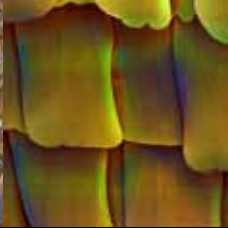
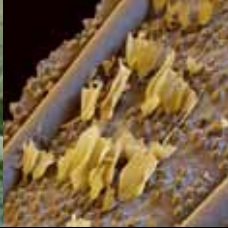




eye of science
meckes & ottawa



M
microscapes



INFORMATION ABOUT THE EXHIBITION

The main theme of this exhibition "microscapes" is structure. The word "microscapes" itself is a technical term put together from microscope and landscape, to draw attention to the mostly bizarre microscopical structures.

The objects refer to botany, zoology, parts of the human body or even to the world of crystals.

All pictures are taken with the help of a Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), or Light Microscope (LM).

Oliver Meckes as the photographer and Nicole Ottawa as the biologist, supported by the designer Elke Pikkemaat create these special photos with expensive techniques and patience down to the last detail.

The photos are acrylic sealed from the front. They are strengthened on the backside with an not visible frame made of aluminium because of the sealing, the photos have an enormous brilliance and depth. All photos are signed and there is a limited edition of five for each motive.

As a supplement for the main exhibition, we offer a set of portraits from insects. All portraits are Scanning Electron Microscope images, coloured and classical framed in wood. They are signed, as a limited edition of 10 for each theme (see pages 38 - 43).

PHOTOS, NUMBER	HEIGHT X WIDTH
5 pieces	80 x 80 cm / 100 x 80 cm
16 pieces	100 x 100 cm / 120 x 100 cm / 125 x 100 cm
9 pieces	100 x 125 cm / 125 x 125 cm
1 pieces	100 x 135 cm
1 pieces	120 x 150 cm
6 pieces	30 x 30 cm / 30 x 40 cm portraits in frames, outer frame size 44 x 50 cm / 44 x 60 cm

ICONOGRAPHY

as a word- document

PACKAGING

all photos together in 2-3 wooden boxes

INSURANCE

EUR 52.000,-

CONTACT

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CURRICULUM VITAE

OLIVER MECKES

Photographer, born 1963 in Stuttgart
1973-1979 Highschool, first microscopic experiences, first reflex camera.
1979-1985 Education as salesman in photographic equipment, later as as photographer
1986-1989 Studies in scientific photography and first contacts with SEM-technics and
1990-1993 practicing scientific photography in all disciplines (SEM, light micrography, Schlierenoptik, macro, high speed...) at "Institut für Wissenschaftliche Fotografie" by Manfred Kage

NICOLE OTTAWA

Dipl. Biol., born 1965,
1975-1984 High-school education in Fürstfeldbruck (Munich)
1985-1993 studying biology with 2 semesters microbiology and chemistry at "Freie Universität Berlin".
Experiences in reflex camera technics, especially macro- photography.
1993-1994 studies in scientific photography at "Institut für Wissenschaftliche Fotografie"
1994, Mai Education in SEM- techniques in „Institut für medizinische Physik“ at the Univ. of Münster.

eye of science

1995	Founding eye of science in Reutlingen
2002	Moved to own business-rooms in Reutlingen
Since 2003	The designer Elke Pikkemaat completes the team.

EQUIPMENT

One digitized Am-Ray-Scanning-Electron-Microscope with LaB₆-Cathode
One digitized Field-Emission-Scanning-Electron-Microscope
several Light Microscopes
laboratory for biological specimen preparation
underwater- photographic equipment
apple computers for digital imaging.

AWARDS

1997 UND 1998	Wissenschaft visuell (Bild der Wissenschaft)
1998	Fotoprix International, Barcelona
1998	Alfred Eisenstaed Award, New York
1998, 2000, 2001	World Press Photo Award, Preise in different categories
2002	Lennart Nilsson Award for scientific photography
2003	Science-book of the year: „Die fantastische Welt des Unsichtbaren“
2004	„Der Mikrokosmos- für Kinder erklärt“ was nominated for the „German Childrens-Book Award“
2005	1st Prize „Bionale“ Photographic Competition

PUBLICATIONS

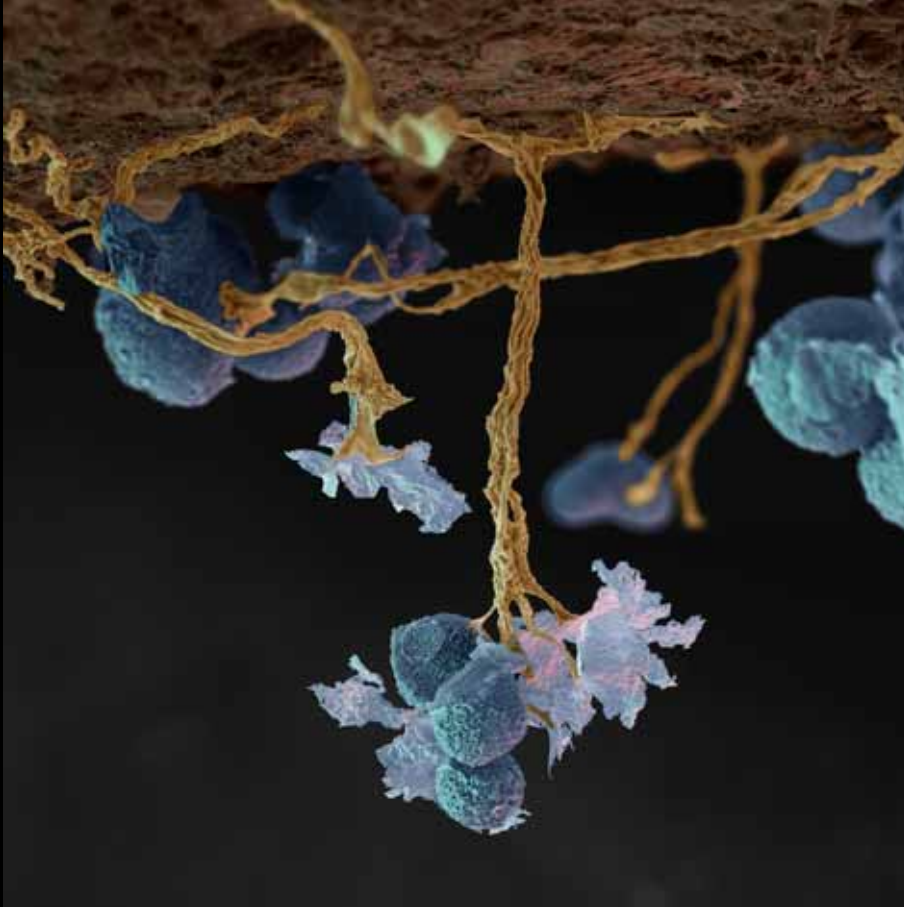
Stern, Geo, Time magazine, Bild der Wissenschaft, Science, Nature, BBC; ad's and annual reports (Bayer, Audi, Schering, Chiron-Behring, Aventis, BASF, MicroTec...) as well as newspapers, schoolbooks

EXHIBITIONS

1997 Naturkundemuseum Stuttgart : „Leben und Leben lassen“
1997 Osiander'sche Buchhandlung Tübingen (Einzelbilder)
Galerie Iffochrome, Fribourg, Schweiz „**eye of science**“
Verlagshaus Gruner & Jahr, HH: „Wissenschaftsfotografie entdeckt neue Welten“
Galerie Edele, Kirchheim/ Teck „**eye of science**“
Naturkundemuseum, Berlin: Ausstellung „Parasiten“

EXHIBITION „ MICROSCAPES „ WAS ALSO PRESENTED IN

Galerie Grashey, Konstanz
SEB Bank, Reutlingen
Stadtmuseum Schleswig
UNESCO, Paris
Naturhistorisches Museum Budapest, Ungarn
Kulturzentrum Knokke-Heist, Belgien
Museum für Technik und Arbeit, Karlsruhe u.a.

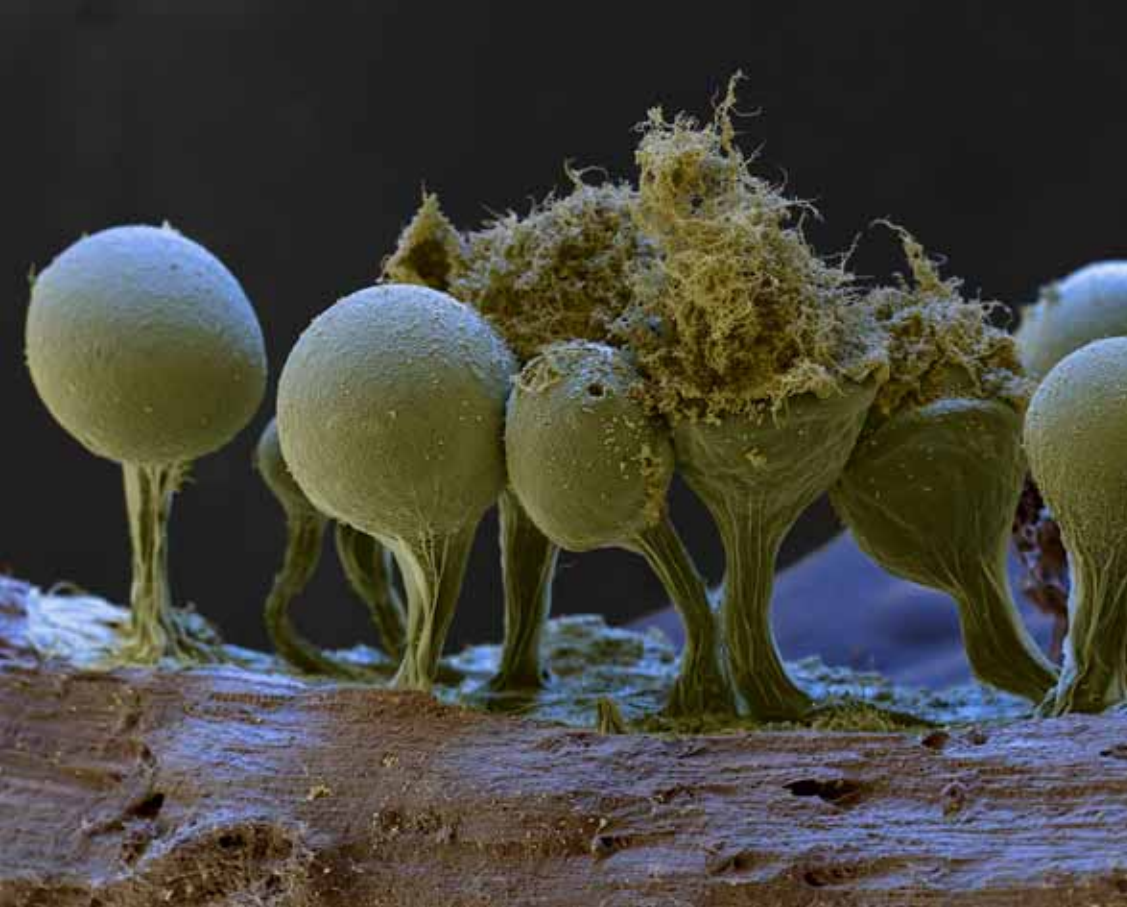


100 x 100 cm
REM, 300:1, 2002

MYXO 1

The fruiting bodies (sporangia) of the slime mould *Badhamia utricularis* grow hanging under pieces of rotten wood.

The delicate, blue outer wall of some of the sporangia have burst, releasing spores. Slime moulds are not fungi, but a separate group with complex life cycles.



100 x 125 cm
REM, 350:1, 2002

MYXO 2

The slime mould *Trichia decipiens* var. *olivacea* forms upright standing, 2-3 mm high fruiting bodies. Some of the sporangia have burst. Changes in the moisture content of the air cause these threads to wriggle, flicking spores into the air and helping them disperse.



100 x 125 cm
REM, 300:1, 2001

LICHEN

The fruiting body of the lichen *Xanthoria parietina* are seen here.

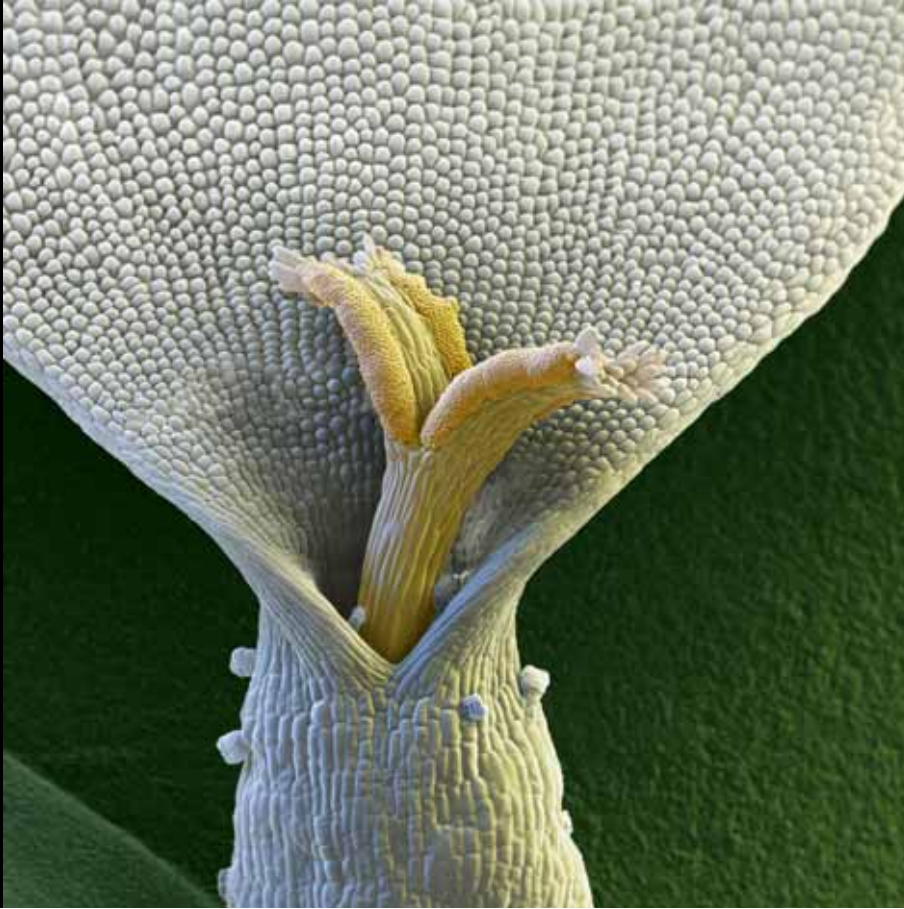
Lichens are symbiotic organisms, consisting of an algal and a fungal partner. The fungus benefits from the photosynthetic activity of the alga. The advantage to the alga, although not clear, may lie in protection from drought and intense light.



120 x 150 cm
REM, 1500:1, 1999

EUKALYPTUS

On the lower surface of a leaf from the Tasmanian snowgum tree (*Eucalyptus coccifera*), numerous stomata are located. The whole leaf is covered with wax to protect the plant to lose too much water.



100 x 100 cm
REM, 300:1, 2002

CHAMOMILLA

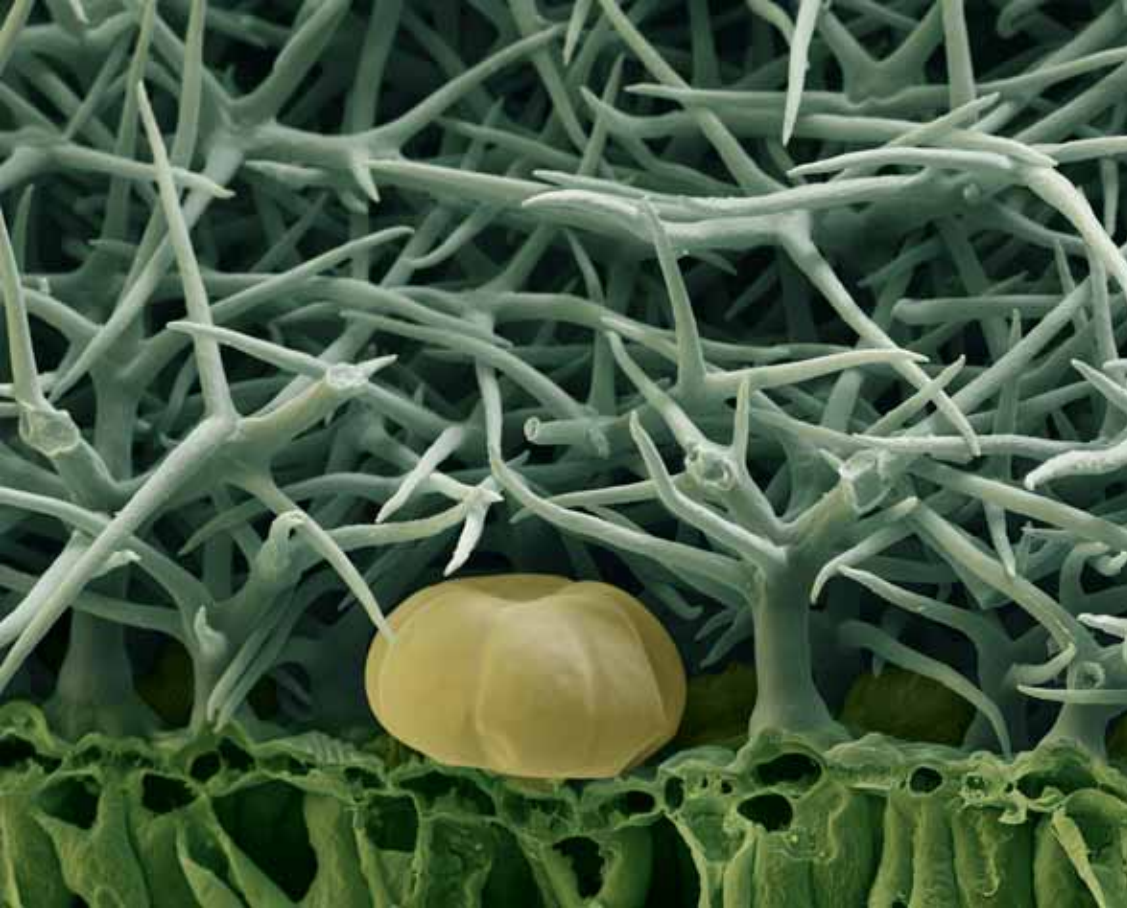
The chamomile has compound flowers, with the apparent flower being made up of numerous florets, each a true flower in its own right. The female part of this flower, the carpel, is orange. This receives the pollen from the male stamens.



100 x 100 cm
REM, 1600:1, 1999

OLIVE

The scale-like leaf hairs on an olive tree leaf (*Olea europaea*) prevent evaporative water loss during dry conditions or high winds. They help the olive tree to survive in the hot and seasonally dry climates in which it lives. Gas content in the leaf is regulated by the stomata (pores between the leaf hairs).



100 x 125 cm
REM, 5900:1, 1999

LAVENDULA

Side view on a broken leaf of a lavender plant (*Lavandula angustifolia*). Numerous dense branched hairs cover the leaf's surface. The rounded structure is an oil gland, where the plant's aromatic oil is stored.



100 x 100 cm
REM, 4300:1, 1999

ALOE

In the centre a stoma on the surface of a leaf from an aloe (*Aloe* sp.), a type of succulent cactus is seen.

A stoma is an opening in a leaf's surface which helps regulate gas exchange between the leaf interior and the atmosphere. It is opened or closed by its two bordering guard cells.



100 x 125 cm
REM, 1600:1, 1999

SALVINIA

Water fern leaf hairs (white) on the leaf surface of the aquatic fern *Salvinia natans*. These water-resistant papillae lie on the leaf's upper surface. This tropical fern is an annual which is a common ornamental plant.



100 x 100 cm
REM, 150:1, 2001

GOOSEGRASS

Goosegrass: hooked fruit of a goosegrass plant (*Galium aparine*). The hooks become lodged in the fur of passing animals, ensuring that the plant's seeds, which are held in the fruit, are well dispersed before germination. Goosegrass is an annual weed that is native to Eurasia.



100 x 100 cm
REM, 4000:1, 2002

SOJA

The picture shows a section through a soya bean. Soya beans are produced in seed pods on the soya plant (*Glycine max*).

Starch is stored in spherical kernels (yellow) in the bean. This carbohydrate source provides a new plant with energy for germination.



80 x 100 cm
REM, 180:1, 2002

WHEAT GRAIN

Germinating wheat grain with a root and a leaf shoot. The majority of the seed of wheat comprises a store of starch surrounded by a seed coat. This starch provides the embryo plant with the necessary energy for germination. Germination may be triggered by humidity, temperature or other factors.

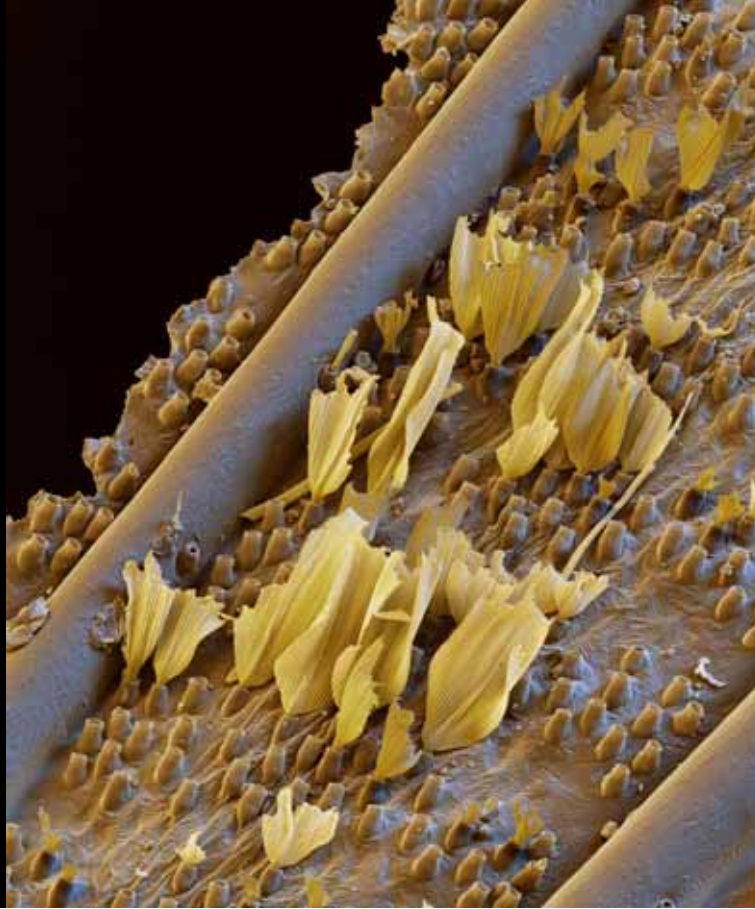


100 x 80 cm
REM, 160:1, 1999

FUNARIA

The spore capsules of the club moss (*Funaria hygrometrica*) are borne on spiralling stalks which curl up in dry conditions and unwind when they are damp.

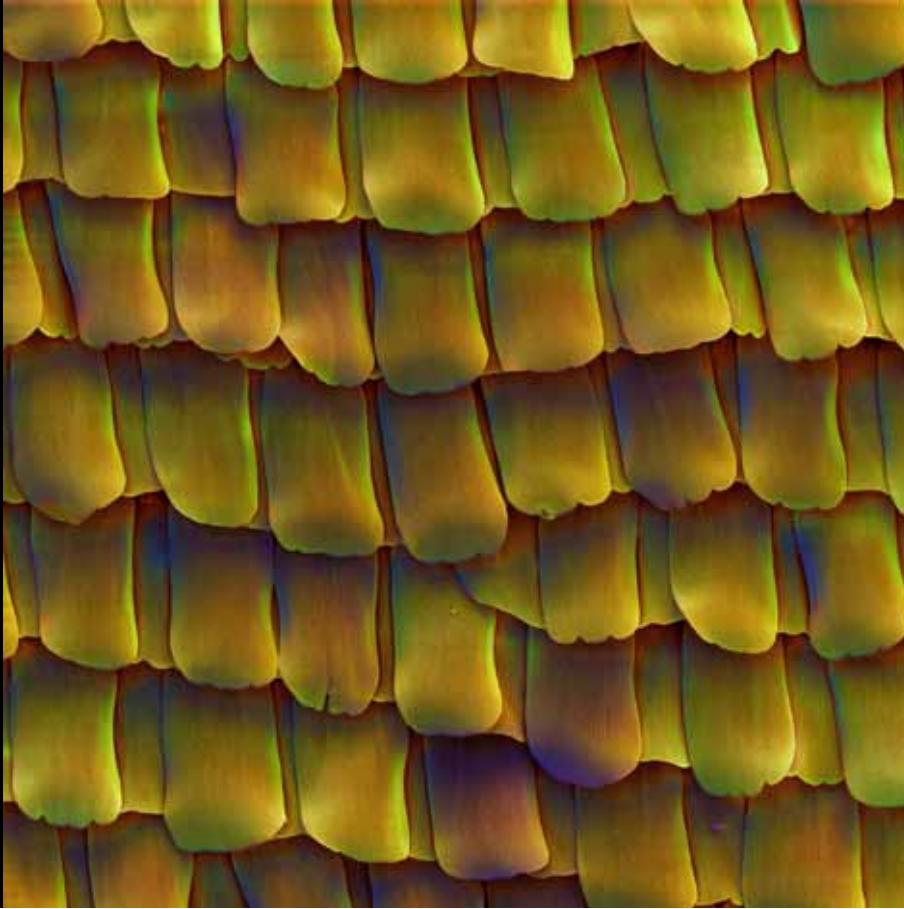
Mosses reproduce by means of spores at certain stages of the life cycle. Spores (brown spheres) are dispersed from the mouth of each capsule.



100 x 80 cm
REM, 2700:1, 1999

BUTTERFLY 1

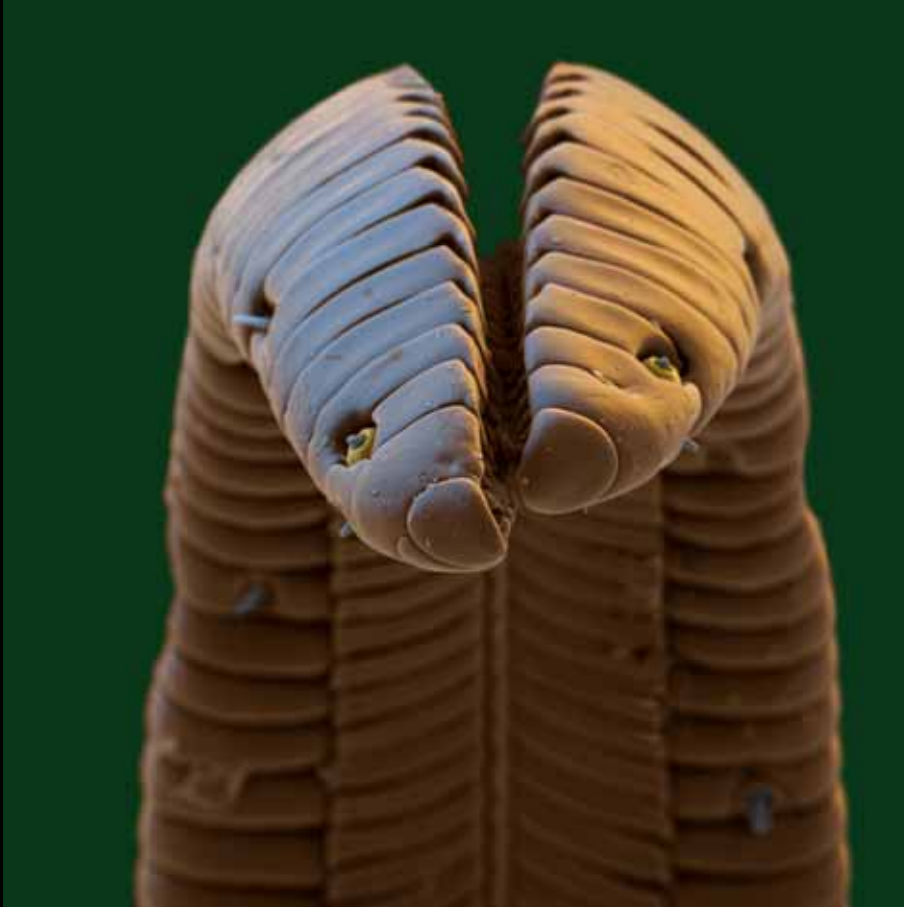
On this decaying butterfly wing many of the scales (yellow) have fallen off, or remain attached to their tubular sockets as fragments. An intact wing is composed of many overlapping scales attached to the wing membrane by short stalks, fitted into the sockets.



120 x 120 cm
REM, 2600:1, 1996

BUTTERFLY 2

The scales from the wing of a peacock butterfly, *Inachis io*. These scales have an intricate design and overlap like the tiles on the roof of a building. They allow heat and light to enter, and also insulate the insect.



100 x 100 cm
REM, 4000:1, 2001

TONGUE

Hawkmoth tongue. Coloured scanning electron micrograph of the end of the tongue (proboscis) of a hummingbird hawkmoth (*Macroglossum stellatarum*). This moth hovers in front of flowers while drinking nectar using this long tongue. It lives in Europe, and is active during the day.



100 x 100 cm
REM, 8000:1, 2000

FACETTA

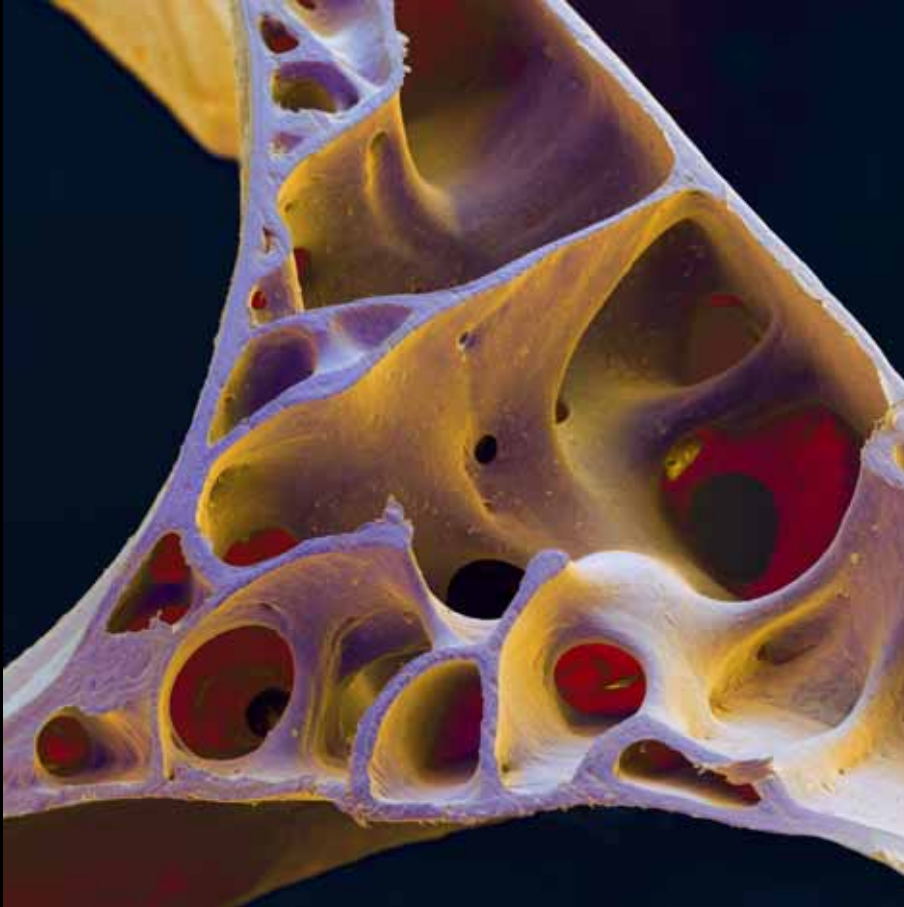
Each of the house-fly's compound eyes comprises several thousand image-forming facets called ommatidia. Each of these is a simple eye which sends a signal to the fly's brain. The brain combines the thousands of images to form a mosaic view of the world.



100 x 100 cm
REM, 580:1, 1996

SHARK SKIN

These sharply pointed placoid scales on a shark skin are also known as dermal teeth or denticles. They give the shark's skin the feel of sandpaper, but disrupt turbulence over the skin, considerably reducing the drag on the shark as it swims. This design is used on the surfaces of swimsuits.



80 x 80 cm
REM, 360:1, 1996

BONE

The picture shows a cross-section through the bone of a falcon's skull. The structure of the bone is spongy (cancellous). Its many small internal chambers make it strong but light. Structures of bones have been adapted in architecture and technique.

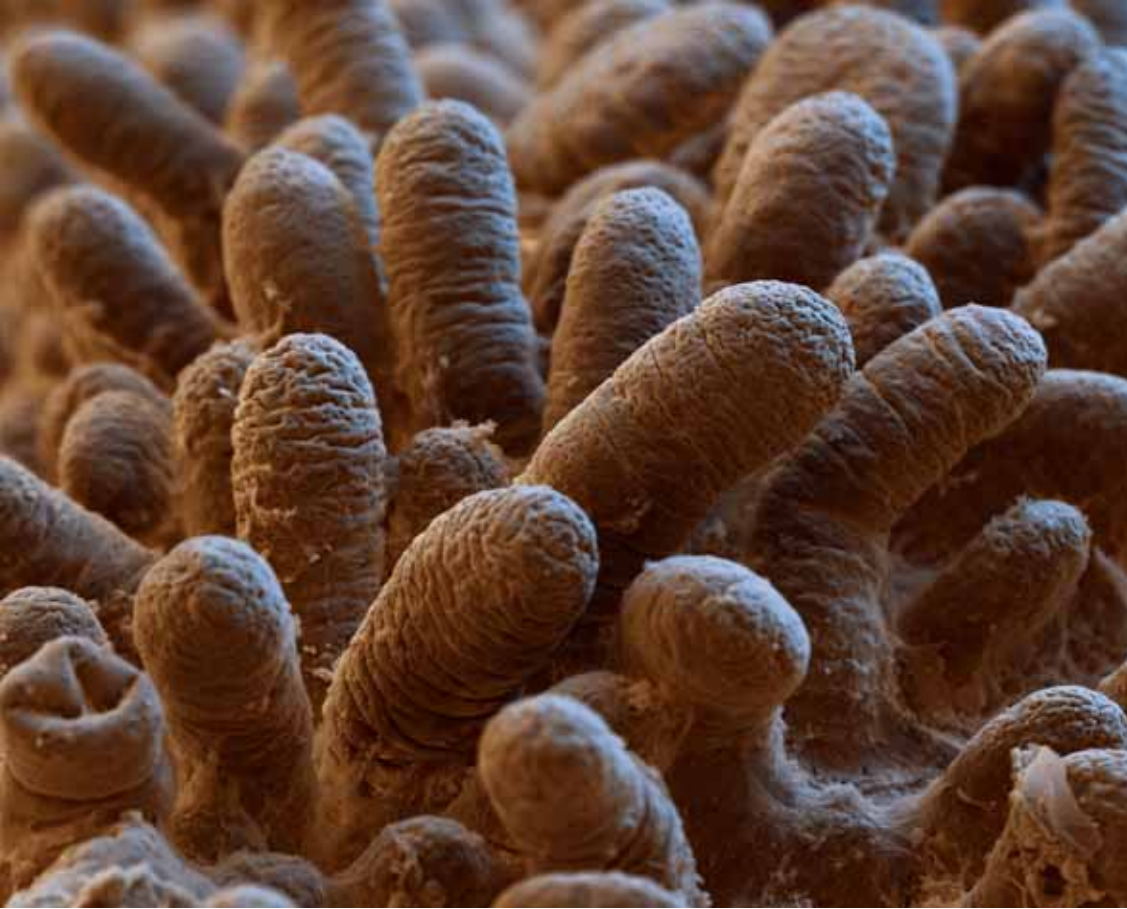


100 x 100 cm
REM, 200:1, 1996

BONE SCREW – TITAN

Bone screw used in orthopaedic surgery to help repair broken bones, in this case in the spinal column. Surgeons may use implants to hold the bone fragments together until they can bond again.

The screw's design has been optimized to withstand the stresses that will be imposed upon it when it is implanted.

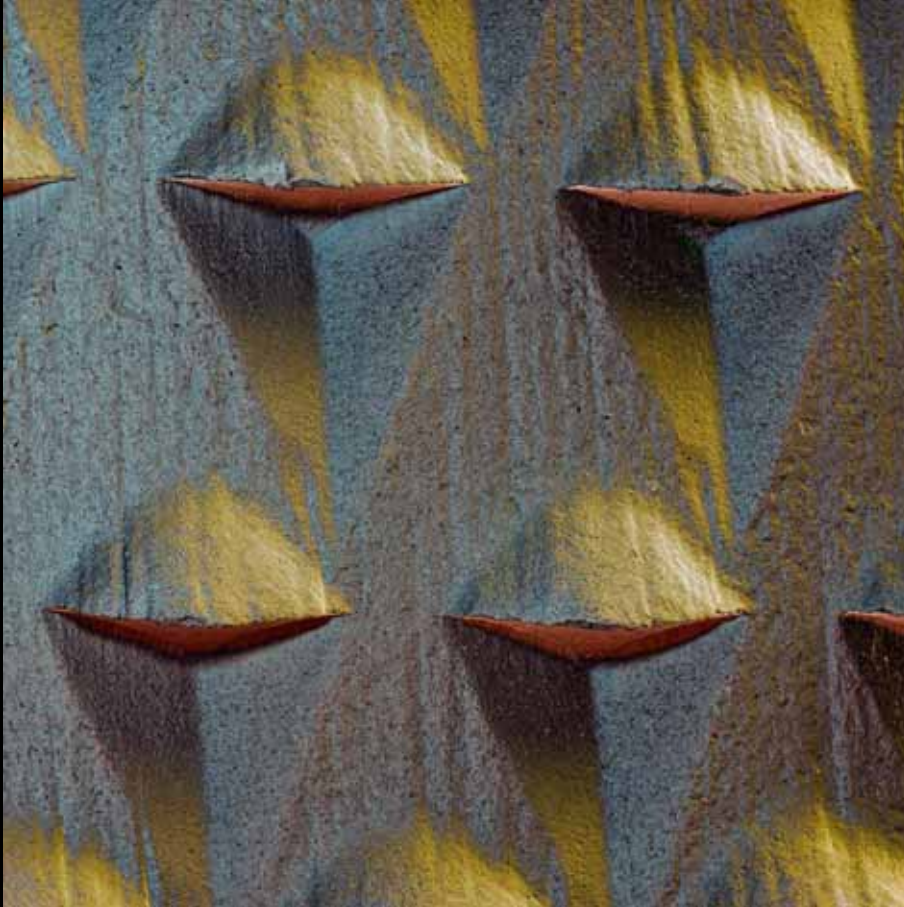


80 x 100 cm
REM, 800:1, 2002

INTESTINUM

Small intestine villi (brown) on the lining of the small intestine. Villi greatly increase the intestinal surface area for the absorption of nutrients from food.

The epithelium (outer layer, folded) of each villus contains blood vessels, which are involved in nutrient absorption, and goblet cells, which secrete mucus onto the intestinal surface.

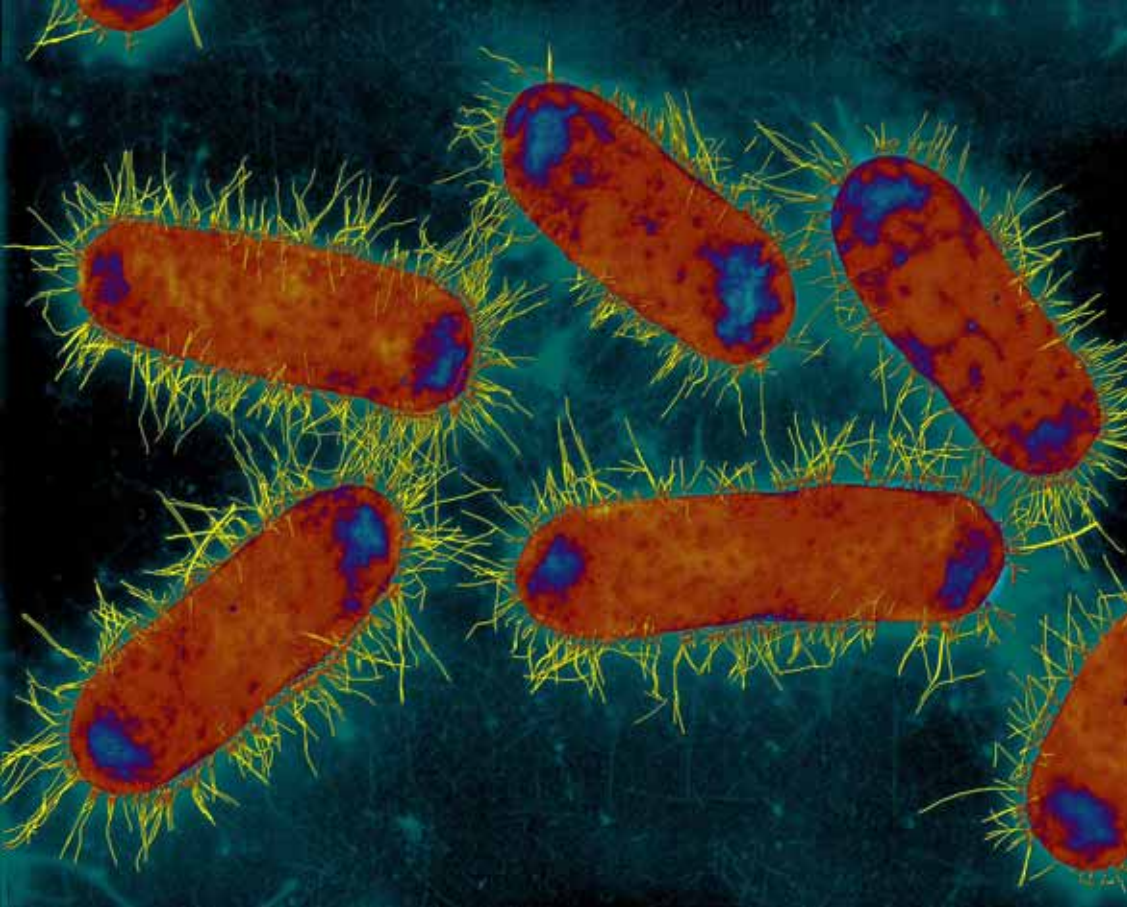


100 x 100 cm
REM, 160:1, 1996

RASP

The raised teeth of a metal file or rasp (seen from above) used in carpentry to smooth rough surfaces of wood.

The shape of the teeth mean that the direction that the file is passed over the wood affects how much wood is removed.



100 x 135 cm
TEM, 250.000:1, 1998

COLI

E. coli are Gram-negative bacilli (rod-shaped) bacteria. Long flagellae (thin thread-like structures) are used by the bacteria to move themselves.

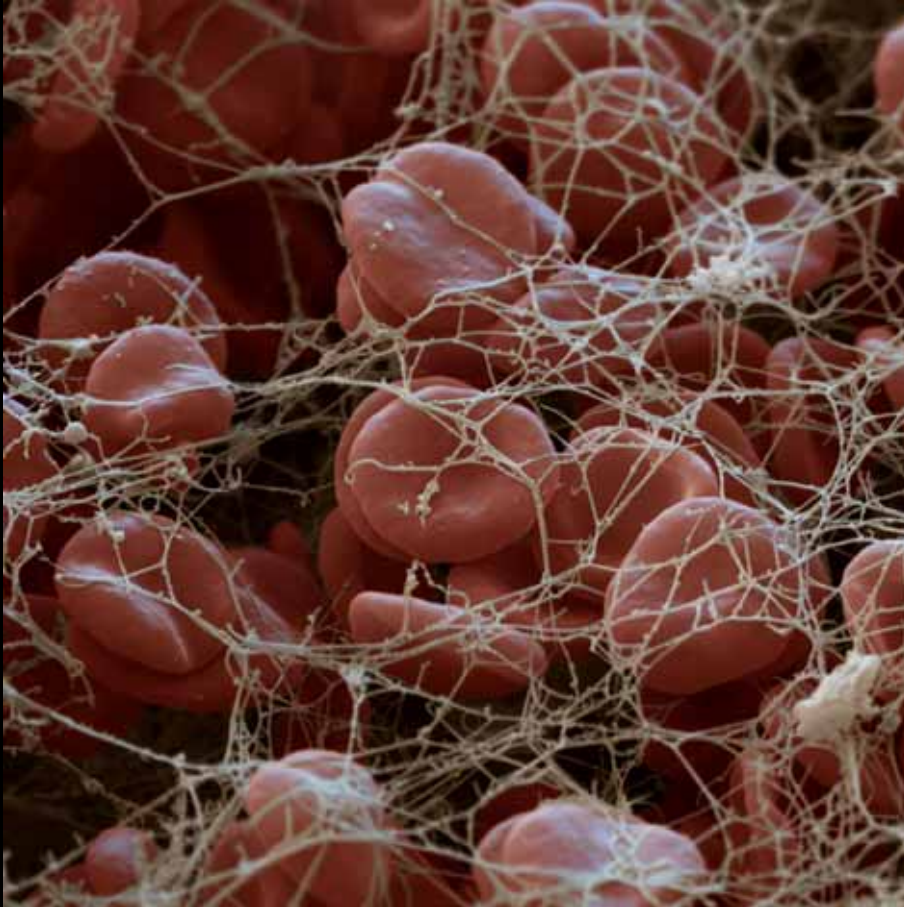
E. coli is a normal inhabitant of the human intestine. However, under certain conditions its numbers may increase, causing infections.



80 x 100 cm
REM, 9600:1, 2003

RETINA

The Retina is the the light sensitive tissue that lines the inside of the eye. From top to bottom are seen: cell bodies of optical ganglion cells (pale red), which form the optic nerve; cell bodies of bipolar neurons and cell bodies of the receptor cells (red); and the rod (white) and cone (yellow) receptors.



80 x 80 cm
REM, 25.300:1, 2003

ERY

Red blood cells are seen trapped in filaments of fibrin protein (brown). Blood clotting is the solidification of blood that occurs when blood vessels are damaged, thereby limiting blood loss. The filaments enmesh platelets and red blood cells, contracting around them to form a solid clot.



120 x 120 cm
REM, 1700:1, 1997

TRICHINELLA 1

Trichinella spiralis (round-worms). Infection follows the consumption of raw or undercooked meat which contains the cysts of the *Trichinella spiralis* larvae. These mature into the adult form in the intestine. From here they migrate around the body, causing fever and pains and forming cysts in the muscles.



100 x 80 cm
REM, 11.200:1, 2001

EPITHEL

This picture shows the cilia covering the epithelial lining of the nasal cavity. These microscopic hair-like structures are covered with a mucus (not seen) that traps dust and other inhaled particles. Coordinated, wave-like beating of the cilia propels the mucus to the back of the nose.



100 x 120 cm
LM, 1000:1, 1993

TRICHINELLA 2

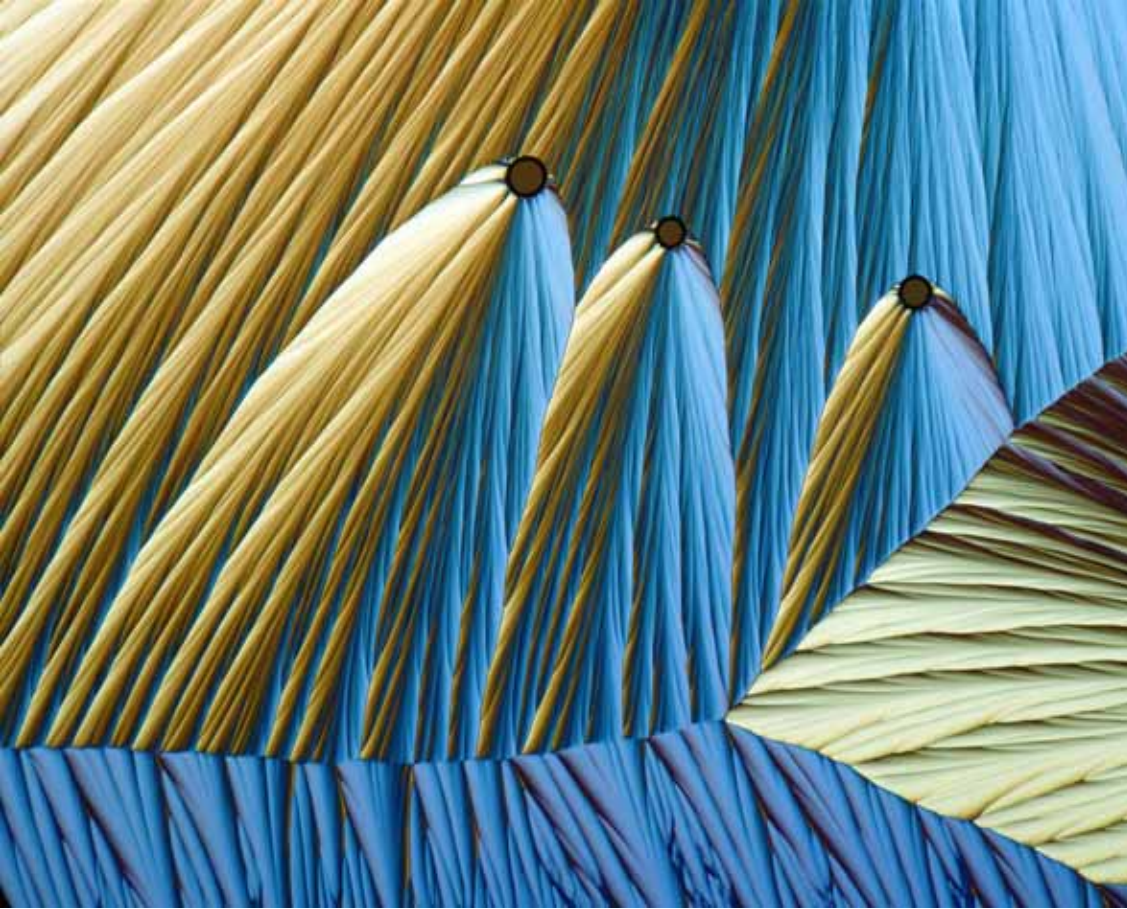
Trichinella spiralis. Light micrograph of a section through cysts caused by the worm *Trichinella spiralis* in pork muscle tissue. The muscle and cysts are stained blue. Two circular cysts are visible (at centre right and centre left) enclosing this nematodes.



120 x 100 cm
LM, 2000:1, 1993

QUARZ

Quartz is a form of silica (silicon dioxide). It occurs naturally in many types of rocks and mineral veins; sand is a form of quartz. Pure quartz is colourless, and has uses in the optical glass industry. Colours in quartz are due to mineral impurities.



100 x 120 cm
LM, 800:1, 2000

EMULGIN B2

Emulgin is used as a substance in cleaning agents. The melting point of Emulgin is at about 40° C. Concentric crystals grow if it is cooled down slowly.



125 x 100 cm
LM, 1000:1, 1993

FIRE

Linoleic acid is comprised of carbon (C), hydrogen (H) and oxygen (O), is an unsaturated fat. Linoleic acid occurs widely in vegetable oils and animal fats. Cholesteryl linoleate is an important constituent of blood. Linoleic acid is one of the most important essential fatty acids and is required for good health.



125 x 100 cm
LM, 600:1, 2001

ICE

Tetradeanol-1. This wax-like, organic substance melts at around 40° C and re-crystallizes in many different forms.



30 x 30 cm
REM, 350:1, 1995

DROSOPHILA MELANOGASTER

The head of the Fruit fly *Drosophila melanogaster*. This small fly is widely used for genetic experiments because it reproduces rapidly and is easily manipulated in the laboratory.



30 x 30 cm
REM, 180:1,1995

PROTOPHORMIA TERRAENOVAE

The maggots of bluebottle flies are used medicinally to clean wounds. The sterile maggots placed in the wound, where they feed on dead tissue and leave healthy tissue untouched. Their saliva contains anti-bacterial chemicals which maintain sterility in the area.



30 x 30 cm
REM, 80:1, 2003

BOMBYX MORI

The head of a silkworm moth caterpillar (*Bombyx mori*). The silkworm uses its chewing mouthparts (upper centre) to feed on mulberry leaves. On either side of the mouthparts is an antenna and several simple eyes. People farm silkworms for their silk, which is woven into cloth.



30 x 30 cm
REM, 50:1, 2000

MACROGLOSSUM STELLATARUM

The hummingbird hawkmoth (*Macroglossum stellatarum*) hovers in front of flowers while drinking nectar using its long proboscis (coiled at centre left). One of its compound eyes (brown) is seen at centre right. This moth lives in Europe and is active during the day.



30 x 30 cm
REM, 400:1, 1995

IXODES RICINUS

The Lyme disease tick *Ixodes ricinus* is a blood-sucking parasite of animals and humans. Here its specialised mouthparts used to pierce the host's skin are seen. Lyme disease occurs when the biting tick transmits a bacterium to humans. Lyme disease causes fever, muscle pain, and inflamed joints.



30 x 40 cm
REM, 40:1, 2004

TELEOPSIS BELZEBUTH

Stalk-eyed flies are mostly tropical insects, with one species being found in North America. The length of the stalks that their eyes are on varies and can be as long as their bodies. Although having their eyes on stalks allows a greater range of vision, it also poses an aerodynamic handicap.



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