



* Vincent Fournier, Post Natural History

THE COCK- ROACH EXPERIENCE CLIMATE CHANGE AS A COCKROACH

HYPNOSIS GROUP SESSION

Nikolaj Plads 10

Copenhagen, Denmark

6 December 2009, 15:00

Participants 25

No recording allowed



Superflex, Experience climate change as a Cockroach, Copenhagen 2009. Hypnotic Group Session. The Eagle, Dhaka, 2012 The Jelly Fish, Rio De Janeiro, 2015 The Polar Bear, Mēn, 2020 The Mosquito, Illulissat, 2025 The Mammoth, Zanzibar, 2050

Edward Bernds, Return of the Fly, 1959



FOR THOUSANDS OF YEARS,
MAN HAS BEEN EVOLUTION'S GREATEST CREATION...

UNTIL NOW.

MIMIC

MIRA SORVINO JEREMY NORTHAM JOSH BROLIN F. MURRAY ABRAHAM AND CHARLES S. DUTTON

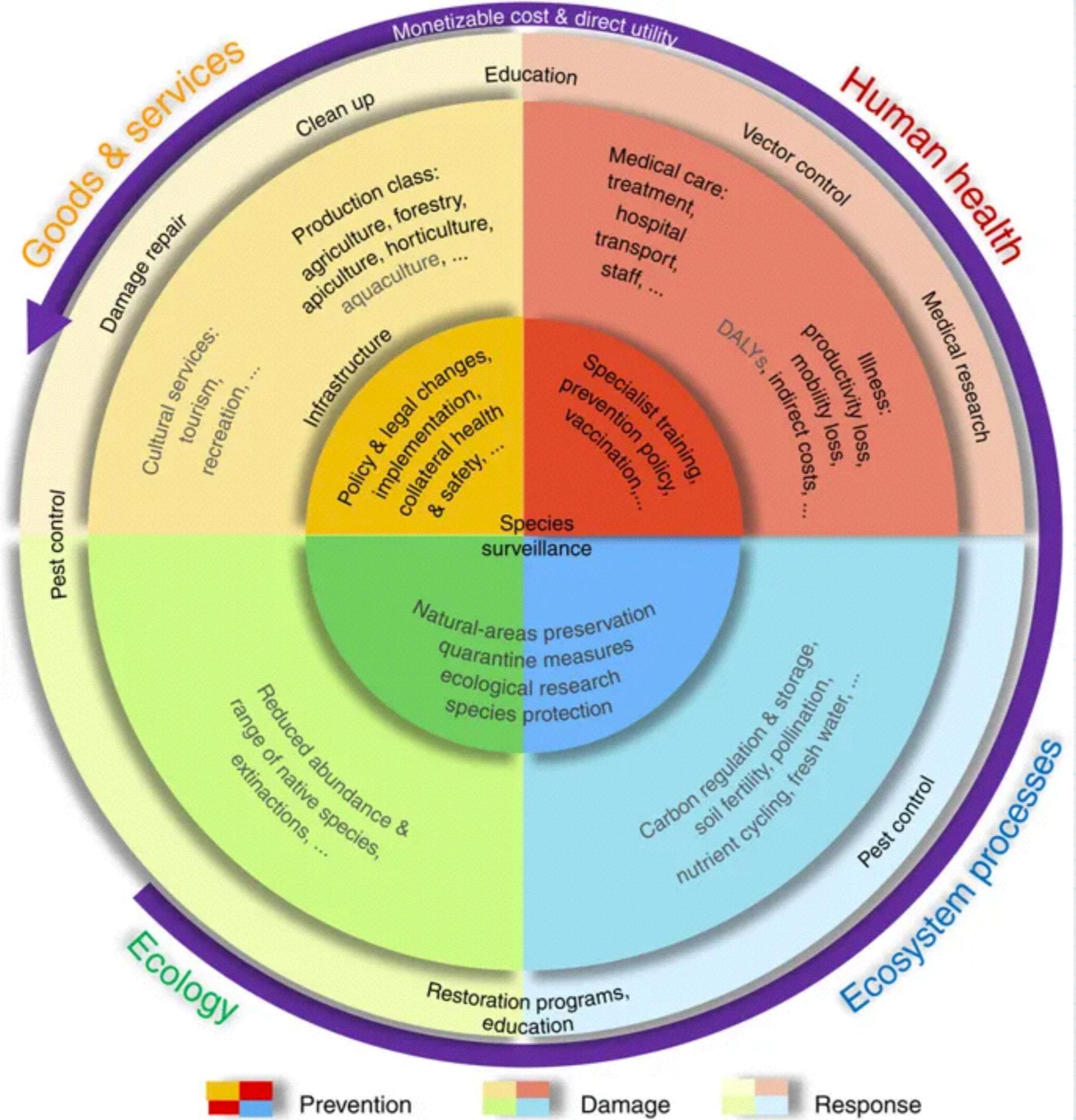
DIRECTED BY GUILLERMO DEL TORO WRITTEN BY GUILLERMO DEL TORO, JESÚS SERRADA, JEREMY NORTHAM, "MIMIC" JOSH BROLIN, GARCIALO, CÉSAR, ALEXANDER GOODMAN & MURRAY ABRAHAM AND CHARLES S. DUTTON PRODUCED BY BILLY HOPKINS, SUZANNE SMITH, KERRY BADER, JESSIE MAE STONE DESIGN: JULIA BOBROVSKY PROPS: RICK LACEY HAIR: THE QUADRUPLE SHOP MAKEUP: CAROL SPERI DIRECTOR OF PHOTOGRAPHY: DAVID LUDWIG EDITORS: MARCO BELTRANO, PATRICK LUSSIER PROPS: SCOTT SHAFRAZ, MICHAEL ZIVKOVIC, GARY GRANT, RICHARD MAYER, MARKUS KOMA, STEPHEN STUART OTTENFELD, MICHAEL PHILLIPS, ROBIN WERNSTEIN, B.J. NACK, DAVID BORNSTEIN PROPS: DONALD A. VOLLMER MUSIC: MATTHEW HOBBS PROPS: MATTHEW HOBBS, GUILLERMO DEL TORO, MATTHEW ENGBERG, JOHN SABLES PROPS: GUILLERMO DEL TORO
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THIS SUMMER, BRACE YOURSELF FOR THE ULTIMATE BATTLE BETWEEN MAN AND NATURE.

Guillermo del Toro, Mimic, 1997



A man runs through a desert locust swarm in the bush near Enziu. Large swarms have been sweeping across Kenya for weeks. Photo: Dai Kurokawa/EPA



“Market and non-market cost categories associated with invasive insect damages.” Massive yet grossly underestimated global costs of invasive insects, 2016.



Agnès Villette & Emmanuelle Foussat, Alien of the
Species (Asian giant hornet), 2018



Agnès Villette & Emmanuelle Foussat, Alien of the Species
(Tiger mosquito), 2018



Agnès Villette & Emmanuelle Foussat, Alien of the
Species (Palm tree beetle), 2018



Agnès Villette & Emmanuelle Foussat, Alien of the Species (Palm tree beetle), 2018

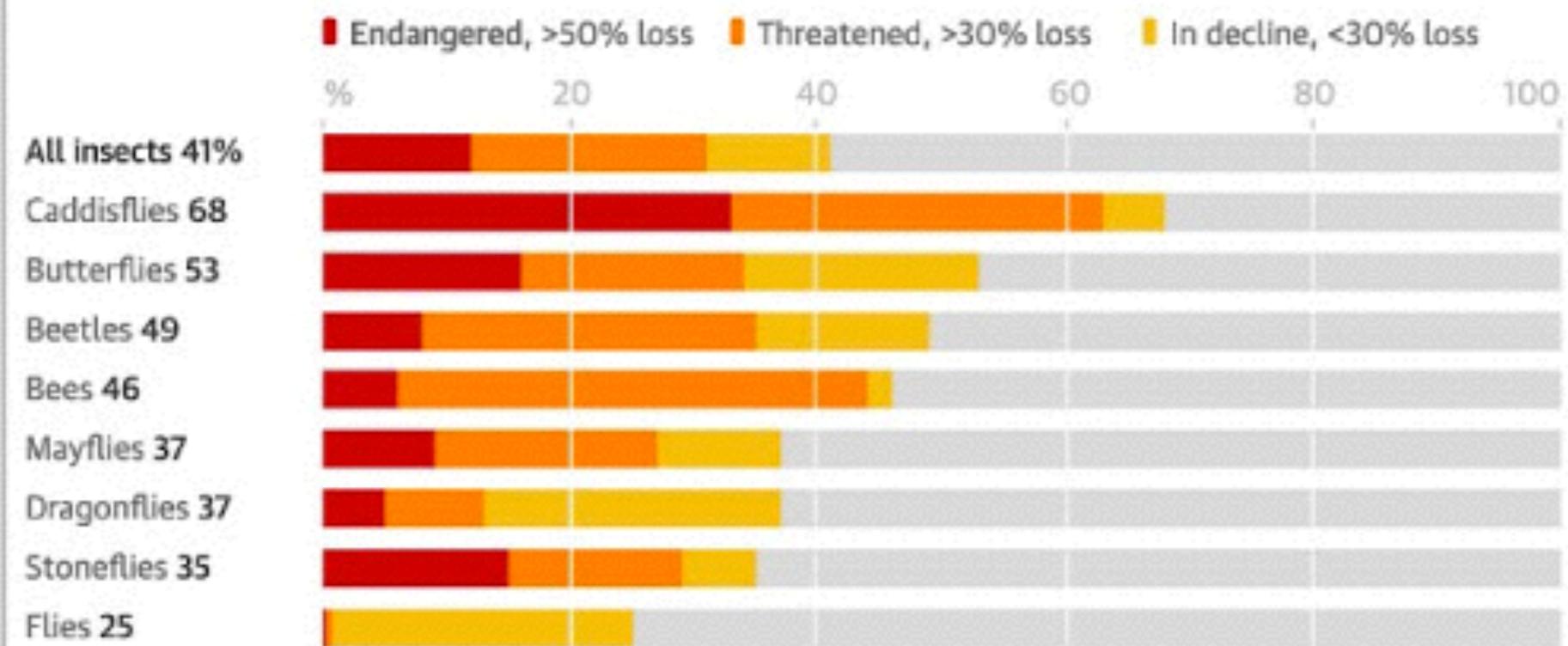


Nice, France

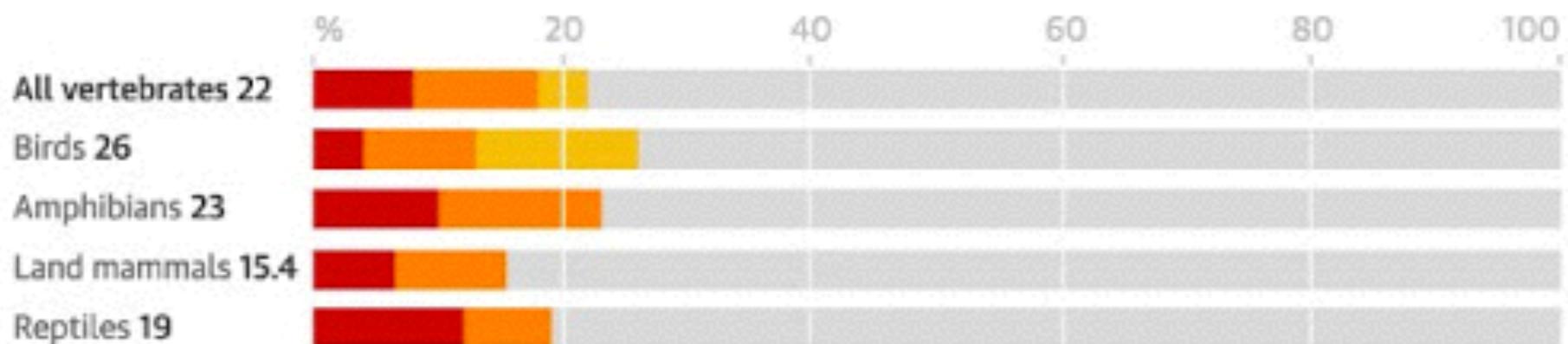


Agnès Villette & Emmanuelle Foussat, Alien of the
Species (Kazakh wasp), 2018

41% of global insect species have declined over the past decade ...



... compared with 22% of vertebrate species



Guardian graphic. Source: Sánchez-Bayo & Wyckhuys, Biological Conservation, 2019

Guardian graphic. Source: Sánchez-Bayo & Wyckhuys, Biological Conservation, 2019



A tomato grower demonstrates the use of a tomato tickler, a device that vibrates the tomato flower in order to release its pollen.



* Materially engineered artificial pollinators

Cornelia Hesse-Honegger, Fire bug,
Phyrrhocoris apterus,
1991. This specimen
from former East
Berlin is badly damaged.
It has a large bump on
the thorax and the
chitin surface is dusty
and dull. The left feeler
has only three
segments and is
misshapen. The right
hind leg is deformed and
missing a foot. The rims
of the neck plate are
damaged, and the left
eye is indented.



Insects as drivers of ecosystem processes

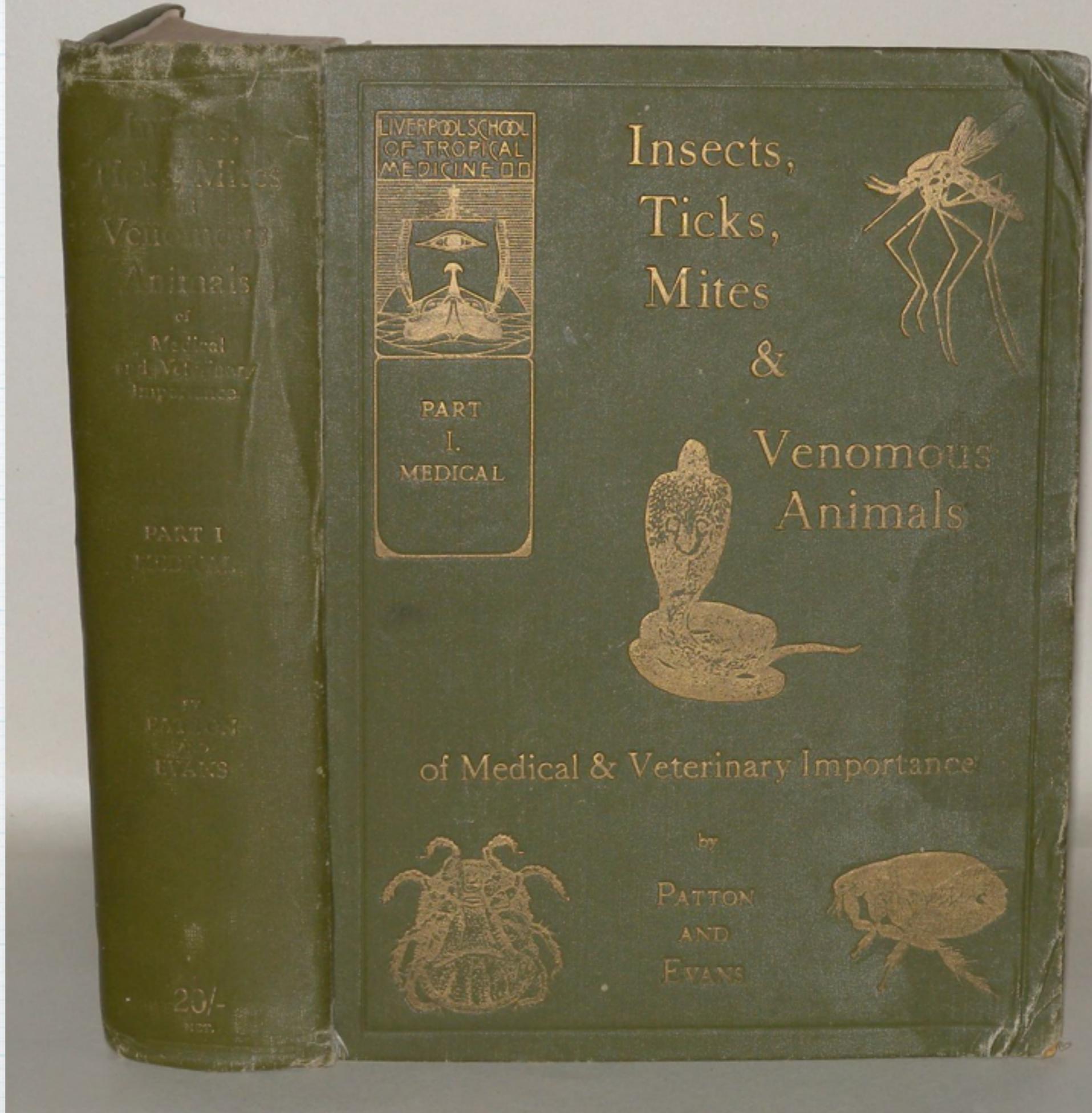


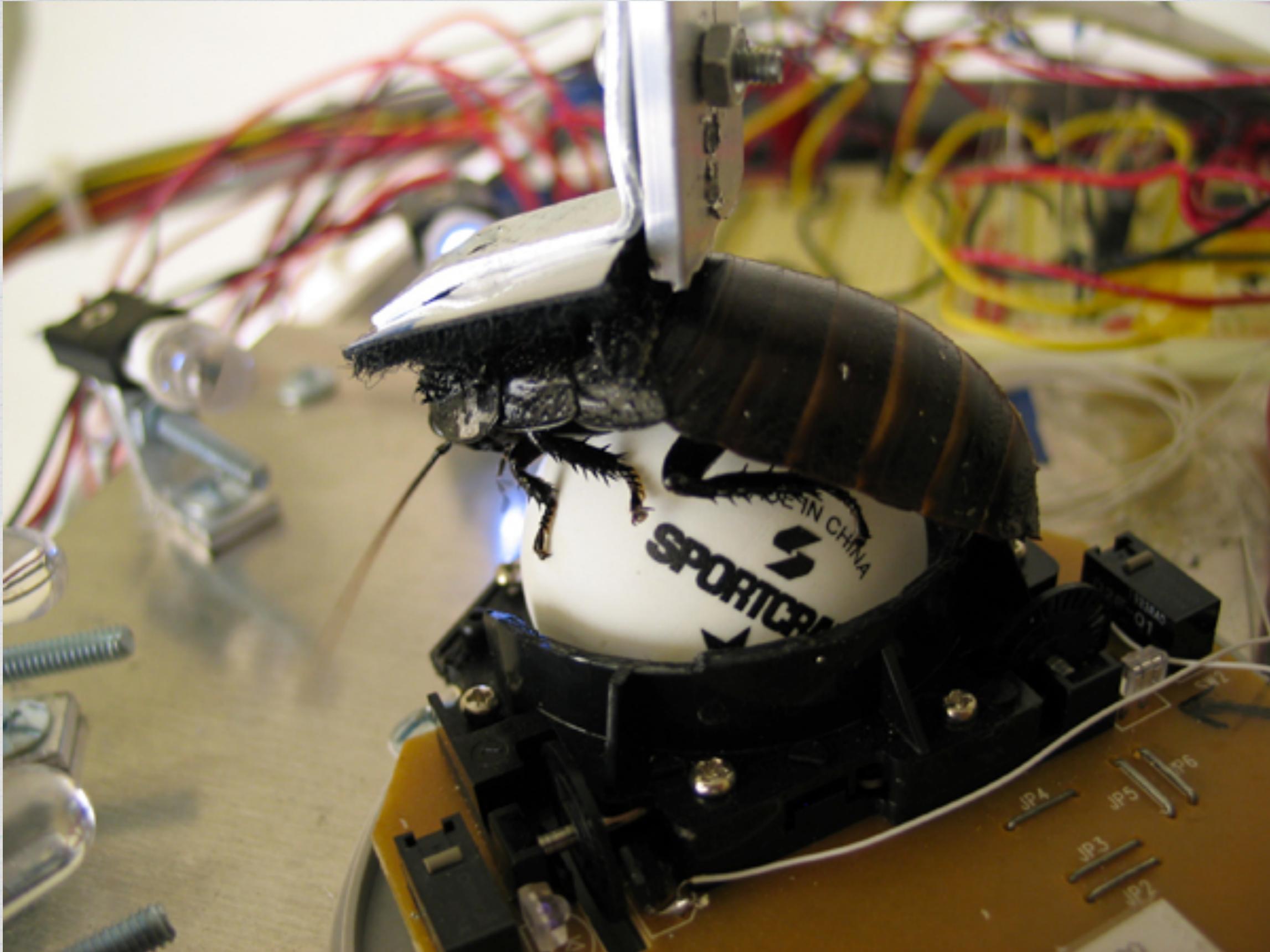
Bui Aðalsteinsson, Insect Bar, 2017. Design
by Tuomas Kortteinen & Heikki Lotvonen.
MOMENTUM 9. Photo: Istvan Virag © Punkt0/
Momentum 9



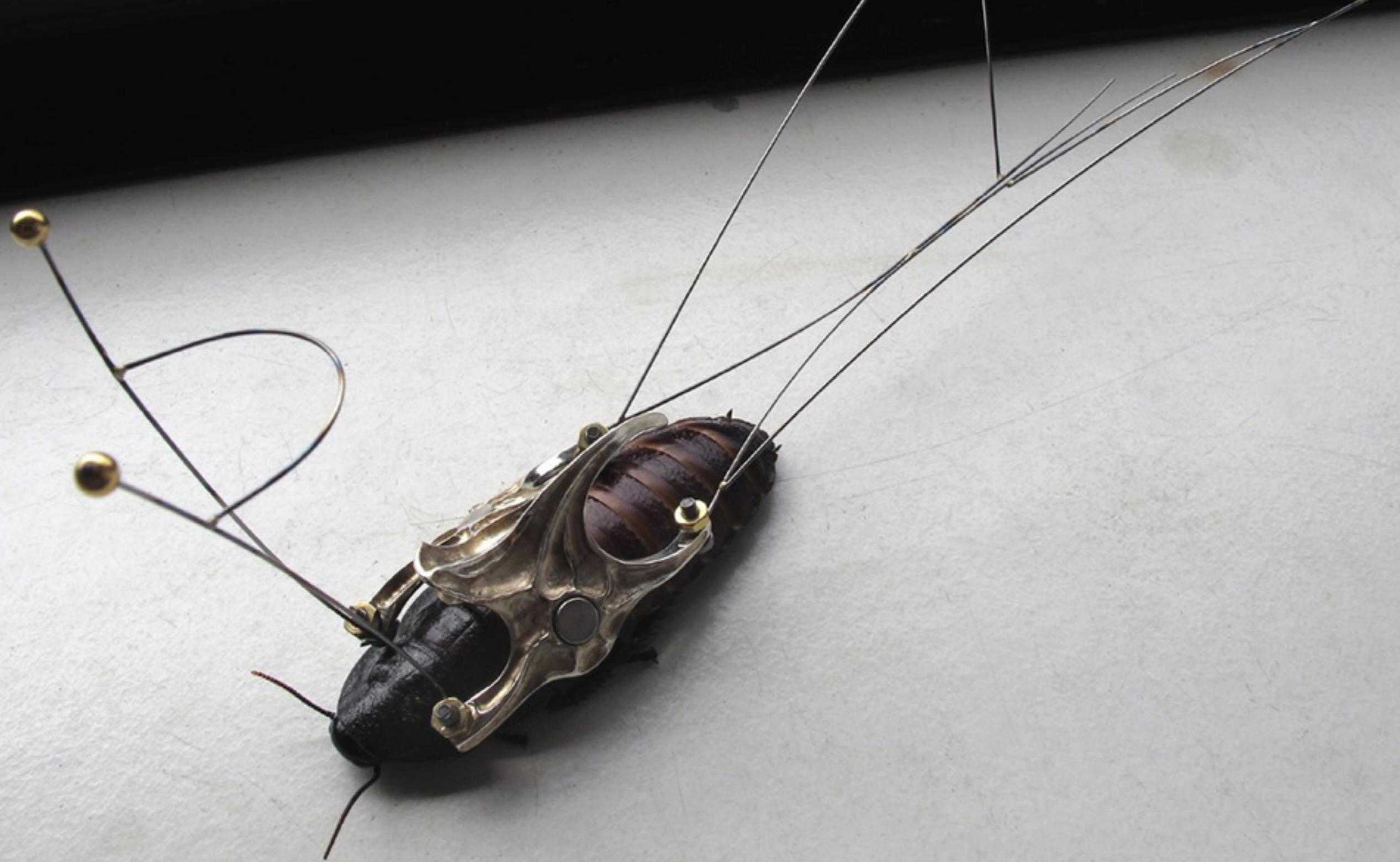


Walter Scott,
Insects, Ticks,
Mites, &
Venomous
Animals, Part
1 Medical,
1929





Garnet Hertz, Cockroach Controlled Mobile Robot, 2004-2006



Angelo Vermeulen, Corrupted C#n#m# (Entomograph), 2015

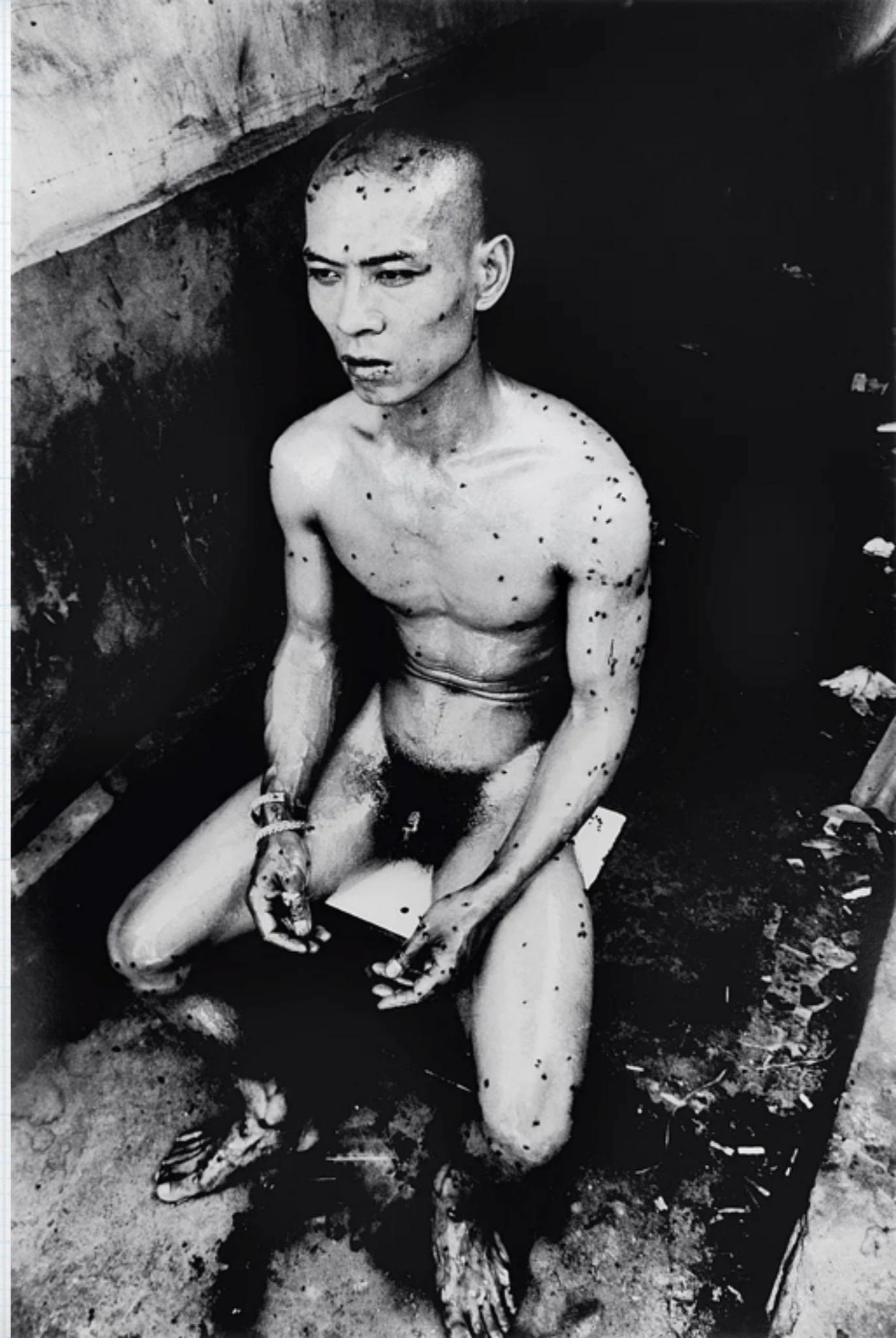


Jeroen Eisinga, Springtime, 2010-11



In Canada, a competition for the best bee beard

Zhang Huan, 12m², 1994





Vincent Fournier, Post Natural History (TREEHOPPER
[Curculionidae botulus] Pollutant-sensitive insect, 2012),
2012-ongoing



Vincent Fournier, Post Natural History (BEETLE [*Oryctes transmissionis*]) Insect adapted to continuous tracking, 2012), 2012-ongoing



Vincent Fournier, Post Natural History (DRAGONFLY
[*Chloromongus detectis*] Volatile inorganic-sensitive animal,
2013) 2012-ongoing



Vincent Fournier, Post Natural History (WEEVIL [*Entimus jumpis*])
Highly-adaptable jumping insect, 2012), 2012-ongoing



Vincent Fournier, Post Natural History (BROWN-CHEEKED HORNBILL [*Bycanistes attractus*] Bird with an unbreakable beak, 2014), 2012-ongoing



Center for Postnatural History, Pittsburgh



TXTMob
"nw mor thn evr"

Institute for Applied Autonomy, TXTMob, 2004



Center for Postnatural History, Pittsburgh

TRANSGENIC MOSQUITO of Southern California



Center for Postnatural
History, Pittsburgh



CENTER FOR POSTNATURAL HISTORY

Rebecca Chesney, I'm blue,
you're yellow (Everton
Park, Liverpool), 2012-
ongoing





Rebecca Chesney, I'm blue,
you're yellow (Everton
Park, Liverpool), 2012-
ongoing





Edgar
Honetschläger,
GoBugsGo.org,
2018



Edgar
Honetschläger,
Go Bugs Go
(film still),
2018



Erik Sjödin, Bee shed in Lötsjön natural reserve and park, Stockholm, Sweden 2018. Photo Erik Sjödin



Erik Sjödin, Making a Meadow in Marbaouparken, Sweden
2019. Photo Erik Sjödin



Erik Sjödin, The Political Beekeeper's Library at Bildmuseet in Umeå, 2018

Erik Sjödin
Den politiska Biologernas Bibliotek, 2005
The Political Beekeeper's Library

CHARLES BUTLER
THE
FEMININE MONARCHIE
OXFORD 1609



Charles Butler, The
Feminine Monarchy,
1609. From Erik Sjödin's
The Political Beekeeper's
Library, 2018



"A wonderful book about
humanity's greatest friend
among the insects..."

—Edward O. Wilson

HONEYBEE DEMOCRACY

THOMAS D. SEELEY



Thomas D. Seeley,
Honeybee Democracy,
2010. From Erik
Sjödin's The Political
Beekeeper's Library,
2018

GRAND ISLAND, NE PUBLIC LIBRARY



3 3 1 4 9 0 2 9 2 6 2 5 6 1

THE WISDOM OF BEES



WHAT THE HIVE CAN TEACH
BUSINESS ABOUT LEADERSHIP,
EFFICIENCY, AND GROWTH



MICHAEL O'MALLEY, Ph.D.



FOREWORD BY ROXANNE QUIMBY,
COFOUNDER AND FORMER CEO OF BURT'S BEES



Michael O'Malley, The Wisdom of Bees, 2010. From Erik Sjödin's The Political Beekeeper's

The Political
Beekeeper's Library



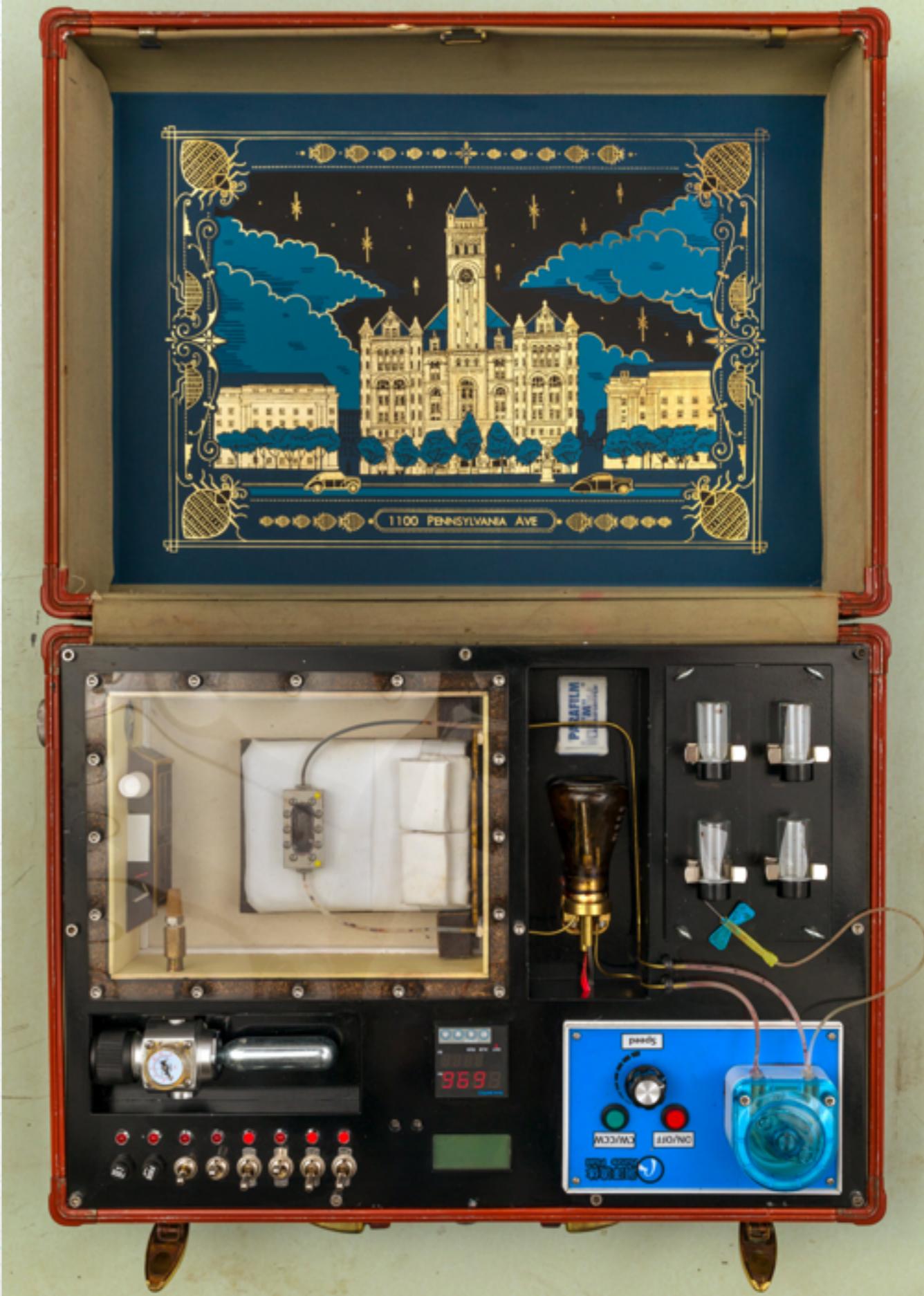
Erik Sjödin

Erik Sjödin, The Political Beekeeper, 2018



Duke Riley, Non-Essential Consultants, Inc, 2019

Duke Riley, Non-Essential
Consultants, Inc (Samsonite
Cimex Lectularius
Propagation Device), 2019



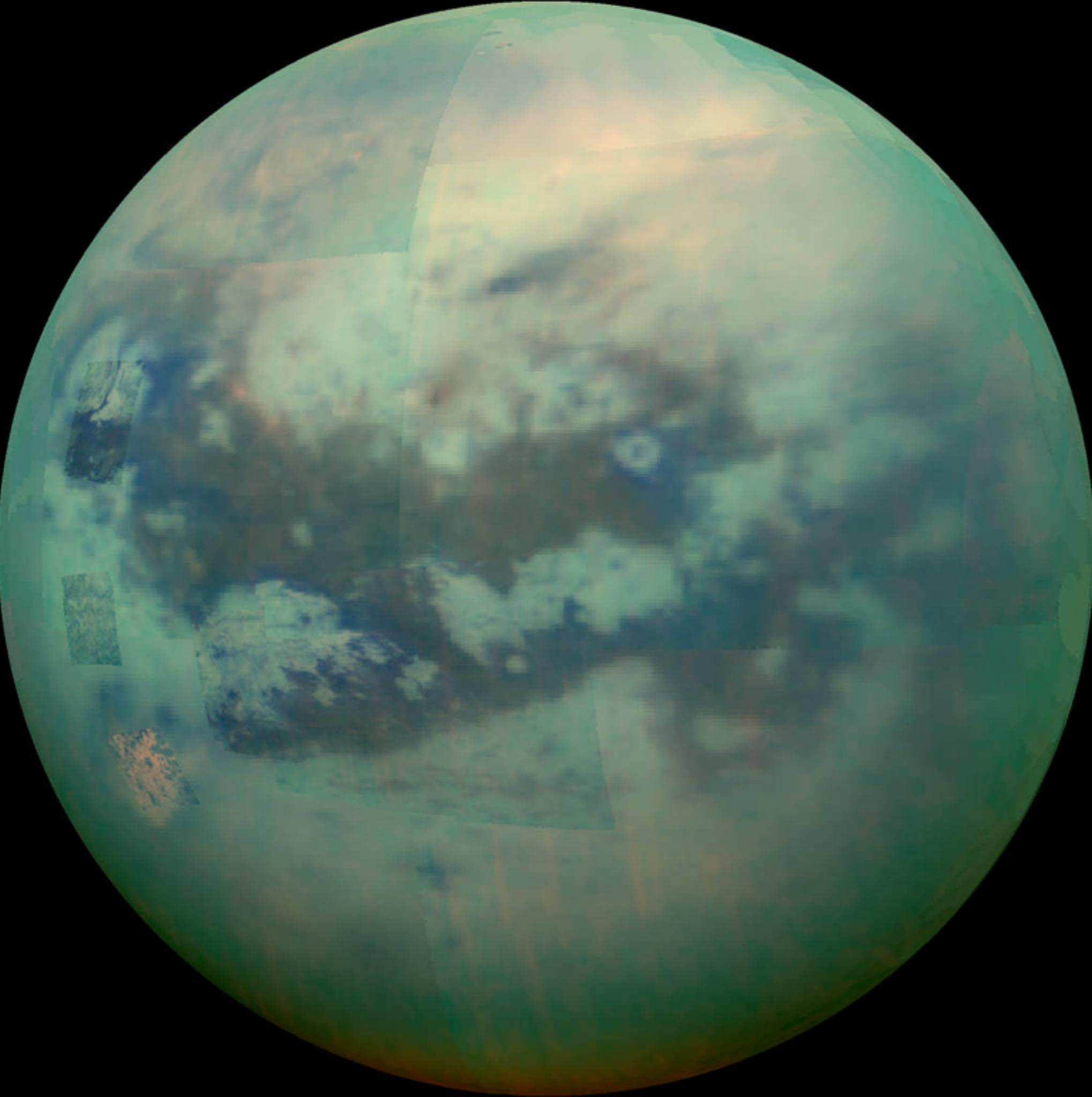


Duke Riley, Non-Essential Consultants, Inc, 2019





Andy Gracie, *Drosophila titanus*, 2011



Infrared view
of Titan from
NASA's Cassini
spacecraft,
2015





Artist's rendition, to scale, of how the TRAPPIST-1 planets would compare to Earth. ESO/M. Kornmesser



FFL01 Flight
Patch from the
NASA

The History of Animals in Space

Since the 18th century, animals have been used for tests aboard balloons and aircraft. In 1783, a sheep, duck and rooster were sent up in the newly invented hot-air balloon (right). The balloon flew for 2 miles (3.2 kilometers) and landed safely.



The first animals in outer space were **fruit flies** launched in a captured Nazi V-2 rocket on Feb. 20, 1947. The flies reached an altitude of 68 miles (108 km) and were recovered alive by parachute.

1945



50

A **mouse** launched on Aug. 15, 1950, attained an altitude of 85 miles (137 km), but died when the rocket disintegrated due to parachute failure. Several other mice were launched during the 1950s.



Albert II became the first **monkey** in space on June 4, 1949. He reached an altitude of 83 miles (134 km), but died on impact when the parachute failed. A previous monkey, Albert I, died when the V-2 rocket failed before reaching peak altitude. Two other monkeys, Albert III and IV, also died when their rockets failed.

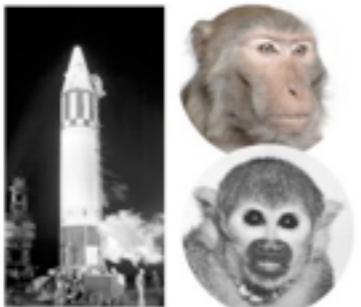


A total of **32 monkeys** have flown in space, including (from left): **rhesus macaques**, **cynomolgus monkeys**, **squirrel monkeys** and **pig-tailed monkeys**. Chimpanzees have also flown.

1955



Laika became the first living being to orbit the Earth on Sputnik 2, Nov. 3, 1957. She died several hours into the flight from stress and heat.



On May 28, 1959, rhesus monkey **Able** and squirrel monkey **Baker** became the first to successfully return to Earth after space flight. The monkeys survived 32 times the pull of Earth's gravity and were weightless for 9 minutes out of their 16-minute flight.

1960



The Soviet Sputnik 5 (Aug. 19, 1960) was the first to return animals alive from orbit. The passengers were the dogs **Rufa** and

The History of animals in space. Image credit: Karl Tate, SPACE.com Infographics Artist

12 dogs on various suborbital flights.
Stray dogs were used since they were thought to be capable of handling extreme cold.



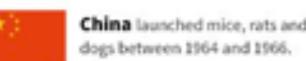
Laika became the first living being to orbit the Earth on Sputnik 2, Nov. 3, 1957. She died several hours into the flight from stress and heat.



The Soviet Sputnik 5 (Aug. 19, 1960) was the first to return animals alive from orbit. The passengers were the dogs **Belka** and **Strelka**, plus a gray rabbit, 42 mice, two rats and fruit flies.



On Jan. 31, 1961, **Ham the Chimpanzee** flew a Mercury capsule on a sub-orbital trajectory, three months before Alan Shepard's flight. **Enos** became the first chimp to orbit a Mercury spacecraft on Nov. 29, 1961. Both chimps survived their flights.



China launched mice, rats and dogs between 1964 and 1966.



In 1968, the Soviet Zond 5 became the first spacecraft to **circle the moon**, carrying a payload of two Russian tortoises, wine flies, mealworms, plants, seeds and bacteria. Zond 6 flew a similar trajectory later that year, but the biological specimens were killed by a malfunction on the return trip.



After humans landed on the moon in 1969, animals in space no longer made the headlines, but spacecraft still carried **biological payloads**, including rabbits, turtles, insects, spiders, fish, jellyfish, amoebae and algae. In 1973, two female European garden spiders named **Arabella** and **Anita** spun webs aboard the NASA space station Skylab for 59 days. Biological payloads have also flown on NASA's Space Shuttle and the space stations of both Russia and America.

From 1966 to 1996, Russia launched a series of 11 "Bion" satellites (right). Research partners have included Austria, Bulgaria, Canada, China, the Commonwealth of Independent States, Czechoslovakia, East Germany, the European Space Agency, France, Germany, Hungary, Lithuania, Poland, Romania, Ukraine and the United States.



The Bion series resumes in 2013 with **Bion-M1** (mission logo, left). Rodents on the spacecraft will spend a month experiencing space flight conditions.



SOME PHOTOS ARE USED TO REPRESENT EVENTS FOR WHICH NO PHOTOS WERE AVAILABLE

SOURCES: NASA, WIKIPEDIA, "CHALLENGE TO APOLLO" BY ASIF SHODIQL NATIONAL PARKS SERVICE, LIBRARY OF CONGRESS

1955



On May 28, 1959, rhesus monkey **Able** and squirrel monkey **Baker** became the first to successfully return to Earth after space flight. The monkeys survived 32 times the pull of Earth's gravity and were weightless for 9 minutes out of their 16-minute flight.

1960



A July 2, 1959, Soviet launch carried two dogs and the first **rabbit** into space.

1965



The French launched the first cat into space on Oct. 18, 1963. **Félicette** had electrodes implanted in her skin to transmit her condition. She reached an altitude of 100 miles (160 km) and landed safely.

1970

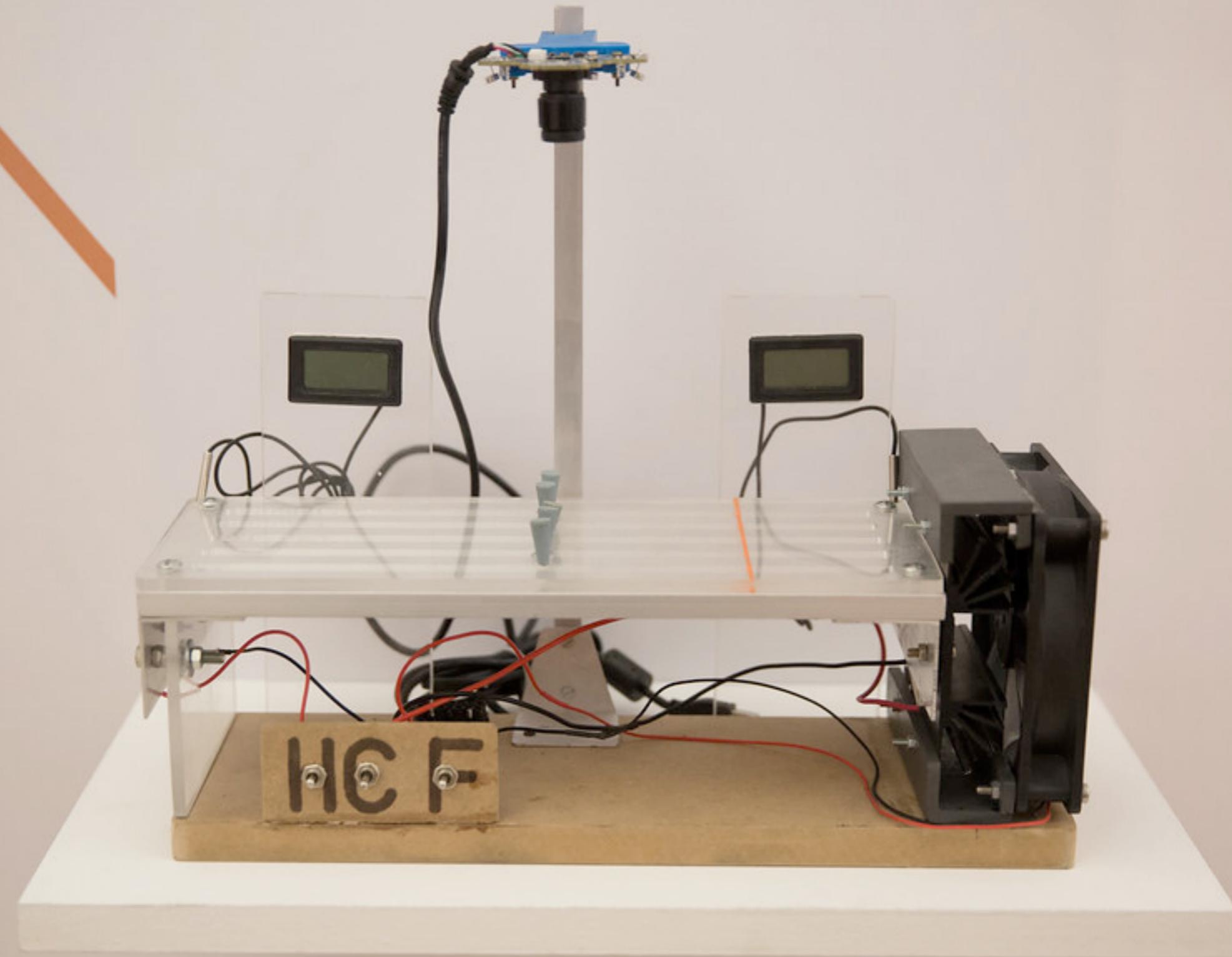
In the late 1960s, NASA launched a series of **Biosatellites** carrying insects, frog eggs, microorganisms and plants. The third and final Biosatellite carried a pig-tailed monkey. It died hours after landing from a heart attack.

The History of animals in space. Image credit: Karl Tate, SPACE.com Infographics Artist

KARL TATE / © SPACE.com



The Vented Fly Box holds and safely transports vials containing flies and fly food. It includes environmental sensors that monitor factors such as temperature and relative humidity. Credits: NASA Ames Research Center/Dominic Hart



Andy Gracie, *Drosophila titanus* (from a set of home-made Titan simulation chambers), 2011. Credit: Tom Mesic

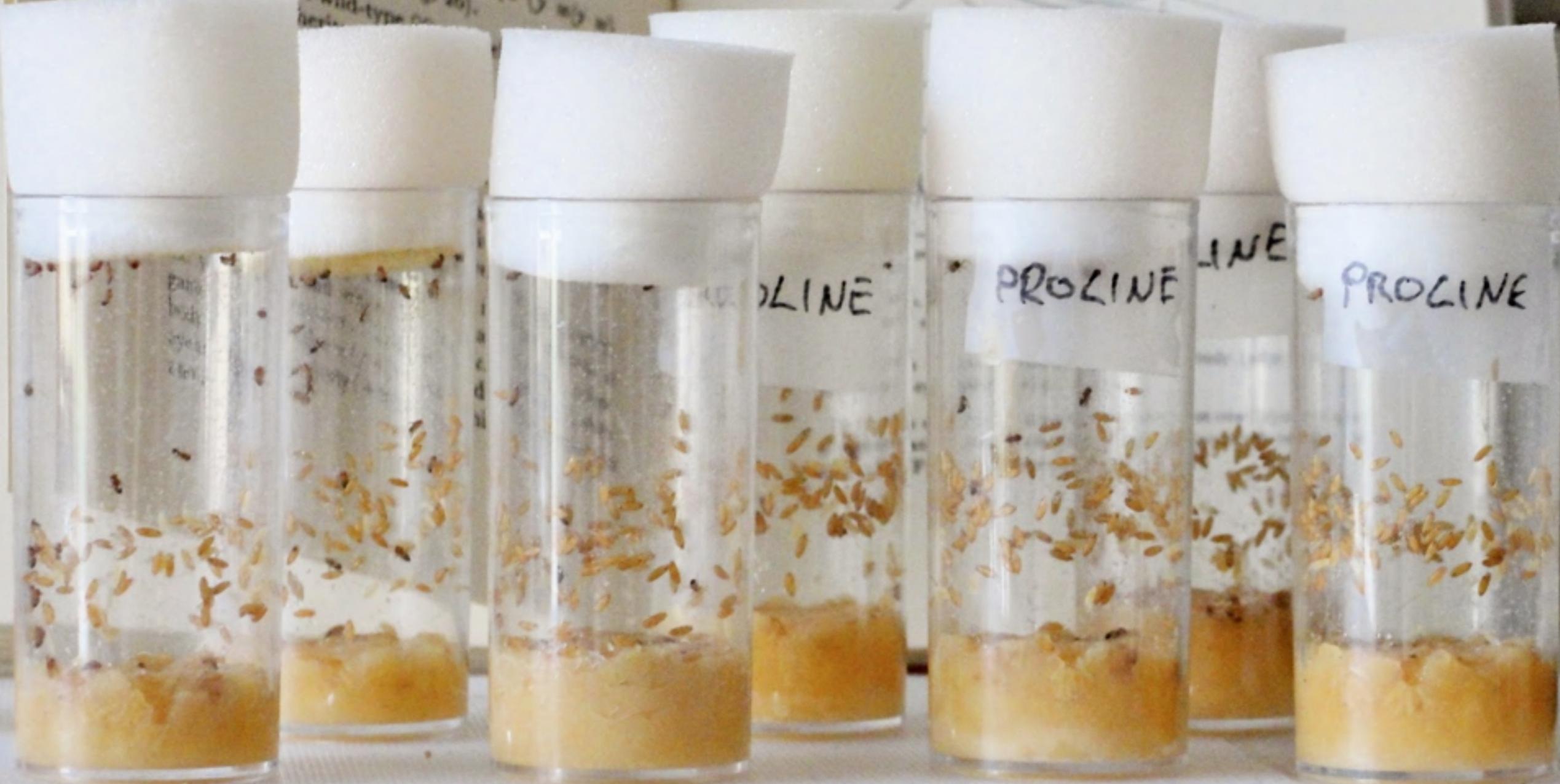
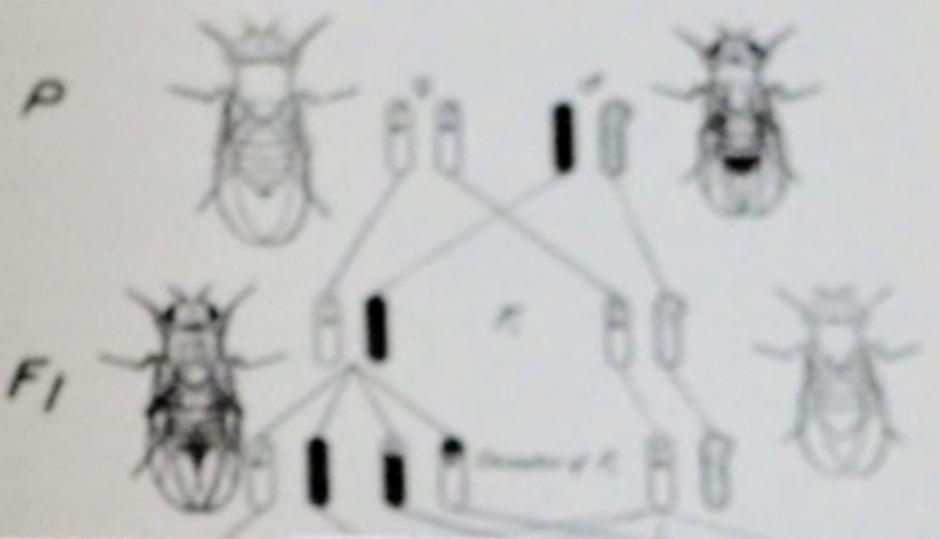
...on the heterogeneous chromosome (or tight linkage) of the fly, but has a cytological basis.

To DEMONSTRATE SEX-LINKED LINKAGE AND DISTANCES BETWEEN LOCI.

As crossing-over is suppressed in the male *D. melanogaster*, only the *F*₁ females are used to illustrate crossing-over, and hence the distance between 2 loci on the same chromosome.

Exercise 30:

Cross: yellow-body and white-eye ♀ × wild-type (+ +) ♂ (Fig. 20).
The *F*₁ gives wild-type females.





Drosophila titanus 09/01/2013



Drosophila titanus 04/06/2012

Andy Gracie, *Drosophila titanus*, 2011. Credit: Sergio Redruello / LABoral



Andy Gracie, *Drosophila titanus*, 2011. Credit: Sergio Redruello / LABoral



Andreas Greiner, Every Fly is a Piece of Art, University of the Arts Berlin, 2012



Andreas Greiner, Every Fly is a Piece of Art, University of
the Arts, Berlin, 2012



Andreas Greiner, Every Fly is a Piece of Art, University of the Arts, Berlin, 2012



Andreas Greiner, Every Fly is a Piece of Art, University of the Arts, Berlin, 2012



Andreas Greiner, Every Fly is a Piece of Art, University of the Arts, Berlin, 2012

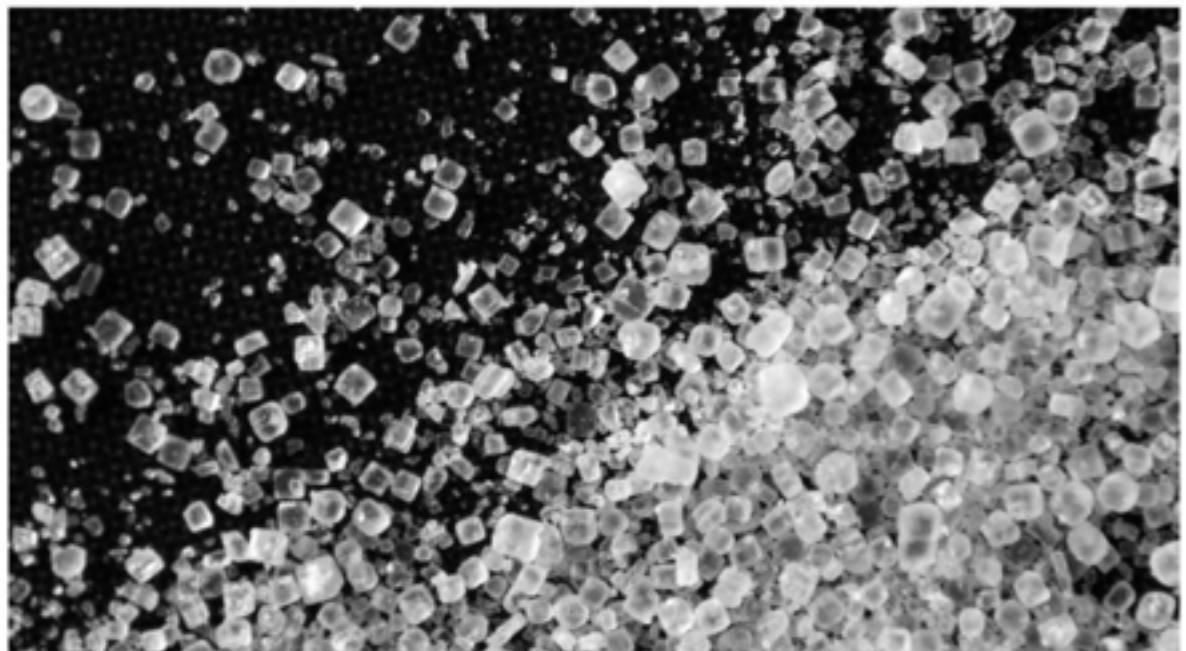




Chaeopsestis ludovicaceae drinking tears from the eye of the author who photographed himself. Courtesy of Hans Bänziger



Center for Genomic Gastronomy, To Flavour Our Tears, 2016

HUMAN TEAR SALT**HUMAN TEAR SALT****YOU WILL NEED**

- 160mls of tears
- 1 large bottomed pan
- Stove

RECIPE NOTES

The high salt content of mammal tears makes them desirable to lachryphagous (tear drinking) insects. With this recipe, you can cut to the chase, making salt crystals from concentrated human tears:

1. Work out how much salt you want to end up with. It takes approx 160mls of tears to make 1 g of salt.
2. Using appropriate stimulation (see the Tear-o-eyes-or recipe or your favourite sad movie), cry and collect tears.
3. Add the tears to a large, flat bottomed pan. Bring to a boil and then simmer slowly, allowing the water to evaporate.
5. As the water boils off, salt crystals will form as the solution supersaturates.
6. Scrape the salt into a container and store for future use.



MOTH SIPPING IN THE WILD



MOTH SIPPING IN THE WILD

YOU WILL NEED

- Animal dung, bird droppings, sweat, or tears
- A thirst for salt

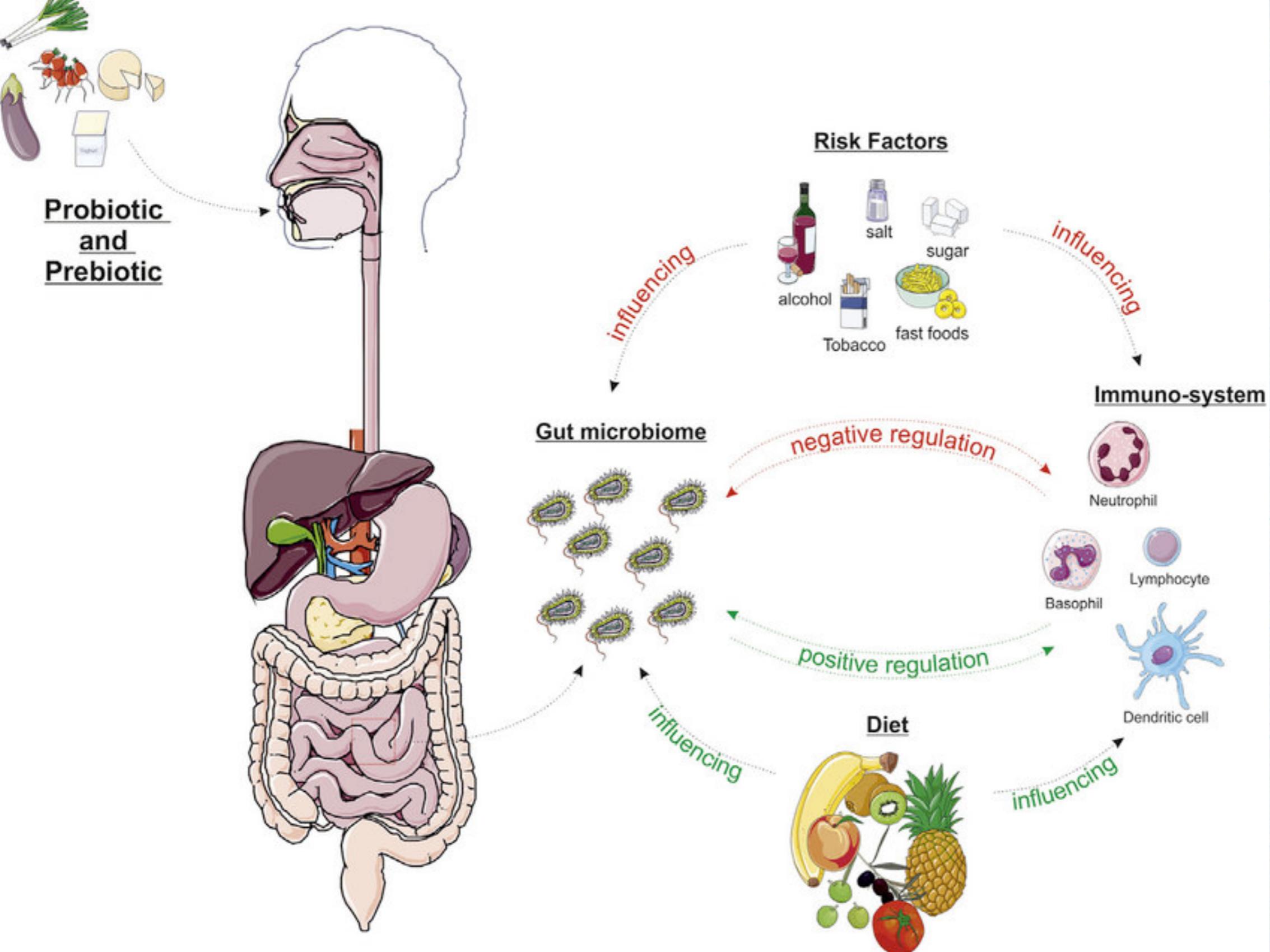
RECIPE NOTES

Nectar as a staple creates a thirst for salt.

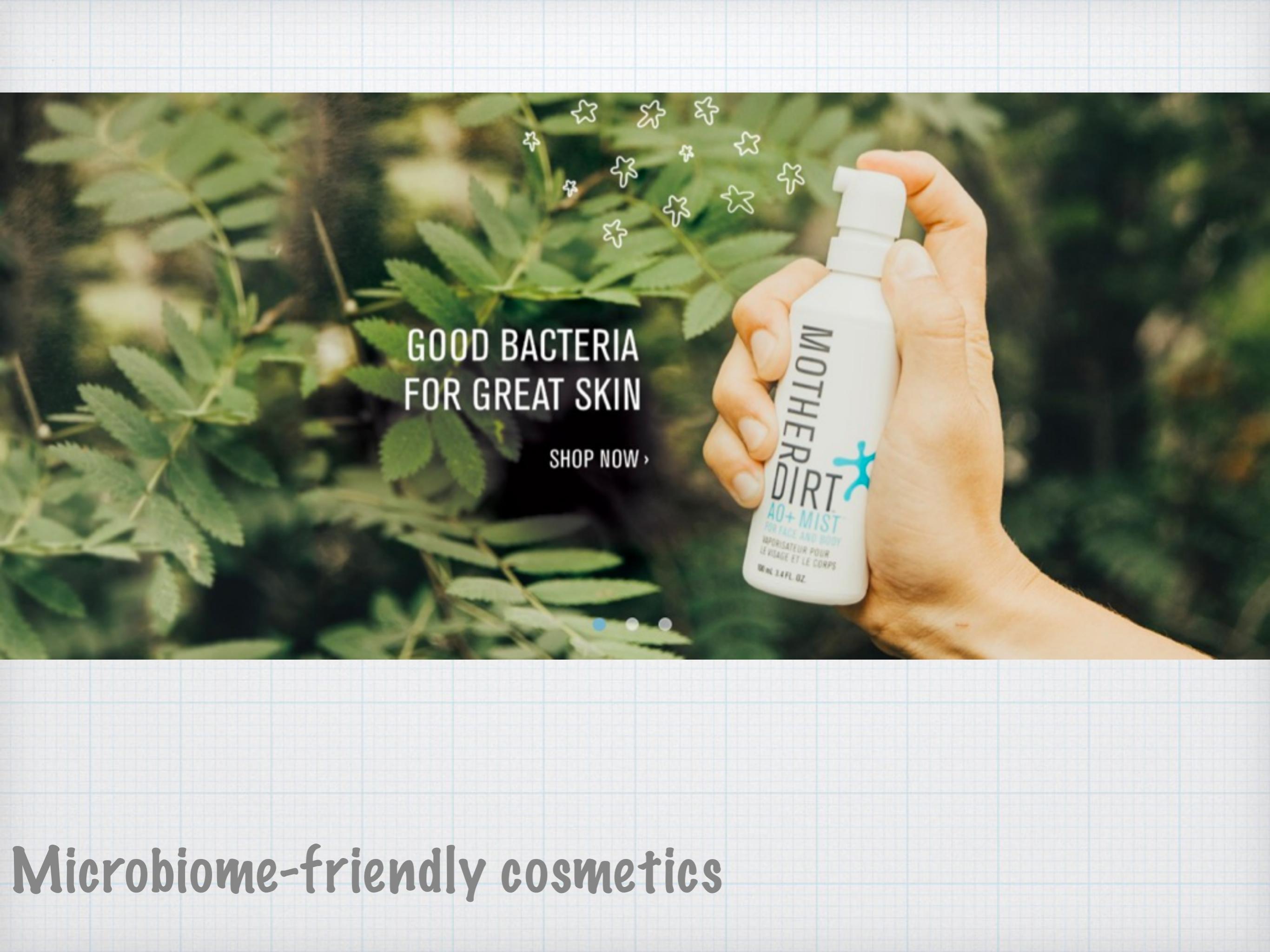
Moths and insects often turn to unusual sources for salt. Their typical diet of nectar, sap flowers, and rotting fruits can leave them deficient in the different salts needed to stay alive. This means they end up turning to unusual sources of nutrition, like animal dung and bird droppings. Some insects even turn to drinking the sweat of animals, and even more strangely they will steal tears in order to cope. *Lobocraspis griseifusa*, a moth from Southeast Asia, is known to land on the faces of water buffalo at twilight. From there, it irritates the eye orb, causing a flood of tears which they greedily consume before fluttering off into the night.

Note: *Lobocraspis griseifusa* isn't the only insect to indulge in this kind of behaviour. *Mara elephantophila*, for example, which drinks the tears of elephants, is among the smallest of such moths.





Schematic representation of how the gut microbiome is regulated. Risk factors such as alcohol consumption, tobacco, salt, sugar and fast food diet negatively influence the microbiome and the immune system. Conversely, a diet rich in fibers, improves the gut microbiome and boosts the immune system



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Microbiome-friendly cosmetics



Looking at the world from other species' points of view is a cure for the disease of human self-importance.

- Michael Pollan, 2007



Revital Cohen & Tuur Van Balen, Cook Me - Black Bile, 2011



Revital Cohen & Tuur Van Balen, Cook Me - Black Bile, 2011



Revital Cohen & Tuur Van Balen, Cook Me - Black Bile, 2011