved from a common ancestor, the moufflon. The first reference to sheep being kept as domestic animals dates back to 7500 BC, when sheep were farmed on the fertile land between the Euphrates and the Tigris. As such, sheep have been domesticated for roughly the same length of time as goats. With a worldwide population of 1.2 billion animals, sheep are almost are numerous as cows, a statistic partly explained by their undemanding nature and by the absence of religious taboos. Sheep provide a range of different products, from meat, milk, wool and fleece to sausage skins, traditionally made from sheep intestines.

The various breeds of sheep have adapted to meet the demands of their environment. Scientists believe that the moufflon was descended from a species of wild sheep farmed in Asia then introduced to Corsica and Sardinia, where it returned to the wild some seven thousand years ago.

[Plate 59]

9) Das reflektierende Selbstbewusstsein

Die Ergebnisse seriöser Verhaltens- und moderner Hirnforschung zeigen, dass Schimpansen und Zwergschimpansen, wenn sie optimal trainiert werden, den Intelligenzgrad eines ca. 4 Jahre alten Kindes erreichen können. Nennen wir dieses Kind Thomas. Wie unser Thomas erkennen sich beide Affenarten im Spiegel. Woher man das weiß? Man tupft einem Schimpansen einen roten Farbklecks auf die Stirn und kann beobachten, wie er vor dem Spiegel versucht, diesen zu entfernen. Bei dem fünf Jahre alten Schimpansen Michi aus Hellabrunn ging dies freilich nicht, er war allerdings auch nicht der „Hellste". Egal ob der Punkt grün oder rot war, er konnte mit seinem Spiegelbild und den Farbpunkten auf seiner Stirn überhaupt nichts anfangen. Offenbar müssen Schimpansen dafür schon älter oder aber zuvor entsprechend trainiert sein.

Nun sagt jedoch dieses bloße Wiedererkennen noch nichts über ein reflektierendes Selbstbewusstsein aus. Weder Thomas noch Michi besitzen nämlich die Fähigkeit, über die eigene Situation im Leben nachzudenken oder sich ein Urteil über sich selbst zu bilden. Beide wissen weder um ihren eigenen Tod noch davon, dass es Zeiträume gab, als es sie als Art überhaupt noch nicht gab. Die Berichte einer amerikanischen Forscherin, die sich mit ihrem Gorillaweibchen „Koko" über den Tod unterhalten können will, dürften einer seriösen Untersuchung nicht standhalten, auch wenn sie ähnlich wie die Mär von den Elefantenfriedhöfen immer wieder durch die Presse geistern. Thomas und Michi mögen in der Lage sein, sich über Vergangenheit und Zukunft in einem Zeitraum von zumindest 24 Stunden Gedanken machen zu können.

M. C. Escher – „Auge". Nur wir Menschen wissen um den Tod

Niemals werden sie aber die Vorstellung eines Lebensplanes entwickeln können.

Die Frage der bösen Stiefmutter Schneewittchens: „Spieglein, Spieglein an der Wand, wer ist die Schönste im ganzen Land?", können weder Thomas noch Michi stellen, noch könnten sie die daraus resultierenden Mordpläne schmieden. Erst wenn Thomas älter geworden ist, wird er durch Reflexion und Bewertung seiner Gedanken unter Einbeziehung des Bewusstseins seiner Mitmenschen in sein eigenes Bewusstsein die Fundamentalsätze eines Sokrates: „Erkenne dich selbst" oder „Ich weiß, dass ich nichts weiß", sowie des Pseudo Descartes: „Ich denke, also bin ich", nachvollziehen können. Dem alternden Schimpansen bleibt diese Erkenntnis verschlossen. Erst das reflektierende Selbstbewusstsein macht den Menschen zur geistigen Person, die ein Tier nie sein kann. Es ist die wesentliche Grundlage für Moral, Kunst, Kultur, Glaube, Religion, Wissenschaft, Tradition und Philosophie. Dies sind wiederum die Voraussetzungen für die Entwicklung unserer menschlichen Gesellschaft.

Nach dem Menschen kommt in dem System der Zoologie der Affe erst nach einer unermesslichen Kluft. Wenn aber einmal ein Linné die Tiere nach ihrer Glückseligkeit, Behaglichkeit des Zustandes und so weiter ordnen würde, so könnte doch öffentlich manche Menschen unter die Mollusken und die Jagdhunde zu stehen.

9) SELF-AWARENESS AND SELFHOOD

According to animal experts and cognitive scientists, a carefully trained chimpanzee can attain the IQ of a four-year-old child. Imagine a young boy called Thomas. Like our four-year-old boy, chimpanzees and pygmy chimpanzees can recognize themselves in the mirror. How can we tell? A red spot is daubed on their foreheads, and the child or the chimp will look in the mirror and attempt to remove it. Of course there's no guarantee that a chimp will pass the test. Our five-year-old chimp Michi couldn't make head or tail of the spots or of his reflection. Michi isn't the brightest of chimps, but perhaps he wasn't old enough or lacked the necessary training.

A chimpanzee or a child's ability to recognize itself in the mirror isn't proof of genuine self-awareness or selfhood. In fact, neither Thomas nor Michi can reflect on their situation in life or form a judgement on themselves. They aren't familiar with the fact of their own mortality and they can't conceive of a time in which their species didn't exist. According to one American researcher, a

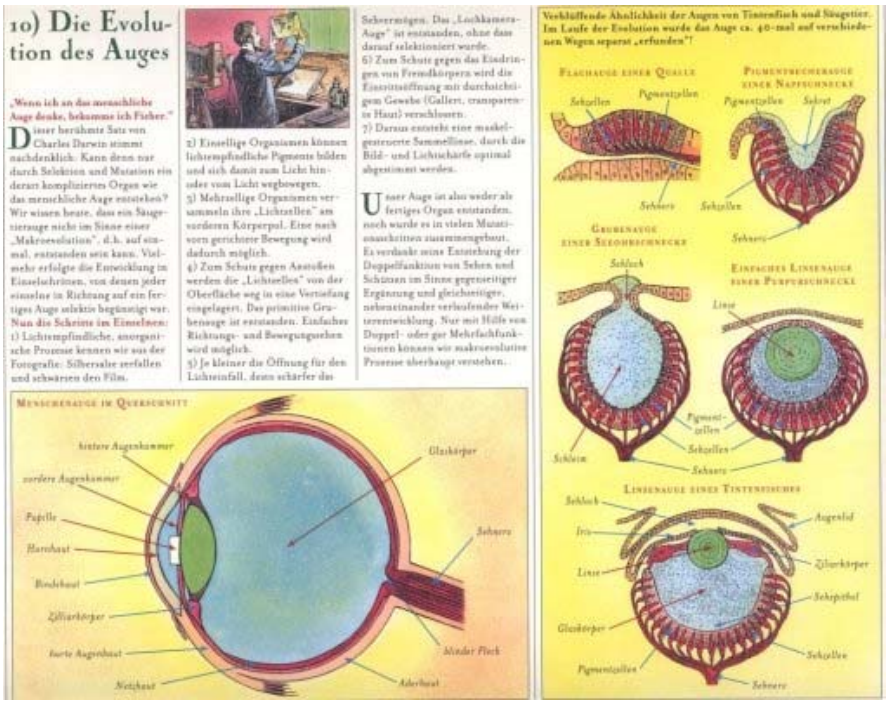
female gorilla Koko was able to converse with her on the subject of death. The media loved the story, but it doesn't stand up to scientific scrutiny – the idea is no less fanciful than the myth of elephant graveyards. Whilst Thomas and Michi are undoubtedly aware of past and future within the time-frame of a day, they lack the ability to conceptualize the overall arc of their lives.

Thomas and Michi can identify themselves in the mirror, but they can't pose the wicked stepmother's question, Mirror, mirror on the wall, who is the fairest of them all? Even if they could, they wouldn't be capable of taking the stepmother's revenge. Nonetheless, as Thomas grows older, he will begin to reflect upon and evaluate his thoughts, taking account of the consciousness of others within his own thoughts. Only then will he come to understand the importance of Socrates' maxims such as 'Know thyself!' and 'I know nothing except the fact of my ignorance' and appreciate the meaning of Descartes' philosophical statement 'I think, therefore I am'. A chimpanzee can never attain such insight, regardless of its age. The ability to reflect on our situation is what makes us fully self-aware in a way that animals aren't. Selfhood and self-awareness are at the heart of human ethics, art, culture, faith, religion, science, traditions and philosophy, all of which are essential for the development of our society.

Chimpanzees rank second in terms of intelligence, but they still trail a long way behind humans. If a taxonomist were to rate animals according to their capacity for contentment, donkeys and dogs would fare better than many human beings.

[Plate 60]

10) EVOLUTION OF THE EYE



The eye to this day gives me a cold shudder.

This famous remark of Darwin's certainly gives cause for thought. Could selection and adaptation really be responsible for creating something as astonishingly intricate as the human eye? These days we know that the mammalian eye didn't evolve suddenly as the result of 'macro-evolution'. The eye came into being in a series of stages, each of which favoured the development of the eye as we know it.

We can isolate the stages as follows:

1. Photography is a familiar example of inorganic photo-sensitivity. Film is coloured by the breakdown of silver chloride;
2. Single-celled organisms produce photo-sensitive pigments. Equipped with the ability to

sense brightness, organisms move away from or towards the light;

3. Multi-cellular life-forms develop a pool of 'light cells' at the front-end of their bodies. Forwards motion develops;
4. The pool of 'light cells' depresses into a cup to protect the cells from accidental knocks. The primitive 'pit eye' comes into being. The organism is able to detect movement and determine its direction;
5. The smaller the aperture, the sharper the vision. The 'pinhole camera eye' has evolved;
6. The aperture is covered with transparent tissue (jelly or translucent skin) to protect it from foreign bodies;
7. A biconvex lens develops. Muscles allow it to optimize the amount of light and the sharpness of the image.

The human eye was not created as a ready-made organ nor was it put together in a complex sequence of mutations. We owe its existence to complementary developmental paths prompted by the dual need for vision and protection. Macro-evolutionary processes can only be understood in relation to dual or multiple needs.