

Umm...

How to begin? Start small, think big!

Children are fascinated by small things; polka dots, full stops, scabs, the dust in their navel, drops of water on windows, dead beetles, the wriggling tadpoles in the pond, and by miniatures—the small wooden drawers in the doll’s furniture, a tiny teacup. But

scale

belongs to both the imagination and to disciplinary regimes; when the child begins to write they start with wild, extravagant, gigantic strokes and marks that ignore the page completely—a line here, a dash there—but soon they must rein in hand and eye and submit print to the rules of standardisation and legibility. They learn to join words together, to speed things up, as if running writing—what we call cursive—were an analogue for the logical flow of grown-up’s thoughts. If only they knew!

But how do we think that thought thinks? And do we think that all thought thinks the same?

In his 1962 work *La Pensée Sauvage*—poorly translated as *The Savage Mind* (1966)—French anthropologist and papa of structuralism, Claude Lévi-Strauss (1908–2009) proposed two opposing ways of thinking, knowing, making and doing in the world; the first he called ‘bricolage’, which he associated with traditional, magical or mythic thought in what we used to call ‘primitive’ societies, the second he called ‘engineering’.

The characteristic feature of mythical thought is that it expresses itself by means of a heterogeneous repertoire which, even if extensive, is nevertheless limited. It has to use this repertoire, however, whatever the task in hand because it has nothing else at its disposal. Mythical thought is therefore a kind of intellectual ‘bricolage’.

—Claude Lévi-Strauss

Bricolage began life as a French word, meaning “to tinker, to putter or potter about; to make do; to improvise; to work within limits”. Lévi-Strauss used this idea to illustrate

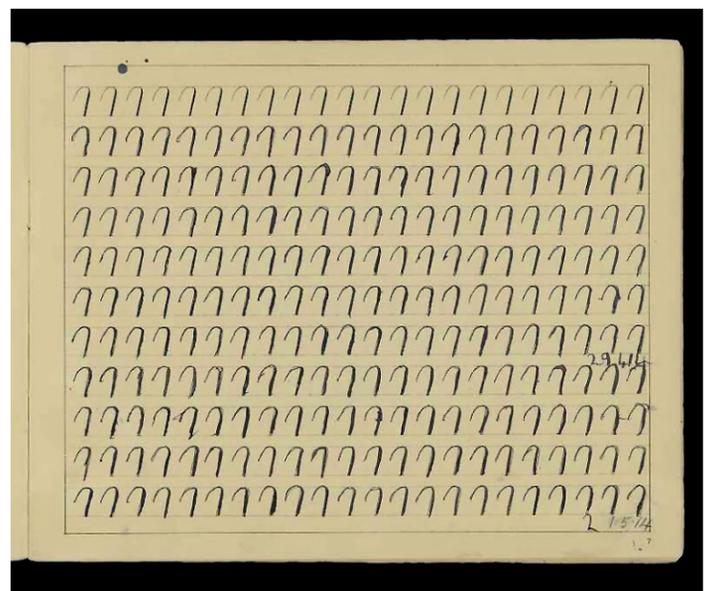
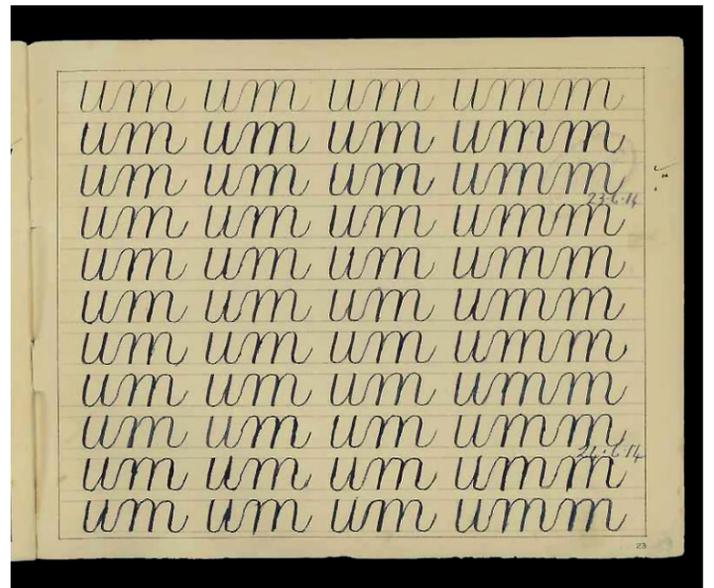


Fig 1: Handwriting study, 1907. Adelaide Museum.

Fig 2: Study for the eventual writing of the letter ‘r’, 1907. Adelaide Museum.

Fig 3: Claude Lévi-Strauss’s *La Pensée Sauvage* (Paris: Plon, 1962) and *The Savage Mind* (University of Chicago Press, 1966).

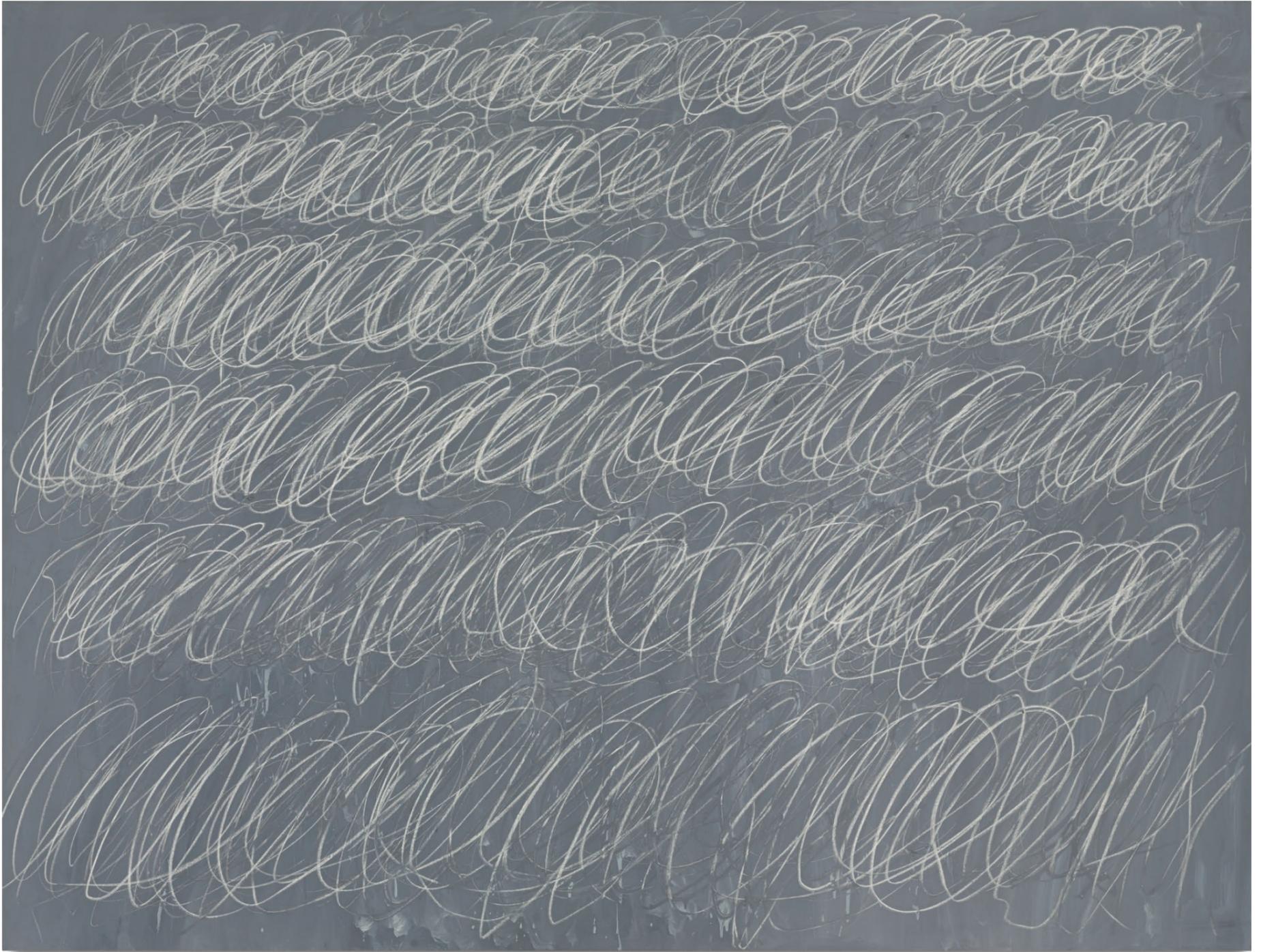


Fig 4: Cy Twombly, *Untitled (New York City)* from the *Blackboard* series, 1968. Sold at auction for US\$70.53 million in 2015.

the way in which societies combine and recombine different symbols and cultural elements to produce recurring structures.

A bricoleur is also a kind of amateur French handyman, who improvises technical solutions to all manner of minor repairs—DIY.

The history of any word is like the rings of an ancient tree, hidden from sight. In the case of bricolage, there is a tinge of the illicit and a good dose of the improvisational and the unexpected; the noun *bricole* has associations which extend all the way from battleground to playground. In the military, it was an ancient kind of military catapult; when peasants in medieval Normandy had their hunting rights curtailed by the king's tyranny, they had to resort to poaching—called *bracconage* in French and *bricolage* in Normandy. The word carries with it a sense of the rebound, of ricocheting off one thing and hitting another. Lévi-Strauss writes, “the verb *bricoler* applies to ball games and billiards, to hunting and riding, but always to invoke an incidental movement: that of the ball that bounces, of the dog that strays away, of the horse that swerves from the straight line to avoid an obstacle.”

Suspicion No. 1: perhaps this theory of bricolage was just another of recycling a discredited opposition between the primitive and modern?

But there is always another story to every story ... Lévi-Strauss's hierarchical opposition between *bricoleur* and *engineer* is symptomatic of the anxieties of the post-WWII period and the very real fear of a Promethean science losing its way—not with fire, but with the splitting of the atom and subsequent horrors of the bombing of Nagasaki and Hiroshima in 1945.

Norbert Wiener (1894–1964), founding theorist of cybernetics and an enthusiast for automation, offered a tragic view of science in his 1950 publication *The Human Use of Human Beings*:

If a man with this tragic sense approaches, not fire [like Prometheus], but another manifestation of original power, like the splitting of the atom, he will do so with fear and trembling. He will not leap in where angels fear to tread, unless he is prepared to accept the punishment of the fallen angels.

These days, that suspicious word *manipulation* has been cheerfully replaced by the apparently value-free concept of the technical term *engineered*, which is attached as noun or adverb to everything from Caesarstone® benches to synthetic gene splicing and stem cell research.

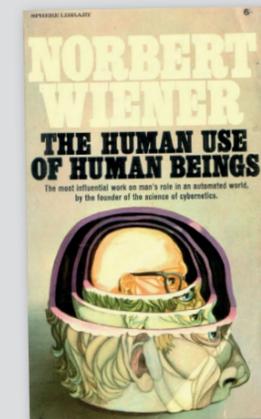
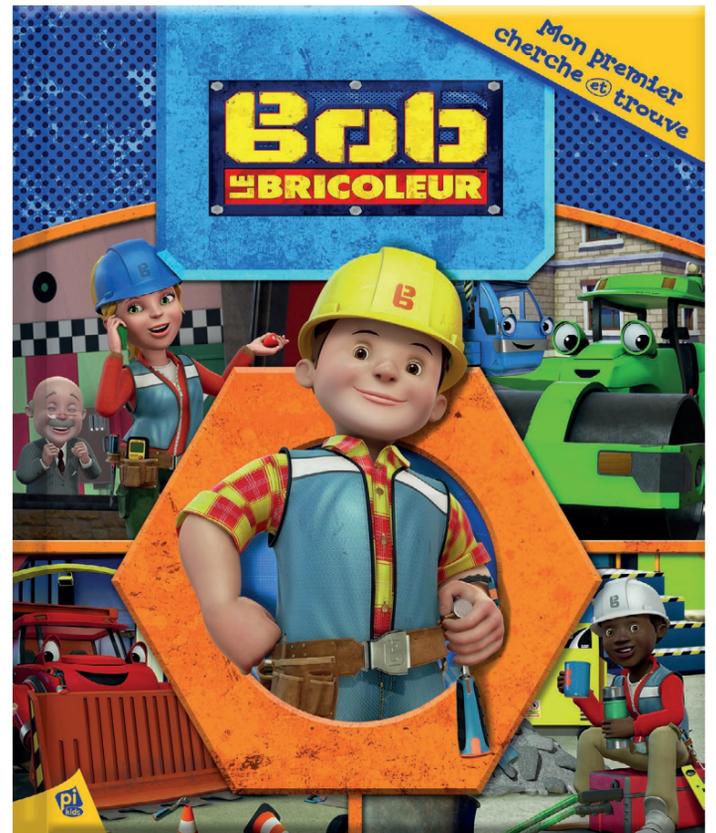


Fig 5: Bob le Bricoleur: Mon premier cherche et trouve, 2017.

Fig 6: Norbert Wiener, *The Human Use of Human Beings*, 1968.

But we still fear the monster's bristles. Who knows what mischief they are up to in their clean, white coats, with their glass and their instruments, and those white masks hiding their faces?

In the room next door, we once more gaze up in wonder, and ask, what is really going on in here? What are those little pulsing cells up to?

Look, Dad! Is that a space ship or a giant chandelier?

Lévi-Strauss set out to demonstrate that intellectual thought is not a modern Western monopoly; the *bricoleur* in traditional societies is both intellectual and creative; their process is associated with making do, using what is hand, innovating from the available and inherited forms of knowledge and combining this with a rigorous classificatory system.

Both for magic and science, the universe is an object of thought at least as much as it is a means of satisfying needs.

—Lévi-Strauss

Some sixty years later, the bricolage virus has infected all kinds of formerly immune disciplines—we have forgotten this absolute opposition between *engineering* and *bricolage*. Contemporary models of innovation now highlight the importance of bringing together existing material in critical assemblages, not by acts of magical conjuring and romantic self-creation, but through open-ended experimentation and collaboration.

The concept of bricolage is cited not just by chaotic thinkers like me, desperate for some way to rationalise and classify their creative practices; architects, sociologists, Silicon Valley start-ups, and organisational theorists have taken up the creative potential of the concept.

Even evolution is apparently not immune to bricolage. In a famous paper, 'Evolution and Tinkering' (1977) French Nobel Prize-winning biologist François Jacob (1920–2013) argued that natural selection is like a bricoleur, "a tinkerer [who] works with no specific end in mind, collecting any materials at his disposal, and rearranging them into a workable object. Thus, contingency constitutes the principle feature of evolutionary processes."

But I am not quite ready to surrender bricolage to all and everything that wants it. The bricoleur is not a propagandist, always already with an eye on the effects of the message; the bricoleur is not thinking of how to sell a new product to reduce the size of our pores and

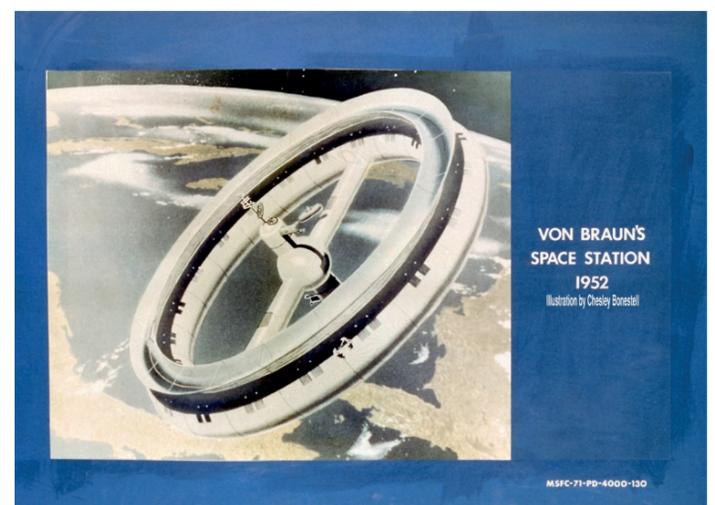
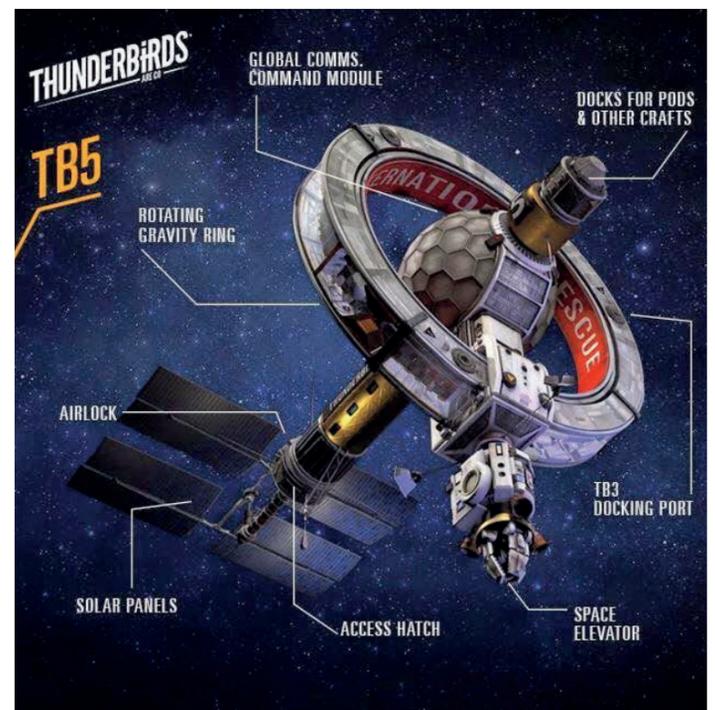
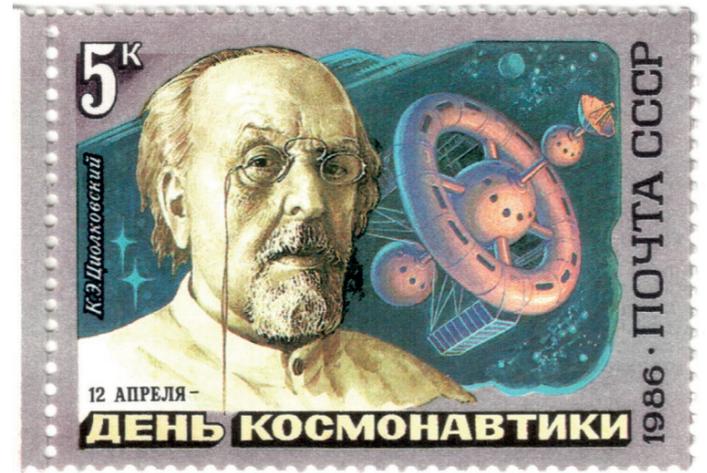


Fig 7: Konstantin Tsiolkovsky (1857–1935) featured on a Soviet Union postage stamp for Cosmonautics Day 1986. Tsiolkovsky was the inventor of the hypothetical rotating space wheel (1903), called the *von Braun wheel*, or the *publik city*. A *publik* is an Eastern European boiled bread roll, rather like a bagel.

Fig 8: *Thunderbirds Are Go* (TV series), 2015– .

Fig 9: Concept for von Braun's Space Station, 1952. Image: NASA.

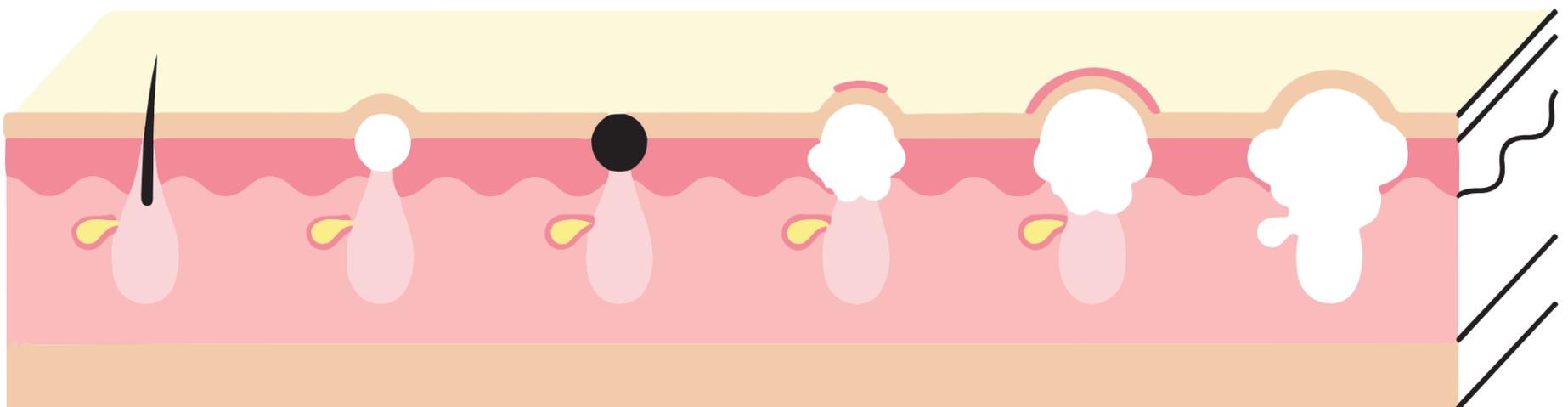
rid us of blackheads. Rather, the bricoleur is unsure of how it will all end; the process is unfolding. *Bricolage* deserves to be more than a heuristic device, more than a fashionable label with a transparent supply chain. In the creative encounter of art and science—in what we used to call hybrid arts, new media arts—in bio-art, what once appeared to be monstrous or oxymoronic couplings now enter into critical and creative relationships that unfold in the process of making. In a 1992 paper on programmer–artists, Turkle and Papert wrote:

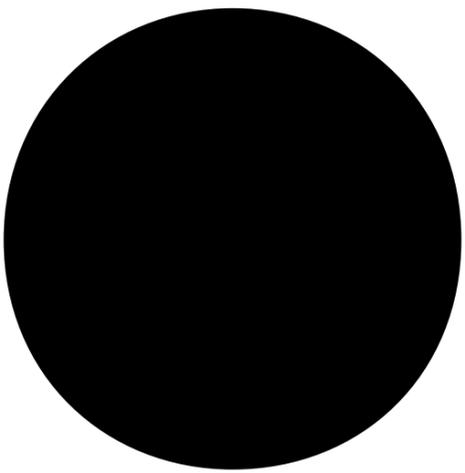
The bricoleur resembles the painter who stands back between brushstrokes, looks at the canvas, and only after this contemplation, decides what to do next. Bricoleurs use a mastery of associations and interactions. For planners, mistakes are missteps; bricoleurs use a navigation of midcourse corrections. For planners, a program is an instrument for premeditated control; bricoleurs have goals but set out to realize them in the spirit of a collaborative venture with the machine. For planners, getting a program to work is like “saying one’s piece”; for bricoleurs, it is more like a conversation than a monologue.

Perhaps for the bricoleur, everything is on the way to becoming something else altogether:

... A full stop? ... Or, a blocked pore?

Fig 10: Types of acne (L–R). Non-inflammatory: healthy, whitehead, and blackhead. Inflammatory: papule, pustule, and cyst/nodule.





Thompson, Ben-Ary and Diecke's exhibition *Bricolage* introduces pottery to incubators, silk to cells, art to science, the past to the future, and the living to the semi-living, in a fruit salad of associations; meanwhile the poor writer is limited to a repertoire of 26 letters, the choice between **serifed** and **sans-serifed** font, a fairly fixed armoury of full stops, commas and capital letters—not to forget that epitome of balance and poise, the semicolon.

But don't forget, I also have scale.

There is something of the 1970s in raku, in bricolage, and in donut-shaped objects. In 1974, Enzo Mari published *Autoprogettazione?*—a book of plans that functioned as open source furniture. In its final form, the book was sent for free to anyone who wanted it.

Likewise, words are free, endlessly combinatory and fascinating. Help yourselves! While it is true that you can't always sit on them, or eat off them, or sleep on them, or turn them into a bookshelf, or make money from them, you can always put them **in** a bookshelf, which is at least something, right?

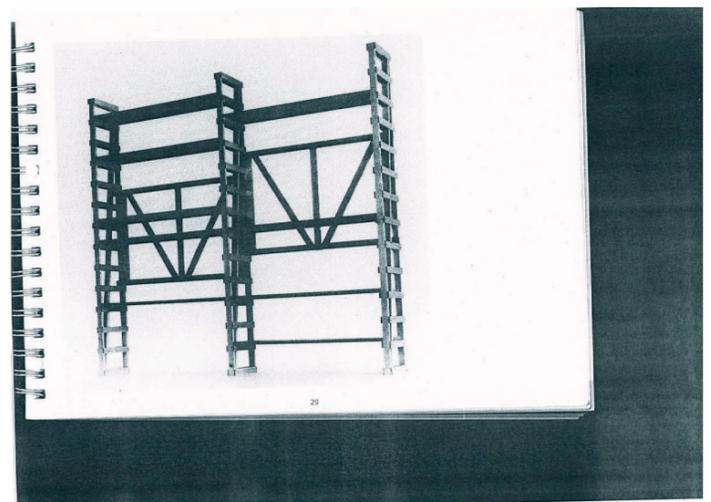
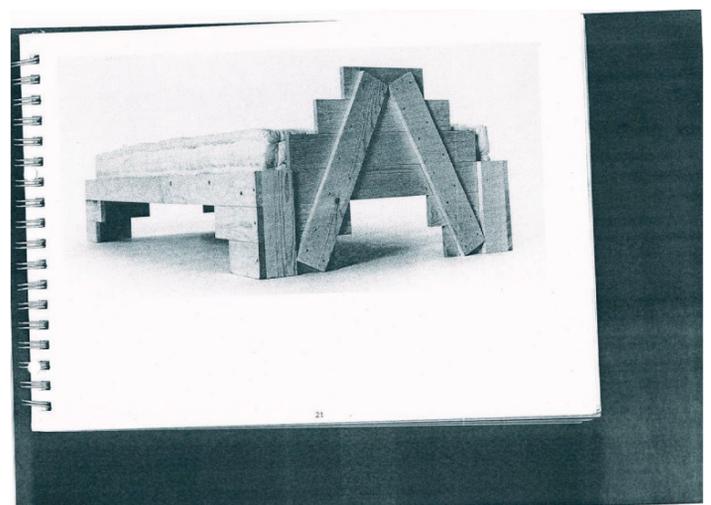
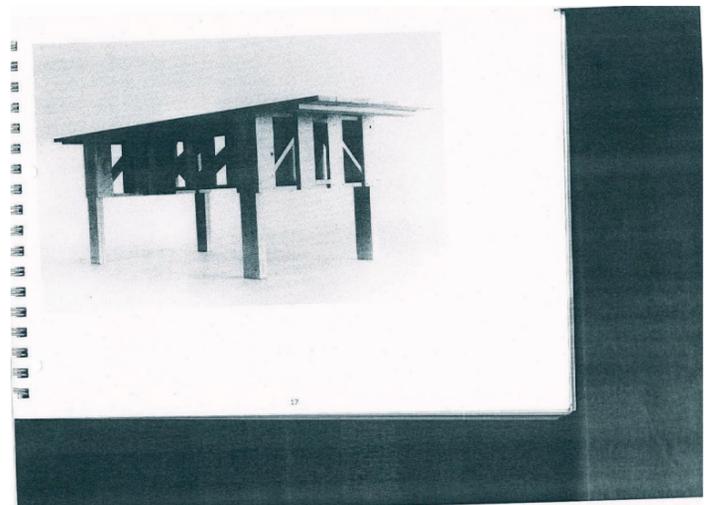
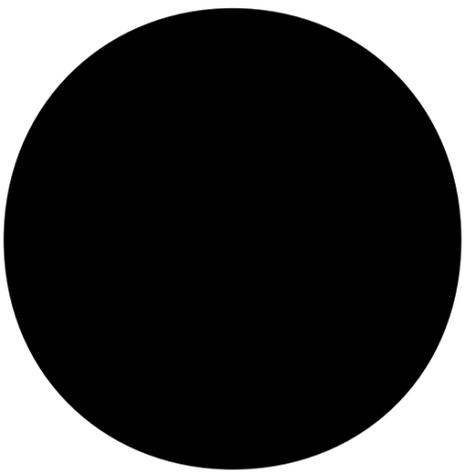


Fig 11: Enzo Mari, *Autoprogettazione?*, 1974/2002 (Corraini Edizioni).



In *Bricolage*, we have something truly 'alchemical' at work. Blood becomes stem cells becomes heart muscle cells that then go about doing what hearts tend to do; they twitch, pulse and beat. If you can turn blood into a stem cell and let it beat, what is next, you might ask?

Devoid of microscope and the augmentation of scale that optics and camera can provide, the heart cells are left to get on with the business of expansion; with the support of their attractive assistant, silk, they are offered the opportunity of going it alone: Ladies and Gents! Watch while they assemble themselves! (*s'assembler?*)

But can we trust art when we don't trust science?

Suspicion No. 2: What if the little cells are just pretending to be happy in their raku incubator, while all the time they are planning to get together when the lights go out, like Woody and his friends in Toy Story. Then what?

- What if a cell were to escape, like a tiger from the zoo?
- But are they even trapped? Do they like it in there?
- Is what they are doing even ethical? Did anyone or anything get hurt?
- They can divide, so they are alive, and if they are alive, should we worry about them?
- But do cells have feelings? They respond to stimuli, right? If they get too cold or too hot, they die...
- Can you feel sorry for a cell, or does it depend where they come from?
- Should you feel less sorry for a fly cell than a mouse cell or a monkey cell?
- What about guinea pigs? (*I love guinea pigs!*)

What are these artists up to?

Is it even art?

Modern bourgeois society, with its relations of production, of exchange and of property, a society that has conjured up such gigantic means of production and of exchange, is like the sorcerer who is no longer able to control the powers of the nether world whom he has called up by his spells.

—Karl Marx (*The Grundrisse*, 1857/1939)

Walt Disney must have known that mitosis (division) offered a vivid analogy for our fears of modernisation, mass production and scientific progress.

A cell is not a reproduction in the sense that Walter Benjamin meant in his essay, 'The Work of Art in the Age of Mechanical Reproduction' (1935), in which he argued that mechanical reproduction devalues the aura of an artefact's uniqueness as art. But the cell, in its capacity to exist outside the body and busily self-assemble in vitro, shares the associations of mass production and the fears associated with modernity. When Mickey Mouse in *The Sorcerer's Apprentice* (*Fantasia*, 1940) disobeys his master and uses magic power to avoid work, the willful broom ignores the wishes of the apprentice and replicates itself in what appears to be an object lesson in capitalism: if you've got a big job, just hire more workers, and if you haven't got any more apprentices, then automate!

The brooms in this animated universe (*don't forget that animation is drawn in cells*) are a terrifying allegory of commodification and rampant viral reproduction. The images collude with the economies of single cell animation (*multiple identical brooms all doing the same thing calls for less drawing*) to make copies of itself whose assembly line sameness overwhelms the young apprentice.

While it might be the case that movement is a sign of human life (*when things starts to move they are said to be 'animated'*), it is also the case that when things begin to move like humans they eliminate the need for humans, as is the case with automation in the factory. The brooms upend the hierarchy between master and slave in a *mise-en-abîme* that is as much a cautionary tale of rampant mass production as a moral lesson for Mickey Mouse.

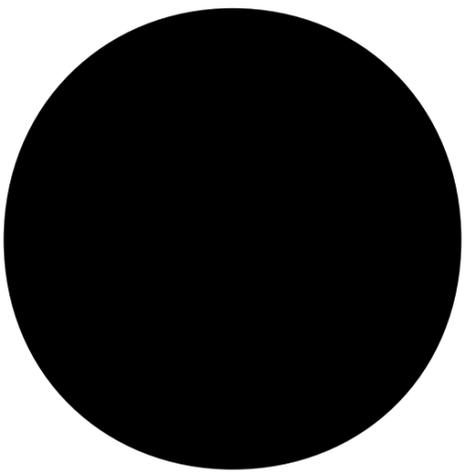


Fig 12: Walt Disney, *The Sorcerer's Apprentice* from *Fantasia*, 1940.



Le Docteur CARREL, de New-York

Fig 13: Dr. Alexis Carrel—biologist, surgeon and author of *Man, The Unknown*, 1935—as a magician.



Just as there is a materiality to the cell, which is the foundation of all life and which we now understand harbours a nucleus and is capable of division and replication and so many things that I will never understand, so too is there a materiality (*and obsessiveness*) to text and writing. This reveals itself through the play of font, style, scale and repetition (*and in Little Dot cartoons and the work of Yayoi Kusama*).

!

?

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;

An exclamation point looks like an index finger raised in warning; a question mark looks like a flashing light or the blink of an eye. A colon ... opens its mouth wide: woe to the writer who does not fill it with something nourishing. Visually, the semicolon looks like a drooping moustache; I am even more aware of its gamey taste.

—Theodor Adorno

In the USA they call it a *period*, but I prefer to call it a *full stop*. When, in his masterful *Micrographia* (1665), Robert Hooke examined a full stop under magnification (**Fig 15**), he was shocked to find that it revealed itself not to be a perfect black dot, but something far less organised and uniform: “a smutty daubing on a matt or uneven floor made with a blunt extinguist brand or stick’s end”.

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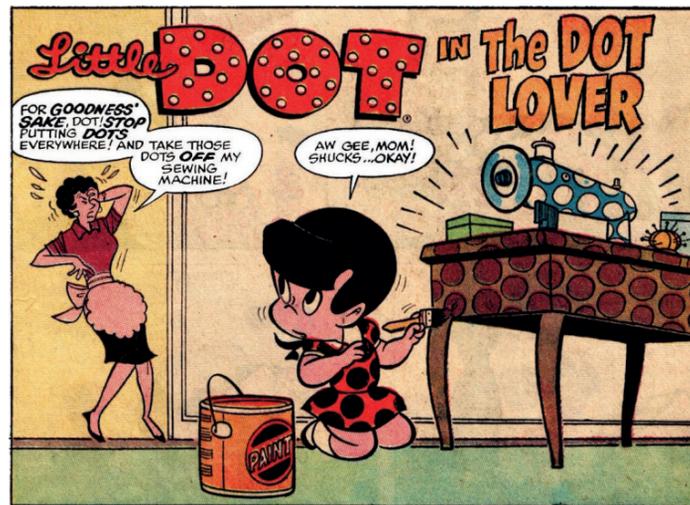
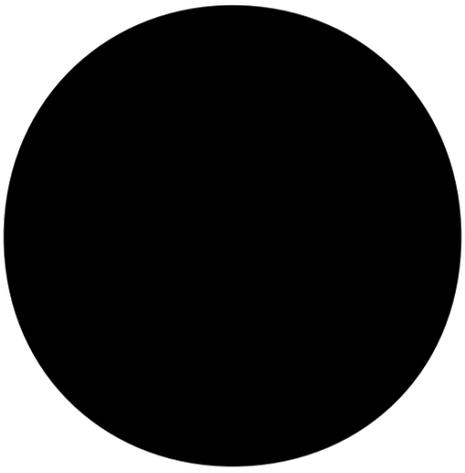


Fig 14: Alfred Harvey and Vic Herman, *Little Dot*, 1953–76.



Fig 15: Reproduction of a full stop under a microscope. Robert Hooke, *Micrographia*, 1665.



The Voyage In

There are no miniatures in nature; the miniature is a cultural product, the product of an eye performing certain operations, manipulating, and attending, in certain ways, to the physical world.

—Susan Stewart

In naming the unknown, we look for clues in what is already known. Robert Hooke used the word *cellulae*, Latin for ‘small storage rooms’ to describe the microscopic structure that he observed using a compound microscope. What he saw (which was in fact dead cell walls) reminded him of the tiny rooms inhabited by monks in a monastery, and the polygon cells of beeswax—hence, cell.

Who could have imagined the inside of the body? I open my mouth for the dentist, who peers in. I am allowed to keep the X-rays of my fractured wrist. I cherish the ultrasound of the foetus pulsing inside me. Through magnification, observation, illustration and then through the technologies of photograph, telescope and microscope, the distant became near, and the invisible was rendered visible. We access diagnostic images of our bodies, mediated by experts, but rarely are we encouraged to prod and peek around in our own interiors; we are supposed to leave ourselves alone.

“Stop picking!” says the mother to her child.

Visual technologies, like photographs, X-rays, illustrations, anatomical drawing, TV document are all ‘voyages in,’ that play with the imaginative possibilities of scale.

This ‘voyage in’ was preceded by centuries of dissecting the whole body—the corpse—into parts. Long before photographic reproduction, scientists relied on illustration to record their findings. It was not until the practice of microscopy in the early to mid-19th century in France and Germany that the relationship between the exterior of the body—the skin—and the interior of the body began to be understood. Before this, medics had to deduce the interior functioning of the body from the anatomy of corpses.

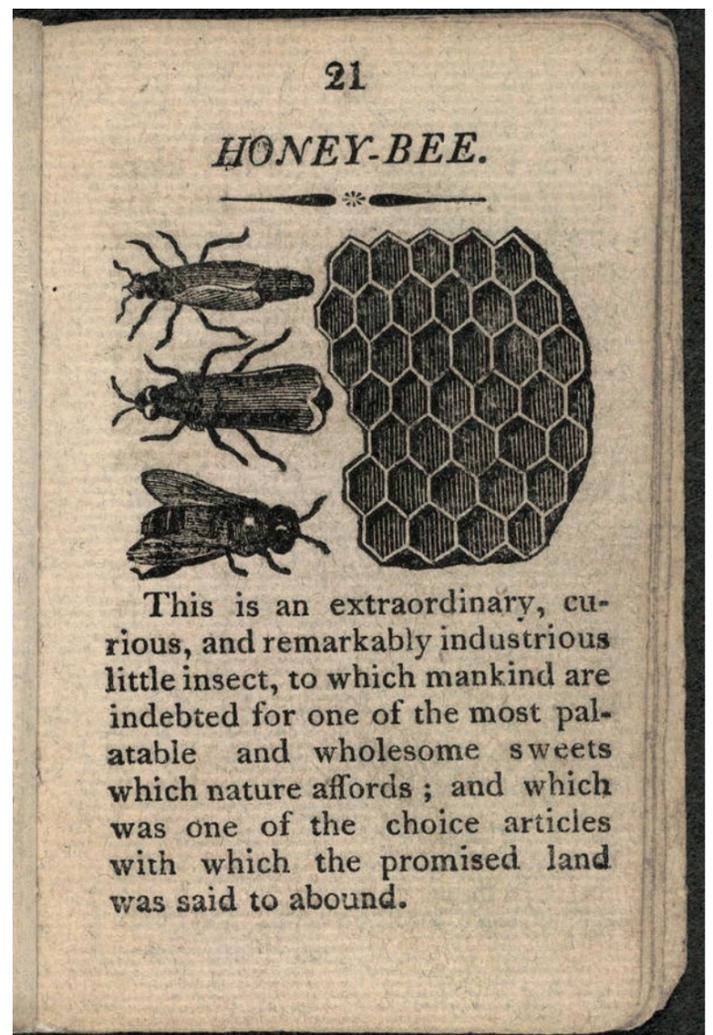
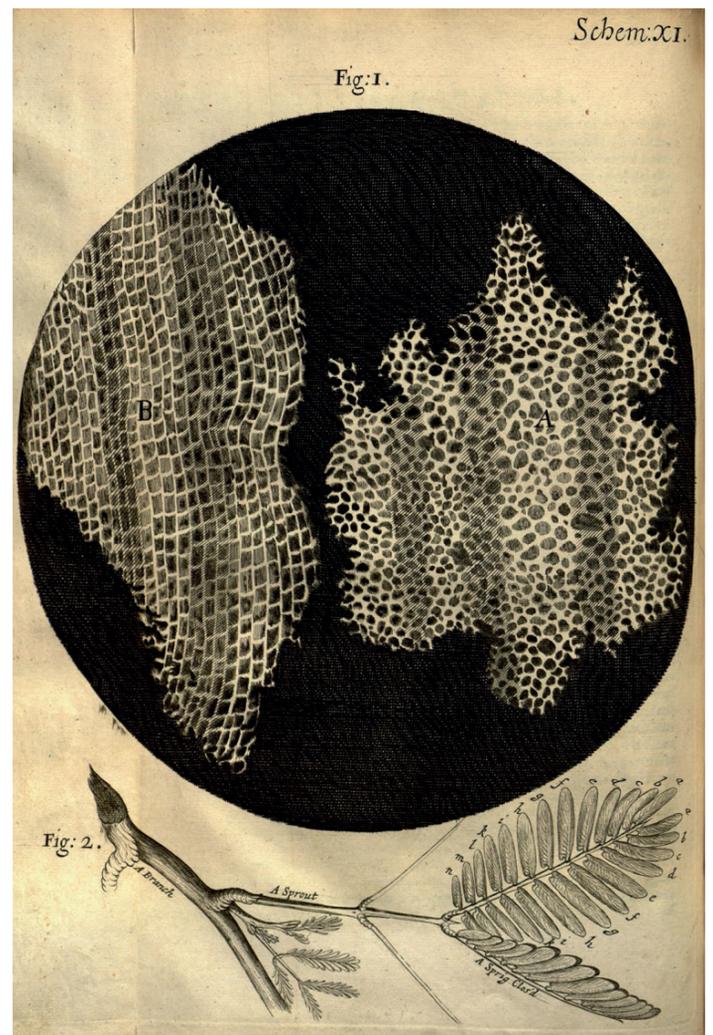


Fig 16: Cork structure and plant sprig. Robert Hooke, *Micrographia*, 1665.

Fig 17: Samuel Wood, *The History of Insects*, 1813.

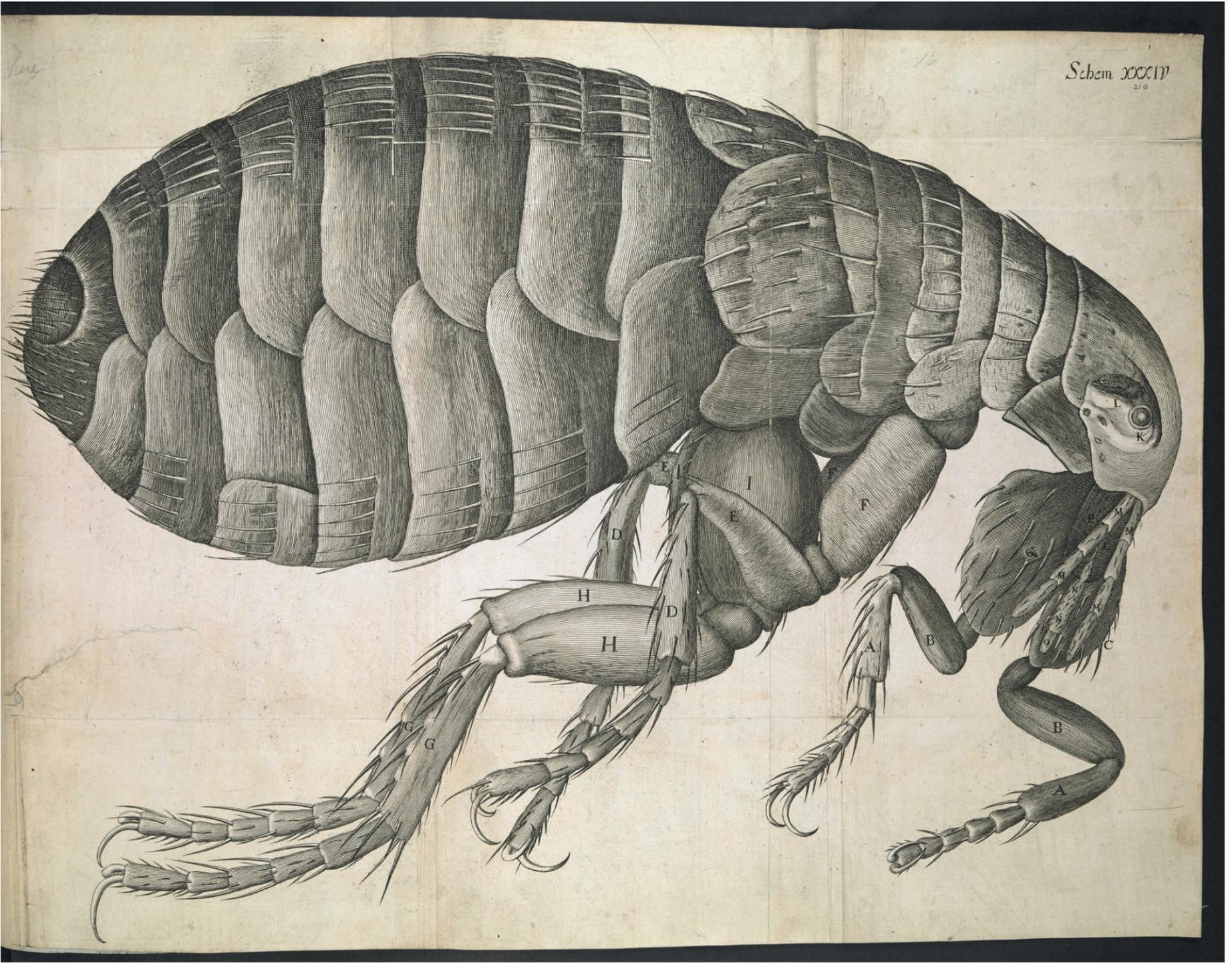


Fig 18: Flea. Robert Hooke, *Micrographia*, 1665.

TAB. X. ad annum 1686. pag. 372.



Novum Microscopium Dni: Iosephi Campani, ejusque usus.

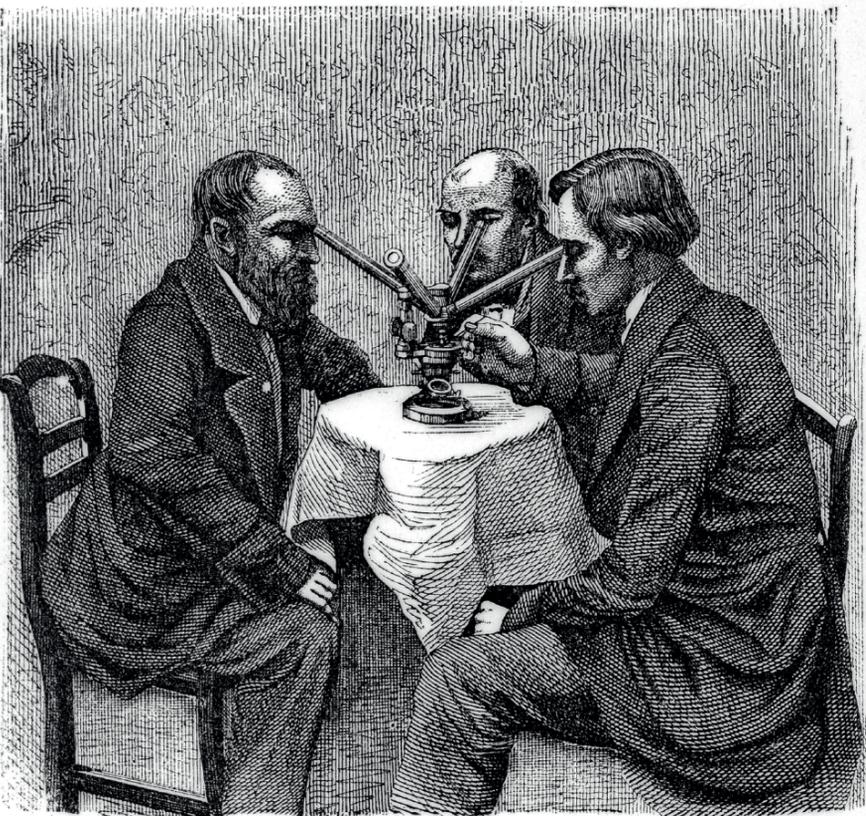


Fig 19: Illustration showing the use of the microscope in medicine (Campani's microscopes). 1686.

Fig 20: Nachet's multiple-microscope in use. This microscope enables four observers to view the object at a time. 1854-56.

Early accounts of anatomists cutting open the body speak of a desire to understand the mysteries of the interior. The earliest European forays into microscopical research, from 1620 to 1720, provided a whole new microworld—and revealed the apparent role of living *animalcules* (Latin: ‘little animal’, an older term of microscopic animals and protozoan) in generating contagion, and disease.

The first to witness a live cell under a microscope was Dutch microscopist Antonie van Leeuwenhoek (1632–1723). Through magnification and microscopic vision, a mode of close descriptive writing developed.

Before the microscope and microscopic depiction, the skin was seen as an open cover serving as a passageway for bodily fluids and substances; sweat was imagined to take on the form of the fluid that was imbibed:

I cleaned well, part of the Skin of my Hand, and by my Microscope, in a space not bigger than a Sand, I saw the Sweat issuing out at about Fifty places, which as they touched, joined together into one little Bubble. After drinking about a Quart of French–Wine over Night, I found myself a little out of order the next morning, at Dinner I drank a Pint and half more, and after about Two Hours, I drank Half a pint of Tea very hot, that I might throw myself into a Sweat; (...) I examined it (...). I made this Experiment, to see if any of the salt Particle to be found in my Sweat, were like those found in Wine.

Skin and pores were thought of as orifices akin to the navel, the anus, nose, breast, eyes, with sweat holes to discharge impurities from deep in the body; the human body harbored strange creatures and emanated foul humours and fluids.

English botanist Nehemia Grew (1641) confirmed the existence of

the PORE

—a noun, which like the full stop, has gone on to have a life of its own, with elaborate regimes of management and abeyance. Alphons Wendt (1834) used a microscope to describe the ‘sweat channel’, and confirmed

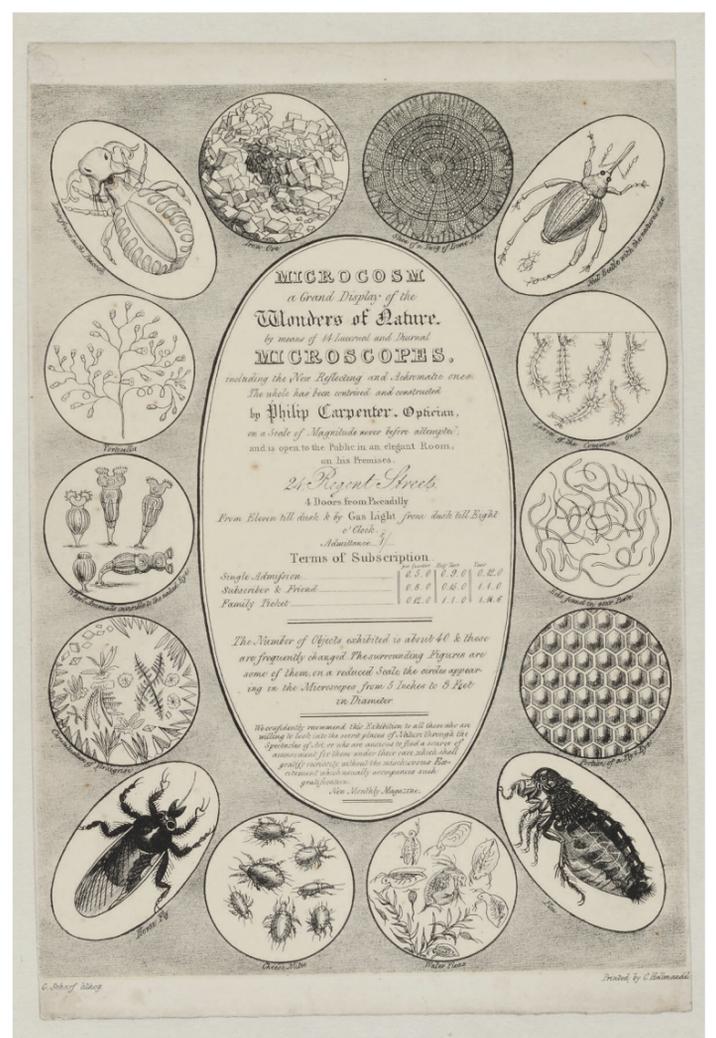
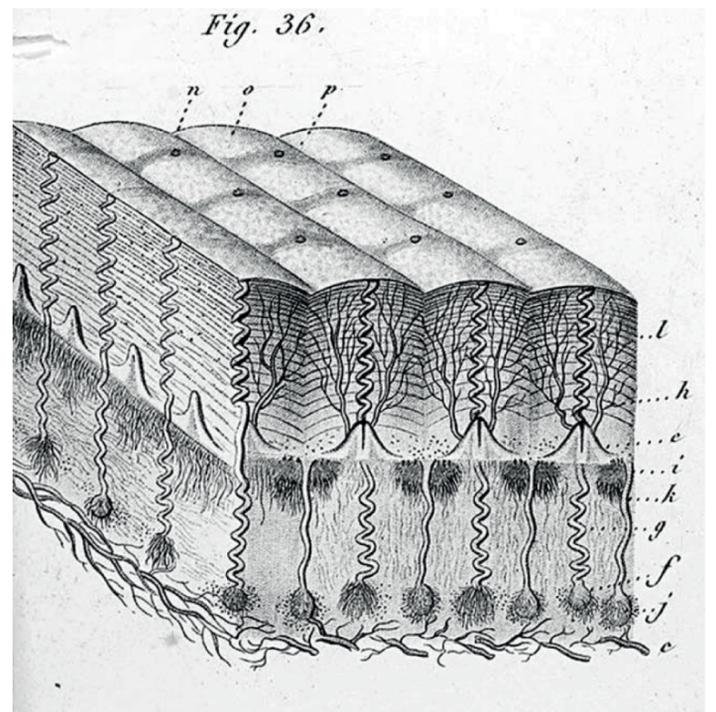
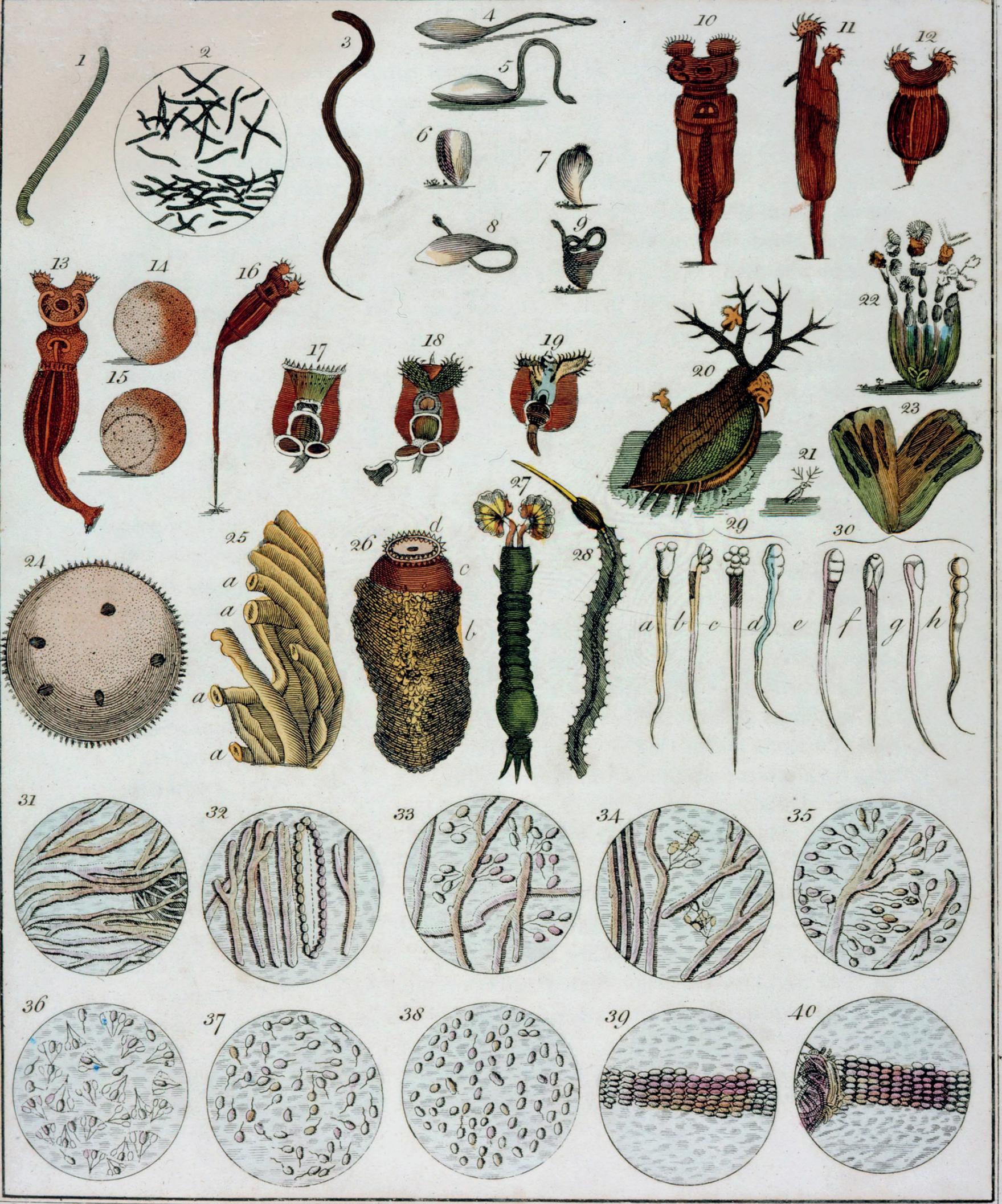


Fig 21: Schematic microscopical articulation of the inner structures inside the skin in Breschet and de Vauzème’s *Nouvelles recherches sur la structure de la peau*, 1835. Universiteitsbibliotheek Leiden.

Fig 22: *Microcosm: A Grand Display of the Wonders of Nature ...* Carpenter, Philip (author), Hullmandel, Charles Joseph (printer), and Scharf, George Johann (lithographer). n.d. [1827?]



Dodd Delin.

Animalcules.

Paf's Sculp.

Fig 23: Animalcules observed by Anton van Leeuwenhoek c.1795.

that sweat was produced inside the skin itself. The creative encounter of drawing and microscopic skin was first depicted in schematic cross-section, in thick bands, which remain the standardised representation used in popular encyclopaedias. The pore (*and the port!*) became a focus point for discussion of general social wellbeing, and an exterior sign of interior problems; the correct management of outer health was linked to moral rectitude and health. John Coventry wrote in 1846:

[W]e hope that every facility may be afforded for public bathing; that cleanliness may no longer be viewed as a luxury accessible only to the wealthy, but that, before the ensuing parliamentary session, the pores, as well as the ports, of our mother country may be rid of their imposts, and unreservedly thrown open.

Barbara Maria Stafford writes that the act of visibilising, or incarnating, the invisible became endowed with special urgency in early modern art and medical experimentation:

The illustrative drive to turn elusive information into riveting spectacle, or into palpable demonstration, was one of the chief educational tools for attaining enlightenment.

The close-up afforded by the magnifying glass and the microscope fed the fascination with interiority and incited the imagination of writers, artists and scientists. In the familiar examples in English of literary miniaturisation—*Thumbelina* (Hans Christian Anderson, 1835), *Gulliver's Travels* (Jonathan Swift, 1726), *Alice's Adventures in Wonderland* (Lewis Carroll, 1865)—scale is used as a perceptual tool for organising point of view; it instigates narrative plot, engenders shock and wonder, and gives rise to satire.

In Mary Norton's aptly named *The Borrowers* (1952), the diminutive Clock family of Pod, Homily and Arrietty attempt to ward off evil cats and turn their reduced size and marginal status in the English post-war decay of the 'Big House' to their advantage by using cotton reels as tables, needles as swords, and in the process discover all manner of unforeseen uses for paper, hairbrushes, pins and threads—thereby offering the reader a perfectly reasonable explanation as to why all those small things like buttons and safety pins are never where you put them.

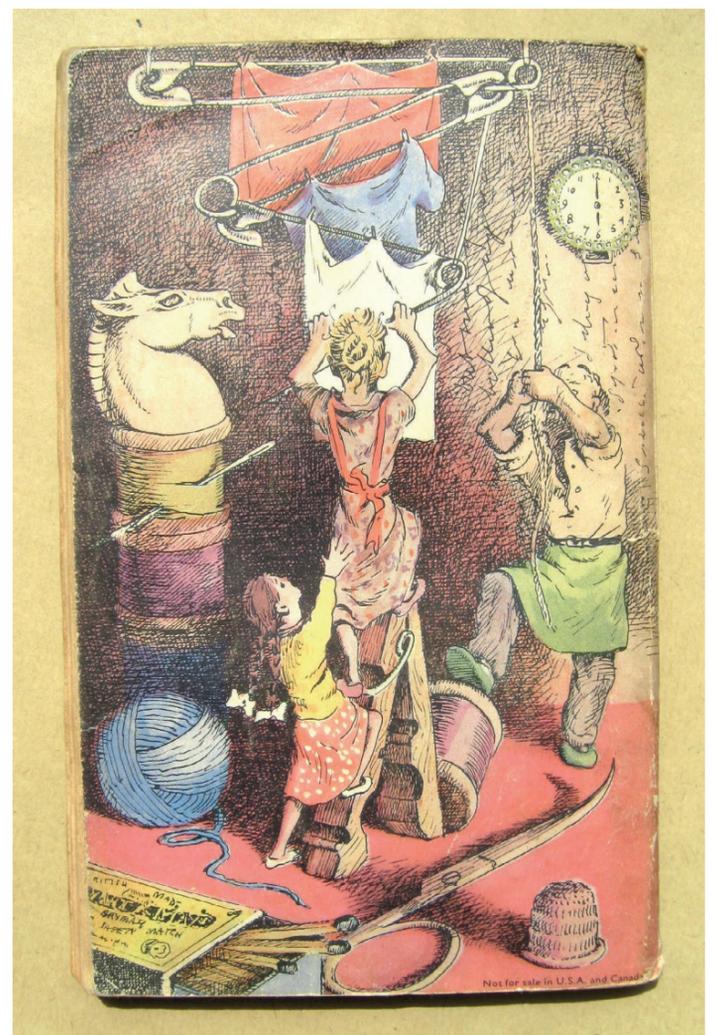
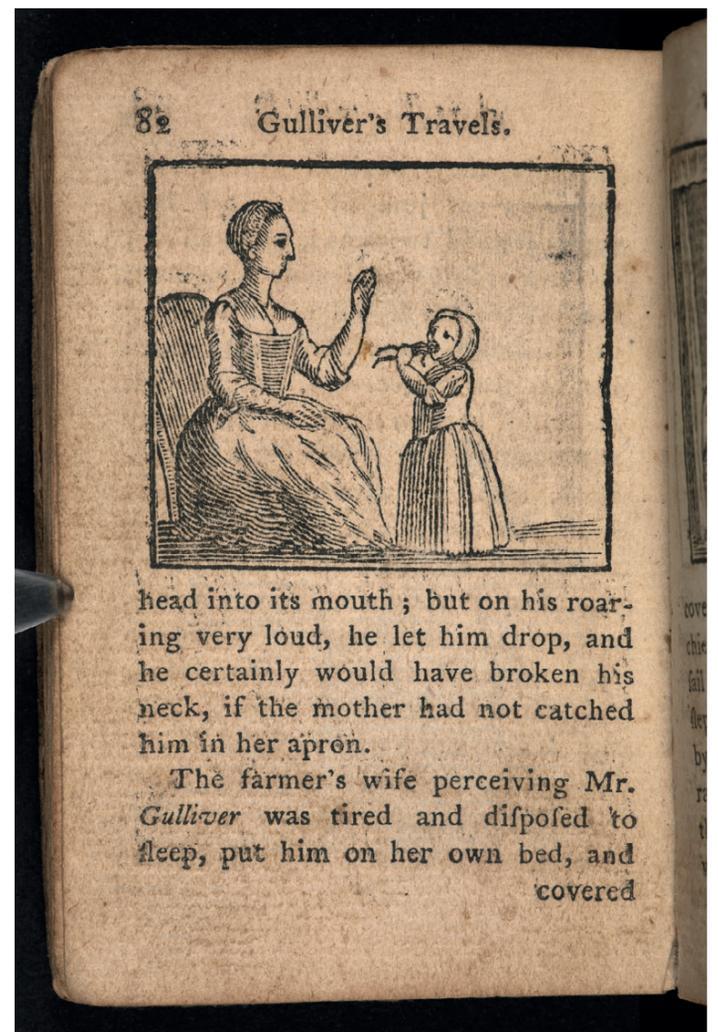


Fig 24: Jonathan Swift, *The Adventures of Captain Gulliver*, 1776.

Fig 25: Mary Norton, *The Borrowers*, 1952/59 (Puffin Books) .

20th CENTURY-FOX
présente :

le voyage fantastique

CINQ SAVANTS
'MINIATURISÉS'
FONT UN
'VOYAGE FANTASTIQUE'
À TRAVERS
LE CORPS HUMAIN

avec

Stephen Boyd
Raquel Welch

Edmond O'Brien · Donald

Pleasence · Arthur O'Connell · William Redfield et Arthur Kennedy

Produit par Saul David · Réalisé par Richard Fleischer · Scénario de Harry Kleiner · Adaptation de David Duncan
Tiré d'une histoire de Otto Klement et Jay Lewis Bixby · Musique de Leonard Rosenman · CinemaScope · Couleurs par DeLuxe

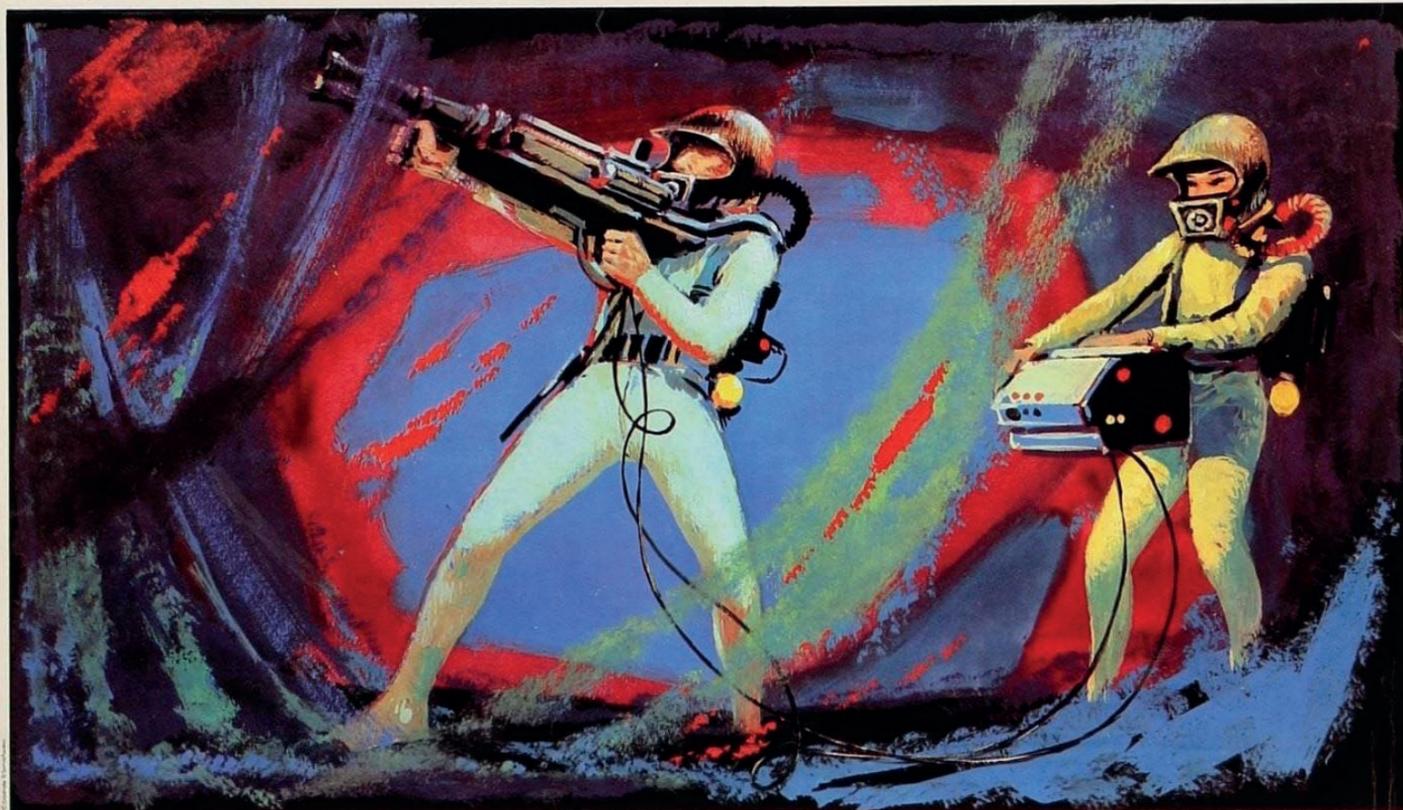
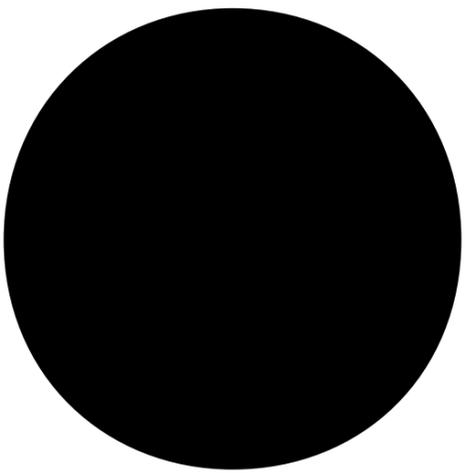


Fig 26: Richard Fleischer (dir.),
Le Voyage Fantastique (1967).



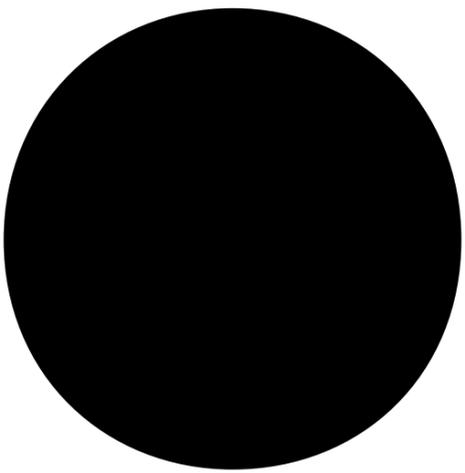
Fig 27: The first X-ray image, *Hand mit Ringen* (Hand with Rings) by Wilhelm Conrad Röntgen, 1895.

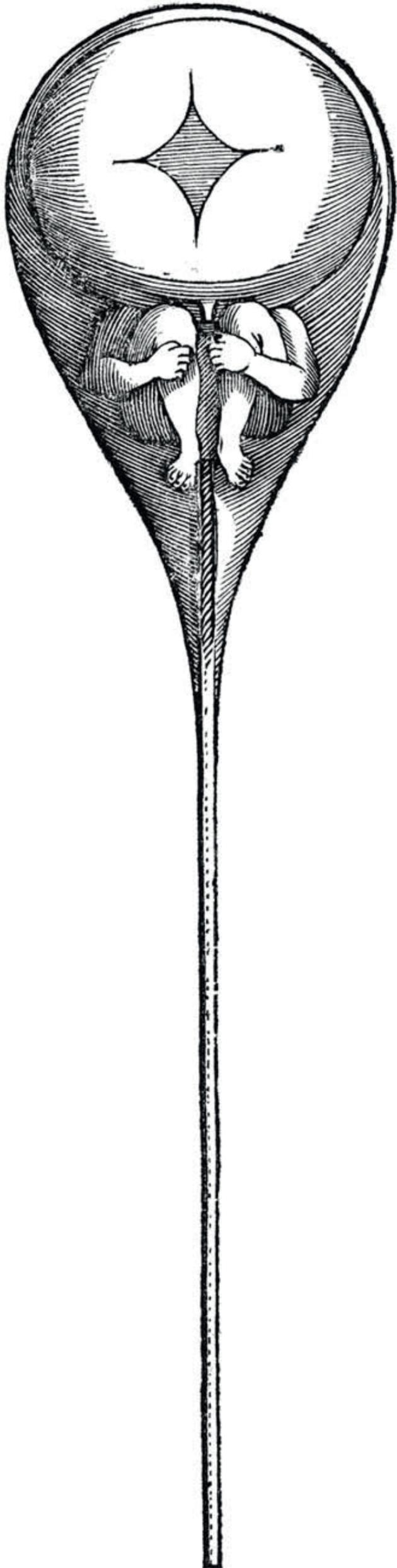


Must art, the image, the visual and the phenomena they give rise to be pinned down by words? It is as if the visual always has to prove itself. And this is the job of print, of words, of technical language, of manuals and dictionaries, and encyclopaedias and children's books, with their familiar didactic cross-sections.

Explicitly or implicitly, non-discursive articulations suffer from the fact that they do not say or read. If they wish to appear legitimate, then they must conform and perform linguistically.

—Barbara Maria Stafford





During the Middle Ages, a point of view arose that all structures required for the production of a new individual were performed within the egg and that development required only their unfolding and growth in size. With the discovery that the egg and sperm are the agents responsible for reproduction, this argument for preformation took the form of the egg or the sperm as containing the entire body of the new organism. The proponents of this theory became known as ovists or animiculists, depending upon whether they believed the egg or the sperm to contain the intact individual.

—S. Robert Hilfer (*The Emergence of Experimental Embryology in the United States*, 1990)

Fig 28: Diagram by N. Hartsoeker (1694) of how he imagined a sperm would look if it contained a preformed individual. Hartsoeker later rejected the preformationist view, carrying out calculations of size that showed that if all of the animals of any species had been enclosed in the first male or female, those animals that now inhabit the earth would have to be infinitely and incomprehensibly small.—S. Robert Hilfer

As you go through life, make this your goal:

Watch the doughnut, not the hole.

Danger!! Danger!! Mutants!!
Genetically Engineered! Monsanto!!
Gene Splicing!! Weird shit!!

Empathy and disgust are so very, very close.
Like a membrane, permeable. What used to
be oxymorons, or magic, are, in the world
of technoscience, can-do's, shouldn't-
do's, must-do's: wolfman, feather-human,
sheep-girl, the swan with wings, a plastic
heart, a glow-in-the-dark rabbit.

It's easy to be scared and to run away, but
it's so much better if we **think** about it.

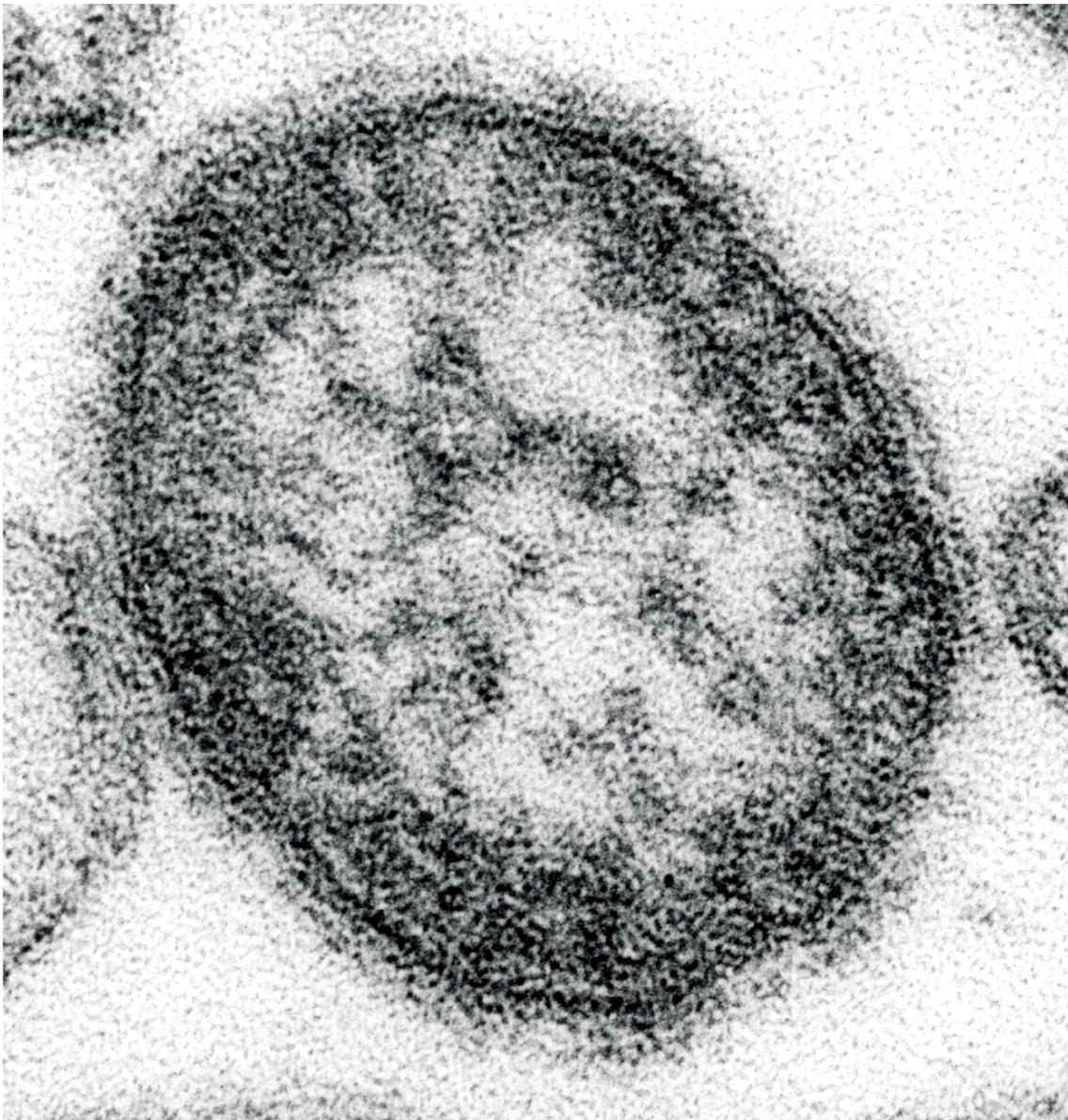


Fig 29: *Measles morbillivirus*
electron micrograph.

