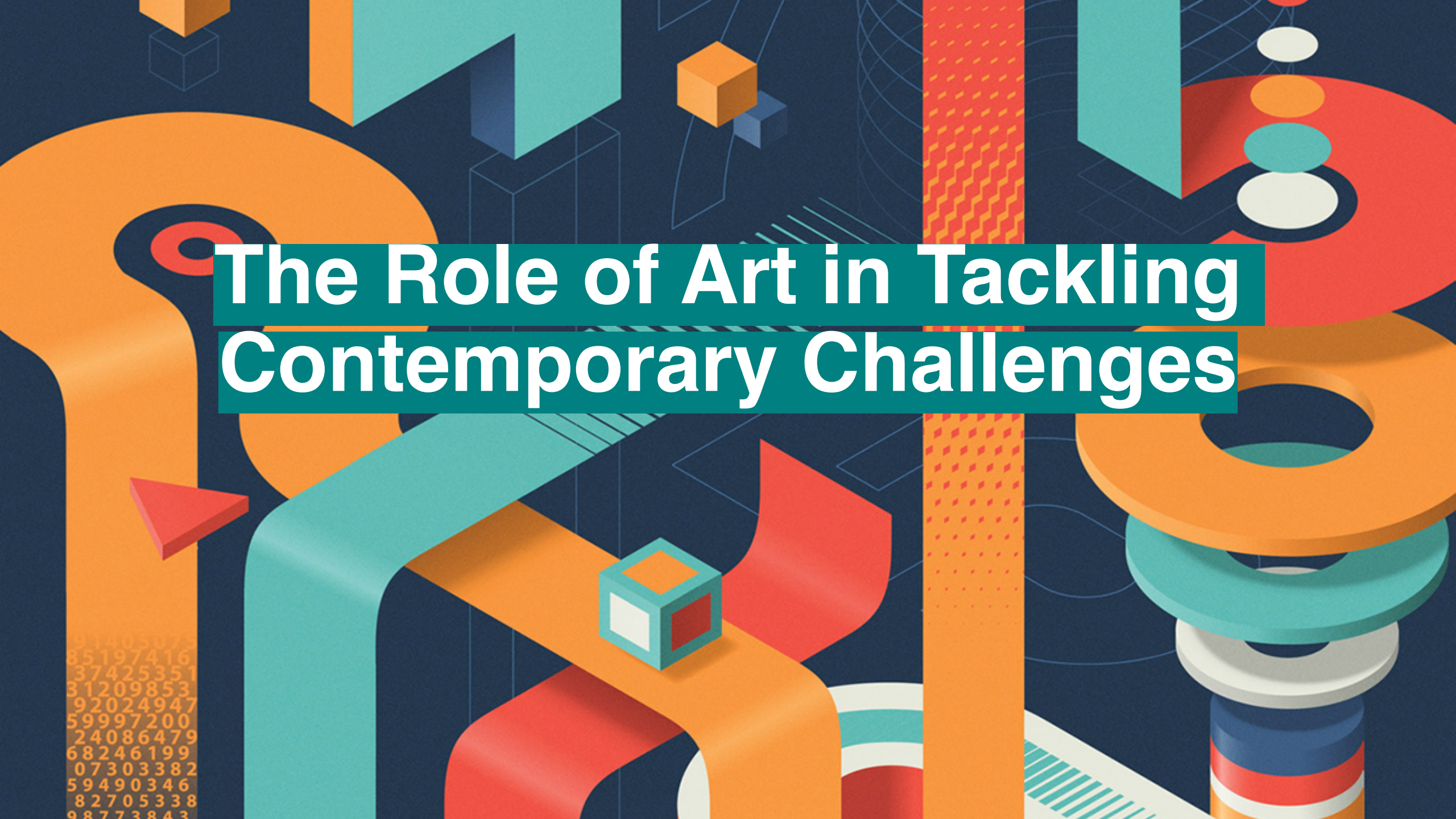
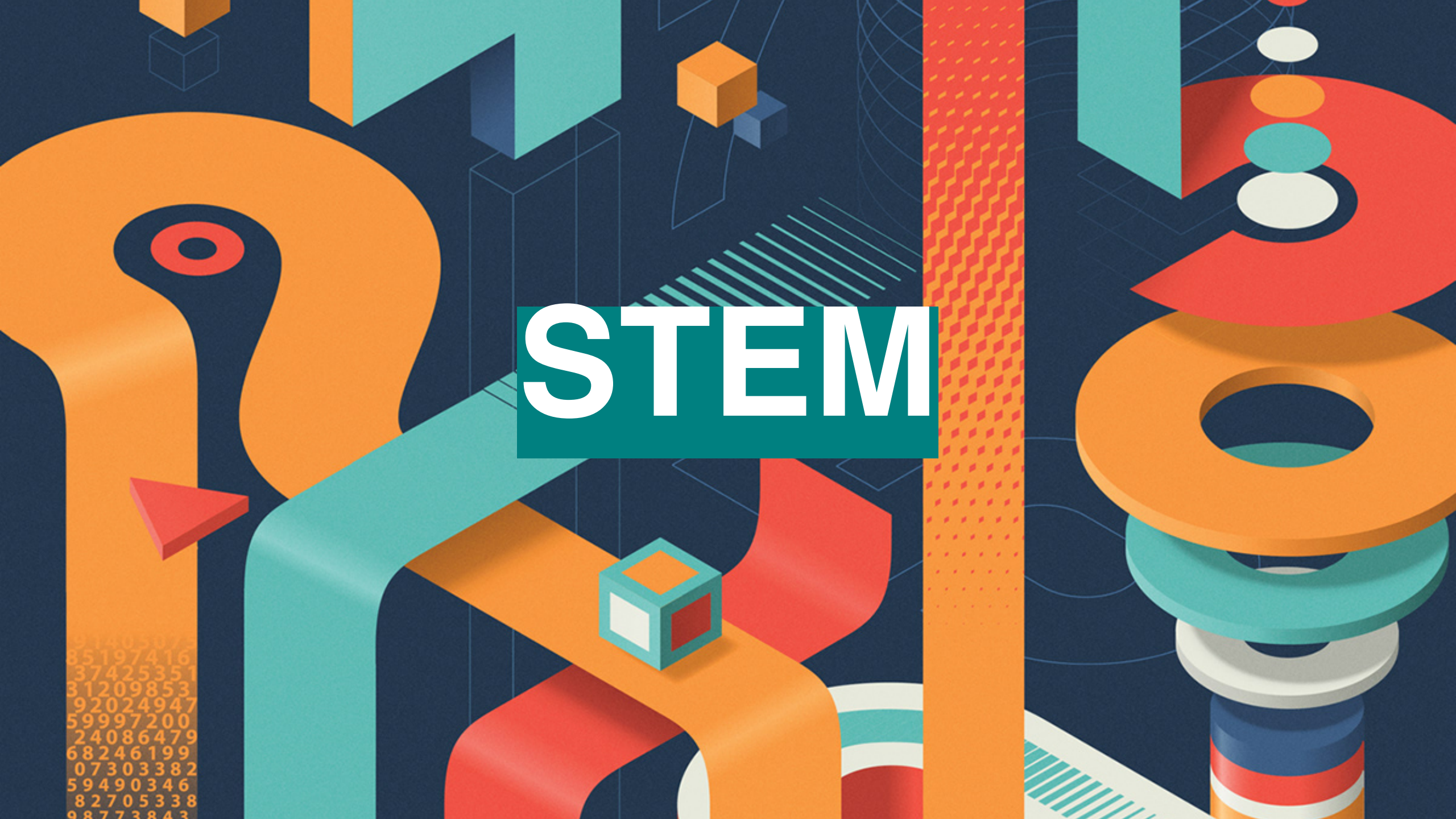

The Role of Art in Tackling Contemporary Challenges

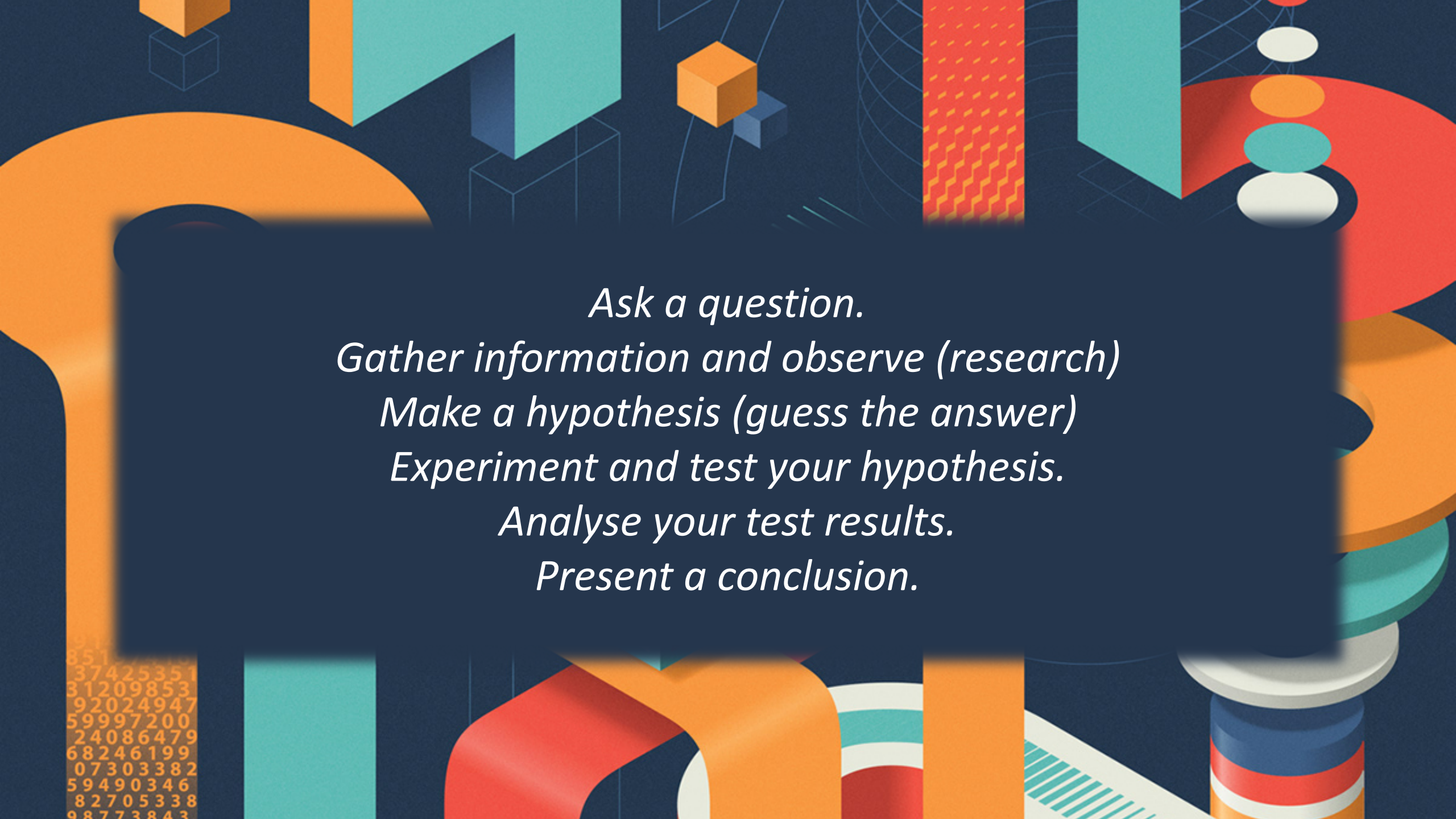

STEM

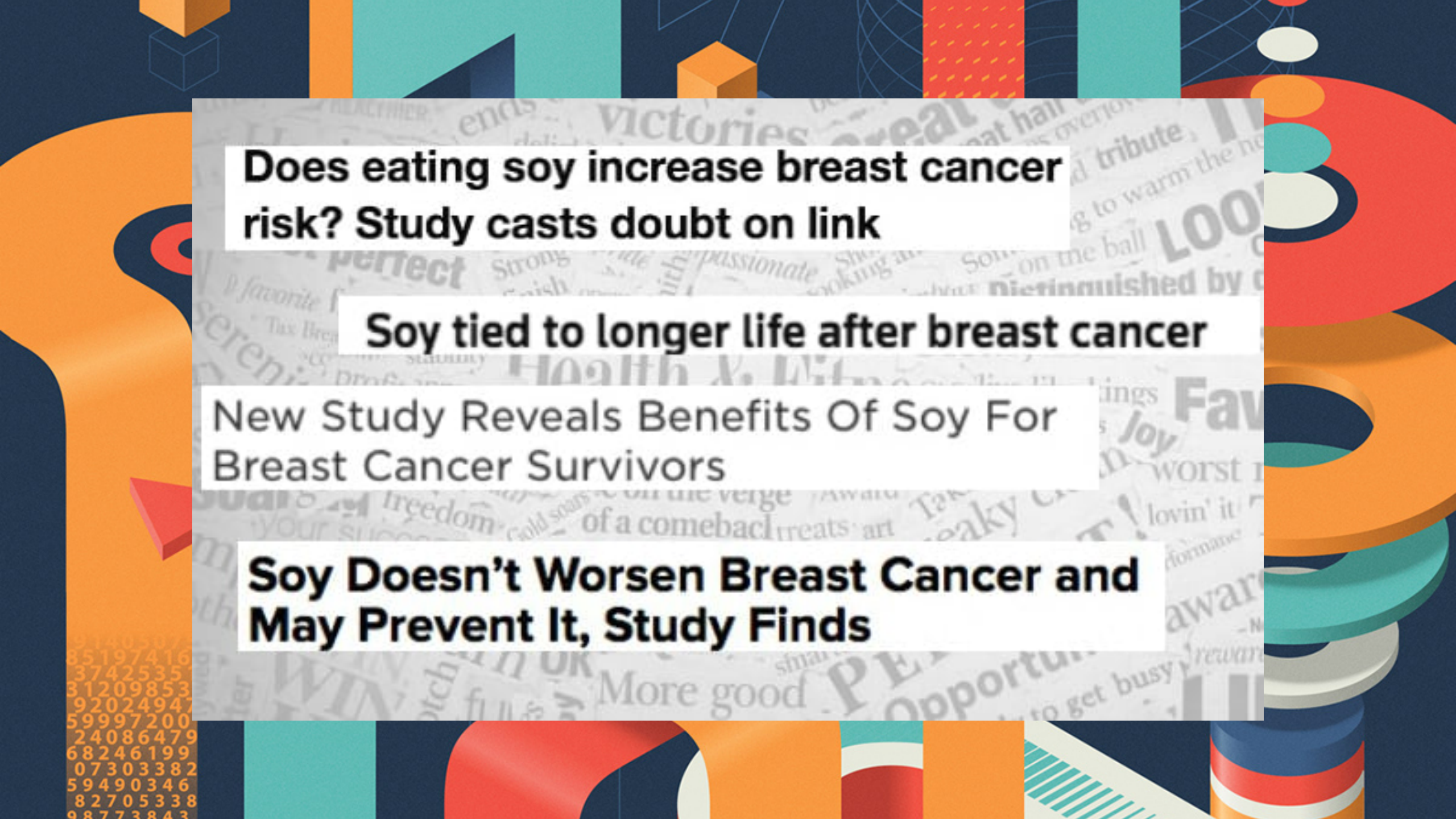

STEAM

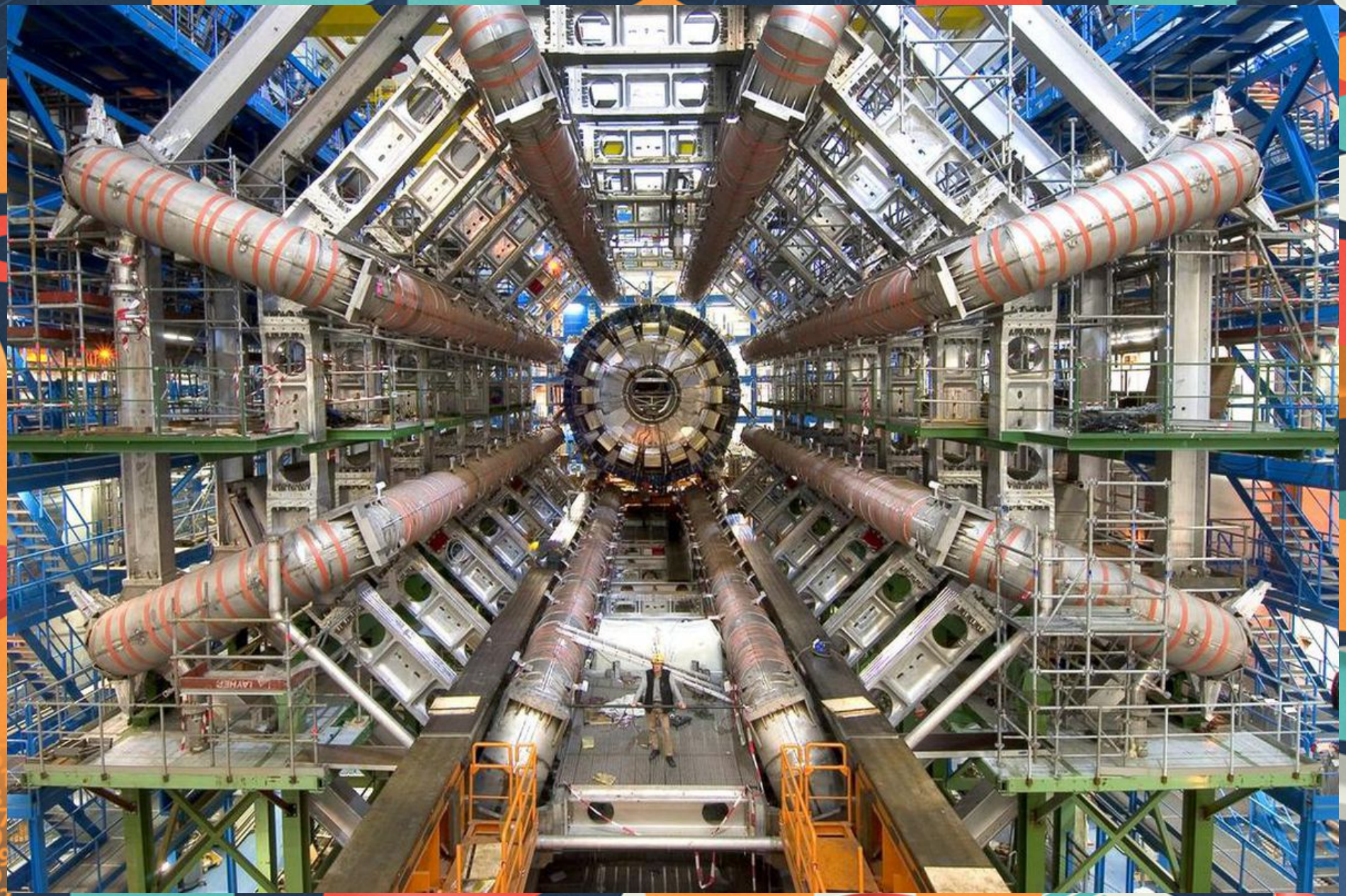

Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David
WISA

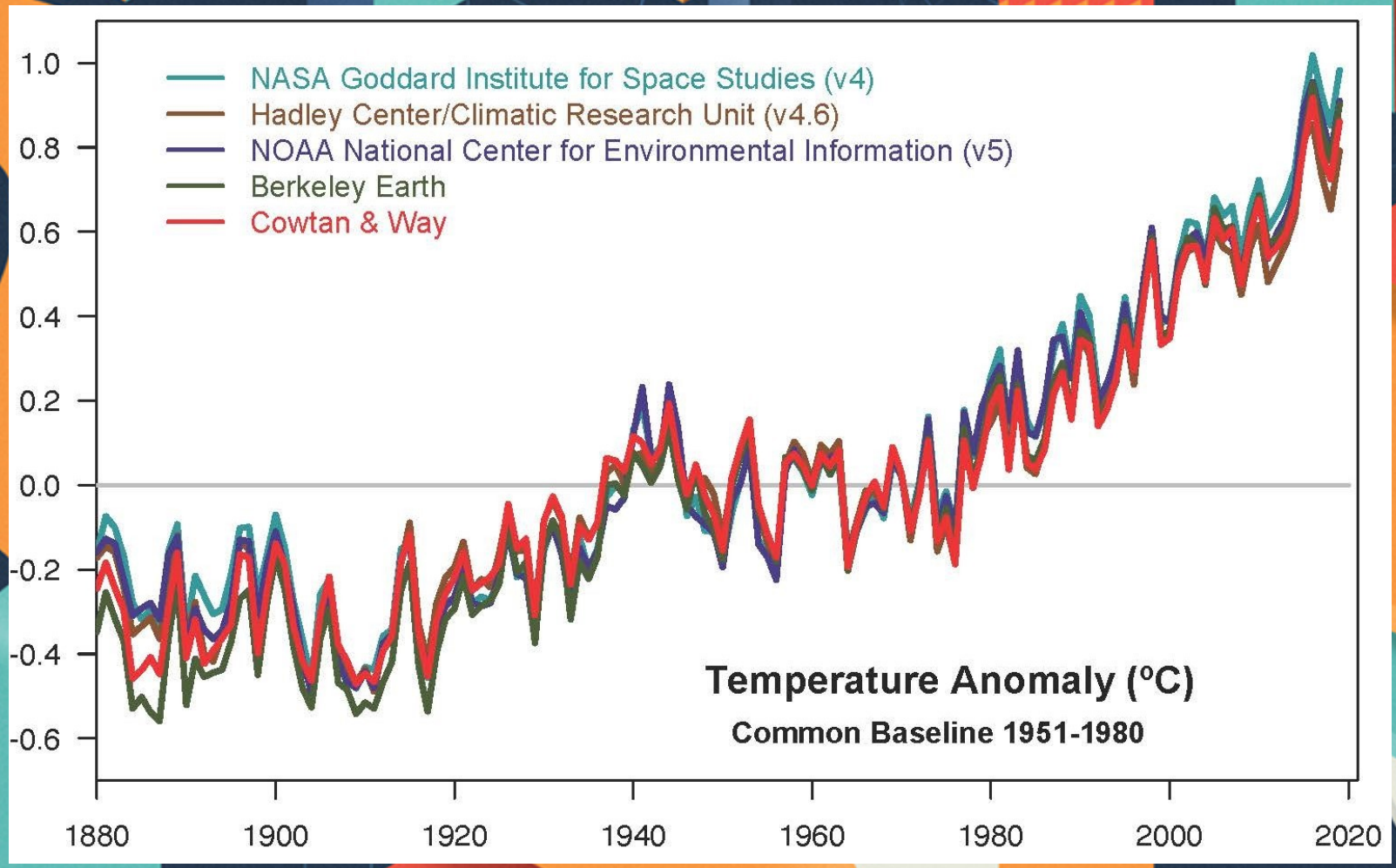

‘Science is actually a very creative venture. It requires thinking outside of box. It requires an ability to be open to new experiences and an ability to change course in the middle, try a different path, or go about things in a new way.’ – Cara Santa Maria

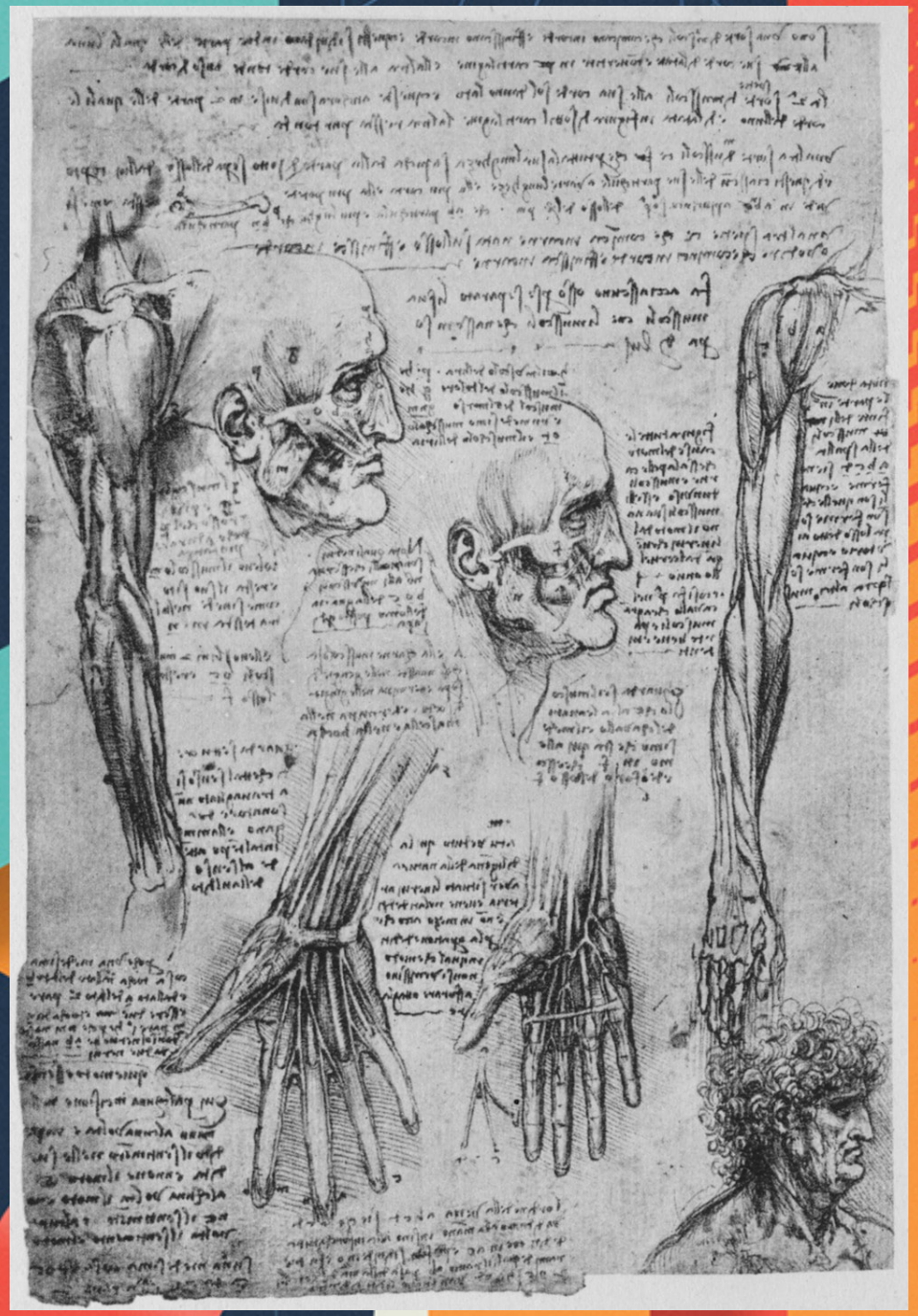

The scientific method

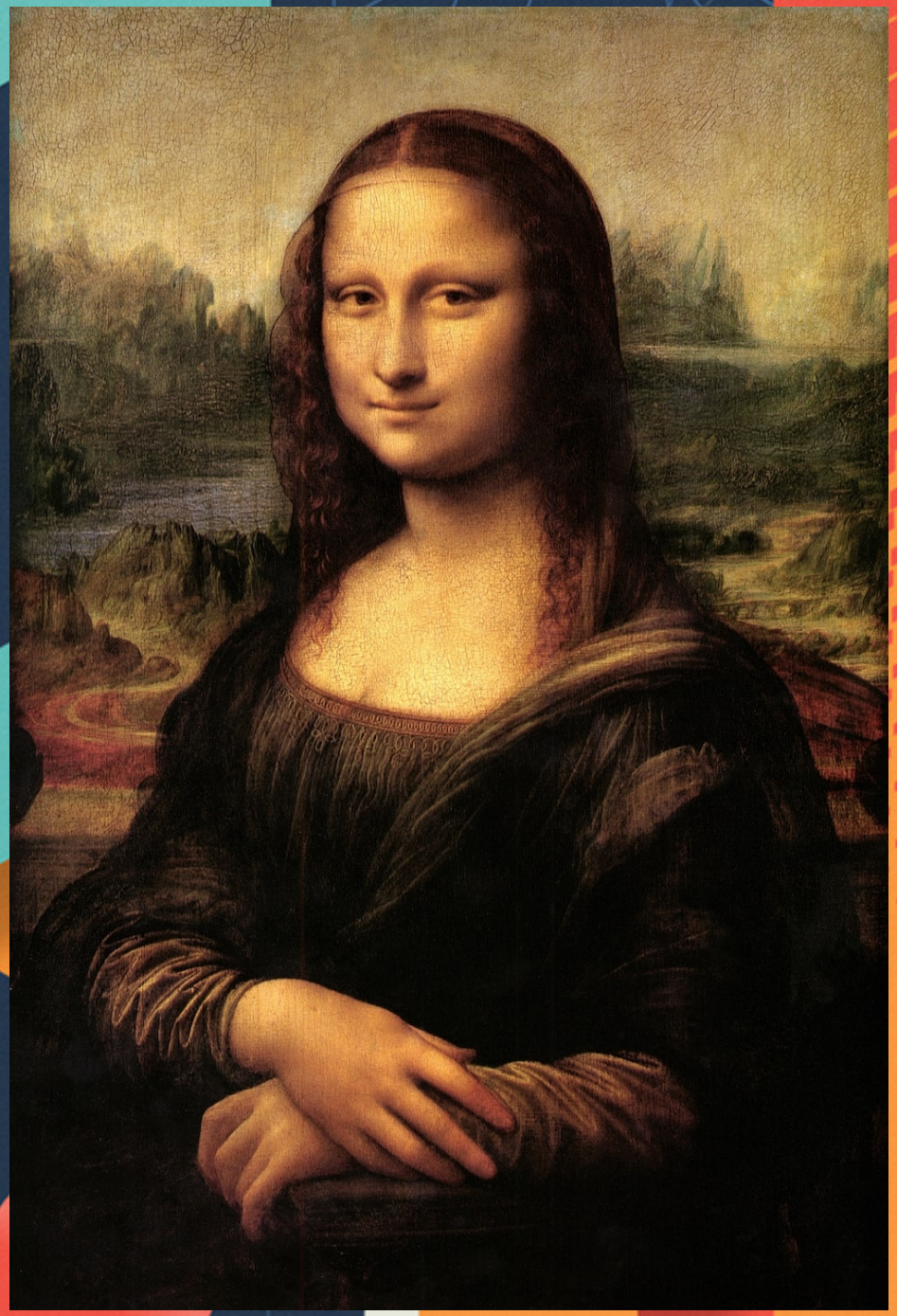

Ask a question.
Gather information and observe (research)
Make a hypothesis (guess the answer)
Experiment and test your hypothesis.
Analyse your test results.
Present a conclusion.


Does eating soy increase breast cancer risk? Study casts doubt on link
Soy tied to longer life after breast cancer
New Study Reveals Benefits Of Soy For Breast Cancer Survivors
Soy Doesn't Worsen Breast Cancer and May Prevent It, Study Finds




NASA Goddard Institute for Space Studies (v4)
Hadley Center/Climatic Research Unit (v4.6)
NOAA National Center for Environmental Information (v5)
Berkeley Earth
Cowtan & Way
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
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1880
1900
1920
1940
1960
1980
2000
2020
Temperature Anomaly (°C)
Common Baseline 1951-1980







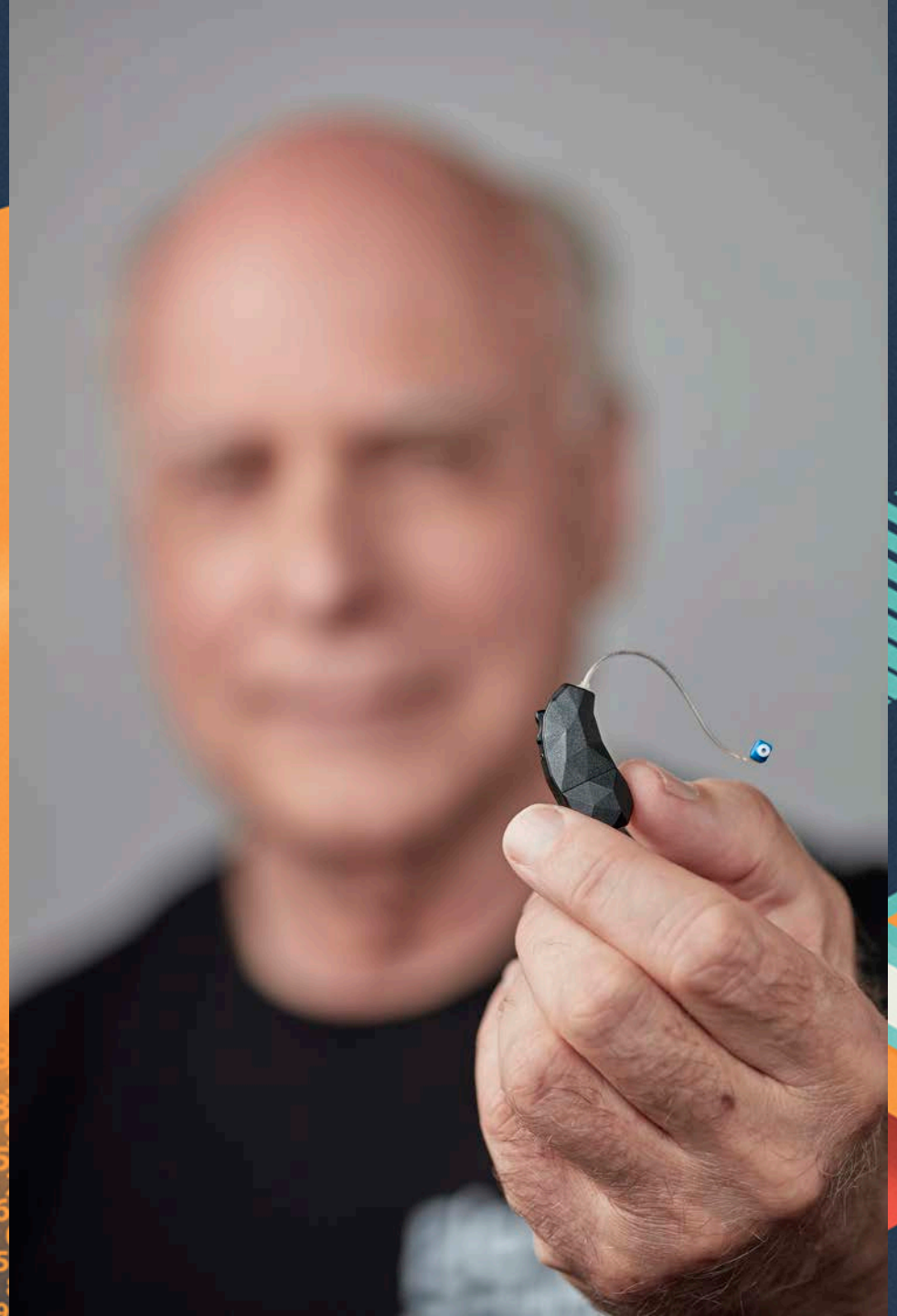


Leah Heiss





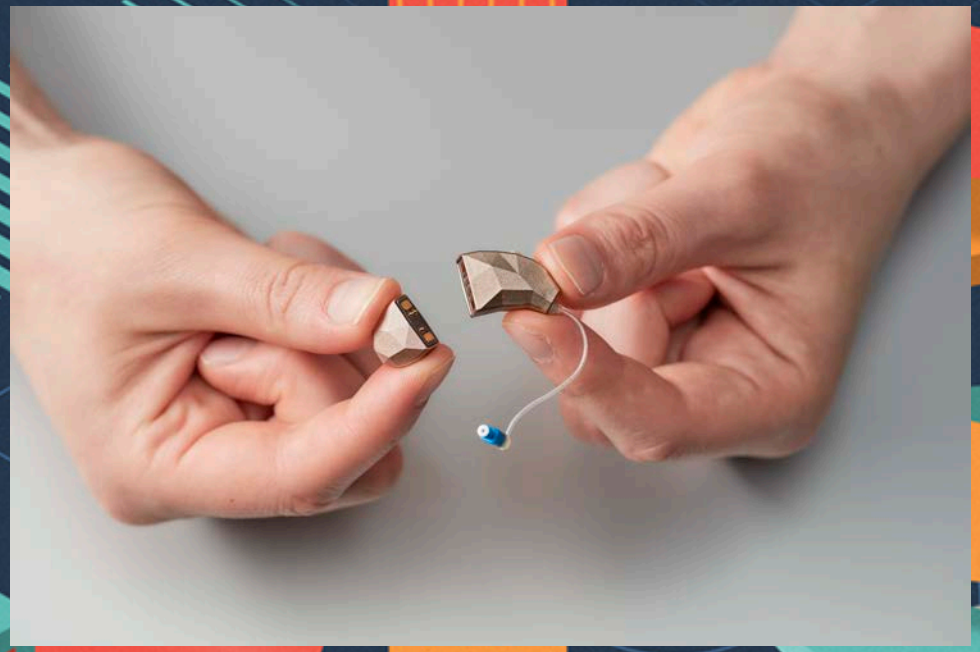
GOOD DESIGN AWARD® OF THE YEAR









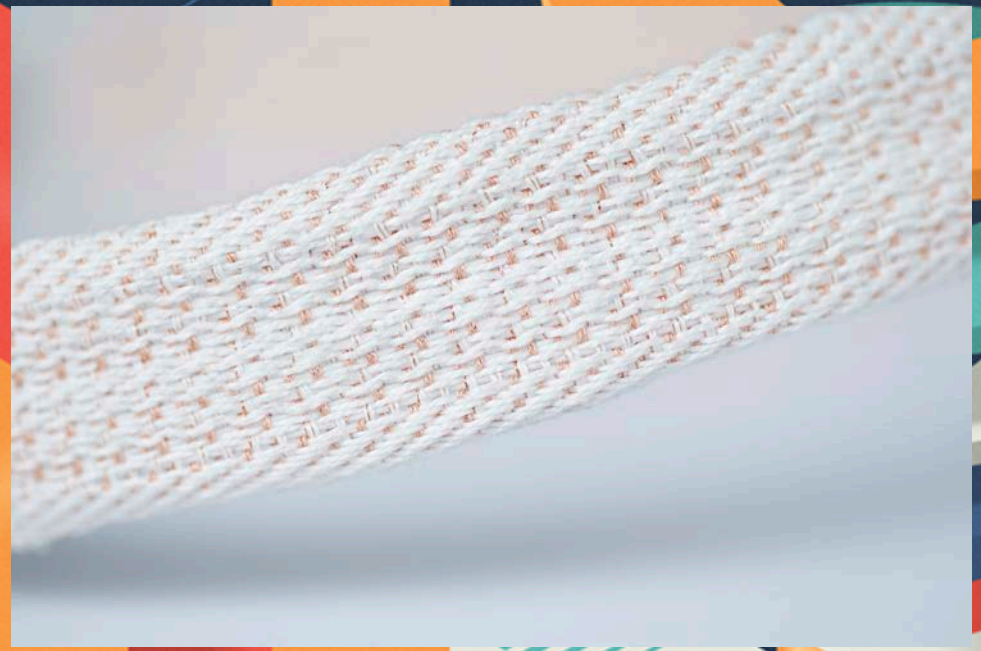






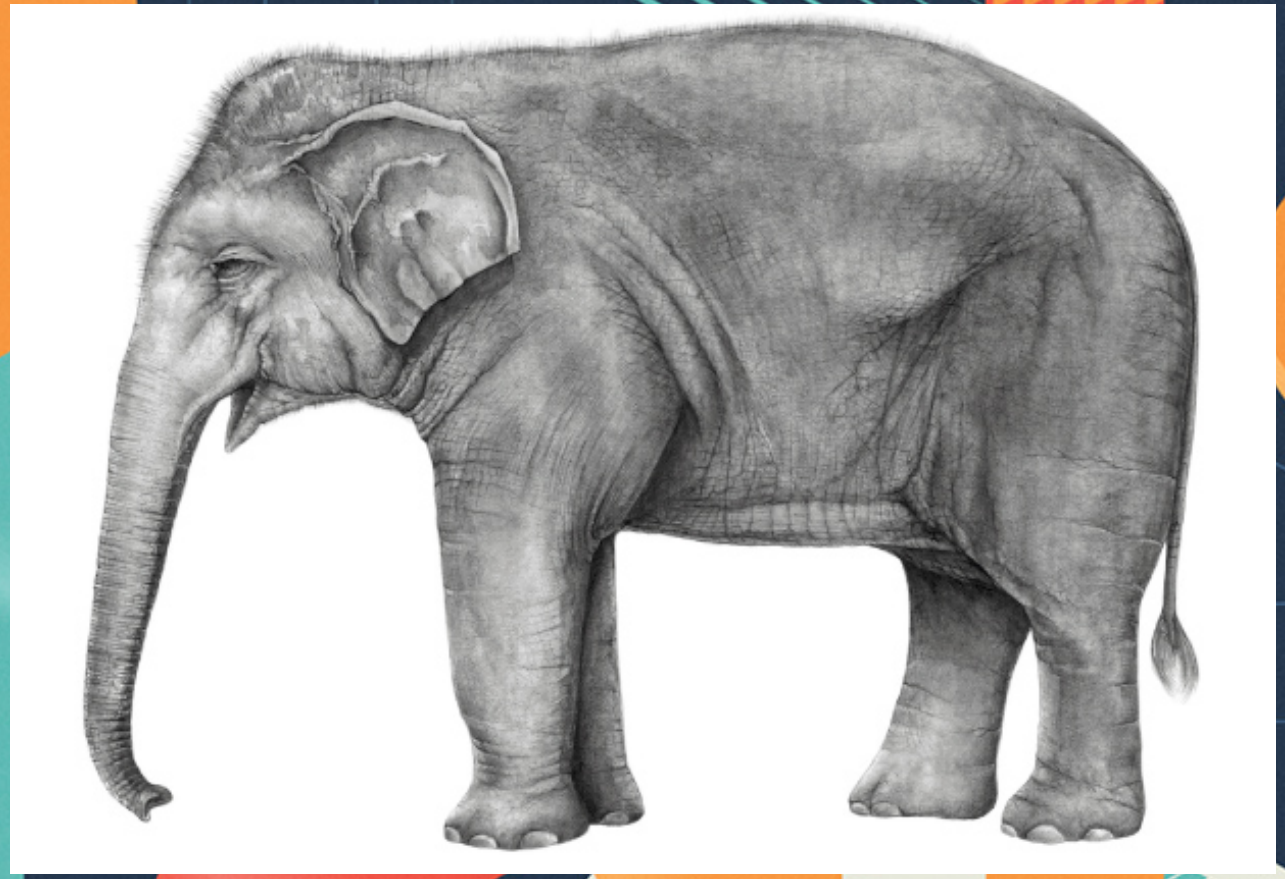








Dr Andrew Howells





M. Seeger, Stuttgart.

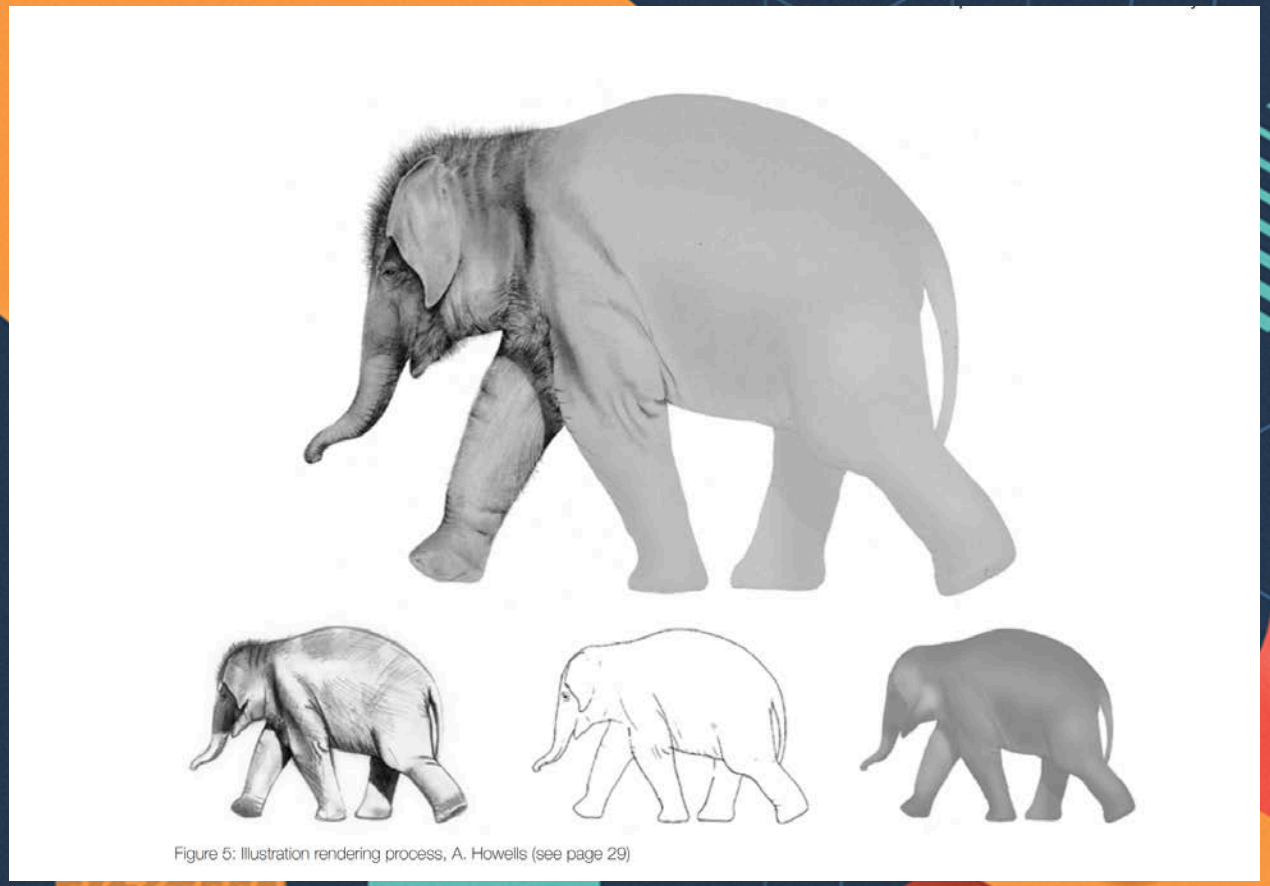


Figure 5: Illustration rendering process, A. Howells (see page 29)

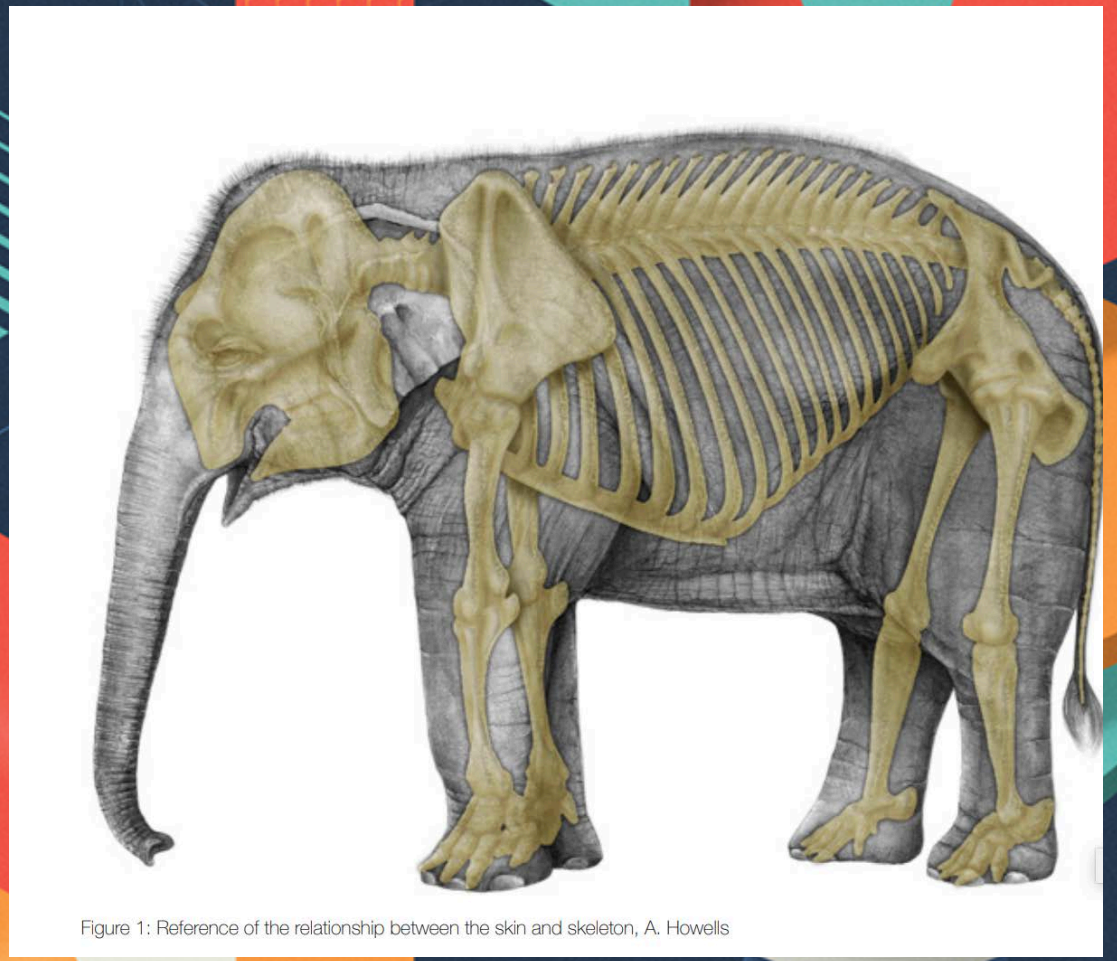
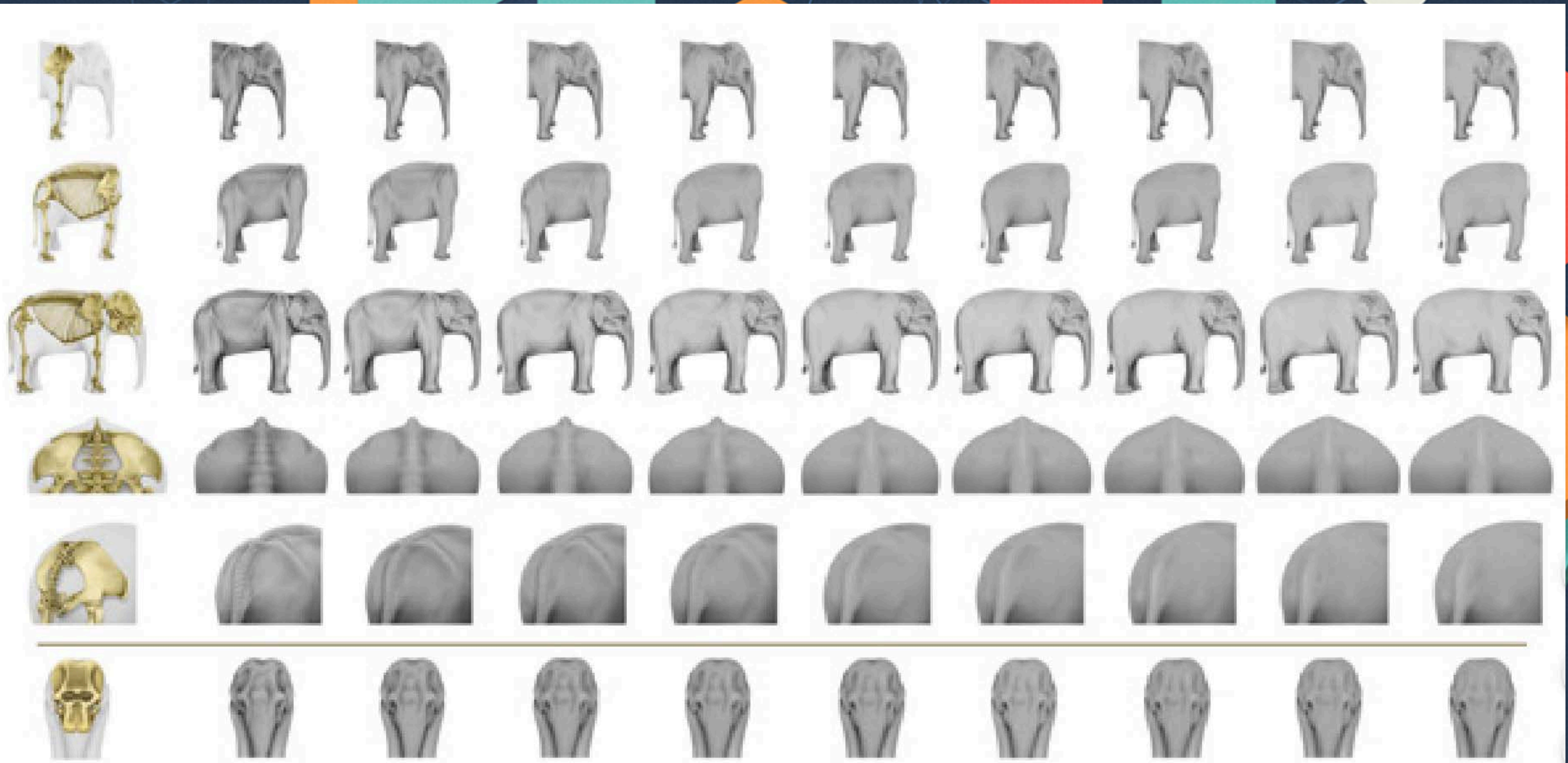


Figure 1: Reference of the relationship between the skin and skeleton, A. Howells



Nicole Davies




Take a look inside its mou
the blue whale doe
It doesn't even have an
hundreds of baleen pl
They're the long br
hanging down from it
The whale doesn't need teeth fo
or chewing, because its food
13
A blue whale can have
as many as 790 baleen plates in its mouth.
Baleen is tough, bendy stuff, like extra-hard fingernails.
12

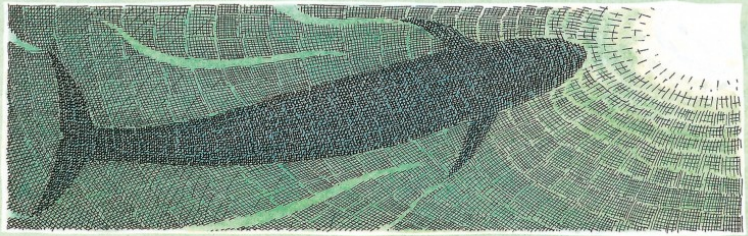


In deep water there isn't much light and it's hard to see. So blue whales use their sense of hearing and their sense of touch to find their way around.

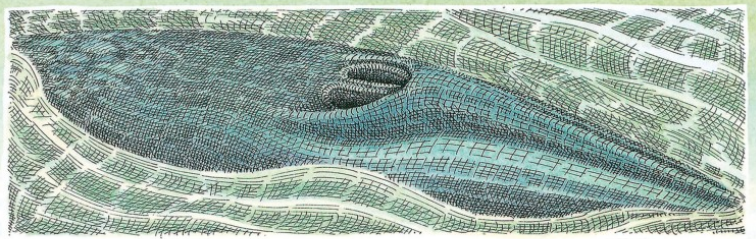
Reach out and touch the blue whale's skin. It's springy and smooth like a hard-boiled egg, and as slippery as wet soap.

Look into its eye. It's as big as a teacup and as dark as the deep sea. Just behind the eye is a hole, as small as the end of a pencil. The hole is one of the blue whale's ears – sticking-out ears would get in the way when the whale is swimming.

The blue whale lives all of its long life in the sea.
But it is a mammal like us, and it breathes air, not water.



From time to time, it has to come to the surface to breathe
through the blowholes on top of its head.



Blue whales can live for about 70 to 80 years.

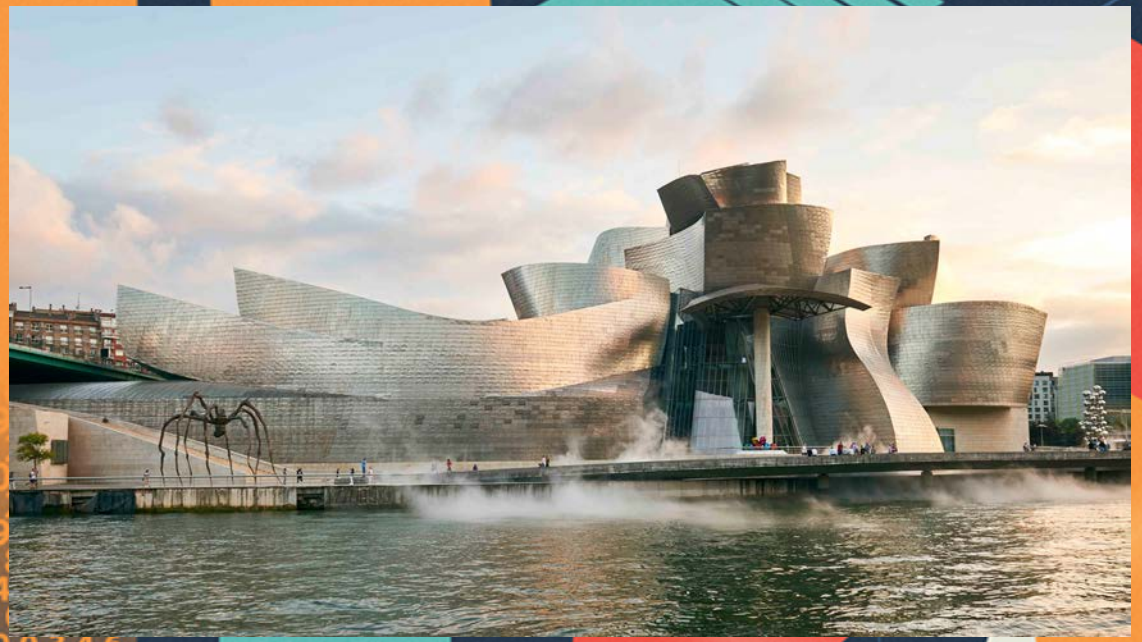
When it breathes out,
it makes a great misty puff
as high as a house.
This is the whale's blow,
and you can see it from far away.
You can hear it, too – a great

PROOUFF.

And if you are close enough
you can smell it, as the whale's
breath is stale and fishy.

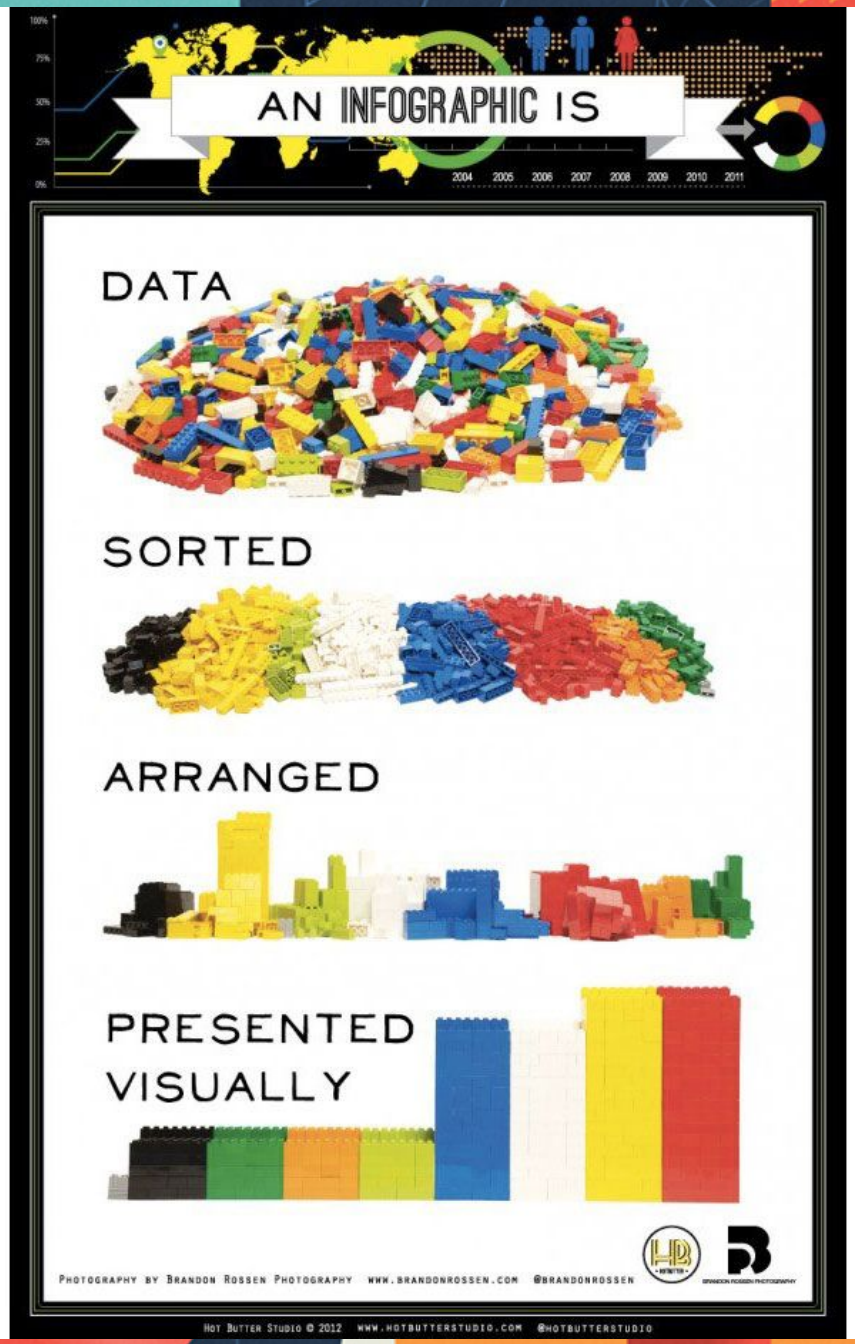
A blue whale can stay underwater for 30 minutes or more.
But on long journeys it usually surfaces for air every 2 to 5 minutes.

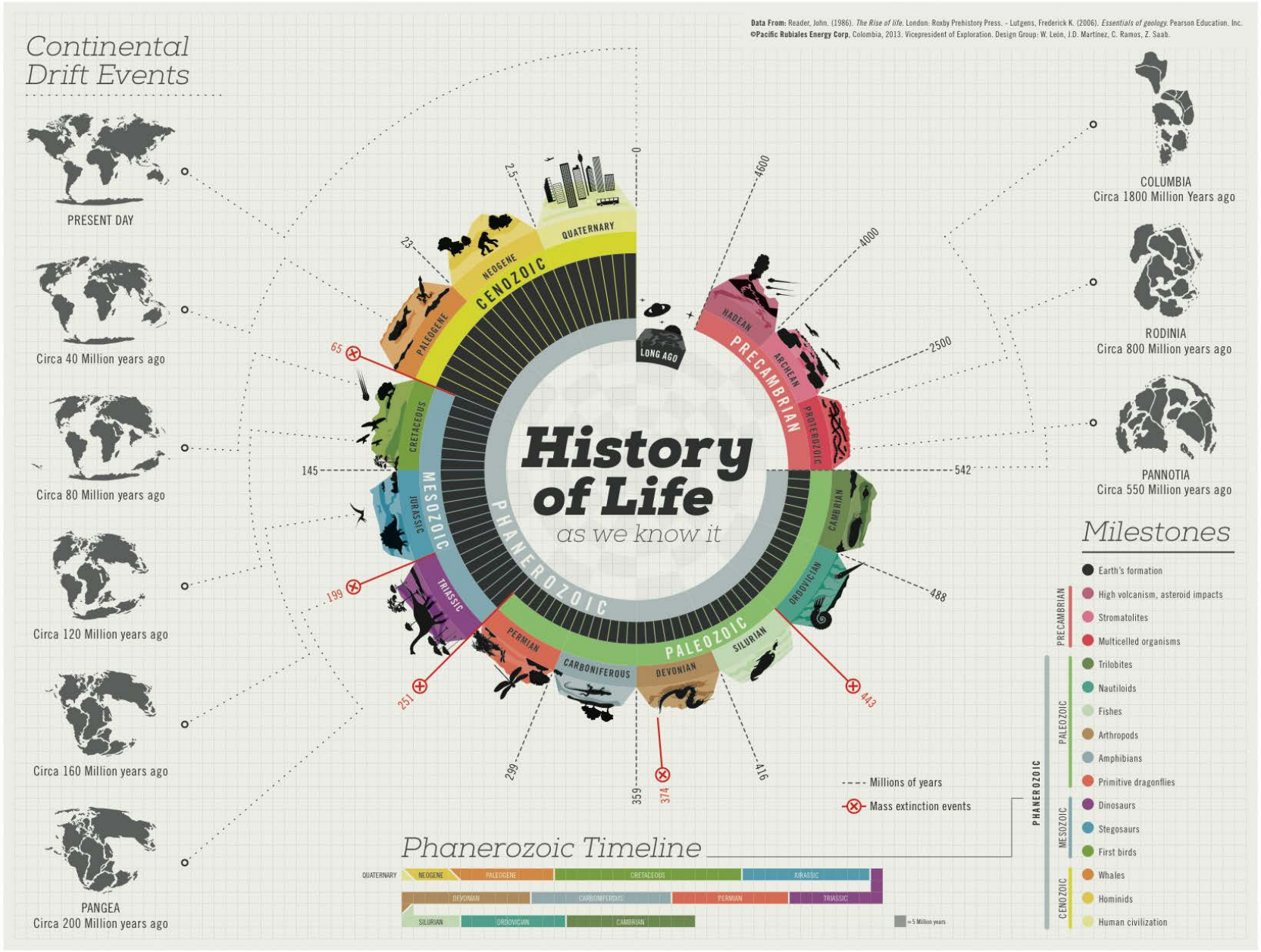


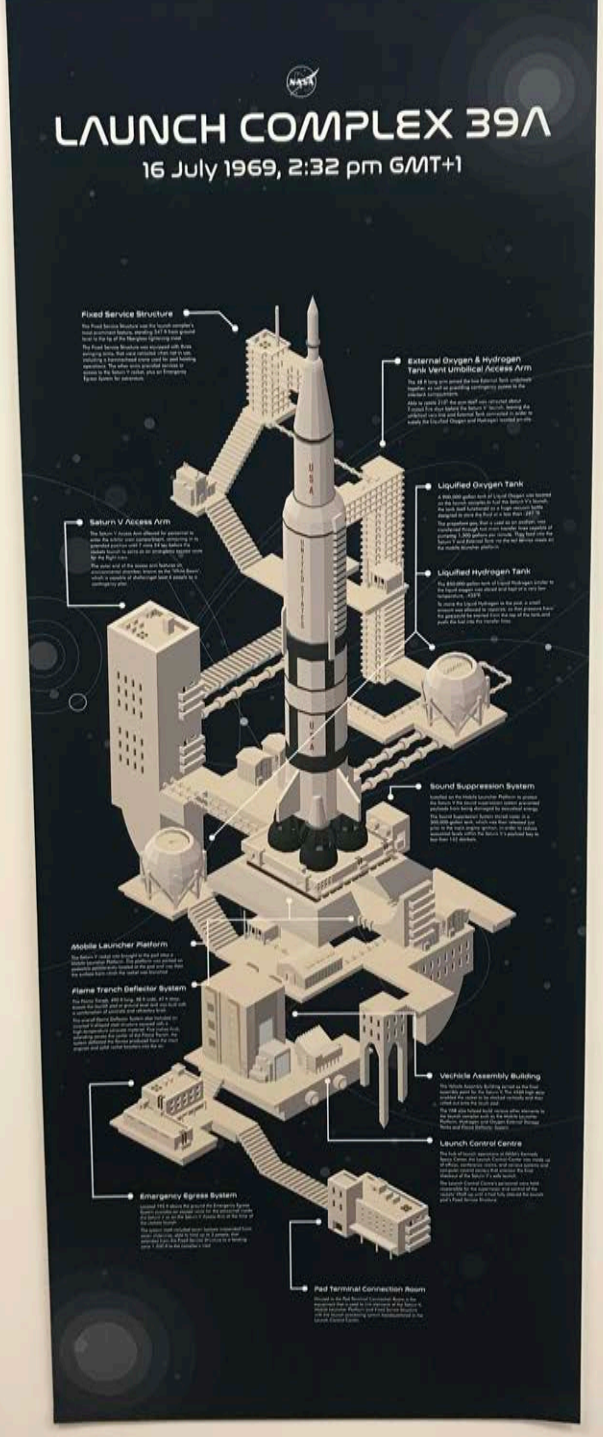




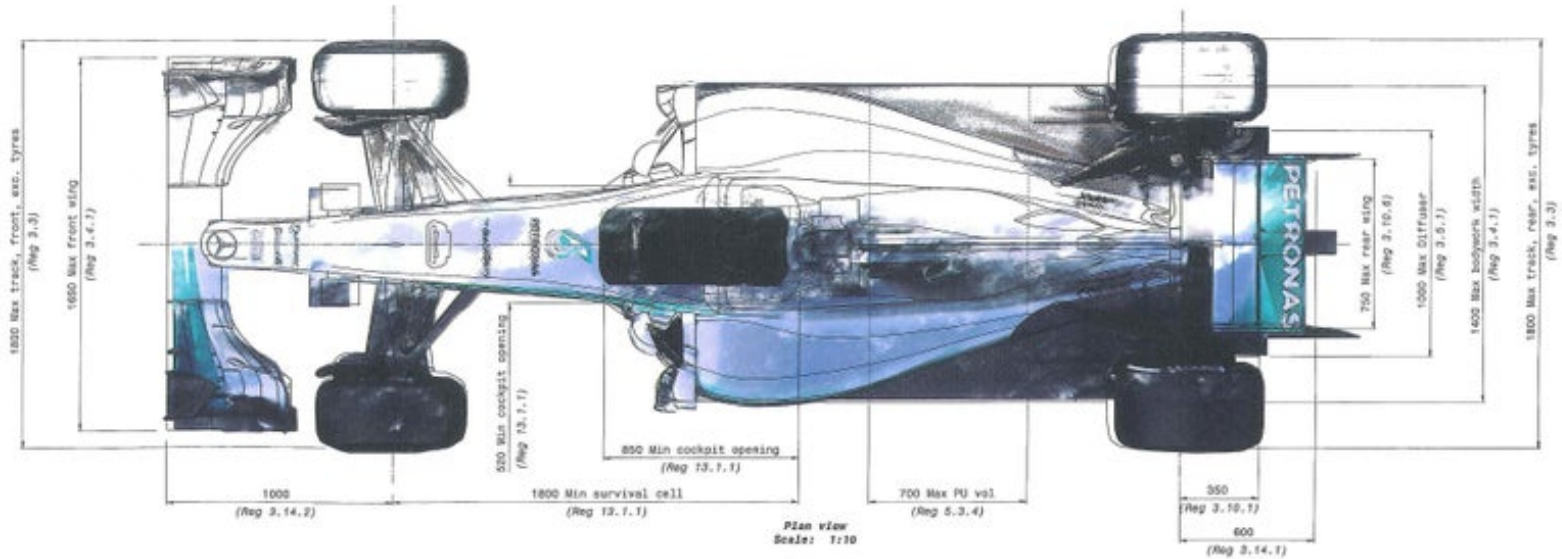


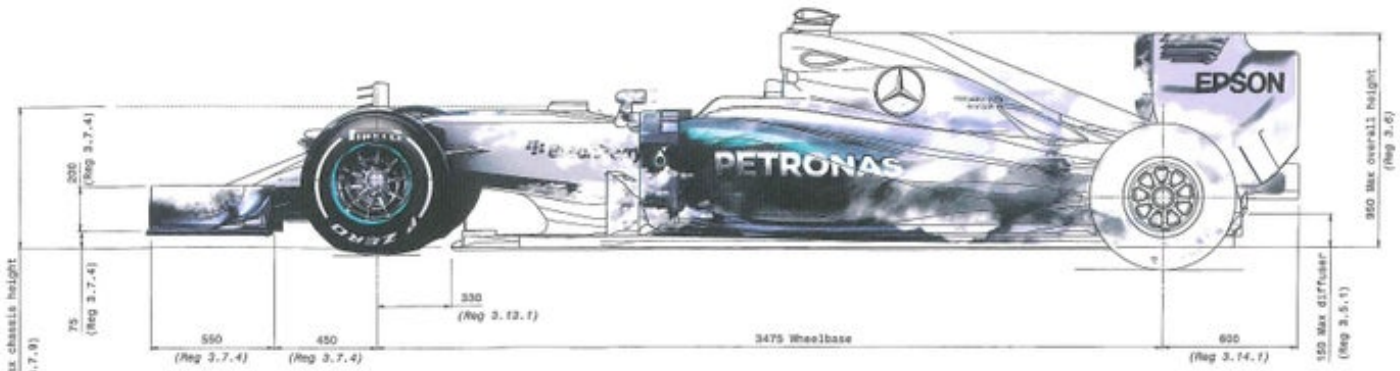

AN INFOGRAPHIC IS
DATA
SORTED
ARRANGED
PRESENTED
VISUALLY
Photography by Brandon Rossen Photography www.brandonrossen.com @brandonrossen
Hot Butter Studio © 2012 www.hotbutterstudio.com @hotbutterstudio


Data From: Reader, John. (1986). The Rise of life. London: Roxby Prehistory Press. - Lutgens, Frederick K. (2006). Essentials of geology. Pearson Education. Inc.
©Pacific Rubiales Energy Corp. Colombia, 2013. Vicepresident of Exploration. Design Group: W. León, J.D. Martínez, C. Ramos, Z. Saab.
Continental Drift Events
PRESENT DAY
Circa 40 Million years ago
Circa 80 Million years ago
Circa 120 Million years ago
Circa 160 Million years ago
PANGEA
Circa 200 Million years ago
COLUMBIA
Circa 1800 Million Years ago
RODINIA
Circa 800 Million years ago
PANNOTIA
Circa 550 Million years ago
History of Life
as we know it
LONG AGO
PRECAMBRIAN
HADEAN
ARCHEAN
PROTEROZOIC
PHANEROZOIC
CENOZOIC
QUATERNARY
NEOGENE
PALEOGENE
MESOZOIC
CRETACEOUS
JURASSIC
TRIASSIC
PALEOZOIC
PERMIAN
CARBONIFEROUS
DEVONIAN
SILURIAN
ORDOVICIAN
CAMBRIAN
0
2.5
23
65
145
199
251
299
359
374
416
443
488
542
2500
4000
4600
Millions of years
Mass extinction events
Phanerozoic Timeline
QUATERNARY
NEOGENE
PALEOGENE
CRETACEOUS
JURASSIC
DEVONIAN
CARBONIFEROUS
PERMIAN
TRIASSIC
SILURIAN
ORDOVICIAN
CAMBRIAN
= 5 Million years
Milestones
PRECAMBRIAN
Earth's formation
High volcanism, asteroid impacts
Stromatolites
Multicelled organisms
PHANEROZOIC
PALEOZOIC
Trilobites
Nautiloids
Fishes
Arthropods
Amphibians
Primitive dragonflies
MESOZOIC
Dinosaurs
Stegosaurs
First birds
CENOZOIC
Whales
Hominids
Human civilization


LAUNCH COMPLEX 39A
16 July 1969, 2:32 pm GMT+1
Fixed Service Structure
External Oxygen & Hydrogen Tank Vent Umbilical Access Arm
Liquified Oxygen Tank
Saturn V Access Arm
Liquified Hydrogen Tank
Sound Suppression System
Mobile Launcher Platform
Flame Tranch Deflector System
Vehicle Assembly Building
Launch Control Centre
Emergency Egress System
Pad Terminal Connection Room


ME
FEMALE
SPACEX
Making Humans a Multi-Planetary Species
MAKING HISTORY
EARTH
MOON
MARS
WHY GO ANYWHERE?
EARTH
strangers I don't
enter, feast your
haiku of melanch





LEWIS HAMILTON NICO ROSBERG PADDY LOWE TOTO WOLFF

Mercedes-Benz Grand Prix Limited

Mercedes F1W06 Hybrid

F. SPIDER SHAFT (ONE PIECE WITH AIRSCREW DRIVE-SHAFT).

G. ROLLER BEARING (REDUCTION GEAR DRIVING WHEEL).

H. BALL BEARING (REDUCTION GEAR THRUST).

J. CRANKSHAFT BALANCE WEIGHT.

K. MASTER ROD (NO. 4 CYLINDER FRONT BANK).

L. CRANKSHAFT SELF-ALIGNING CENTRE BEARING.

M. CRANKSHAFT REAR BEARING.

N. SPRING-HELD LOCK WASHERS CYLINDER RETAINING NUTS).

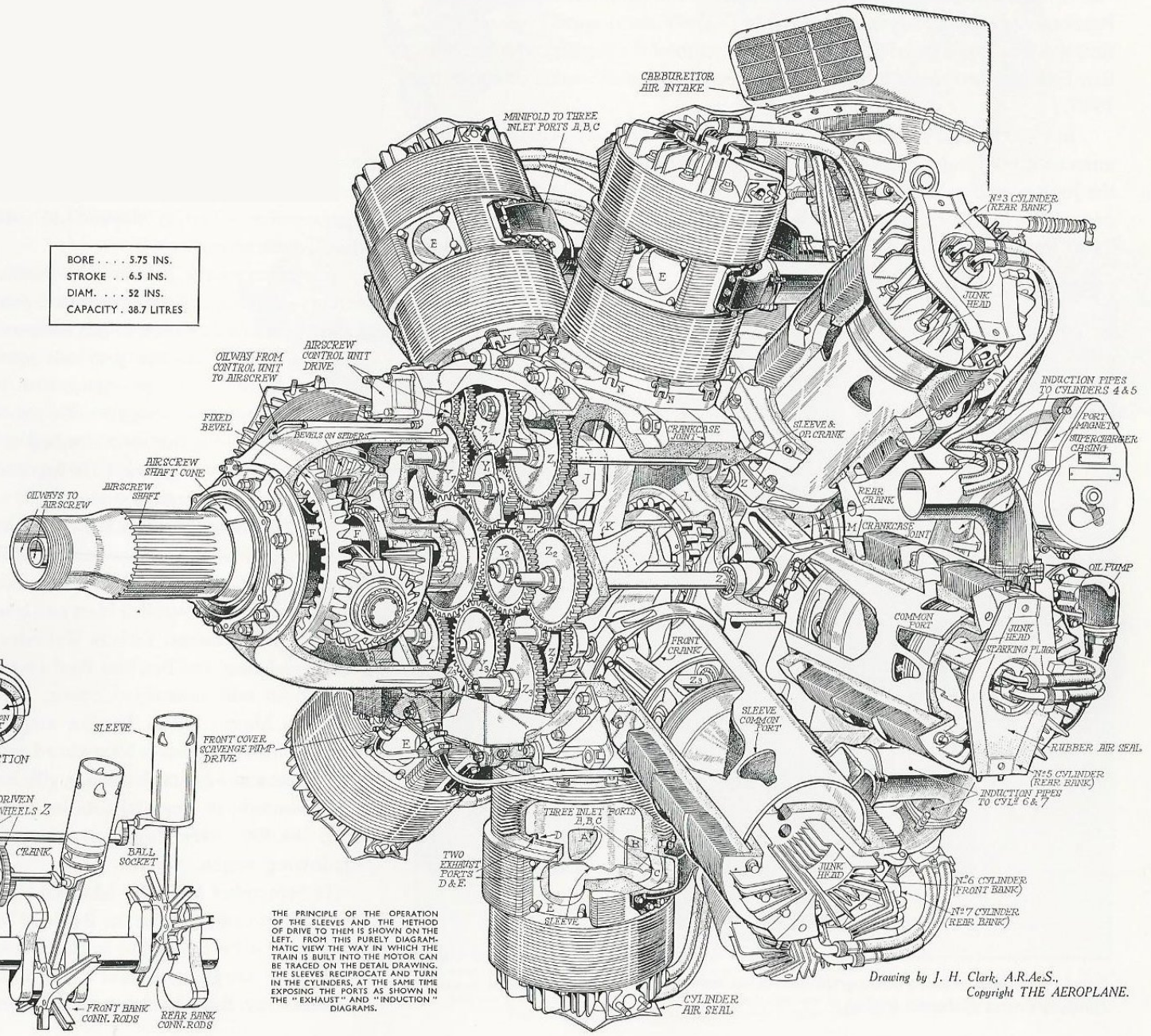
TIMING GEAR SYSTEM WORKS THUS:

SHAFT WHEEL X DRIVES 7 INTERMEDIATE WHEELS AND PINIONS Y_1 Y_2—Y_7.

EACH INTERMEDIATE WHEEL PINION (Y) DRIVES TWO WHEELS, AS Y_1 DRIVES Z_1 Z_1.

EACH PAIR OF DRIVEN WHEELS Z DRIVE TWO SLEEVE CRANKS, ONE TO FRONT BANK, ONE TO REAR BANK.

BORE	5.75 INS.
STROKE	6.5 INS.
DIAM.	52 INS.
CAPACITY	38.7 LITRES

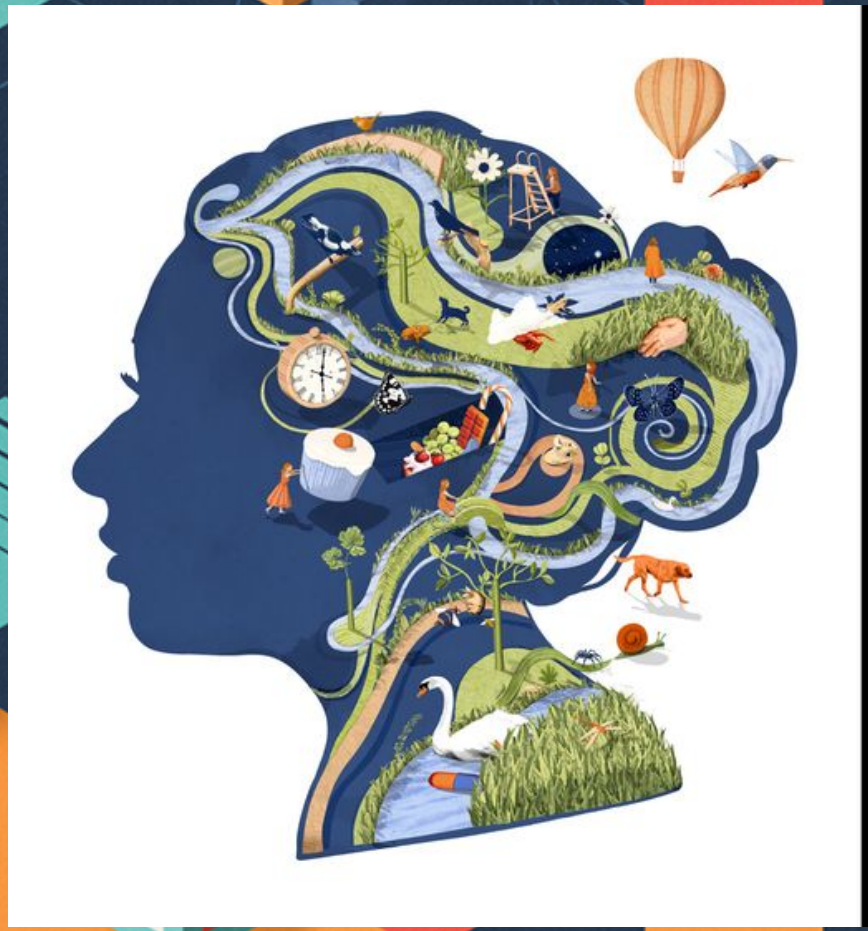


THE PRINCIPLE OF THE OPERATION OF THE SLEEVES AND THE METHOD OF DRIVE TO THEM IS SHOWN ON THE LEFT. FROM THIS PURELY DIAGRAMMATIC VIEW THE WAY IN WHICH THE TRAIN IS BUILT INTO THE MOTOR CAN BE TRACED ON THE DETAIL DRAWING. THE SLEEVES RECIPROCATE AND TURN IN THE CYLINDERS, AT THE SAME TIME EXPOSING THE PORTS AS SHOWN IN THE "EXHAUST" AND "INDUCTION" DIAGRAMS.

Drawing by J. H. Clark, A.R.Ae.S.,

Copyright THE AEROPLANE.



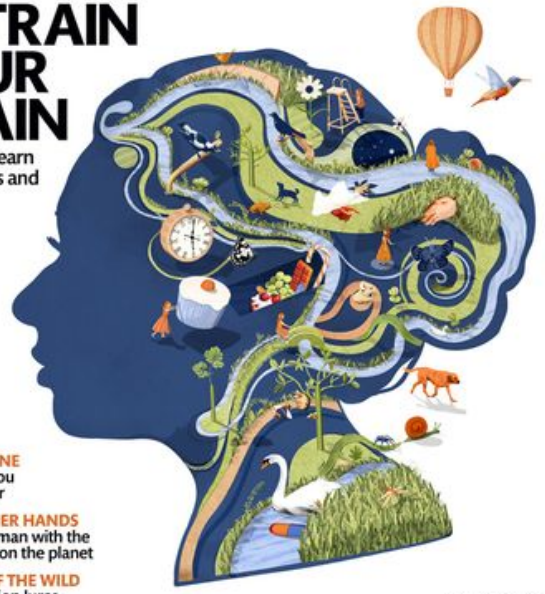


JUST ADD WATER
America's driest river returns from the dead

NewScientist

WEEKLY 15 March 2014

DETRAIN YOUR BRAIN
How to unlearn habits, fears and cravings



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It gets ill so you can get better

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Meet the woman with the toughest job on the planet

BAD CALL OF THE WILD
When evolution lures animals to their doom

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Living planets don't need to be like Earth





COVER STORY

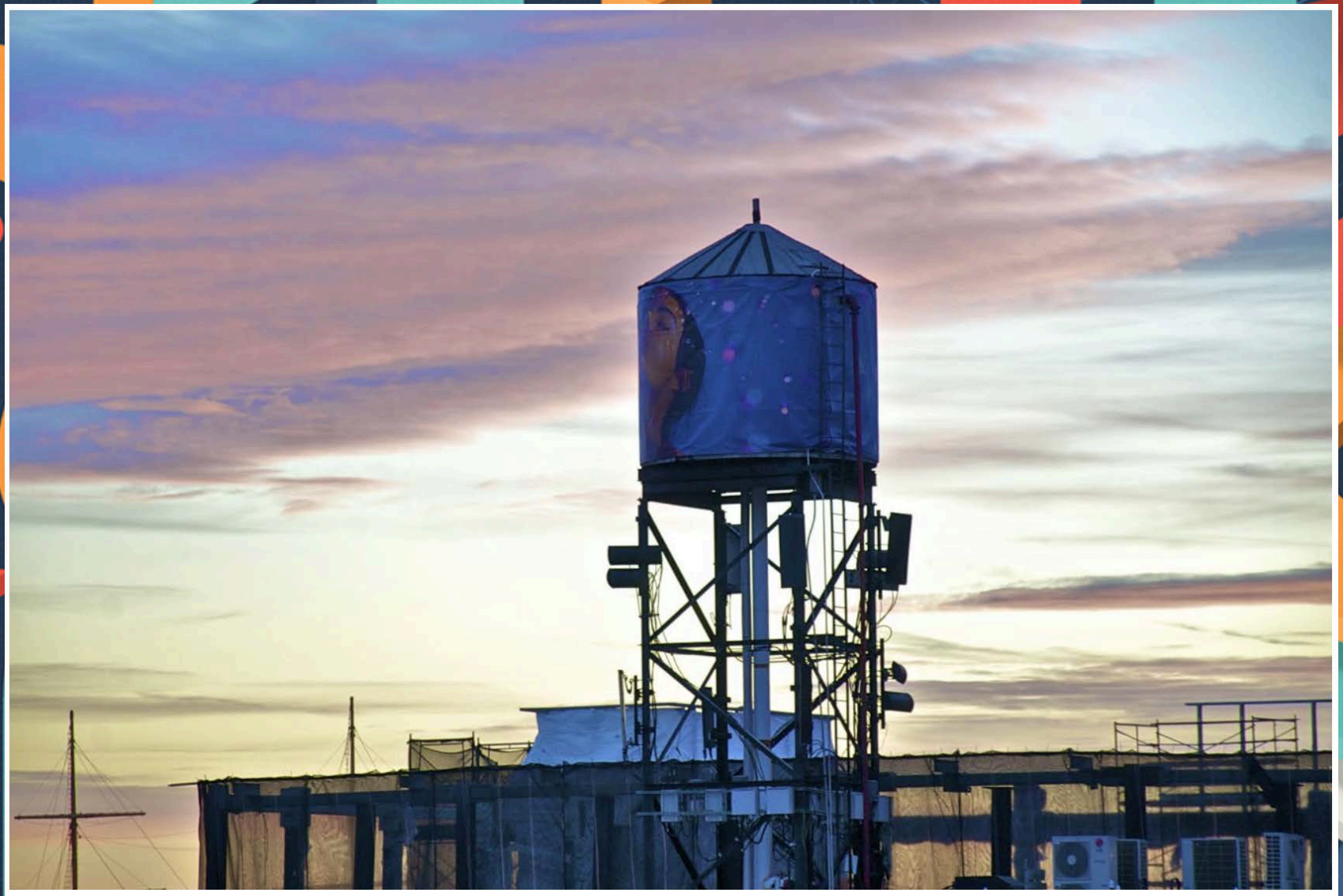
Mon esprit partagé My two minds

Speaking a second language can change everything from problem-solving skills to personality. It is almost as if you are two people, says Catherine de Lange

The Water Tank Project

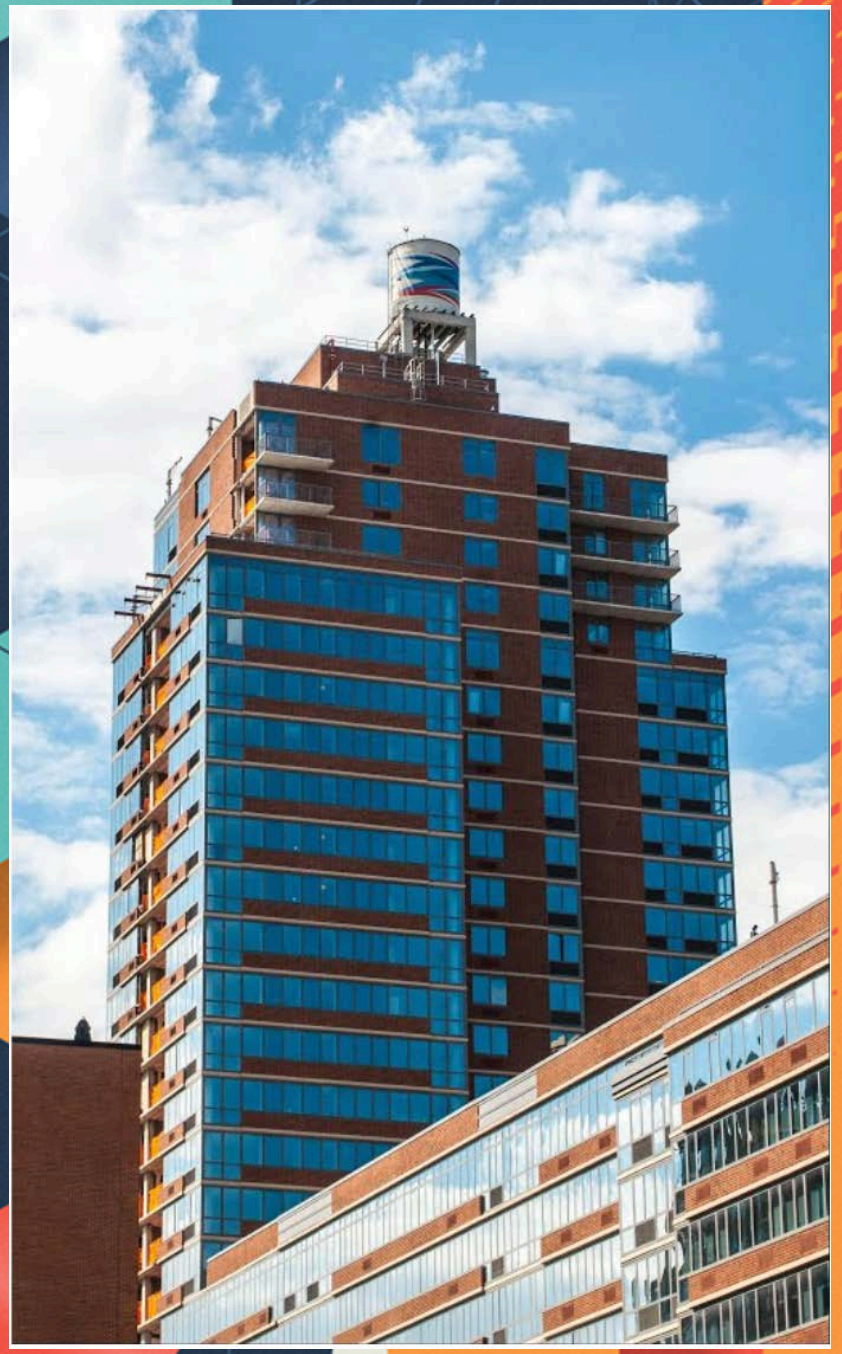


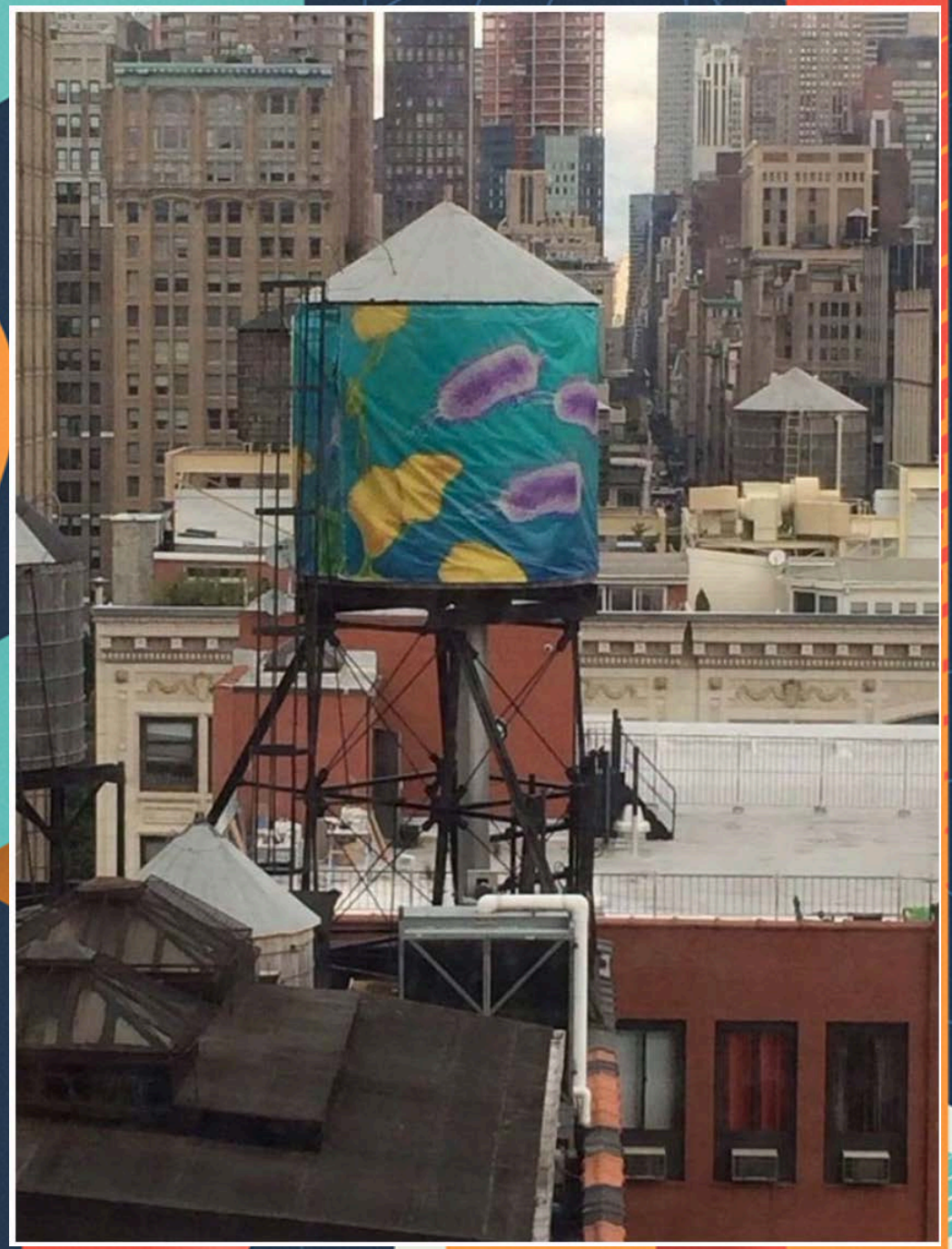


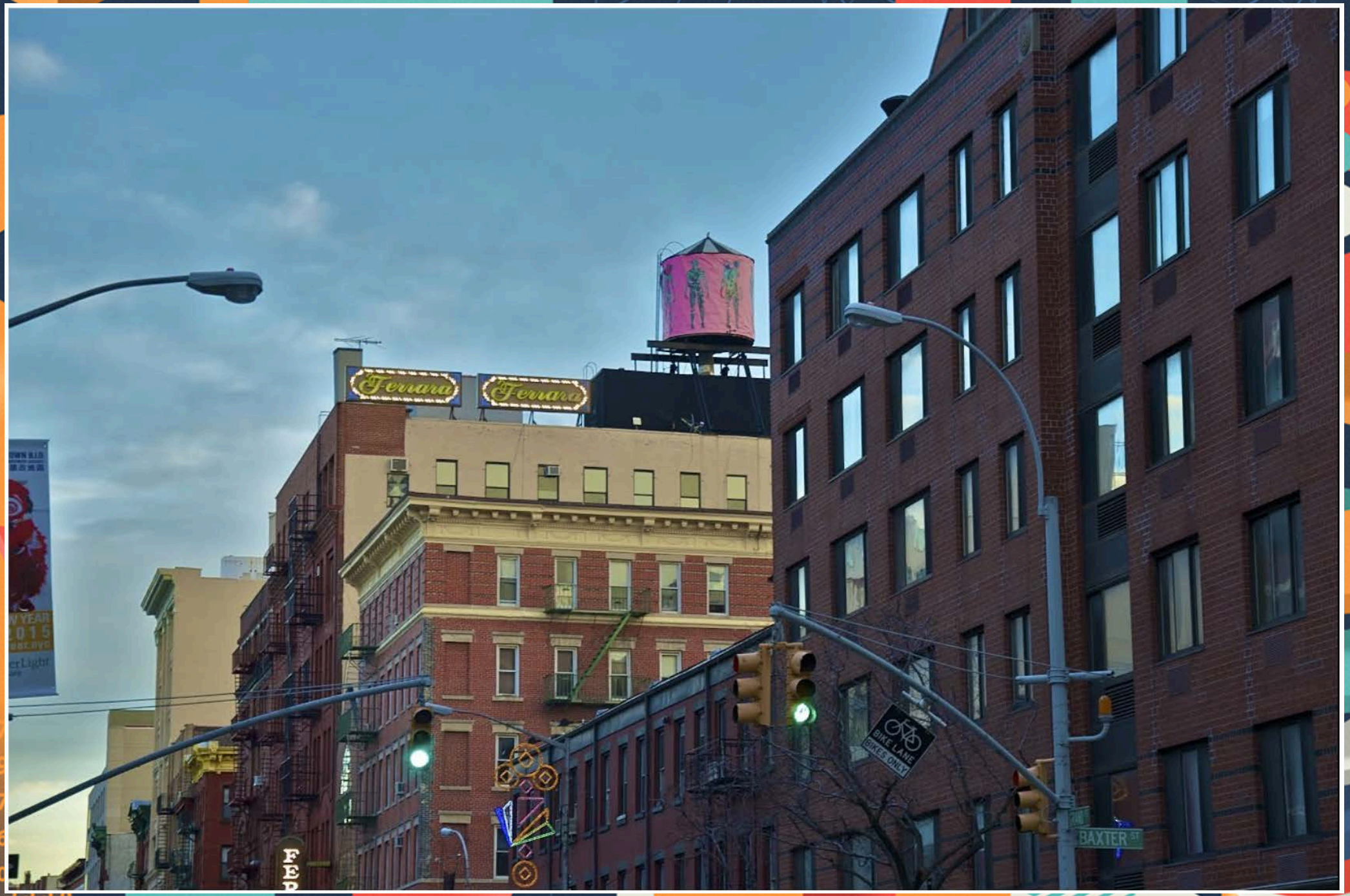




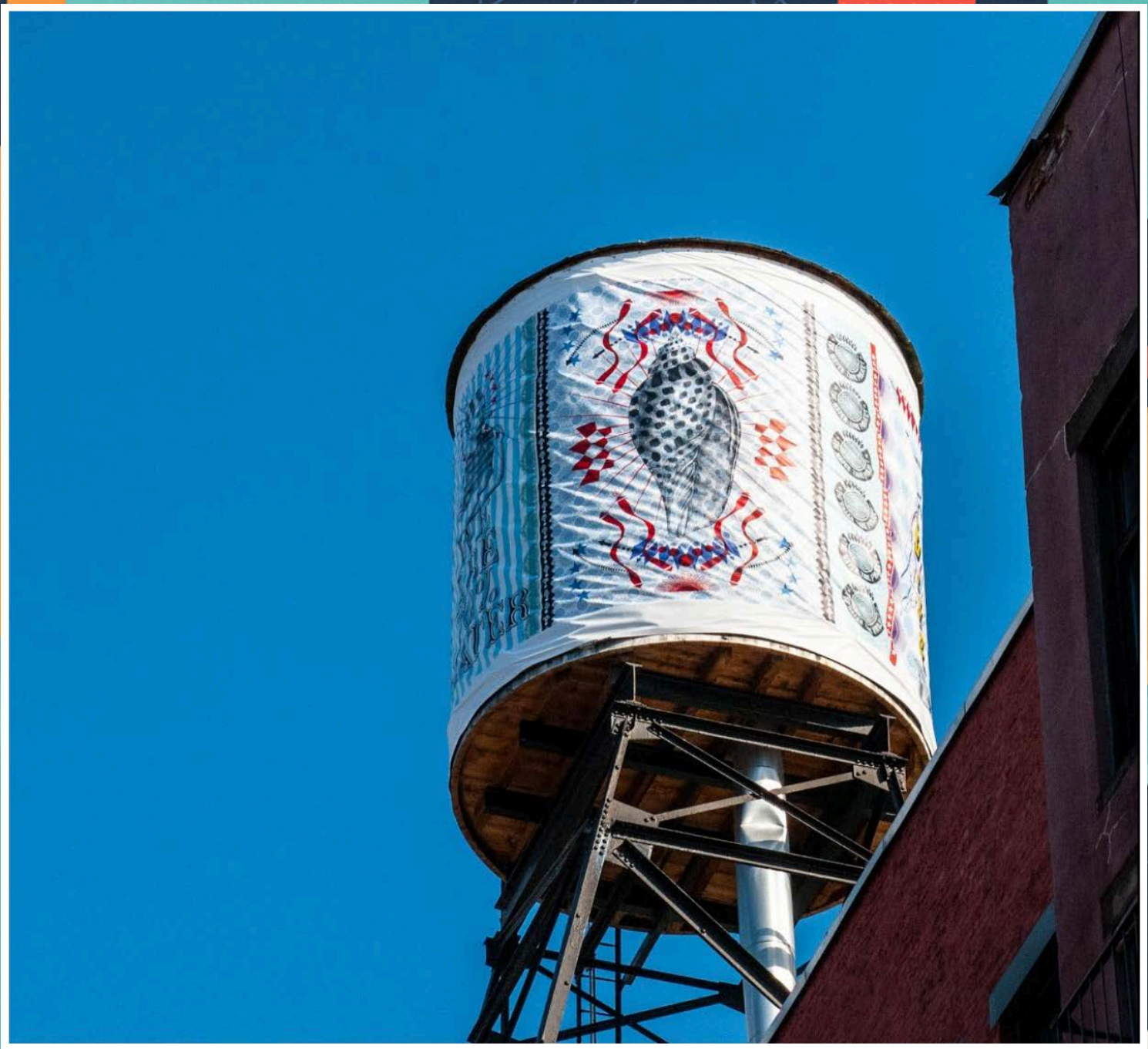




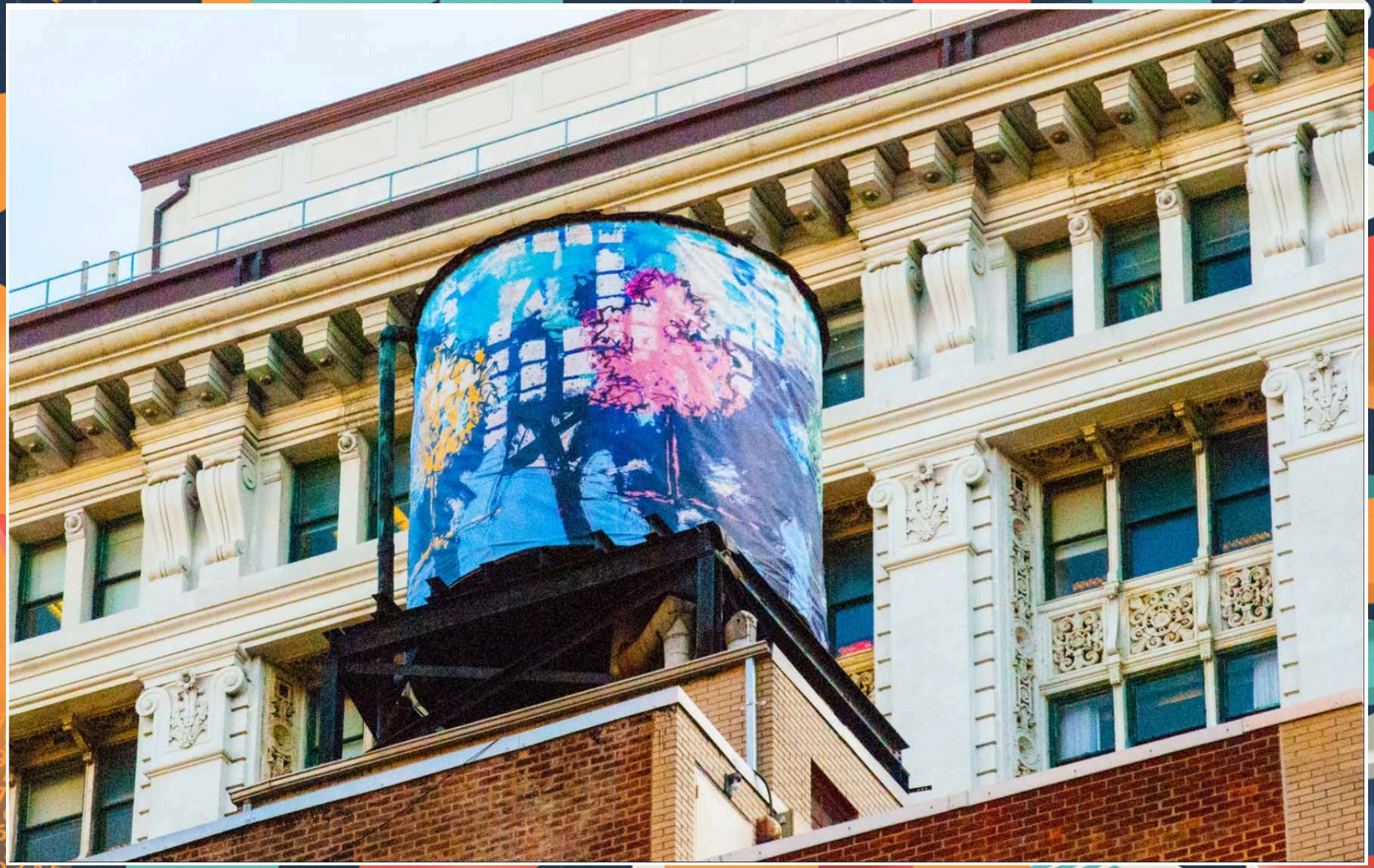



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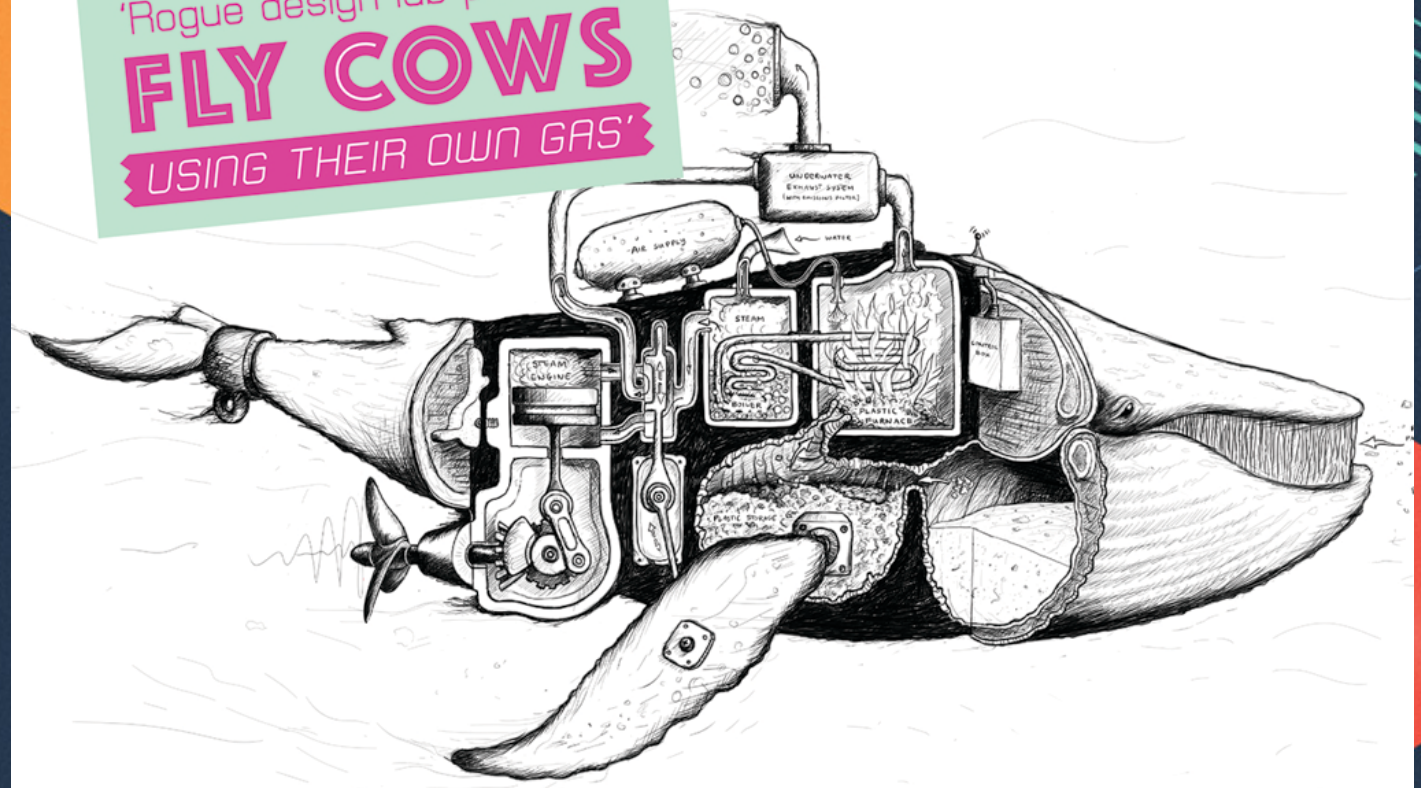

Stephen Mushin
The Cowship Project

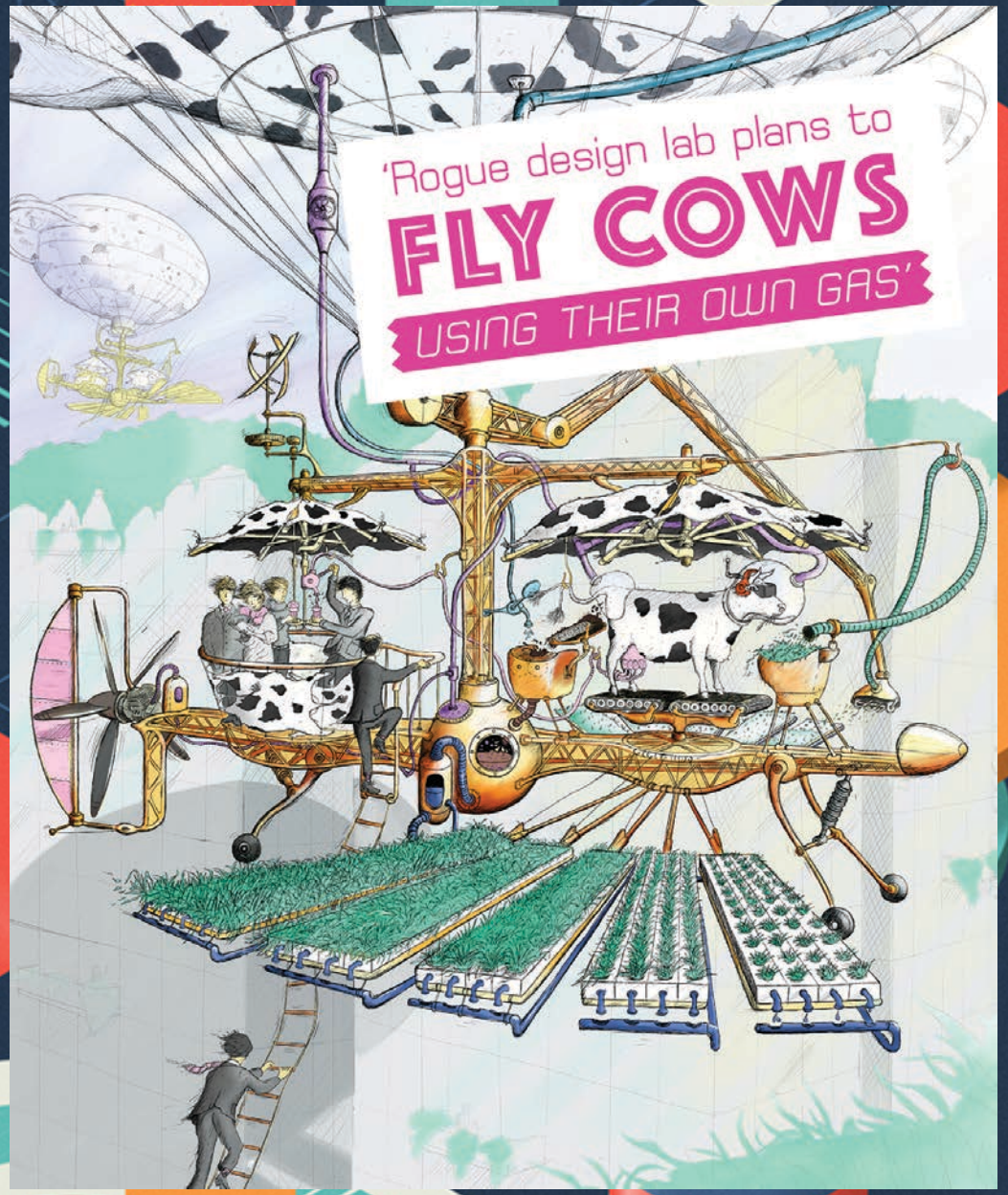
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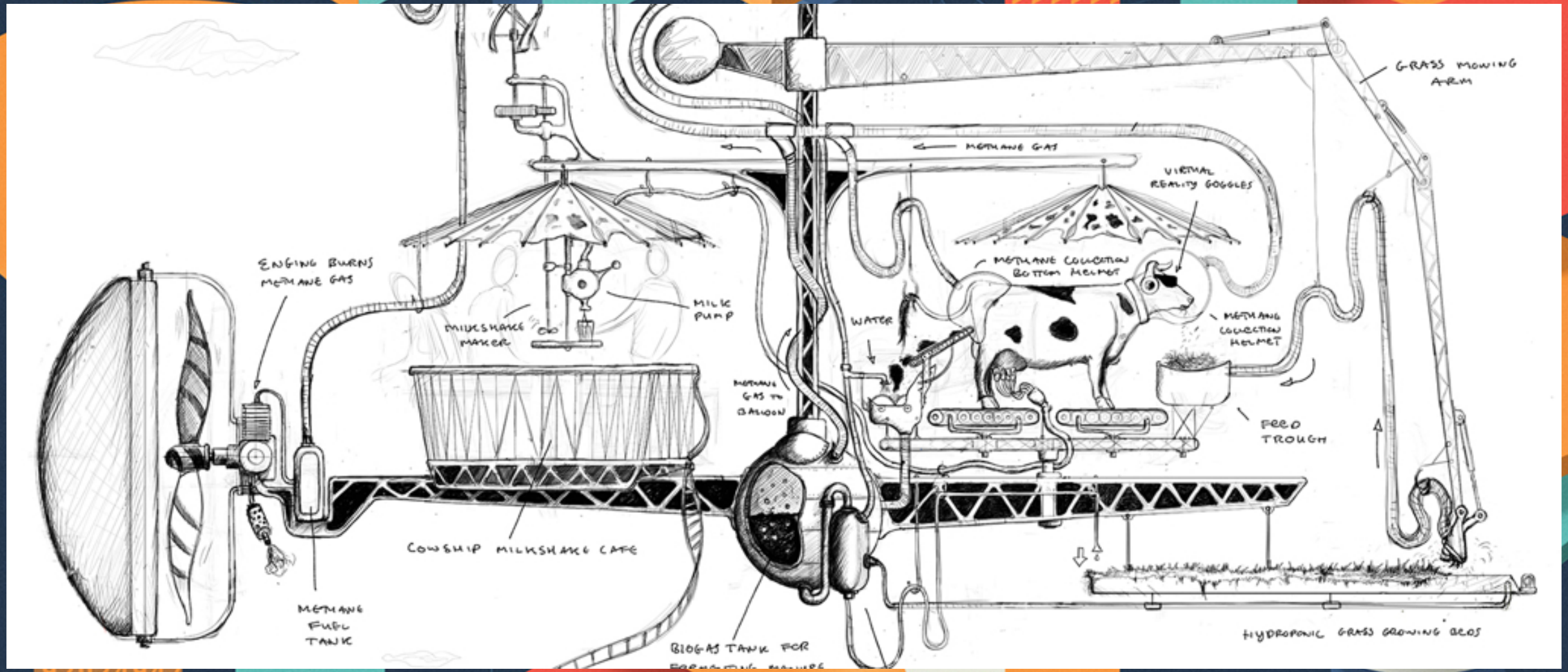
'Rogue design lab plans to

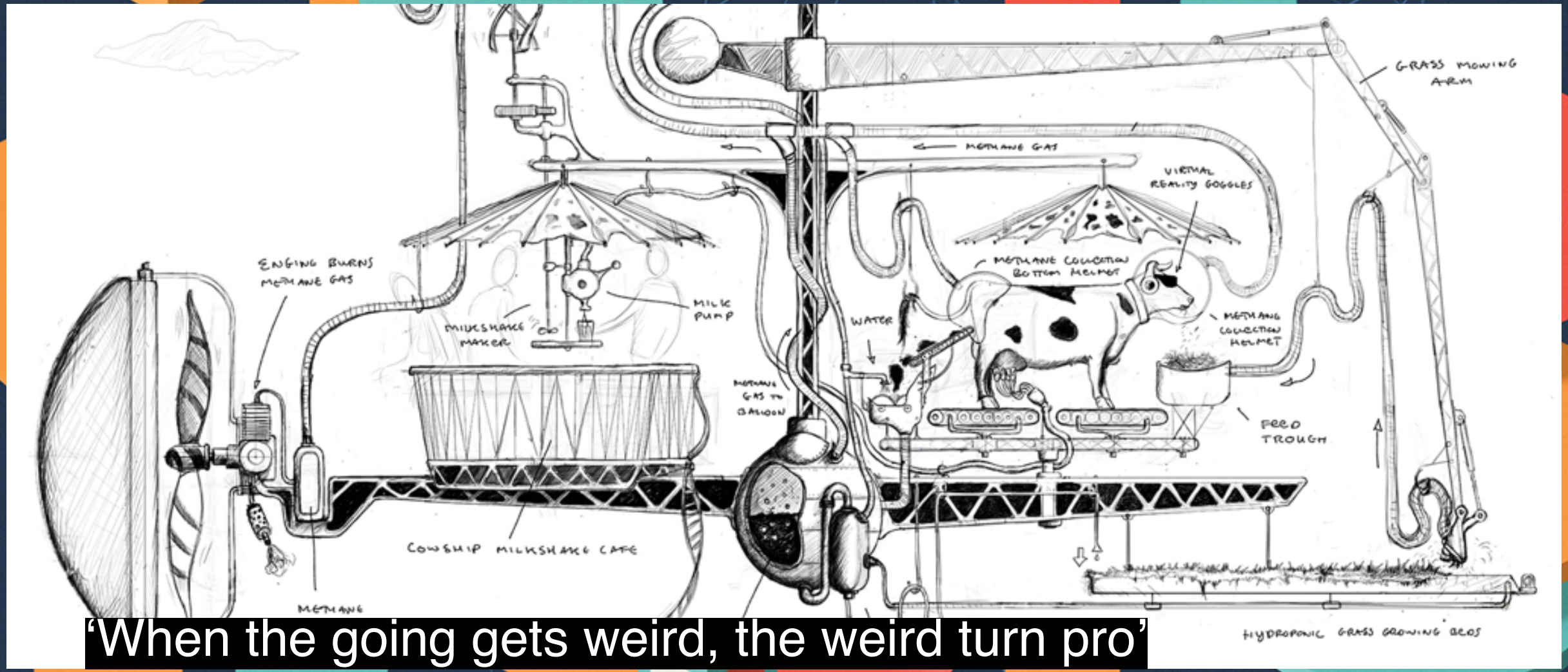
FLY COWS

USING THEIR OWN GAS'

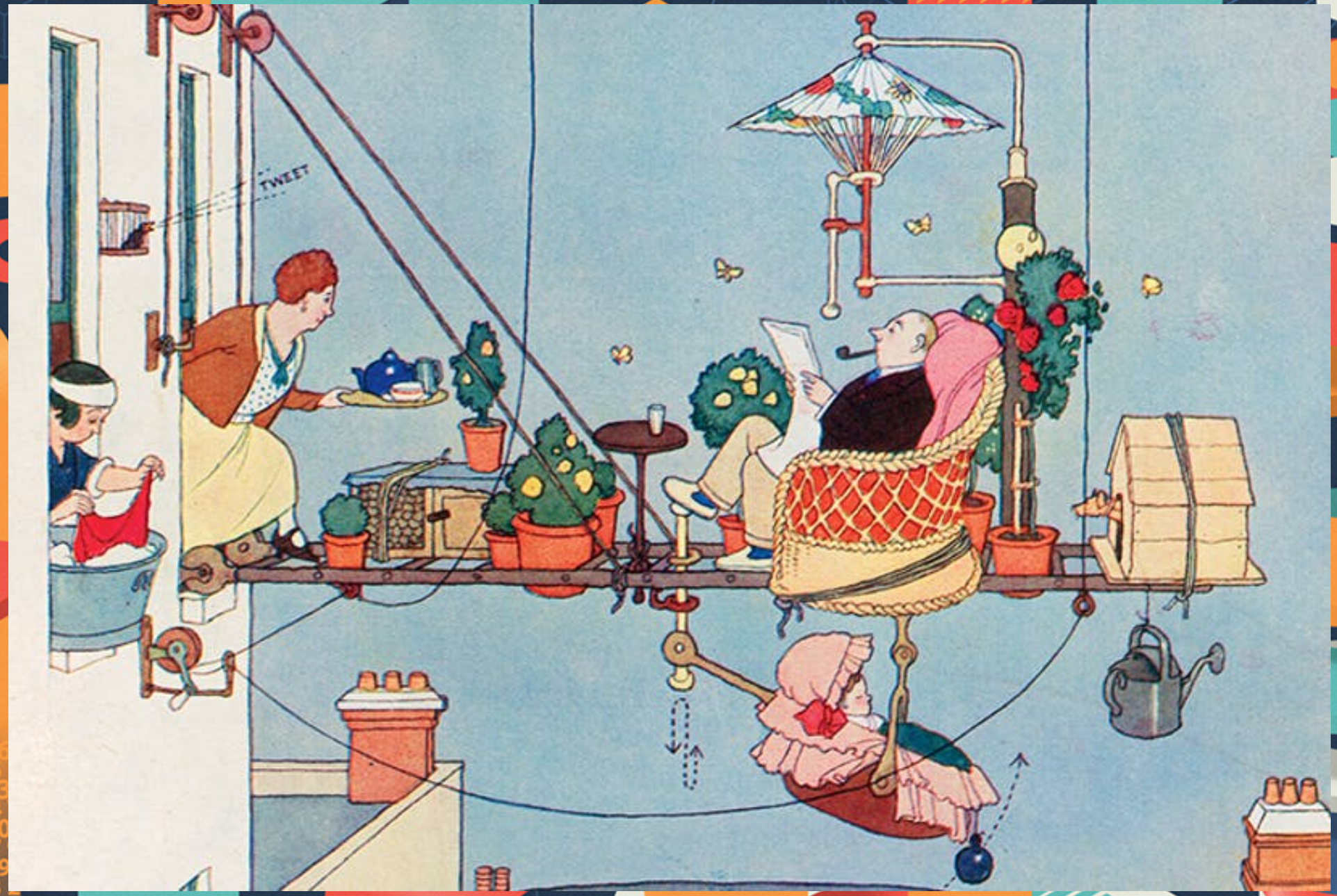


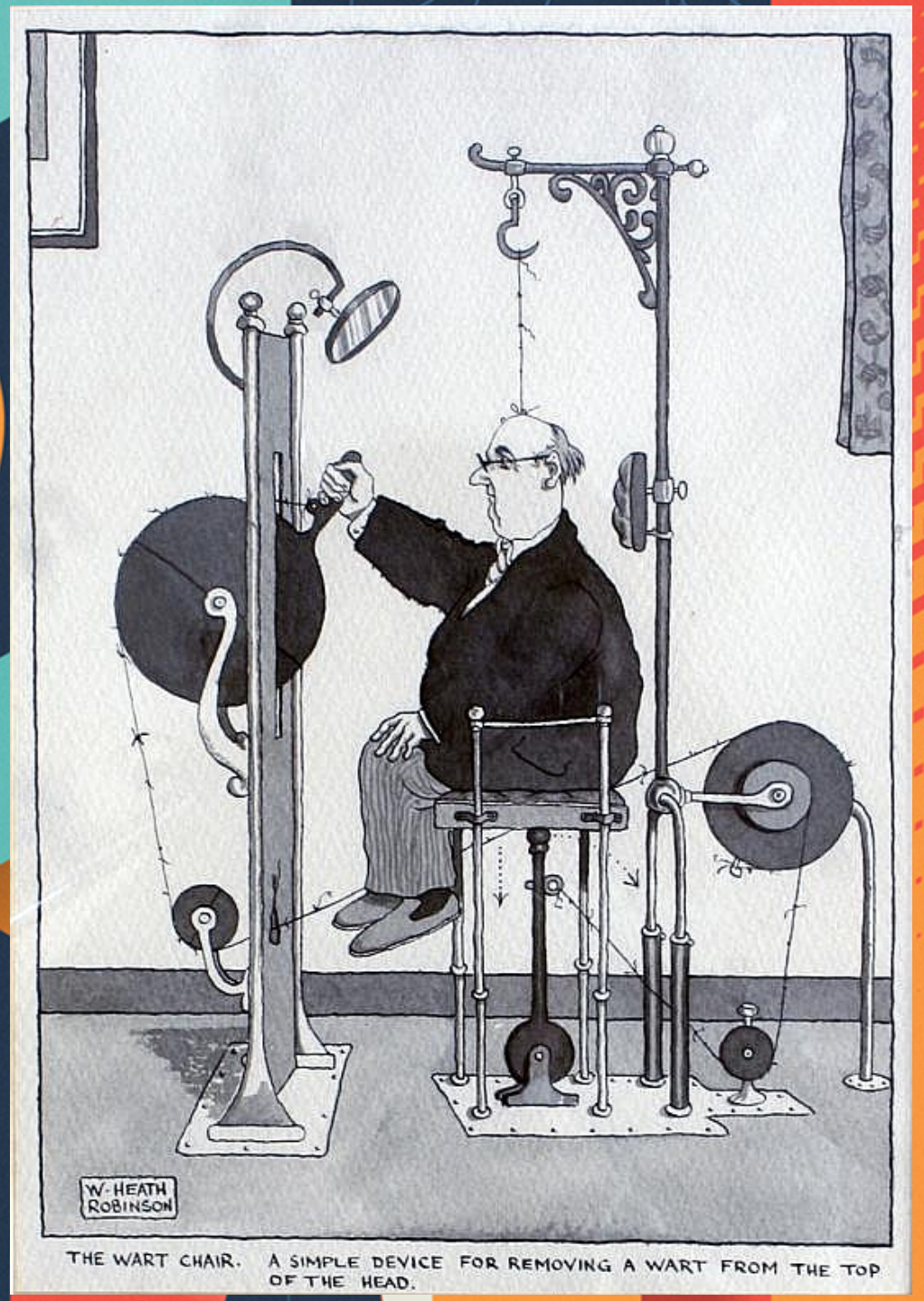



GRASS MOWING ARM
METHANE GAS
VIRTUAL REALITY GOGGLES
METHANE COLLECTION BOTTOM HELMET
ENGINE BURNS METHANE GAS
MILK PUMP
MILKSHAKE MAKER
WATER
METHANE COLLECTION HELMET
METHANE GAS TO BALLOON
FEED TROUGH
COWSHIP MILKSHAKE CAFE
METHANE FUEL TANK
BIOGAS TANK FOR
HYDROPONIC GRASS GROWING BEDS

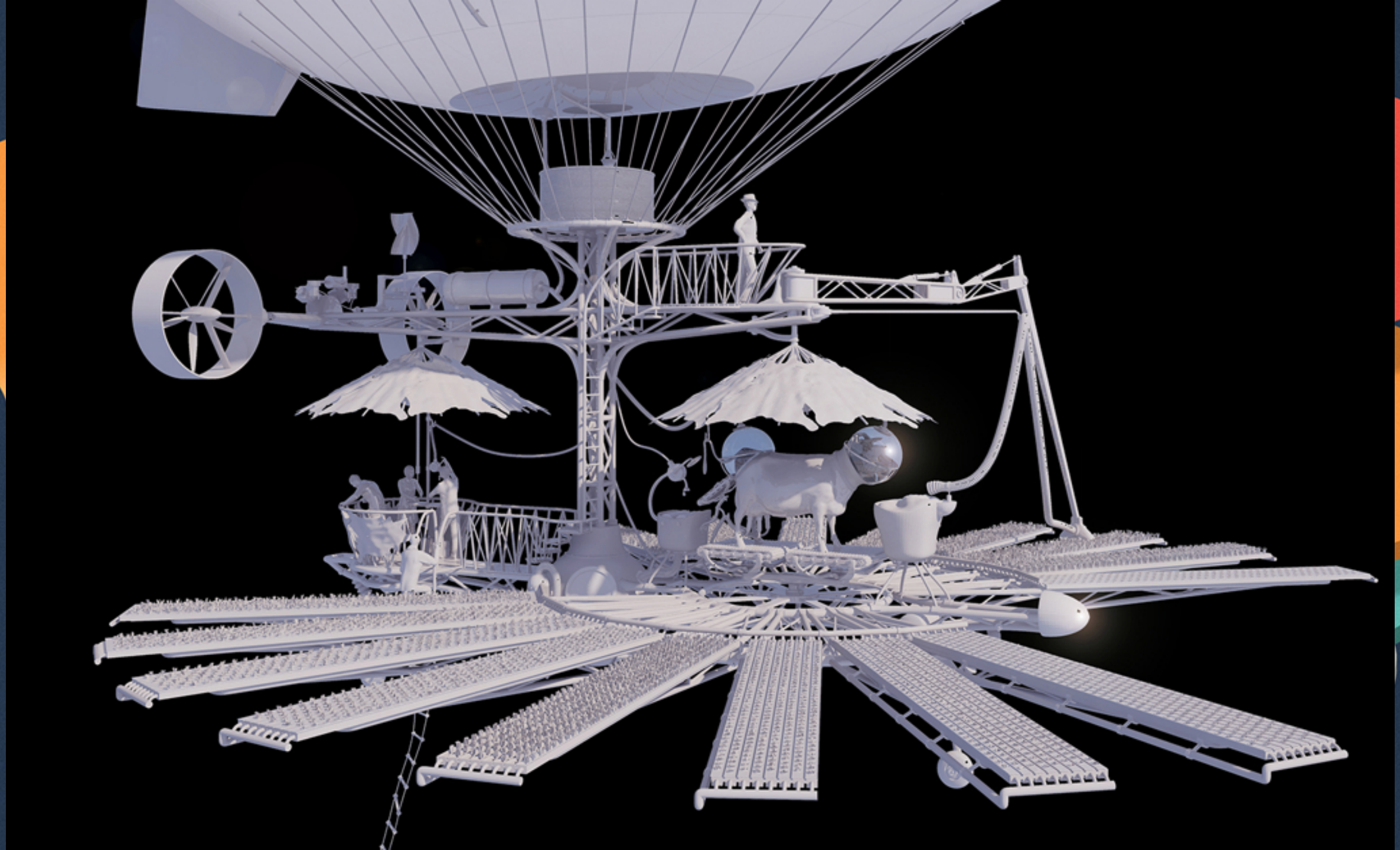


‘When the going gets weird, the weird turn pro’ Mushin's gonzo designs propose preposterously provocative solutions to deadly serious environmental problems.


TWEET



THE WART CHAIR. A SIMPLE DEVICE FOR REMOVING A WART FROM THE TOP OF THE HEAD.





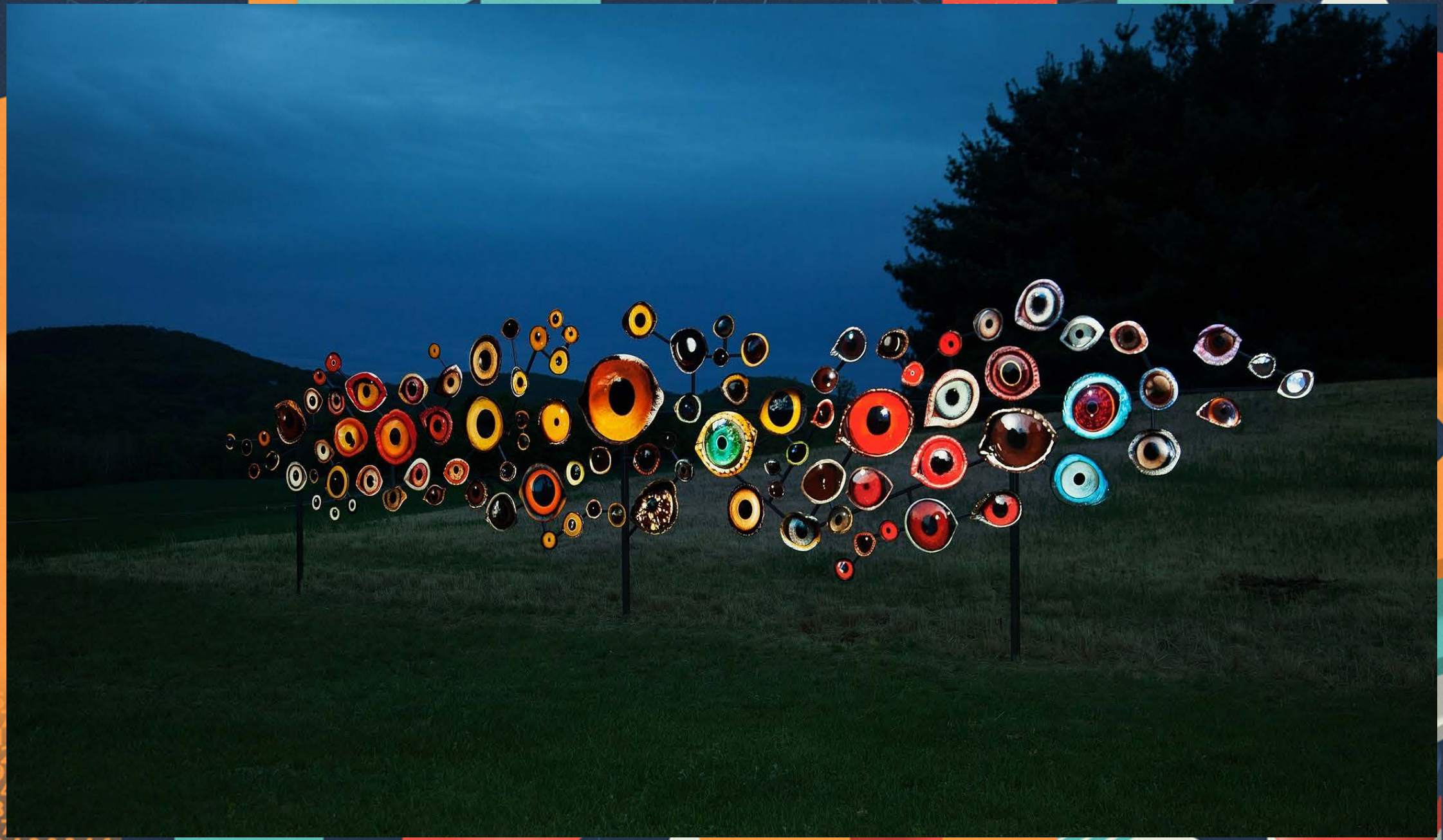

‘The projects tap into deep feelings of shame we all carry about our impact on the world, the resources we consume, the animals that work for us to produce the lives we live’

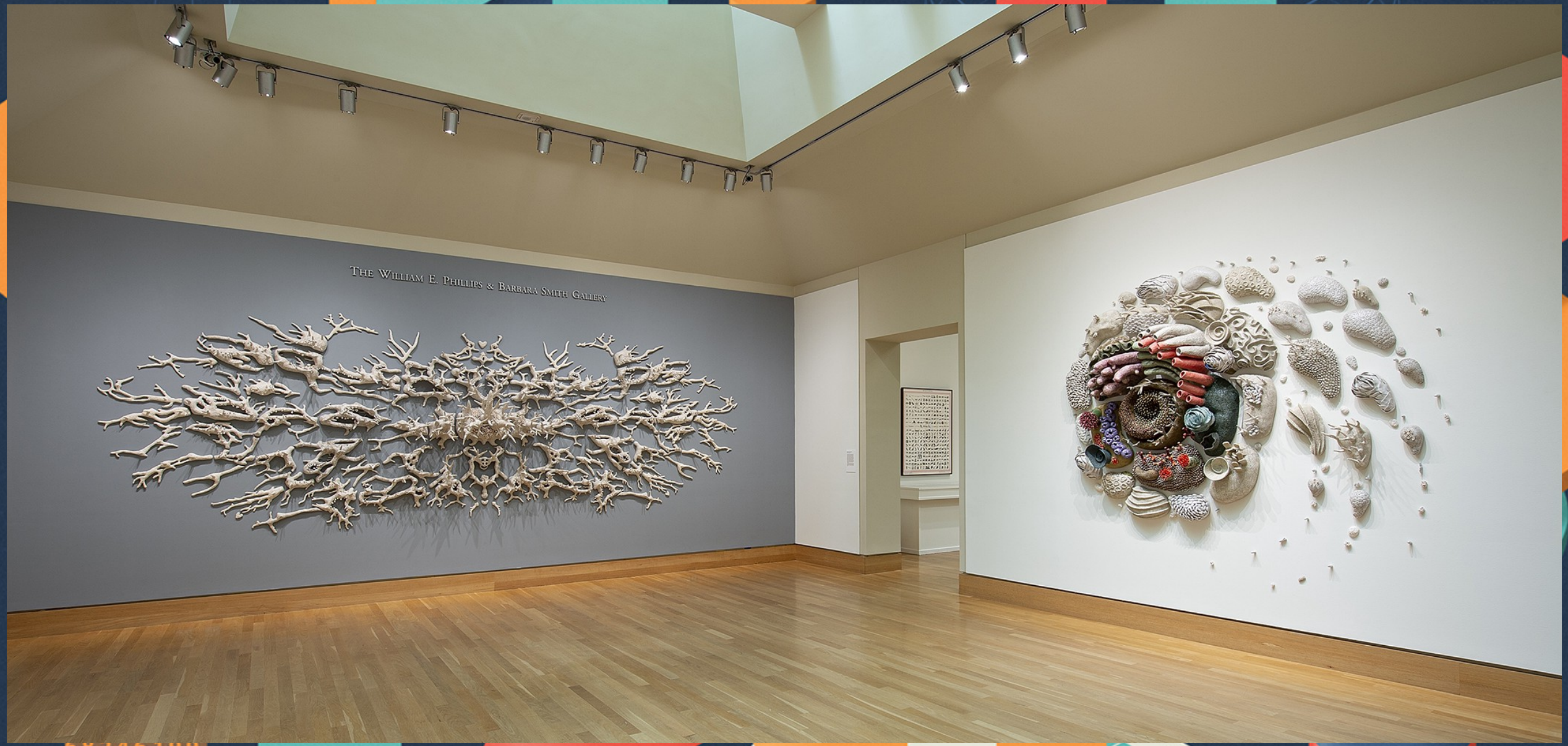

Working across the world in some of the most extreme environments, Sean “Hula” Yoro and his twin Kapu have painted beautifully intricate murals which stress the dangers of rising sea levels and climate change. Their work embraces the transience of art as most are washed or eroded away after a mere few weeks










The William E. Phillips & Barbara Smith Gallery

Malum Geminos and Afterglow (Our Changing Seas VI), Courtney Mattison

…referring to ocean acidification as the “equally evil twin” of climate change caused by carbon dioxide emissions dissolving into the sea.” The structure of the mural is inspired by fractals, a natural mathematical phenomenon which has a unique evolving symmetry. The sculpture mimicks “gelatinous white polyps that appear to have had their supportive skeletons dissolved by acidic seawater.”



PROTECT THE FORESTS,
THEY ARE THE CLIMATE UMBRELLA OF OUR PLANET.

www.panda.org/forests

WWF

We cut off something that doesn't grow again.

Wherever the rain forest is cleared, barren ground remains.



WWF

2015
European Year
for Development



Ugly

is what's happening in our oceans.

Ugly is to see overfishing destroy the future of
800 million people who depend on fish to survive.

Make a difference. Choose sustainable fish.

www.fishforward.eu

This project is co-funded by the European Union. The contents of this ad are the sole responsibility of WWF and can in no way be taken to represent the views of the EU.

WWF

2015
European Year
for Development



Shocking

is the practice of overfishing.

Shocking is to know that up to 30% of the fish
we eat are caught illegally and to do nothing about it.

Make a difference. Choose sustainable fish.

www.fishforward.eu

This project is co-funded by the European Union. The contents of this ad are the sole responsibility of WWF and can in no way be taken to represent the views of the EU.

WWF

2015
European Year
for Development



Pathetic

is to catch fish before they ever had a chance to grow and reproduce.

Pathetic is not to fight this destructive practice.

Make a difference. Choose sustainable fish.

www.fishforward.eu

This project is co-funded by the European Union. The contents of this ad are the sole responsibility of WWF and can in no way be taken to represent the views of the EU.

WWF


STOP CLIMATE CHANGE
BEFORE IT CHANGES YOU.
WWF
for a living planet









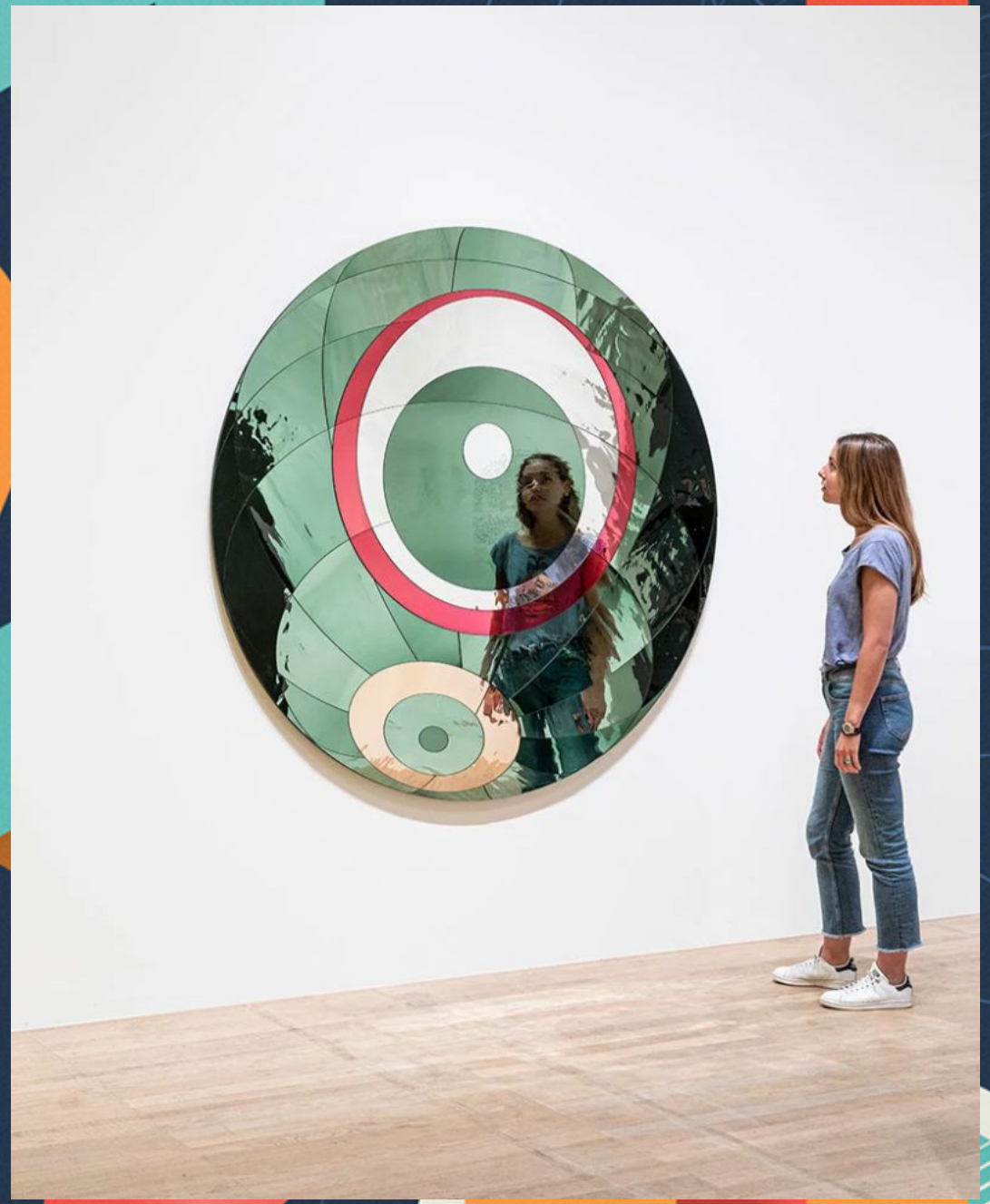
Olafur Eliasson's Art Exhibition That Alerts to Climate Change















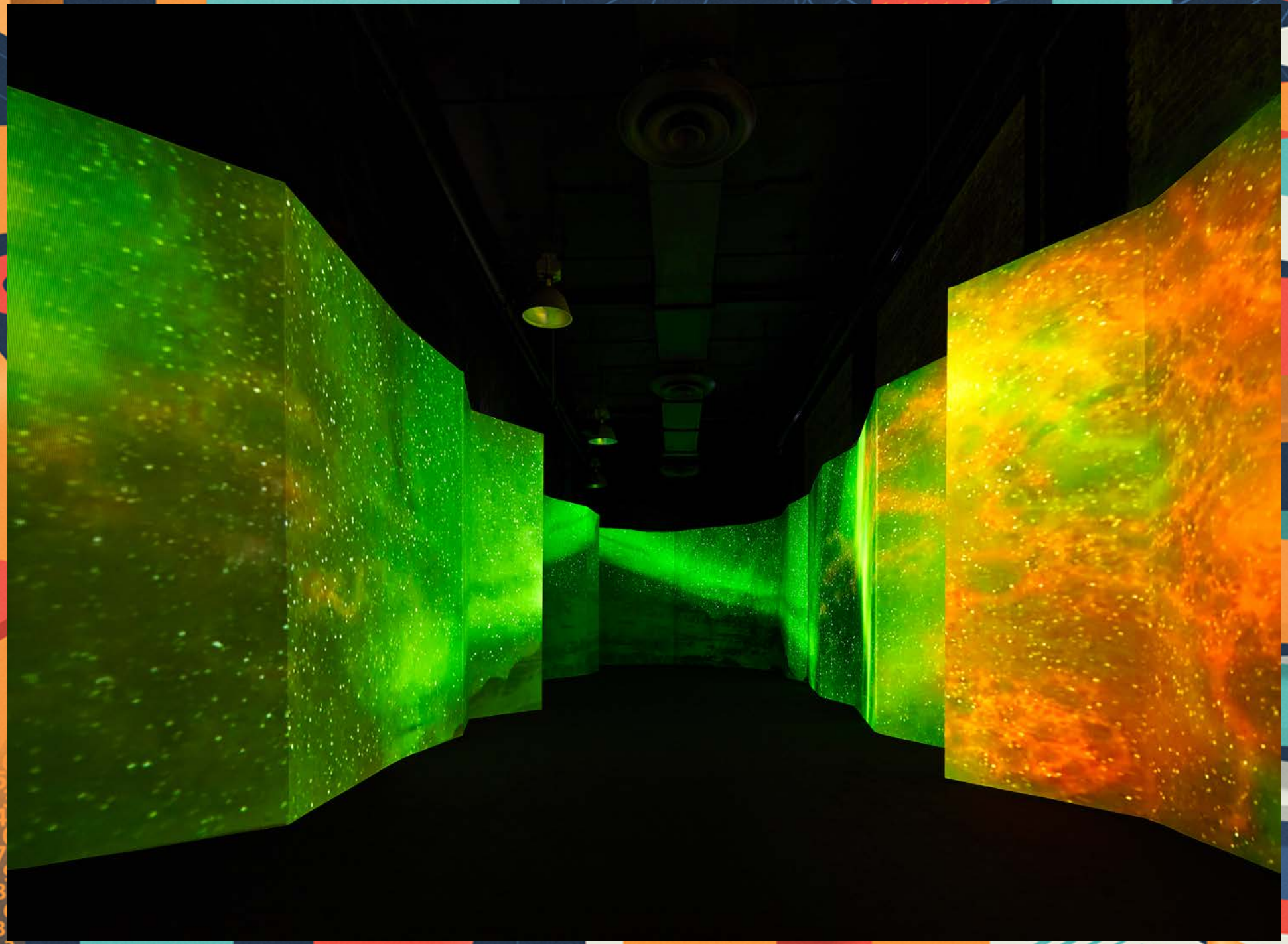


This stunning immersive art exhibition confronts realities of climate change

It’s almost a cliché to say this, but the best art does more than just look appealing. It reaches into your brain and soul and won’t let go. You’ll still be thinking about it days later trying to piece together what exactly you experienced. Arcadia Earth, a fully immersive art installation focused on environmental issues, is exactly that kind of experience.

Experiential artist Valentino Vettori is the brain behind the design of this 15-room journey examining the plight of our planet. Human scale art installations, many of them making use of augmented and virtual reality, overpower your senses, and force you to contemplate the subject matter.

Arcadia Earth has partnered with Oceanic Global, a non-profit dedicated to ocean conservation, and proceeds from all ticket sales will go to further raise awareness about how humans are damaging our ecosystem.









This art exhibition draws attention to climate change

President Dr Arif Alvi criticised United States President Donald Trump for sitting over enormous resources but doing nothing about climate change.

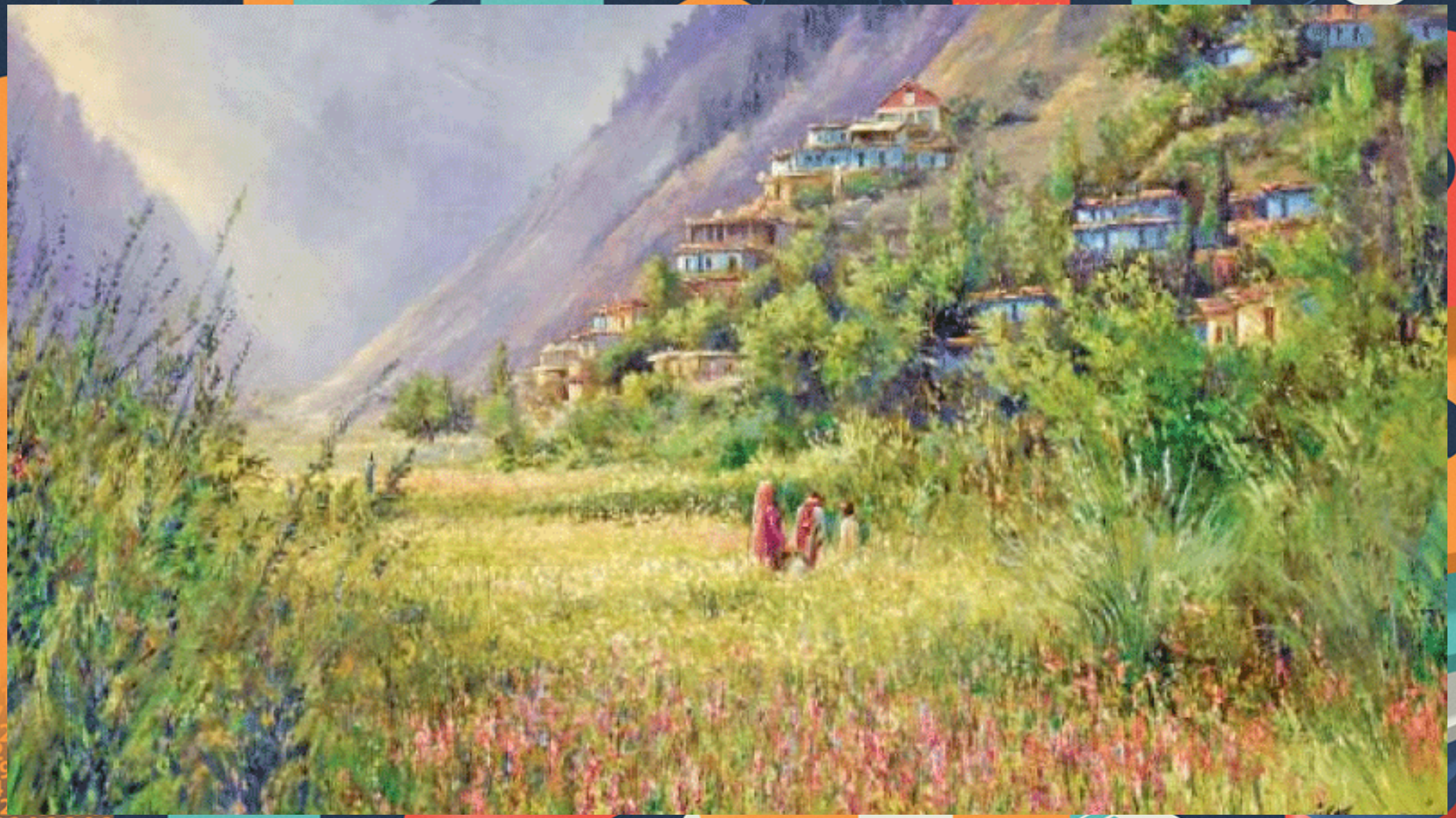
“In comparison I have very little, but I acknowledge climate change as a threat,” Dr Alvi said at the opening of an exhibition titled Art for Climate Change at the Pakistan National Council of Arts.

The exhibition was the outcome of the Art for Climate Change retreat organised by Gallery 6 in collaboration with the Pakistan Tourism Development Corporation where 16 painters, photographers and filmmakers were invited to Naran in August.







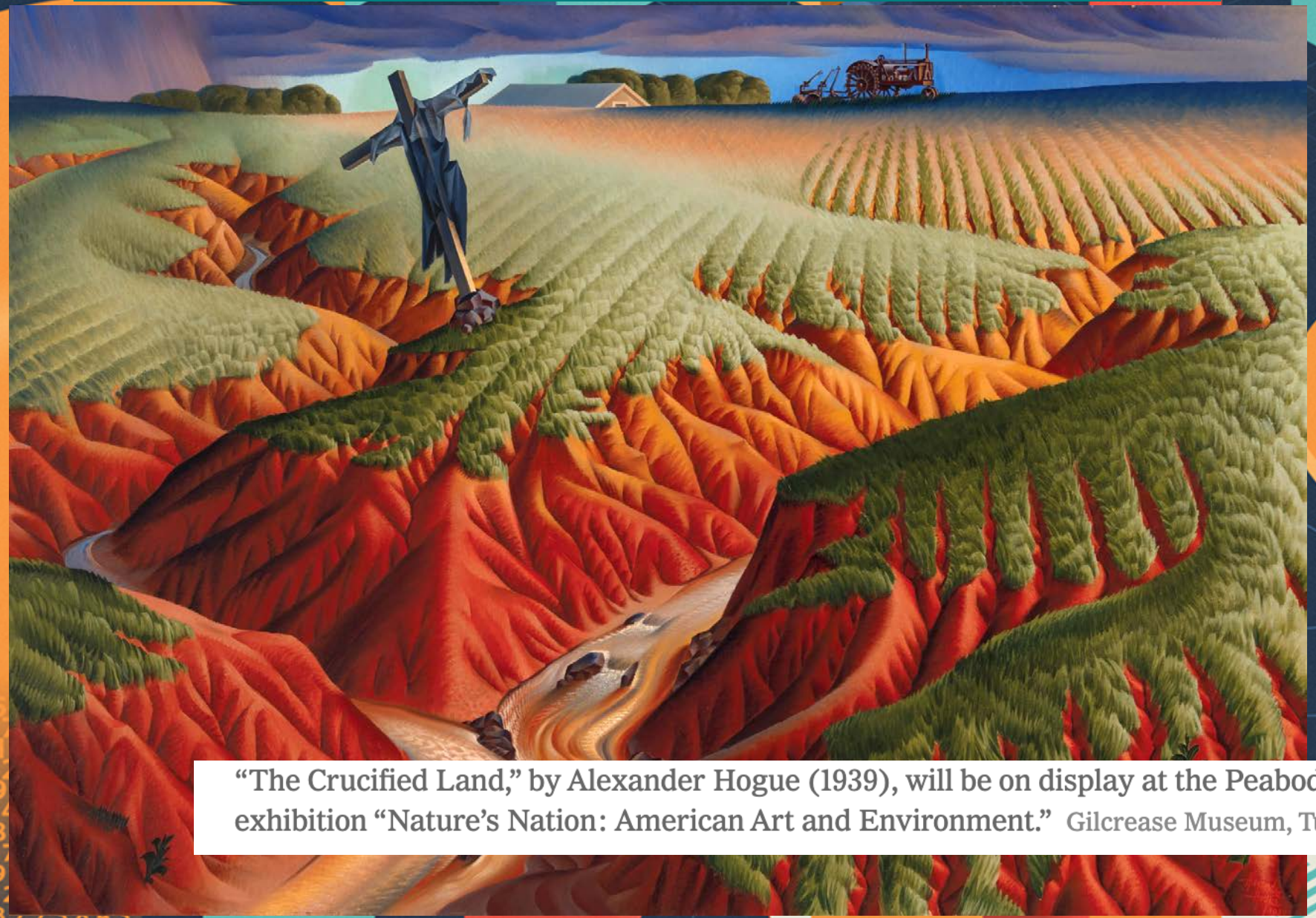


Can Art Drive Change on Climate Change?

Alexis Rockman - Bruce Museum



Can Art Help Save the Planet?



"The Crucified Land," by Alexander Hogue (1939), will be on display at the Peabody Essex Museum's exhibition "Nature's Nation: American Art and Environment." Gilcrease Museum, Tulsa


Museo del Prado (Prado Museum) recently collaborated on a project with the World Wildlife Fund (WWF) designed to coincide with the 2019 UN Climate Change Conference in Madrid. Paintings from the museum's collection were digitally modified to reflect a future world destroyed by inaction. Rising sea levels, barren rivers, and refugee camps transform works by European painters into a campaign to save the environment.





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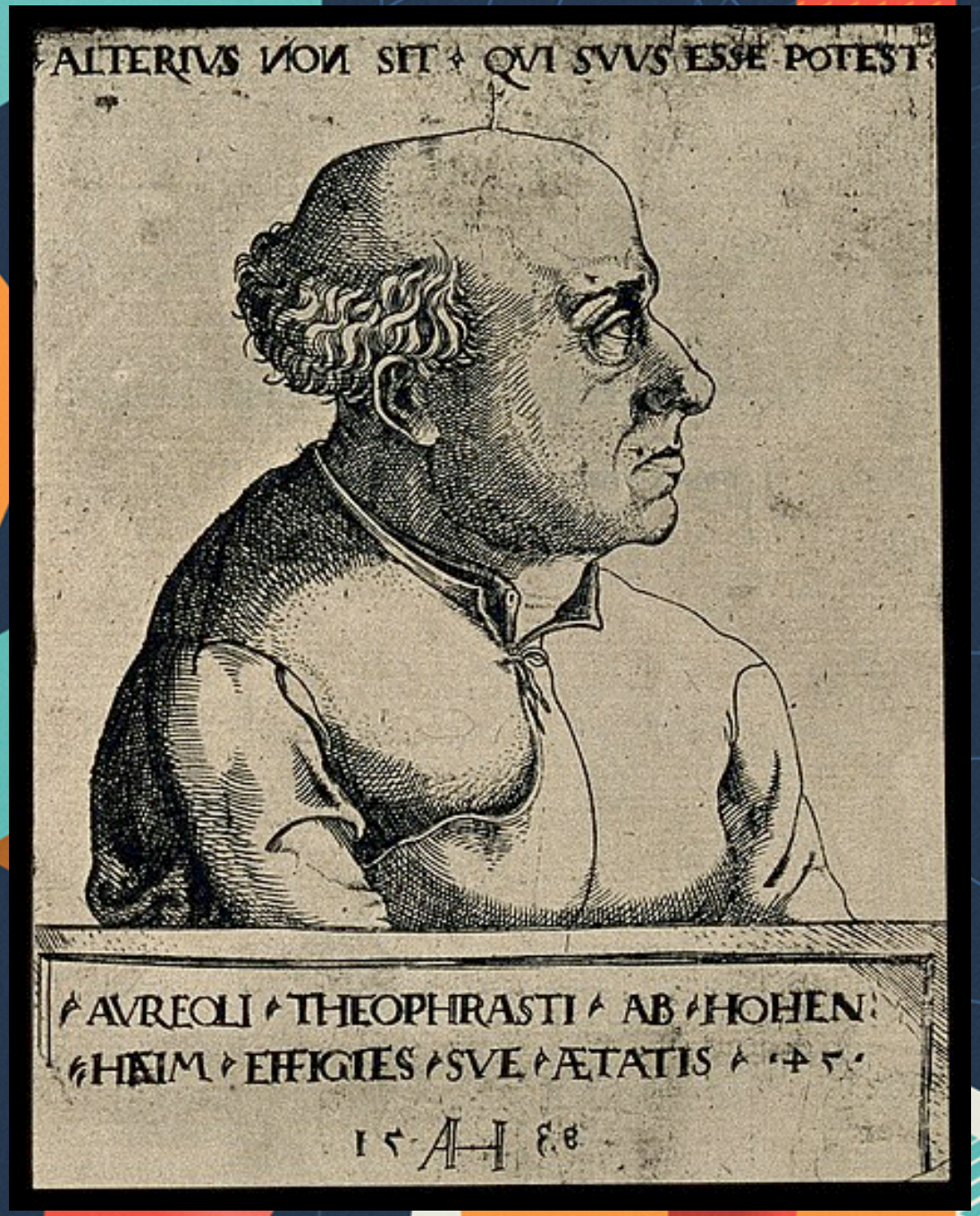

WWF
JULIO FALAGAN




WWF




WWF
CLIMATE REFUGEE
AGENCY


ALTERIVS NON SIT QVI SVVS ESSE POTEST
AVREOLI THEOPHRASTI AB HOHEN
HEIM EFFIGIES SVE ÆTATIS


of our food is
clean.
Our food contains no artificial preservatives, sweeteners, flavors and no colors from artificial sources.

AN ALL-NATURAL BANANA



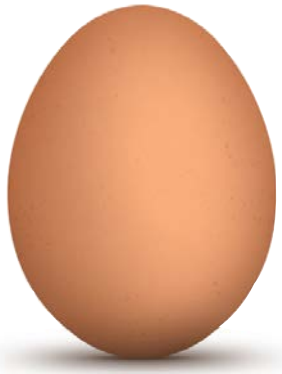
INGREDIENTS: WATER (75%), **SUGARS (12%)** (GLUCOSE (48%), FRUCTOSE (40%), SUCROSE (2%), MALTOSE (<1%)), STARCH (5%), FIBRE E460 (3%), **AMINO ACIDS (<1%)** (GLUTAMIC ACID (19%), ASPARTIC ACID (16%), HISTIDINE (11%), LEUCINE (7%), LYSINE (5%), PHENYLALANINE (4%), ARGININE (4%), VALINE (4%), ALANINE (4%), SERINE (4%), GLYCINE (3%), THREONINE (3%), ISOLEUCINE (3%), PROLINE (3%), TRYPTOPHAN (1%), CYSTINE (1%), TYROSINE (1%), METHIONINE (1%)), **FATTY ACIDS (<1%)** (PALMITIC ACID (30%), OMEGA-6 FATTY ACID: LINOLEIC ACID (14%), OMEGA-3 FATTY ACID: LINOLENIC ACID (8%), OLEIC ACID (7%), PALMITOLEIC ACID (3%), STEARIC ACID (2%), LAURIC ACID (1%), MYRISTIC ACID (1%), CAPRIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, E515, OXALIC ACID, E300, E306 (TOCOPHEROL), PHYLLOQUINONE, THIAMIN, **COLOURS** (YELLOW-ORANGE E101 (RIBOFLAVIN), YELLOW-BROWN E160a), **FLAVOURS** (3-METHYLBUT-1-YL ETHANOATE, 2-METHYLBUTYL ETHANOATE, 2-METHYLPROPAN-1-OL, 3-METHYLBUTYL-1-OL, 2-HYDROXY-3-METHYL BUTANOATE, 3-METHYLBUTANAL, ETHYL HEXANOATE, ETHYL BUTANOATE, PENTYL ACETATE), 1510, NATURAL RIPENING AGENT (ETHENE GAS).

ALL-NATURAL BLUEBERRIES



INGREDIENTS: AQUA (84%), **SUGARS (10%)** (FRUCTOSE (48%), GLUCOSE (40%), SUCROSE (2%)), FIBRE E460 (2.4%), **AMINO ACIDS (<1%)** (GLUTAMIC ACID (23%), ASPARTIC ACID (18%), LEUCINE (17%), ARGININE (8%), ALANINE (4%), VALINE (4%), GLYCINE (4%), PROLINE (4%), ISOLEUCINE (3%), SERINE (3%), THREONINE (3%), PHENYLALANINE (2%), LYSINE (2%), METHIONINE (2%), TYROSINE (1%), HISTIDINE (1%), CYSTINE (1%), TRYPTOPHAN (<1%)), **FATTY ACIDS (<1%)** (OMEGA-6 FATTY ACID: LINOLEIC ACID (30%), OMEGA-3 FATTY ACID: LINOLENIC ACID (19%), OLEIC ACID (18%), PALMITIC ACID (6%), STEARIC ACID (2%), PALMITOLEIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, OXALIC ACID, E300, E306 (TOCOPHEROL), THIAMIN, **COLOURS** (E163a, E163b, E163e, E163f, E160a) **FLAVOURS** (ETHYL ETHANOATE, 3-METHYL BUTYRALDEHYDE, 2-METHYL BUTYRALDEHYDE, PENTANAL, METHYLBUTYRATE, OCTENE, HEXANAL, DECANAL, 3-CARENE, LIMONENE, STYRENE, NONANE, ETHYL-3-METHYLBUTANOATE, NON-1-ENE, HEXAN-2-ONE, HYDROXYLINALOOL, LINALOOL, TERPINYL ACETATE, CARYOPHYLLENE, ALPHA-TERPINEOL, ALPHA-TERPINENE, 1,8-CINEOLE, CITRAL, BENZALDEHYDE), METHYLPARABEN, 1510, E300, E440, E421 and **FRESH AIR** (E941, E948, E290).

AN ALL-NATURAL EGG



INGREDIENTS: AQUA (75.8%), **AMINO ACIDS (12.6%)** (GLUTAMIC ACID (14%), ASPARTIC ACID (11%), VALINE (9%), ARGININE (8%), LEUCINE (8%), LYSINE (7%), SERINE (7%), PHENYLALANINE (6%), ALANINE (5%), ISOLEUCINE (5%), PROLINE (4%), TYROSINE (3%), THREONINE (3%), GLYCINE (3%), HISTIDINE (2%), METHIONINE (3%), CYSTINE (2%), TRYPTOPHAN (1%)); **FATTY ACIDS (9.9%)** (OCTADECENOIC ACID (45%), HEXADECANOIC ACID (32%), OCTADECANOIC ACID (12%), EICOSATETRAENOIC ACID (3%), EICOSANOIC ACID (2%), DOCOSANOIC ACID (1%), TETRACOSANOIC ACID (1%), OCTANOIC ACID (<1%), DECANOIC ACID (<1%), DODECANOIC ACID (<1%), TETRADECANOIC ACID (<1%), PENTADECANOIC ACID (<1%), HEPTADECANOIC ACID (<1%), TETRADECENOIC ACID (<1%), HEXADECENOIC ACID (<1%), EICOSENOIC ACID (<1%), DOCOSENOIC ACID (<1%), OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (12%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (<1%), EICOSAPENTAENOIC ACID (EPA) (<1%), OMEGA-3 FATTY ACID: DOCOSAHEXAENOIC ACID (DHA) (<1%)); **SUGARS (0.8%)** (GLUCOSE (30%), SUCROSE (15%), FRUCTOSE (15%), LACTOSE (15%), MALTOSE (15%), GALACTOSE (15%)); **COLOUR** (E160c, E160a), E306, E101; **FLAVOURS** (PHENYLACETALDEHYDE, DODECA-2-ENAL, HEPTA-2-ENAL, HEXADECANAL, OCTADECANAL, PENTAN-2-ONE, BUTAN-2-ONE, ACETALDEHYDE, FORMALDEHYDE, ACETONE); SHELL (E170), ALSO CONTAINS BENZENE & BENZENE DERIVATIVES, ESTERS, FURANS, SULFUR-CONTAINING COMPOUNDS AND TERPENES.

AN ALL-NATURAL PASSIONFRUIT



INGREDIENTS: AQUA (72.9%), **SUGARS (11.2%)** (FRUCTOSE (48%), GLUCOSE (46%), MALTOSE (2%), GALACTOSE (2%), SUCROSE (2%)), FIBRE E460 (10.4%), ASH, **AMINO ACIDS (1.1%)** (GLUTAMIC ACID (17%), ASPARTIC ACID (12%), ARGININE (8%), LYSINE (6%), GLYCINE (6%), LEUCINE (6%), VALINE (5%), ISOLEUCINE (5%), ALANINE (5%), SERINE (5%), PHENYLALANINE (4%), PROLINE (4%), THREONINE (4%), HISTIDINE (3%), CYSTINE (3%), TYROSINE (3%), METHIONINE (3%), TRYPTOPHAN (1%)), **FATTY ACIDS (<1%)** (OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (73%), OCTADECAENOIC ACID (15%), HEXADECANOIC ACID (8%), OCTADECANOIC ACID (3%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (<1%)), **PRESERVATIVES (<1%)** (E236, E296), **COLOURS (<1%)** (E163, E162, E160a, E161b, E161c, E140, E161d, E161e, E161g, E161h) E300, E307, FOLATE, CHOLINE, BETAINE, PHYTOSTEROLS, **FLAVOURS (<1%)** (LINALOOL (15.3%), OCTAN-1-OL (11.5%), ETHYL HEXANOATE (11.1%), ETHYL BUTANOATE (9.4%), HEXAN-1-OL (9.0%), ALPHA-TERPINEOL (8.0%), BENZALDEHYDE (4.6%), ETHYL BENZOATE (3.0%), 3-METHYL-1-BUTANOL (2.8%), GERANIOL (2.4%), METHYL CYCLOPENTANE (1.8%), BENZOIC ACID E210 (1.6%), UNDECANOL (1.5%), CYCLOPENTANONE (1.5%), PHENYLMETHYL ETHANOATE (1.4%), HEXEN-1-OL (1.2%), TERPINENE-4-OL, (1.1%), ACETAL 1,1-DIETHOXYETHANE (1.0%), 3-HYDROXY-2-BUTANONE (1.0%), HEXANOIC ACID (<1%), OCTANOIC ACID (<1%), CIS-LINALOOL OXIDE (<1%), 3-METHYL-2-BUTEN-1-OL (<1%), BENZENE ACETALDEHYDE (<1%), FLAVOURS UNIQUE TO PASSIONFRUIT: (+)-CIS-2-METHYL-4-PROPYL-1,3-OXATHIANE, 3-MERCAPTOHEXAN-1-OL, 3-MERCAPTOHEXYL ETHANOATE, 3-MERCAPTO-3-METHYLBUTYL ETHANOATE, (S)-(3-HEXAN-1-OL)-L-CYSTEINE).

AN ALL-NATURAL STRAWBERRY



INGREDIENTS: AQUA (90.9%), **SUGARS (4.9%)** (FRUCTOSE (50%), GLUCOSE (41%), SUCROSE (9%)), FIBRE E460 (2.0%), ASH, **FATTY ACIDS (<1%)** (OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (42%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (31%), OCTADECAENOIC ACID (20%), HEXADECANOIC ACID (6%), OCTADECANOIC ACID (1%), HEXADECAENOIC ACID (<1%)), **AMINO ACIDS (<1%)** (ASPARTIC ACID (26%), GLUTAMIC ACID (17%), LEUCINE (6%), ALANINE (6%), LYSINE (5%), GLYCINE (5%), ARGININE (5%), PROLINE (4%), SERINE (4%), TYROSINE (4%), THREONINE (4%), ISOLEUCINE (3%), PHENYLALANINE (3%), VALINE (3%), HISTIDINE (2%), TRYPTOPHAN (1%), CYSTINE (1%), METHIONINE (<1%)), **PRESERVATIVES** (E236, E296) **COLOURS** (E160a, E161b, E161c, E140, E161d, E161e, E161g, E161h) E300, E307, FOLATE, CHOLINE, BETAINE, PHYTOSTEROLS, **FLAVOURS** (2,5-DIMETHYL-4-HYDROXY-2H-FURAN-3-ONE, 2,5-DIMETHYL-4-METHOXY-2H-FURAN-3-ONE, GAMMA DECALACTONE, GAMMA-DODECALACTONE, 2-FURFURAL, 5-HYDROXY METHYL-FURFURAL, LIMONENE, LINALOOL, (E)-NEROLIDOL, E1510, HEXANOL, OCTANOL, METHYL BUTANOATE, ETHYL BUTANOATE, METHYL HEXANOATE, ETHYL HEXANOATE, HEXYL ETHANOATE, (E)-2-HEXEN-1-YL ETHANOATE, BUTYL ETHANOATE, METHYL OCTANOATE, ETHYL OCTANOATE, OCTYL-2-METHYL BUTANOATE, OCTYL HEXANOATE, DECYL BUTANOATE, DECYL ETHANOATE, METHANETHIOL, ETHYL 3-METHYLBUTANOATE, GERANIOL, E210, FARNESYL ACETATE, MESIFURANE, METHYL ANTHRANILATE, GAMMA-DECALACTONE, METHIONAL, DIMETHOXYMETHANE, 1-BUTOXY-1-ETHOXYETHANE), 2-(4-HYDROXYPHENYL)-ETHYL BETA-D-GLUCOPYRANOSIDE.

AN ALL-NATURAL ROASTED COFFEE BEAN



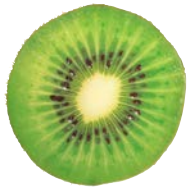
INGREDIENTS: CAFFEINE, **CHLOROGENIC ACIDS** (5-CAFFEOYLQUINIC ACID, 3,4-DICAFFEOYLQUINIC ACID, 3-CAFFEO-4-FERULOYLQUINIC ACID, 5-P-COUMAROYL-QUINIC ACID), CAFESTOL, KAHWEOL, AMINO ACIDS, **SOLUBLE DIETARY FIBRE** (GALACTOMANNANS AND TYPE II ARABINOGALACTANS), GALACTOSE, ARABINOSE, FURANS, PYRIDINES, PYRAZINES, PYRROLS, ALDEHYDES, MELANOIDINS, **FATTY ACIDS** (LINOLEIC ACID, OLEIC ACID, LINOLENIC ACID, COFFEADIOL, ARABIOL I), ASH, **STEROLS** (4-DESMETHYLSTEROLS, 4-METHYLSTEROLS, 4,4-DIMETHYL-STEROLS, ALPHA-, BETA- AND GAMMA-TOCOPHEROLS), **FLAVOURS** (2,3-BUTANE-DIONE, 2,3-PENTANEDIONE, 1-OCTEN-3-ONE, 2-HYDROXY-3-METHYL-2-CYCLO-PENTENE-1-ONE PROPANAL, 2-METHYL-PROPANAL, 3-METHYL-PROPANAL, 2-METHYLBUTANAL, 4-METHYLBUTANAL, HEXANAL, (E)-2-NONENAL, METHIONAL, METHANETHIOL, 4-METHYL-2-BUTENO-1-THIOL, 2-METHYL-4-FURANTHIOL, 5-DIMETHYL-TRISULFIDE, 2-FURFURYLTHIOL, 2-FURAN-METHANTHIOL, 2-(METHYL-THIO)-PROPANAL, 2-(METHYLTHIO-METHYL)FURAN, 3,5-DI-HYDRO-4(2H)-THIOPHENONE, 2-ACETYL-2-TYAZOLINE, 4-METHYLBUTANOIC ACID, DAMASCENE 4-HYDROXY-2,5-DIMETHYL 4(2H)-FURANONE (FURANEOL), 2-ETHYL-FURANEOL, 4-HYDROXY-4,5-DIMETHYL-2(5H)-FURANONE (SOTOLON), 5-ETHYL-4-HYDROXY-4-METHYL-2-(5H)-FURAN-ONE (ABEXONA), 2-ETHYL-4-HYDROXY-5-METHYL-4-(5H)-FURANONE, 2-METHOXY-PHENOL, 4-METHOXY-PHENOL, 4-ETHYL-2-METH-OXY-PHENOL, 4-VINYL-2-METHOXY-PHENOL, 4-ETHENYL-2-METHOXYPHENOL, 3-METHYL-INDOLE, VANILLINE, 2,3-DIMETHYL-PYRAZINE, 2,5-DIMETHYLPYRAZINE, 2-ETHYL-PYRAZINE, 2-ETHYL-6-METHYLPYRAZINE, 2,3-DIETHYL-5-METHYLPYRAZINE, 2-ETHYL-3,5-DIMETHYLPYRAZINE, 3-ETHYL-2,5-DIMETHYLPYRAZINE, 3-ISOPROPYL-2-METH-OXYPYRAZINE, 3-ISOBUTYL-2-METHOXY-PYRAZINE, 2-ETHENYL-3,5-DIMETHYL-PYRAZINE 2-ETHENYL-3-ETHYL-5-METHYL-PYRAZINE, 6,7-DIHYDRO-5H-CYCLOPENTA PYRAZINE, 6,7-DI-HYDRO-5-METHYL-5H-CYCLOPENTAPYRAZINE, 3-MER-CAPTO-3-METHYLBUTYL FORMATE, 3-MERCAPTO-3-METHYLBUTANOL), **MINERALS** (POTASSIUM, PHOSPHORUS, SODIUM, MAGNESIUM, CALCIUM, SULFUR, ZINC, STRONTIUM, SILICON, MANGANESE, IRON, COPPER, BARIUM, BORON, ALUMINIUM).

AN ALL-NATURAL PEACH



INGREDIENTS: AQUA (88.9%), **SUGARS (8.4%)** (SUCROSE (48%), GLUCOSE (20%), FRUCTOSE (15%), MALTOSE (<1%), GALACTOSE (<1%)), FIBRE E460 (1.5%), **FATTY ACIDS (<1%)** OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (28%), OCTADECENOIC ACID (22%), (HEXADECANOIC ACID (6%), OCTADECANOIC ACID (1%), HEXADECENOIC ACID (1%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (<1%)), **AMINO ACIDS (<1%)** (ASPARTIC ACID (54%), GLUTAMIC ACID (7%), LYSINE (4%), SERINE (4%), ALANINE (4%), LEUCINE (3%), GLYCINE (3%), VALINE (3%), THREONINE (2%), ARGININE (2%), HISTIDINE (2%), PROLINE (2%), CYSTINE (2%), ISOLEUCINE (2%), TYROSINE (2%), PHENYLALANINE (2%), TRYPTOPHAN (2%), METHIONINE (2%)) **COLOURS** (E160a, E161b, E161c) E300, E307, **FLAVOURS** (BENZALDEHYDE, LINALOOL, GAMMA- AND DELTA-DECALACTONE, DELTA- AND GAMMA-OCTALACTONE, 6-PENTYL-ALPHA-PYRONE, HEXADECANOIC ACID, (Z)-3-HEXEN-1-YL ACETATE, ETHYL BUTANOATE, (Z)-3-HEXANAL, HEXANAL, (E,E)-2,4-DECADIENAL, BENZALDEHYDE, DELTA- AND GAMMA-DODECALACTONE, GAMMA-JASMOLACTONE, TERPINOLENE, 4-DECANOLIDE, BETA-DAMASCENONE, CARVOMENTHENAL, ALPHA-TERPINEOL, 3-METHYL-BUTYL ACETATE), CHOLINE, PANTOTHENIC ACID.

AN ALL-NATURAL KIWI



INGREDIENTS: AQUA (83.1%), **SUGARS (9.0%)** (FRUCTOSE (48%), GLUCOSE (46%), MALTOSE (2%), GALACTOSE (2%), SUCROSE (2%)), FIBRE E460 (3.0%), ASH, **AMINO ACIDS (1.1%)** (GLUTAMIC ACID (17%), ASPARTIC ACID (12%), ARGININE (8%), LYSINE (6%), GLYCINE (6%), LEUCINE (6%), VALINE (5%), ISOLEUCINE (5%), ALANINE (5%), SERINE (5%), PHENYLALANINE (4%), PROLINE (4%), THREONINE (4%), HISTIDINE (3%), CYSTINE (3%), TYROSINE (3%), METHIONINE (3%), TRYPTOPHAN (1%)), **FATTY ACIDS (<1%)** (OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (68%), OCTADECAENOIC ACID (13%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (12%), HEXADECANOIC ACID (4%), OCTADECANOIC ACID (3%)), **PRESERVATIVES** (E236, E296), **COLOURS** (E160a, E161b, E161c, E140, E161d, E161e, E161g, E161h) E300, E307, FOLATE, CHOLINE, BETAINE, PHYTOSTEROLS, **FLAVOURS** (2,5-DIMETHYL-4-HYDROXY-3(2H)-FURANONE, 3-HYDROXY-BETA-DAMASCONE, 4-VINYLGUAIACOL, (Z)-3-HEXEN-1-OL, UNRIPE FLAVOUR: (E)-2-HEXENAL, RIPE FLAVOUR: ETHYL BUTANOATE, METHYL ETHANOATE, METHYL BUTANOATE, ETHYL BUTANOATE, METHYL HEXANOATE), E210.

AN ALL-NATURAL LEMON



INGREDIENTS: WATER (87.4%), FIBRE E460 (4.7%), **SUGARS (2.5%)** (GLUCOSE (40%), FRUCTOSE (36%), SUCROSE (24%)); **AMINO ACIDS (1.2%)** (GLUTAMIC ACID (19%), ASPARTIC ACID (16%), HISTIDINE (11%), LEUCINE (7%), LYSINE (5%), PHENYLALANINE (4%), ARGININE (4%), VALINE (4%), ALANINE (4%), SERINE (4%), GLYCINE (3%), THREONINE (3%), ISOLEUCINE (3%), PROLINE (3%), TRYPTOPHAN (1%), CYSTINE (1%), TYROSINE (1%), METHIONINE (1%)); ASH (0.4%), **FATTY ACIDS (0.3%)** (OMEGA-6 FATTY ACID: LINOLEIC ACID (46.3%), PALMITIC ACID (24.9%), OMEGA-3 FATTY ACID: LINOLENIC ACID (19.1%), OLEIC ACID (7.4%), STEARIC ACID (1.5%), MYRISTIC ACID (0.4%), PALMITOLEIC ACID (0.4%)); PHYTOSTEROLS, E515, E300, PHYLLOQUINONE, PERILLYL ALCOHOL, THIAMIN, NIACIN, **COLOURS** (HESPERIDIN (70%), ERIOCITRIN (20%), RUTIN (10%)); **FLAVOURS** (LIMONENE (65.9%), BETA-PINENE (13.8%), GAMMA-TERPINENE (9.4%), ALPHA-PINENE (2.0%), GERANIAL (1.5%), MYRCENE (1.5%), NERAL (0.9%), SABINENE (0.5%), BETA-BISABOLENE (0.5%), ALPHA-THUJENE (0.4%), MERYL ACETATE (0.4%), GERANYL ACETATE (0.4%), TERPINOLENE (0.4%), TRANS-ALPHA-BERGAMOTENE (0.3%), BETA CAROPHYLLENE (0.2%), ALPHA-TERPINENE (0.2%), ALPHA-TERPINOL (0.2%), ALPHA-PHELLABDRENE (0.1%), (E)-BETA OCIMENE (0.1%), NONANAL (0.1%), LINALOOL (0.1%), CITRONELLAL (0.1%)).

ALL-NATURAL CHERRIES



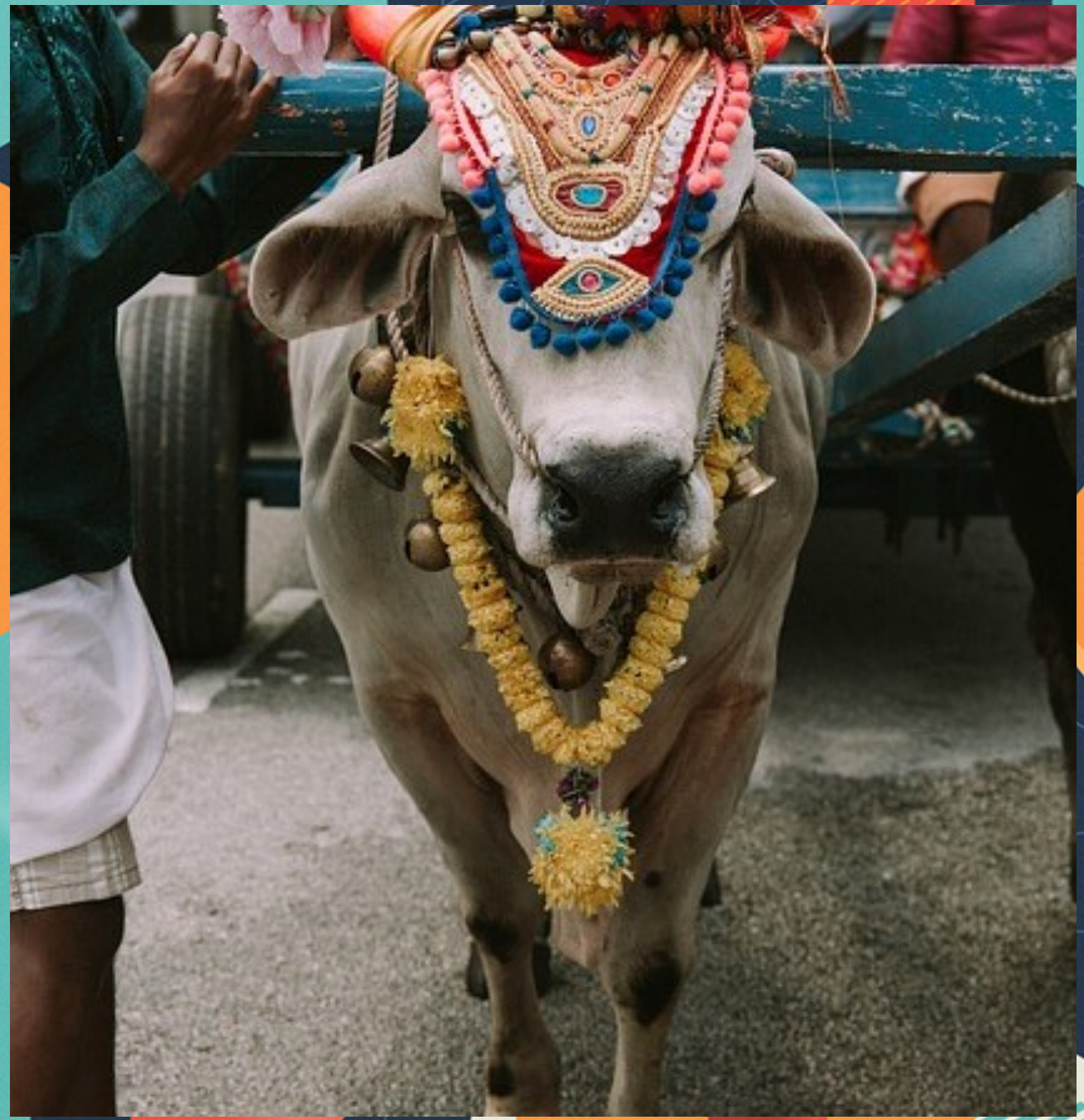
INGREDIENTS: AQUA (82.2%), **SUGARS (12.8%)** (GLUCOSE (52%), FRUCTOSE (42%), GALACTOSE (5%), MALTOSE (<1%), SUCROSE (<1%)), FIBRE E460 (2.1%), ASH, **FATTY ACIDS (1.6%)** (OCTADECAENOIC ACID (24%), OMEGA-6 FATTY ACID: OCTADECADIENOIC ACID (24%), OMEGA-3 FATTY ACID: OCTADECATRIENOIC ACID (23%), HEXADECANOIC ACID (14%), OCTADECANOIC ACID (<1%), HEXADECAENOIC ACID (<1%), TETRADECANOIC ACID (<1%)) **AMINO ACIDS (<1%)** (ASPARTIC ACID (57%), GLUTAMIC ACID (9%), PROLINE (4%), SERENE (3%), LEUCINE (3%), ALANINE (3%), LYSINE (3%), PHENYLALANINE (2%), GLYCINE (2%), THREONINE (2%), VALINE (2%), ARGININE (2%), HISTIDINE (2%), ISOLEUCINE (2%), TYROSINE (1%), METHIONINE (1%), CYSTEINE (1%), TRYPTOPHAN (1%)), **COLOURS** (E160a, E161b, E161c), E300, E307, CHOLINE, PHYTOSTEROLS, **FLAVOURS** ((Z)-3-HEXENOL, 2-HEPTANONE, CINNAMIC ALCOHOL, CINNAMIC ALDEHYDE, (E)-2,6-NONANEDIENAL, (E)-2-HEXENAL, HEXANAL, EUGENOL, LINALOOL, BENZALDEHYDE, PHENYLACETALDEHYDE).

ALL-NATURAL DURIAN



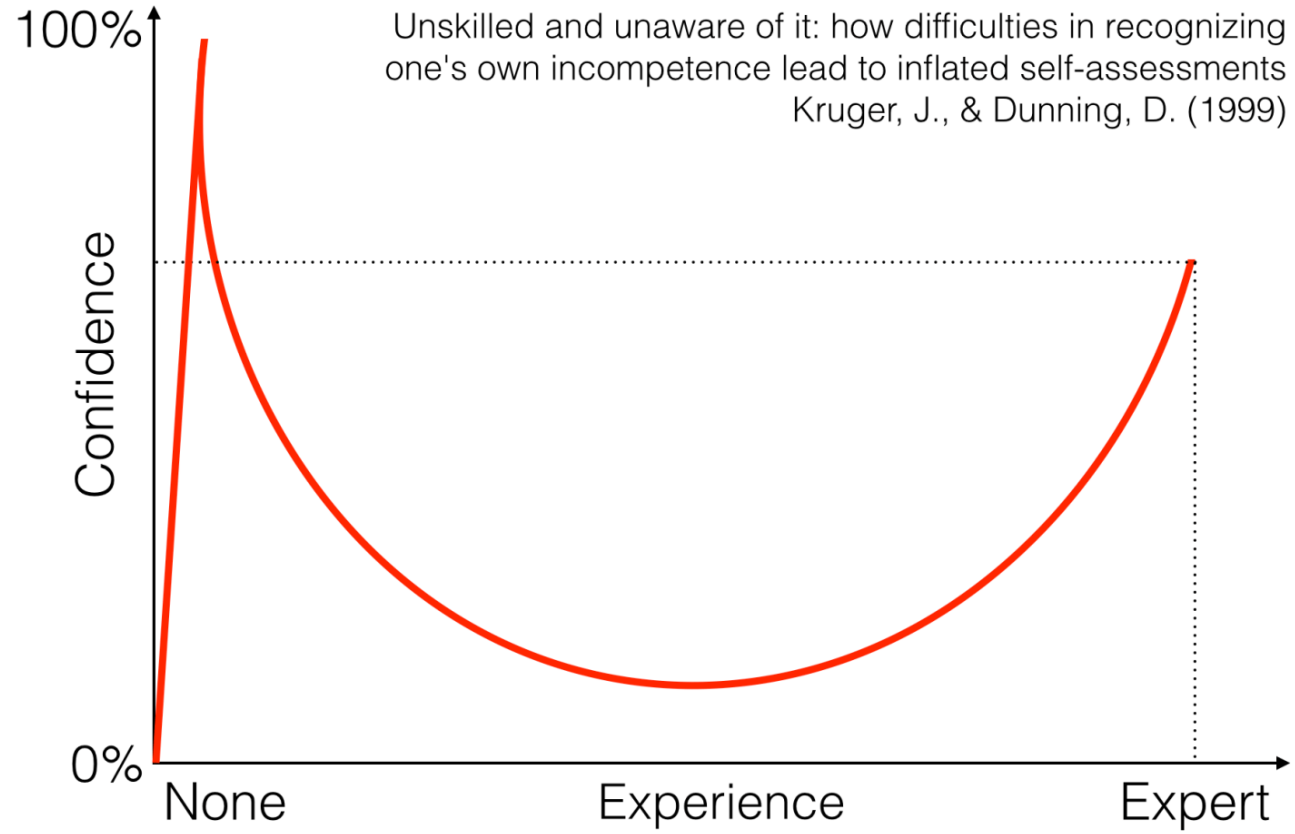
INGREDIENTS: AQUA (65%), **FATTY ACIDS (13%)** (PALMITIC ACID (C16:0), PALMITOLEIC ACID (C16:1), STEARIC ACID (C18:0), OLEIC ACID (C18:1), LINOLEIC ACID (C18:2), LINOLENIC ACID (C18:2)), **SUGARS (9%)** (GLUCOSE (48%), FRUCTOSE (40%), SUCROSE (2%)), FIBRE E460 (3.8%), **AMINO ACIDS (3.6%)** (LEUCINE (37%), LYSINE (7%), ASPARTIC ACID (6%), GLYCINE (6%), ALANINE (5%), GLUTAMIC ACID (5%), VALINE (5%), PROLINE (4%), SERINE (4%), THREONINE (4%), ISOLEUCINE (3%), PHENYLALANINE (3%), OTHER (11%)), E300, **COLOURS** (E140), **FLAVOURS** (ETHYL (2S)-2-METHYLBUTANOATE (FRUITY), ETHYL CINNAMATE (HONEY), 1-(ETHYL-SULFANYL)-ETHANETHIOL (ROASTED ONION), 1-(ETHYL-DISULFANYL)-1-(ETHYLSULFANYL)-ETHANE (ONION), 2(5)-ETHYL-4-HYDROXY-5(2)-METHYLFURAN-3(2H)-ONE (CARAMEL), 3-HYDROXY-4,5-DIMETHYLFURAN-2(5H)-ONE ("SOUP SEASONING"), ETHYL 2-METHYLPROPANOATE (FRUITY), ETHYL BUTANOATE (FRUITY), 3-METHYLBUT-2-ENE-1-THIOL (SKUNKY), ETHANE-1,1-DITHIOL (DURIAN), 1-(METHYLSULFANYL)-ETHANETHIOL (ROASTED ONION), 1-(ETHYLSULFANYL)-PROPANE-1-THIOL (ROASTED ONION), 4-HYDROXY-2,5-DIMETHYLFURAN-3(2H)-ONE (CARAMEL), HYDROGEN SULFIDE (ROTTEN EGG), ACETALDEHYDE (FRESH, FRUITY), METHANETHIOL (ROTTEN CABBAGE), ETHANETHIOL (ROTTEN ONION), PROPANE-1-THIOL (ROTTEN DURIAN), AND **NATURAL DEODORANT:** 5-HYDROXY-METHYL-FURFURAL.


Why is it so hard?




FACT
belief

Dunning-Kruger Effect



Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments
Kruger, J., & Dunning, D. (1999)




Task before next week:
What’s your idea?