
London City Airport Station
Trains to Central London
DLR
London City Airport
No trolleys
Airport luggage trolleys must not be taken beyond this point
Trains this way
Assistance
NO SMOKING


don
Town
DLR
UNDERGROUND
Woolwich Arsena
Platform
London's Rail & Tube services
tfl.gov.uk
Key to lines and symbols
Find your station
Fares information
oyster
National Rail
TRANSPORT FOR LONDON


112


Keep door
area clear


UNDERGROUND
HOLBORN STATION
Saturday 11 until
Sunday 12 October
Planned closures
Peacock


VIET EAT
PRINT EVERYTHING
LL22 AGY


Y COUNTER · 55




King Charles III




@STRANDPALACE
TELEPHONE
PULL


STRAND PALACE
EST. 1909 LONDON


TELEPHONE
PULL
SWANSE
WHERE BRIGHT FUTU
global
15 Blackwa
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20
KEEP
CLEAR
KEEP
CLEAR




Uber Boat
by thames clippers


MECKA


LOOK RIGHT


LOOK LEFT
LOOK LEFT
LOOK RIGHT


EARTH
IS
FLAT
PEDESTRIANS
push button and wait
for signal opposite
WAIT
wait
cross
with care

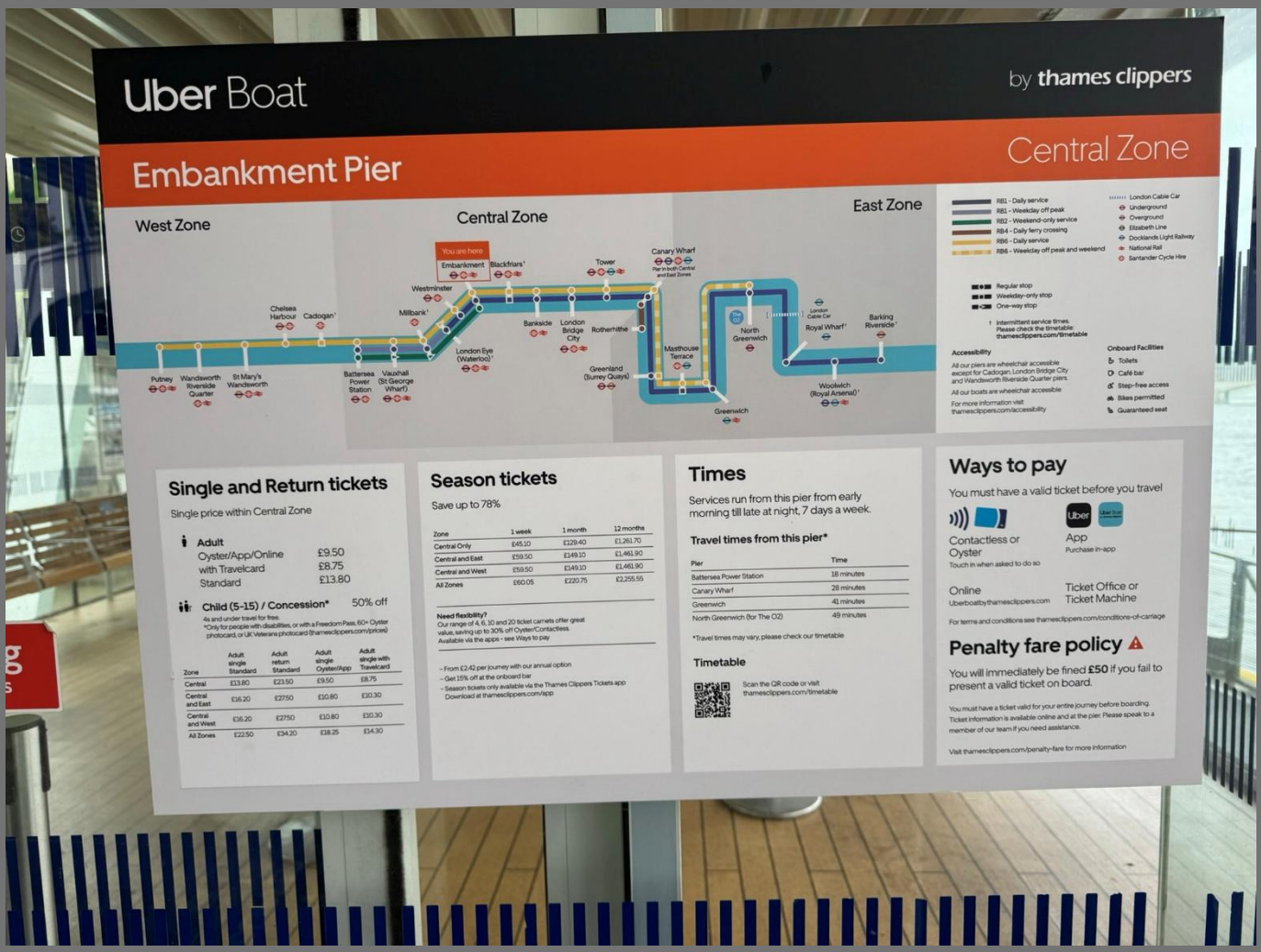

SIDE QUESTS
Strand
Embankment (Savoy)
↑ Embankment
Charing Cross
COVENT GARDEN →
Strand
Santander
Santander
Santander
Santander
58701




THIS OBELISK QUARRIED AT SYENE
WAS ERECTED AT ON (HELIOPOLIS)
BY THE PHARAOH
THOTHMES III ABOUT 1500 B.C.
LATERAL INSCRIPTIONS WERE ADDED
NEARLY TWO CENTURIES LATER
BY RAMESES THE GREAT
REMOVED DURING THE GREEK DYNASTY
TO ALEXANDRIA
THE ROYAL CITY OF CLEOPATRA
IT WAS THERE ERECTED IN THE
18TH YEAR OF AUGUSTUS CÆSAR B.C. 12






Uber Boat
by thames clippers
Embankment Pier
Central Zone
West Zone
Central Zone
East Zone
You are here
Embankment
Blackfriars
Tower
Canary Wharf
Pier in both Central and East Zones
Westminster
Millbank
Chelsea Harbour
Cadogan
Bankside
London Bridge City
Rotherhithe
North Greenwich
London Cable Car
Royal Wharf
Barking Riverside
Masthouse Terrace
Greenland (Surrey Quays)
Woolwich (Royal Arsenal)
Greenwich
London Eye (Waterloo)
Battersea Power Station
Vauxhall (St George Wharf)
Putney
Wandsworth Riverside Quarter
St Mary's Wandsworth
RB1 - Daily service
RB1 - Weekday off peak
RB2 - Weekend-only service
RB4 - Daily ferry crossing
RB6 - Daily service
RB6 - Weekday off peak and weekend
London Cable Car
Underground
Overground
Elizabeth Line
Docklands Light Railway
National Rail
Santander Cycle Hire
Regular stop
Weekday-only stop
One-way stop
† Intermittent service times. Please check the timetable: thamesclippers.com/timetable
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All our piers are wheelchair accessible except for Cadogan, London Bridge City and Wandsworth Riverside Quarter piers.
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Single price within Central Zone
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Standard £8.75
£13.80
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4s and under travel for free.
*Only for people with disabilities, or with a Freedom Pass, 60+ Oyster photocard, or UK Veterans photocard (thamesclippers.com/prices)
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Central | £13.80 | £23.50 | £9.50 | £8.75
Central and East | £16.20 | £27.50 | £10.80 | £10.30
Central and West | £16.20 | £27.50 | £10.80 | £10.30
All Zones | £22.50 | £34.20 | £18.25 | £14.30
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Save up to 78%
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Central Only | £45.10 | £129.40 | £1,261.70
Central and East | £59.50 | £149.10 | £1,461.90
Central and West | £59.50 | £149.10 | £1,461.90
All Zones | £60.05 | £220.75 | £2,255.55
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Pier | Time
Battersea Power Station | 18 minutes
Canary Wharf | 28 minutes
Greenwich | 41 minutes
North Greenwich (for The O2) | 49 minutes
*Travel times may vary, please check our timetable
Timetable
Scan the QR code or visit thamesclippers.com/timetable
Ways to pay
You must have a valid ticket before you travel
Contactless or Oyster
Touch in when asked to do so
App
Purchase in-app
Online
Uberboatbythamesclippers.com
Ticket Office or Ticket Machine
For terms and conditions see thamesclippers.com/conditions-of-carriage
Penalty fare policy
You will immediately be fined £50 if you fail to present a valid ticket on board.
You must have a ticket valid for your entire journey before boarding. Ticket information is available online and at the pier. Please speak to a member of our team if you need assistance.
Visit thamesclippers.com/penalty-fare for more information


PERONI
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Uber Boat
by thames clippers
Venus Clipper
No smoking
in an
Emergency




WATERLOO BRIDGE


Tornado Clipper


WATERLOO BRIDGE






SHAKESPEARE'S GLOBE
SWAN
BANKSIDE




CAPTAIN ROCKET


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GEORGESON - JOHN
GERRITY - JOSEPH T
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GIBBONS - CYRIL S W
GIESON - FRANK
GIGG - REGINALD
GILL - ROBERT W
GILLARD - CHARLES
GOSE - EMMANUEL
HAINES - WILFRED S
HALIDAY - CHARLES W
HALL - ARTHUR
HALL - DUDLEY W
HALL - GEORGE W
HALL - GEORGE J J
HALL - ROBERT
HALL - TALBOT E
HALLAS - JAMES T
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HAMMERSLEY - JOHN S
HAMMOND - FRANK E
HAMMOND - WILLIAM D
HEMBURY - REGINALD W
HENDY - JAMES
HENLEY - ERNEST J
HENRY - ENRIQUE
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FINE CHINA MUG
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CONTAINS 76.7% PORK
SMOKED WITH BEECHWOOD
350g
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Frankfurter
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10 CHICKEN
SMOKED WITH NATURAL BEECHWOOD
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Herta Classic Frankfurter Hot Dogs 10 Pk 350G
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of
Justice


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INSERT & DIAL
INSERT EACH COIN AND PRESS HERE
COINS
CREDIT
COIN
AT&T BT Talk Around
NEW WORLD
NEXT CALL
LAST NUMBER REDIAL
LANGUAGE SELECT
VOLUME CONTROL
NEW WORLD PAYPHONES
Using our payphones
Accepted methods of payment
Emergency services
Customer services


AIK
149
149
150


LYCEUM
LYCEUM
1834
THE LION KING
THE LION KING
THE LION KING


SAVOY
SAVOY


STRICTLY LIMITED CHRISTMAS RUN
SANTA'S FAVOURITE MUSICAL IS BACK!
elf
THE ALDWYCH
THE DELAUNAY
59
LTZ 1728
dpd
BUS
STOP


LOOK LEFT

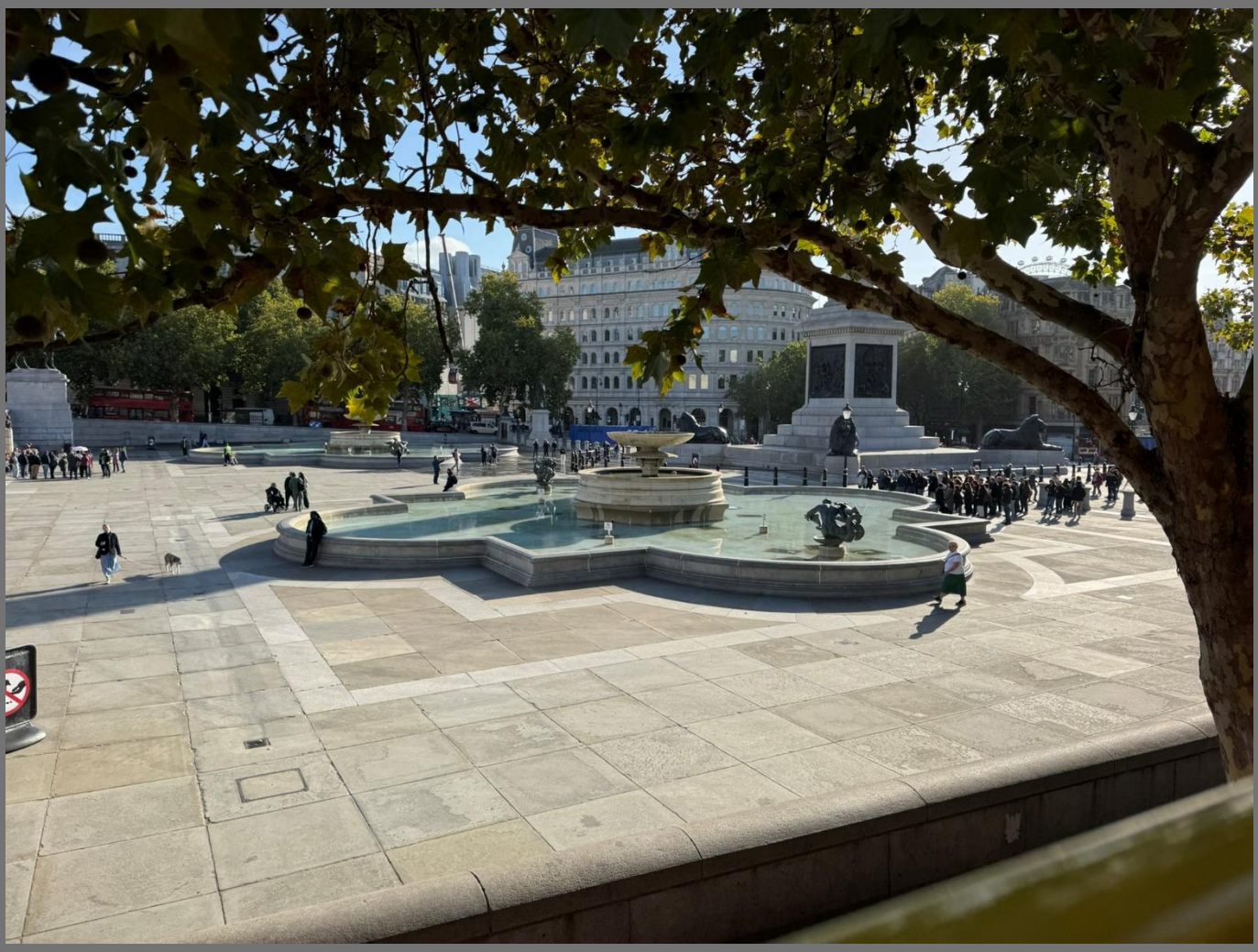





Harry Potter
ND THE CURSED CHILD
mixed glass
mixed paper & card
plastic bottles
drink cans


Harry Potter
AND THE CURSED CHILD


CCTV
IN OPERATION




GIFT
BOX
BOX • WHITE






Uber Boat




S. MARK
ST. LUKE
BENEDICITE OMNIA OPERA DOMINI DOMINO
SANCTUS
SANCTUS





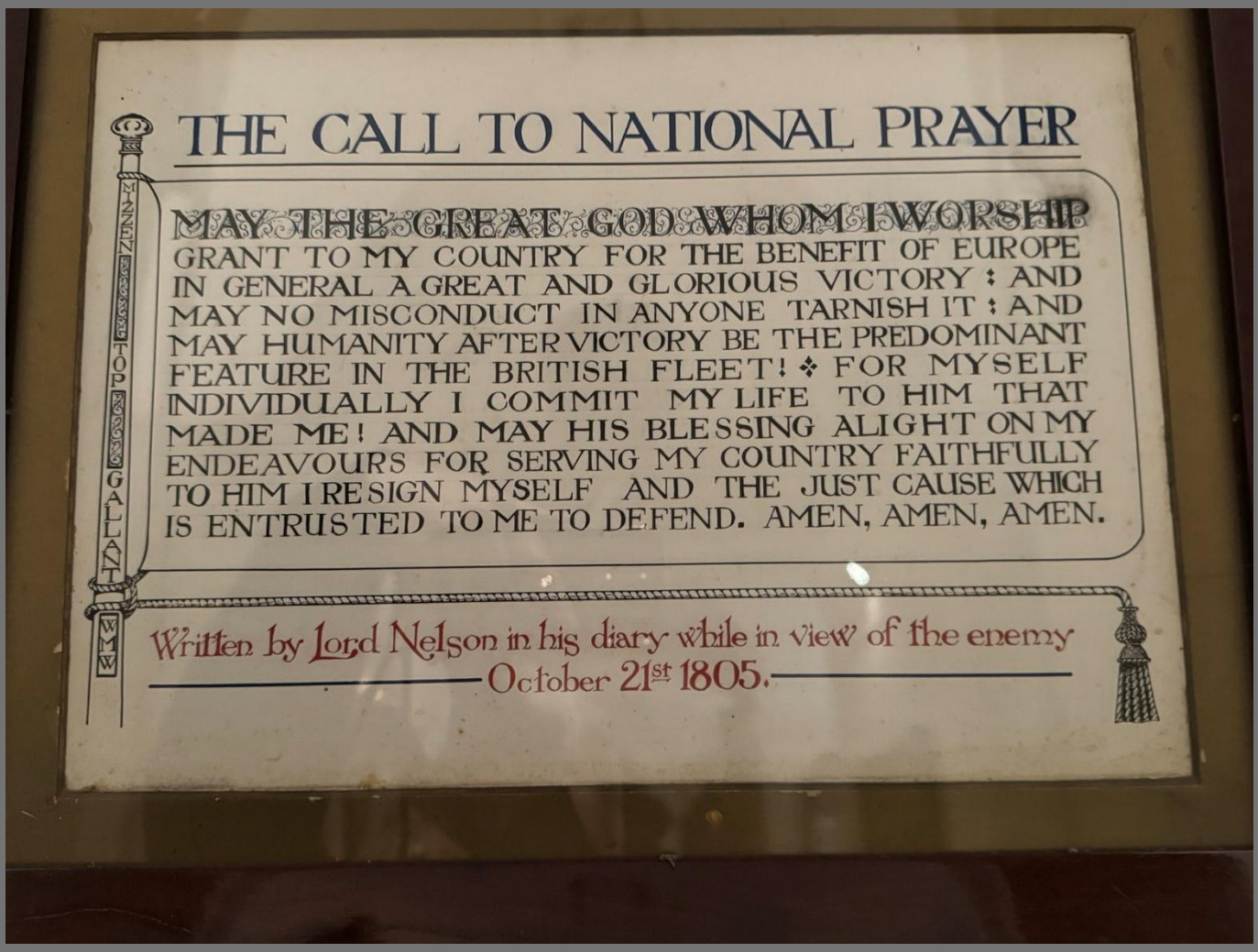

The Crypt


FORTIOR VINCIT
CHARLES EDWARD MADDEN
ADMIRAL OF THE FLEET
SEPTEMBER 5TH 1862
JUNE 5TH 1935
GOVERNOR GENERAL
NEW ZEALAND 1920-24
ADMIRAL OF THE FLEET


EFFIGIES WHICH
SURVIVED THE
GREAT FIRE OF
1666

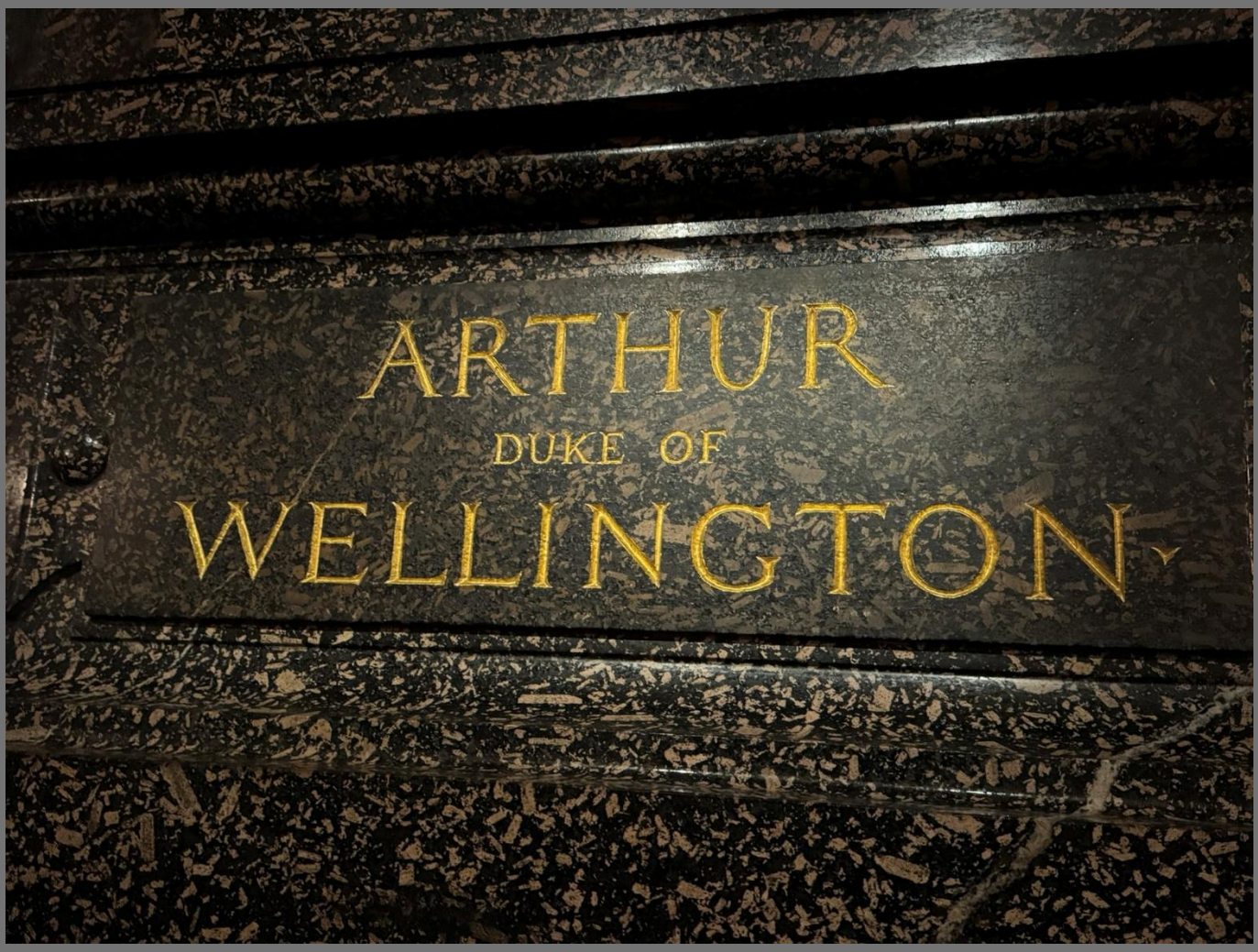

ANVS CESTRIENSIS
NOVEMBRIS 29
1661




THE CALL TO NATIONAL PRAYER
MAY THE GREAT GOD WHOM I WORSHIP GRANT TO MY COUNTRY FOR THE BENEFIT OF EUROPE IN GENERAL A GREAT AND GLORIOUS VICTORY : AND MAY NO MISCONDUCT IN ANYONE TARNISH IT : AND MAY HUMANITY AFTER VICTORY BE THE PREDOMINANT FEATURE IN THE BRITISH FLEET! ❖ FOR MYSELF INDIVIDUALLY I COMMIT MY LIFE TO HIM THAT MADE ME! AND MAY HIS BLESSING ALIGHT ON MY ENDEAVOURS FOR SERVING MY COUNTRY FAITHFULLY TO HIM I RESIGN MYSELF AND THE JUST CAUSE WHICH IS ENTRUSTED TO ME TO DEFEND. AMEN, AMEN, AMEN.
MANLY ESSEX FOR ENGLAND GALLANT
WMW
Written by Lord Nelson in his diary while in view of the enemy
October 21st 1805.


HORATIO·VISC·NELSON


Field Marshal
LORD
IRONSIDE
GCB·CMG·DSO
1939-40 Chief of The
Imperial General Staff
1940 Commander in
Chief Home Forces
1880
THE ROYAL REGIMENT OF ARTILLERY
1959


ARTHUR
DUKE OF
WELLINGTON


ARTHUR
DUKE OF
WELLINGTON






Please mind your head
when leaving seat




VANS




Hard Rock
CAFE
Hard Rock Cafe


Hard Rock
CAFE
PICCADILLY CIRCUS


And if The city Never Sleeps
Then That Makes Two
ED SHEERAN


BUD LIGHT




HOTEL CAFÉ ROYAL


Way out
COVENT GARDEN


NT GARDEN
Way out
WAY OUT
Return of the SPIDER
ALEX CROSS
JAMES PATTERSON
MORE THAN JUST A CRUISE
IT'S A BOATLOAD OF FUN!


TIFFANY & CO.




STAGE DOOR
The Magic Flute
Push Button to Open
Keep clear
Push Button to Open
Keep clear
PRESS TO OPEN


The Magic Flute
Embark on a fantastical journey
Music WOLFGANG AMADEUS MOZART
ROYAL OPERA
10 OCT — 3 NOV


DIEU·ET·
·MON·DROIT
ROYAL
OPERA
HOUSE
MAIN
ENTRANCE




Doors
GA GB GC
1D 2D
3D 3E
Lifts to levels
5 6
Crush Room
Dorfman Conservatory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SNUFF
18
KING SIZE
CIGARETTES
KING SIZE
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The more you smoke the more you risk your health
SEGAR & SNUFF
PARLOUR
OLD ESTABLISHED
S ILLEGAL TO
LL TOBACCO
RODUCTS TO
ONE UNDER
HE AGE OF 18
Welcome Here!


Stazenger
violets are Blue,
I've got alzheimer
Cheese on Toast
I'M NOT GAY
BUT MY GIRLFRIEND IS
I'M NOT GAY
UT MY BOYFRIEND IS
I ♥
MY BITCH
ME?
SARCASTIC?
EVER.
Roses are Red,
Bacon is tasty,
Poetry is Hard,
Bacon.
Q1. Are You Drunk?
Yes ☐
NO ☐ X
I'M NOT ANTISOCIAL
I'M ANTI STUPID
Tupac
Oasis
BACK


HOT FRESH DONUTS
HOT FRESH CHURROS
HOT FRESH DONUTS
HOT DONUTS & CHURROS
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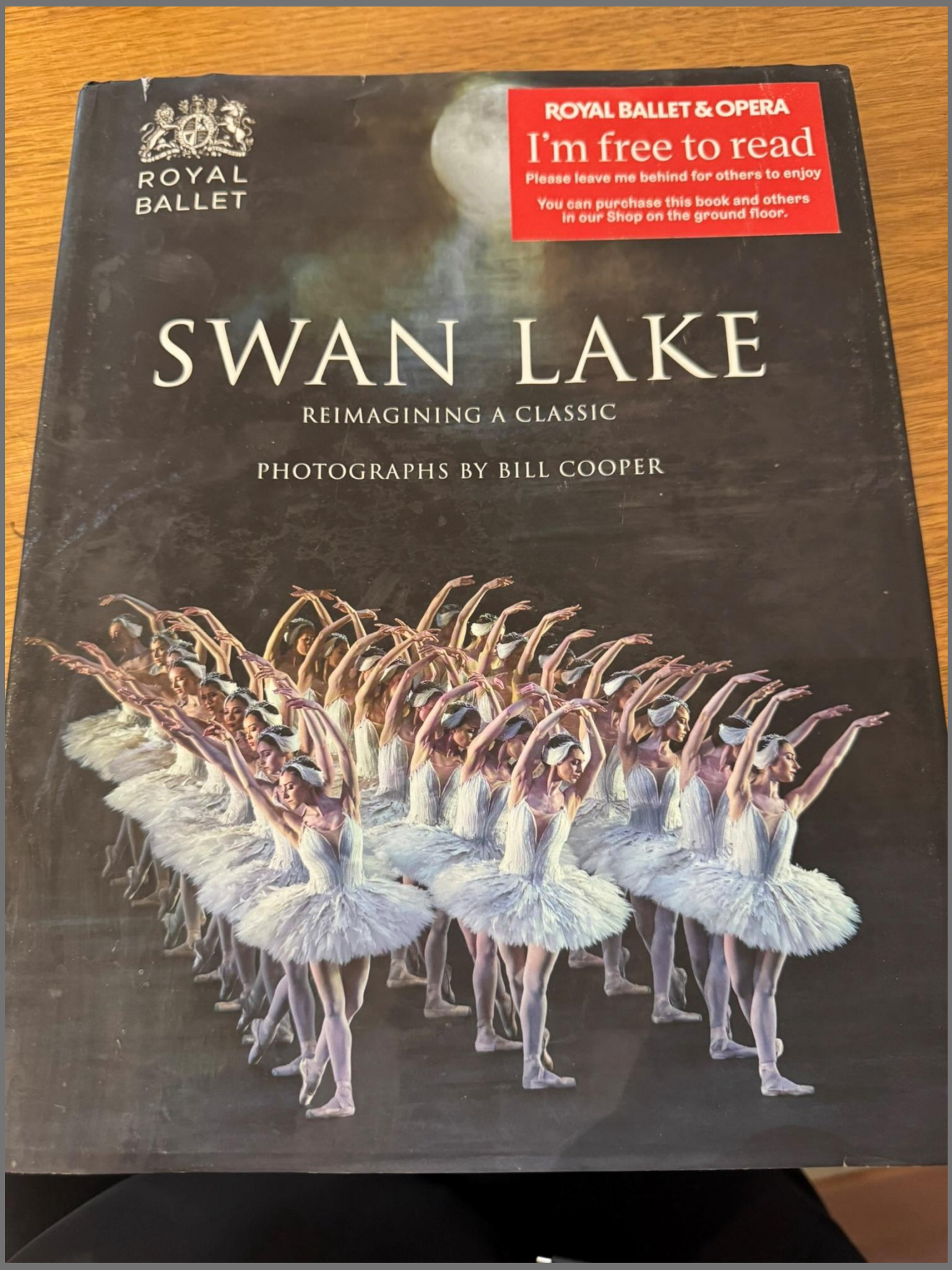
AND OPENED
ON THE


LÄDERACH
SWITZERLAND
Raspberry Blackberry
Panda
Cornflakes


Born to Dance
COVENT GARDEN
LONDON
Princess Steps Here
DO NOT DISTURB
A Love of Dance
Miss Ellie
Covent Garden London


ROYAL BALLET
ROYAL BALLET & OPERA
I'm free to read
Please leave me behind for others to enjoy
You can purchase this book and others in our Shop on the ground floor.
SWAN LAKE
REIMAGINING A CLASSIC
PHOTOGRAPHS BY BILL COOPER








ICE CREAM
NORTHERN
BL*C






Giselle


FOH


RAVEN GIRL
SYMPHONY IN C
A MIDSUMMER NIGHT'S DREAM
THE ROYAL OPERA
WORLD PREMIERE
THE TEMPEST
Thomas Adès
SIEGFRIED
WAGNER
AIDA
THE ROYAL BALLET
THE RITE OF SPRING
THE HOUSE WILL BURN


THE ROYAL OPERA
★★★★
'Altogether a fabulous evening'
THE GUARDIAN
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ROYAL OPERA HOUSE
10 | 12 | 15 | 18 | 27 | 30 September at 7pm | 2 October at 7pm | 4 October at 12 noon
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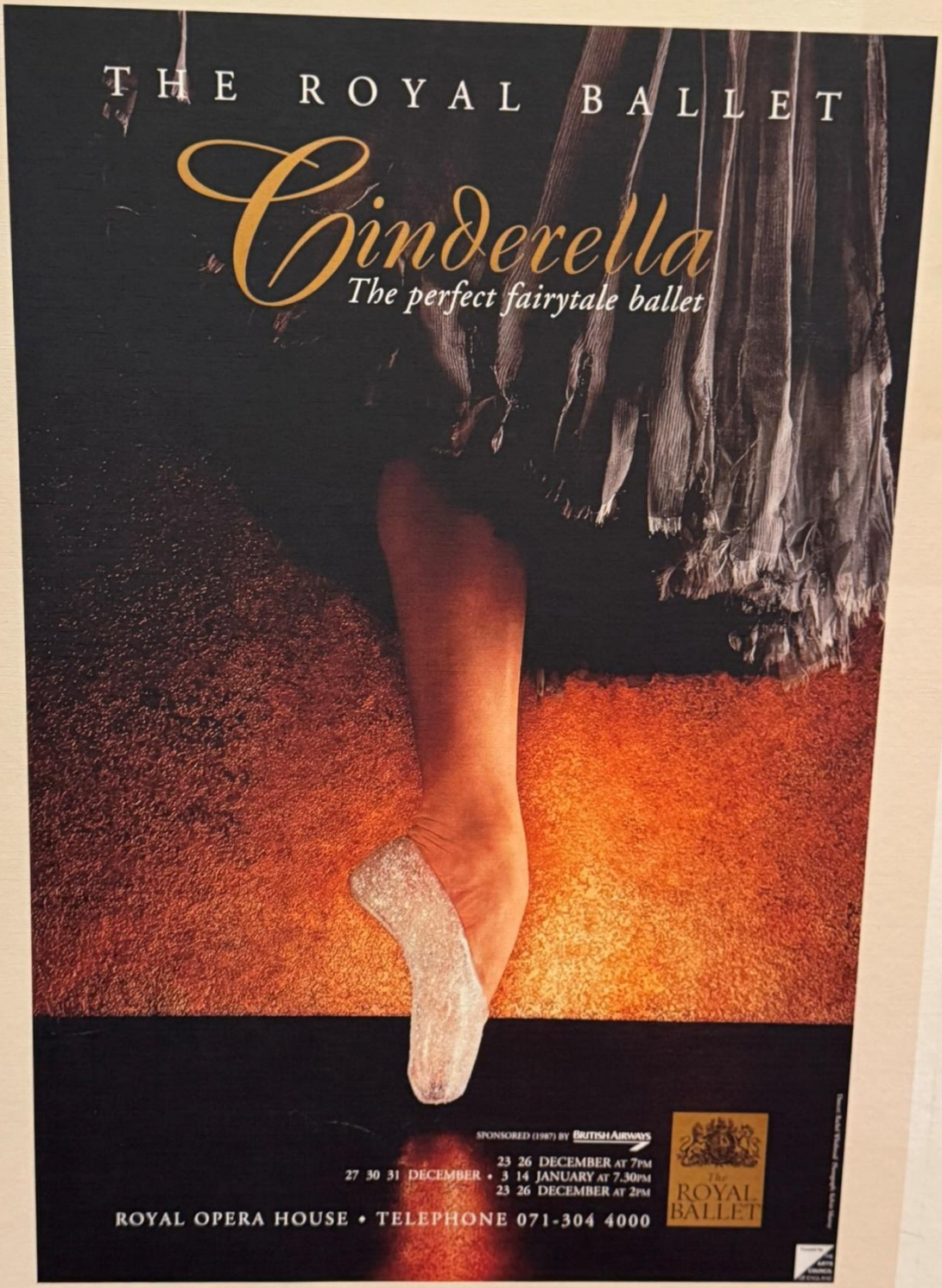
For cast details and to book online visit www.roh.org.uk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The ROYAL BALLET

1994

1994




THE ROYAL OPERA
LA TRAVIATA
GUISEPPE VERDI
14 | 17 | 23 January at 7pm 20 January at 3pm
26 January at 6.30pm 29 | 30 January at 7pm
1 | 4 | 6 | 9 | 12 | 14 February at 7pm
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CARMEN
NEW PRODUCTION | GEORGES BIZET
8 | 11 | 15 | 19 | 22 | 28 | 30 December at 7pm | 2 | 8 | 22 | 24 | 26 | 31 January at 7pm
6 January at 6.30pm | 3 February at 6.30pm
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ROYAL OPERA HOUSE

1969

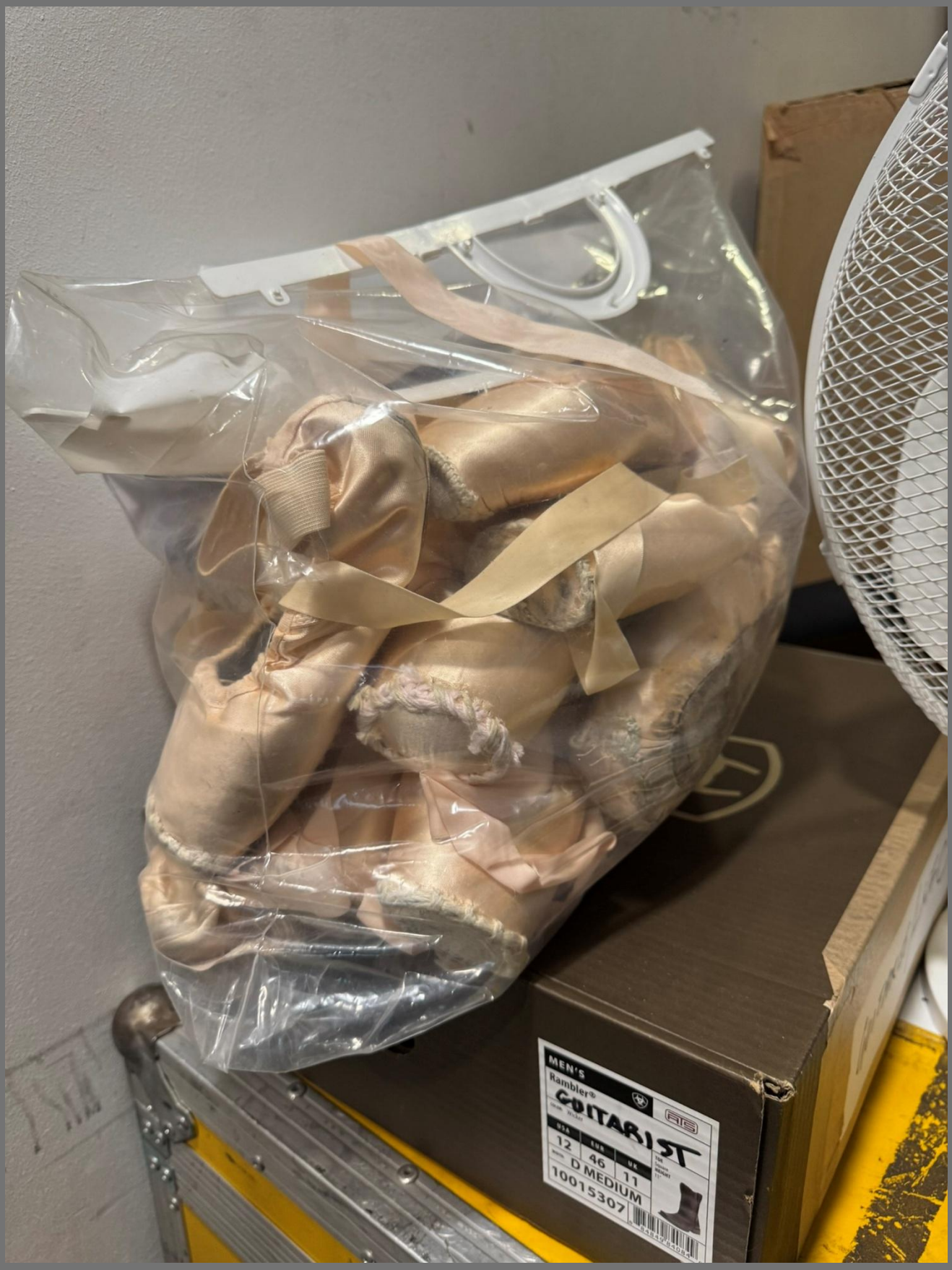
2006






HARRY'S

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COCKTAIL BAR


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THE LION KING
THE LION KING
THE LION KING
THE LION KING
SOMERSET HOUSE
LYCEUM THEATRE
HERCULES
lime


BG22 NTM


Worthing


RADIO


YOU ALREADY KNOW
YOU'RE GONNA LOVE IT!
BENNY ANDERSSON & BJÖRN ULVAEUS'
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THE SMASH HIT MUSICAL
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ESSOR A CYCLE HIRE






48
48
48
46


THE ROYAL MEWS
THE ROYAL MEWS


















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13


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13
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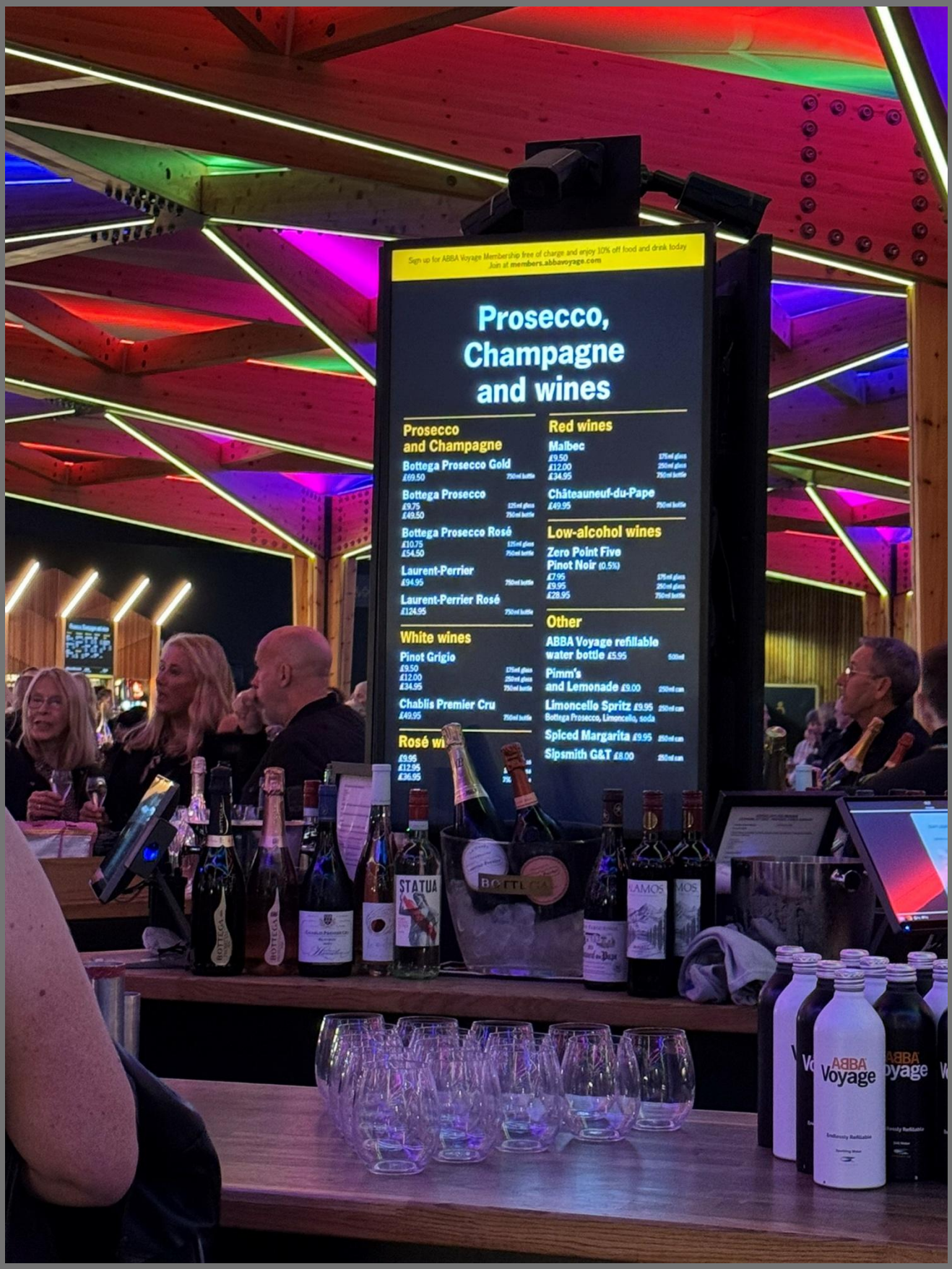
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ABBA
Voyage




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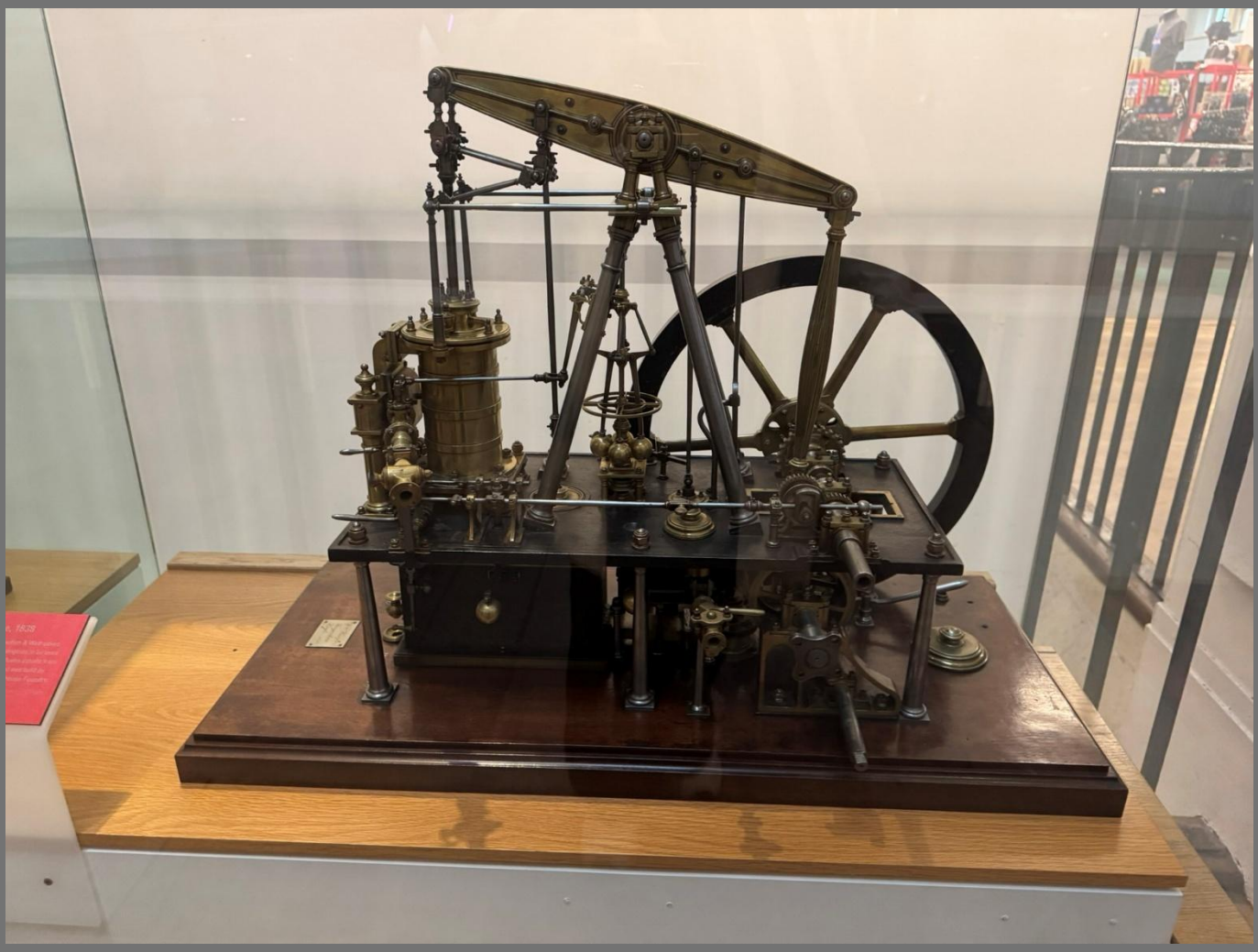
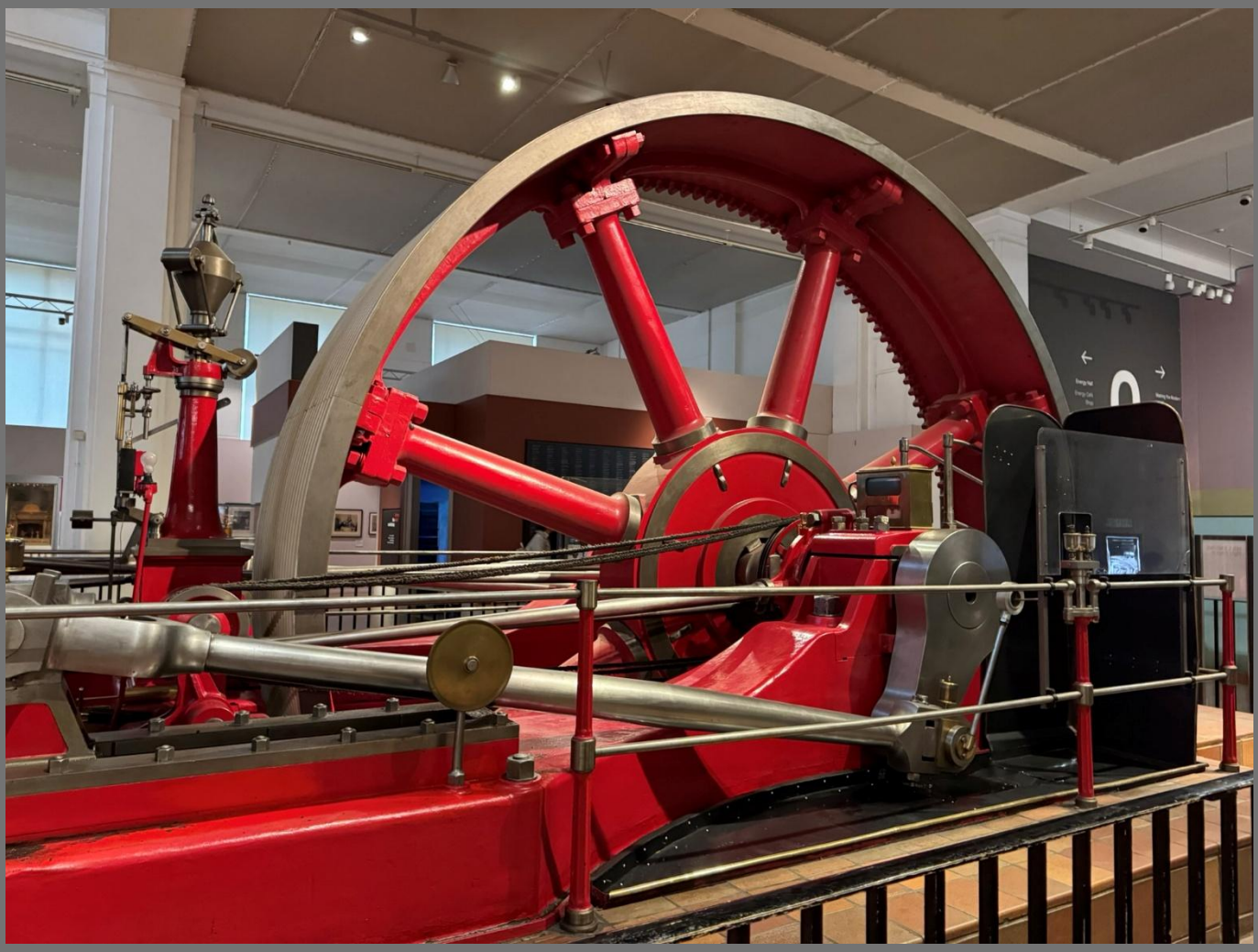
SCIENCE MUSEUM
ENTRANCE
SCIENCE MUSEUM
ENTRANCE
GROUP ENTRANCE


TECHNICIANS
TICKETS + i
IMAX 3D


SPACE
SHOP
NIKE
LOOK AROUND
LOOK AROUND



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MUSEUM
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Veuillez inserer le montant necessaire puis choissisez votre medaille en pressant sur l'un des boutons ci-dessous.
Inserire il denaro, quindi premere il pulsante lampeggiante per scegliere la moneta.
Inserta una moneda y presiona el botón luminoso para escoger.
Die Münze einwerfen und dann die aufleuchtende Taste eindrucken.
VISA
No change given
Monnaie exacte
Non da resto
Ningún cambio dado
Kein Wechselgeld

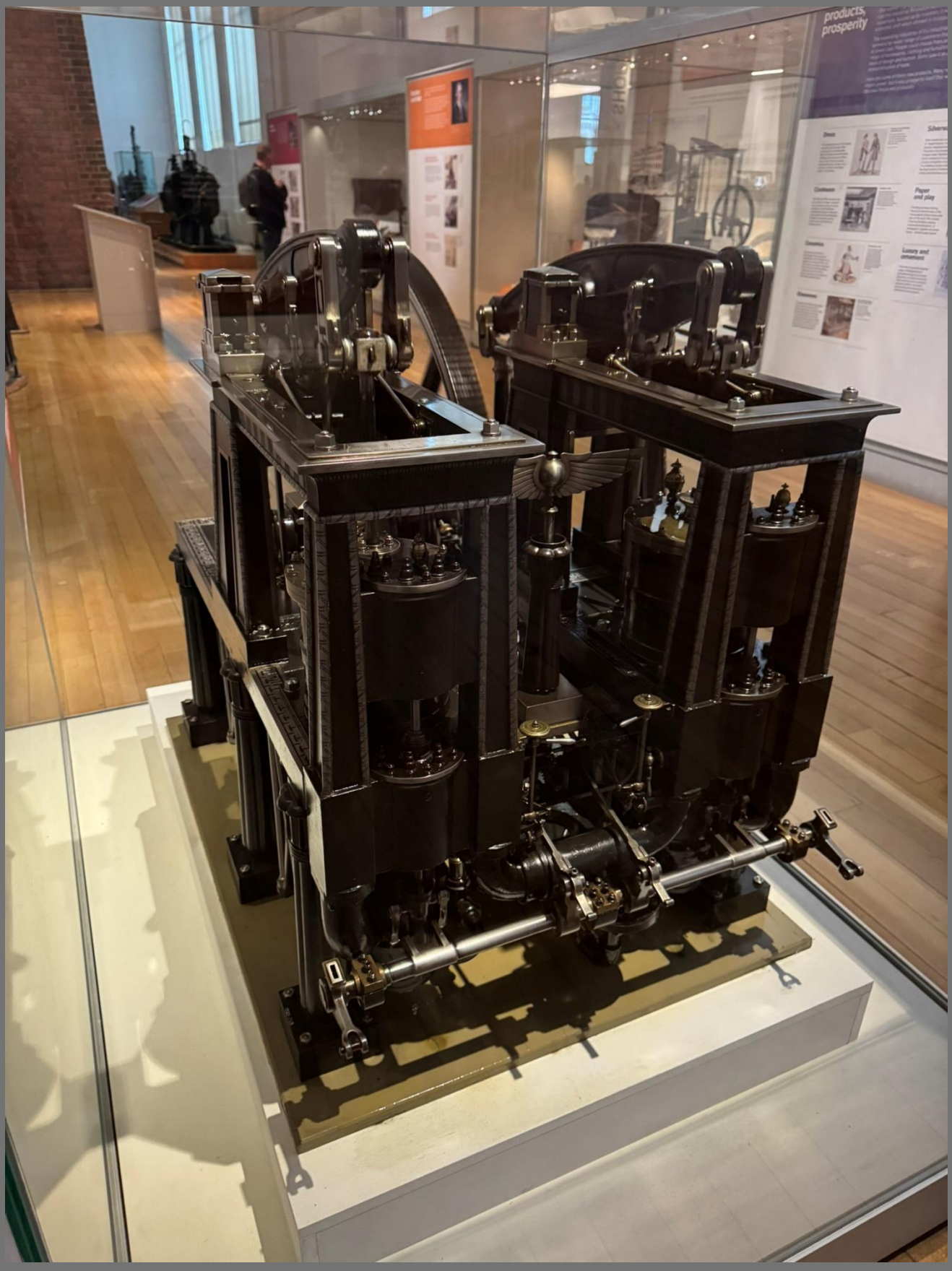


Mould and cast of Venus, plaster

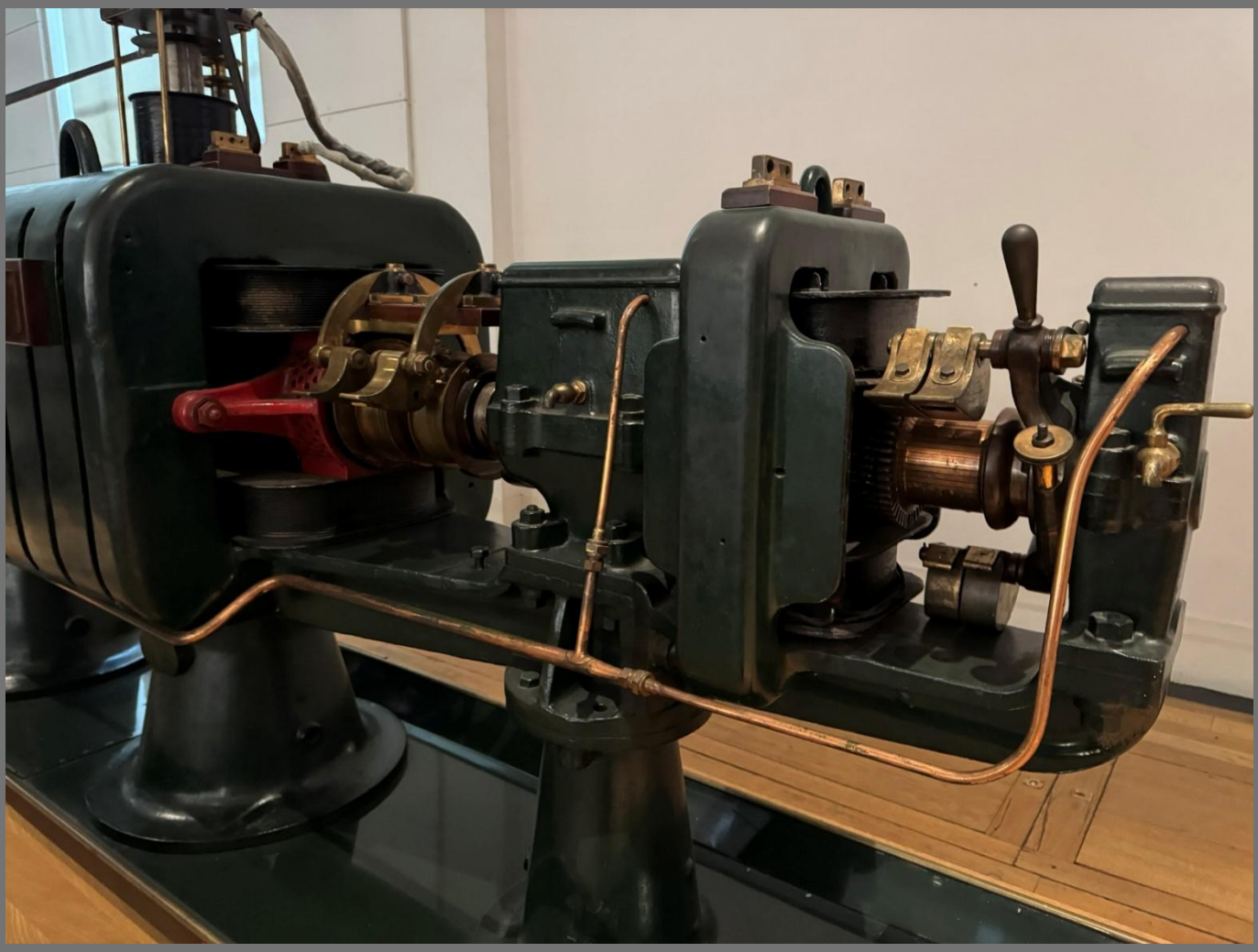
Venus was the Roman goddess of love.

Source: Major J M Gibson-Watt Inv. Nos: 1926-1075/215, /216

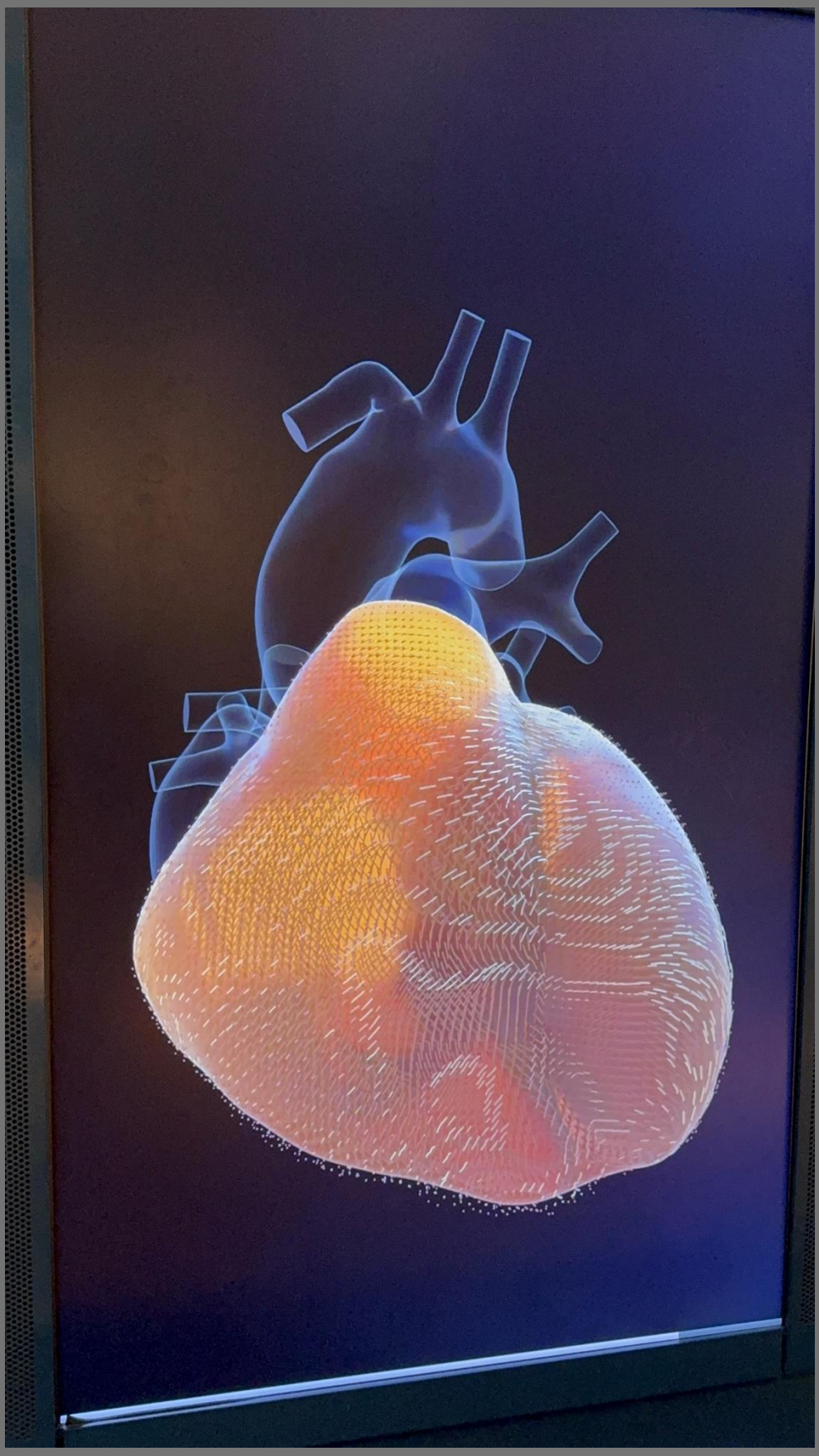



products,
prosperity
Power
and play
Luxury and
ornament


Becoming a craftsman
James Watt's family ran maritime businesses in Greenock, building ships that set sail from Scotland to trade across the Atlantic Ocean. At the workbench Watt learned practical skills about constructing and equipping ships. He also learned about being a merchant, exporting goods such as textiles, herring, coal and salt, and importing plantation products including tobacco and sugar.
1
Greenock in 1758
Map of the Clyde produced by James's uncle, 1734
2
Watt's tools
Watt listed the tools that he took when he left home in 1763 to live with his uncle in Glasgow. These examples come from his workshop.
1 leather apron, 1 jack & 1 Hand plain
1 saw 1 large farrour 1 small ditto
4 Chissals 4 Gamlars & 1 Quadrant and vanes 3 Pyles 1 Handsaw &
1 Tenon [saw]
Learning a trade
Watt went to London in 1756, training with John Morgan of Cornhill. Watt learned to make new instruments and met new contacts. He could now launch himself into the trade shaping Britain's fortunes, from producing new maps to making navigation instruments which more easily connected Scotland to the Atlantic shipping routes.
3
Architect's rule by Ramsden, c. 1775
Watt became friends with the great London instrument-maker Jesse Ramsden, who made this scale. At one time Watt had his business correspondence sent to Ramsden's shop.
4
Two protractors, 1760–1800
These unsigned protractors may have been made by Watt or bought in. They were wrapped in paper marked 'protractor price 7/6 in Watt's hand.
5
Pairs of dividers, 1760–80
An instrument was only as accurate as its measuring scale. Making or 'dividing' these scales was a highly skilled job which all instrument-makers had to master.
6
Three squares, 1758–73
One of these three small squares has been used to test punches. It is also marked with Watt's name.
7
Box of hinges, 1758–73
A supply of hinges, preserved in the workshop, for the boxes Watt made for his instruments.
8
Barometer face plate, 1758–73
This unfinished brass plate, preserved in Watt's workshop, was to go behind the glass tube and mercury column on one of his barometers.
9
Barometer face printing plate, 1758–72
This copper printing plate, lettered in reverse, was for making paper versions of the barometer face for cheaper instruments.
Invention and imitation
James Watt made and marketed his own inventions. One of his first was an ingenious perspective drawing tool, though he soon found it was being copied. Perhaps because of this experience, in later life Watt became an energetic enforcer of his steam engine patents.
10
Watt's perspective drawing apparatus, c. 1765
The instrument came in several sizes, and Watt used one himself for drawing and mapping. Some elements of its geometrical linkages resemble ideas he used later on his steam engines and sculpture machines.
11
Flute by Richard Potter, 1790
This flute dates from the period when James Watt was also making similar instruments.
12
Sections or 'joints' of Watt flutes
Parts of flutes have been found in the workshop, but there are no complete examples. Watt sold them for 3 shillings each, or about £90 in today's money.
13
Flute production – drills and reamers
Reamers were used to cut the central hole out of the tube accurately. Smaller versions were for the finger holes.
14
Pin gauges
Pin gauges marked the position of each finger hole in the flute before they were drilled.
15
Flute drill
A drill made by Watt to shape the flute finger holes all at once. His tools often show manufacturing innovations that would speed up work.
16
'I Lot' punch, 1758–72
This rocker rough-blocks punch, found among Watt's tools, is cut like 'I Lot', a clever and French flute-maker who inspired the long. Did Watt use the punch to mark his own flutes and sell them at a higher price?
17
Violin fingerboards and tuning peg, 1758–72
Few relics of Watt's lathe-making survive in the shop. The fingerboards are Daniel Cooper's specially shaped design to help novices to learn where to place their fingers.
18
Circular saw blades, 1758–72
The three circular saw blades, also used in violin-making, are possibly the earliest known examples of this now widely used cutting tool.




ENGINEERS
ENGINEERS



Engineers have transformed how we see and light our world.

Digital imaging sensors generate billions of images, from family photos to views of distant galaxies.

LED lighting illuminates our lives, using less energy than older alternatives.

These two innovations together shine a light on engineers' ability to visualise what they are creating and shape it towards a successful outcome.



With parents' permission, MetaboLight engineers Gemma and Isobel monitor a newborn baby with Subhabrata, a doctor. Image: MetaboLight UCL



Ilias Tachtsidis and Paola Pinti, leading members of the MetaboLight team, conducting research. Image: MetaboLight UCL

Prototype MetaboLight cap to help measure babies' brain health

Engineers including Ilias Tachtsidis at University College London are developing a new way to identify potential brain injuries in newborns quickly and safely using light.

Using a cap like this one, light is passed through a baby's brain and detected by a sensitive camera. Measuring these light levels gives an indication of blood flow, oxygen and how that oxygen is used in a baby's brain. Large quantities are essential for our brain health.

Lent by Professor Tachtsidis, University College London
Loan no. L2022-32

Prototype MetaboLight adult-sized cap

Over 15 years of research led a team of engineers, physicists and clinicians to develop a tool to see inside our brains using light. Devices were sent to researchers around the world to study brain function and help understand brain injuries following heart surgery or a stroke.

Cheaper than MRI scans, this is wearable tech. So anyone using it in a clinical trial or in a hospital can move around, or it can be brought to their bedside.

Lent by Professor Tachtsidis, University College London
Loan no. L2022-81


ENERGY
SCIENCE MUSEUM
SCIENCE MUSEUM
SCIENCE MUSEUM
SCIENCE MUSEUM

Southampton Hand prosthetic arm prototype

Inspired by how our brains and hands communicate with each other, engineer Peter Kyberd at the University of Southampton aimed to make a prosthetic arm that was easy for users to control. The user initiates movement by thinking, activating their arm muscles, which moves the hand. Sensors on the hand identify the shape of an object and the microprocessor selects the grasp needed.

Testing is a key part of the process, ensuring prosthetic limbs are wearable, usable and suit a person's needs.

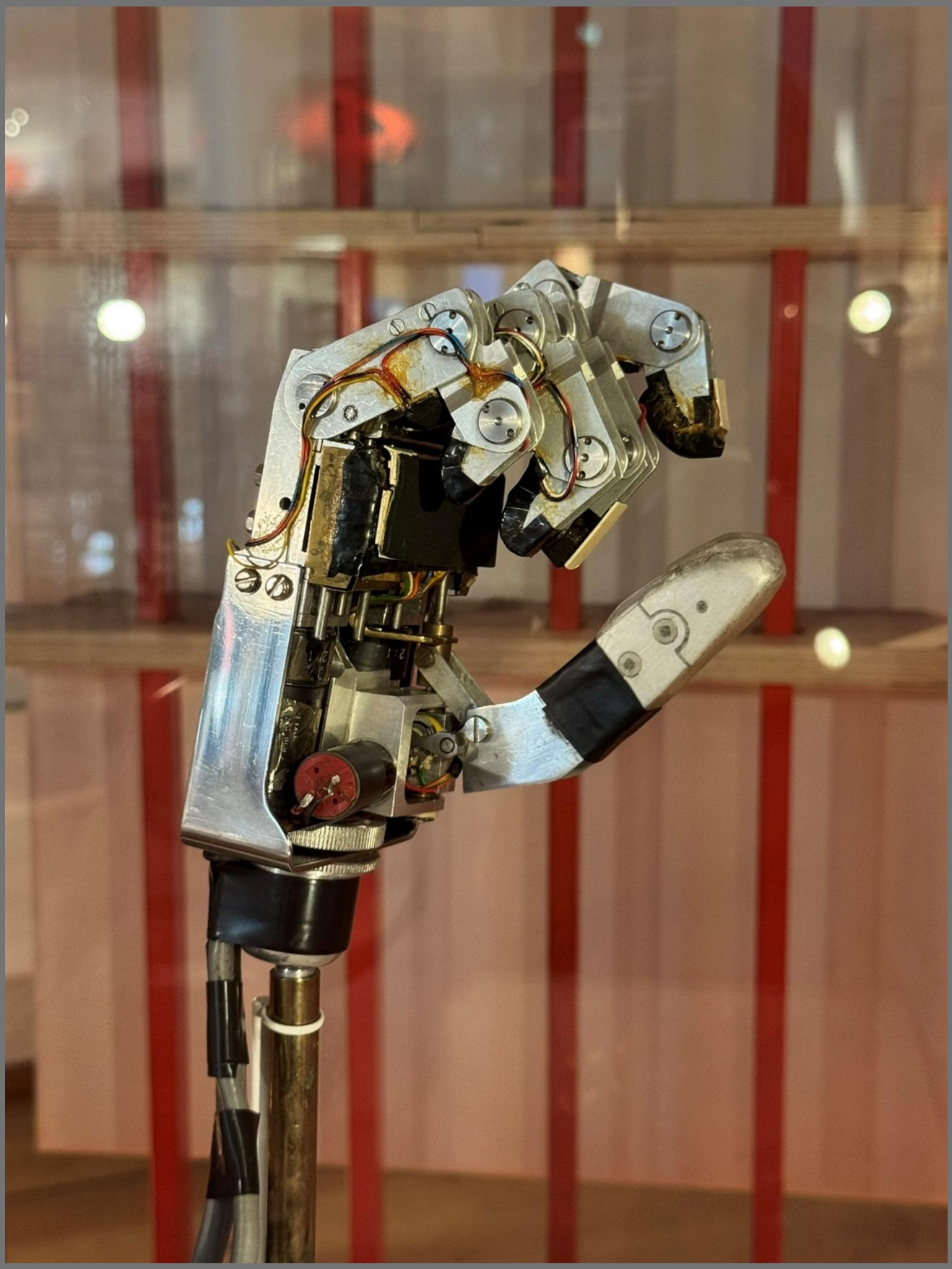


Prosthesis users are very practical people. If the solution does not help them they will tell you, and the best way they can see how it works is through a physical prototype.

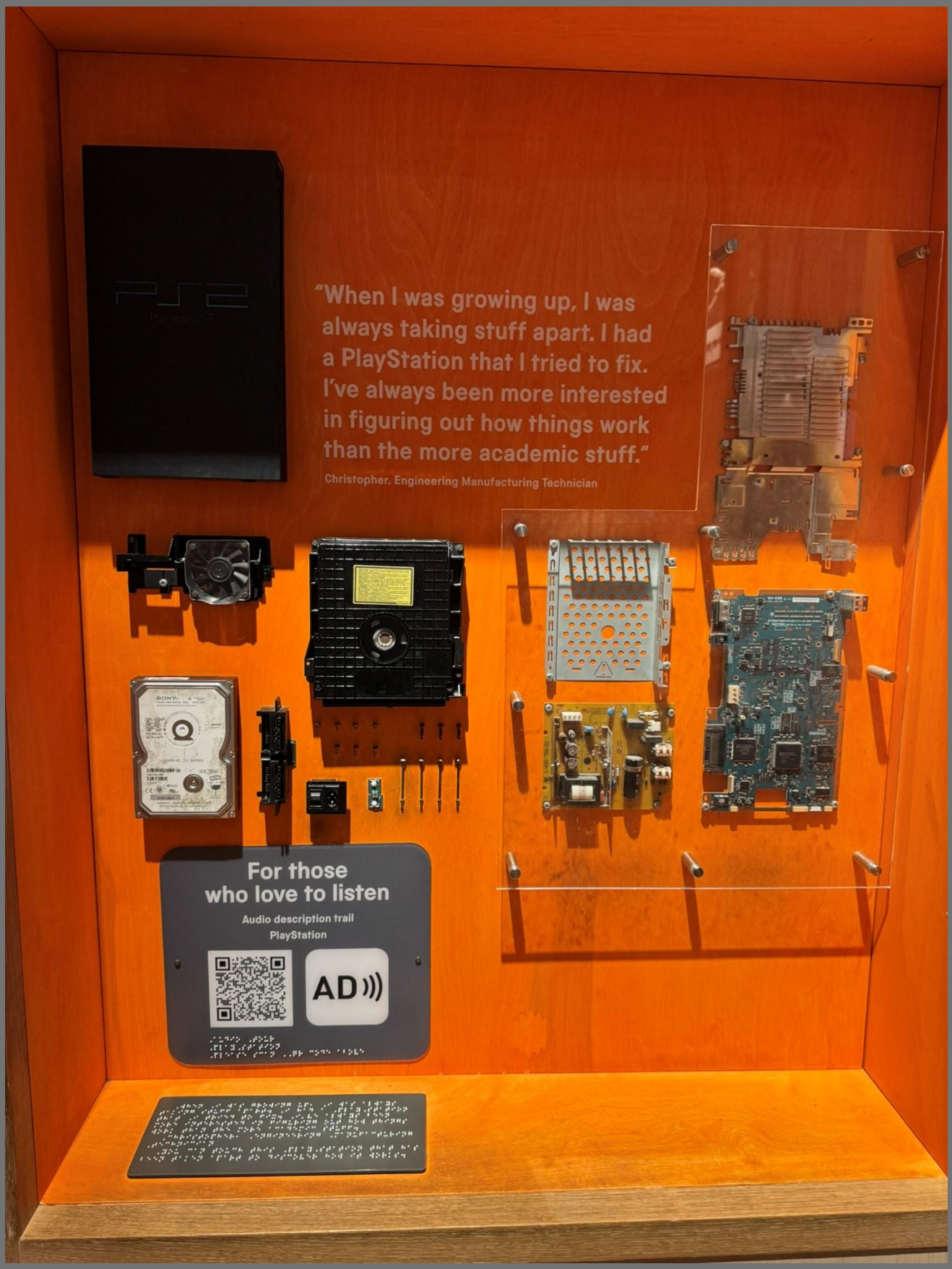
Peter Kyberd

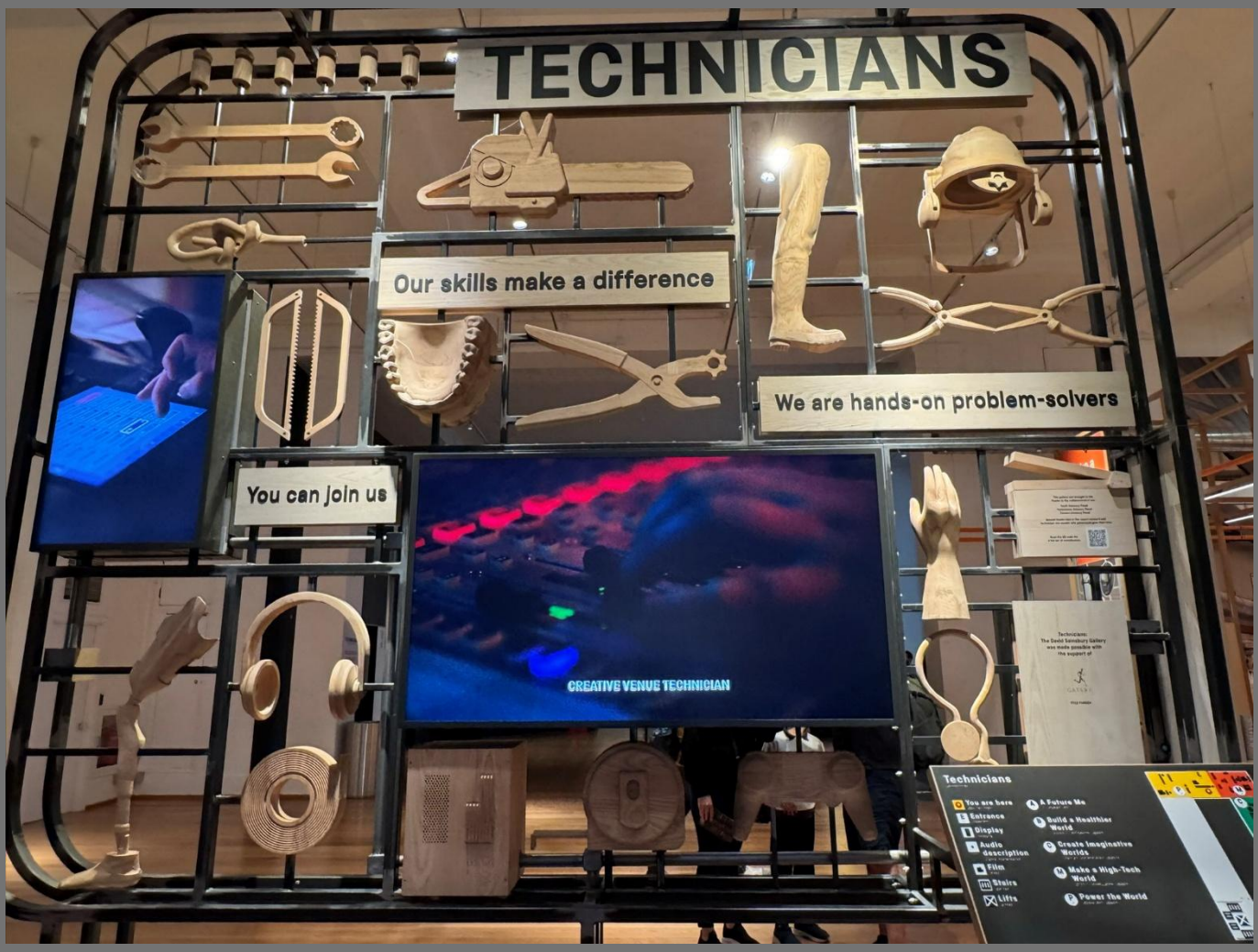
Image: James King-Holmes/Science Photo Library

Donated by University of Southampton
Science Museum Group. Object no. 2021-1256/1




TECHNICIANS
Our skills make a difference
We are hands-on problem-solvers
You can join us


PS2
PlayStation 2
"When I was growing up, I was always taking stuff apart. I had a PlayStation that I tried to fix. I've always been more interested in figuring out how things work than the more academic stuff."
Christopher, Engineering Manufacturing Technician
SONY
For those who love to listen
Audio description trail
PlayStation
AD


TECHNICIANS
Our skills make a difference
We are hands-on problem-solvers
You can join us
CREATIVE VENUE TECHNICIAN
Technicians
You are here
Entrance
Display
Audio description
Film
Stairs
Lifts
A Future Me
Build a Healthier World
Create Imaginative Worlds
Make a High-Tech World
Power the World

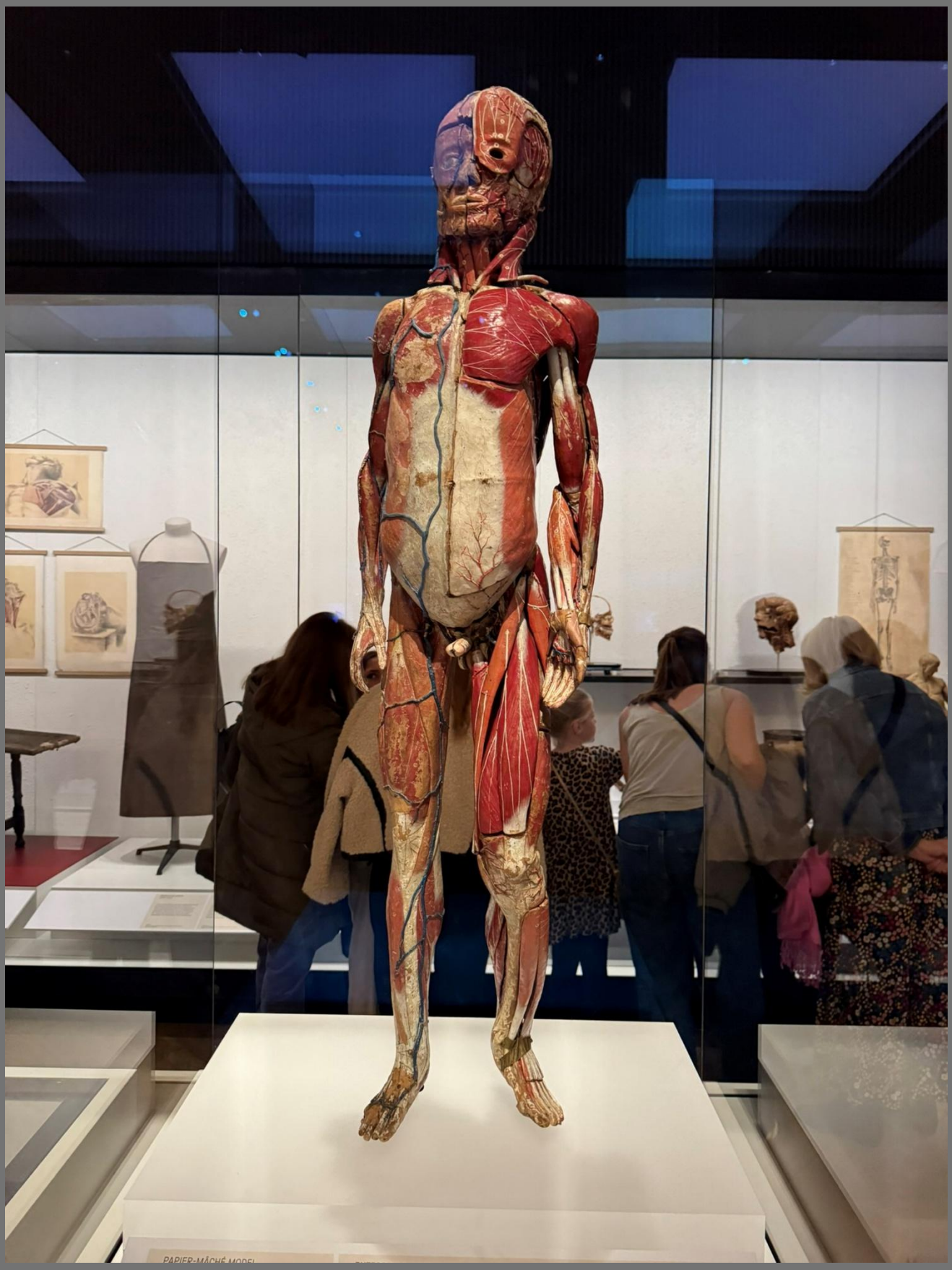
MEDICINE
THE WELLCOME GALLERIES
Water


ANATOMY


FEMALE WAX ANATOMICAL FIGURE
1818
The fresh skin tone and calm expression of this anatomical model sharply contrast with the dramatic exposure of her open chest. It is the work of Italian model-maker Francesco Calenzuoli, renowned for his precision and accuracy. He has re-created the body's vibrant colours, details as fine as thread veins, as well






PAPIER-MÂCHÉ MODEL

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2
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4
THE CHANGING STYLE
OF THE STETHOSCOPE
1830–1980
By the 1850s the stethoscope was an essential tool used routinely by doctors. René Laënnec's original design was adapted for different purposes. Trumpet-shaped stethoscopes were useful for examining pregnant women and
1 PIORRY STETHOSCOPE
1830–1850
3 STETHOSCOPE TO LISTEN
TO TWO CHEST AREAS




TECHNICON Lab aid
HUMAN LUNGS
13



POSTMORTEM TOOLS
2016

21 ELECTRIC BONE S

POSTMORTEM TOOLS
2016

Postmortems are medical examinations on a body after death. They are carried out on around 20% of people who die in Britain each year, to establish the cause. After careful external inspection of the body, specialised tools are used to open it up to locate signs of disease or injury. Organs are examined for abnormalities, and small samples of tissue or body fluids may be taken for further analysis. 15 16

England
Donated by John Radcliffe Hospital Mortuary
Science Museum Group


LEARNING FROM THE DEAD
A POSTMORTEM EXAMINATION
STEP 1
Long incision made down the front of the body to enable internal organs to be removed and examined
STEP 2
Single incision across the back of the head to allow the top of the skull to be removed to examine the brain
STEP 3
Other organs examined carefully by eye and dissected to look for abnormalities such as blood clots or tumours
STEP 4
If further information is required, pieces of tissue or body fluids may be taken for analysis
STEP 5
Organs returned to the body

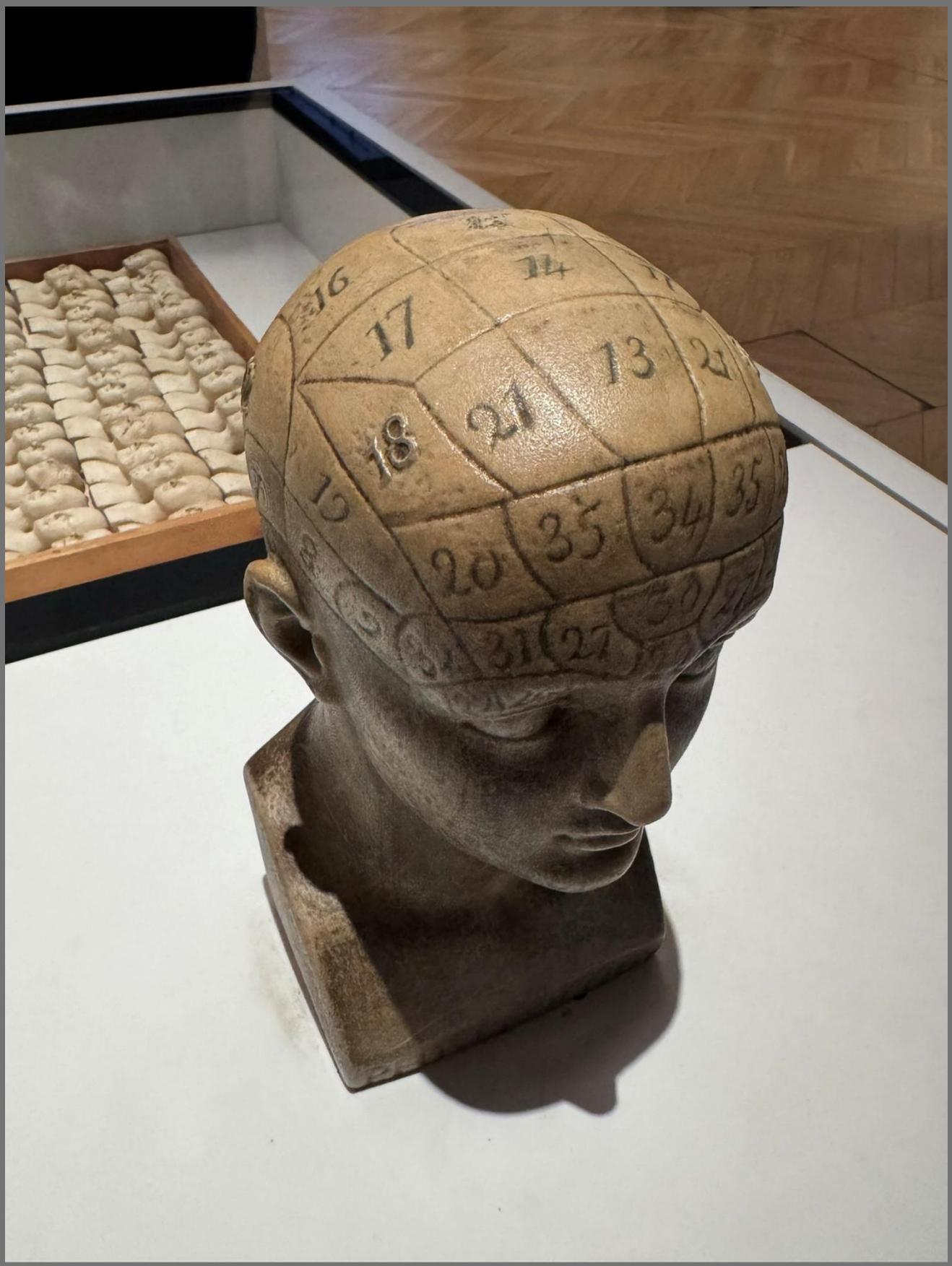


AL HEADS

2 TEACHING MODEL
OF THE HUMAN BRAIN
1800–1850

MEASURING OUR DIFFERENCE
1800–1850

Instruments to measure head and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27


8


CHEMICALLY PREPARED PAPER
W & R. BALSTON, Ltd.
GENUINE WHATMAN
CLINITEST
ALTEST
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PHENISTIX
CLINITEST
AMES COMPANY, INC.
SIX, SIMPLE, QUICK, RELIABLE ROUTINE URINE TESTS
*ALTEST Reagent Tablets
for the detection of PROTEIN
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for the detection of true GLUCOSE
*ICTOTEST Reagent Tablets
for the detection of BILIRUBIN
*CLINITEST Reagent Tablets
for the detection and estimation of SUGAR
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for the detection of ACETONE & DIACETIC ACID
*TRADE MARKS
All the above colours are for illustration only. Do not use for actual tests.
Write to Ames Company for standardised colour scales and full information.

7

10

BLOOD TRANSFUSION SERVICE.

Blood Group B

Reg. No.

Name COLLIER

Address

Donor's Signature

BLOOD TRANSFUSION SERVICE

SOUTHEND-ON-SEA

HOSPITALS BRANCH

Certificate of Blood Donation

Serial No.

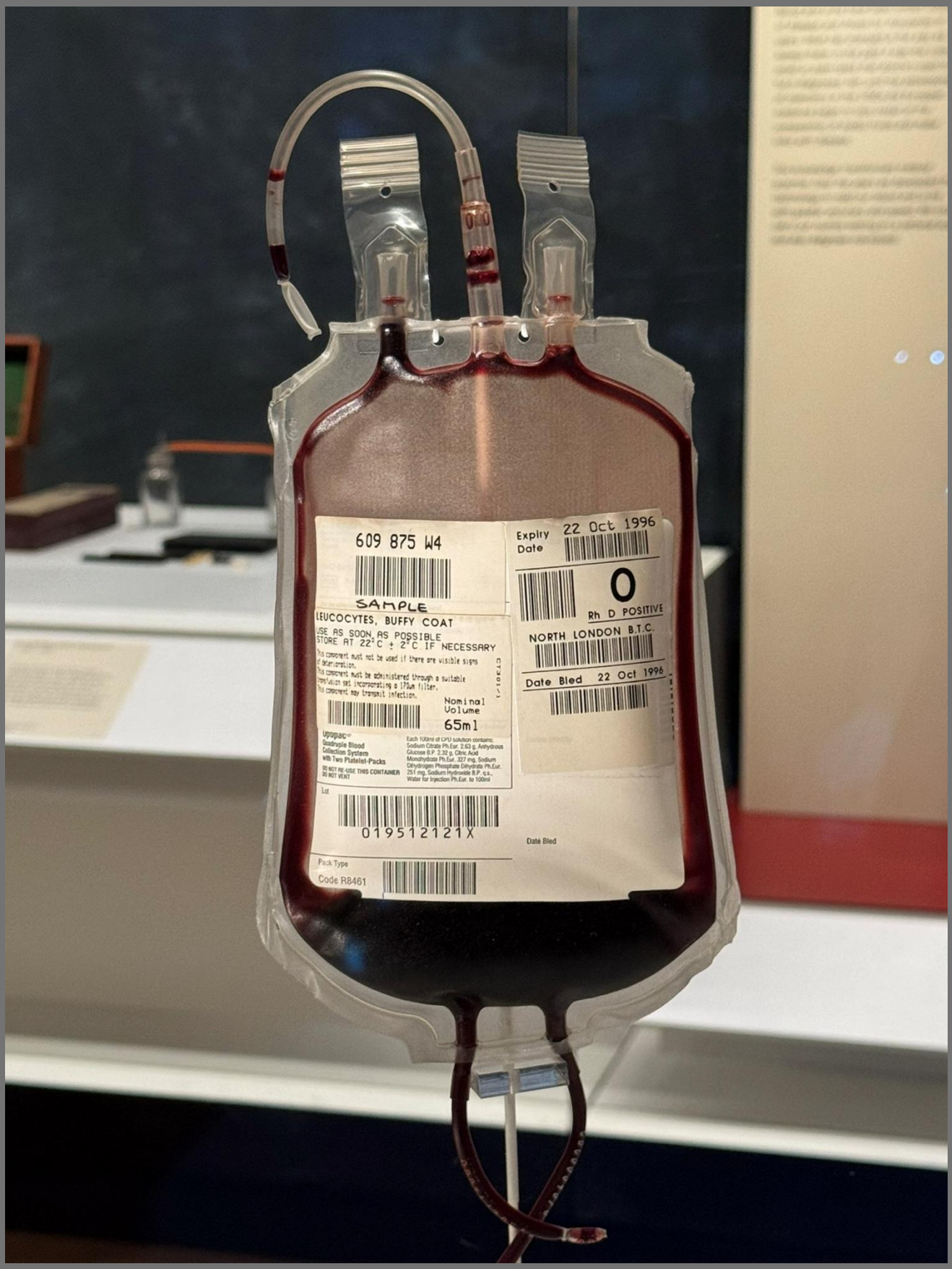
Reg. No. of Donor

Date 13 APR 1950

Time

Place GENERAL HOSPITAL SOUTHEND ON SEA

K&J 51-7783


609 875 W4
SAMPLE
Expiry Date
22 Oct 1996
O
Rh D POSITIVE
NORTH LONDON B.T.C.
Date Bled 22 Oct 1996
LEUCOCYTES, BUFFY COAT
USE AS SOON AS POSSIBLE
STORE AT 22°C ± 2°C IF NECESSARY
This component must not be used if there are visible signs of deterioration.
This component must be administered through a suitable transfusion set incorporating a 170µm filter.
This component may transmit infection.
Nominal Volume
65ml
Uupac
Quadruple Blood Collection System with Two Platelet-Packs
DO NOT RE-USE THIS CONTAINER
DO NOT VENT
Each 100ml of CPD solution contains: Sodium Citrate Ph.Eur. 2.63 g, Anhydrous Glucose B.P. 2.32 g, Citric Acid Monohydrate Ph.Eur. 327 mg, Sodium Dihydrogen Phosphate Dihydrate Ph.Eur. 251 mg, Sodium Hydroxide B.P. q.s., Water for Injection Ph.Eur. to 100ml
Lot
019512121X
Date Bled
Pack Type
Code R8461



7 CALENDAR FOR ESTIMATING EXPECTED BIRTH DATE 1822–1869

This calendar was an early method to calculate when a woman would give birth, by counting the days from her last missed menstrual period. Before reliable pregnancy tests, whether a woman was pregnant or not could be uncertain. There was little way of knowing for sure until movement was felt during the later stages of pregnancy.

England
Lent by Wellcome Collection to the Science Museum Group
Object no. A615358/1

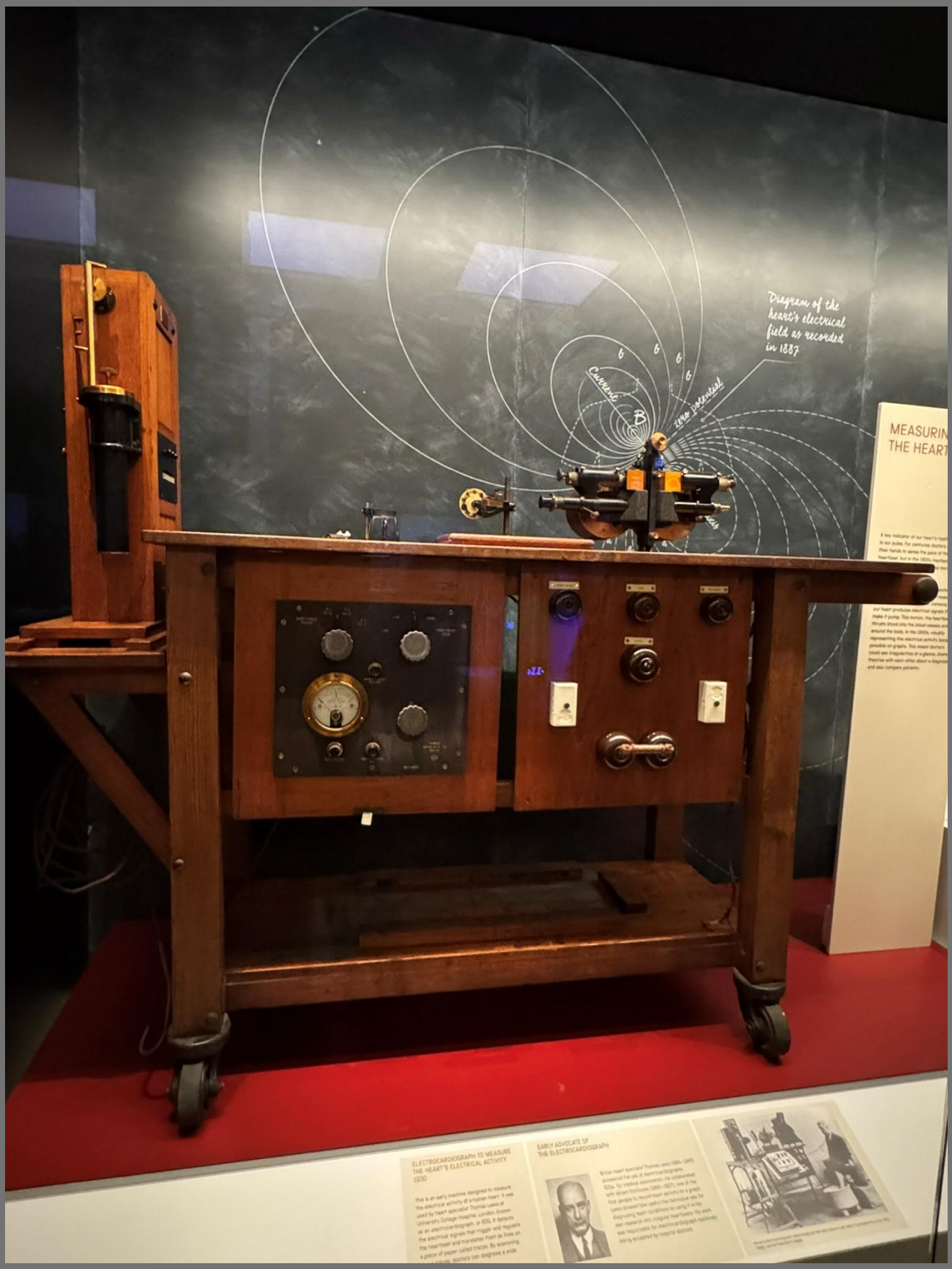
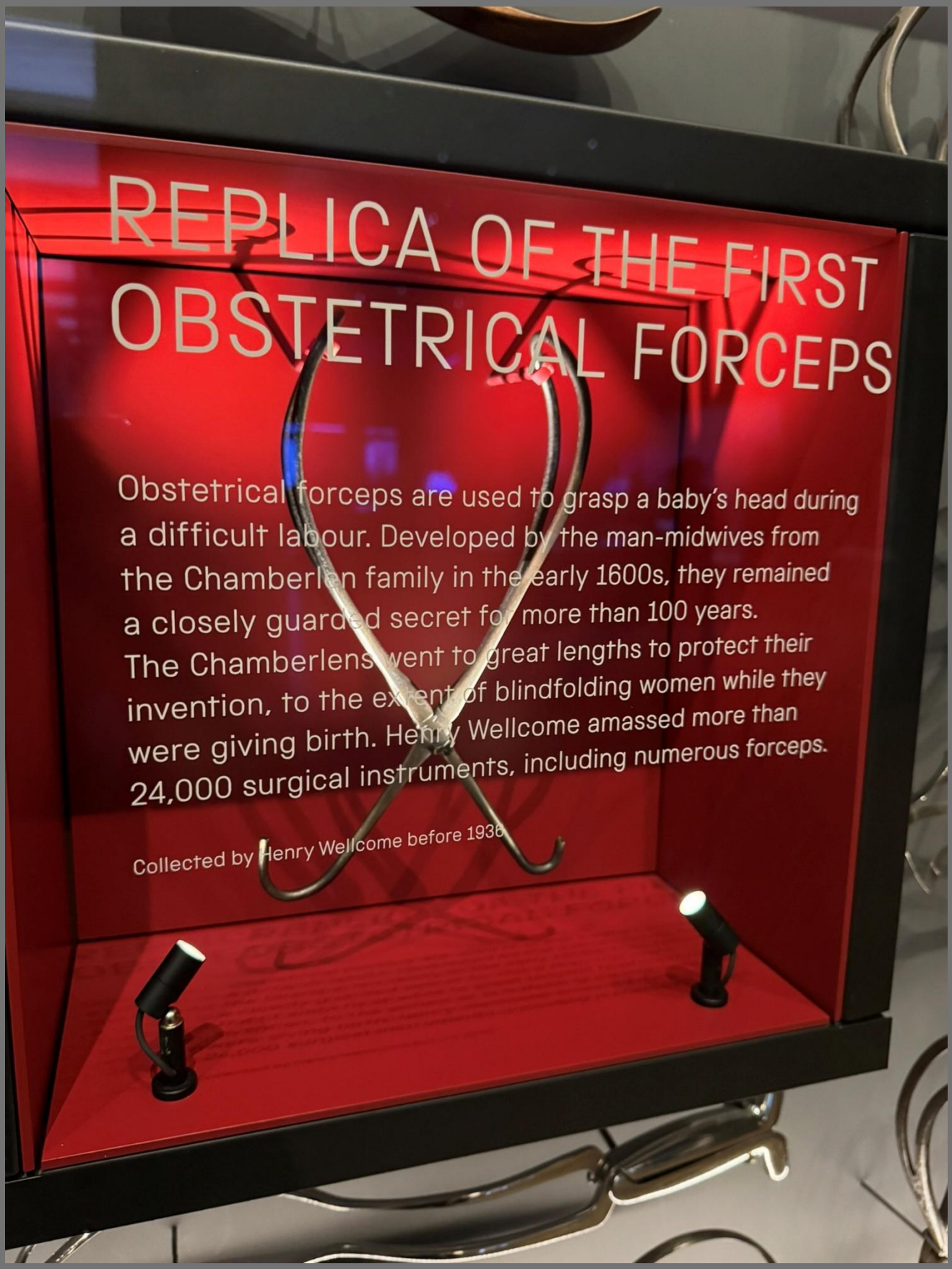


Diagram of the heart's electrical field as recorded in 1887
Currents
B
time potential
MEASURIN
THE HEART
ELECTROCARDIOGRAPH TO MEASURE THE HEART'S ELECTRICAL ACTIVITY
1930
EARLY ADVOCATE OF THE ELECTROCARDIOGRAPH




REPLICA OF THE FIRST OBSTETRICAL FORCEPS
Obstetrical forceps are used to grasp a baby's head during a difficult labour. Developed by the man-midwives from the Chamberlen family in the early 1600s, they remained a closely guarded secret for more than 100 years. The Chamberlens went to great lengths to protect their invention, to the extent of blindfolding women while they were giving birth. Henry Wellcome amassed more than 24,000 surgical instruments, including numerous forceps.
Collected by Henry Wellcome before 1936
Oxygenaire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Collected by Henry Wellcome before 1936



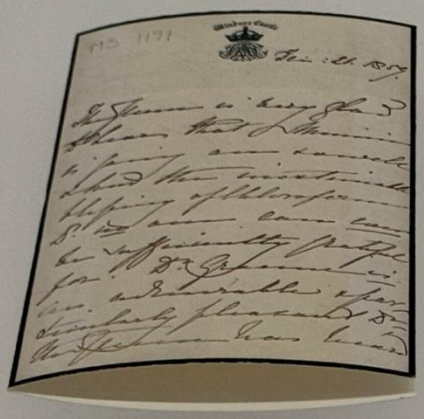



IRISH MOSS
TANE POISON
JAMAICA PEPPER
CANNE D' INDE
PRIMEVERE
TURMERIC
GUM ARABIC
ARUM ROOT


ottobock.




bebionic



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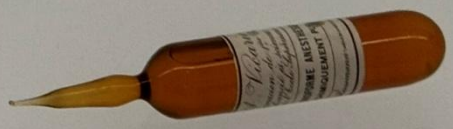

10


We apologise for the removal of this object
Object: 1979-216 Glass bottle of cocaine eye drops
This object has been removed for Conservation.
For more information please contact:
scmobjectenquiries@sciencemuseum.ac.uk
12
Cocaïn
20%
F TABLETS.
F TABLETS.
F TABLETS.


1

EXPERIMENTING WITH LISTER
1830 – 1880

Joseph Lister experimented with ideas about infection, often assisted by his wife, Agnes. Using household items and specially made glassware, he noticed that urine exposed to air decomposes, while urine not exposed to air remains intact. Lister concluded that something in the air – germs, as we now know them – caused infection.

He continued to experiment, adapting his antisepsis technique along the way.

England
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FINEST SELECTED
SURGICAL
SILKWORM GUT
LIGATURES
R. WHITELAW (ABDN.) LTD
51 Woolmanhill, Aberdeen
SUTURES
FOR SURGICAL USE ONLY
EDINBURGH & LONDON
MILNES
SILKWORM
GUT.
Wilson St., New Cross Rd., London, S.E.
THE GALEN MANUFACTURING Co., Ltd.
Dr. HAGEDORN'S NEEDLES.
STOUT
FISTULA
THIN
FISTULA
INTESTINE
STRAIGHT
HALF-CURVED.
EXTERNAL
MOUNTED
R 2176
1937
17
18

STITCHING BLOOD VESSELS AND WOUNDS

Stitches known as ligatures are used to close blood vessels. Stitches known as sutures are used for wounds.

Cotton, silk, animal tendons, horsehair, metal clips, staples and synthetic materials have all been used for practice or on patients. Since the 1900s stitches have been sterilised in chemicals or heat before use to prevent infection. Many ligatures are eventually absorbed by the body.

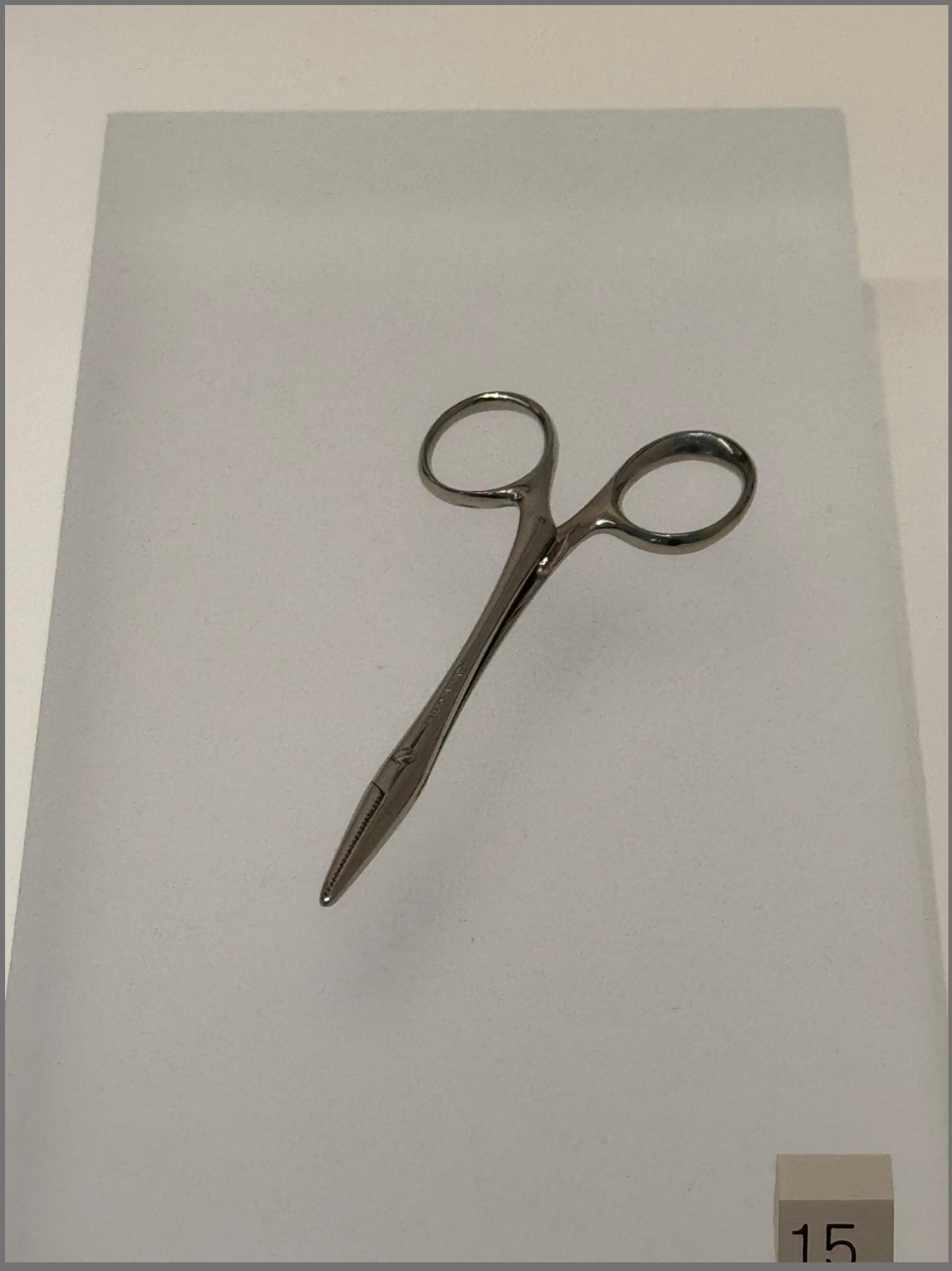
17 LIGATURES AND STITCHES

Lent by Wellcome Collection
to the Science Museum Group
Object nos. A270171, A616705, A616706,
A616708, A613554, A642842

18 NEEDLE HOLDER

Britain
Science Museum Group
Object no. 2000-163


TRANSFUSION SET
900
800
700
600
500 C.C.
500 C.C.
C.C. BLOOD
CONTENTS OF CASE
TRANSFUSION NEEDLES.
GENERAL SURGICAL COMPANY, LIMITED.
13


15

TREATMENTS DURING THE FIRST WORLD WAR
1979

This scene is of medical treatment and care during the First World War (1914–18). Stretcher-bearers carry the wounded to w ambulances. Those with minor injuries are t before returning to battle. For the seriously wounded, it is the beginning of the road ho often with mental as well as physical scars.

England
Science Museum Group
Object no. 1986-1497









had his right leg
e in 1903, his father,
his prosthetic leg.
n a chair or table leg
al sleeve.

Service started in 1948,
o buy prosthetics. They
their own ingenuity.

6 AMPUTATION KIT
1800s

Amputation instruments from the 1700s are similar to modern tools, with knives to cut through skin and muscle and saws to sever bone. Rather than ebony handles, however, today's instruments are entirely metal, which is easily sterilised by heat. Blood flow to the limb was stopped with a tight-fitting tool, known as a tourniquet.





ARM FOR
LBOW AMPUTEES

99-528

EXPERIENCE OF AMPUTATION DURING THE FIRST WORLD WAR

"They'd taken it off, guillotined it off, never said a word, the only thing I knew was the men on one crutch with a tin can with a leg off, begging. I prayed to die, what a shock."

William Henry Towers, 1989

REPORTING ON AMPUTATIONS

"Next to the loss of life, the sacrifice of a limb is the greatest sacrifice that a man can make for his country."

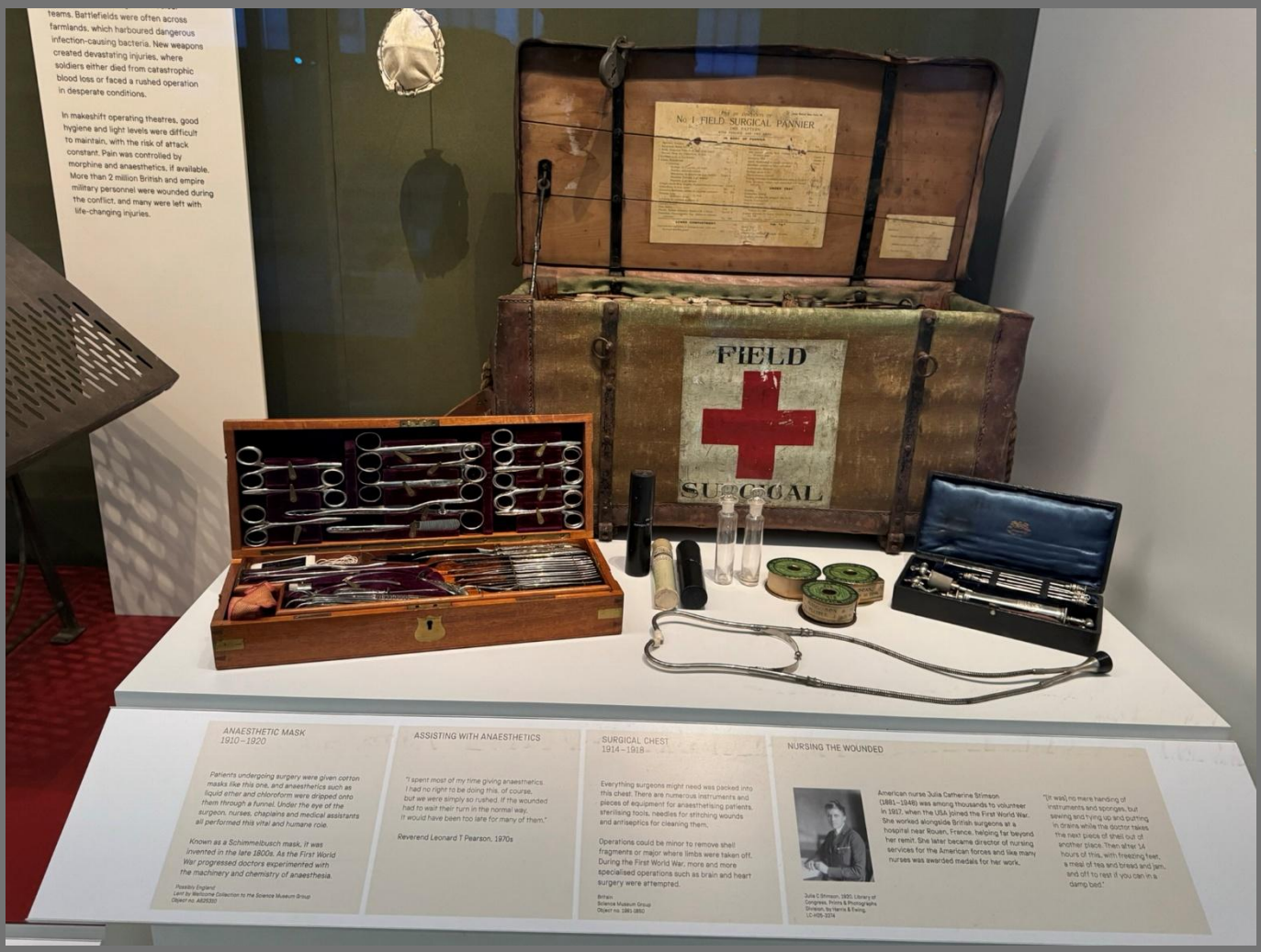
The Times, 1920

4 ROYAL
SURGI
1917

To limit th
World War
to include
prevent th
and so hel
Equipment
to control
included a

England
Made by J Weiss
Donated by Kyna
Science Museum


1
2
3
VAR VETERAN
PROSTHETIC LIMBS FOR SERVICEMEN


teams. Battlefields were often across farmlands, which harboured dangerous infection-causing bacteria. New weapons created devastating injuries, where soldiers either died from catastrophic blood loss or faced a rushed operation in desperate conditions.
In makeshift operating theatres, good hygiene and light levels were difficult to maintain, with the risk of attack constant. Pain was controlled by morphine and anaesthetics, if available. More than 2 million British and empire military personnel were wounded during the conflict, and many were left with life-changing injuries.
No 1 FIELD SURGICAL PANNIER
FIELD
SURGICAL
ANAESTHETIC MASK
1910–1920
Patients undergoing surgery were given cotton masks like this one, and anaesthetics such as liquid ether and chloroform were dripped onto them through a funnel. Under the eye of the surgeon, nurses, chaplains and medical assistants all performed this vital and humane role.
Known as a Schimmelbusch mask, it was invented in the late 1800s. As the First World War progressed doctors experimented with the machinery and chemistry of anaesthesia.
Possibly England
Lent by Wellcome Collection to the Science Museum Group
Object no. A620330
ASSISTING WITH ANAESTHETICS
"I spent most of my time giving anaesthetics. I had no right to be doing this, of course, but we were simply so rushed. If the wounded had to wait their turn in the normal way, it would have been too late for many of them."
Reverend Leonard T Pearson, 1970s
SURGICAL CHEST
1914–1918
Everything surgeons might need was packed into this chest. There are numerous instruments and pieces of equipment for anaesthetising patients, sterilising tools, needles for stitching wounds and antiseptics for cleaning them.
Operations could be minor to remove shell fragments or major where limbs were taken off. During the First World War, more and more specialised operations such as brain and heart surgery were attempted.
Britain
Science Museum Group
Object no. 1981-1850
NURSING THE WOUNDED
American nurse Julia Catherine Stimson (1881–1946) was among thousands to volunteer in 1917, when the USA joined the First World War. She worked alongside British surgeons at a hospital near Rouen, France, helping far beyond her remit. She later became director of nursing services for the American forces and like many nurses was awarded medals for her work.
Julia C Stimson, 1920, Library of Congress, Prints & Photographs Division, by Harris & Ewing, LC-H05-3374
"[It was] no mere handing of instruments and sponges, but sewing and tying up and putting in drains while the doctor takes the next piece of shell out of another place. Then after 14 hours of this, with freezing feet, a meal of tea and bread and jam, and off to rest if you can in a damp bed."


SIX
HALF CURVED.
BAYER & MELTZER



ANAESTHETIC MASK
1910–1920

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ASSISTING WITH ANAESTHETICS

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Reverend Leonard T Pearson

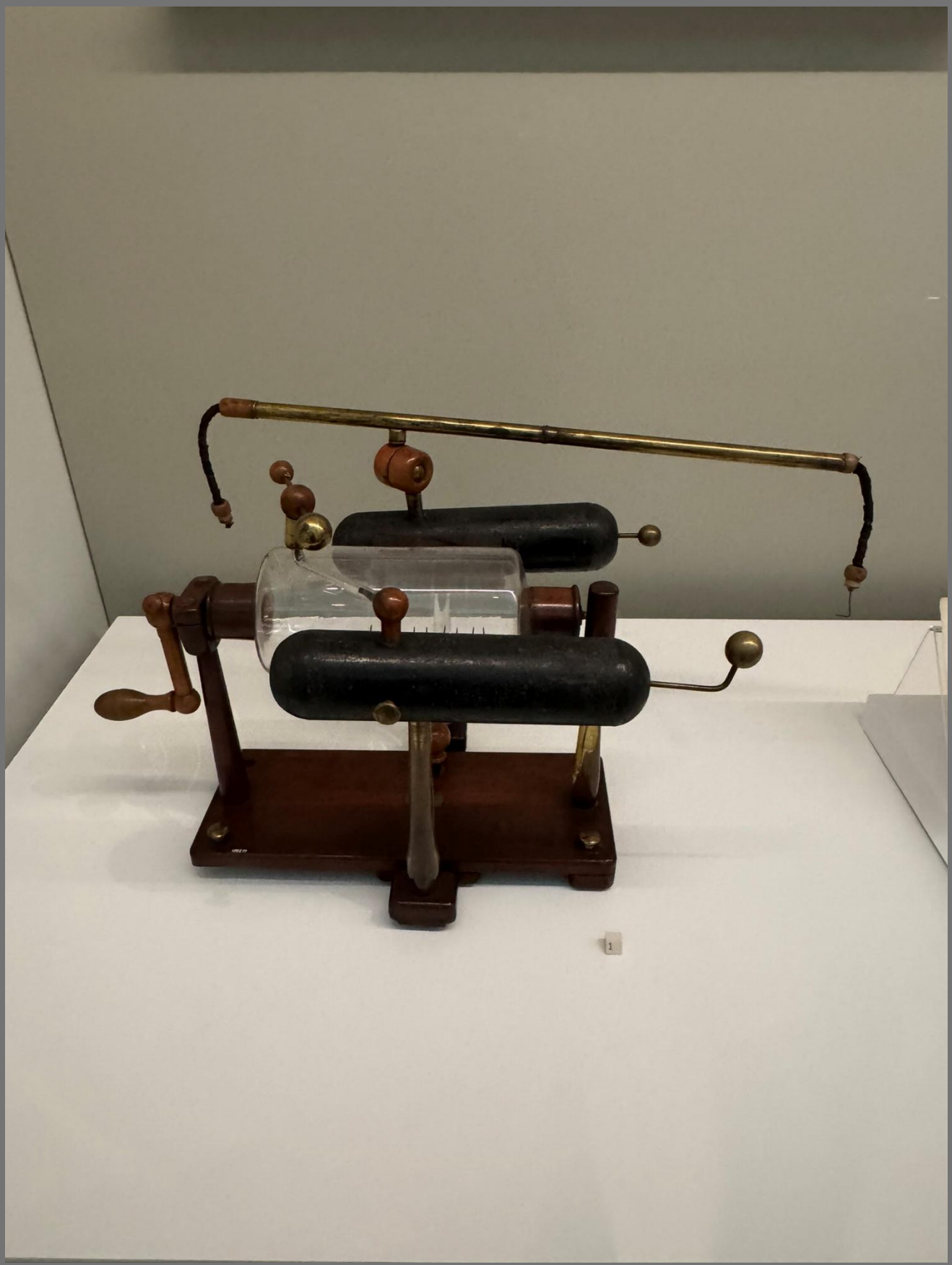
SURGICAL CHEST
1914–1918

Everything surgeons might need was pa this chest. There are numerous instrume pieces of equipment for anaesthetic sterilising tools.


LIST OF CONTENTS OF
No. 1 FIELD SURGICAL PANNIER
1905 PATTERN
WITH PADLOCK AND TWO KEYS
IN BODY OF PANNIER.
LOWER COMPARTMENT.
UNDER TRAY.
TIN "A"
FIELD
SURGICAL
CHLOROFORM
DROP BOTTLE
SURGEONS · RUBBER · ADHESIVE · PLASTER · MAW'S


ADHESIVE PLASTER
& Sons,
by 10 yards.
ADHESIVE






All In Search of Health
Should Wear Harness'
"Electropathic"
Belt
For Suffering Men & Women
For Nervous Exhaustion, Insomnia, Rheumatism, Indigestion, Sleeplessness, Ladies' Ailments &c.
Imparts New Life and Vigour
Note The Address
Pamphlet and Consultation Free
The Medical Battery Co Ltd.
52 Oxford St London W.
The Electropathic Belt
Thousands of Sufferers
Consultation Free
Mr. C. H. Harness'
Electric Corset
For Health, Comfort & Elegance
No Woman Should Be Without One!!
The Medical Battery Co. Ltd.
52 Oxford St. London W.
The Very Thing for Ladies
Harness' Magnetic Corsets
For Women of all Ages
Harness' Magnetic Corsets
5/6
Men! Why are you weak?
Dr. Sanden's Electric Belt and Suspensory for
Weak Men
A never failing cure for all the weakness of men
Dr. Sanden Electric Belt

ELECTROMAGNETIC MACHINES
1854–1905

These portable devices were used to generate therapeutic electricity in the home or by travelling practitioners. Turning the handles produced an electromagnetic current. The faster the handle was turned, the stronger the current. The brass cylinders were then applied to the body, delivering a mild prickling sensation. Adverts claimed the devices could relieve pain and even cure cancer and heart disease.

Lent by Wellcome Collection to the Science Museum Group


DAVIS & KIDDER'S
PATENT MAGNETO-
ELECTRIC MACHINE
FOR NERVOUS DISEASES.
OPTICIANS,
No. 177 CLAY STREET,
SAN FRANCISCO, CAL.
PATENTED AUG. 1, 1854
4


THE IMPROVED
MAGNETO-ELECTRIC MACHINE,
FOR
NERVOUS DISEASES,
MANUFACTURED BY
S. MAW, SON & THOMPSON, 10, 11, & 12, ALDERSGATE STREET, LONDON, E.C.
Directions for Use.—Connect the two metallic cords with the sockets
ent of the box, and apply the handles attached to the cords to the part
subjected to the electric current, the strength for which may be regulated by the speed at which the handle is turned. If it is
gently to increase the power, the brass knob at the end of the box should be pulled out, so as to disconnect the keeper from the magn
If a piece of wet sponge is placed in each handle, it will obviate the prickling sensation which at times is an annoyance to the patient. The
sponges must not be put away in the box damp, as they will rust the apparatus. The bearings and spring should be occasionally oiled.
A106925.


5
NEWLY INVENTED
IMPROVED MAGNETO
ELECTRIC MACHINE.
FOR NERVOUS DISEASES
DIRECTIONS.—Connect two metallic cords or wires with the Sockets in the ends of the Box, and apply the handles connected with the other ends of the metallic cords or wires, to any part of the person through which it is desirable to pass the current of Electricity. Then turn the Crank, regulating the strength of the current by the speed, and by the knob at the end of the Box: it being desirable to increase the strength only to that degree most agreeable to the patient. It is less unpleasant to the patient if wet sponges are placed in the ends of the Handles, and these applied to the skin, as they prevent the prickling sensation. The sponges should never be put inside of the Box while wet, as they rust the machinery. In applying it for the Toothache, Tic-Doloreux, or Neuralgia, the operator takes one Handle and places his fingers or sponge over the part affected, while the patient holds the other Handle. In applying it to the foot, place one of the Handles in the water, with the foot, and hold the other in the hand or apply it to any other part of the person. The Bearings and Spring must be oiled occasionally.


MALARIA
CURED BY
QUININE
TAKE THE STANDARD TREATMENT
SEE YOUR PHYSICIAN
ORANGE QUININE WINE
Prepared according to the BRITISH PHARMACOPŒIA 1898.
Dose. One wineglassful 2 or 3 times a day. Each ounce contains one grain of pure hydrochloride of quinine.
Burroughs Wellcome & Co.
"TABLOIDS"
COMPRESSED.
Livingstone Rousers.
Tonic, Cathartic and Antimalarial.
Dose, one to three Tabloids, and repeat in two hours if necessary. In intermittent fever, the first dose should be taken directly before the cold stage appears.
PREPARED BY
Burroughs Wellcome & Co.,
Manufacturing Chemists,
Snow Hill Buildings, LONDON, E.C.
Now's the time
to take
MERITAL
QUININE
COMPOUND
TABLETS
1/11
PER BOTTLE THIRTY TABLETS
FOR QUICK RELIEF OF COLDS & INFLUENZA
Dr Mc MUNN'S
Kinate of QUININE and Cinchonine
TONICA
1936
S.F.V.
QUINQUINA AU VIN
CE VIN N'EST PAS UN MEDICAMENT
REGISTRE DU COMMERCE BRUXELLES 4574


R:CINCH:AM
CHINÆ COR
TEX
Cort.
Cali
say.
PULV:CHIN
Chinae


1
1 EARLY SAMPLES OF QUININE
1820–1840
The active ingredient in cinchona bark is quinine, and these are some of the first samples of it. It was extracted in 1820 by French chemist Pierre-Joseph Pelletier and pharmacist Joseph Bienaimé Caventou. By treating people with quinine rather than the bark, doses could be better controlled and side effects reduced.
Producing quinine synthetically is expensive and complex, so it is still extracted from its bark.
France
Lent by Wellcome Collection to the Science Museum Group
Object nos. A182555, A182556, A182560, A182561
FEVER-CATCHERS
Caventou and Pelletier
Ordre National des Pharmaciens, Paris/Archives Charmet/ Bridgeman Images



Pierre-Joseph Pelletier (1788–1842), a French chemist, and Joseph Bienaimé Caventou (1795–1877), a French pharmacist, succeeded in extracting quinine from the cinchona bark where others had failed. Such was the demand, by 1826 Pelletier's factory was processing 150 tonnes of bark into 3.6 tonnes of quinine.

Pelletier and Caventou hunted for other substances, and discovered and named the poison strychnine.

2 QUININE FOR SALE
1870–1910

In powdered form, quinine doses were easier to measure. They also reduced some of its potential side effects when administered from bark, such as hearing loss, nausea, ringing in the ears and headaches. Post offices in India and Jamaica and pharmacies around the world often sold individual doses to those who could afford them.

Companies started producing quinine from cinchona bark for global markets.



ANALYSING QUININE
1850–1883

English chemist John Eliot Howard analysed many different varieties of cinchona for their quinine content. He was attempting to identify which varieties gave the best results for the drug.

His work influenced the setting up of British cinchona plantations. These supplied the army and newly acquired colonies such as India with a cheap and reliable source of quinine.

AN EXPERT ON QUININE

John Eliot Howard (1807–83) was a British chemist who dedicated his life's work to studying cinchona bark and quinine. His research was so respected that his family firm, Howards and Sons, became synonymous with high-quality bark. His many publications on the subject aimed at differentiating and illustrating the number of species of cinchona trees, a matter still debated. A genus (group) of cinchona plants, *Howardia*, was named in his honour after his death.



QUININE, THE TRAVELLER'S FRIEND
1907–1919

Quinine was packed into the medical kits of early explorers to treat fever, and carried to the Amazon, Antarctica and across the Atlantic. It came to Europe in the mid-1600s, but it took another 250 years before people discovered it could cure malaria by blocking the parasite's ability to invade our red blood cells. Quinine is still sometimes used to treat severe malaria.

England
Lent by Wellcome Collection to the Science Museum Group

3 AIRCRAFT FIRST-AID KIT
From Alcock and Brown's first Atlantic crossing, 1919

Object no. A700023

4 MEDICAL KIT
From Shackleton's Antarctic expedition, 1907–09

Object no. A700031

5 MEDICINE CHEST
From Lange's Amazon expedition, 1911

Object no. A700016

6 LIVINGSTONE
A MALARIA ME
1890

The British explore
quinine treatment
travelling through
These were later

Before the 1898
parasites caused
many others – be
purged by bowel
had a laxative ef

England
Donated by N Michalows
Science Museum Group
Object no. 1995-10 pt 3



QUININE FOR THE EVERYDAY
1870–1970

Quinine is best known for treating malaria in the tropics, but the bitter-tasting drug found its way into everyday products such as cold remedies, contraception, toothpaste, headache relief pills and asthma drugs.

In pill, powder, liquid and lozenge form, quinine was widely available over the counter and by prescription. To make quinine more palatable, sugar and water were added to create tonic water that was often drunk with gin.

7 SOLUBLE QUININE CAPSULES
1915

Britain
Lent by Wellcome Collection to the Science Museum Group
Object no. A629915 pts 2, 3

8 LIQUID QUININE PREPARATIONS
1940–1960

Britain
Lent by Wellcome Collection to the Science Museum Group
Object nos. A676493, 1987-955/26

9 WHITE'S BLACK CROW COLD PILLS
1941–1950

USA
Donated by Victoria and Albert Museum Science Museum Group
Object no. 1989-253

10 QUININE PILLS
1860–1950

Lent by Wellcome Collection to the Science Museum Group
Object nos. A629733, A630151 pt 16, A635375/1, A640263, A654674, A874296, 1979-464/11

11 QUININE OINTMENT AND CONTRACEPTIVE SPONGE
1920–1940

Britain
Lent by Wellcome Collection to the Science Museum Group
Object nos. A626883, A626897

12 INJECTABLE QUININE FOR CHEST COMPLAINTS
1930–1970

England
Donated by Barclays Bank Science Museum Group
Object no. 1979-464/10



A RECIPE FOR HEALTH
1562–1566

8 NEW WORLD DRUGS
1562–1566

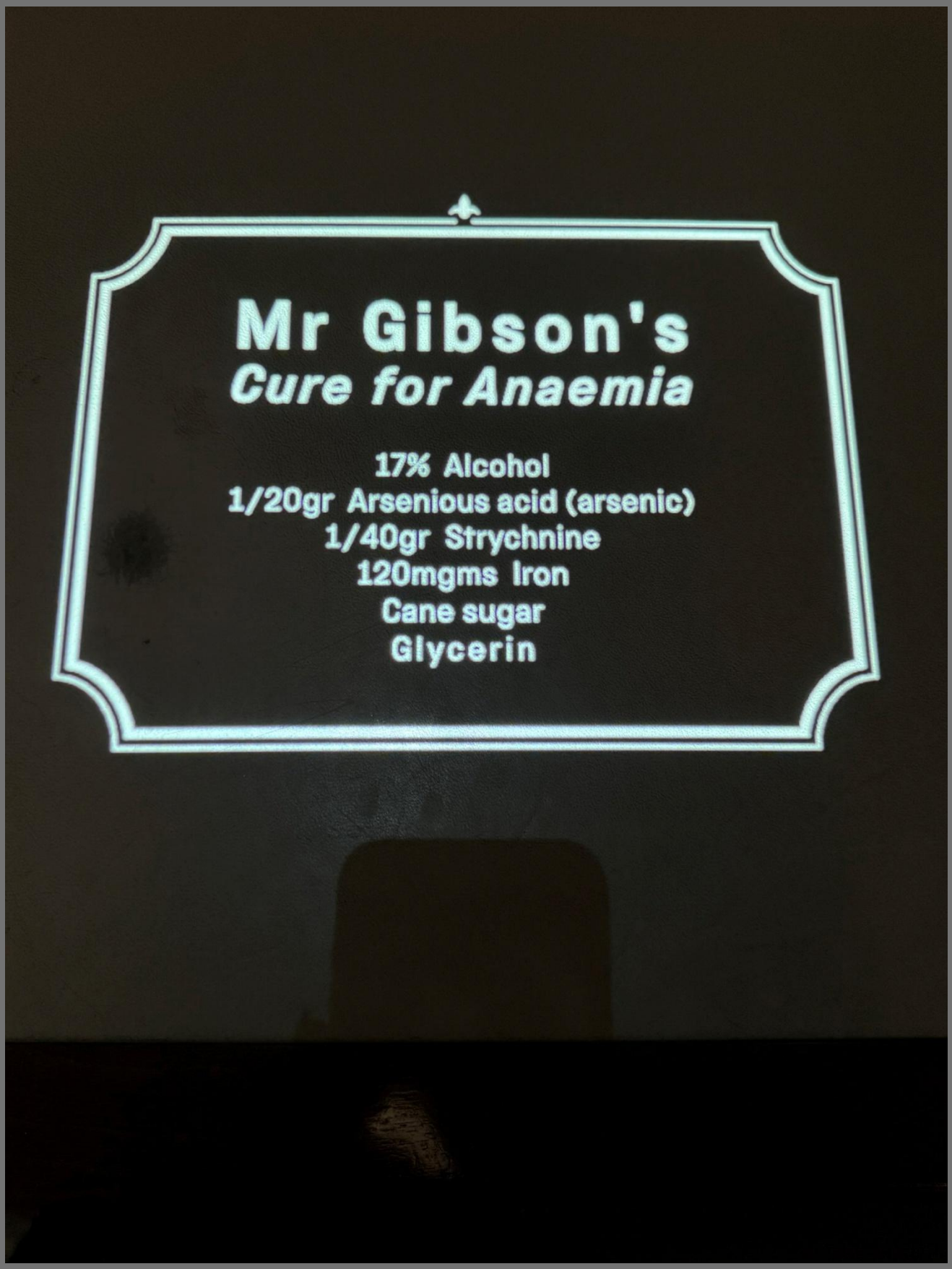
9 BOX FO

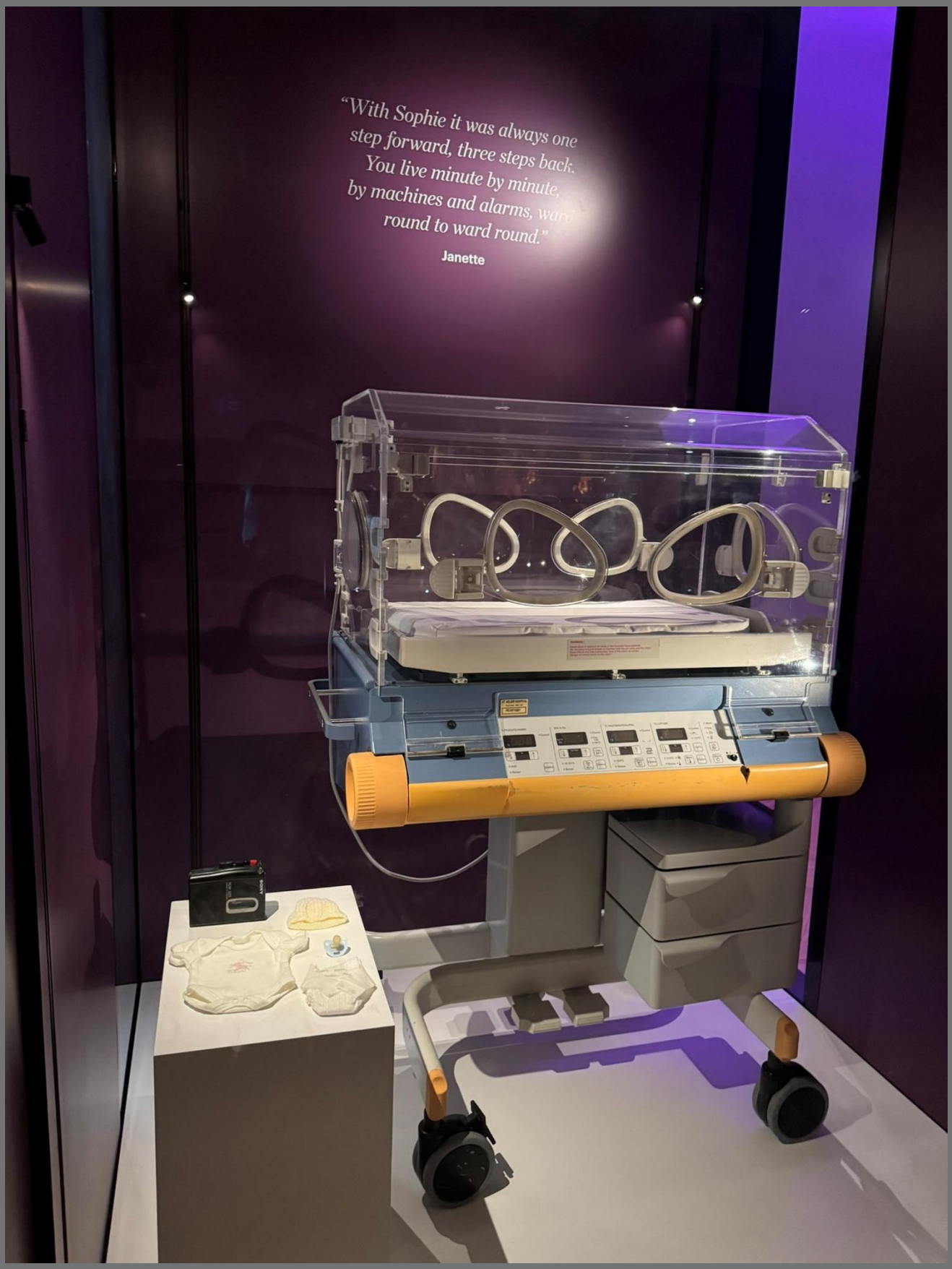

Guy's
Tonic
keep baby happy
with
Fennings'
CHILDREN'S
Powders
FOR TEETHING TROUBLES AND THE
UPS-AND-DOWNS OF CHILDHOOD
"HAZELINE"
SNOW
Gives
Natural
Charm
Non-greasy
Vanishes
CHEMISTS
GIBSON & SON

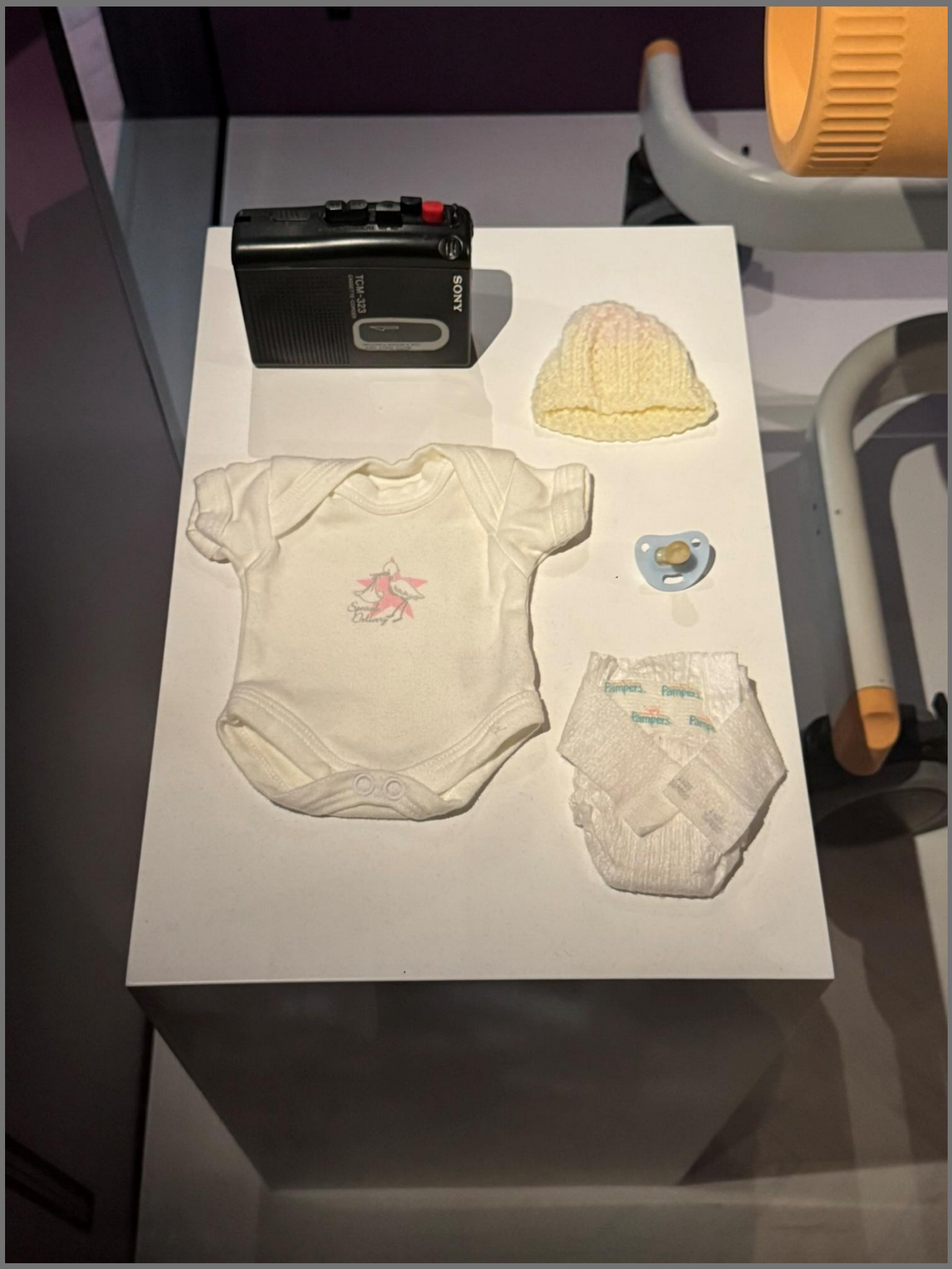

MIXED CACHOUS
GELATINE LOZENGES
EUCALYPT: PASTILLES
GLYCERINE & BLACK CURRANT




BOVRIL
LYONS TEA
SOLD HERE
Pears
TOOTH PASTE
ANADIN
Cadbury's Cocoa
CADBURY'S
CHOCOLATE
MACLEANS
SOLID DENTIFRICE
9d
Cadbury's Milk
MARMITE
BOVRIL
FRY'S
CHOCOLATE CREAM
COLD CREAM
MARKING INK
GOLD PAINT


Mr Gibson's
Cure for Anaemia
17% Alcohol
1/20gr Arsenious acid (arsenic)
1/40gr Strychnine
120mgms Iron
Cane sugar
Glycerin


"With Sophie it was always one
step forward, three steps back.
You live minute by minute,
by machines and alarms, ward
round to ward round."
Janette


SONY
TCM-323
Pampers
Pampers
Pampers
Pamp


"People sometimes think that once equipped with an artificial kidney it's all plain sailing – but it is not necessarily like that at all."
Moreen
MROY DIALYSATE SYSTEM




NHS


NHS

SANTA MEDICINA
ELEANOR CROOK
2018

Eleanor Crook's imposing sculpture combines medical and religious symbolism to help us reflect on the frailty of human life. *Santa Medicina* is both surgeon and saint. This healer wears an operating gown, which becomes a rich skirt encrusted with protective amulets, referencing those on display elsewhere in this gallery. The stethoscope becomes a string of prayer beads, the head mirror a halo.

England
Commissioned by the Science Museum Group
Object no. 2019-59




MEDICAL
ISOLATION
From the imposing brick walls of psychiatric institutions in the 1800s to the emergency field hospitals associated with modern epidemics, there are countless ways medical interventions have isolated people.
Sometimes doctors create controlled environments in the belief they can offer better treatment or, from, at other times, those in authority choose to confine people to contain a perceived health threat. Public discrimination and stigma, or even personal choice, can also lead individuals to various forms of isolation.

LEPROSY, A DISEASE OF ISOLATION

SKELETON SHOWING SIGNS OF LEPROSY
About 1350

This is the skeleton of a woman who lived with
leprosy for several decades. The effects of
the disease can clearly be seen in marks and th
damage to her skull, shoulder blades and
bones in her feet.

She lived in Denmark more than 600 years
and had been buried in a cemetery reserv
for those with the disease.

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About 1350

This is the skeleton of a woman who lived with leprosy for several decades. The effects of the disease can clearly be seen in marks and damage to her skull, shoulder blades and the bones in her feet.

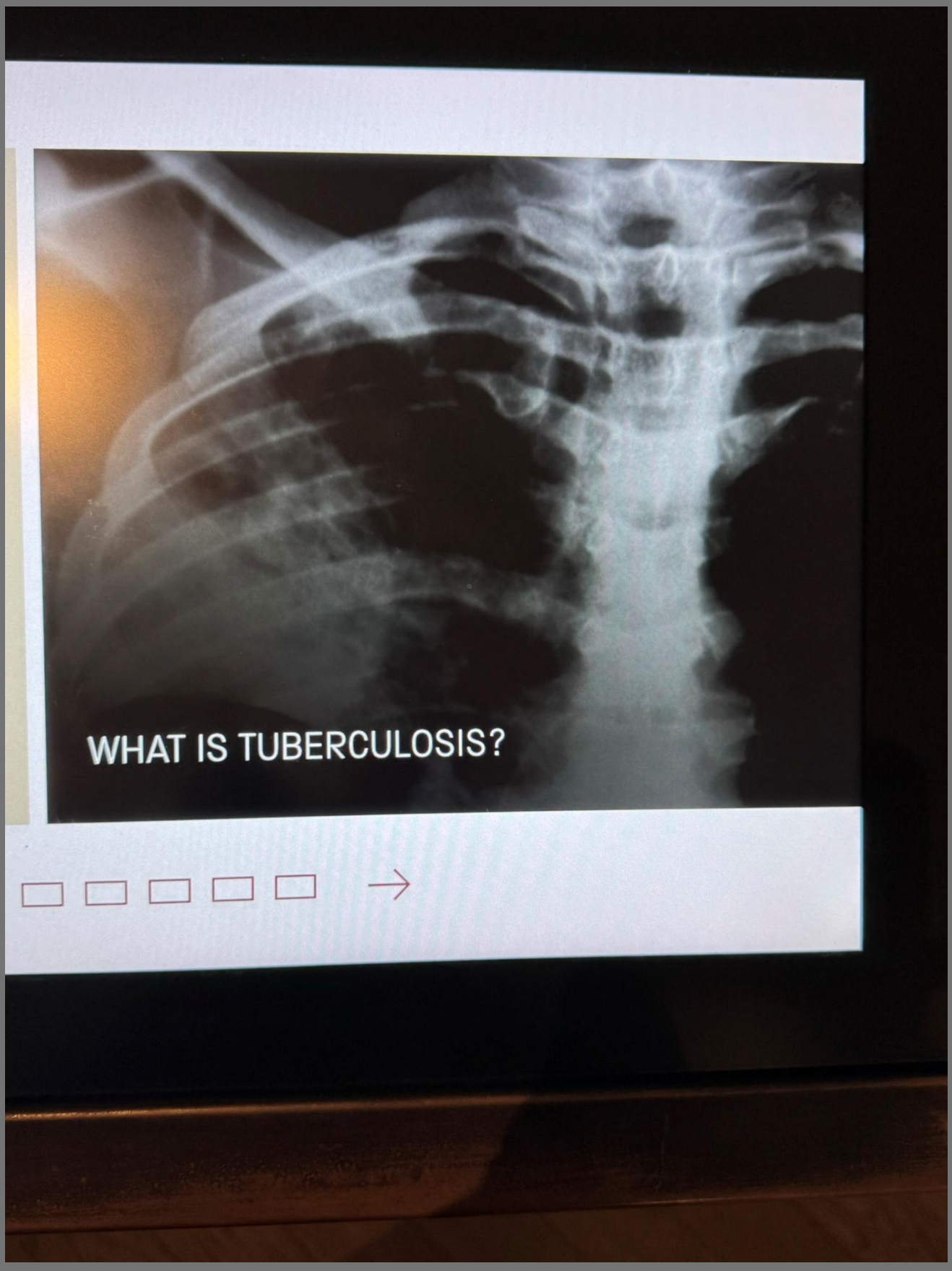
She lived in Denmark more than 600 years ago and had been buried in a cemetery reserved for those with the disease.

Denmark
Lent by Wellcome Collection to the Science Museum Group
Object no. A635011




FIGHTING INFECTIOUS DISEASE
We can all catch infectious diseases, brought on by bacteria, viruses or other microorganisms. Some, such as the common cold, rarely cause any serious problems. But others kill millions of us every year.
Controlling the spread of infection has been a major focus for governments and organisations across the world. Preventing it is complicated, but great improvements have been made through vaccination, education, increased standards of living and global cooperation.


EDWARD JENNER'S
MEDICAL EQUIPMENT
About 1800
1 EDWARD JENNER'S
MEDICINE CHEST
About 1800
Object no. A642790
THE MAN WHO
INTRODUCED VACCINES


WHAT IS TUBERCULOSIS?



The GOVERNORS and DIRECTORS of the POOR

HEREBY GIVE NOTICE,

That, with the view of affording prompt and Gratuitous assistance to Poor Persons resident in this Parish affected with Bowel Complaints and

CHOLERA,

The following Medical Gentlemen are appointed, either of whom may be immediately applied to for Medicine and Attendance, on the occurrence of those Complaints, viz.—

Mr. FRENCH, 41, Gt. Marlborough St
Mr. HOUSLEY, 28, Broad Street.
Mr. WILSON, 16, Great Ryder St.
Mr. JAMES, 49, Princes Street.
Mr. DAVIES, 25, Brewer Street.

SUGGESTIONS AS TO FOOD, CLOTHING, &c.

Regularity in the Hours of taking Meals, which should consist of any description of wholesome Food, with the moderate use of sound Beer.
Abstinence from Spirituous Liquors.
Warm Clothing and Cleanliness of Person.
The avoidance of unnecessary exposure to Cold and Wet, Damp Clothes, or Wet Shoes.
Regularity in obtaining sufficient Rest and Sleep.
Cleanliness of Rooms, which should be aired by opening the middle of each day.

By Order of the Board,
GEORGE B

PARISH OFFICE, *Pelard Street,*
30 November, 1831.

☞ It is requested that this Paper be taken care of, as it can be easily referred to.

Board of Health.

ON Christmas Day, Sunday, the 25th instant, and on the Days preceding and following it, the Shops of the Spirit-Dealers, and the Public Houses, at Gateshead, were more than usually beset with Persons applying for Drams, and intoxicating themselves with strong Liquors, which is too frequently the custom at this Season.

Since that time, it is truly lamentable to notice the following melancholy Report of Cholera Cases which is just made public.

GATESHEAD, Dec. 29th.

172 Cases of Cholera; of these, 40 Cases on the 26th of December, 59 on the 27th, and 44 on the 28th.

63 Deaths; of these, 32 on the 27th Dec.

December 30th, 1831. By order of the Board.

SUNDERLAND: PRINTED BY REED & SON.

f Cholera.

Y GOVERNMENT.

the wearing of wet and insufficient clothing ed,

a flannel or woollen belt be worn round the

s been found serviceable in checking the tendency to plaint so common during the prevalence of Cholera. e has, in this country, been always found to commence ness in the bowels, and in this stage is very tractable. however, be noticed, that the looseness is frequently d by pain or uneasiness, and fatal delay has often from the notion that cholera must be attended with In the earlier stage here referred to, there is often no cramp, and it is at this period that the disease can be y arrested. In all such cases let from twenty to forty Dr. J. LEMAC's Cholera Tincture be administered in half brandy, and the symptoms will abate immediately.

personal cleanliness be carefully observed.
t every cause tending to depress the moral and energies be carefully avoided.
et crowding of persons within houses and nts be avoided.
t sleeping in low and damp rooms be avoided.
t fires be kept up during the night in sleeping ning apartments, the night being the period of nger from attack, especially under exposure to damp.

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guarant
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able to

CLERKENWELL.

His Majesty's Privy Council having approved of precautions proposed by the Board of Health in London, on the alarming approach OF THE

INDIAN CHOLERA

It is deemed proper to call the attention of the Inhabitants to some of the Symptoms and Remedies mentioned by them as printed, and now in circulation.

Symptoms of the Disorder;

Giddiness, sickness, nervous agitation, slow pulse, cramp beginning at the fingers and toes and rapidly approaching the trunk, change of colour to a leaden blue, purple, black or brown; the skin dreadfully cold, and often damp, the tongue moist and loaded but flabby and chilly, the voice much affected, and respiration quick and irregular.

REMEDIES;

All means tending to restore circulation and to maintain the warmth of the body should be had recourse to without the least delay.

The patient should be immediately put to bed, wrapped up in hot blankets, and warmth should be sustained by other external applications, such as repeated frictions with flannels and camphorated spirits, poultices of mustard and linseed (equal parts) to the stomach, particularly where pain and vomiting exist, and similar poultices to the feet and legs to restore their warmth. The returning heat of the body may be promoted by bags containing hot salt or bran applied to different parts, and for the same purpose of restoring and sustaining the circulation white wine whey with spice, hot brandy and water, or salvolatile in a dose of a tea spoon full in hot water, frequently repeated; or from 5 to 20 drops of some of the essential oils, as peppermint, cloves or cayenne, in a wine glass of water may be administered with the same view. Where the stomach will bear it, warm broth with spice may be employed. In every severe case or where medical aid is difficult to be obtained, from 20 to 40 drops of laudanum may be given in any of the warm drinks previously recommended.

These simple means are proposed as resources in the incipient stages of the Disease, until Medical aid can be had.

THOS. KEY,
GEO. TINDALL, *Churchwardens.*

Sir GILBERT BLANE, Bart. in a pamphlet written by him on the subject of this Disease, recommends persons to guard against its approach by moderate but temperate living, and to have in readiness the prescribed remedies, and in case of attack to resort thereto immediately but the great preventative he states, is found to consist in a due regard to Cleanliness and Ventilation.

N.B It is particularly requested that this Paper may be preserved, and that the Inmates generally, in the House where it is left may be made acquainted with its contents.

NOV. 1st, 1831.

T. GOODE, PRINTER, CROSS STREET, WILDERNESS ROW

CHOLERA DISTRICTS.

***LOOSENESS** of the **BOWELS** is the Beginning of CHOLERA.*

Thousands of Lives may be saved by attending in Time to this Complaint, which should on no account be *neglected* by either Young or Old, in Places where the Disease prevails.

When CRAMPS IN
SICKNESS AT STOMACH,
of MUSTARD POWDER *in*
Water with as much C
and after the Stomach
DROPS OF LAUDANUM sl

HEATED PLATE

CHOLERA.

From the alarming advance of epidemic cholera towards the western ports of Europe, fears have been entertained of its introduction into this country. The circumstance of vessels trading between this port and those ports of the Baltic where the disease prevails, renders it necessary that every possible endeavour should be used to prevent the introduction of so destructive an epidemic amongst us. Should such precautions unfortunately be unavailing, it will then be necessary to have recourse to those means of arresting the disease, and preventing its further dissemination, which have been found most successful in other places.

These considerations have occasioned the institution of a Board of Health, consisting of the Magistrates, Clergy, Medical Men, and several of the principal inhabitants of Sunderland and its neighbourhood. This board has already had several meetings, at one of which nearly forty medical gentlemen were present; and no pains have been spared to procure every information tending to throw light upon the subject.

With regard to the introduction of cholera, it is sufficient to observe, that the strictest quarantine regulations are at present enforced on all ships arriving from suspected districts.

But, preparing for its appearance, the Board of Health have given their next attention to providing suitable places of accommodation for the sick, to which, on the first appearance of the disease, the persons affected may be removed; and where the exertions and skill of the medical attendants will be employed with the

CHOLERA MORBUS.

The Following Prescription

FOR

THE CURE OF THE CHOLERA MORBUS,

Has proved greatly beneficial in numerous instances in FRANKFORT, and is strongly recommended by those who have had opportunity of witnessing its efficacious tendency.

One Pint of Strong Spirits of Wine.
One Pint of good White Wine Vinegar.
One Ounce of Powdered Camphor.
One Ounce of Flour of Mustard, or Bruised Mustard Seed.
Quarter of an Ounce of Ground Pepper.
One full Tea-spoonful of Bruised Garlic.
Half an Ounce of Powdered Carthardes.

Mix the above well together in a Bottle, and expose it twelve hours to the sun, or in some warm place, taking care to shake it repeatedly.

Let the patient be instantly put to bed, under warm Coverlids, and let his Hands and Feet be rubbed powerfully and uninterruptedly with the Mixture warmed. During this operation let the Patient take a Tumbler full of strong drink, composed of two parts of Camomile Flowers, and one part of Balm Mint. Persevere in this course, and at the end of Fifteen Minutes, at the utmost, the Patient will break out into a profuse perspiration, his Head and Body being well covered beneath the Bed-clothes. The Patient must be kept in this state between Two and Three Hours; he must not fall asleep. After this, remove the extra covering from off the Bed, and the Patient will drop into a slumber, which will last Six or Eight Hours, accompanied by a gentle perspiration. When the Patient awakes, he will find himself weak, but the disease will have entirely left him; he will require nothing but rest and a moderate diet to restore him to perfect health.

After having been rubbed, the Bed-clothes must COMPLETELY cover the body and arms, as the slightest chill would occasion his death. When the Cramps in the Stomach come on, apply very hot dry Bandages of Bran and Ashes to the Pit of the Stomach, and when necessary, a Bladder of Hot Water to the region of the Navel.

The great object is to produce strong perspiration, and to restore the circulation of the blood.

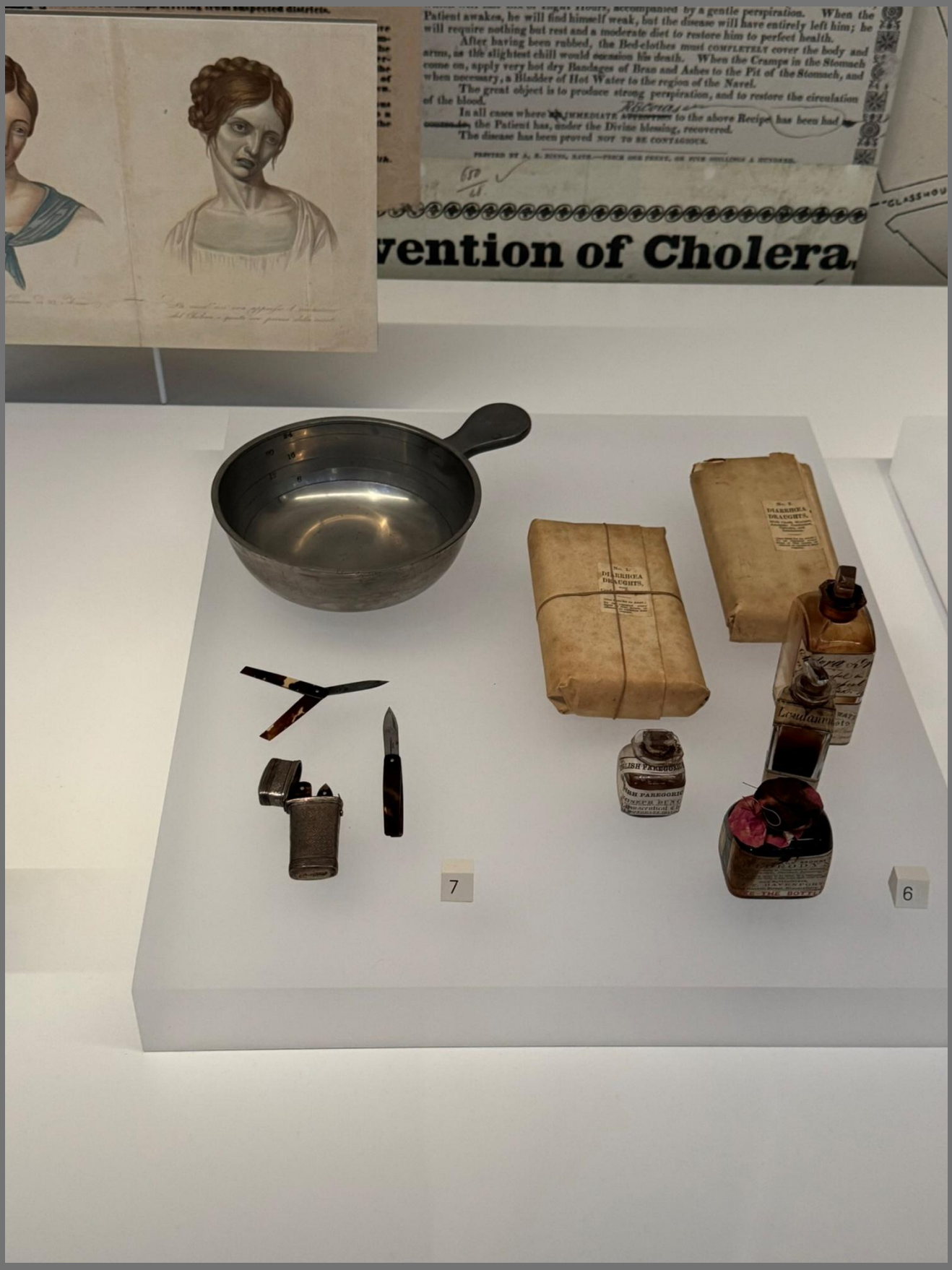
In all cases where IMMEDIATE ATTENTION to the above Recipe has been had recourse to, the Patient has, under the Divine blessing, recovered.

The disease has been proved NOT TO BE CONTAGIOUS.

PRINTED BY J. S. SUNN, BATH.—PRICE ONE PENNY, OR FIVE SHILLINGS A HUNDRED.



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The disease has been proved NOT TO BE CONTAGIOUS.
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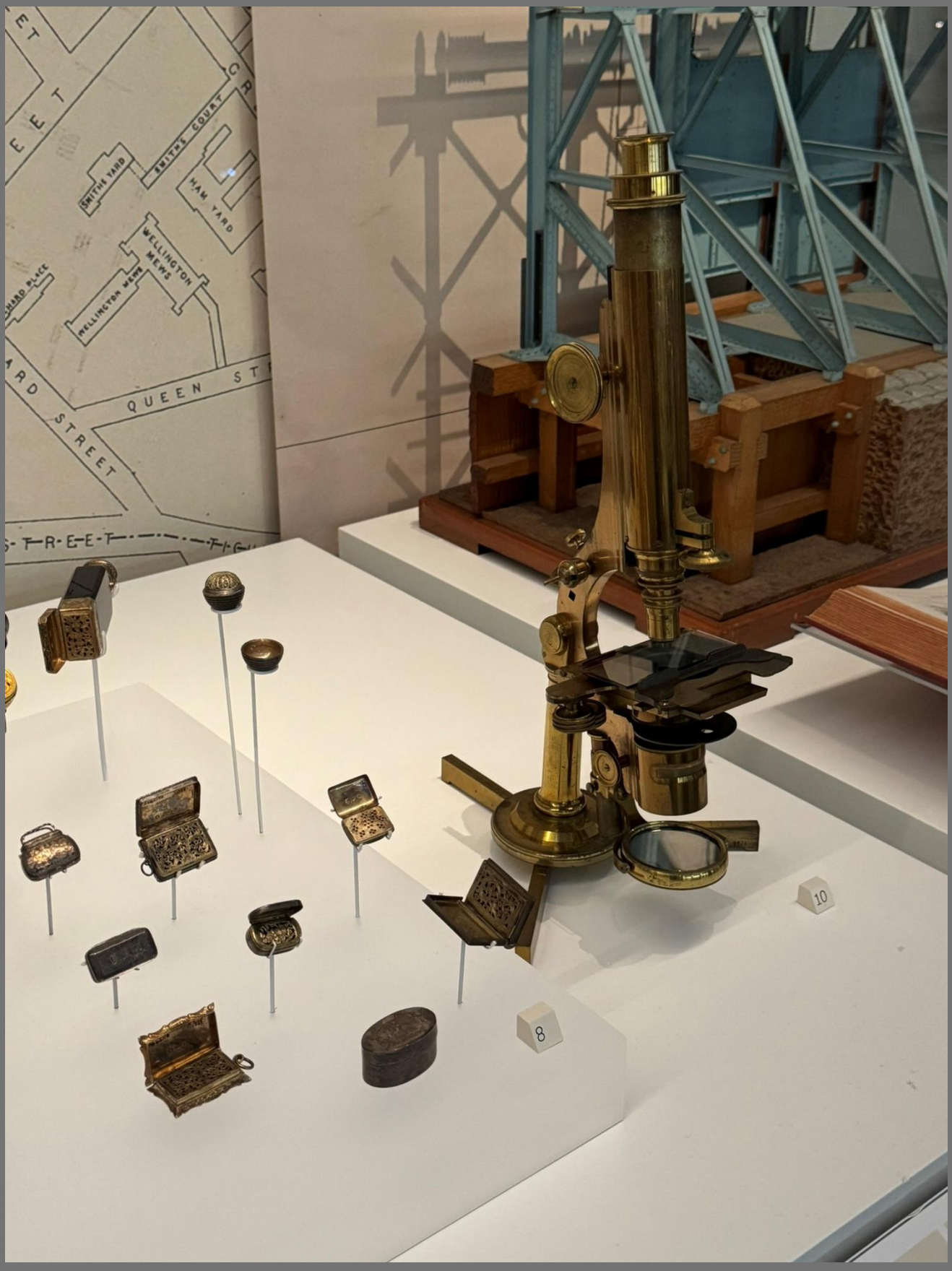
DIARRHŒA DRAUGHTS.
7
6


SMITHS YARD
SMITHS COURT
HAM YARD
WELLINGTON MEWS
WELLINGTON MEWS
QUEEN ST
STREET
10
8

11 *PUNCH* MAGAZINE AND OTHER VOICES OF REFORM
1858

The popular magazine *Punch* was among the many voices of the 1800s urging public health reforms. Journalists, politicians, novelists and engineers all exposed the desperate environments and hardships being endured by many, and called for change.

Often motivated by different concerns and advocating different approaches, their ideas were published in numerous books and journals.

England
Science Museum Group
Object no. E2017.3012.1



ZINE AND
OF REFORM

ine *Punch* was among the
1800s urging public health

NO WAY TO LIVE

"How many, who amidst this compound of
sickening smells, these heaps of filth, these

NEW STA

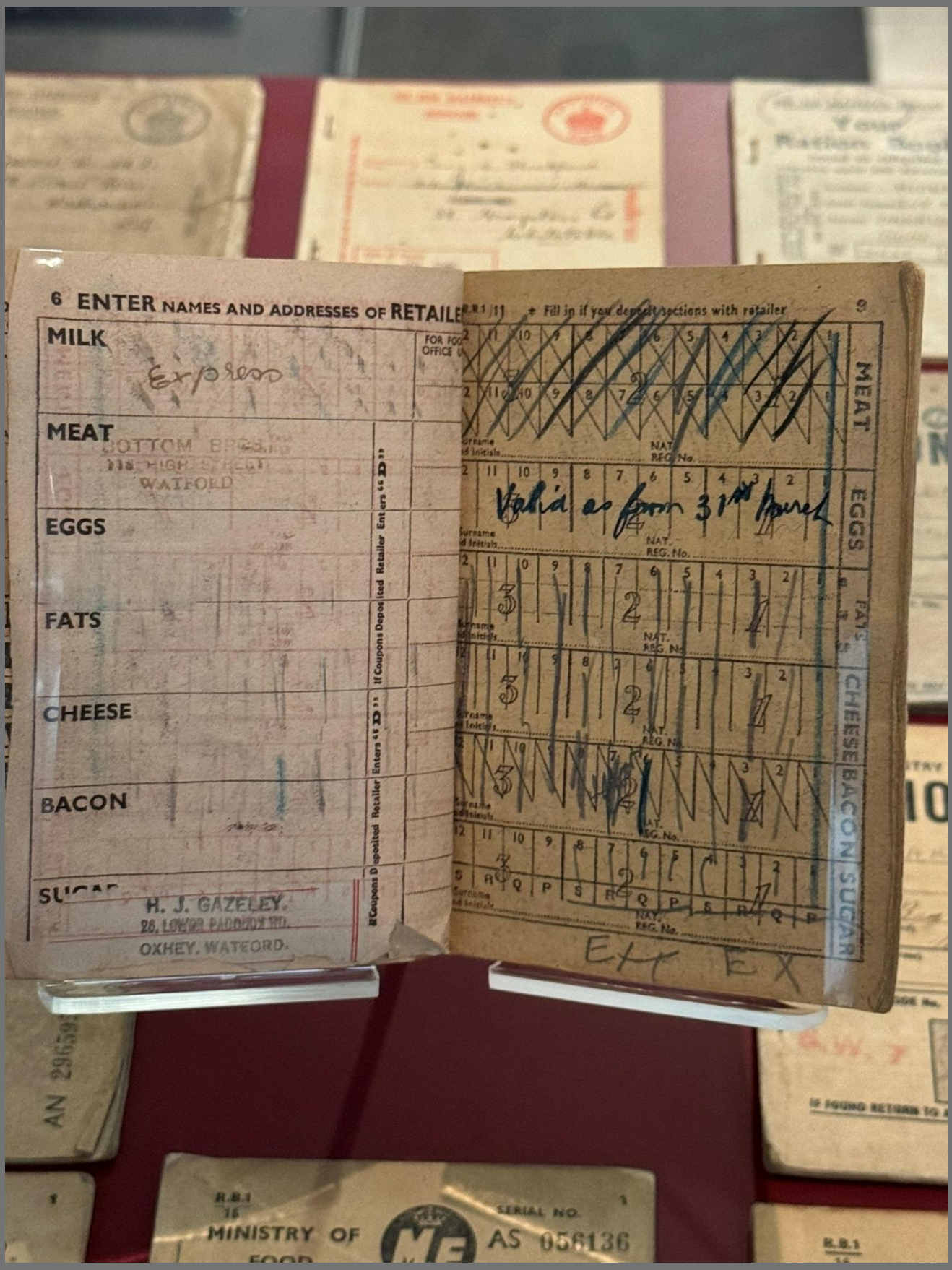
A major br
London wa


PUBLIC BATHS
CHESHIRE ST.
1
2

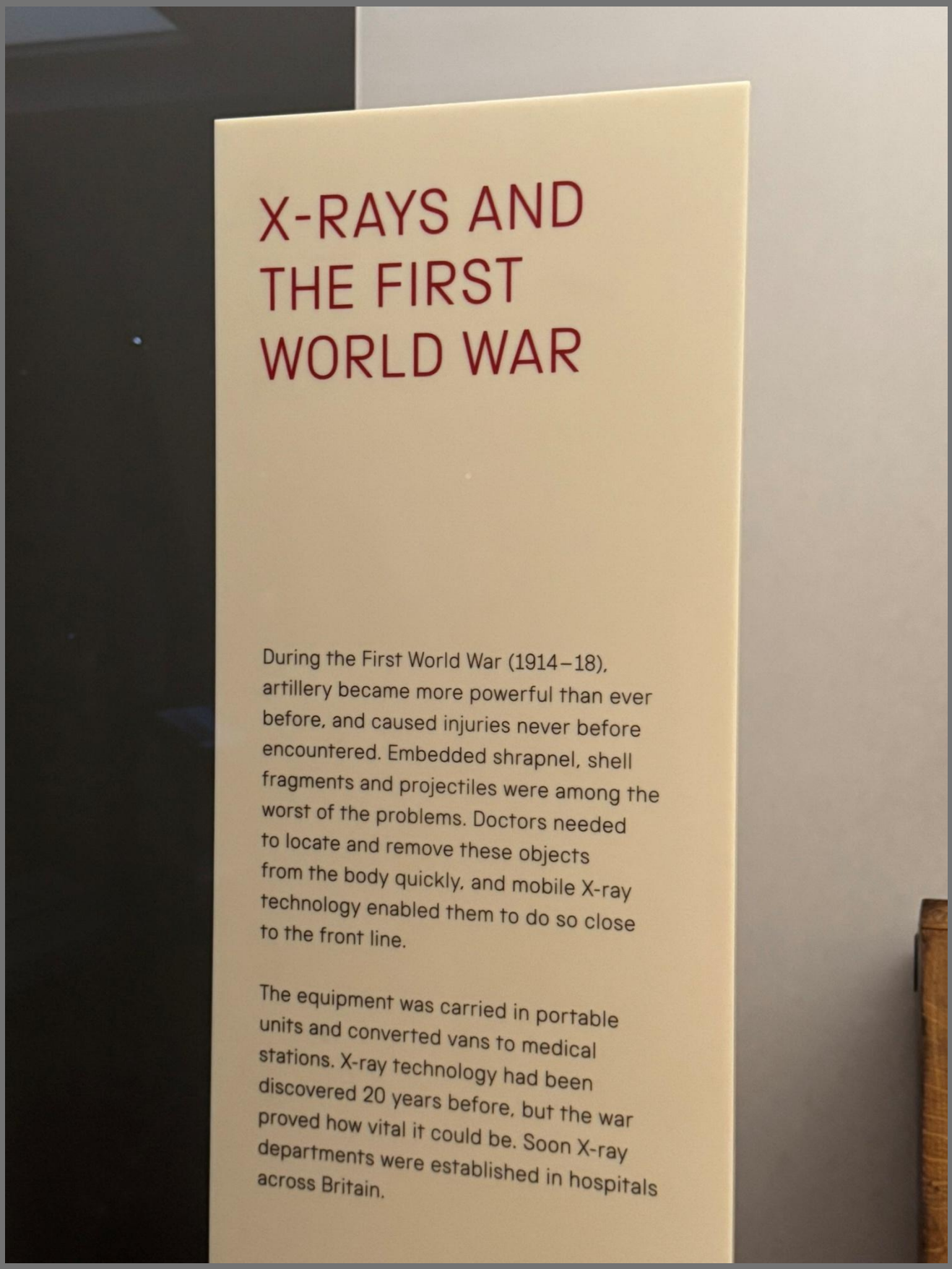


SPENDING A PENNY
1890 – 1930

The first public toilets were installed at London's Crystal Palace, in Hyde Park, for the Great

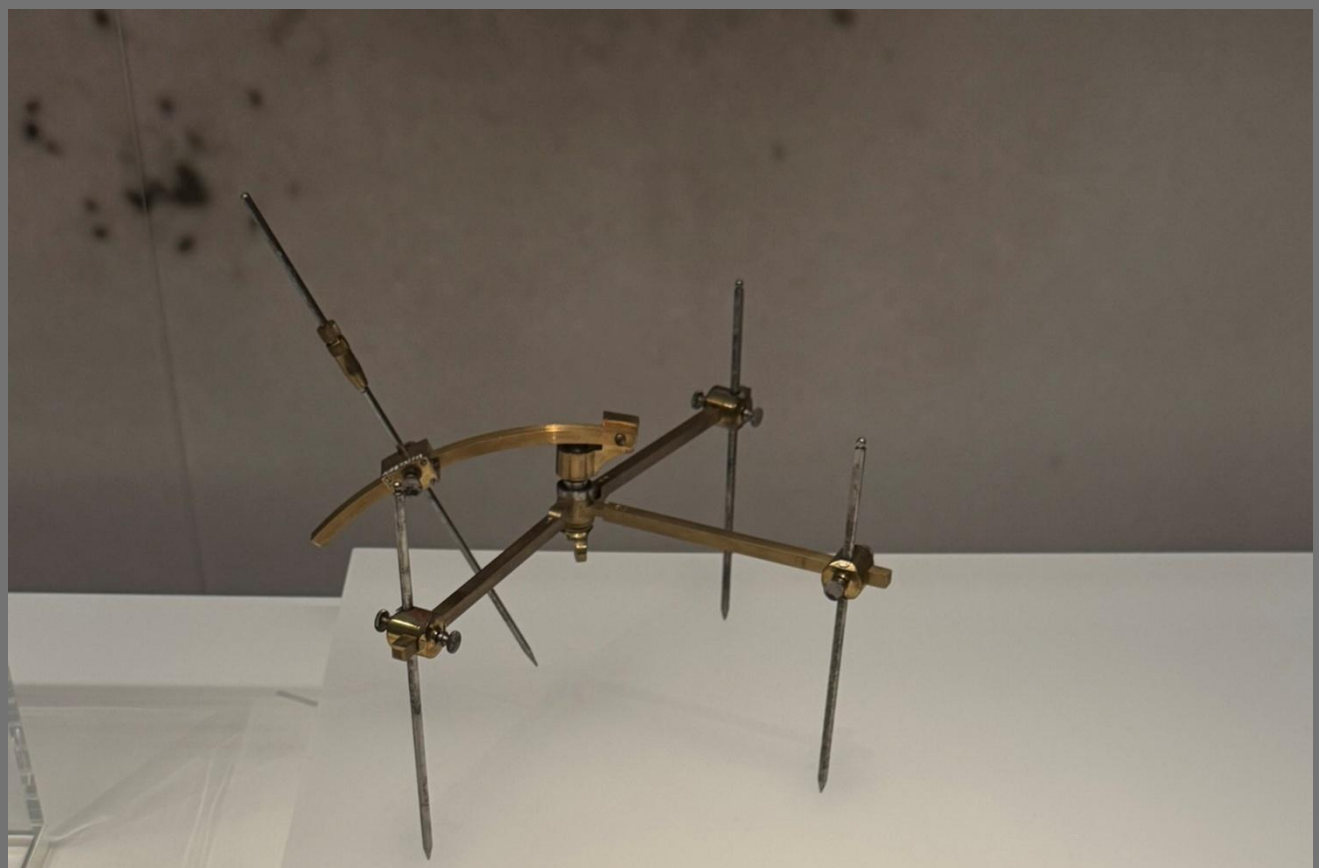

6 ENTER NAMES AND ADDRESSES OF RETAILE
MILK
Express
MEAT
BOTTOM BROS.
118 HIGH STREET
WATFORD
EGGS
FATS
CHEESE
BACON
SUGAR
If Coupons Deposited Retailer Enters "D"
H. J. GAZELEY.
28, LOWER PADDOCK RD.
OXHEY, WATFORD.
R.B.1 11 * Fill in if you deposit sections with retailer
MEAT
EGGS
FATS
CHEESE
BACON
SUGAR
Surname and Initials
NAT. REG. No.
Valid as from 31st March
EH EX
R.B.1
15
MINISTRY OF FOOD
SERIAL NO.
AS 056136


MAGNETIC RESONANCE
IMAGING
TOUCH TO START


X-RAYS AND THE FIRST WORLD WAR
During the First World War (1914–18), artillery became more powerful than ever before, and caused injuries never before encountered. Embedded shrapnel, shell fragments and projectiles were among the worst of the problems. Doctors needed to locate and remove these objects from the body quickly, and mobile X-ray technology enabled them to do so close to the front line.
The equipment was carried in portable units and converted vans to medical stations. X-ray technology had been discovered 20 years before, but the war proved how vital it could be. Soon X-ray departments were established in hospitals across Britain.


F. Reiner & Co. Wien
K. K. KM 9
SCHALTTAFEL


F. Reiner & Co. Wien
k. K. M. 9
UNTERBRECHER



2

— 4 —

Technique de la méthode

1. — Temps du calage

Le matériel radiographique peut être très simple, ici qu'on le rencontre dans les moindres installations. Il comporte essentiellement une table horizontale, un pied support d'ampoule à tige verticale et bras horizontal pouvant coulisser suivant son axe. Il est commode que ce bras soit gradué en centimètres. S'il ne l'est pas, on pourra le munir d'une graduation de fortune.

Etant donné un blessé possédant un corps étranger, une balle par exemple, dans une région quelconque, la première préoccupation doit être de dégrossir la localisation à l'aide de la radioscopie ou de radiographies préalables. Il s'agit, en effet, l'existence de la radioscopie dans les tâtons, sa situation approximative, et dans ce but l'usage de la

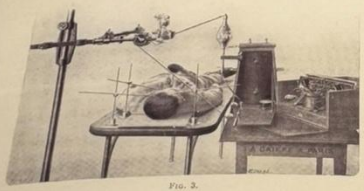


Fig. 3.

radiostéroscopie est tout à fait recommandable. On peut aussi, chaque fois que cela est possible, avoir recours à deux radiographies orthogonales ; mais elles ne peuvent pas toujours être exécutées, à l'épaule, à la hanche, par exemple (1).

Il devient dès lors facile d'envisager par quelle voie d'accès on abordera le projectile. La région approximative où siégera l'incision, ainsi que la position du blessé pendant l'opération, pourront être déterminées, d'accord avec le chirurgien, si le radiologiste n'opère pas lui-même.

Cela étant établi, la plaque radiographique est préparée. Elle peut être incluse soit dans un châssis ordinaire, muni ou non d'un écran renforçateur, soit dans un sachet ou enveloppe de papier. Une précaution essentielle est de choisir une plaque d'un format

(1) Dans de tels cas, il est exceptionnel commode d'avoir recours au procédé de « l'écran percé avec fil à plomb » (Gallet et Hirtz), rapide, précis et supprimant toute mensuration directe toujours difficile à réaliser avec exactitude.

— 5 —

supérieur à celui que l'on emploierait pour exécuter une radiographie ordinaire. Il s'agit, en effet, de recueillir deux images sécantes avec des obliquités contraires, en qui augmente leur étendue totale.

Sur la face avant du châssis ou de l'enveloppe (côté qui regarde l'ampoule) le point d'intersection des deux diagonales est marqué et sur ce point un petit index de plomb est fixé à l'aide de poplet gommé ou d'un morceau de hémoplaste. Les plaques sont ensuite disposées sur la table à un endroit convenable, de façon qu'elle se présente sous la région à explorer lorsque le blessé sera couché pour la radiographie. Il est vivement recommandé d'orienter les bords de la plaque parallèlement à ceux de la table et de diriger le plus grande dimension dans le sens même ou se fera le déplacement de l'ampoule, en général perpendiculairement au grand axe de la table. Le pied support d'ampoule est alors approché, le bras horizontal

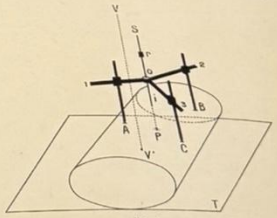


Fig. 4.

étant bien parallèle au bord le plus étendu de la plaque radiographique. Grâce au fil à plomb, le foyer du tube est amené sur la verticale de l'index central la plaque. Cette position est marquée sur le bras du support par un repère qui servira de point initial pour opérer deux déplacements successifs de l'ampoule. Cette-ci sera, en effet, portée d'abord en deçà, puis au delà de ce point initial d'une même quantité, 3 centimètres par exemple ; cette longueur est pratiquement nécessaire et suffisante. Les deux radiographies successives seront donc exécutées ultérieurement en des positions distantes de 6 centimètres.

La hauteur de l'anticathode au-dessus de la plaque est ensuite réglée ; on se sert dans ce but d'une règle graduée ou d'un ruban métrique. La distance convenable peut varier suivant l'épaisseur de la région à explorer ; elle peut aller de 35 ou 40 centimètres pour une main, à 60 centimètres et plus pour un crâne. Il est toutefois plus commode d'opérer à la même hauteur.

4

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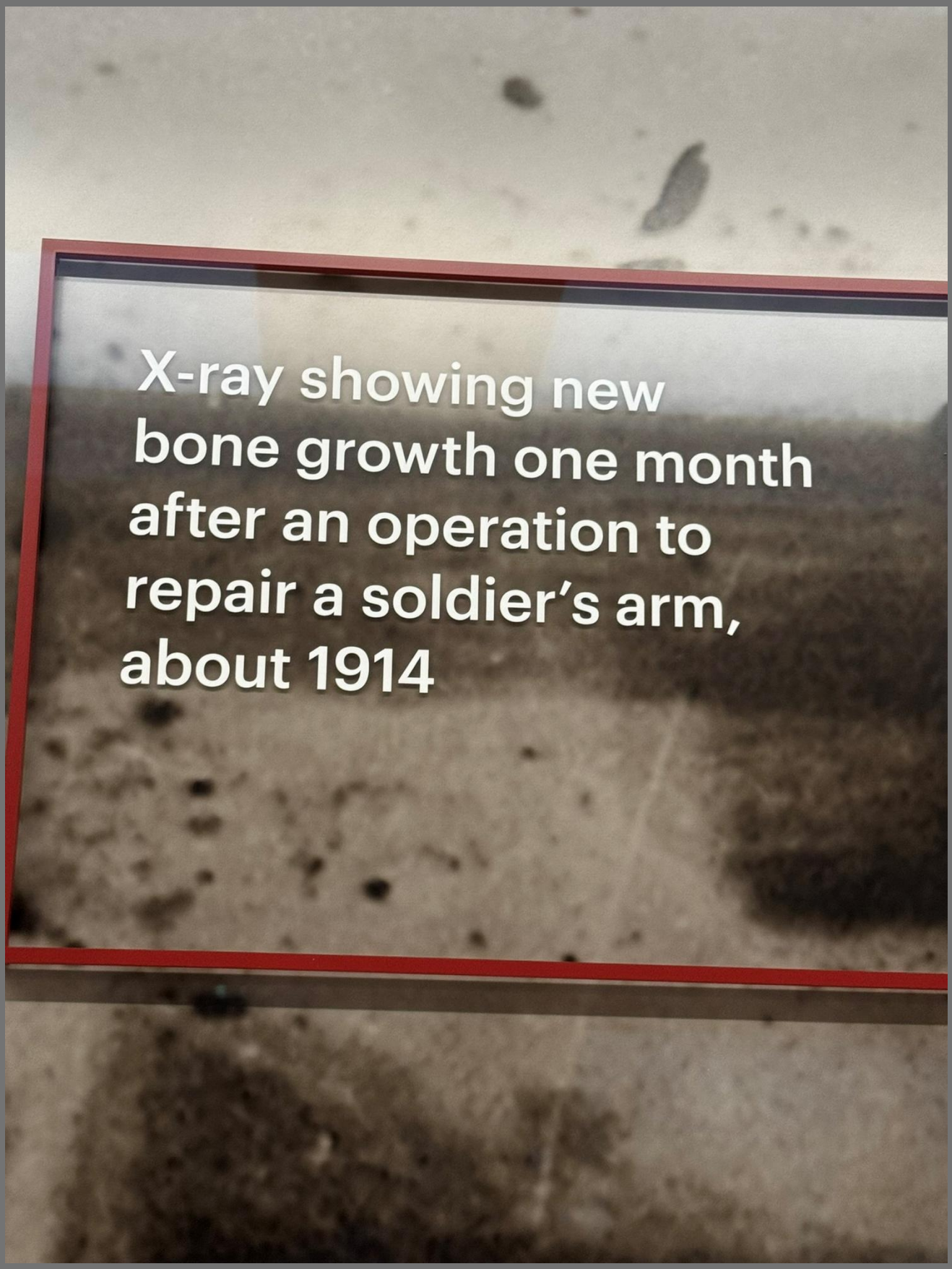
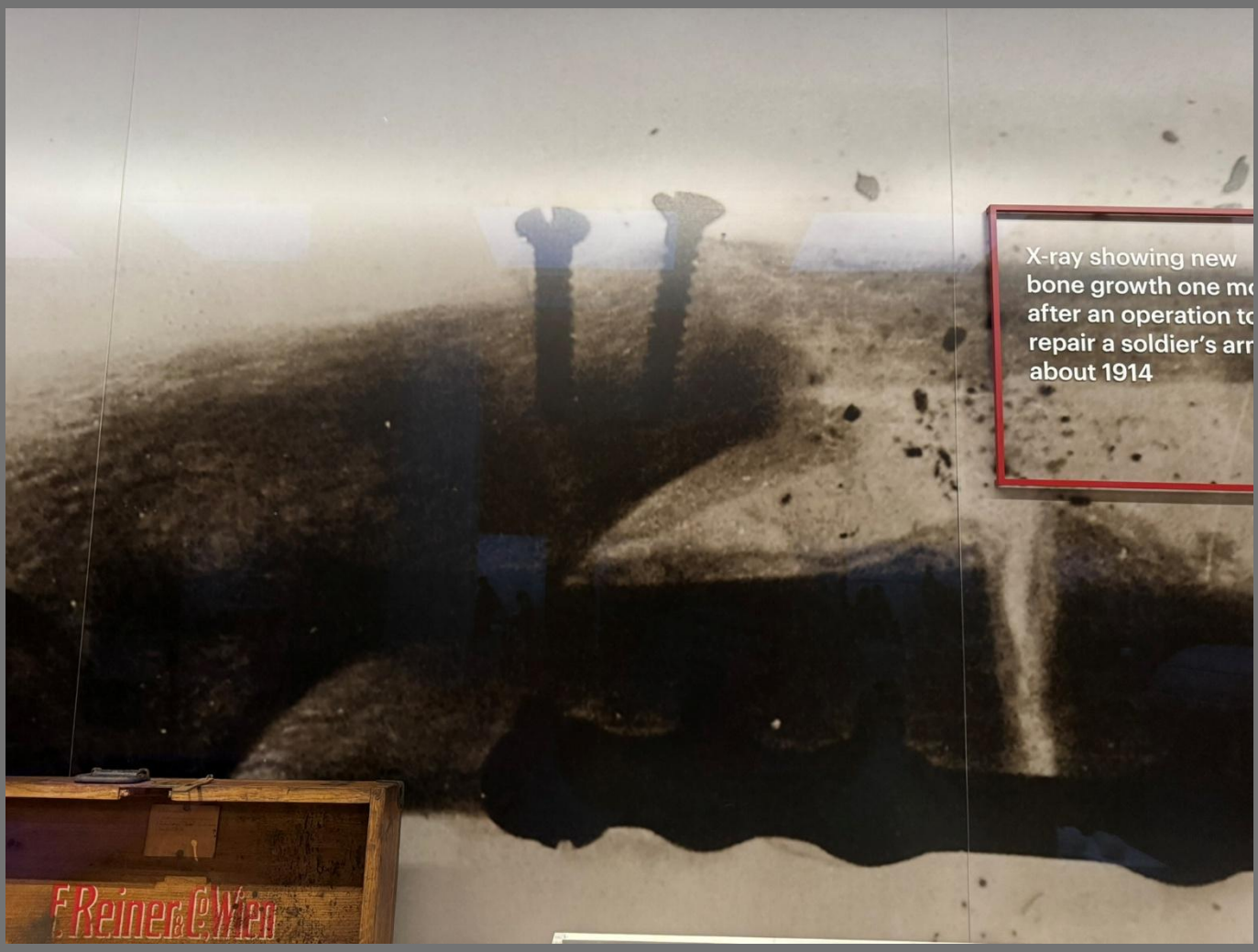

X-ray showing new
bone growth one month
after an operation to
repair a soldier's arm,
about 1914


X-ray showing new
bone growth one mo
after an operation to
repair a soldier's arr
about 1914
F. Reiner & Co. Wien

1939–1945 **SECOND WORLD WAR**

56 BMW 801, about 1940

Originally thought to produce too much drag, this engine showed that radials could still be used to power fighter aircraft. Designers thought that the blunt nose required to accommodate the bulkier shape of a radial engine would ruin the streamlining of a fighter, increasing drag and limiting the pilot's visibility. Yet the tight-fitting cowl, or covering, on this radial engine reduced the drag to a level competitive with slim liquid-cooled engines.

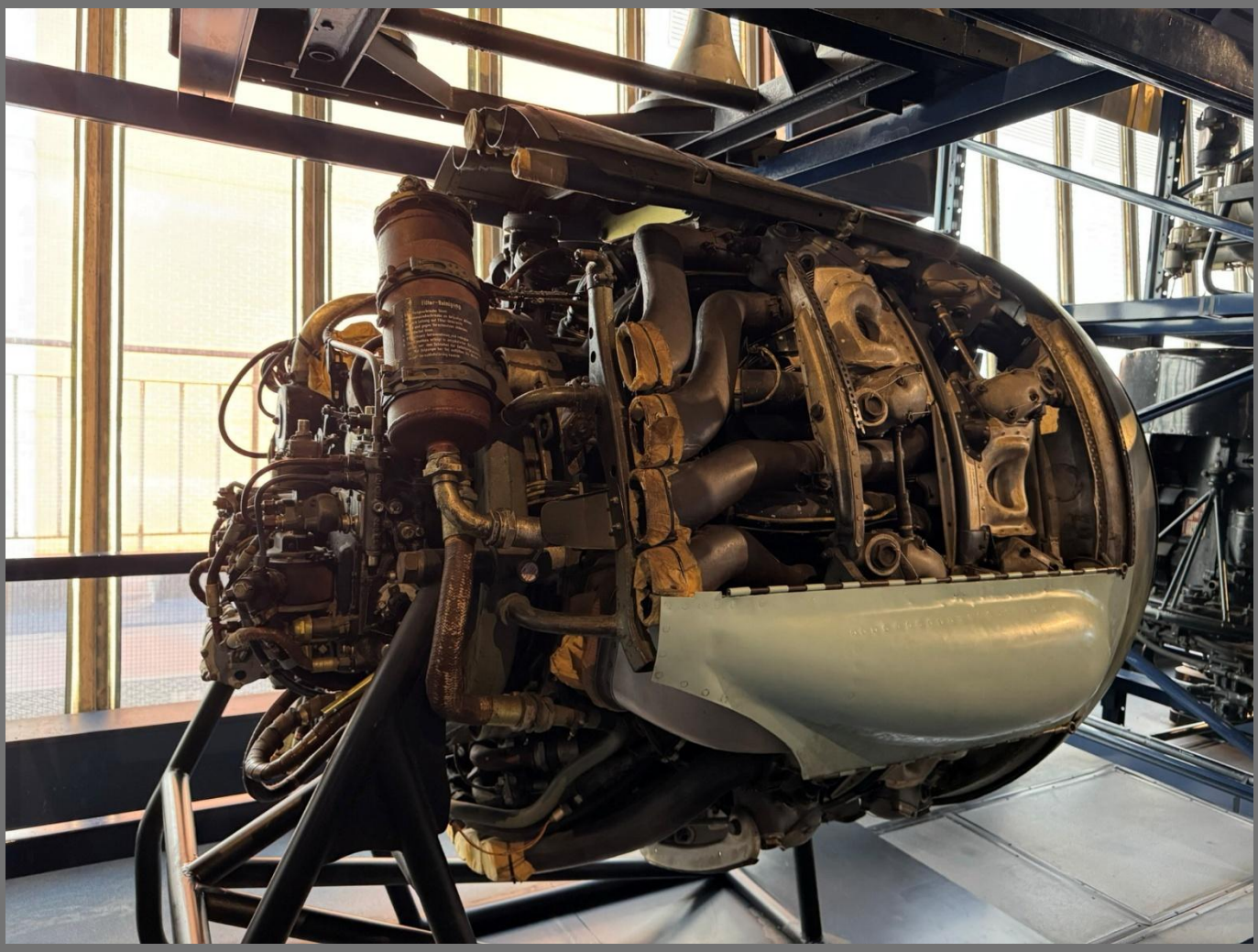
Manufacturer	BMW
Cylinders	14
Type	Twin-row radial
Capacity	41.8 litres
Output	1,600hp (1,193kW)
Weight	1,211kg

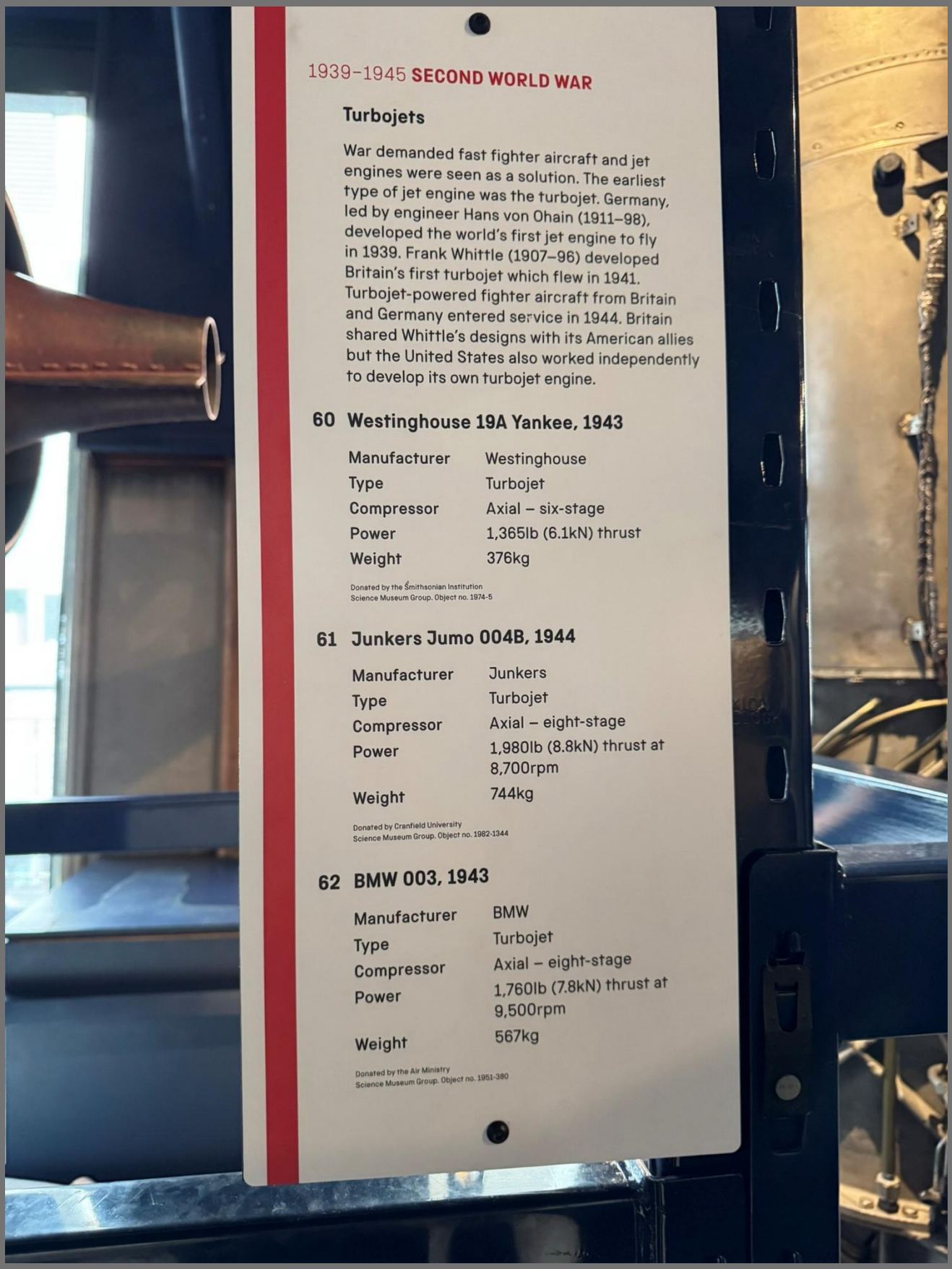
Donated by the Air Ministry
Science Museum Group. Object no. 1951-379

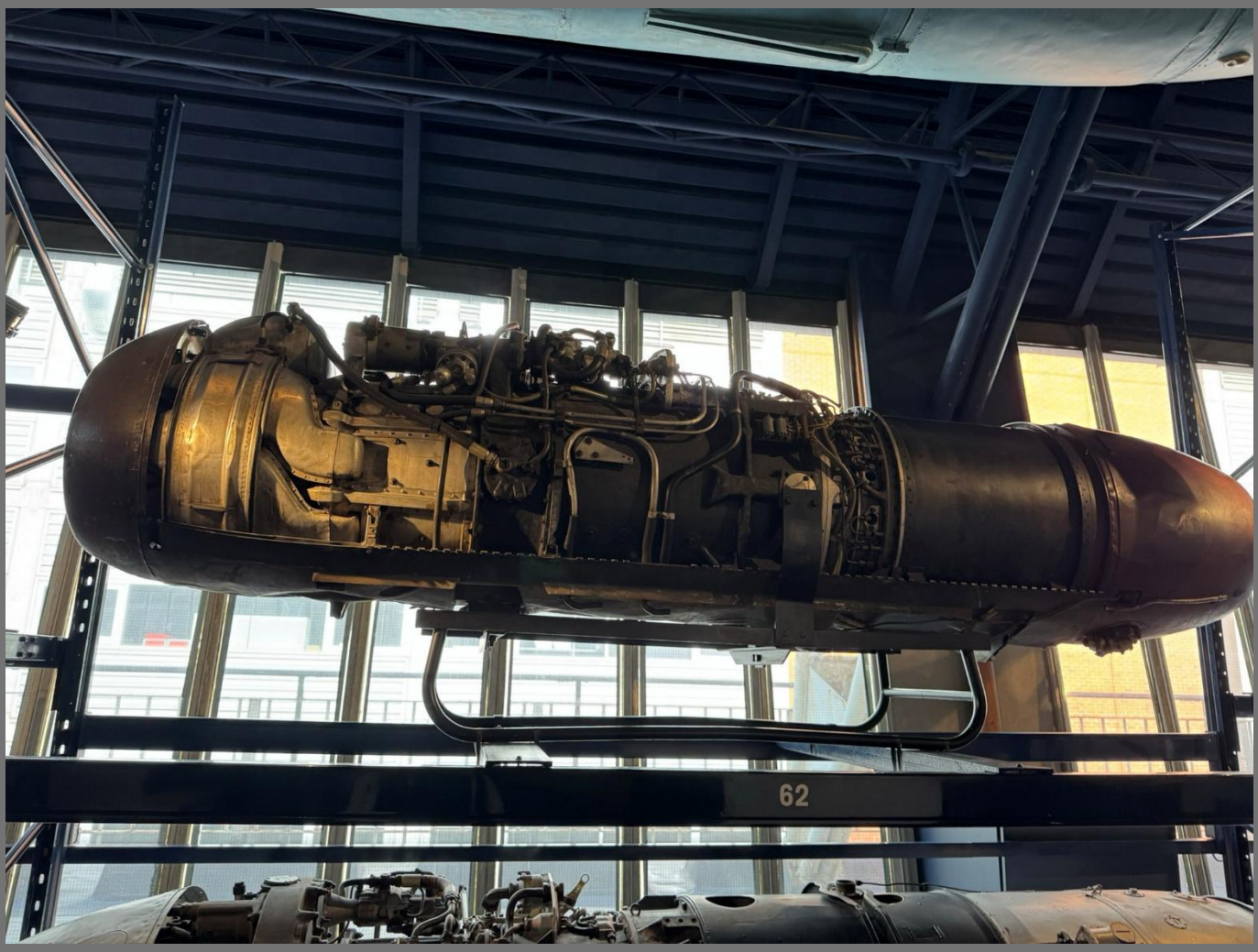


The Junkers Ju 88k aeroplane used two BMW 801 engines.

Image: Science Museum Group Collection




1939–1945 SECOND WORLD WAR
Turbojets
War demanded fast fighter aircraft and jet engines were seen as a solution. The earliest type of jet engine was the turbojet. Germany, led by engineer Hans von Ohain (1911–98), developed the world's first jet engine to fly in 1939. Frank Whittle (1907–96) developed Britain's first turbojet which flew in 1941. Turbojet-powered fighter aircraft from Britain and Germany entered service in 1944. Britain shared Whittle's designs with its American allies but the United States also worked independently to develop its own turbojet engine.
60 Westinghouse 19A Yankee, 1943
Manufacturer Westinghouse
Type Turbojet
Compressor Axial – six-stage
Power 1,365lb (6.1kN) thrust
Weight 376kg
Donated by the Smithsonian Institution
Science Museum Group. Object no. 1974-5
61 Junkers Jumo 004B, 1944
Manufacturer Junkers
Type Turbojet
Compressor Axial – eight-stage
Power 1,980lb (8.8kN) thrust at 8,700rpm
Weight 744kg
Donated by Cranfield University
Science Museum Group. Object no. 1982-1344
62 BMW 003, 1943
Manufacturer BMW
Type Turbojet
Compressor Axial – eight-stage
Power 1,760lb (7.8kN) thrust at 9,500rpm
Weight 567kg
Donated by the Air Ministry
Science Museum Group. Object no. 1951-380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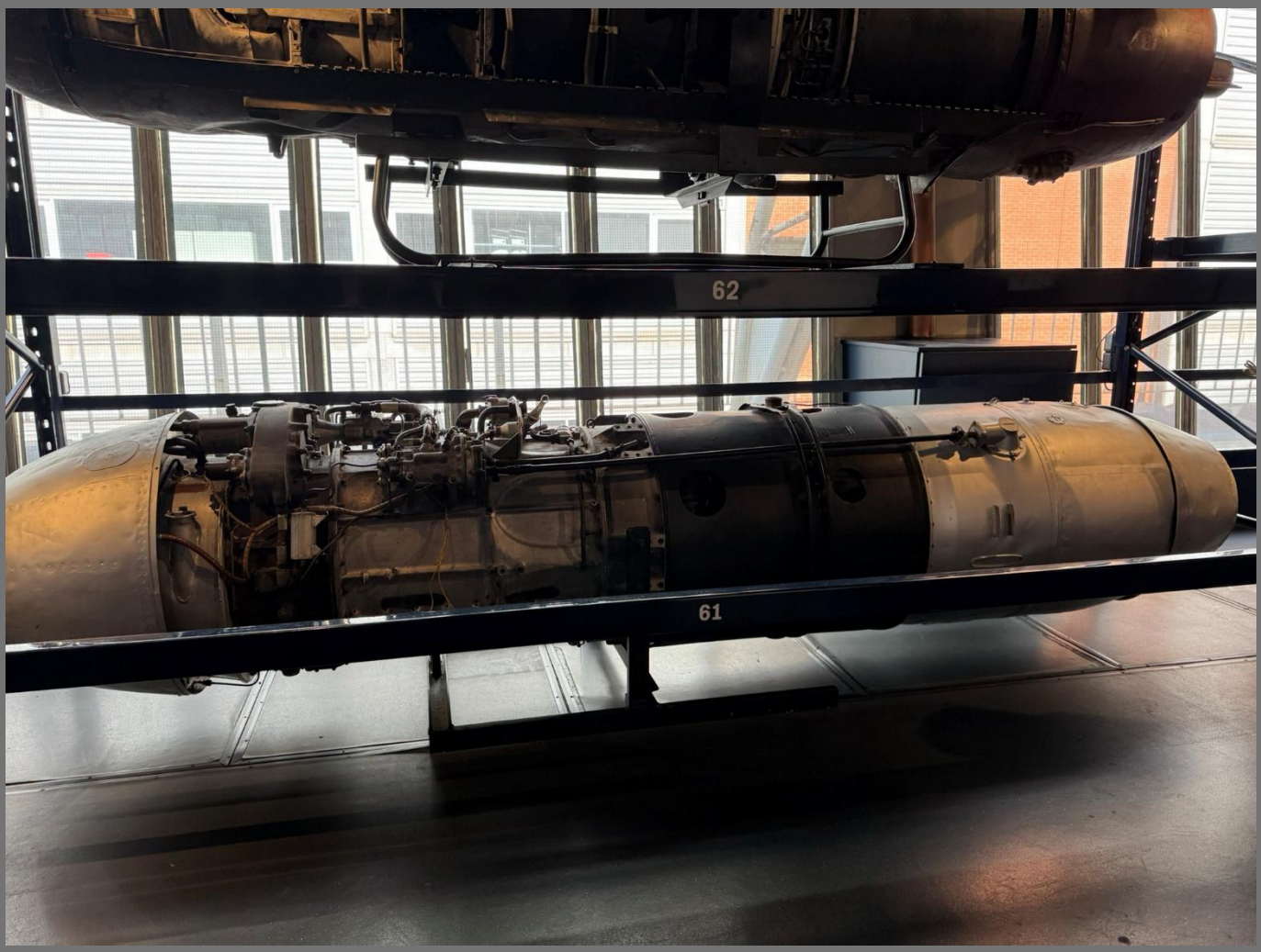
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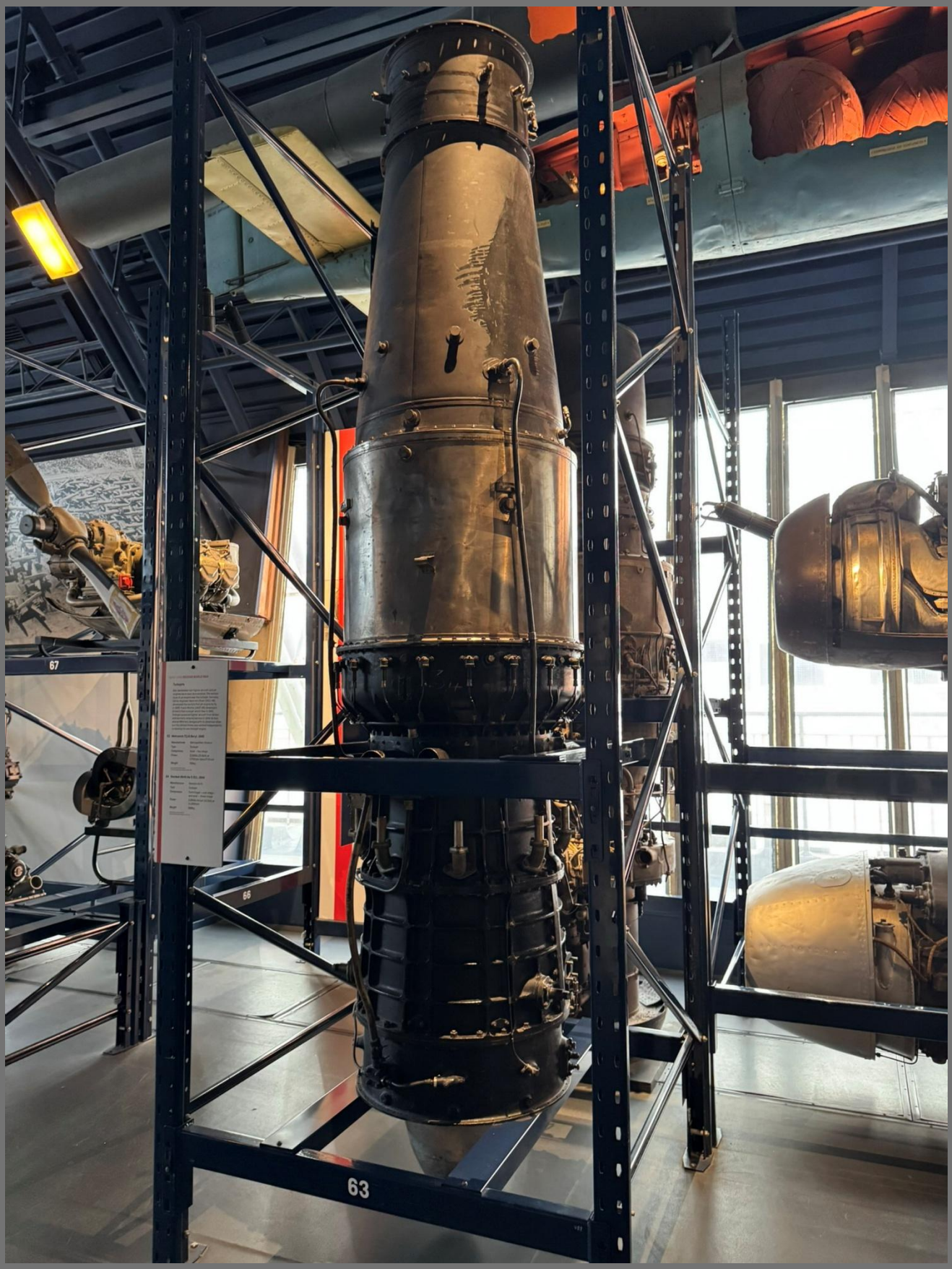
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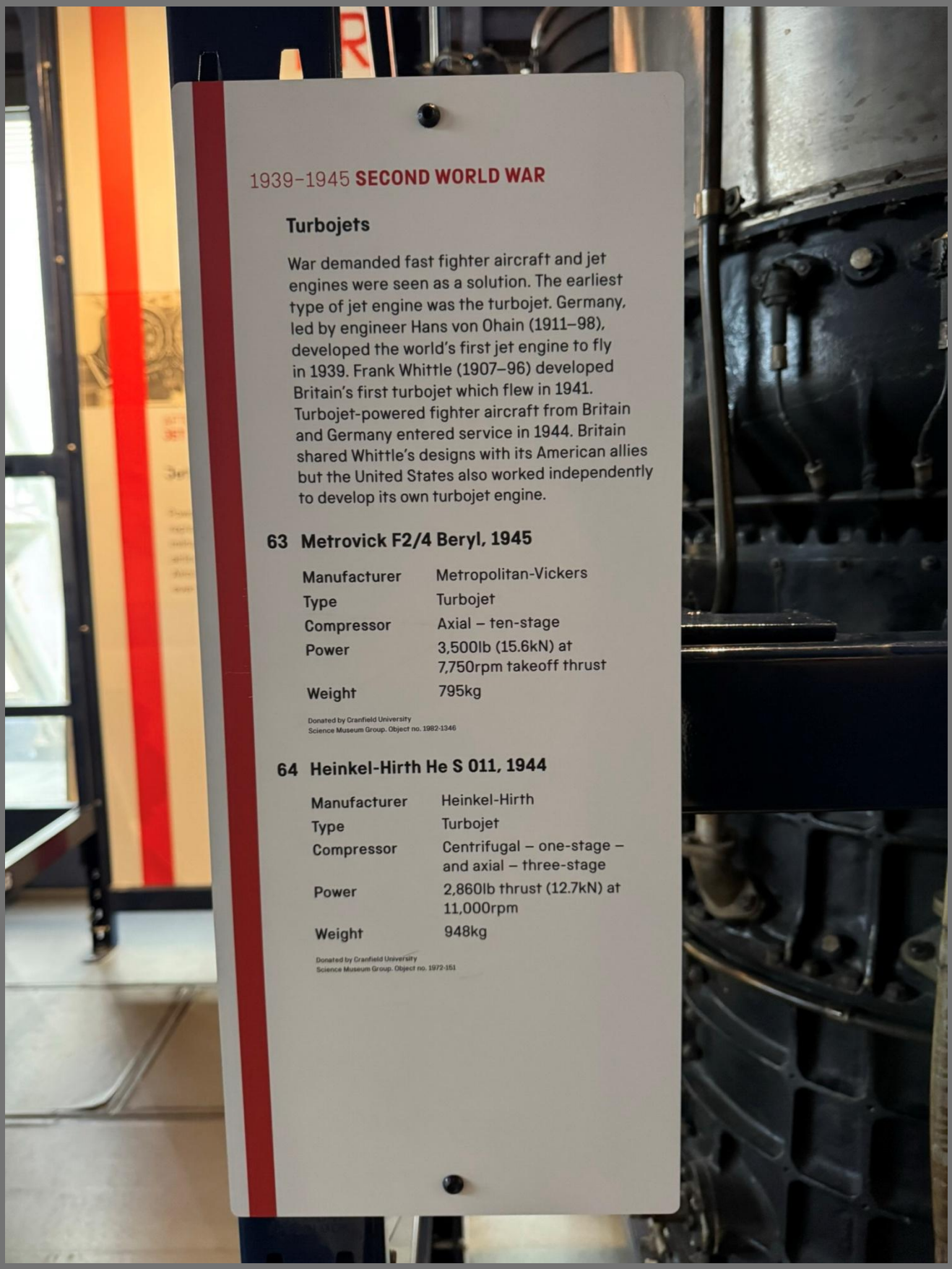
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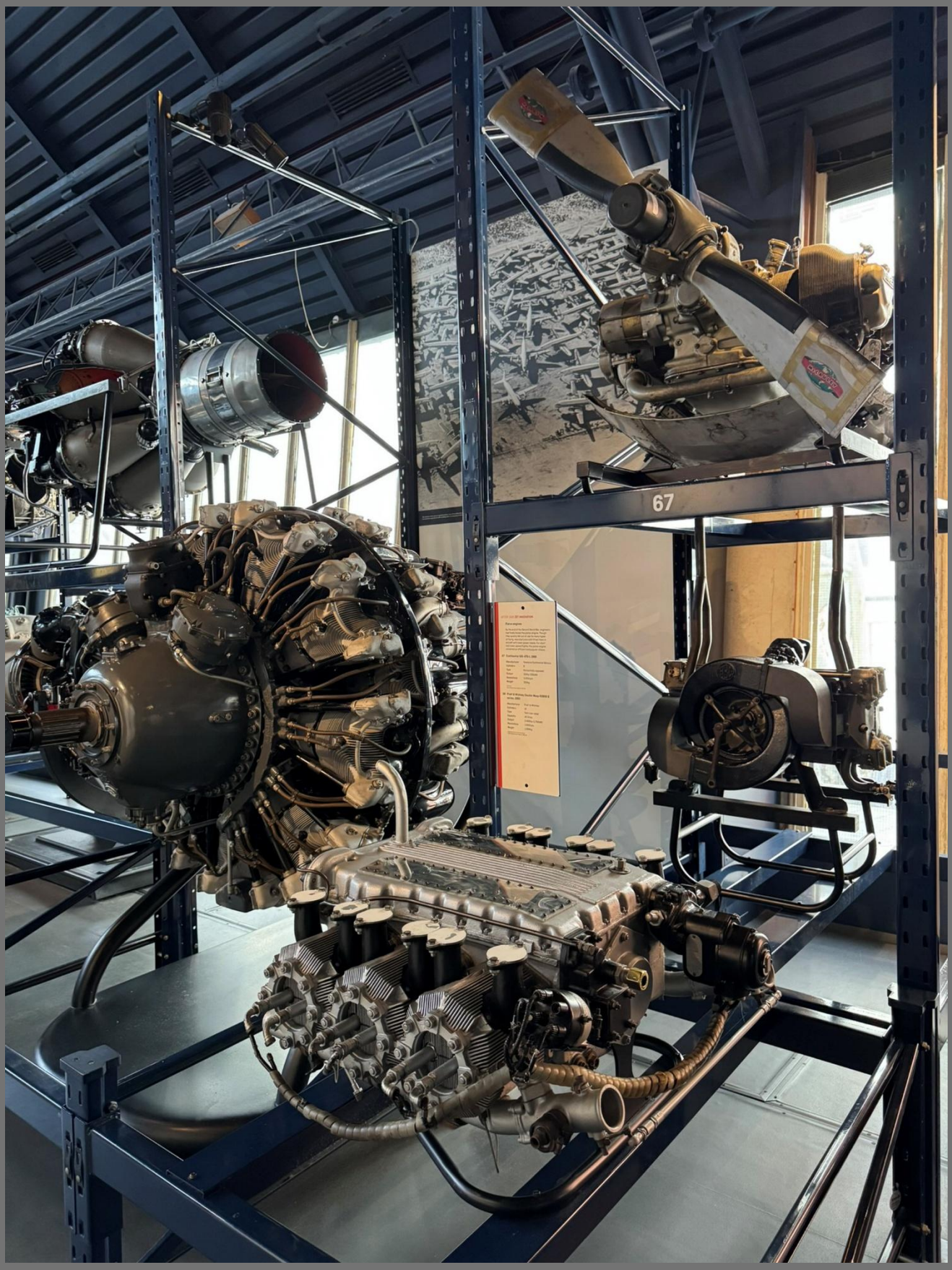
63 Metrovick F2/4 Beryl, 1945
Manufacturer Metropolitan-Vickers
Type Turbojet
Compressor Axial – ten-stage
Power 3,500lb (15.6kN) at 7,750rpm takeoff thrust
Weight 795kg
Donated by Cranfield University
Science Museum Group. Object no. 1982-1346
64 Heinkel-Hirth He S 011, 1944
Manufacturer Heinkel-Hirth
Type Turbojet
Compressor Centrifugal – one-stage – and axial – three-stage
Power 2,860lb thrust (12.7kN) at 11,000rpm
Weight 948kg
Donated by Cranfield University
Science Museum Group. Object no. 1972-151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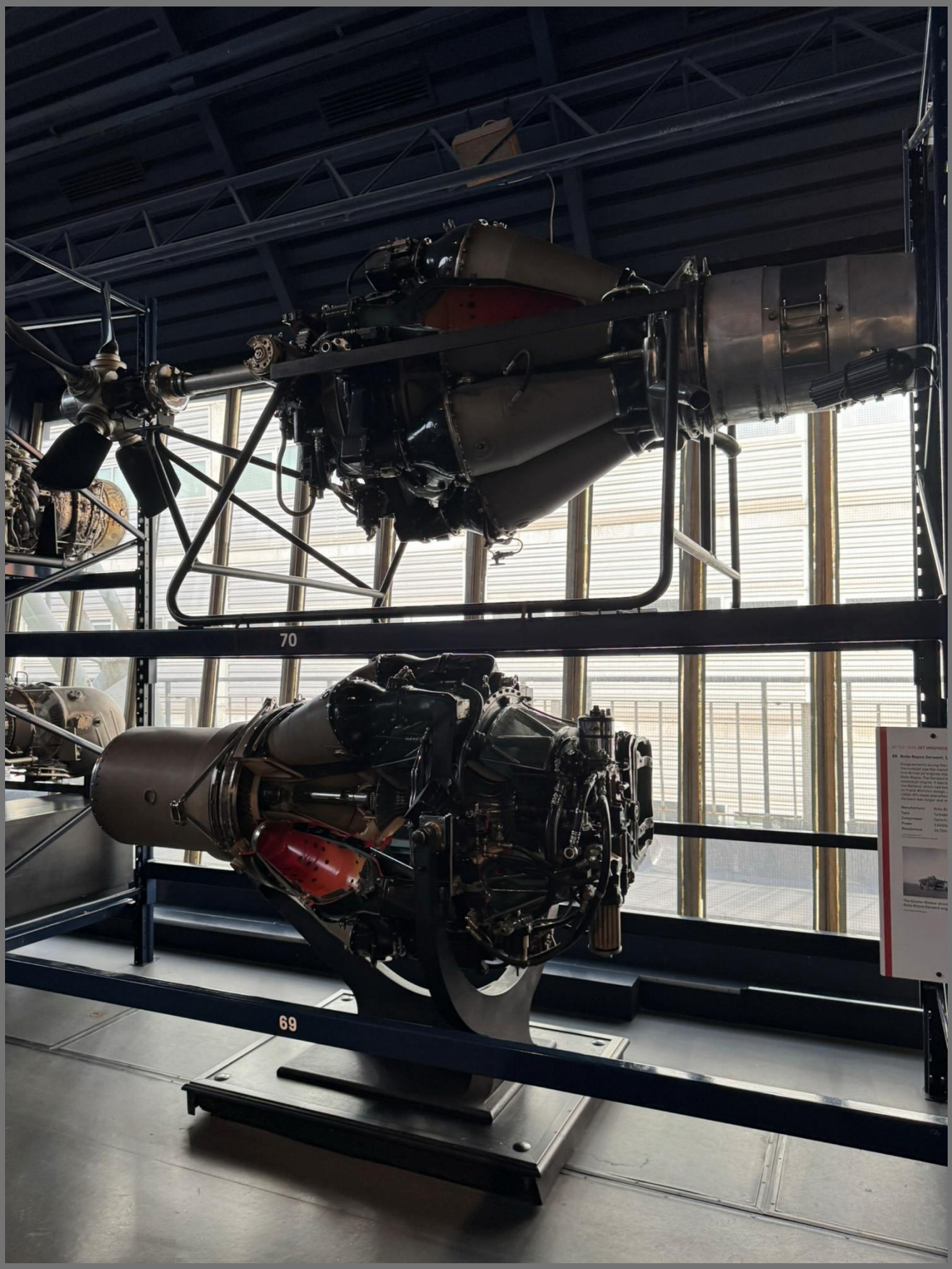
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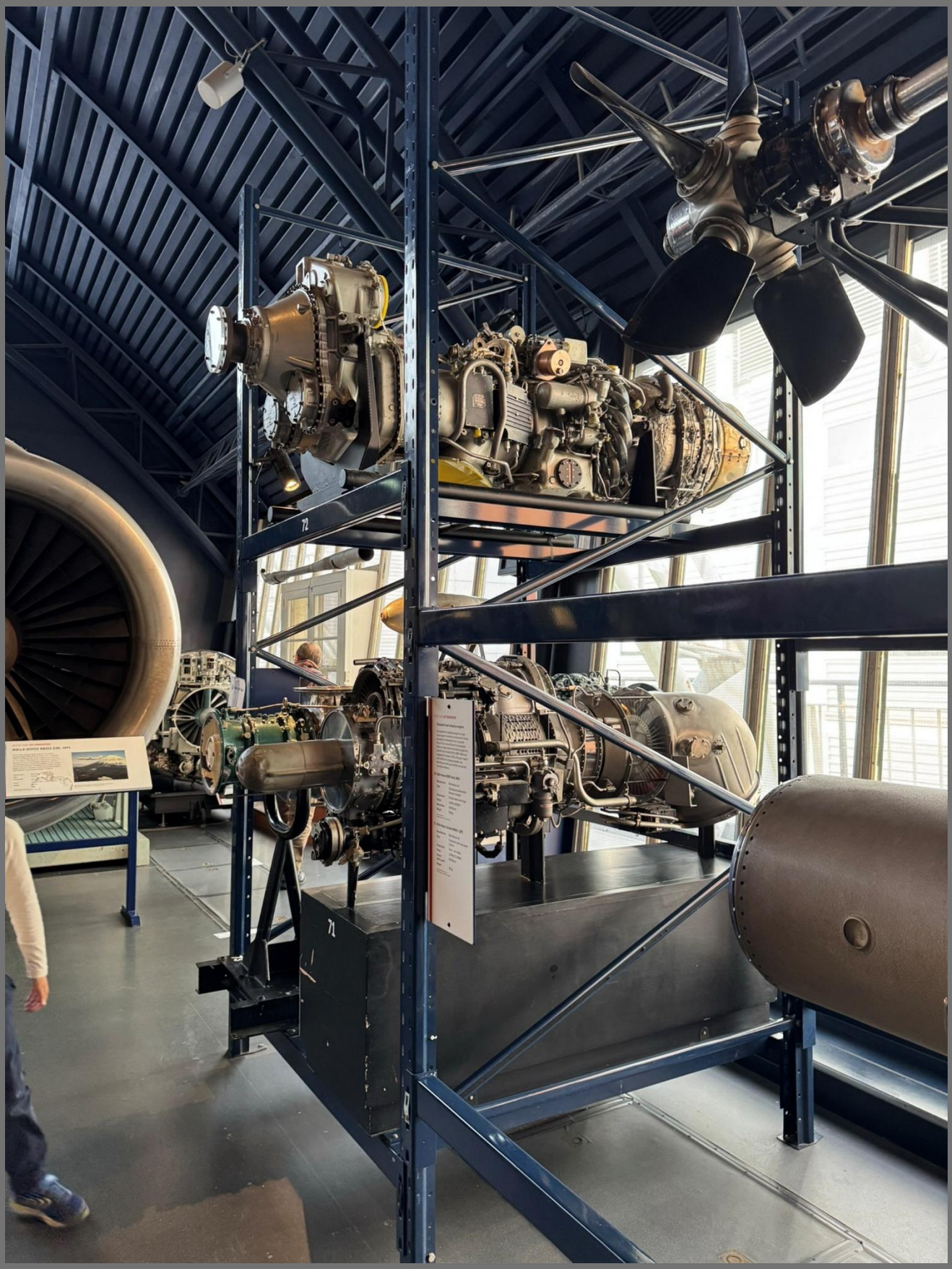
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AFTER 1945 JET INNOVATION
ROLLS-ROYCE/SNECMA OLYMPUS 593B, 1969
Here is an engine to break the sound barrier. Four of them were used on each Concorde aircraft, accelerating it to twice the speed of sound. This cut the transatlantic flight time from about eight hours to just under three and a half hours. This particular engine was used on the French prototype, 001, and then on the British 002. The Concorde fleet flew both special flights for just under 30 years before being retired in 2003.
Manufacturer: Rolls-Royce Ltd, Snecma
Type: Turbojet with reheat
Compressor: Axial – seven-stage low pressure compression, seven-stage high pressure compressor
Power: 31,000lbf (138kN) static thrust, 38,050lb (169kN) with reheat
Weight: 3,125kg
The Concorde aeroplane used four Rolls-Royce/Snecma Olympus 593B engines.
AFTER 1945 JET INNOVATION
ROLLS-ROYCE RB211-22B, 1971
Jumbo jets needed jumbo engines. The RB211 powered wide-body airliners such as the Lockheed TriStar and Boeing 747. It has a large fan at the front of the engine. This draws air in and pushes most of it around the core of the engine where the turbine is. The bypassing air adds to the engine's thrust, making it more fuel-efficient. The RB211 is a turbofan engine. Quiet, efficient turbofans made flying more pleasant and cheaper, boosting passenger numbers.
Manufacturer: Rolls-Royce
Type: Turbofan
Compressor: Axial – [illegible] high pressure compressor, six-stage intermediate pressure compressor
Power: 48,600lbf (216kN) static thrust
Weight: 6,667kg
Length: 6.4m
Many Boeing 747s used four Rolls-Royce RB211-524 engines.

AFTER 1945 **JET INNOVATION**

ROLLS-ROYCE/SNECMA OLYMPUS 593B, 1969

Here is an engine to break the sound barrier. Four of them were used on each Concorde aircraft, accelerating it to twice the speed of sound. This cut the transatlantic flight time from about eight hours to just under three and a half hours. This particular engine was used on the French prototype, 001, and then on the British 002. The Concorde fleet flew commercial flights for just under 30 years before being retired in 2003.

Manufacturer	Rolls-Royce Ltd, Snecma
Type	Turbojet with reheat
Compressor	Axial – seven-stage low-pressure compressor, seven-stage high-pressure compressor
Power	31,000lb (138kN) static thrust, 36,280lb (161kN) with reheat
Weight	3,110kg

Donated by Department of Trade & Industry
Science Museum Group. Object no. 1977-46

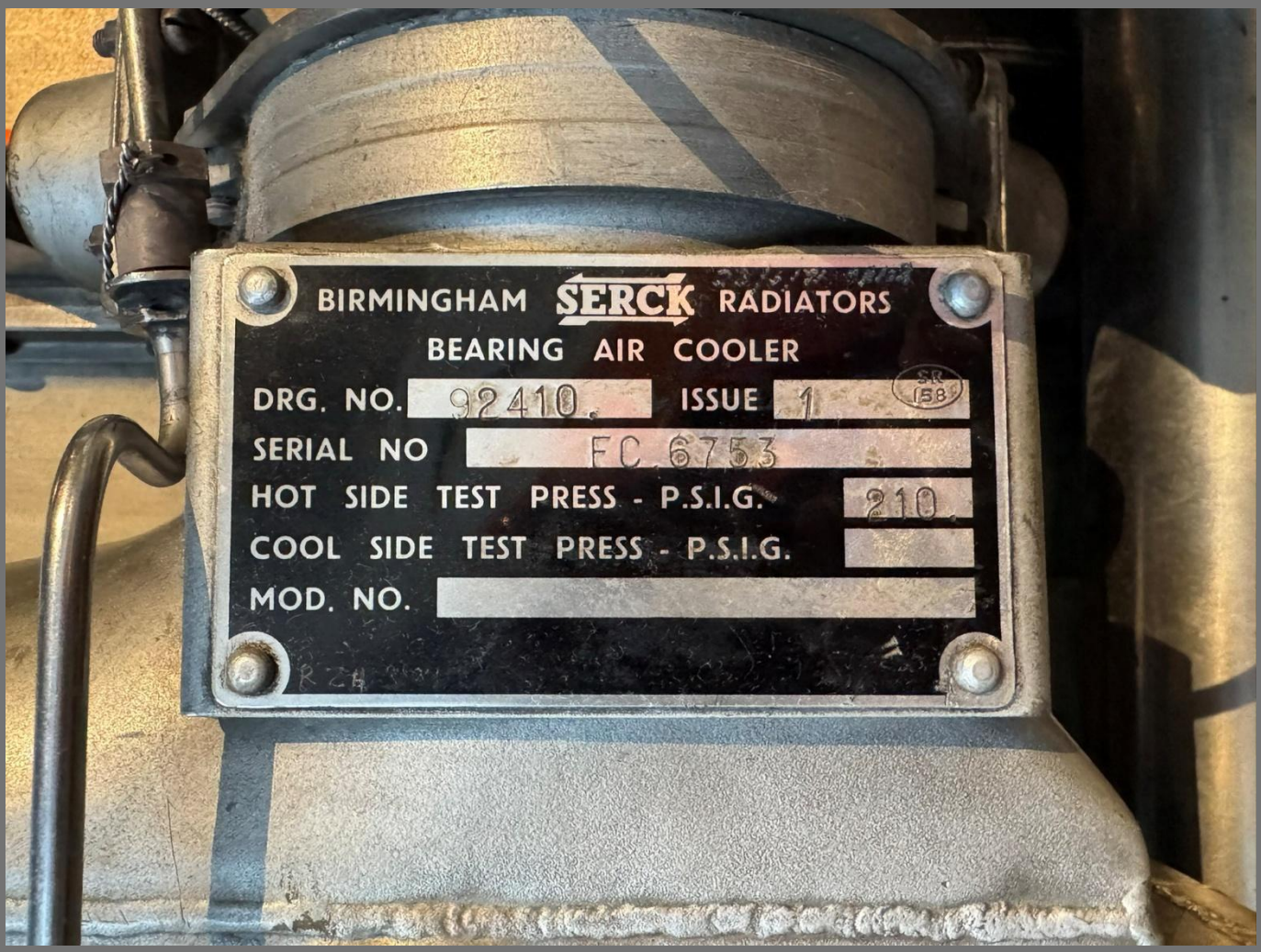


The Concorde aeroplane used four Rolls-Royce/Snecma Olympus 593B engines.
Image: Science Museum Group Collection






100


BIRMINGHAM SERCK RADIATORS
BEARING AIR COOLER
DRG. NO. 92410.
ISSUE 1
SERIAL NO FC 6753
HOT SIDE TEST PRESS - P.S.I.G. 210.
COOL SIDE TEST PRESS - P.S.I.G.
MOD. NO.


AFTER 1945 JET INNOVATION
SECTIONED ROLLS-ROYCE PEGASUS, 1980

1980

AFTER 1945 **JET INNOVATION**

SECTIONED ROLLS-ROYCE PEGASUS, 1980

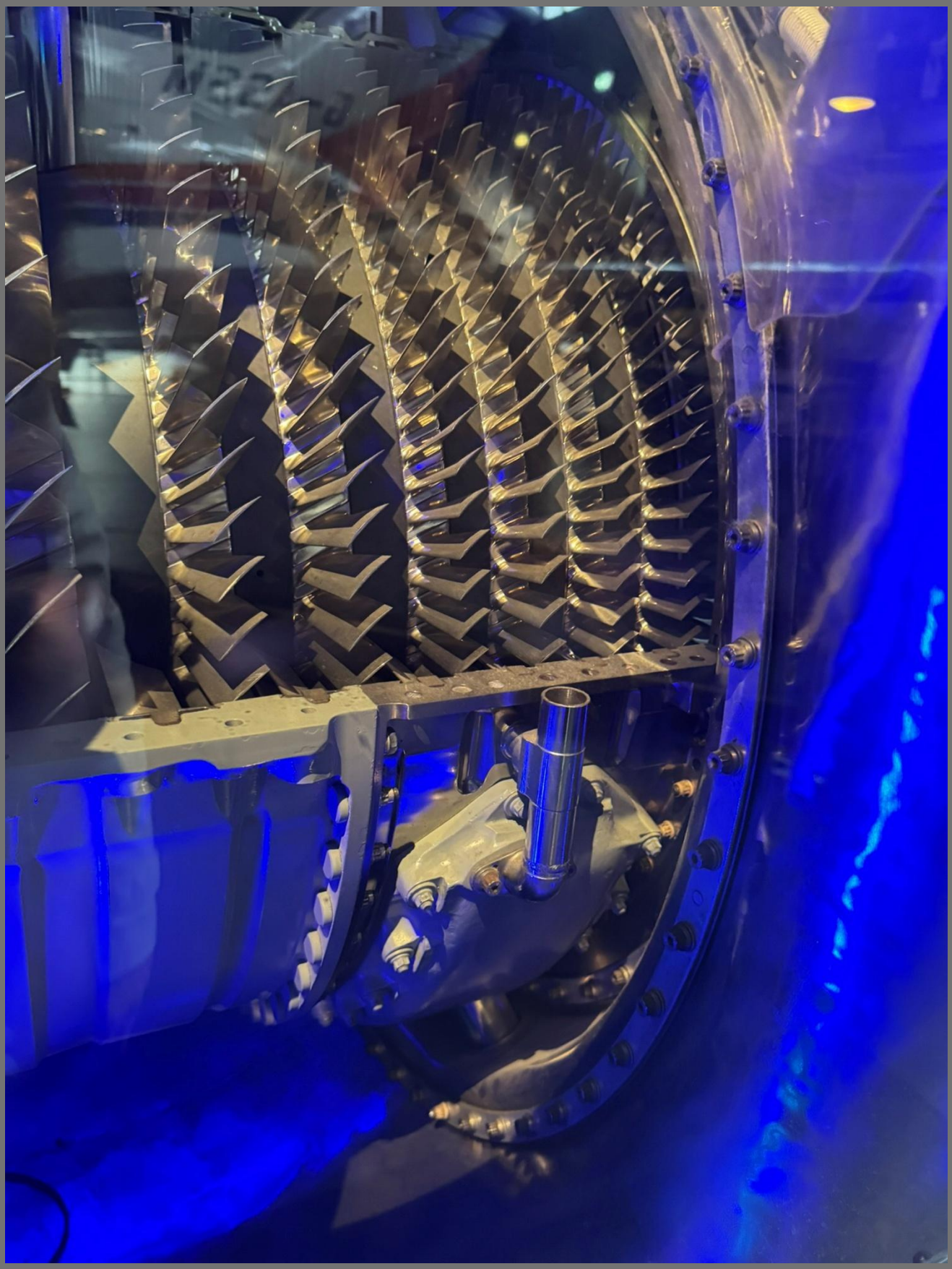
The Pegasus engine enabled the P1127 and its successor, the Harrier, to take off and land vertically. This means they didn't need to use runways. Air enters through the engine intakes either side of the cockpit and is pushed through by a compressor. Some is immediately forced out through the front swivelling nozzles (lit blue). The rest flows through the engine and is forced out through nozzles at the rear (lit red). This moves the aircraft upwards, forwards or backwards, depending on which way the nozzles are facing.

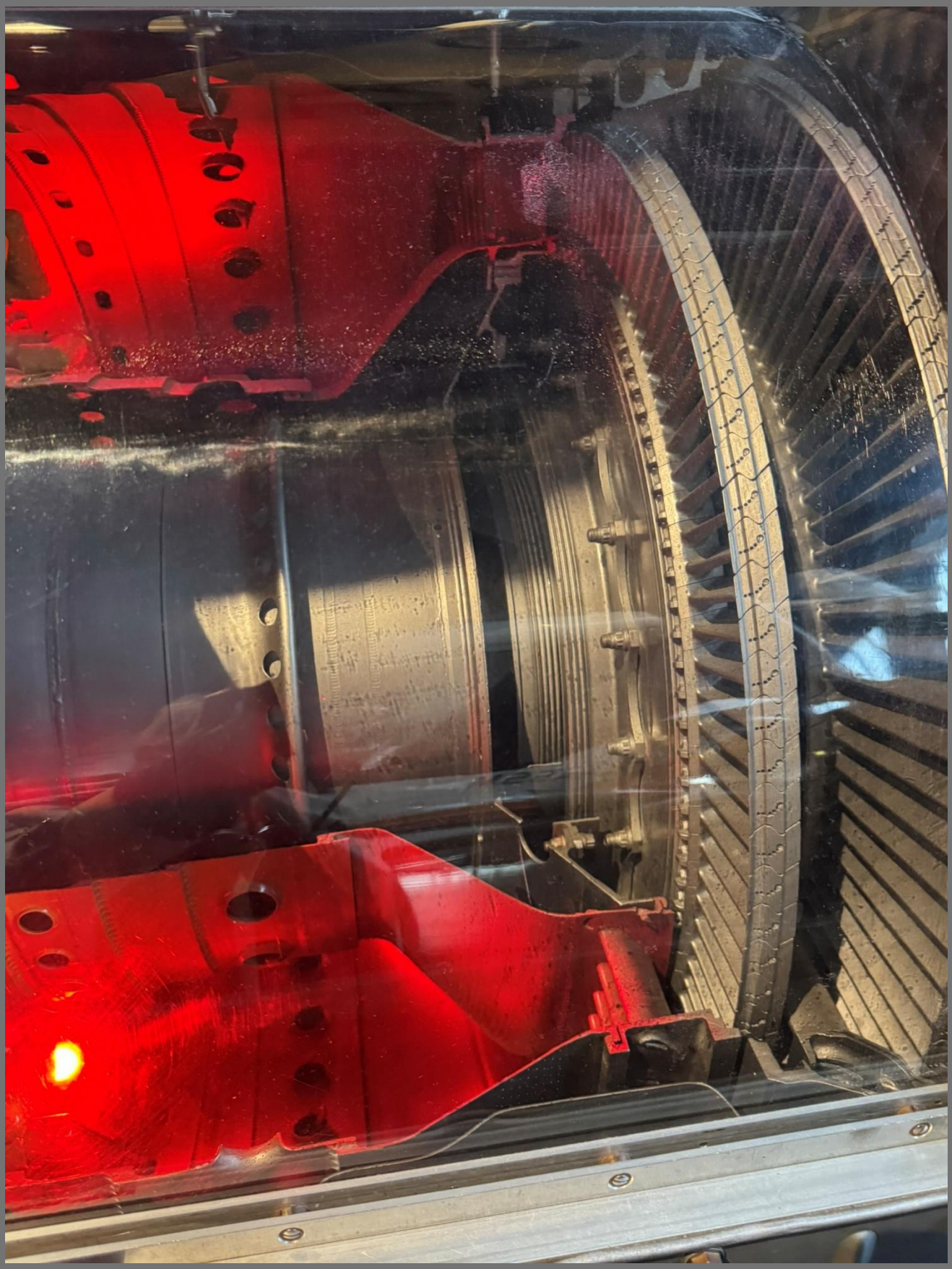
Manufacturer	Rolls-Royce Ltd
Type	Turbofan
Compressor	Axial – three-stage low-pressure compressor, eight-stage high-pressure compressor
Power	21,500lbs (95.6kN) thrust
Weight	1,361kg

Lent by Rolls-Royce Heritage Trust
Science Museum Group. Object no. 1996-138

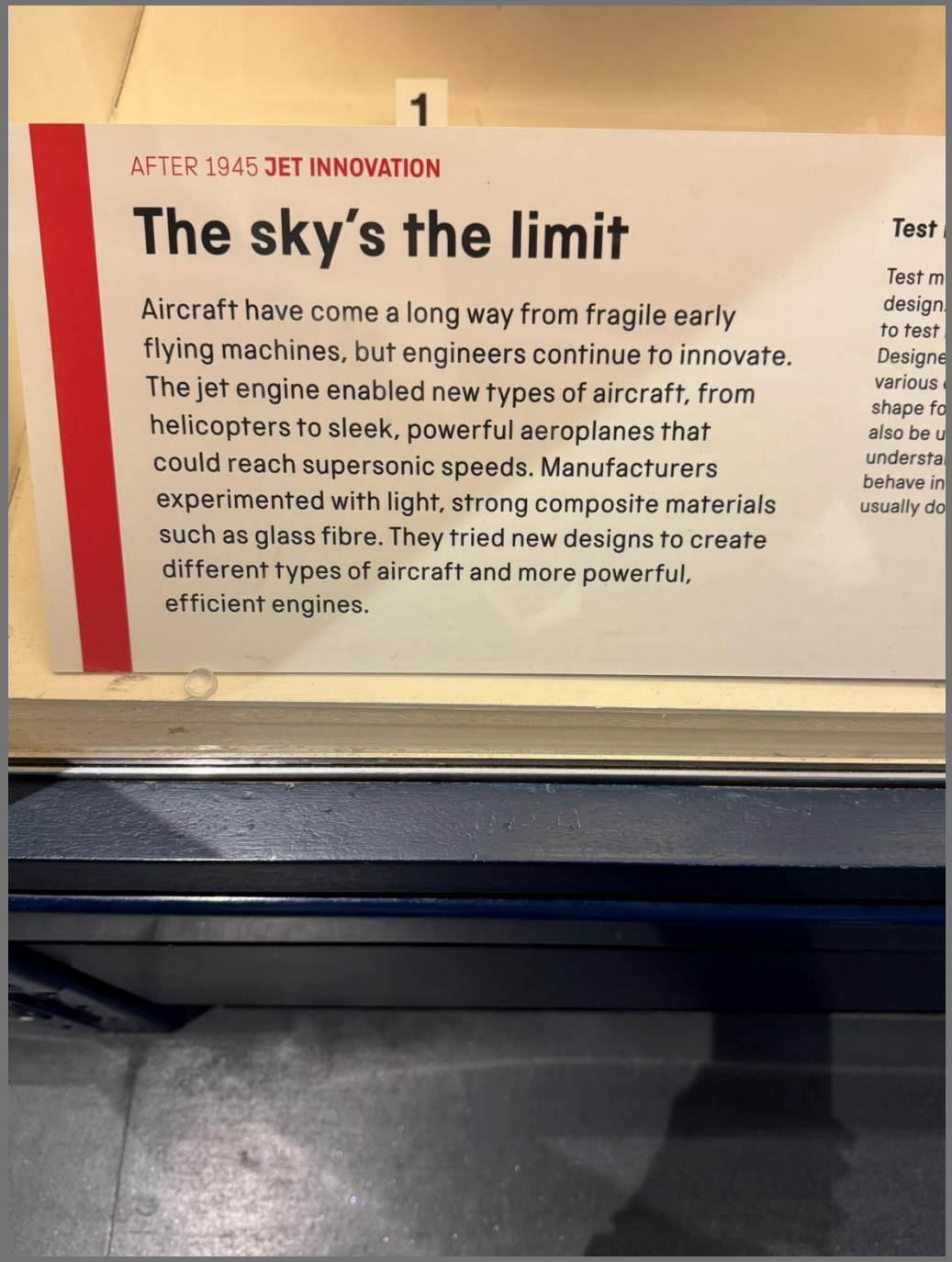


The Hawker Harrier aircraft used a Rolls-Royce Pegasus engine.
Image: BAE Systems



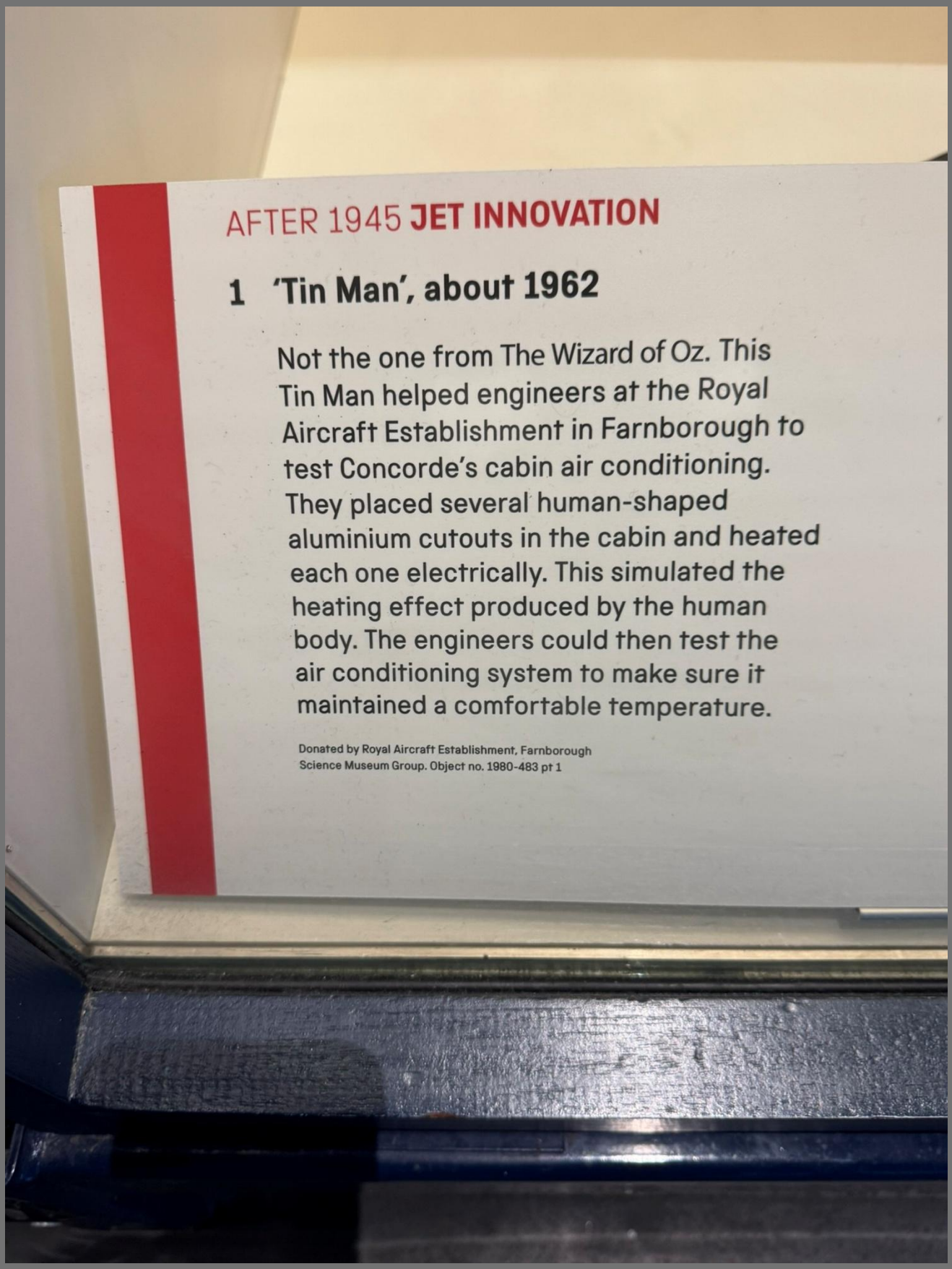



The sky's the limit


1
AFTER 1945 JET INNOVATION
The sky's the limit
Aircraft have come a long way from fragile early flying machines, but engineers continue to innovate. The jet engine enabled new types of aircraft, from helicopters to sleek, powerful aeroplanes that could reach supersonic speeds. Manufacturers experimented with light, strong composite materials such as glass fibre. They tried new designs to create different types of aircraft and more powerful, efficient engines.


ABOVE
Low-speed wind tunnel model of
Boeing 747, 1966
Engineers traditionally used wind tunnels


3
2
1
AFTER 1945 JET INNOVATION
1 'Tin Man', about 1962
Not the one from The Wizard of Oz. This Tin Man helped engineers at the Royal Aircraft Establishment in Farnborough to test Concorde's cabin air conditioning. They placed several human-shaped aluminium cutouts in the cabin and heated each one electrically. This simulated the heating effect produced by the human body. The engineers could then test the air conditioning system to make sure it maintained a comfortable temperature.
2 Windak full-pressure flying suit, 1962
After the Second World War, aircraft flew at far higher altitudes. As altitude increases, air pressure decreases. This can have dangerous effects on the human body. This suit was designed to provide pilots with oxygen and maintain the pressure needed for blood to flow properly around their bodies. Full body suits like this were abandoned when it was realised that an oxygen mask and pressurisation vest would be enough.
3 Test pilot's partial-pressure helmet, type D, 1957
In case of emergency, test pilots wore a helmet like this. If the cabin depressurised above 12,192 metres (about 7.5 miles), the suit would automatically inflate and the helmet's visor would seal shut. The sealed helmet became oxygen-tight so the pilot could breathe. The inflated suit re-created normal air pressure so the pilot's body could work as usual.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Donated by Royal Aircraft Establishment, Farnborough
Science Museum Group. Object no. 1980-483 pt 1



2 Windak full-pressure flying suit, 1962

After the Second World War, aircraft flew at far higher altitudes. As altitude increases, air pressure decreases. This can have dangerous effects on the human body. This suit was designed to provide pilots with oxygen and maintain the pressure needed for blood to flow properly around their bodies. Full body suits like this were abandoned when it was realised that an oxygen mask and pressurisation vest would be enough.

Lent by Windak Limited
Science Museum Group. Object no. 1978-244 pt 1


3

1918–1939 **INTERWAR EXPANSION**

WHEEL FROM BEARDMORE INFLEXIBLE AIRCRAFT, ABOUT 1928

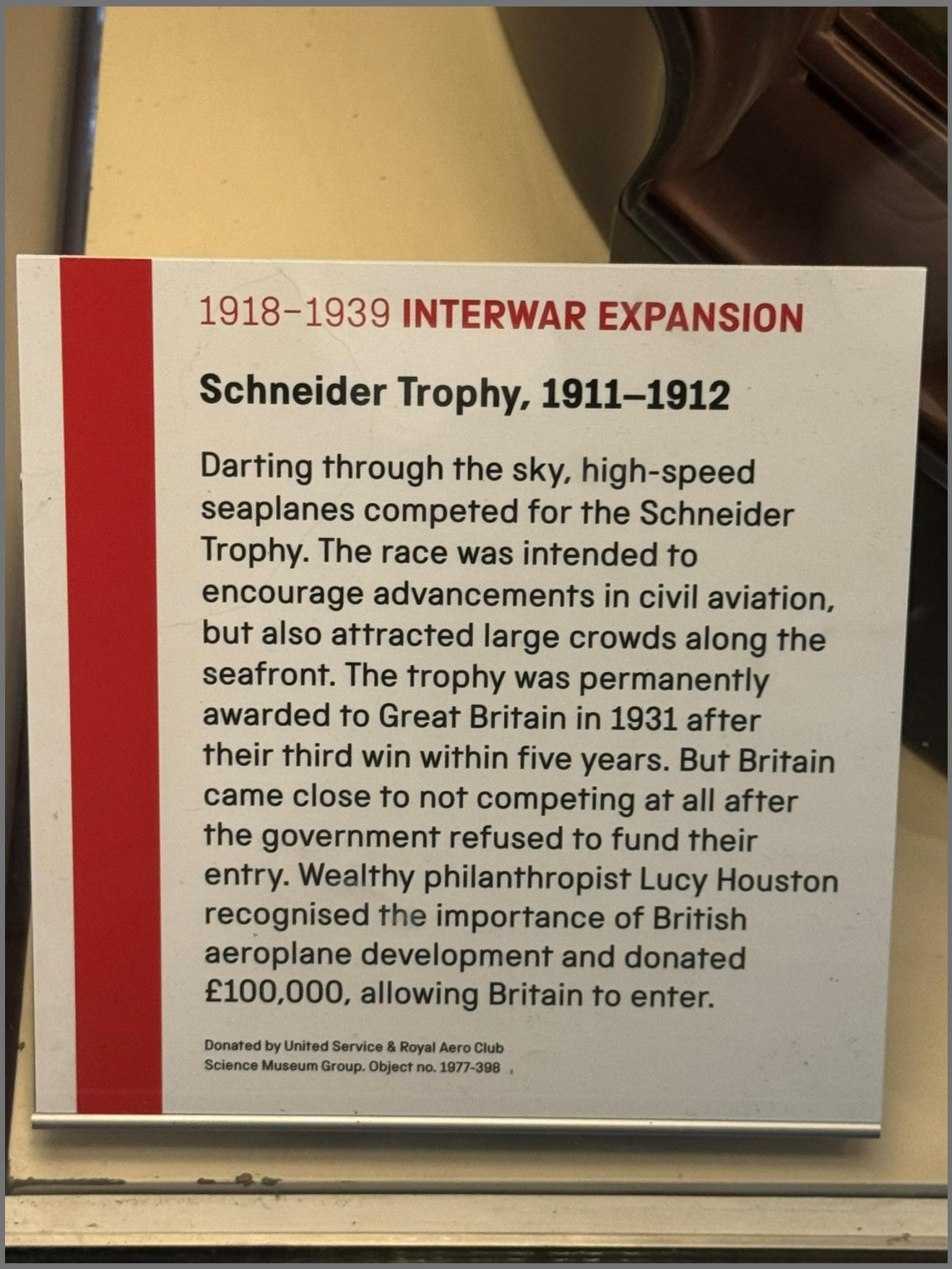
The Beardmore Inflexible was the largest aeroplane in Britain on its construction in 1928. It was an experimental three-engine bomber built using the new type of all-metal construction. Its wings spanned 48 metres and its tyres were the largest developed by the Dunlop company at that time. This spoked wire wheel is an early design, while the aluminium wheel with a tyre also displayed in this gallery is a newer version.

Donated by Dunlop Rubber Company
Science Museum Group. Object no. 1960-63

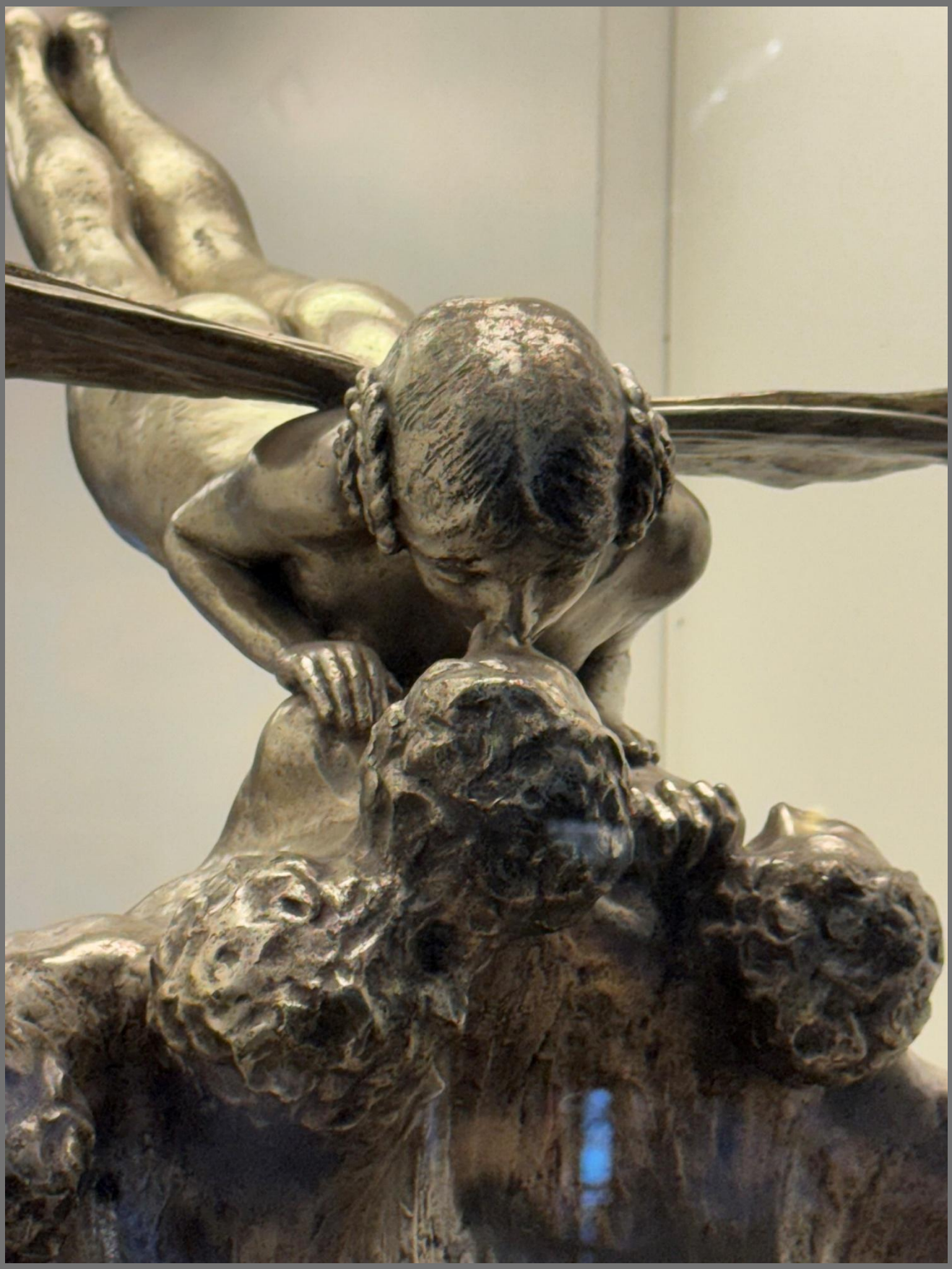


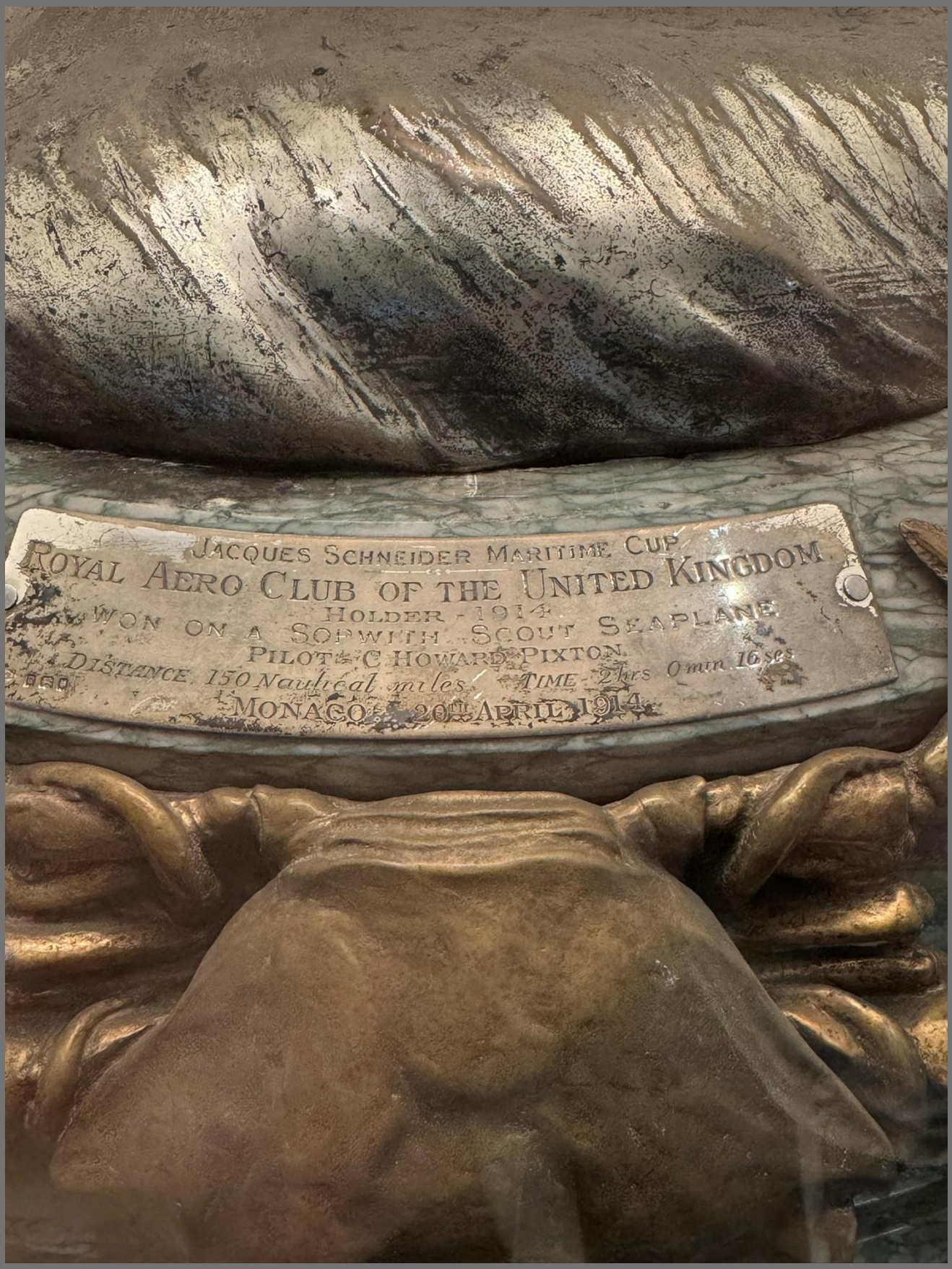


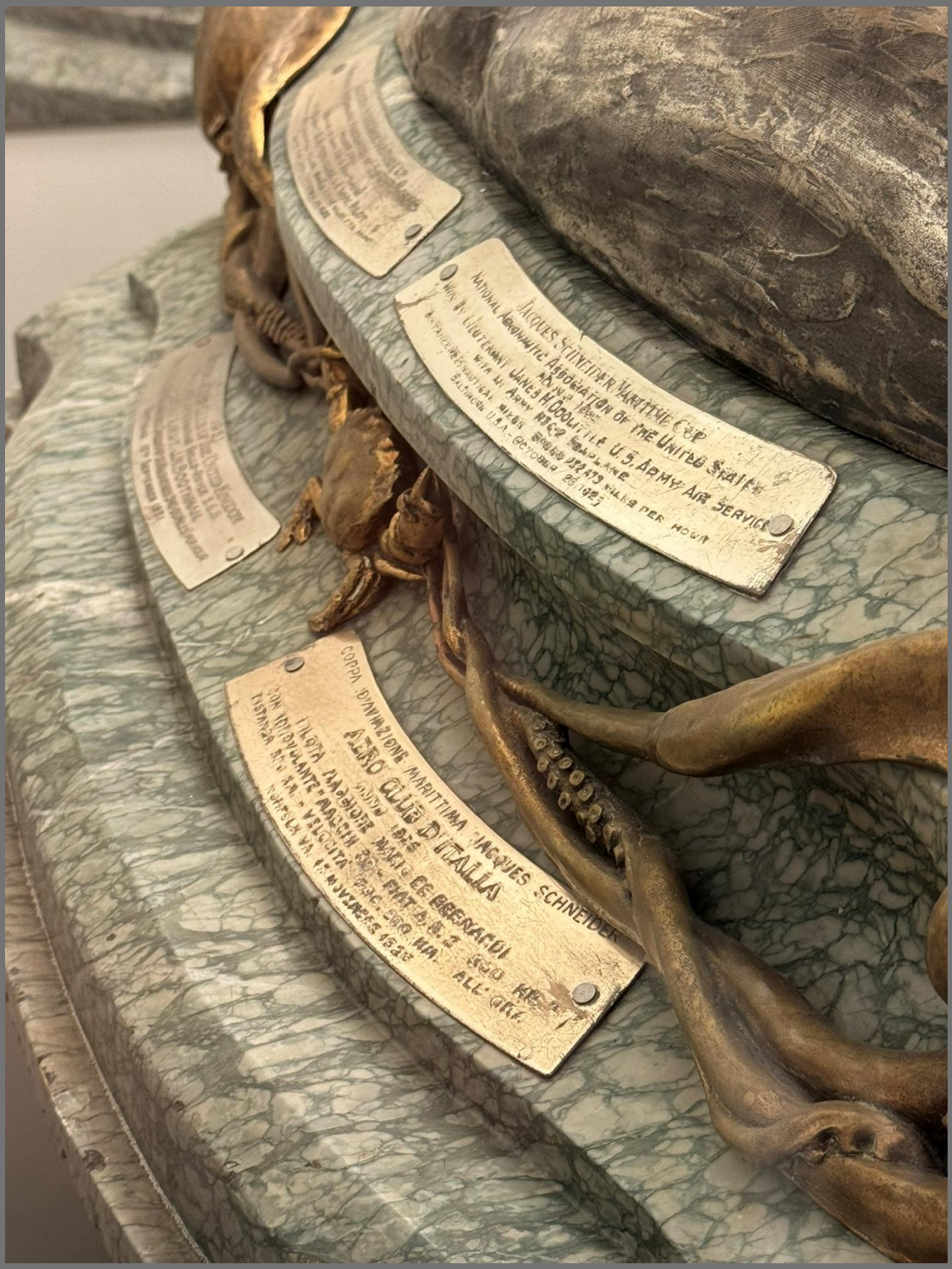



1918–1939 INTERWAR EXPANSION
Schneider Trophy, 1911–1912
Darting through the sky, high-speed seaplanes competed for the Schneider Trophy. The race was intended to encourage advancements in civil aviation, but also attracted large crowds along the seafront. The trophy was permanently awarded to Great Britain in 1931 after their third win within five years. But Britain came close to not competing at all after the government refused to fund their entry. Wealthy philanthropist Lucy Houston recognised the importance of British aeroplane development and donated £100,000, allowing Britain to enter.
Donated by United Service & Royal Aero Club
Science Museum Group. Object no. 1977-398

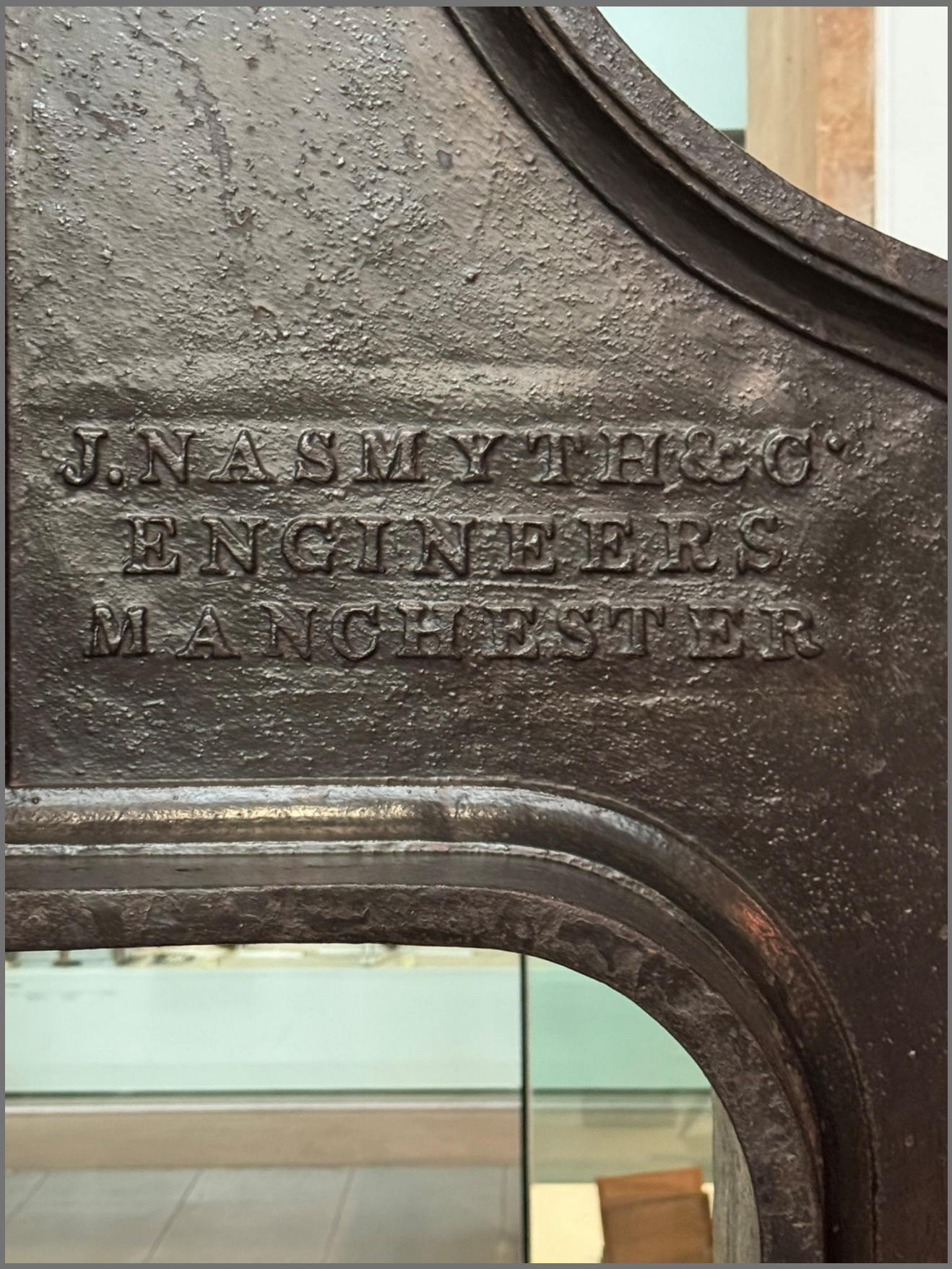


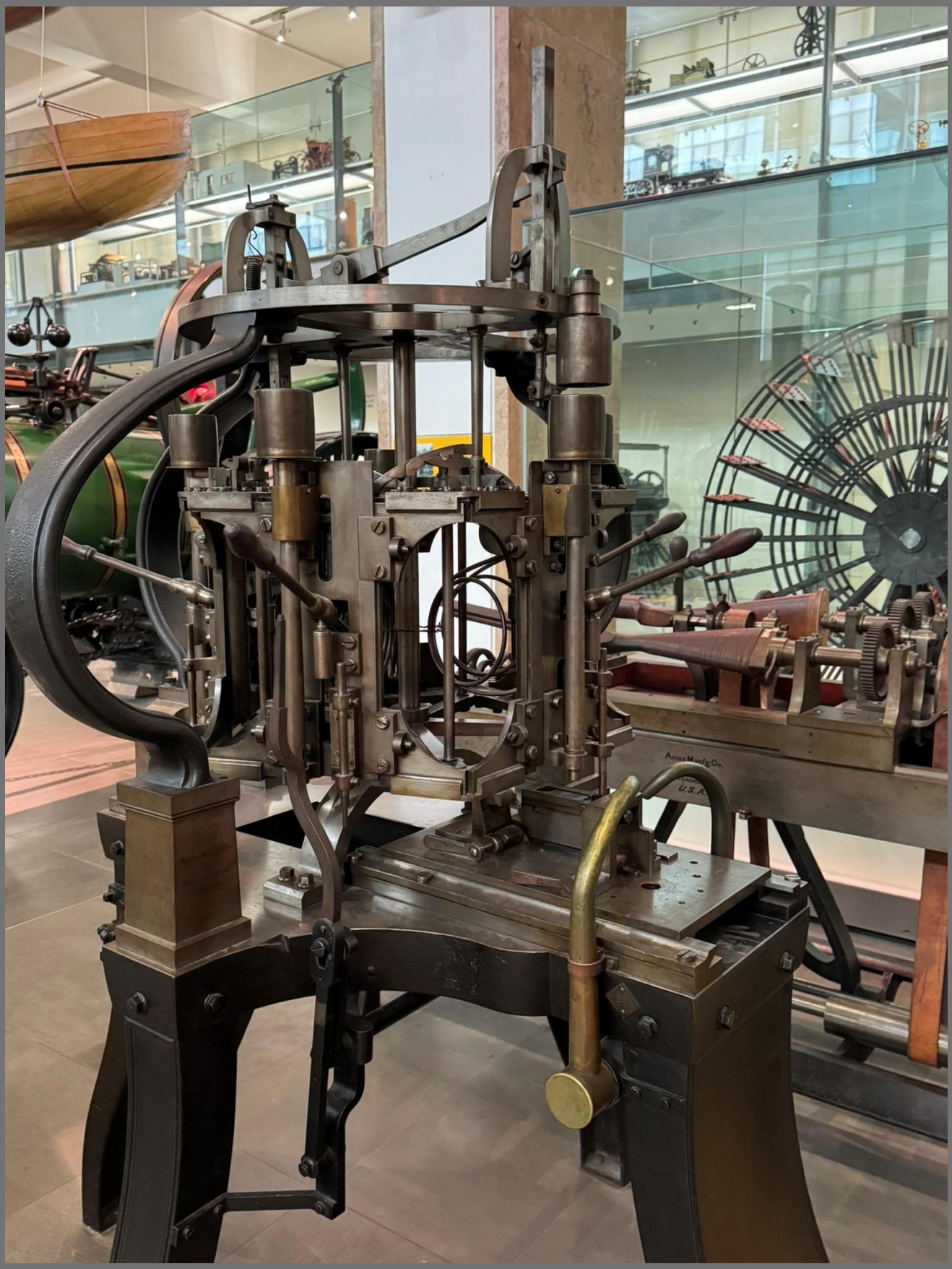


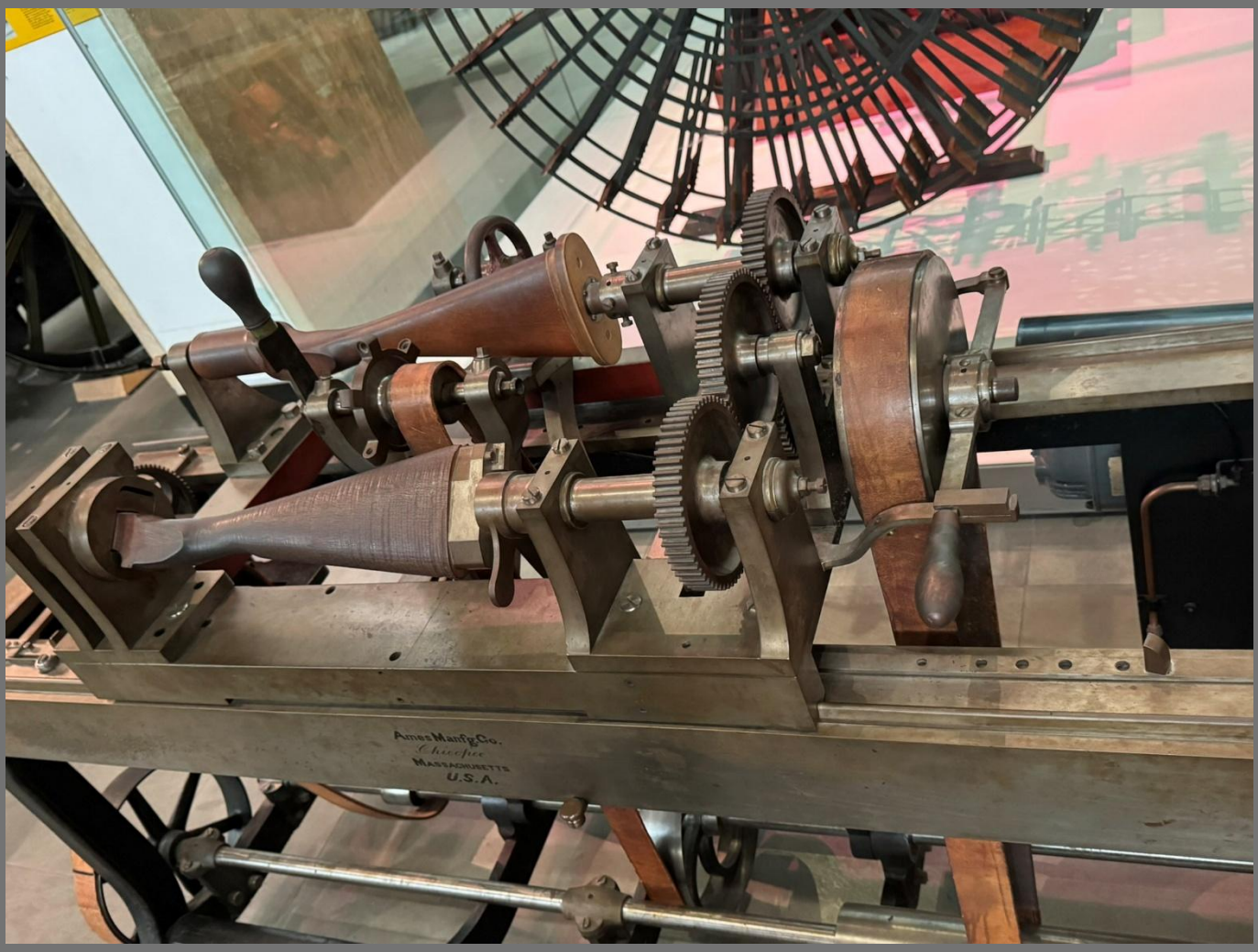

JACQUES SCHNEIDER MARITIME CUP
ROYAL AERO CLUB OF THE UNITED KINGDOM
HOLDER - 1914
WON ON A SOPWITH SCOUT SEAPLANE
PILOT - C HOWARD PIXTON
DISTANCE 150 Nautical miles TIME - 2 hrs 0 min 16 secs
MONACO 20TH APRIL 1914


JACQUES SCHNEIDER MARITIME CUP
NATIONAL AERONAUTIC ASSOCIATION OF THE UNITED STATES
WON BY LIEUTENANT JAMES H DOOLITTLE U.S. ARMY AIR SERVICE
WITH AN ARMY RC-2 SEAPLANE
AVERAGE SPEED OVER COURSE 232.573 MILES PER HOUR
BALTIMORE U.S.A. OCTOBER 26 1925
COPPA D'AVVIAZIONE MARITTIMA "JACQUES SCHNEIDER"
AERO CLUB D'ITALIA
VINTA DAL
TENENTE MAGGIORE MARIO DE BERNARDI
CON IDROVOLANTE "MACCHI" - FIAT A.S.2 600 HP
DISTANZA KM. - VELOCITA' MEDIA KM. ALL'ORA
NELL'ORA VA 1° NOVEMBRE 1926




J.NASMYTH&C°
ENGINEERS
MANCHESTER


Ames Mfg Co.


Ames Manfg Co.
Chicopee
Massachusetts
U.S.A.


1918
Ames Manfg. Co.
Chicopee
Massachusetts
U.S.A.

Ames Gunstock Lathe 1857



e Royal Small Arms Factory, Enfield, from e Illustrated London News, 21 September 1, showing an artist's impression of some he new machines.

rce: Science Museum/Science & Society ure Library

A 'copy lathe' produces exact replicas by using a master shape to govern the path of a cutting tool. This example is one of several American gun-making tools installed at the Royal Small Arms Factory in Enfield. Gunstocks have a complex three-dimensional shape and this machine reduced the amount of handwork needed to make them.

Thomas Blanchard devised copy lathes at the Springfield Armoury in Massachusetts, USA, to help modernise and speed up production. They also have parallels with sculpture-copying machines developed in later life by steam pioneer James Watt. The machines' legacy is the computer numerically controlled (CNC) machining systems that characterise mass-production today.

Source: Royal Small Arms Factory Inv. 1966–58


Ames Manfg.Co.
Chicopee
MASSACHUSETTS
U.S.A.


Ames Manfg.Co.
Chicopee
Massachusetts
U.S.A.

Ames Lock-recessing Machine, 1857



Celebrations for the end of the Boer War in May 1902 at the Royal Small Arms Factory, Enfield. The scene shows the character of a light engineering shop powered by overhead shafts and belts.

Source: London Borough of Enfield Public Libraries

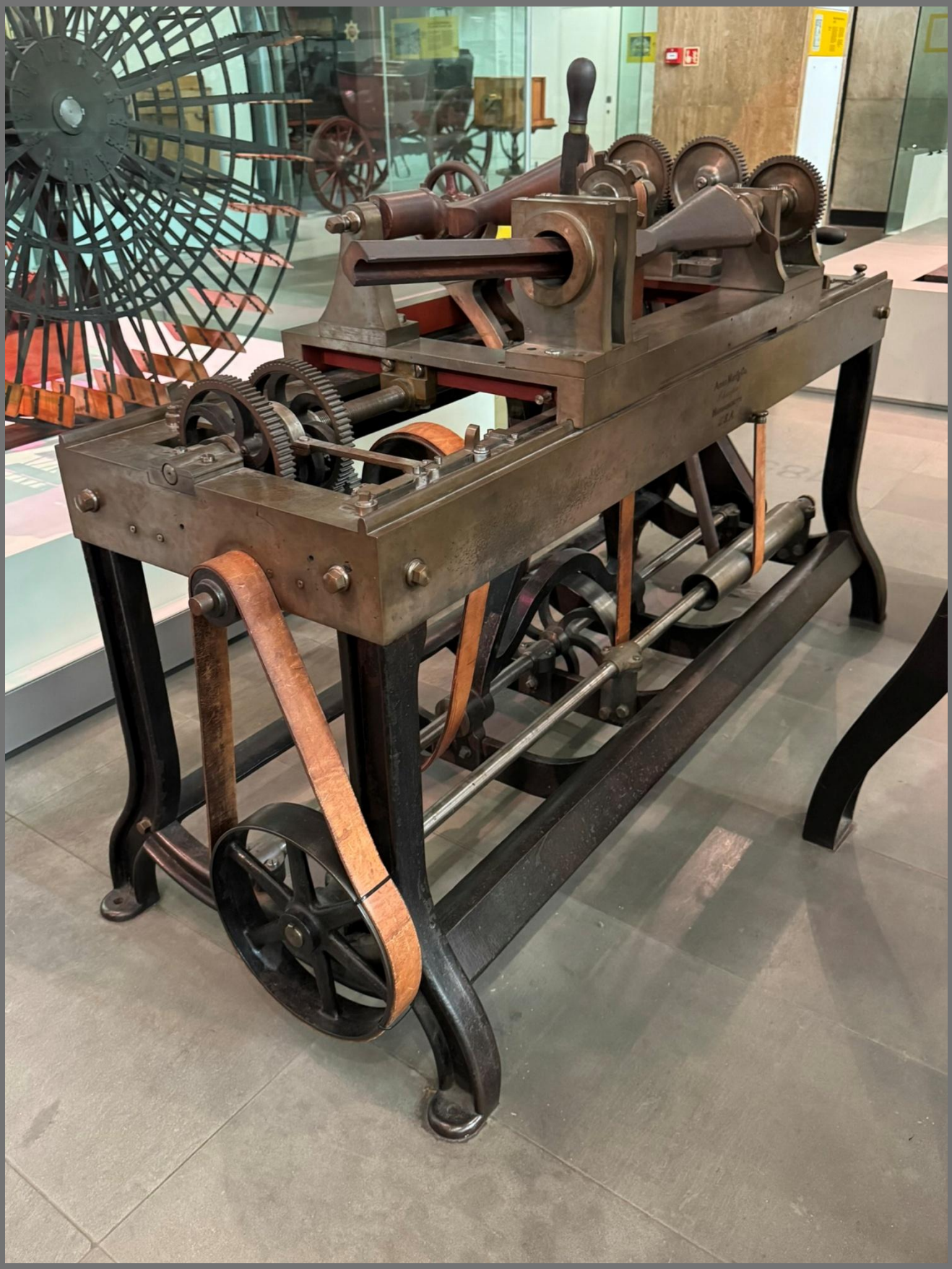
This machine was imported from America as part of a push to modernise British gun-making. Installed at the Royal Small Arms factory in Enfield, it cut the recess in a gun's wooden stock into which the mechanism (the 'lock') fitted. Unlike handmade gun parts, machined components were identical, accurate and interchangeable, simplifying assembly and repair.

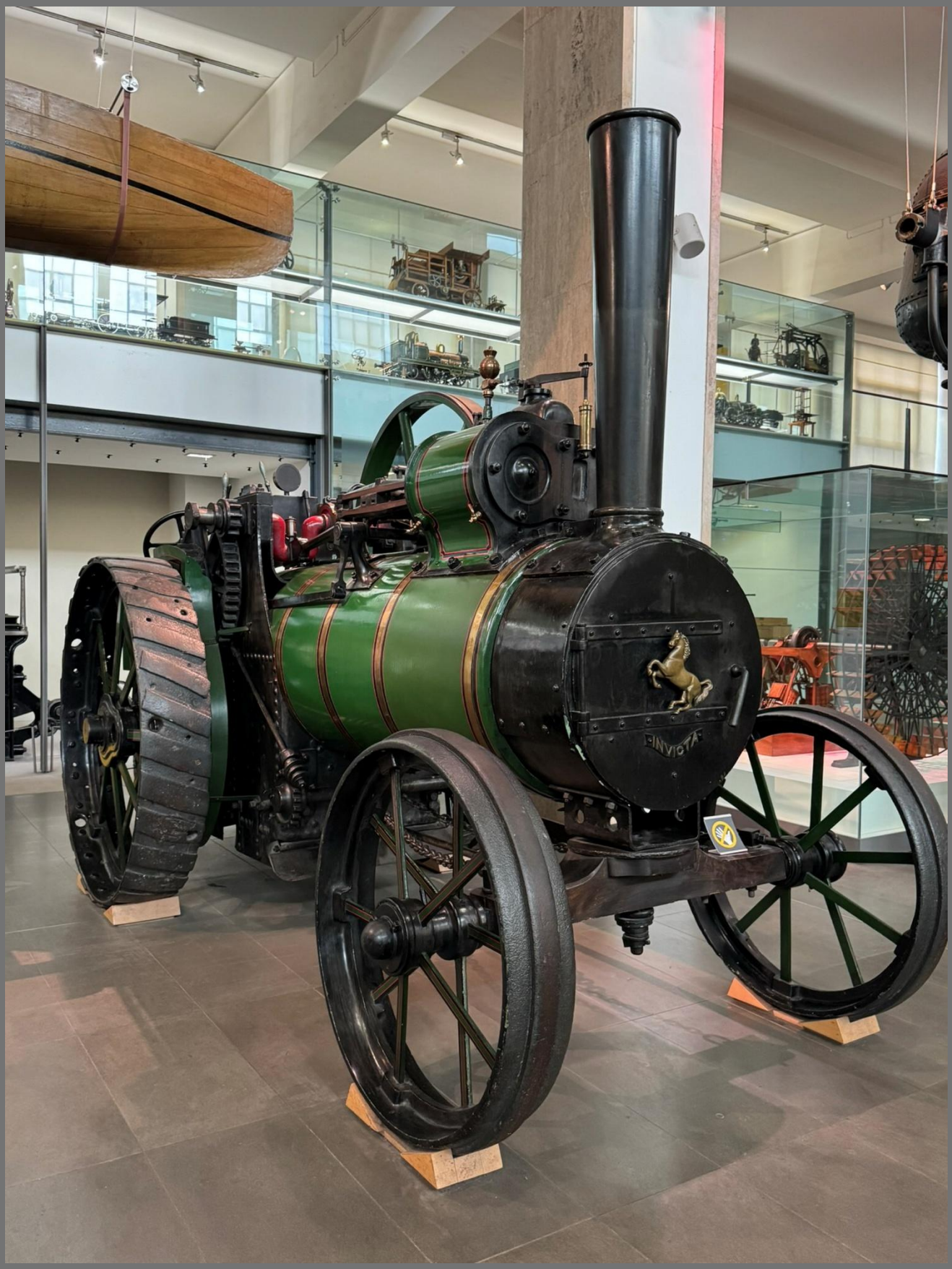
The Great Exhibition of 1851 showed that American manufacturing methods for small, accurate parts in large numbers were superior to craft-based British practices. After a government inquiry, Britain bought over 150 new American machines to update manufacturing processes at Enfield – and employed American personnel in several managerial posts.

Source: Royal Small Arms Factory Inv. 1957–1








INVICTA

Technology in Everyday Life c.1820–1880

Machinery

VI. Manufacturing
Machines and Tools

Rotary printing press for newspapers, 1870
The development from the late 1860s of rotary printing machines with integral folding machines enabled newspapers to be produced more quickly and cheaply than before. This machine was made by the Victory Printing and Folding Machine Manufacturing Co. in 1870 for the *Liverpool Daily Post*. It passed to the *Wigan Observer* in 1884 and continued to print that newspaper until January 1966, by which time it had produced 43,747 editions, somewhere in the region of a million copies. In 1905 the original folding machine was removed (the saw cuts can be seen on the left) and replaced by one of larger capacity, not shown here.

1978-89 (Manchester County Museums)




Foden
DIESEL No1.
Built 1931


SPACE
Foden




Steam power for the workshop

1. Lumière Cine-Camera and Projector, 1896

The brothers Louis and Auguste Lumière were two of the earliest players in the development of motion pictures.

Their cinématographe device, patented in 1895, was a combined cine-camera and projector, using an intermittent claw derived from the mechanism used in sewing machines. It was used to show the first projected cinema film to a paying audience, in the basement of the Grand Café, Paris, on 28 December 1895. This example is the earliest surviving from the subsequent production run.

Source: Philips Inv. 1991–5011

Sequence from *Arrivée d'un train à La Ciotat* by Louis Lumière, 1897.

Source: © Association Frères Lumière, COLL. CNC



2. Bragg's X-ray Spectrometer, 1913

William Bragg, Leeds-based professor of physics, designed this instrument to study the structure of crystals with his son, Lawrence Bragg, also a renowned physicist, earning them a joint Nobel Prize for Physics in 1915.

Understanding the properties of crystals, from common salt and diamonds to complex organic compounds, has allowed innumerable advances in chemistry, physics, materials science, biology and medicine.

Source: Royal Institution Inv. 1926–1021


vigating
world


Navigating
the world
N°8
1


Foden
Foden
DIESEL No1
Built 1931

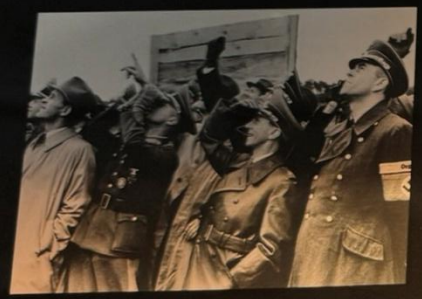

Ford
PP 7963
V.C.C.

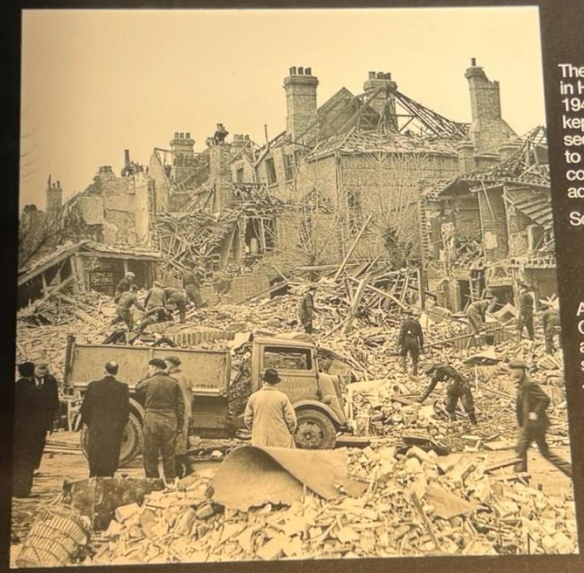



Birth of

V2 Rocket 1945







The aftermath of a V2 explosion in Hornsey, north London in 1944. Since the British media kept the locations of V2 strikes secret, German analysts began to study newspaper obituary columns to check the aiming accuracy of the attacks.

Source: Hulton Getty

Albert Speer and Joseph Goebbels witness a V2 launch at the Peenemünde research station on the Baltic coast in June 1943. Nazi officials were, at first, doubtful of the value of the rocket but the noise and drama of a launch usually convinced sceptics that this unstoppable 'revenge weapon' would end the war.

Source: Ullstein-Hanns Hubmann


GREENWICH TIME SERVICE


CHOPPER
RALEIGH
Flymo
SINGER
Nomadics
Cars
117. Radar speed-trap camera,
118. Tyre-deflation device, 199
Spiked grid thrown by police acro
path of an escaping car to deflate
119. Wheel clamp, 1999
120. Piece of motorway, 1985
A test sample of the UK's M1 m
Prospecting
121. Dowsing rods, 1994
To search for hidden substanc
Politics
Power
64. Police equipment, 1985–1999
65. Military ration pack, c.1964
66. Burglar alarm, c.1975
Craft
Wood
70. Wooden bowl, 1999
Wooden bowl, made from turned mango wood in the Philippines.
Ceramics
71. Crockery, 1999
Sewing
73. Industrial sewing machine, c.1970
Singer 552 high-speed industrial sewing machine, used in clothing manufacture in the 1970s. It ran at
120
122
123
130



Soft technology

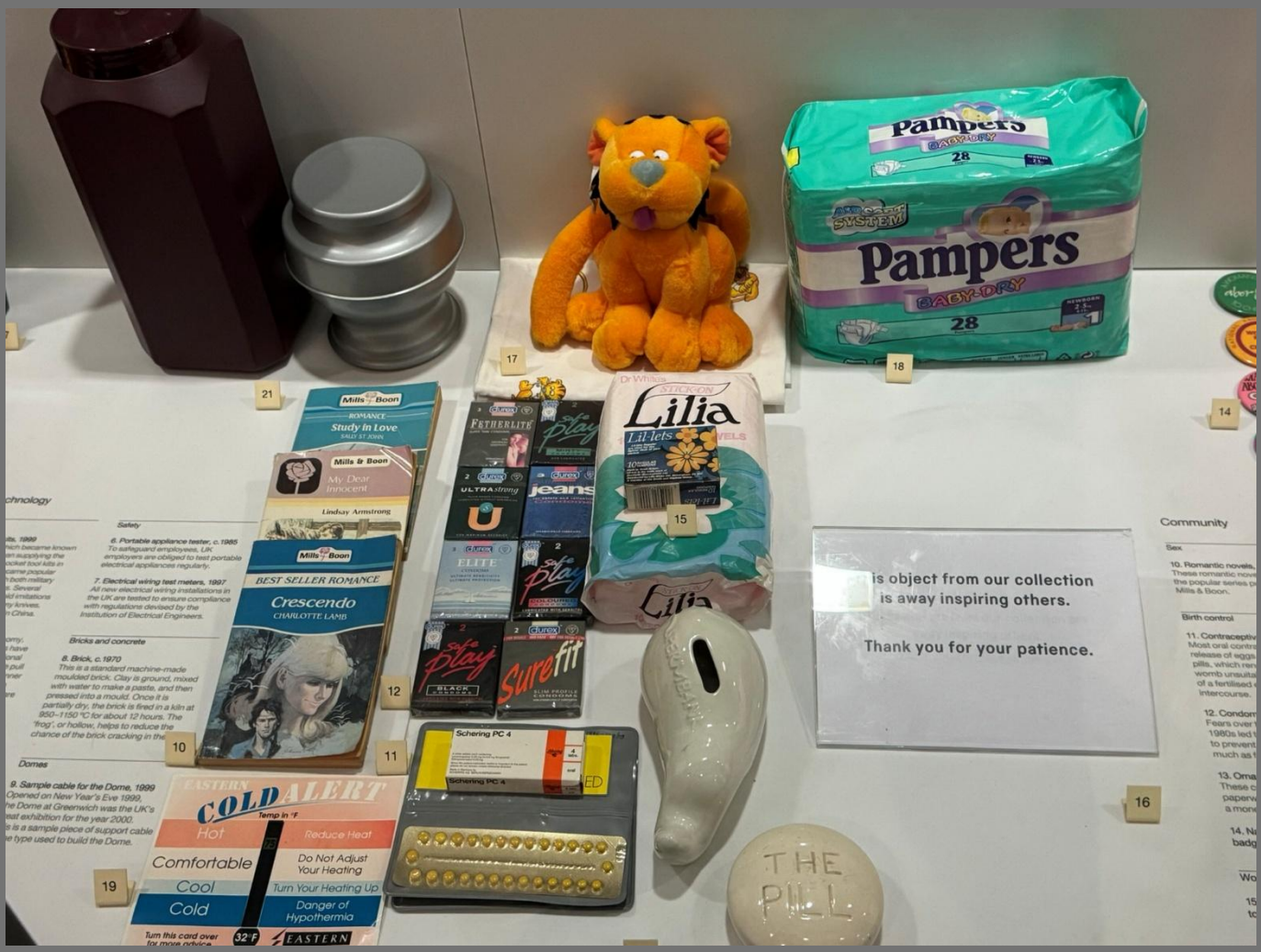
Good tools

1. General tool kit, 1999

The kit consists of the follo
components:

hardpoint saw
hacksaw
junior hacksaw
hacksaw blades
claw hammer
rubber mallet
3 rasp files
4 chisels
plane
t-bar with b
6 precisio
4 twist g
spirit le


MEGGER
PAT1
Earth Bond
Insulation
Flash
Operation
TEST
DEWALT
MEGGER CBT3
6 screwdrivers
pliers
slip-joint wrench
plumb line
measuring tape
hole saw set
insulation stripper
4 sanding blocks
wire brush
sharpening stone
wood screws and plugs
18 twist drills
triangular shave hook
3 pencils
snap-off blade knife
2 clamps
Soft technology


Pampers
BABY-DRY
28
Pampers
BABY-DRY
28
Mills & Boon
ROMANCE
Study in Love
Mills & Boon
My Dear Innocent
Lindsay Armstrong
Mills & Boon
BEST SELLER ROMANCE
Crescendo
CHARLOTTE LAMB
Lilia
Lil-lets
Sure fit
Schering PC 4
EASTERN
COLD ALERT
Temp in °F
Hot
Reduce Heat
Comfortable
Do Not Adjust Your Heating
Cool
Turn Your Heating Up
Cold
Danger of Hypothermia
32°F
EASTERN
THE PILL
is object from our collection
is away inspiring others.
Thank you for your patience.
Community
Sex
Birth control


KENWOOD
sodastream
SAMSUNG
Community
INDIAN
MENU
The Sunshine Breakfast
MILK
82
83
84
86
88
89
90
91
94
95
124
125



30. *Combined diphtheria and tetanus vaccine, c.1984*
This combined vaccine was used where the more usual triple vaccine, including protection against whooping cough, was contra-indicated or not required.

31. *Diamond-tipped knife, c.1970*
Used for eye surgery, the sharp diamond blade reduces the pressure needed to cut into the eye.

32. *Alternative therapies, 1990s*
Many diverse complementary therapies were available at the end of the twentieth century, including crystal therapy and aromatherapy.

33. *Vitamin supplement, 1991*

Psychological self-care

4. *Electronic laughing ball, c.1995*

sabled

Spectacles, 1970–1999
v materials were introduced into ctacle manufacture during this od, including anti-allergy nickel- rames, lightweight titanium alloy s and thinner lenses made from efractive index glass.

ntact lens equipment, 1999

Learning

Drugs

38. Tobacco, 1999
Medical research, wh smoking with a lengt health hazards inclu and heart disease, l measures to reduce Manufacturers resp smoking measures tar cigarettes. Res advertising in the marketing metho free gifts to smok

39. Sweet cigare

40. Snuff, 1999
Although snuff period, its pop waned with th smoking.

41. Pipe, 199

42. Nicotine
Measures t habit includ promotion products, skin patch

43. Smok
Special t stains o


LEGO SYSTEM
6425
2229
3-7
LEGO
basic
46
49
STRIKE
NIKKO
47
NIKKO
54
52
AERO-FLYTE
BEGINNERS MODEL
FLYING SERIES
NIMBUS
30" WING SPAN
Electronic Talking
Lovable Bears
Look after
Feed him
and send
im to sleep
I'll talk softly to you
My name is Minty
Take them with you everywhere
PEPPERMINT SCENTED
50
Tummy Ache
A BOARD GAME
Up to 4 players
age 3-10
play and learn games
Tummy Ache
53
Learning
Toys
46. Construction
47. Steam
48. Mod
49. Ra
50. El
51.
47
49
54
52
50
53


mmunications
otography
4. Cameras, 1968–1999
he most common film format
this period was 35mm,
hough drop-in cartridge
ystems were also popular.
Polaroid instant-picture
cameras filled a niche market.
Audio equipment
105. Crystal radio set, 1999
106. Personal stereo, c.1993
The Sony Walkman was first released in 1979. Personal stereos became smaller and lighter until it was possible to buy one just a little larger than the audio cassette itself.
107. Audio cassettes, c.1970
The Compact Cassette, developed by Philips for dictation machines and released in 1963, became the dominant format for home recording in this period.
Electronics
108. Clocks, 1970–1988
An important development for domestic clocks in this period was the use of direct radio control from accurate laboratory clocks.
109. Watches, 1976–1999
Quartz watches became increasingly accurate, sophisticated and cheap throughout the late twentieth century.
110. Integrated circuits, c.1985
These are operational amplifiers, a type of component used in most
electronic circ
ADDO
Playback
112
113
111


nstruments
138. Guitar and effects, 1990s
The electric guitar was originally devised to compete with louder instruments in a band. The waa-fuzz effect pedal was widely used in funk and rock music.
139. 'Silent' violin and cello, 1999
Electrical pick-ups detect the vibrations of the strings.
VIDEO CASSETTE RECORDER N1512
VCR
AUTOMATIC RECORDING
PHILIPS
141
Video
140. Television receiver, 1979
141. Philips video cassette recorder, c.1974
The Philips tape format was superseded by Sony's Betamax and JVC's VHS format.
142. Satellite television receiving equipment, c.1989
Communication
siser, 1970
e synthesiser
rical wavefor
ed to imitate
e novel soun
sed by pione
1970s, incl
Music.
er, c.1980
synthesiser
numbers w
ectrical wa
0 was one
esisers p
Yamaha
ew niche
market.
of turntables
SL-1200 dir
eleased in 1
rnal DJs on
of these
me the in
d club DJ
0s.
Tommy Boy
Soul Sonic Force
synergy
HYBRID
PHONO CD
MIC
MIC LEVEL
POWER
MASTER LEVEL
1
2
KILL
KILL
Technics
129

139
139
NOKIA
StarTAC
140
142

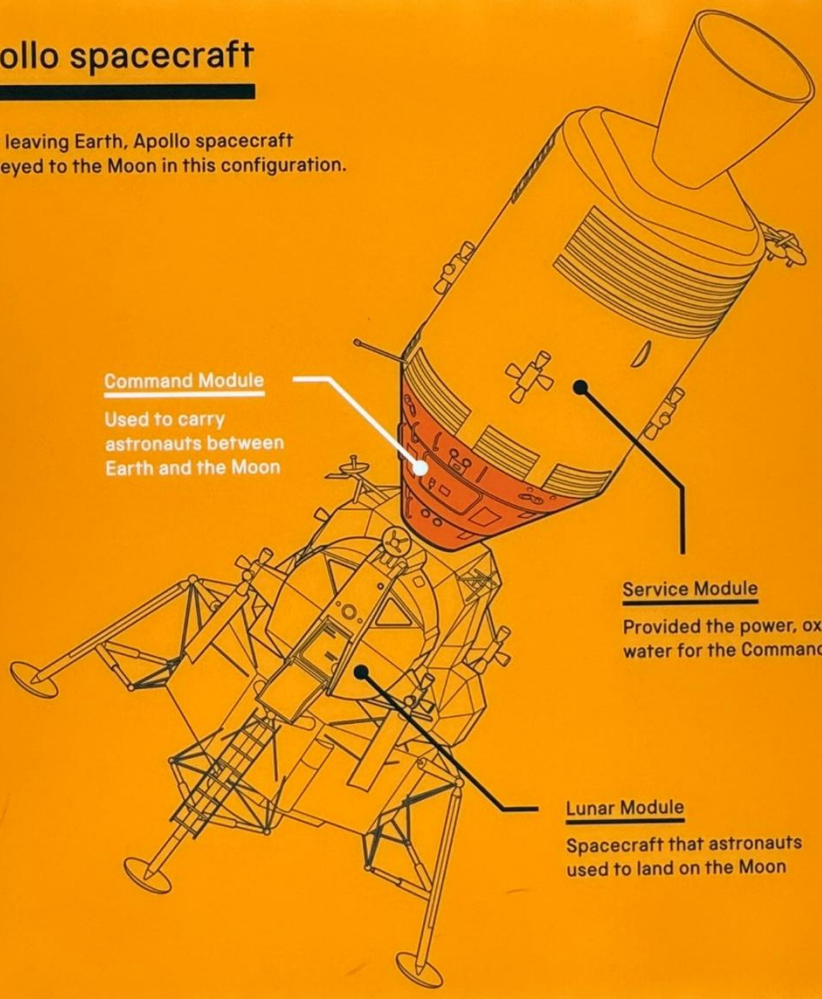

SH DOW




Apollo spacecraft
After leaving Earth, Apollo spacecraft journeyed to the Moon in this configuration.

Apollo spacecraft

After leaving Earth, Apollo spacecraft journeyed to the Moon in this configuration.



Command Module

Used to carry astronauts between Earth and the Moon

Service Module

Provided the power, oxygen and water for the Command Module

Lunar Module

Spacecraft that astronauts used to land on the Moon

H
la
Ap
19
Thi
Ge
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Co
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Lent by
Science
Object

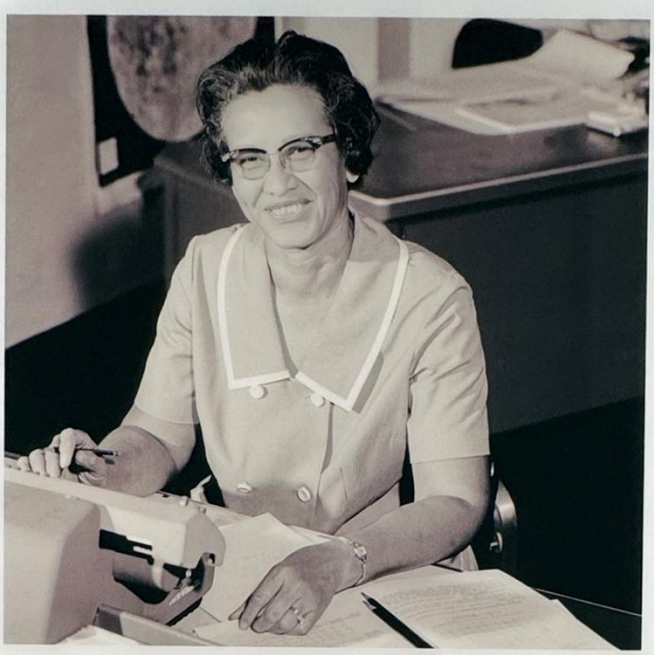
How do you prepare for landing on the Moon?

Apollo 10 Command Module 'Charlie Brown'

1969

This spacecraft took astronauts Tom Stafford, Gene Cernan and John Young around the Moon in May 1969. The mission successfully practised everything required to reach the Moon – except land. Once Apollo 10 reached the Moon, Tom and Gene flew the Lunar Module above the lunar surface, before returning to join John in this Command Module for their journey home. Two months later, Apollo 11 became the first mission to successfully put humans on the Moon.

Lent by Smithsonian Air and Space Museum, Washington D.C.
Science Museum Group
Object no. 1976-106



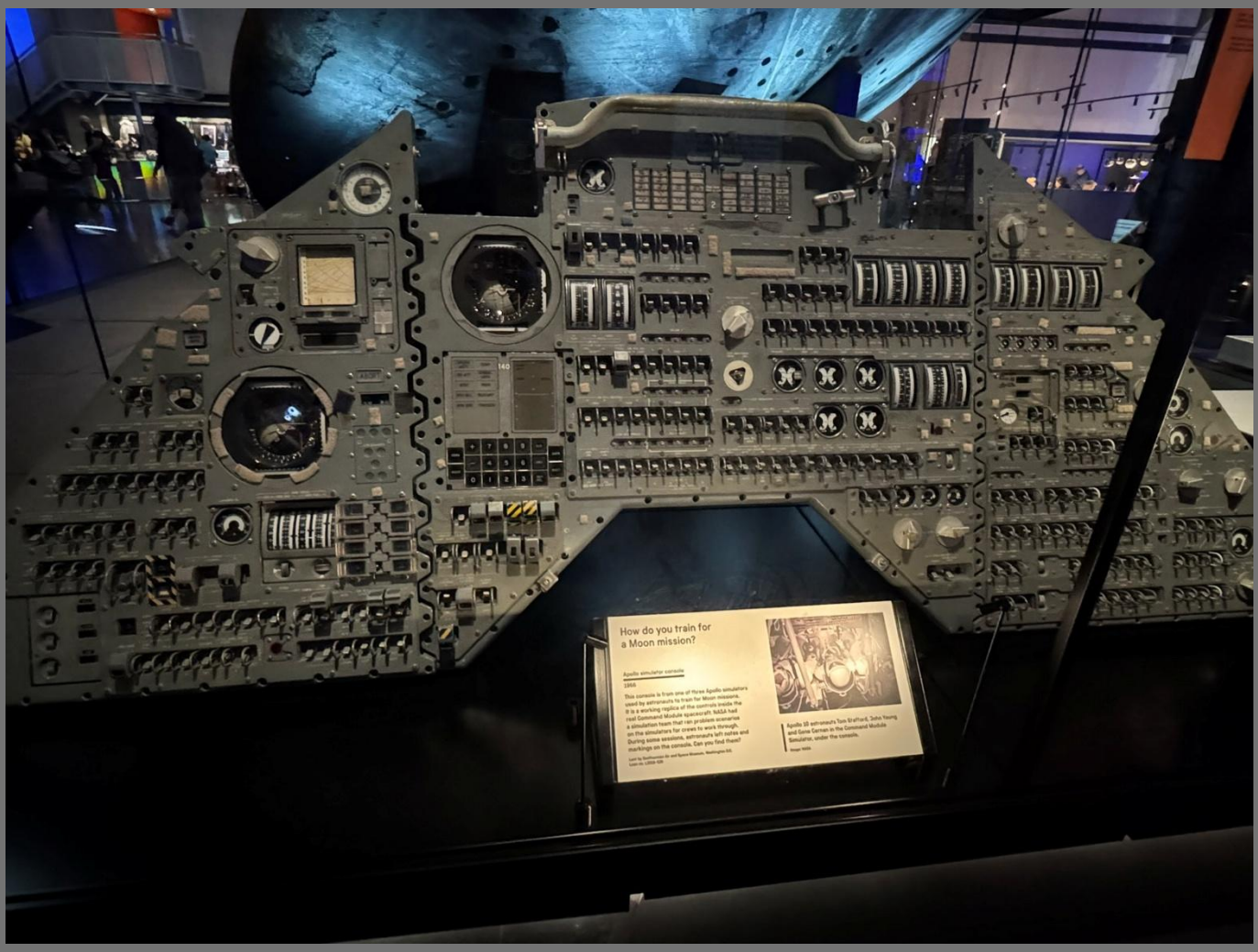
Reflecting on the Apollo missions, Katherine said, 'We wrote our own textbook because there was no other text about space.'

Image: NASA/Bob Nye

KATHERINE JOHNSON

Katherine was one of several hundred women who worked as NASA mathematicians in the 1950s and 1960s. As a black woman, she faced discrimination in the workplace, even though her expertise was crucial in getting astronauts safely home.

Katherine worked on many programmes, but her most memorable one was Apollo. She calculated exactly when the Lunar Module would need to launch from the surface of the Moon to successfully dock with the orbiting Command Module.

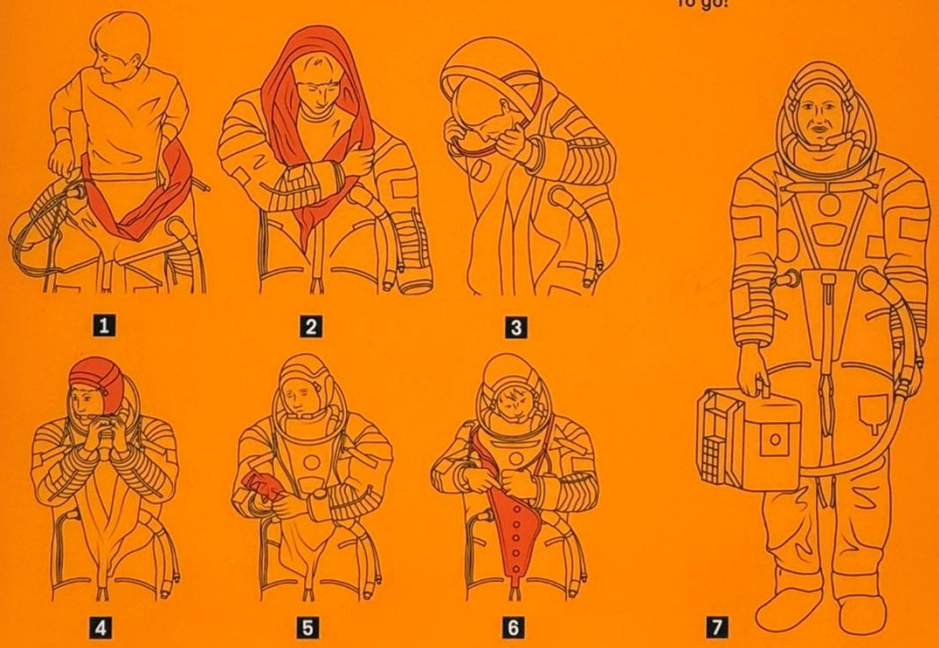

How do you train for a Moon mission?
Apollo simulator console
1966
This console is from one of three Apollo simulators used by astronauts to train for Moon missions. It is a working replica of the controls inside the real Command Module spacecraft. NASA had a simulation team that ran problem scenarios on the simulators for crews to work through. During some sessions, astronauts left notes and markings on the consoles. Can you find them?
Apollo 10 astronauts Tom Stafford, John Young and Gene Cernan in the Command Module Simulator, under the consoles.


How to put on a Sokol suit

How to put on a Sokol suit

Sokol suits have an inner airtight lining called a bladder and a Teflon-coated outer layer. These keep the wearer safe while travelling aboard Russian spacecraft.

1. Step into the suit and pull it up.
2. Slide in your arms.
3. Pull the back of the suit up, and tuck your head into the suit as you pull the neck ring and helmet over the top.
4. Put on your communications cap.
5. Fold the internal bladder of the suit and wrap elastic bands very tightly around it.
6. Zip and close the suit.
7. Connect life support and ready to go!



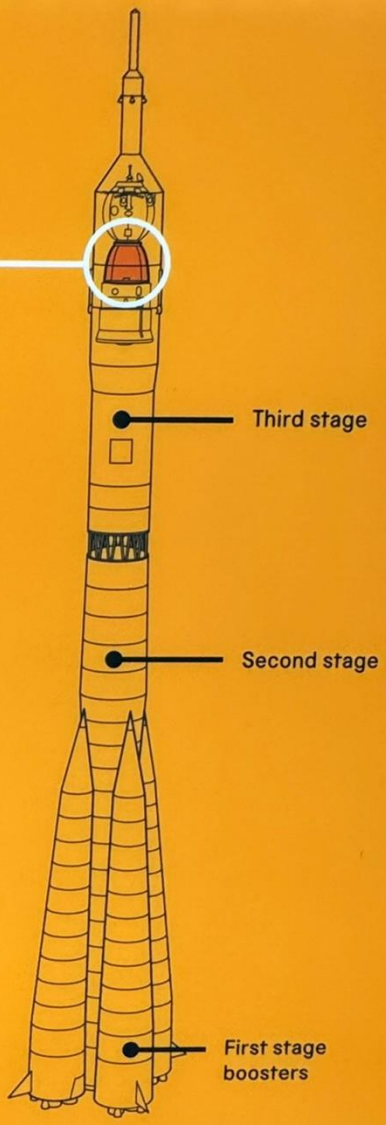

РОССИЯ
RUSSIA
Soyuz descent

Soyuz descent module

The Soyuz rocket is 50 metres tall and has three sections, or stages. The astronauts travel in the third stage. The first and second stages hold most of the fuel and rockets needed to leave Earth.



Soyuz descent module

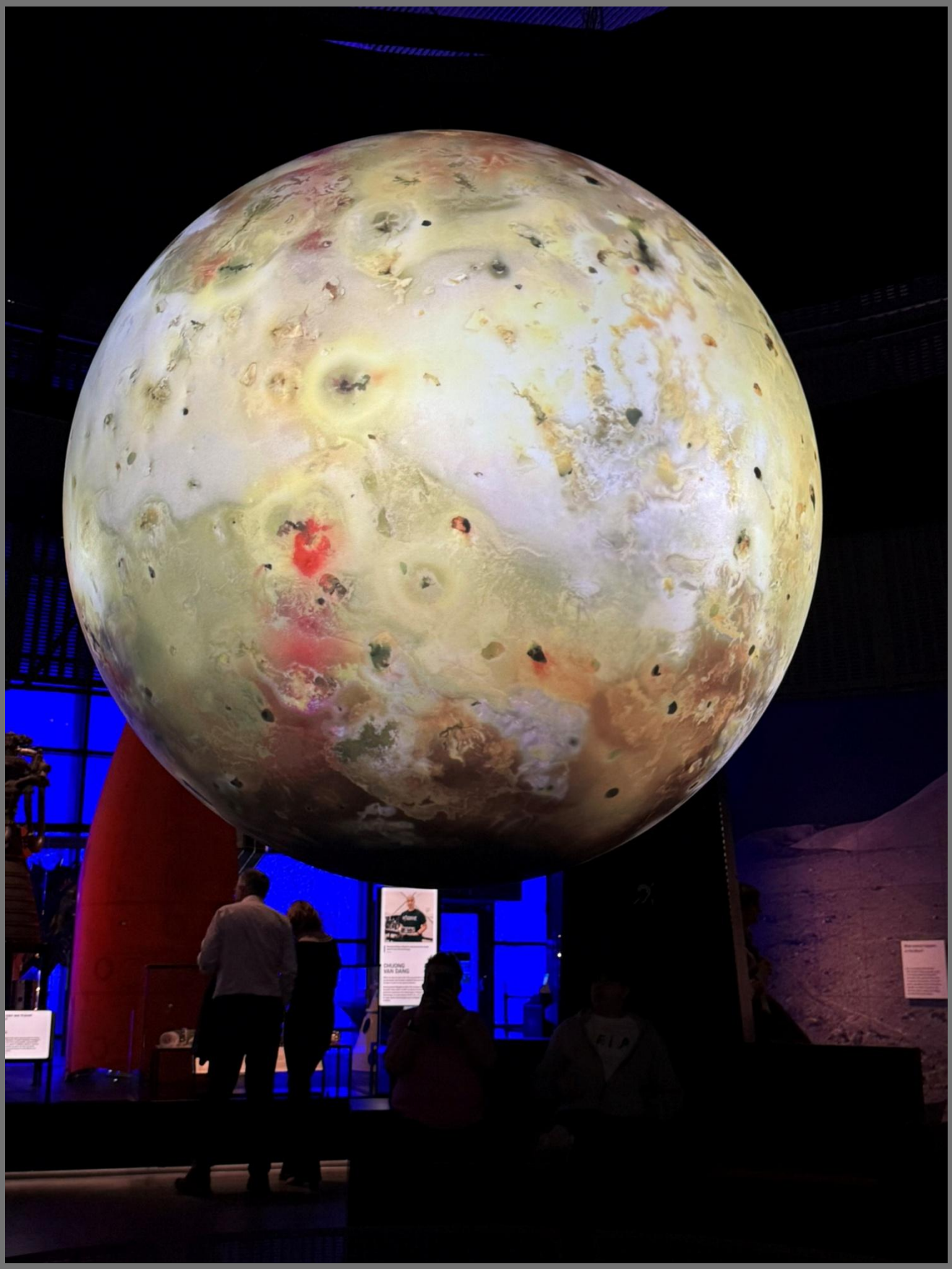


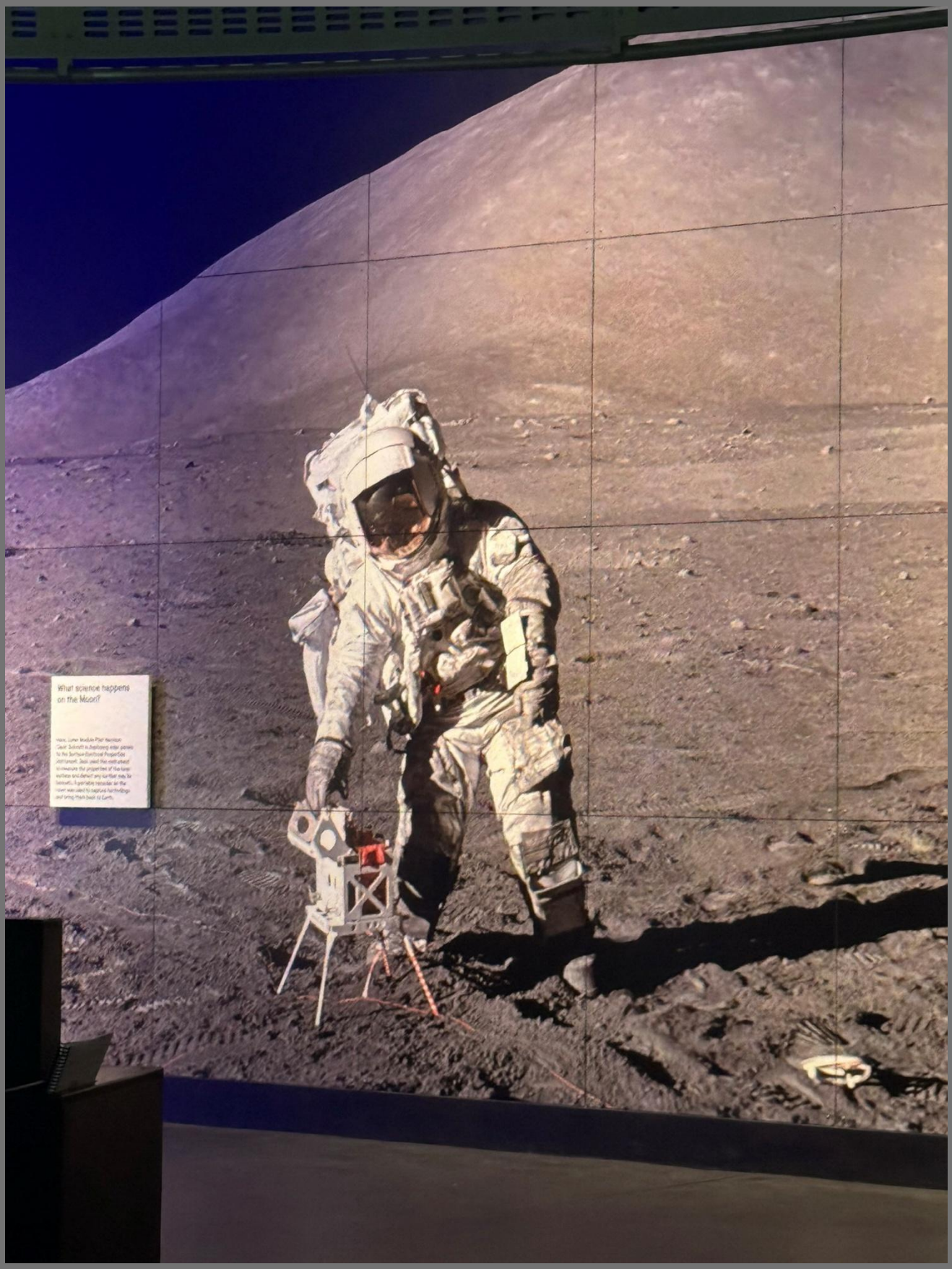


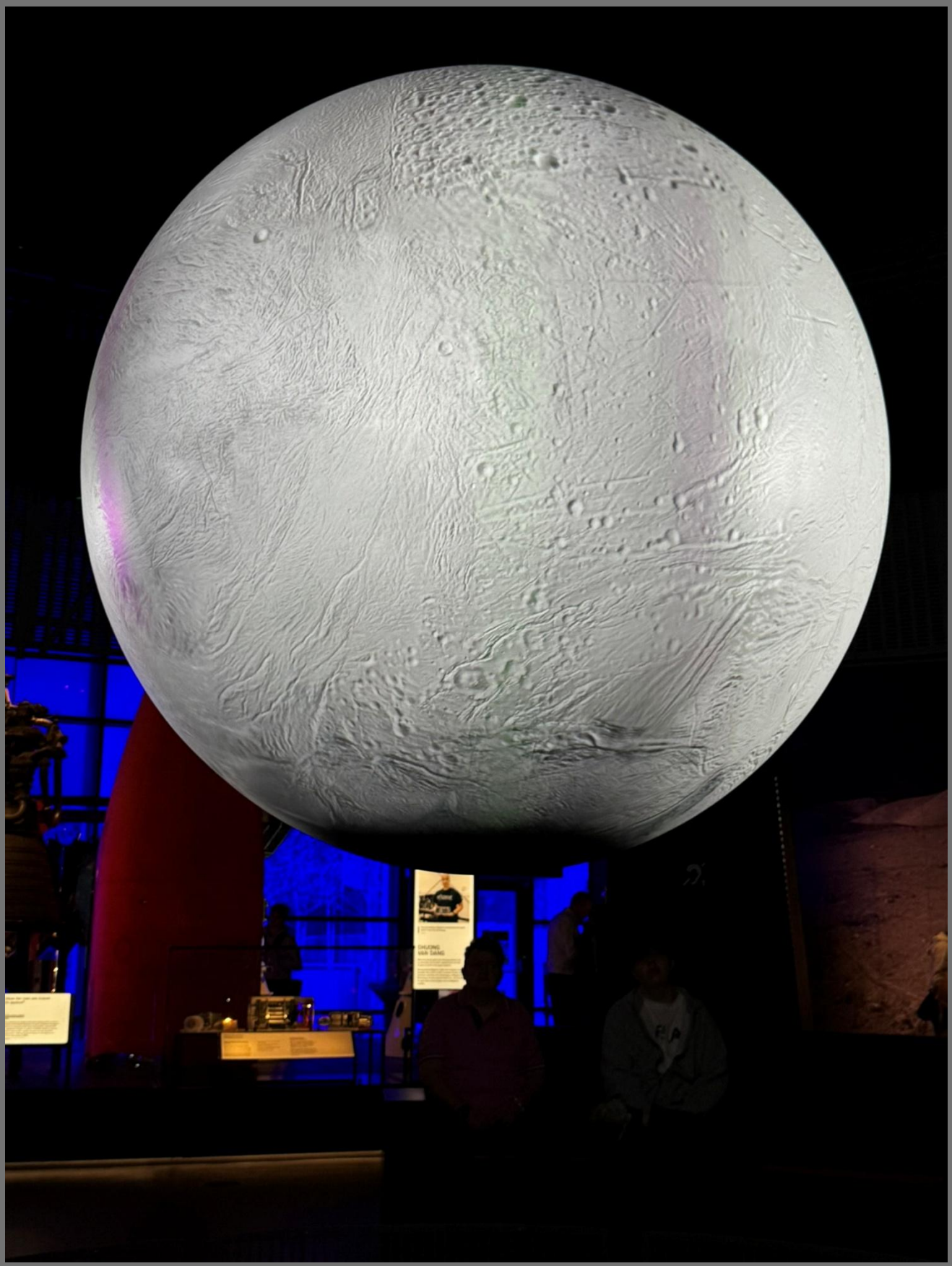

CHUONG
VAN SANG

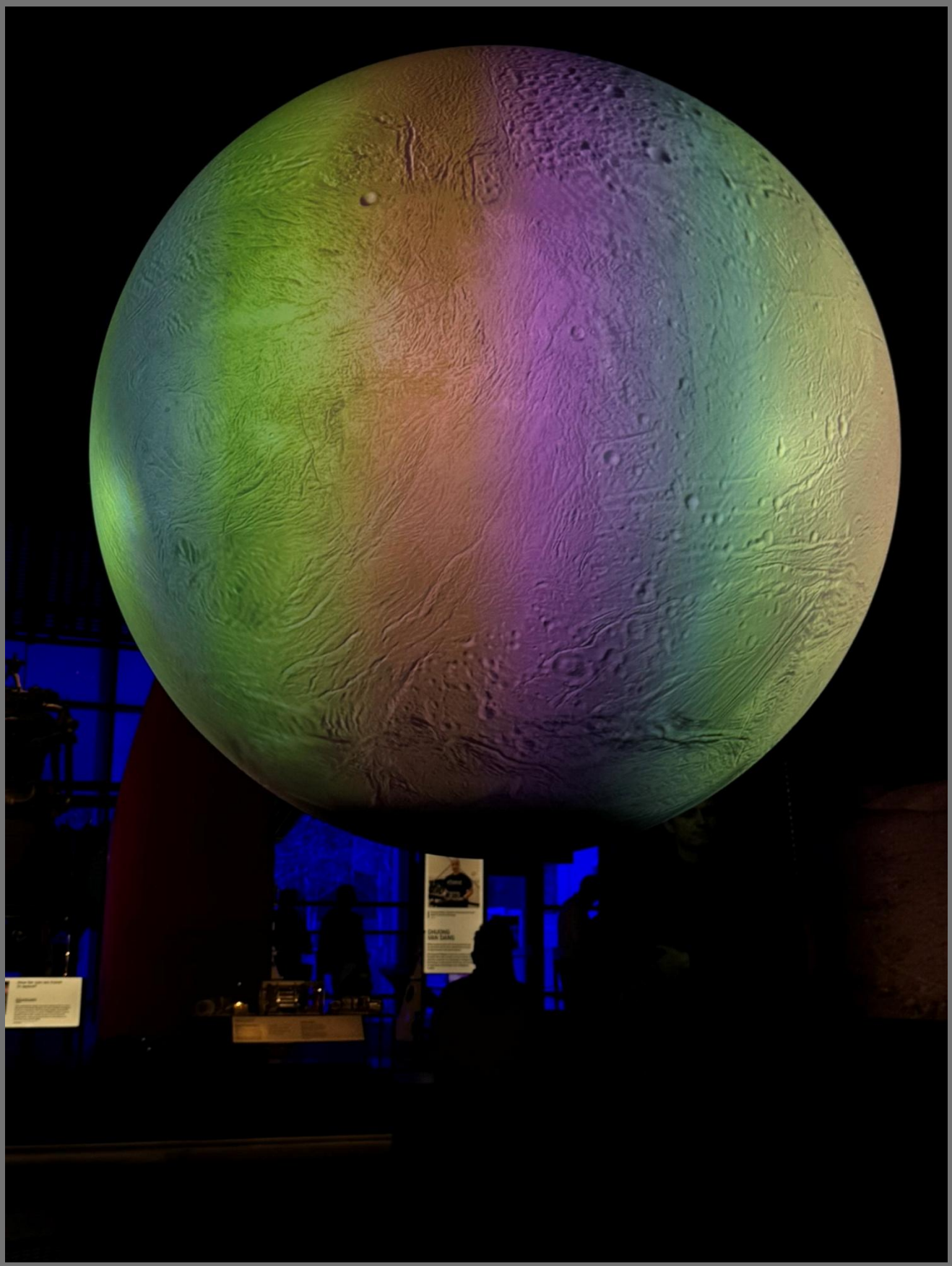


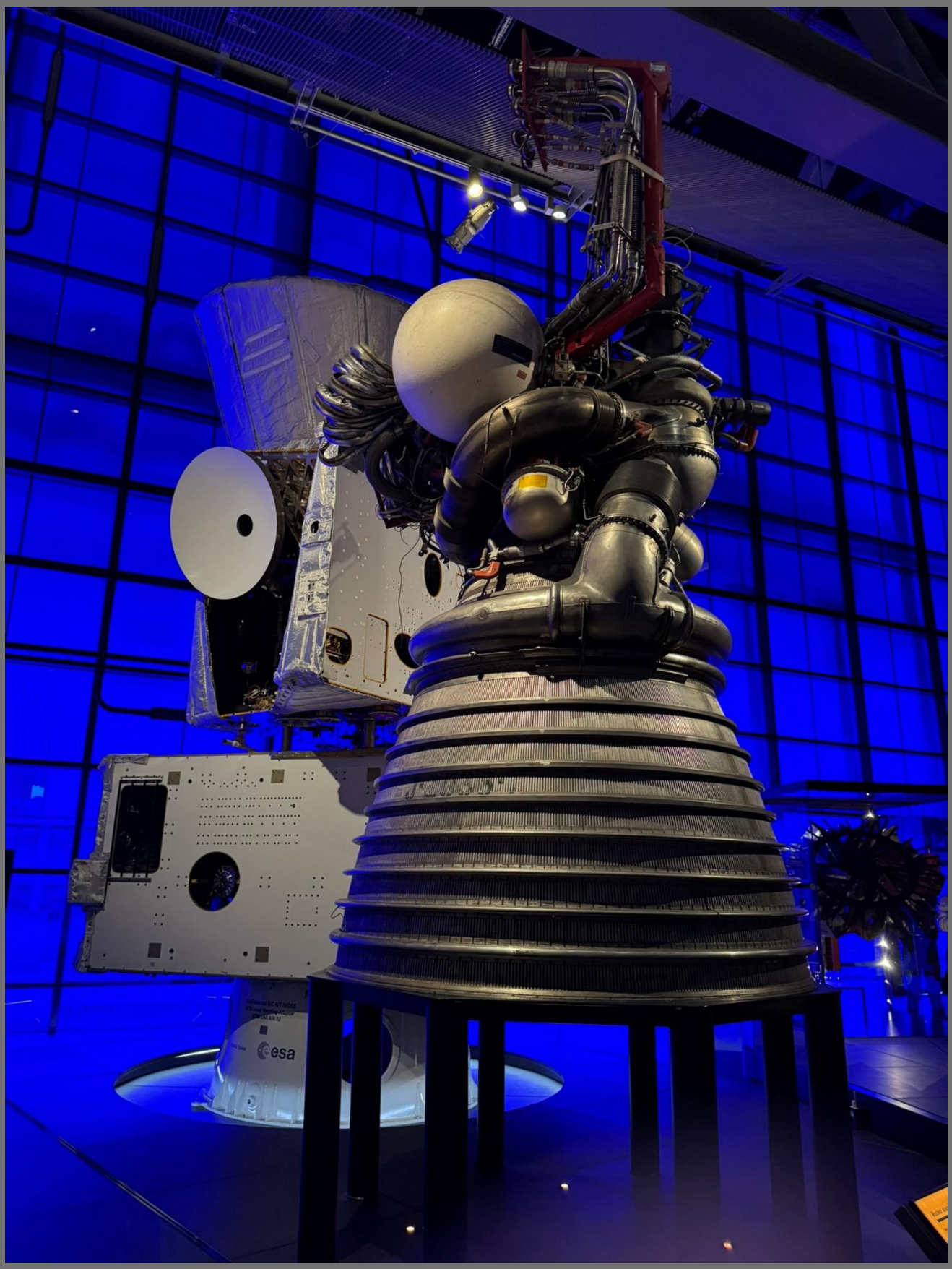





What science happens on the Moon?

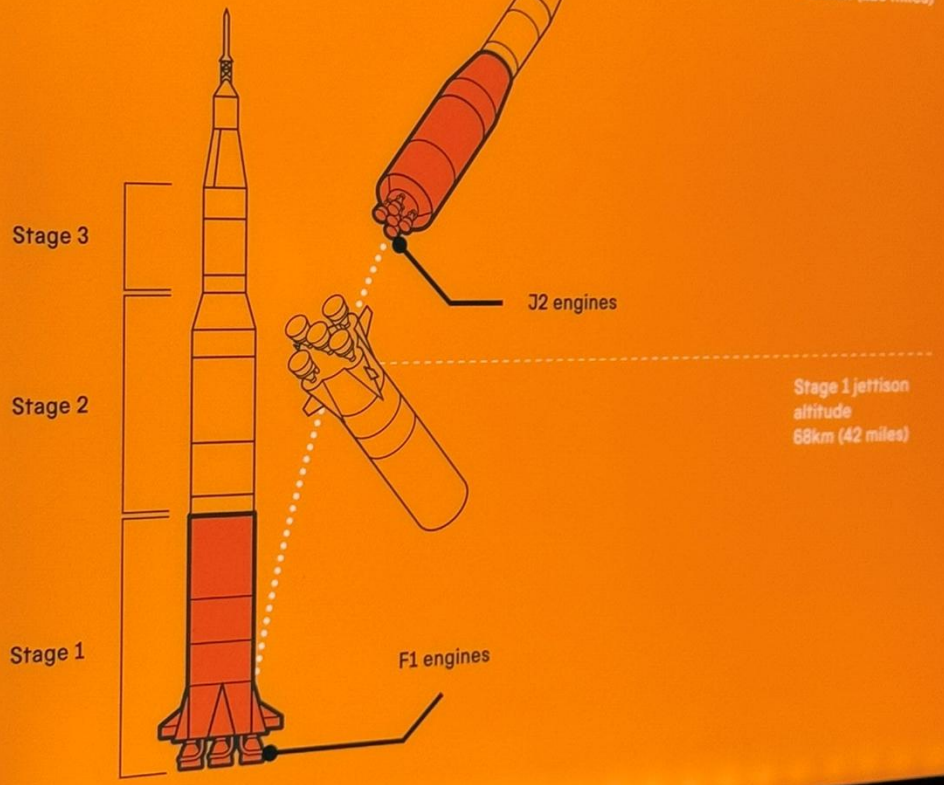


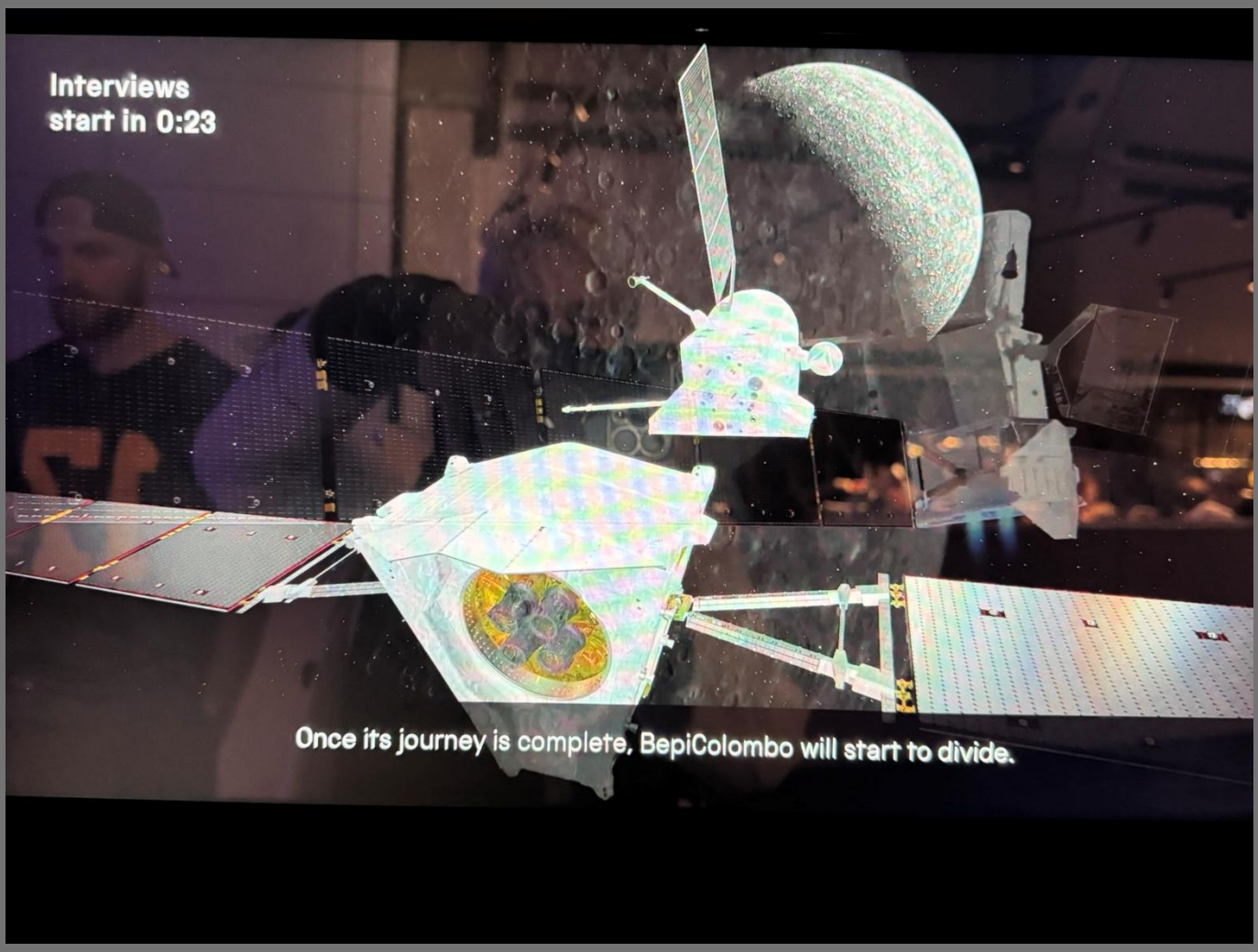


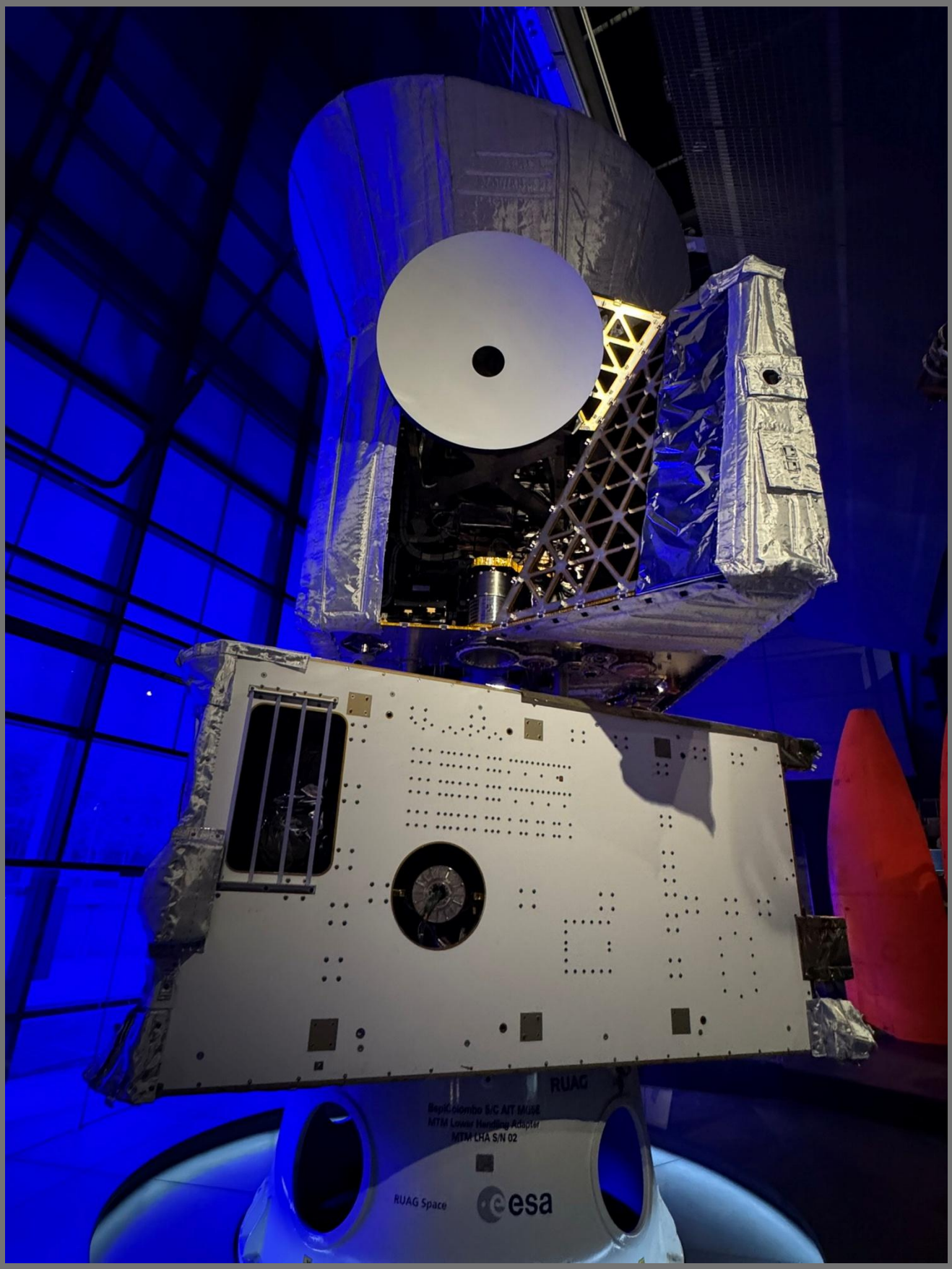

esa

Rocket stages

Saturn V rockets had three sections, or stages. When stages 1 and 2 reached a specific speed and altitude, they were separated (jettisoned) and fell into the sea. Stage 3 separated after pushing the spacecraft to the Moon.

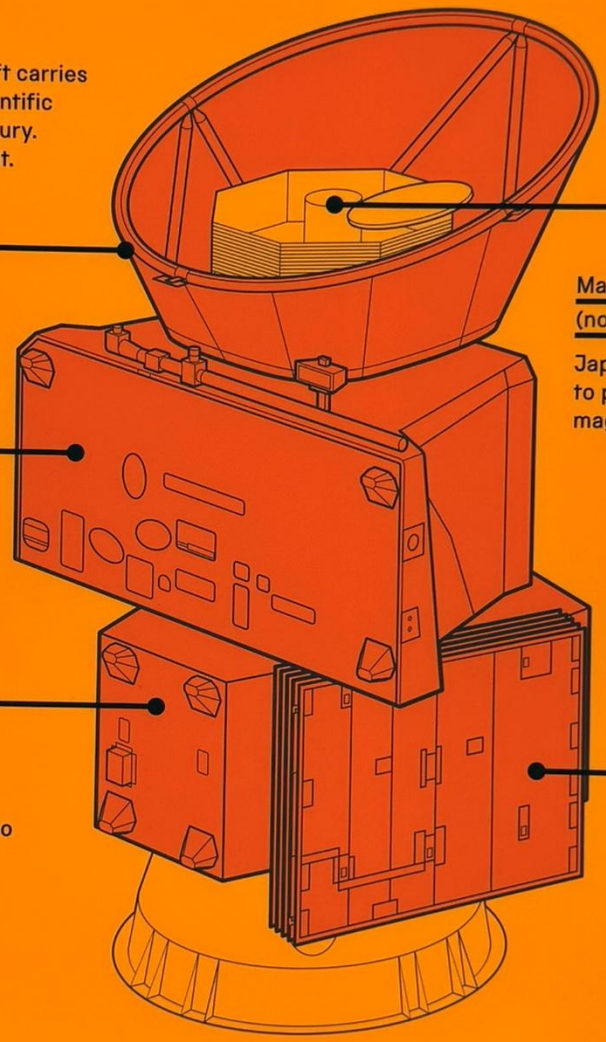



Interviews
start in 0:23
Once its journey is complete, BepiColombo will start to divide.


RUAG
BepiColombo S/C AIT MGSE
MTM Lower Handling Adapter
MTM LHA S/N 02
RUAG Space
esa

BepiColombo

The BepiColombo spacecraft carries two satellites to gather scientific data when it arrives at Mercury. Each go into a separate orbit.



Sun-shield

Protects the Japanese satellite during the journey

Magnetospheric Orbiter (not displayed)

Japanese satellite to probe Mercury's magnetic field

Planetary Orbiter

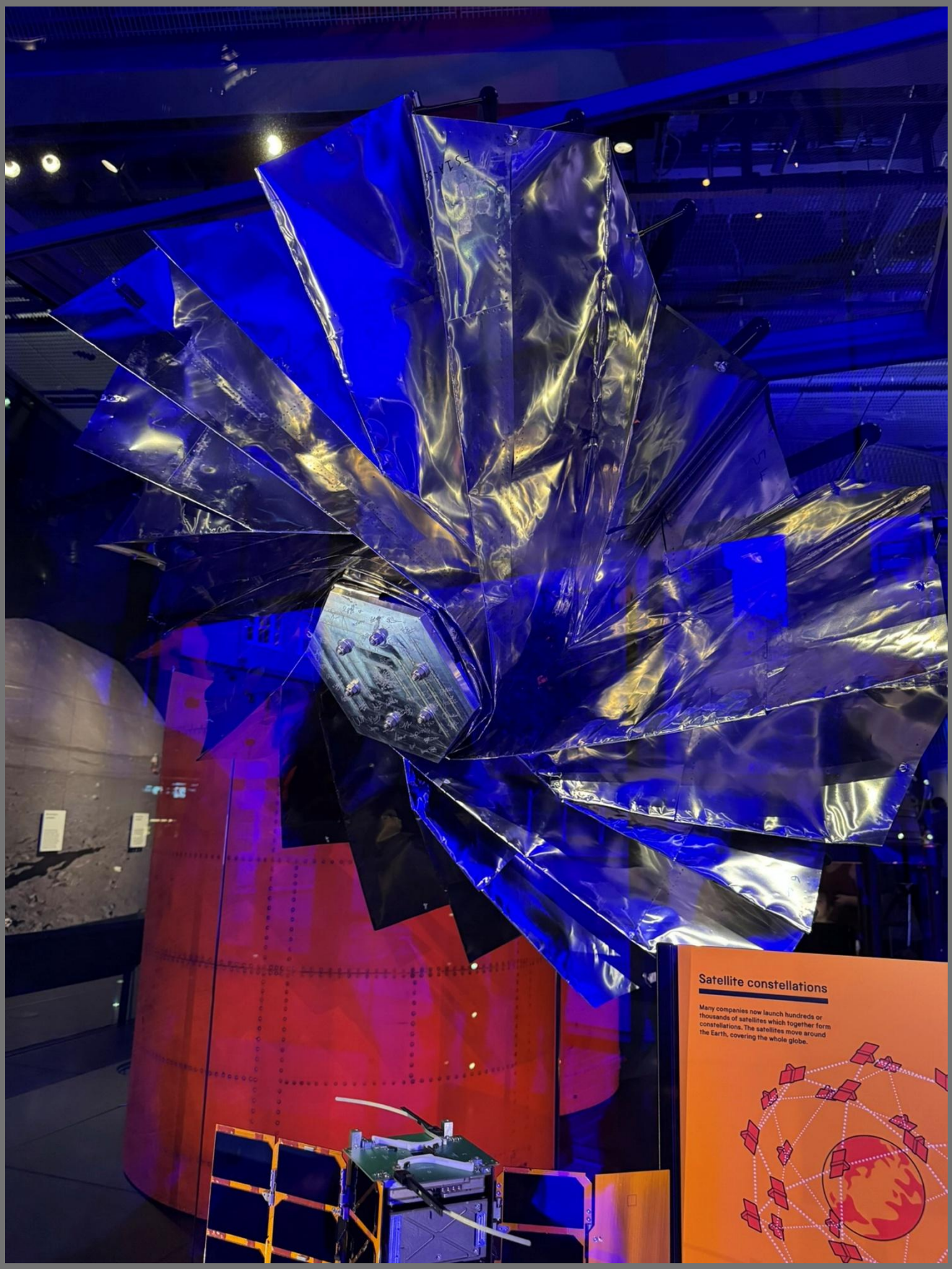
European satellite will mainly study Mercury's surface and interior

Transfer Module

Carries BepiColombo through space

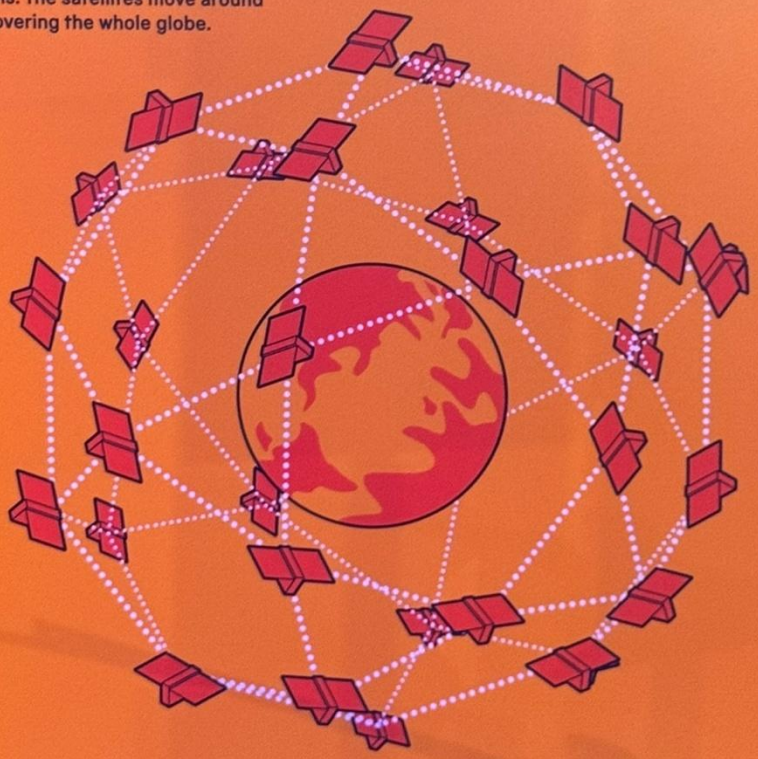
Solar panels

Generate electrical power


Satellite constellations
Many companies now launch hundreds or thousands of satellites which together form constellations. The satellites move around the Earth, covering the whole globe.

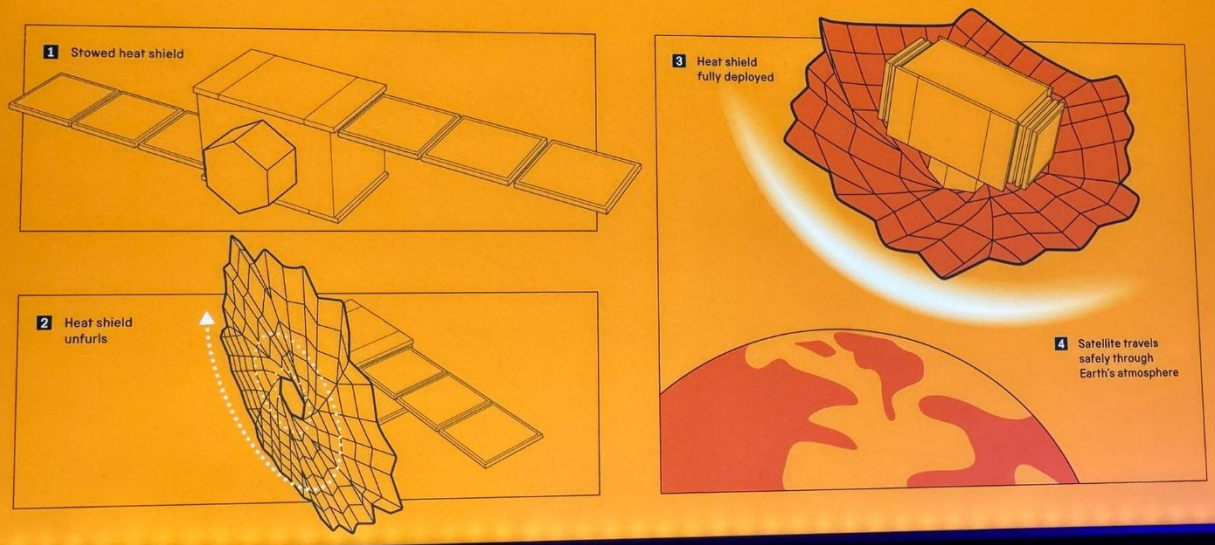
Satellite constellations

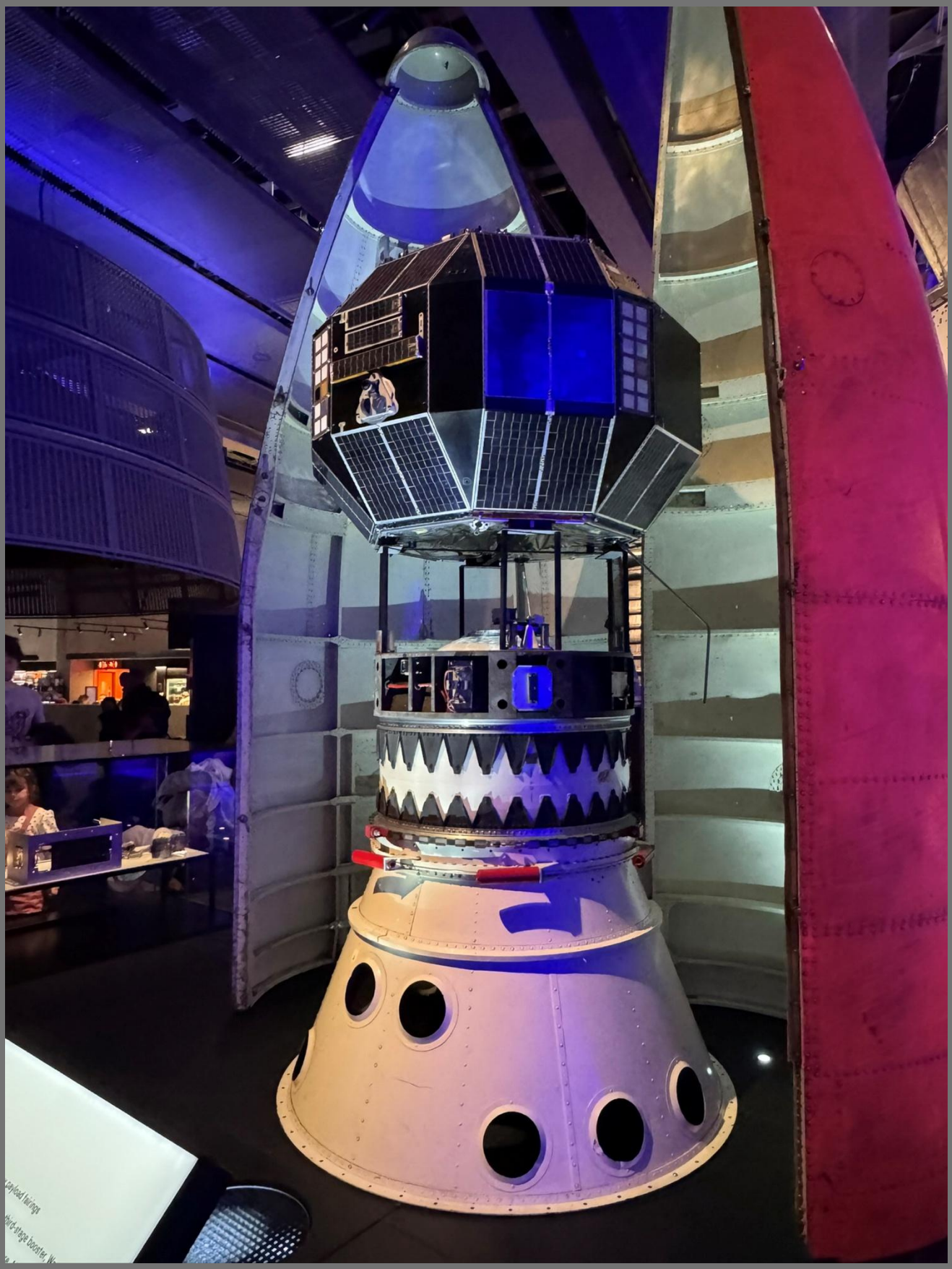
Many companies now launch hundreds or thousands of satellites which together form constellations. The satellites move around the Earth, covering the whole globe.

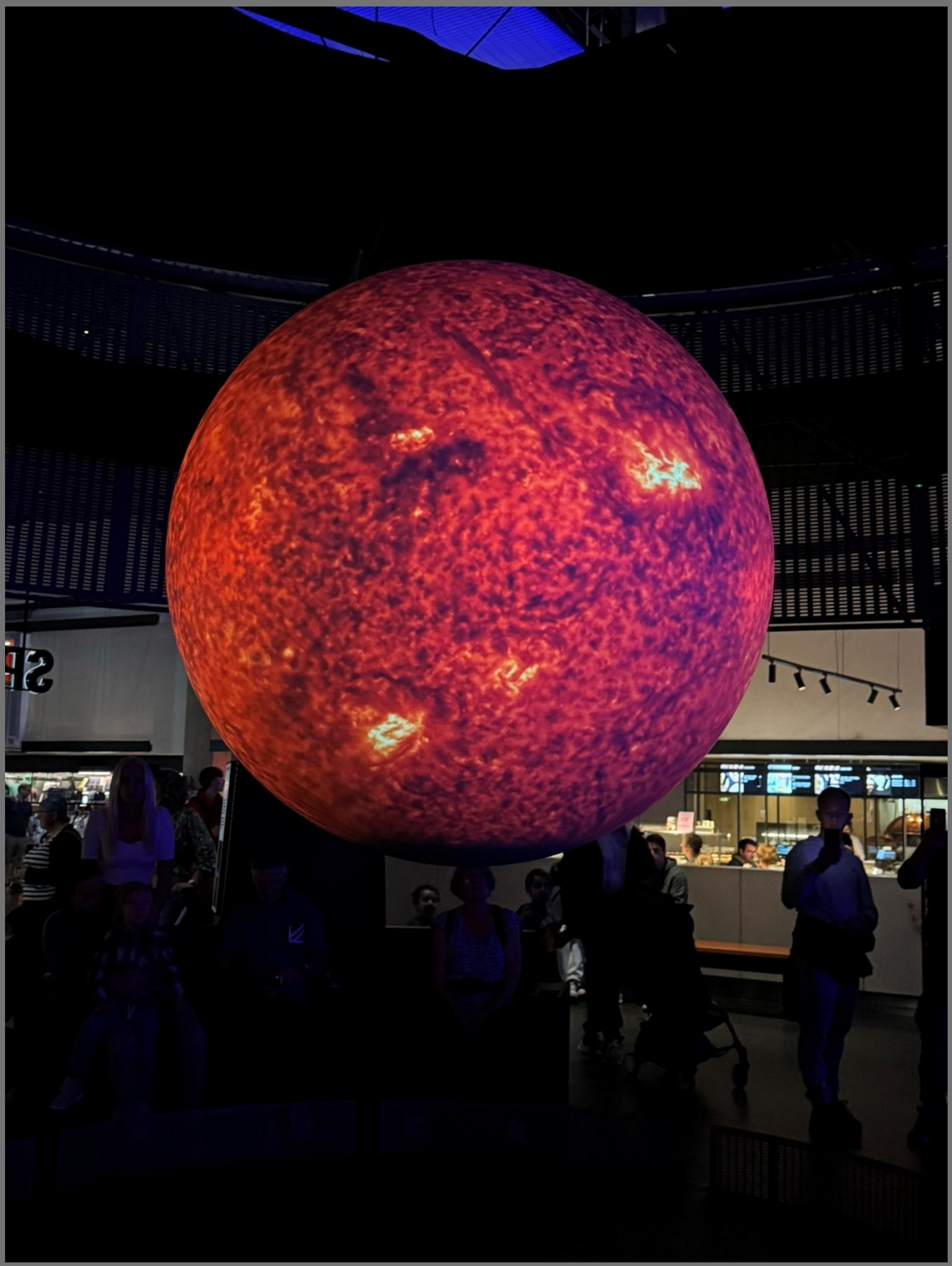


How Space Forge's heat shield works

The heat shield is stowed on the satellite. When the satellite returns to Earth, the stowed heat shield unfurls, dissipating the heat of re-entry and protecting the satellite.








SPACE



YURI GAGARIN

Yuri Gagarin in Vostok 1.
'I see the Earth! It is beautiful!'
Image: Album/Alamy

On 12 April 1961, Yuri Gagarin became the first person in space when he completed a 108-minute flight aboard Vostok 1. Being only 1.57 metres tall helped him fit inside the cramped spacecraft. After one orbit, he ejected at an altitude of 7km (4.3 miles) to parachute to Earth.

Yuri became a celebrity, visiting the UK during a worldwide tour in 1961. To protect their hero, the Soviet Union never sent him into space again. Despite this precaution, he was killed during a routine training flight in 1968.

Statue of Yuri Gagarin

Replica cast from the original
by Anatoly Novikov
2010 (original 1984)

This statue commemorates a symbolic leap into the Space Age. It is an example of socialist realism, the official art movement of the former Soviet Union. Looking into the future, Yuri triumphantly stands on the globe. An infinity loop at his feet represents his Earth orbit, while the plinth bears the name 'Gagarin' and the medal given to all cosmonauts.

Today's Russian space agency gifted this statue to Britain in 2011 to commemorate 50 years since Yuri visited the UK in celebration of this achievement.

Science Museum Group
Object no. 2025-2100


ЛЕТЧИК-КОСМОНАВТ
СССР
ГАГАРИНУ


ГАГАРИНУ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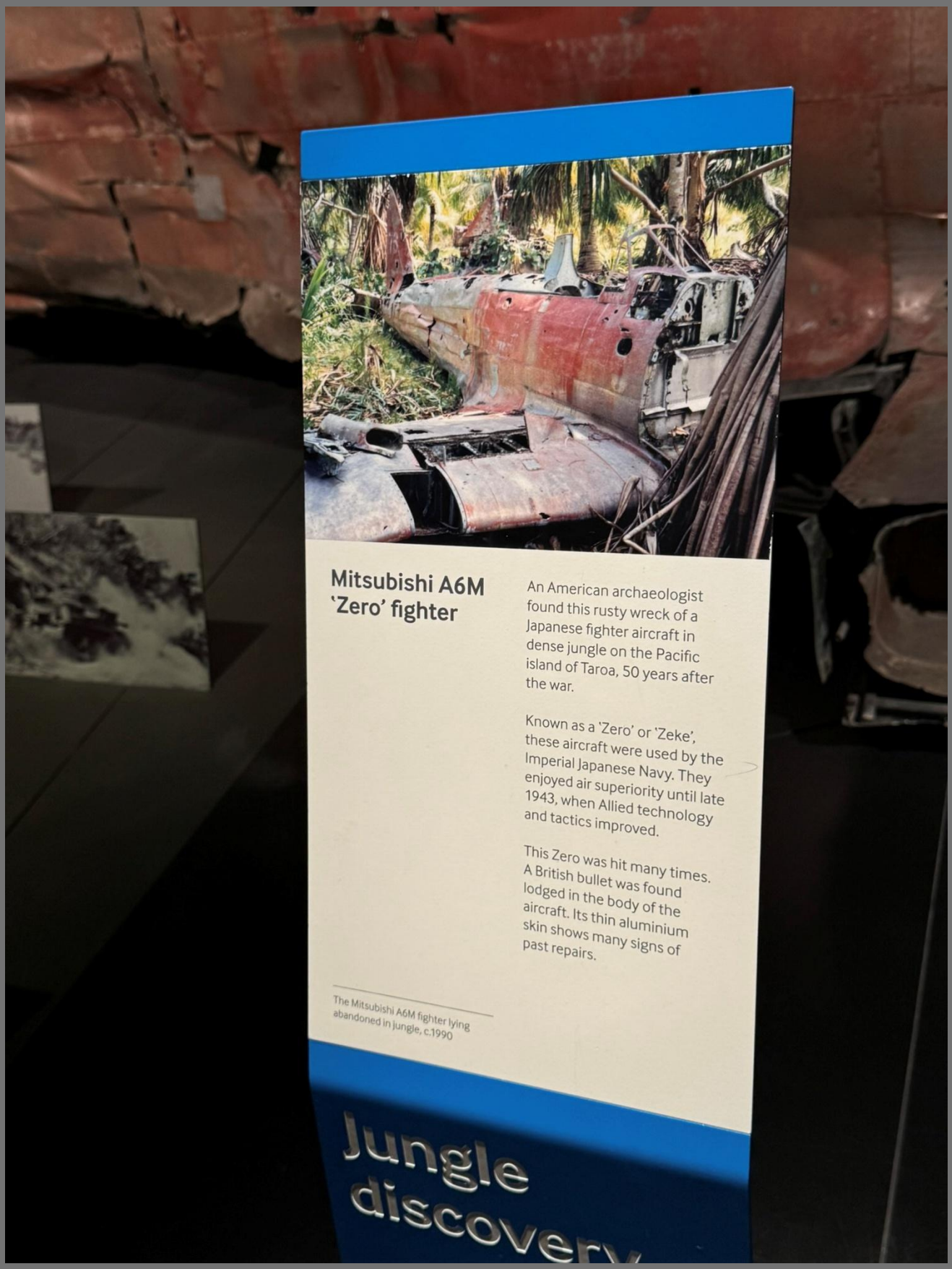
Mitsubishi A6M
'Zero' fighter
An American archaeologist found this rusty wreck of a Japanese fighter aircraft in dense jungle on the Pacific island of Taroa, 50 years after the war.
Known as a 'Zero' or 'Zeke', these aircraft were used by the Imperial Japanese Navy. They enjoyed air superiority until late 1943, when Allied technology and tactics improved.
This Zero was hit many times. A British bullet was found lodged in the body of the aircraft. Its thin aluminium skin shows many signs of past repairs.
The Mitsubishi A6M fighter lying abandoned in jungle, c.1990
Jungle
discovery


盡忠報國
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WILLIE PUSHER II
6



Granite rock fragment

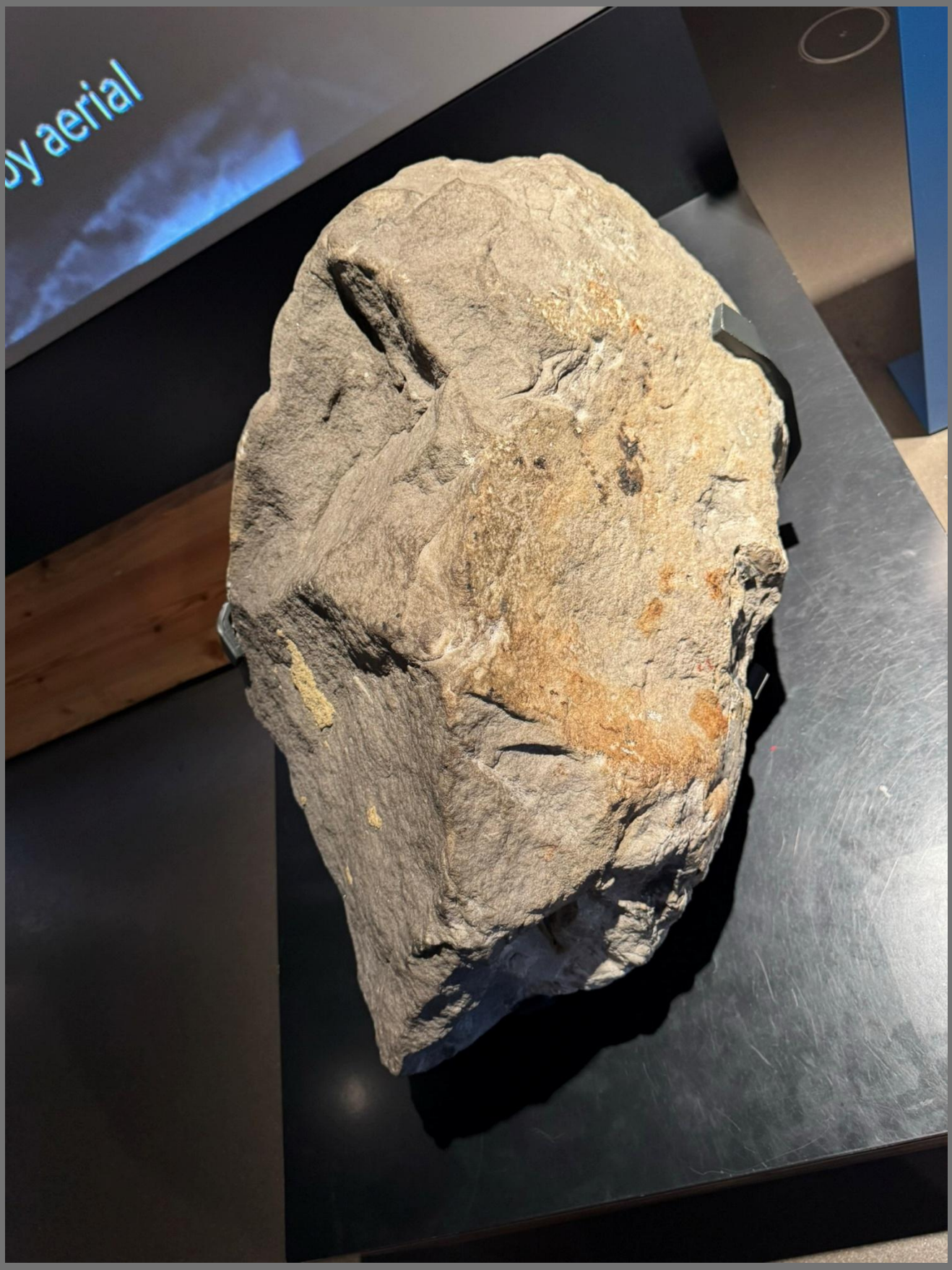
Landing Ship Tanks (LST) were designed to get armoured vehicles and soldiers ashore. The American-built LST 370 had already found success in landing troops on Sicily and at Salerno on mainland Italy in 1943. It was also called into action for the invasion of France.

During the D-Day landings on 6 June 1944, LST 370 approached too close to the French shore. It struck this 164 kg lump of granite, which became wedged in the ship's hull. It was only discovered back in Britain.

In the thick of the fighting, no-one had noticed.

Commandos land from Landing Ship Tanks on D-Day, 6 June 1944

Souvenir


y aerial



M4A4 Sherman tank

Armoured vehicles such as this tank were designed as mobile weapons. For their crew, they also served as living quarters.

Life inside a tank was uncomfortable. Restricted to the small operating compartment, the crew of five was cut off from the outside world. They would often have to eat, drink, sleep and even relieve themselves either inside or near their vehicle.

This American-made Sherman was used by the British Guards Armoured Division, which fought from 1944 to 1945 through northern France, Belgium, the Netherlands and Germany.

Sherman tanks advance across Normandy, 1944

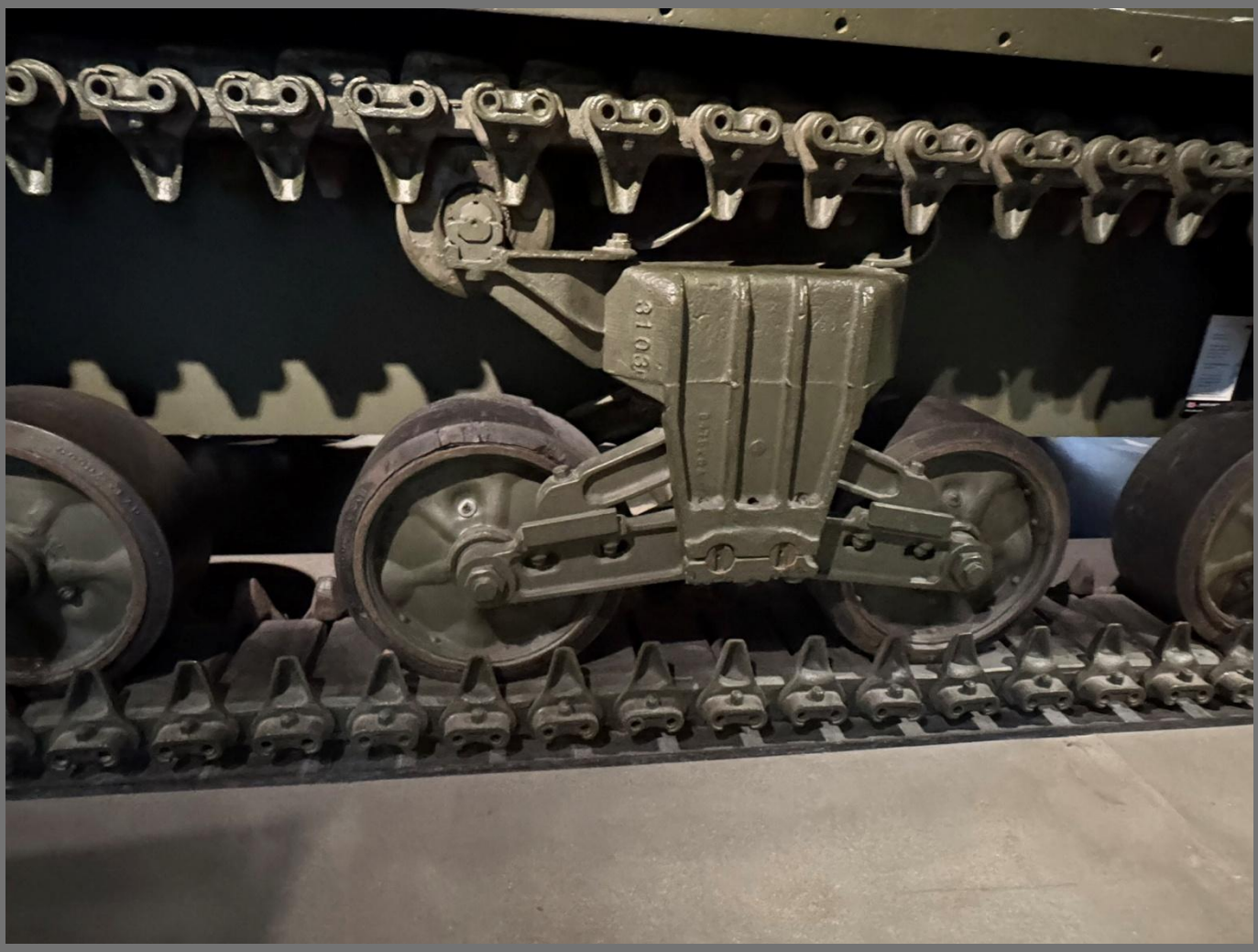
Home away from home


T 232274
51


WILLIE PUSHER II
T 232274
6


51

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WILLIE PUSHER II
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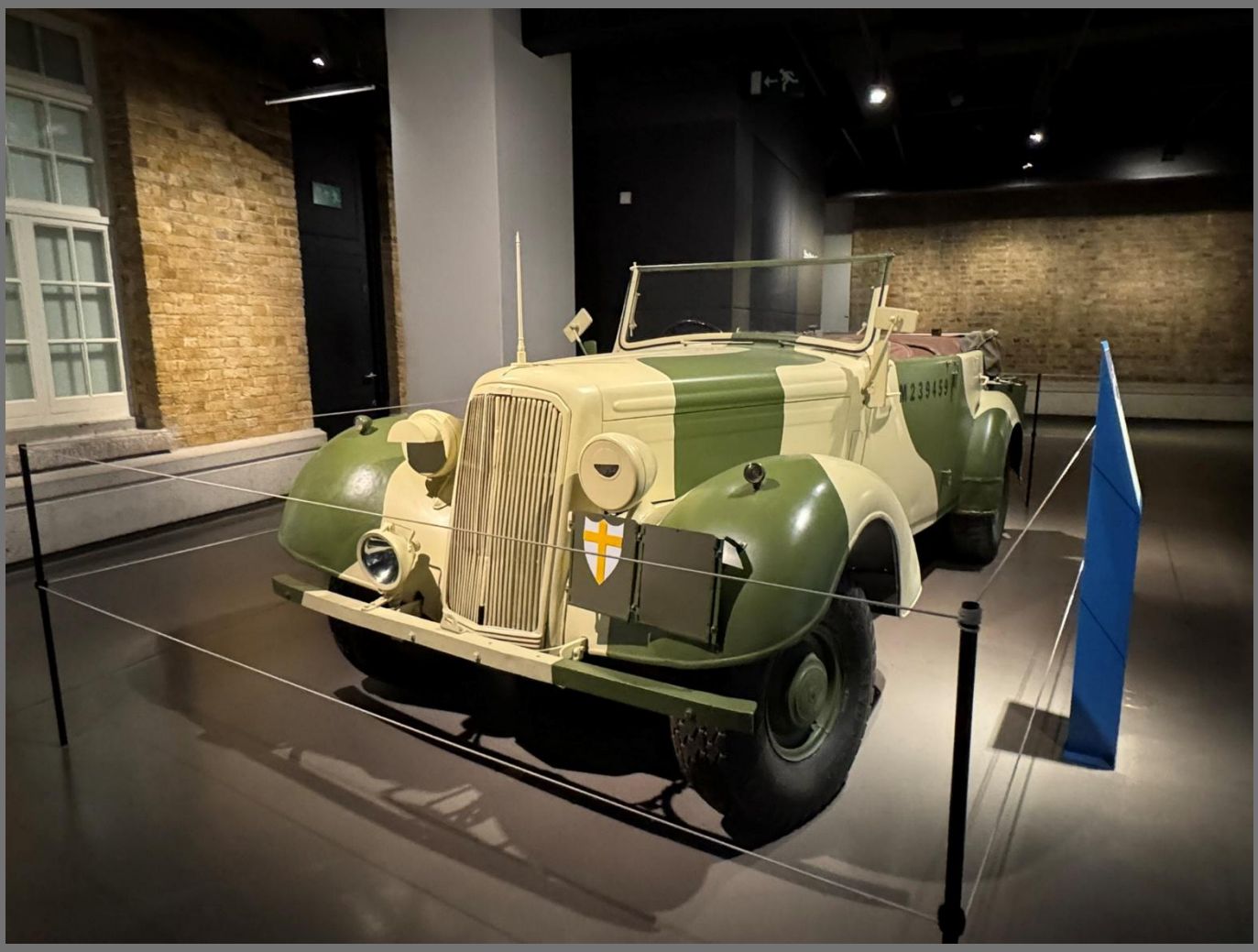

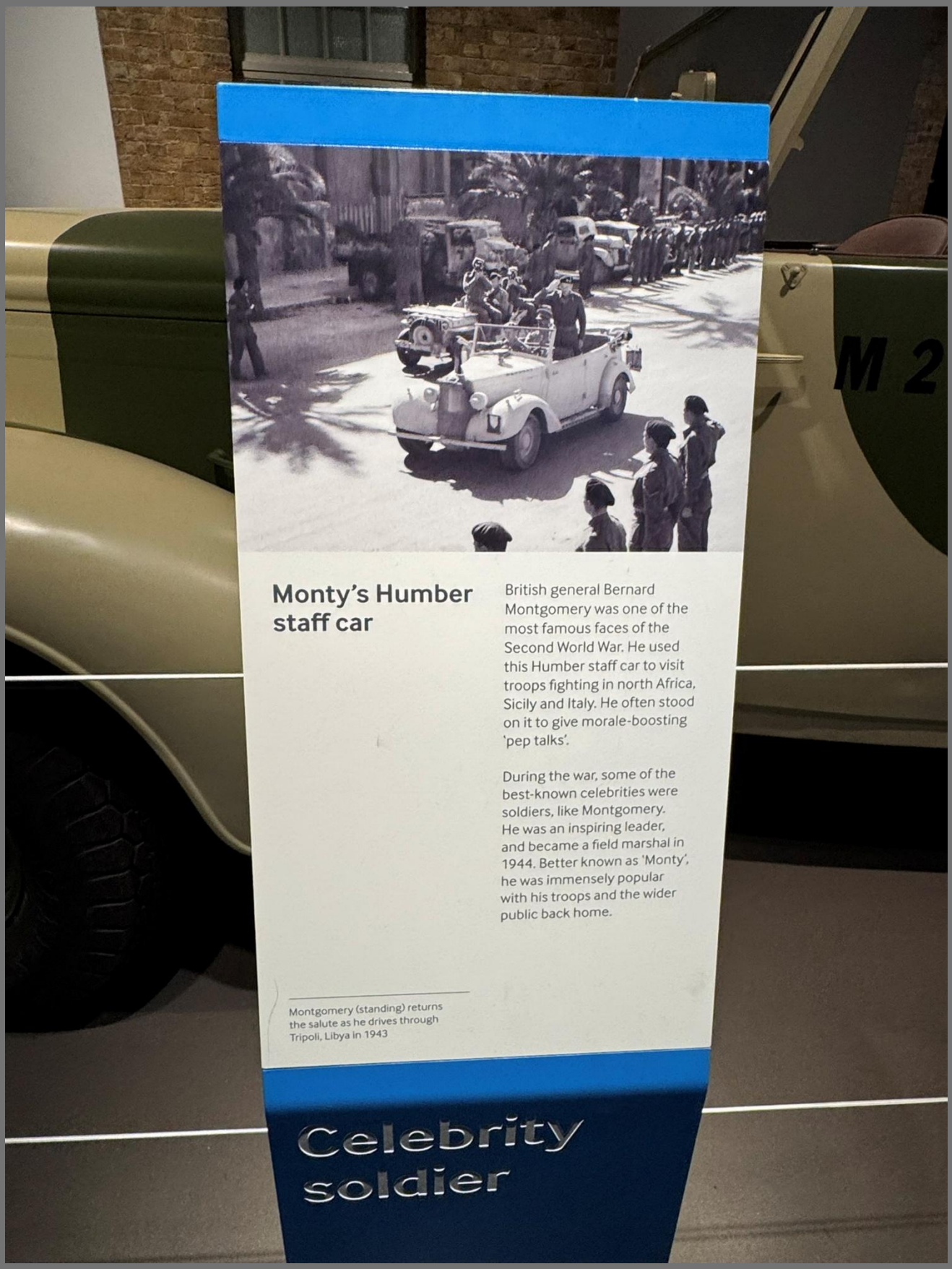

Monty's Humber staff car

British general Bernard Montgomery was one of the most famous faces of the Second World War. He used this Humber staff car to visit troops fighting in north Africa, Sicily and Italy. He often stood on it to give morale-boosting 'pep talks'.

During the war, some of the best-known celebrities were soldiers, like Montgomery. He was an inspiring leader, and became a field marshal in 1944. Better known as 'Monty', he was immensely popular with his troops and the wider public back home.

Montgomery (standing) returns the salute as he drives through Tripoli, Libya in 1943

Celebrity soldier



BMW R75 motorcycle

BMW designed this motorcycle and sidecar for the German Army. It was used to scout in front of advancing troops.

The Germans also used traditional horse power as Germany's industry failed to produce enough lorries and jeeps to keep the army mobile. By 1944, the German Army still relied upon 1.25 million horses to pull guns and carry supplies.

The British and Americans, on the other hand, were fully motorised. This difference was one factor in the Allies' defeat of Germany in 1945.

Horse-drawn guns of the German field artillery, September 1939

On the move


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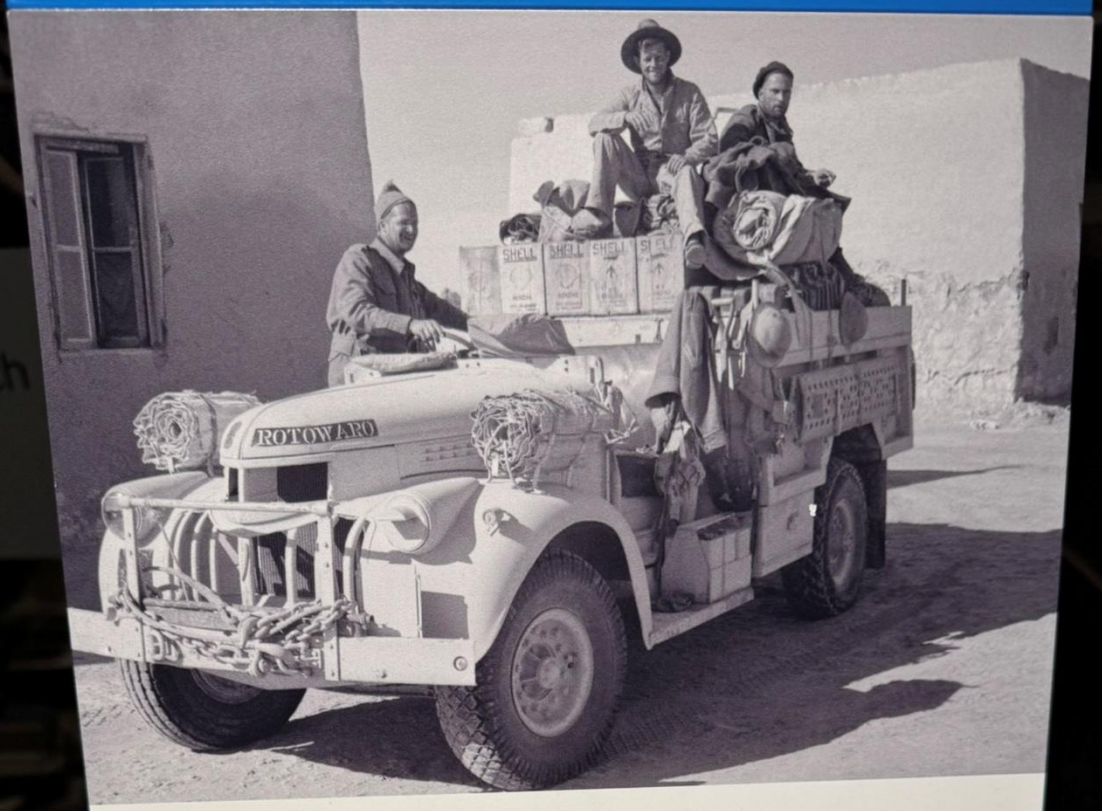
WH1431017

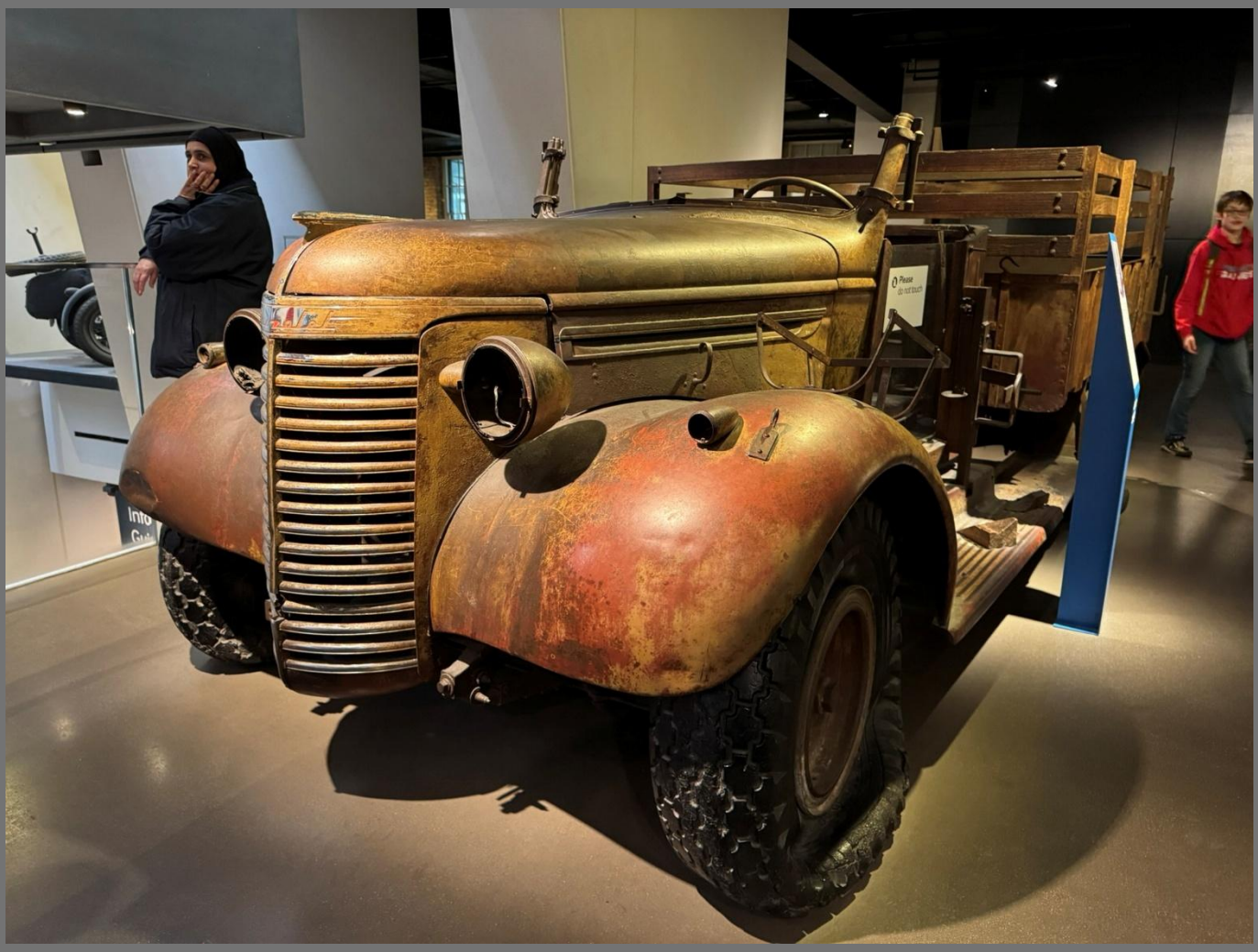


LRDG Chevrolet truck

In late 1940, this truck was used by the British Army's new Long Range Desert Group (LRDG) in north Africa. Formed to undertake secret reconnaissance missions behind enemy lines, the LRDG relied on such vehicles to speed them across the harsh desert terrain.

This truck's crew drove deep into Libya to attack Italian forces. Trooper Clarkie Waetford named the truck *Waikaha* after the place where his grandparents grew up in New Zealand. *Waikaha* means 'strong water' in Maori.

A Long Range Desert Group truck, about to embark on patrol in Egypt, 1942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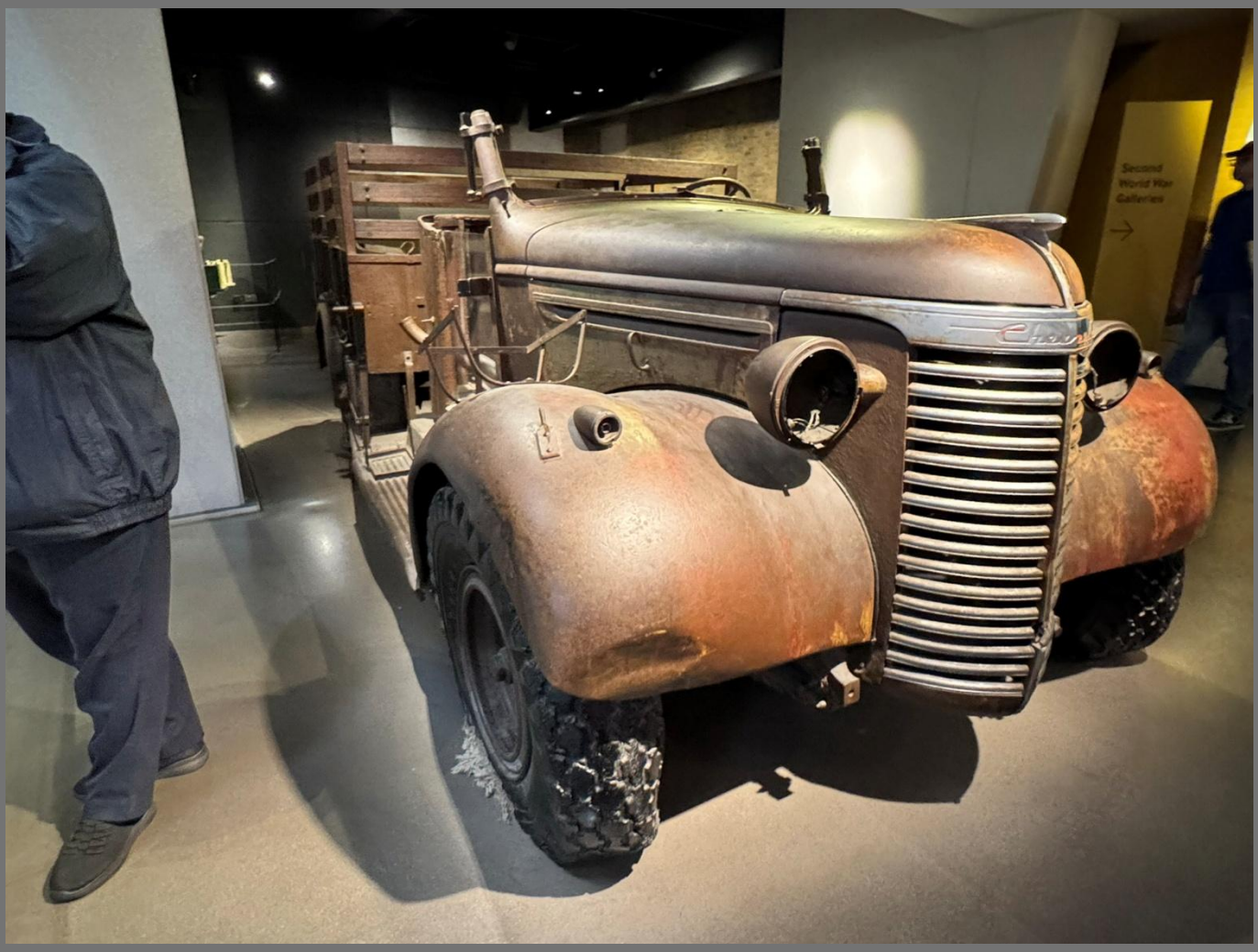
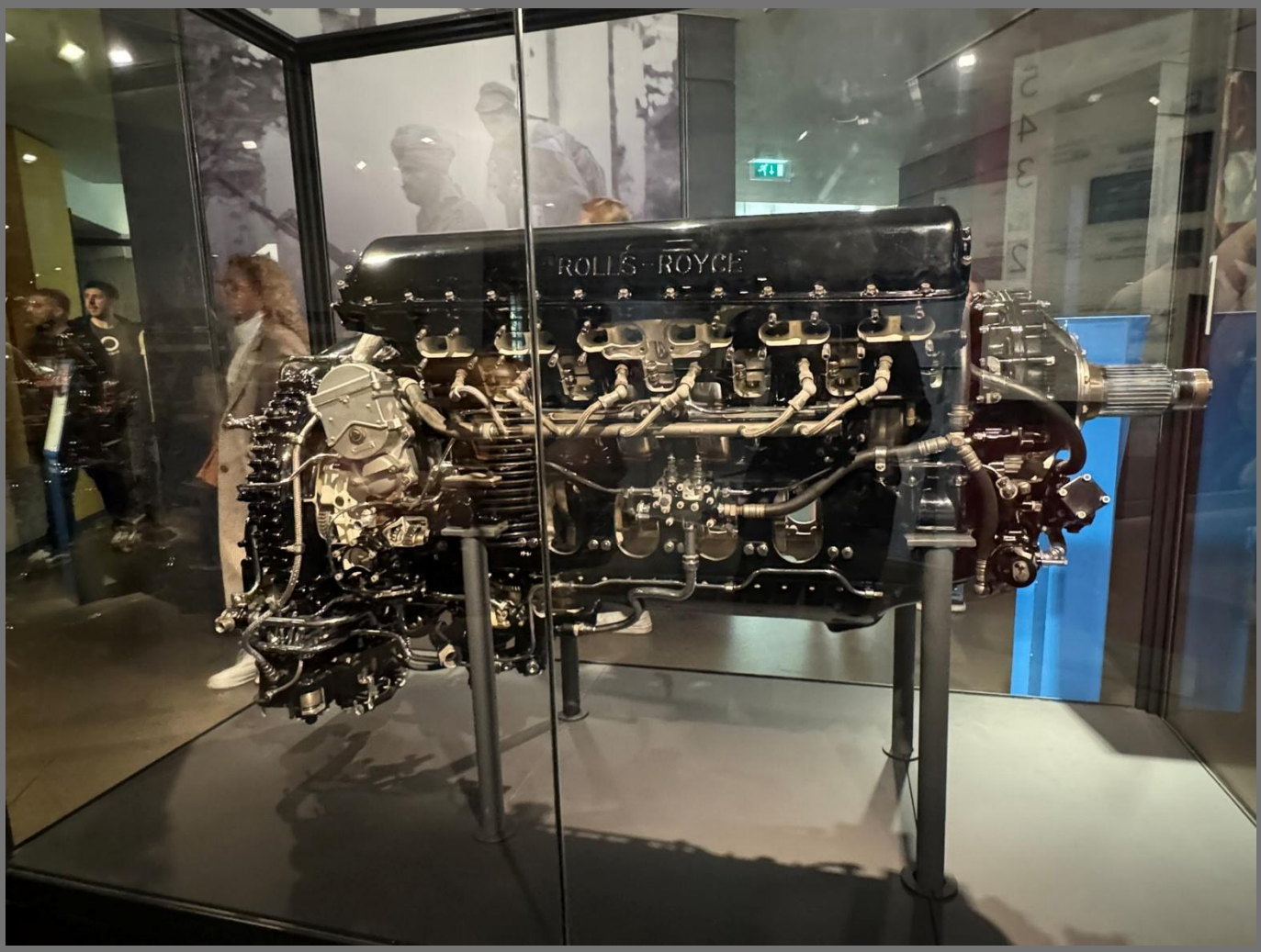
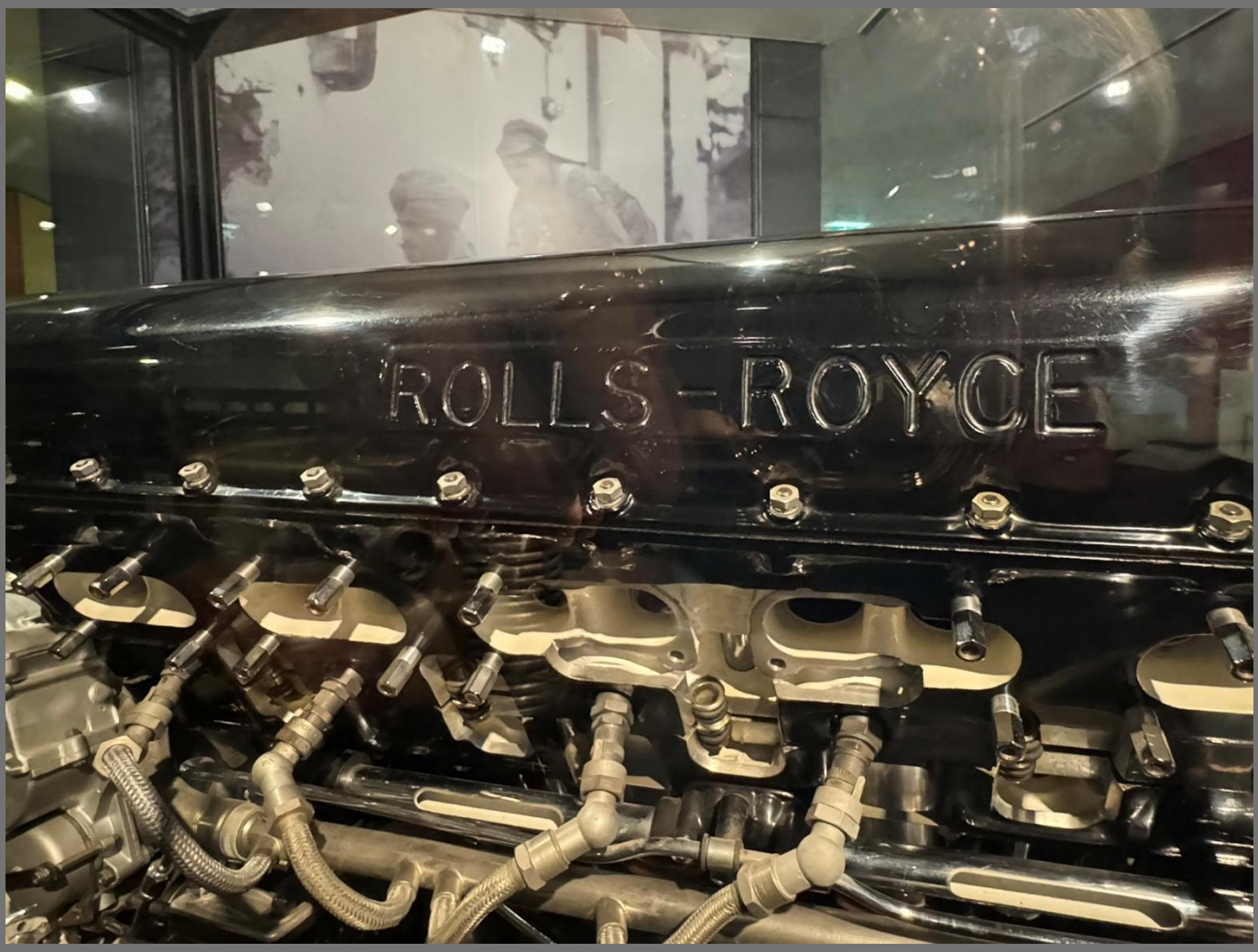

Second
World War
Galleries


ROLLS-ROYCE


ROLLS-ROYCE

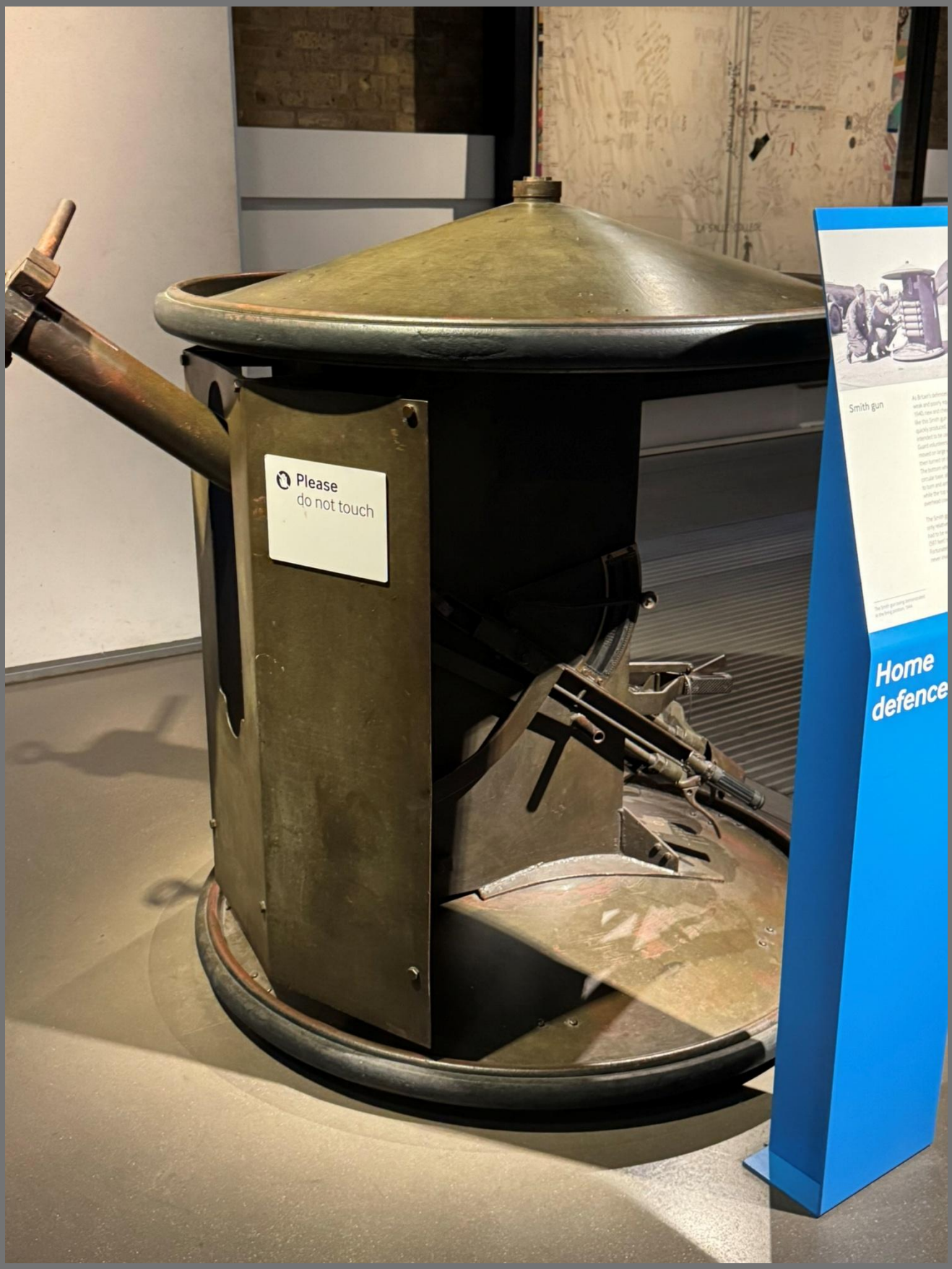

51A



Smith gun

As Britain's defences were weak and poorly equipped in 1940, new and cheap weapons like this Smith gun were quickly produced. They were intended to be used by Home Guard volunteers. The gun moved on large wheels and was then turned on its side to fire. The bottom wheel provided a circular base, allowing its crew to turn and aim the weapon, while the top wheel provided overhead cover.

The Smith gun could fire only relatively light shells. It had to be within 182 metres (597 feet) to damage a tank. Fortunately, the Germans never invaded Britain.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Smith gun
Home
defence



ARP Warden's shelter

This one-person Consol Firewatcher's shelter was designed in 1938. It offered key war workers protection against bomb blasts and flying debris.

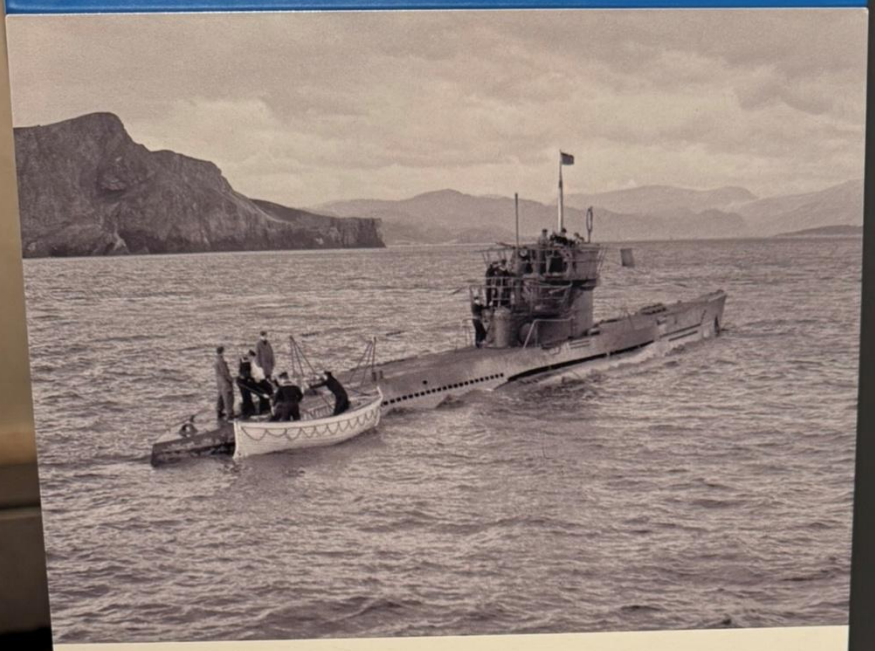
During air raids most people took cover in public shelters or in shelters in their gardens. Others stayed in their homes and waited for raids to pass.

Air Raid Precautions (ARP) Wardens, firewatchers, police and firemen had no such choice. They all had to deal with the impact of a raid as it was happening.

An ARP Warden searches rubble following a London air raid, 1941


Families imprisoned
ARP Warden's shelter
Shelter or coffin?


Act of defiance
Changi flag



German G7e/T3 torpedo

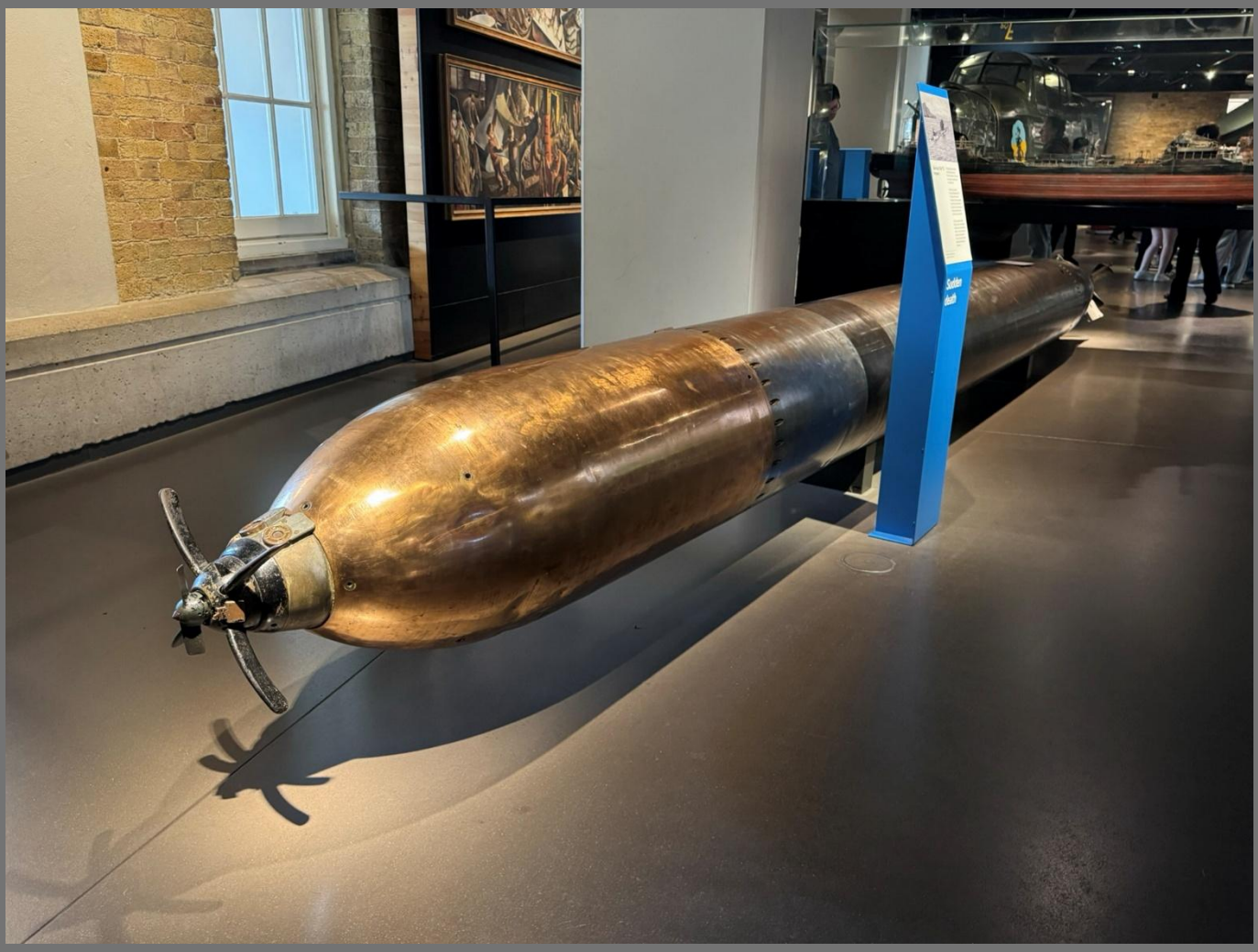
The greatest threat to British and Allied ships was from German torpedoes. Their arrival was sudden, unexpected and very often fatal.

Powered by an electric motor, models like this G7e/T3 torpedo left no trail in the water. Attack came without any warning. They were fired by German U-boat submarines which patrolled the oceans in order to hunt down ships.

U-boats could also fire their deck gun when on the surface. But this was risky and left them exposed. U-boat commanders preferred to attack quickly on the surface and then dive beneath the protection of the waves.

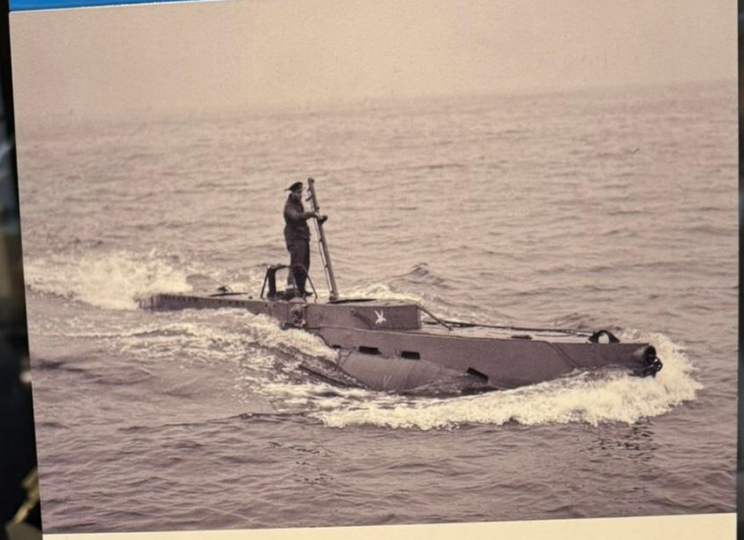
The German *U-1305* during its surrender on 10 May 1945

Sudden









Midget submarine X-7

These mangled remains are of the British midget submarine X-7. It was fatally damaged during an attack on the German battleship *Tirpitz* on 22 September 1943. Two of the submarine's four crew members were drowned. Its captain, Godfrey Place, was awarded the Victoria Cross for his 'courage, endurance and utter contempt for danger'.

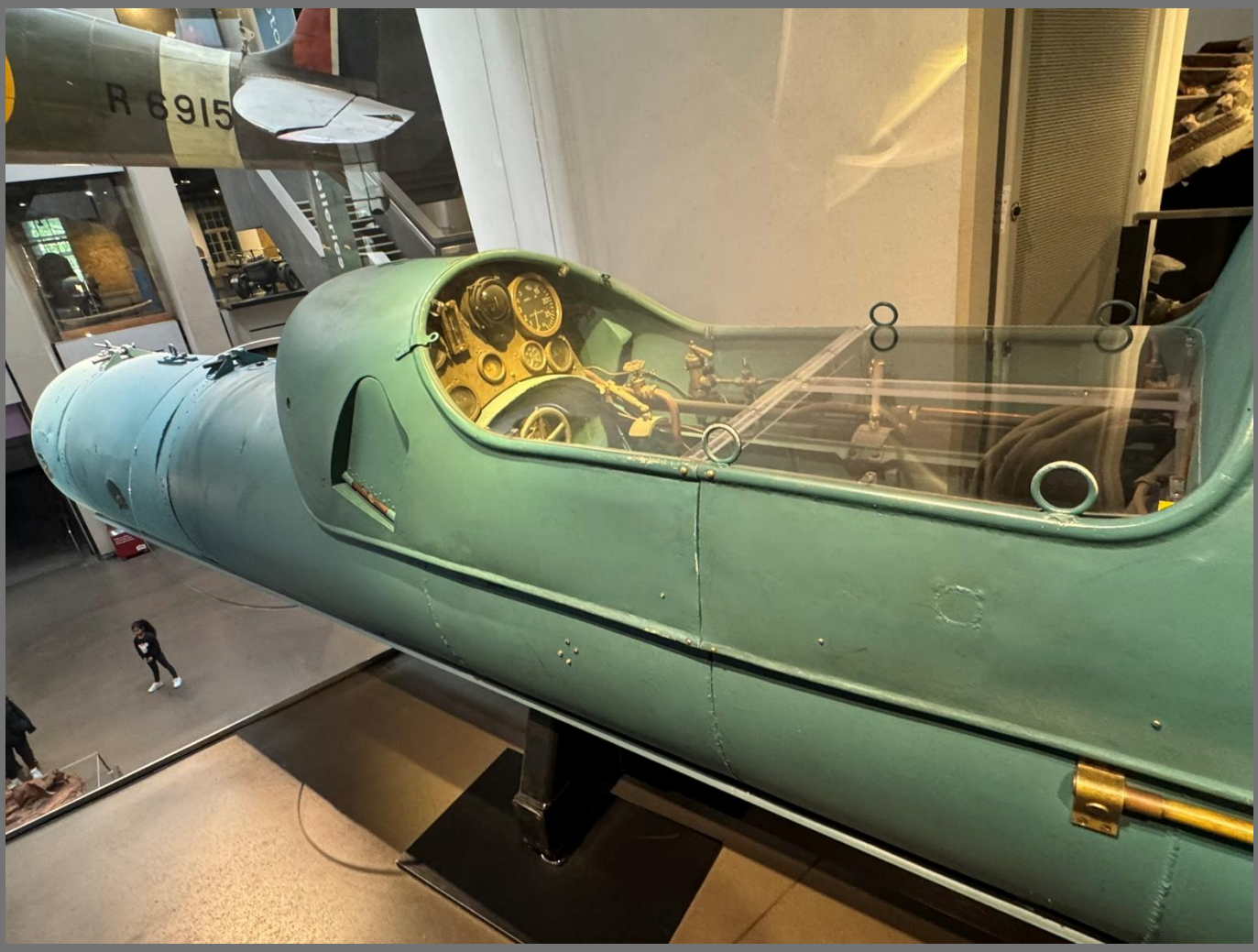
Midget submarines like X-7 were small enough to slip under harbour defences, but the operations in which they were involved were extremely dangerous. The Germans recovered part of X-7 after the attack. This section remained underwater until raised by British divers in 1976.

A later model of a British X-Craft, April 1944

Out of the depths




PIMLICO


R 6915



SSB manned torpedo

This Italian SSB submersible was used to dive beneath underwater nets that protected ships against torpedo attacks while in harbour.

Two divers would sit on this 'human torpedo' and propel themselves towards enemy ships. They would remove the explosive charge at the front and attach it to the ship. They then made their getaway on the submersible before the charge detonated.

The SSBs were nicknamed *Maiali* (pigs) by the Italian Navy, because they were so awkward to steer.

The British-made Chariot, pictured here at Rothesay in 1944, was inspired by successful Italian submersibles

Human torpedo



A battery of 88mm Flak anti-aircraft guns opens fire in 1940

88mm Flak 36 gun

The German 88mm Flak 36 anti-aircraft gun was feared by Allied air and tank crews.

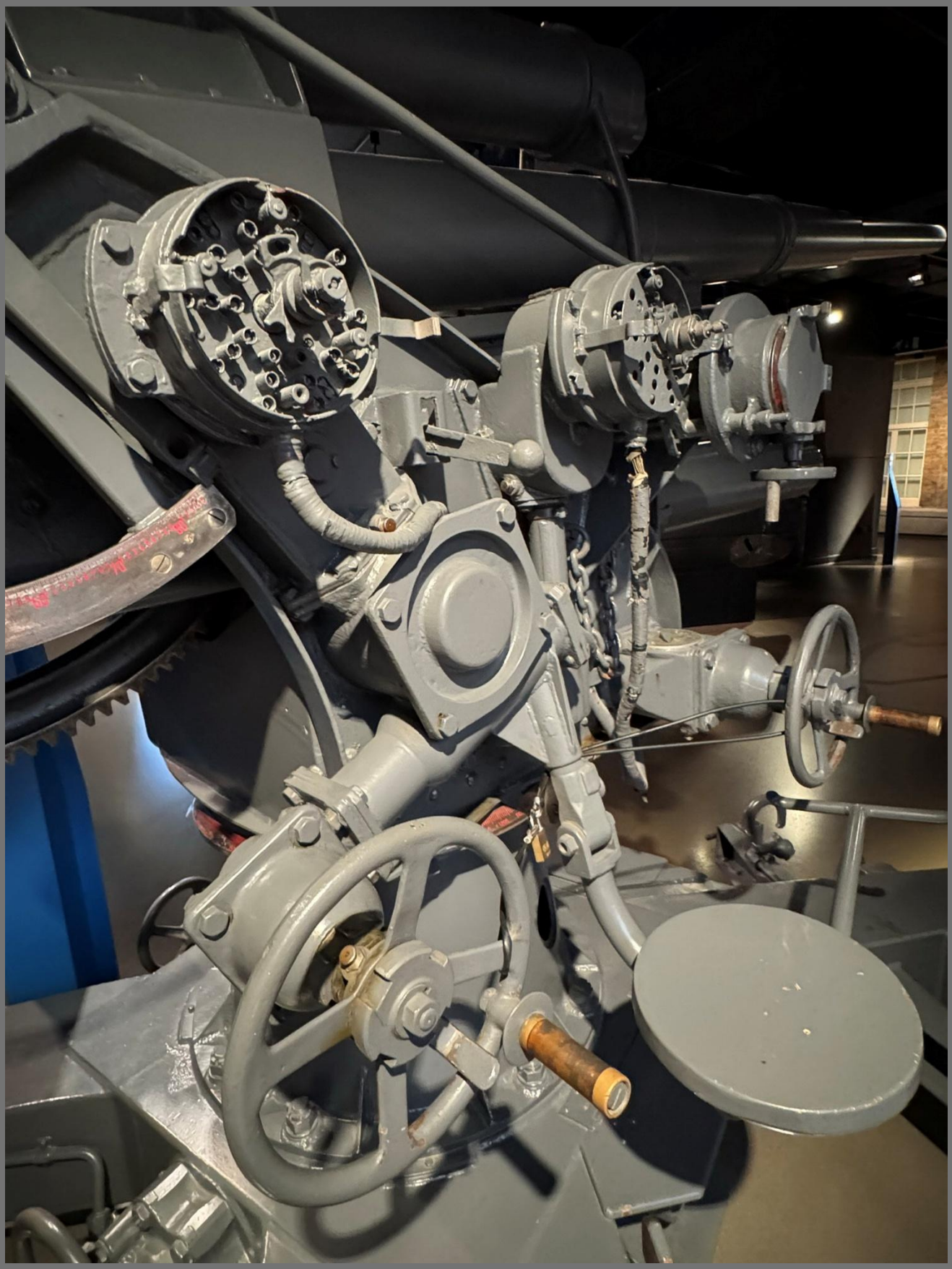
The '88' was originally designed to destroy aircraft. It shot down approximately one in three of all Allied bombers brought down over Germany. The gun was also used against tanks, where it proved just as effective.

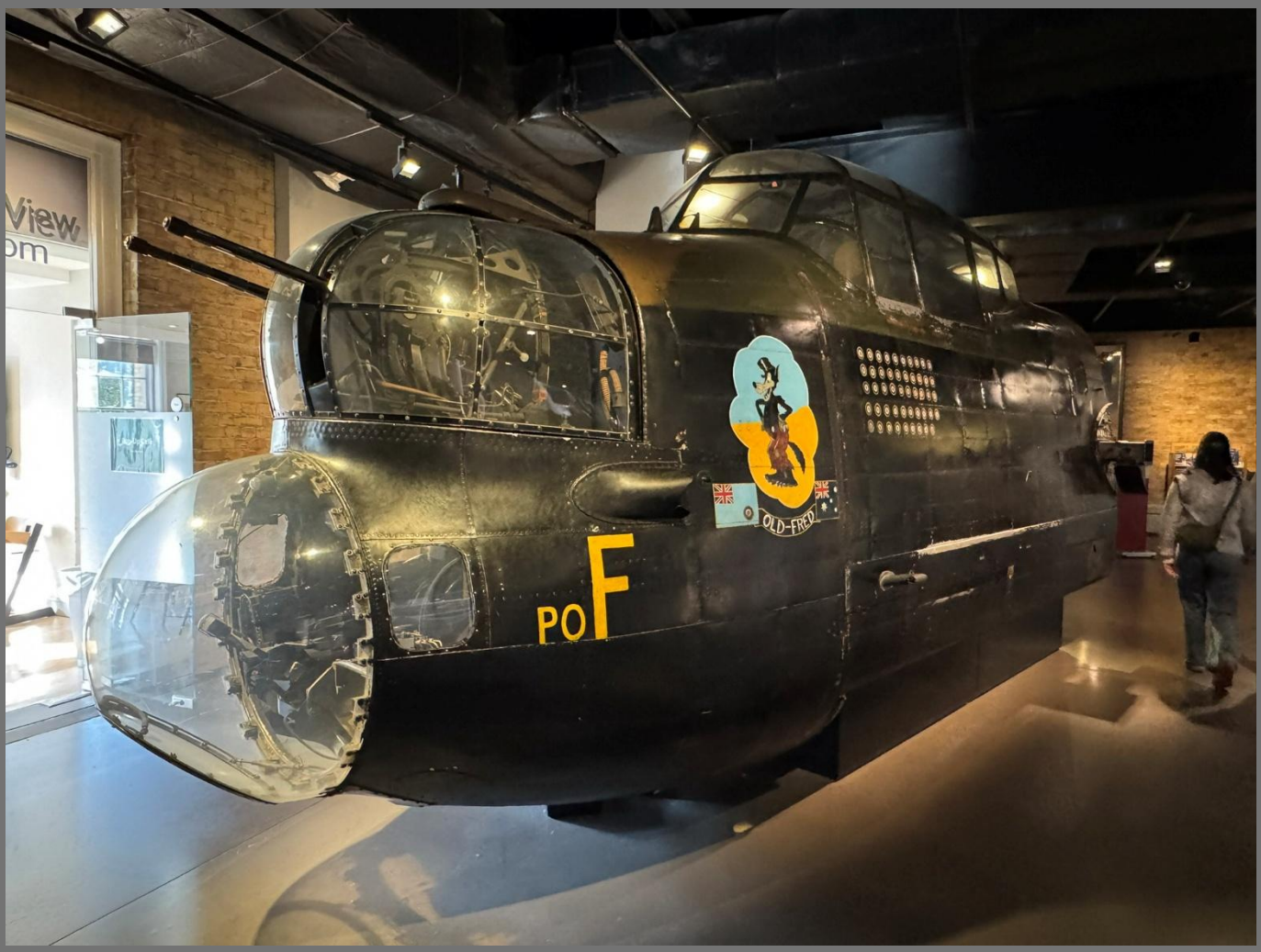
The word 'flak' – a contraction of the German *Flugabwehrkanone* (anti-aircraft gun) – entered the English language during the war. It became a standard word for hostility or criticism.










PO F
OLD-FRED


STEEL
DANGER





Crew from No. 467 Squadron, Royal Australian Air Force, in front of their Lancaster, 1944

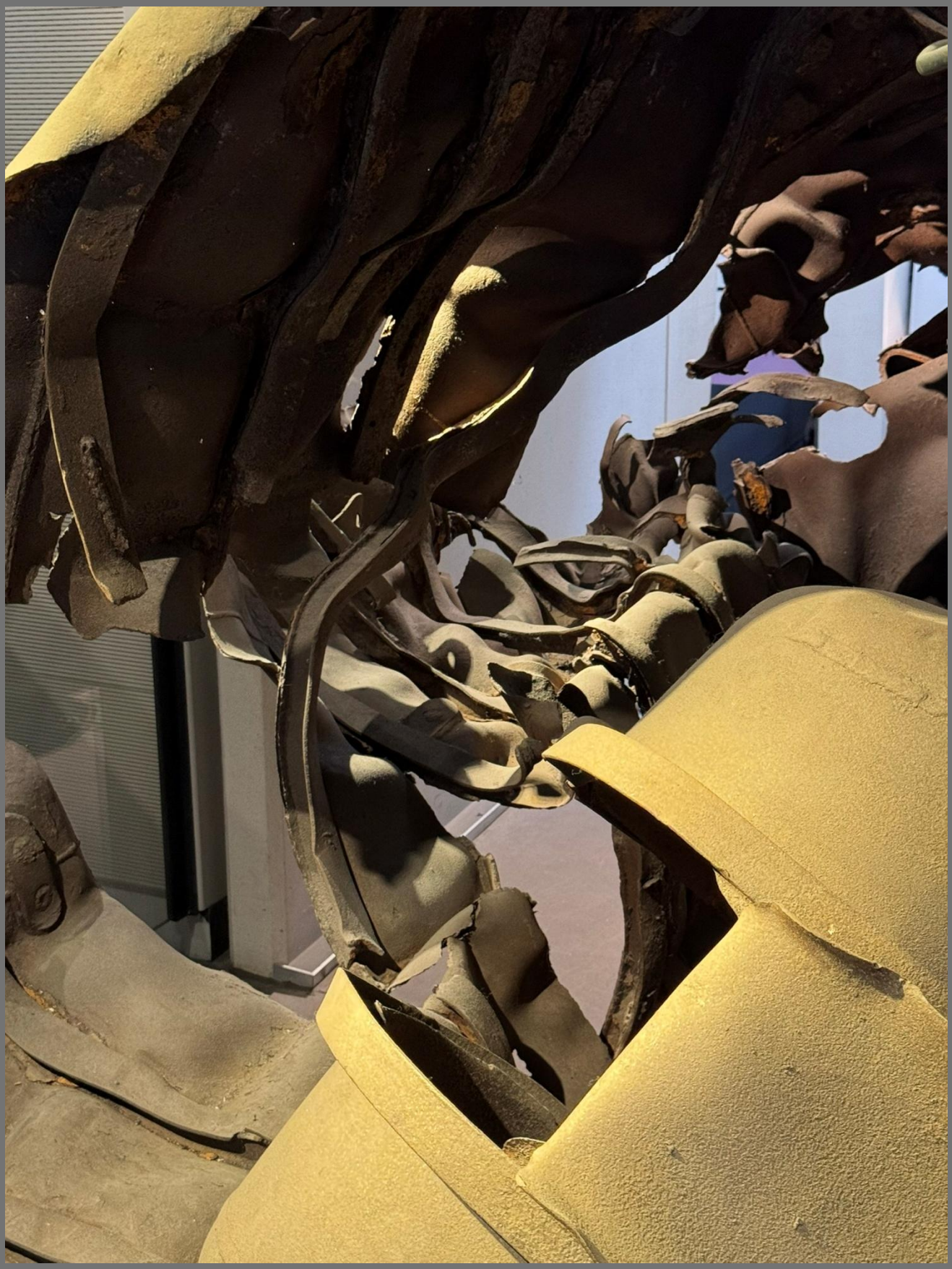
Avro Lancaster bomber cockpit

The Lancaster bomber formed the backbone of Britain's bombing raids against Germany during the later years of the war.

More than 7,000 Lancasters were built. Their crews dropped over 600,000 tons of bombs. This Lancaster was made in Manchester in 1943. No. 467 Squadron of the Royal Australian Air Force flew 49 bombing operations in this Lancaster, 12 of them over Berlin.

Within the squadron, this aircraft was coded 'F' and known affectionately by its crew as 'Fred the Fox'. Yet the nose art shows Walt Disney's Big Bad Wolf.







Midget submarine X-7

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A later model of a British X-Craft, April 1944


Second
World War
Supported by
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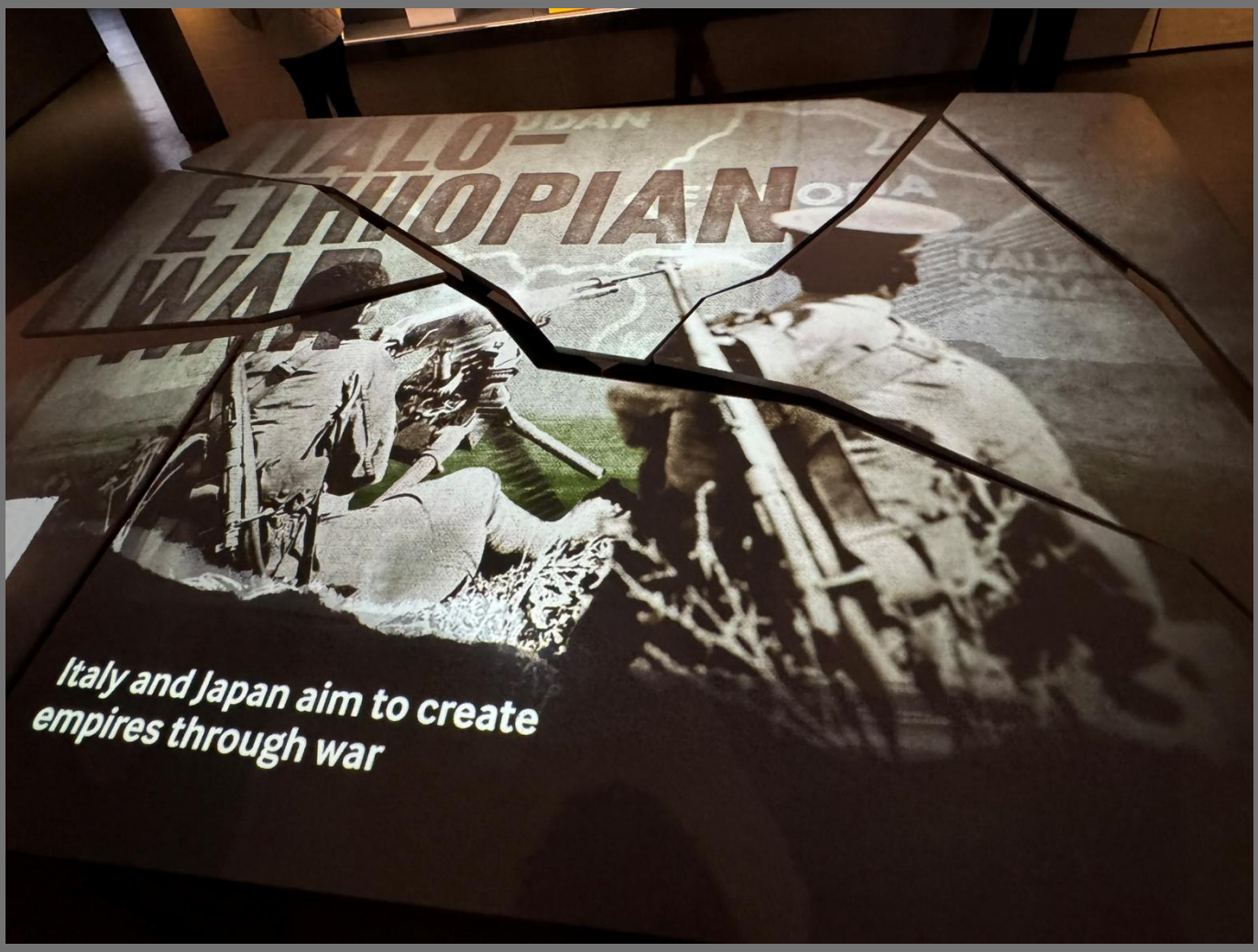
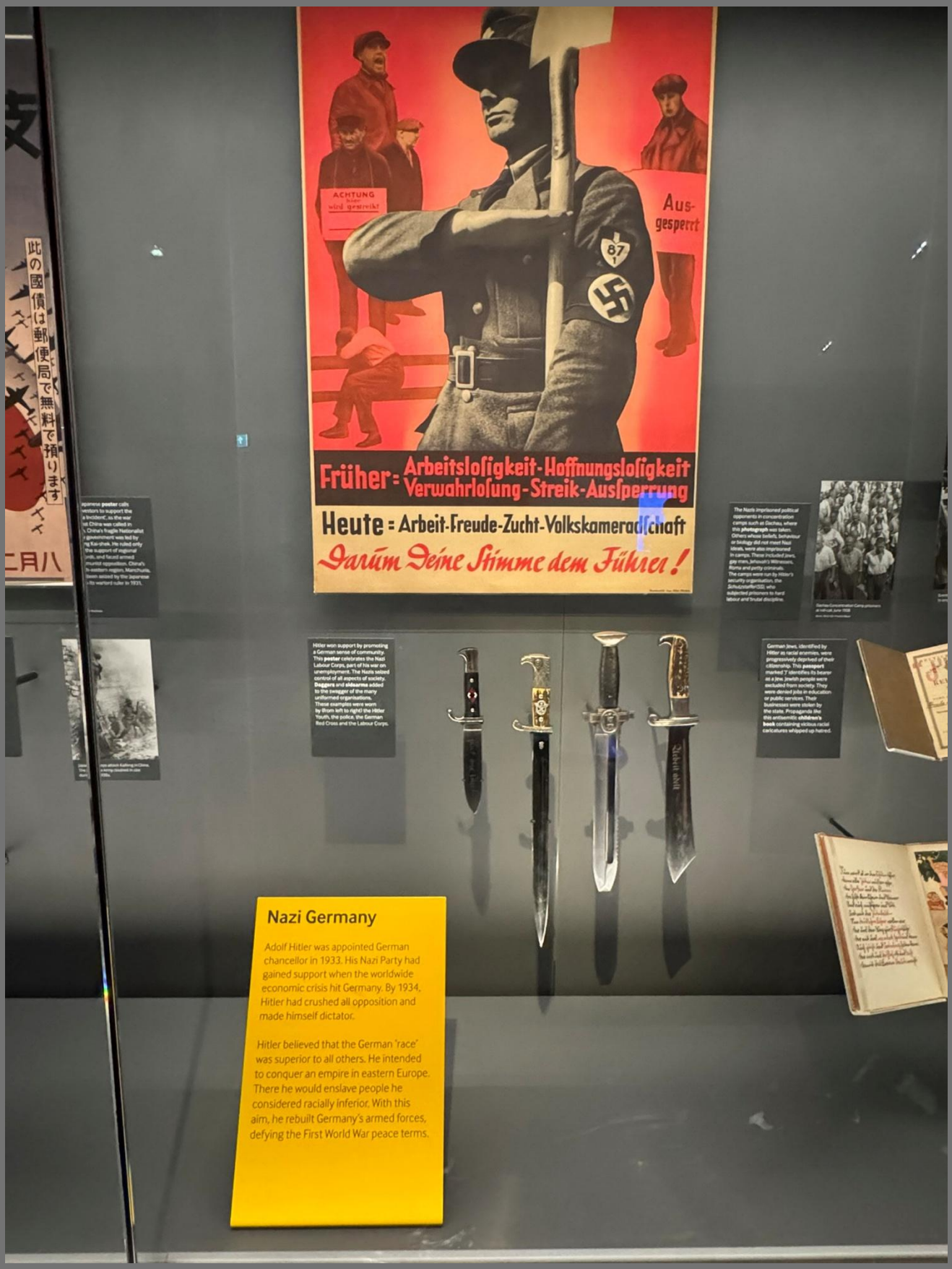
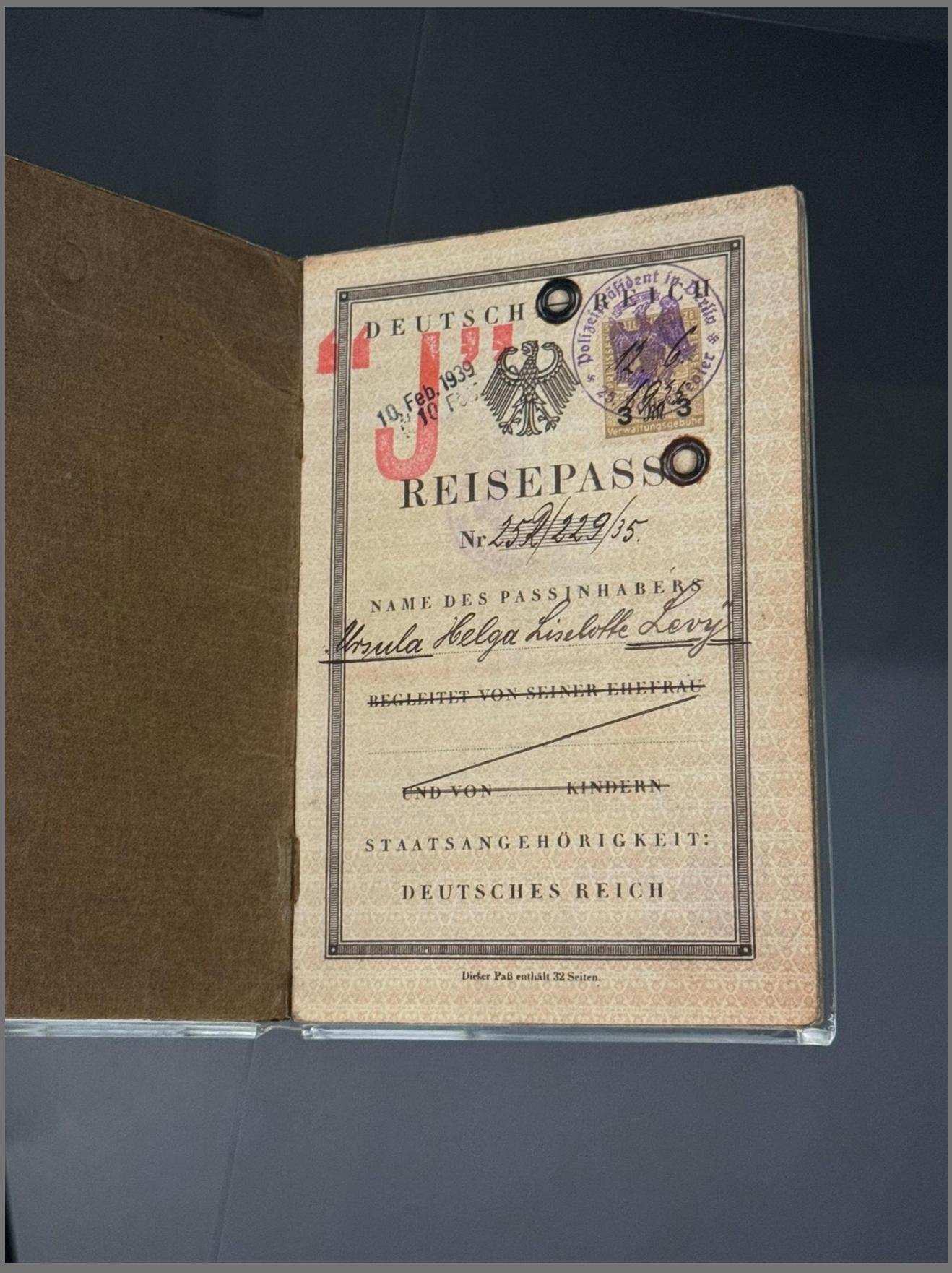
JAPAN
Aggressive nations
threaten the peace


ITALO–
ETHIOPIAN
WAR
Italy and Japan aim to create
empires through war


ACHTUNG
wird gewirkt
Aus-
gesperrt
Früher = Arbeitslosigkeit-Hoffnungslosigkeit
Verwahrlosung-Streik-Aussperrung
Heute = Arbeit-Freude-Zucht-Volkskameradschaft
Darum Deine Stimme dem Führer!
Nazi Germany
Adolf Hitler was appointed German chancellor in 1933. His Nazi Party had gained support when the worldwide economic crisis hit Germany. By 1934, Hitler had crushed all opposition and made himself dictator.
Hitler believed that the German 'race' was superior to all others. He intended to conquer an empire in eastern Europe. There he would enslave people he considered racially inferior. With this aim, he rebuilt Germany's armed forces, defying the First World War peace terms.


SDAP
Dachau Concentration Camp prisoners at roll-call, June 1938
Events like this 1934 Nazi rally were stage-managed to emphasise mass support for Hitler
Hitler gained popularity by defying the hated peace terms, forced on Germany in 1919. He broke them by expanding Germany's army and creating a powerful modern air force. In March 1938 he went even further, launching an unopposed invasion of Austria. This **ballot paper** is from the referendum held to rubber-stamp the Anschluss (union) of Germany and Austria.
Young Austrians celebrate Hitler's takeover of their country
REISEPASS
SCHULE
Volksabstimmung und Großdeutscher Reichstag
Stimmzettel
Wiedervereinigung Österreichs mit dem Deutschen Reich
Adolf Hitler?
Ja
Nein



DEUTSCHES REICH

J

10. Feb. 1939

Polizeipräsident in Berlin

12 6

3 RM 3

Verwaltungsgebühr

REISEPASS

Nr 159/229/35

NAME DES PASSINHABERS

Ursula Helga Liselotte Levy

~~BEGLEITET VON SEINER EHEFRAU~~

~~UND VON KINDERN~~

STAATSANGEHÖRIGKEIT:

DEUTSCHES REICH

Dieser Paß enthält 32 Seiten.

Volksabstimmung und Großdeutscher Reichstag

Stimmzettel

Bist Du mit der am 13. März 1938 vollzogenen

Wiedervereinigung Österreichs mit dem Deutschen Reich

einverstanden und stimmst Du für die Liste unseres Führers

Adolf Hitler?

Ja



Nein

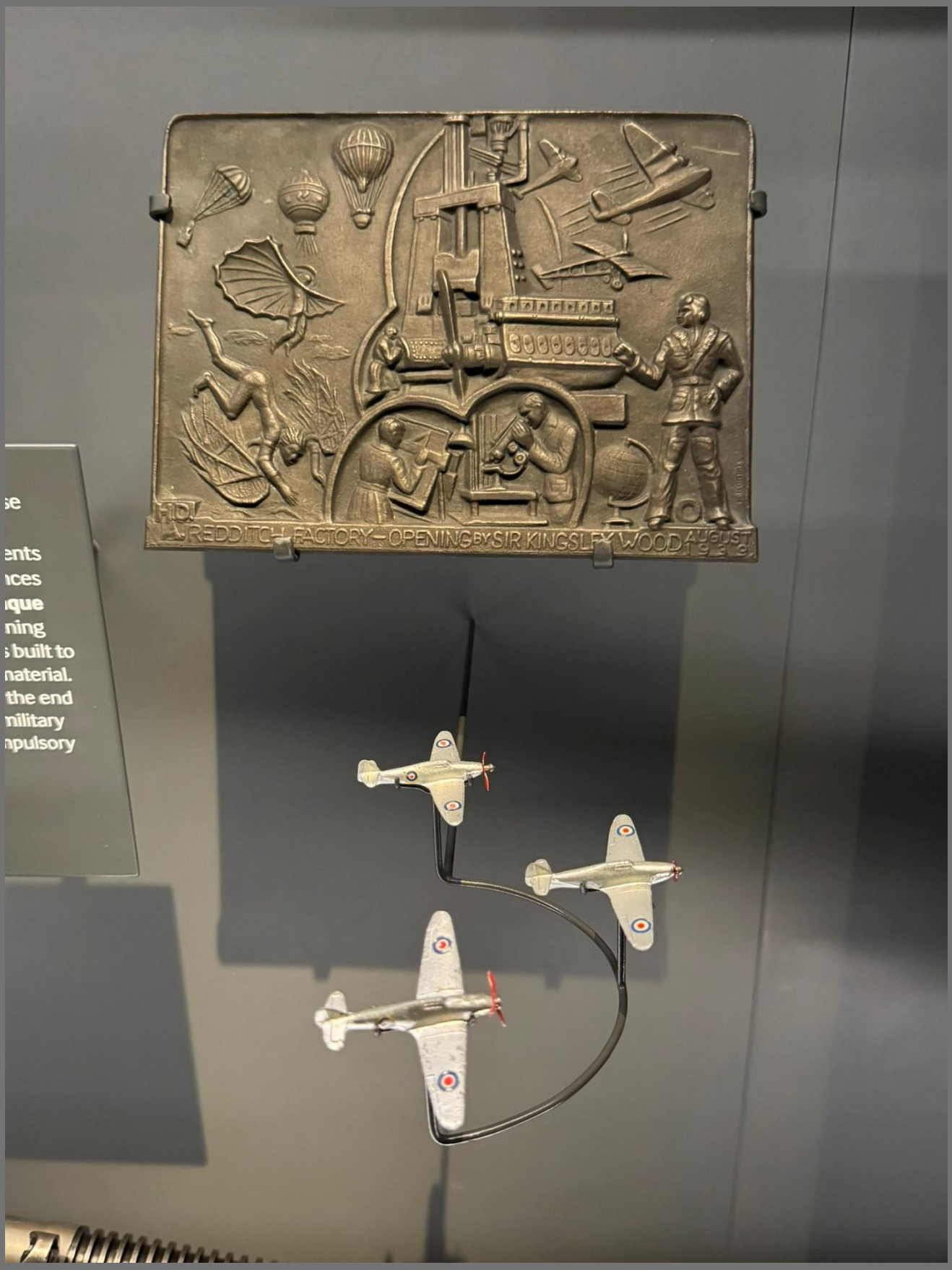


Events like this 1934 Nazi rally were stage-managed to emphasise mass support for Hitler


Many foreign
warships on Wampo
River
Buried
Alive
浦東三井煤棧大火



Chiang Kai-shek established himself as China's most powerful political figure during the 1920s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REDDITCH FACTORY – OPENING BY SIR KINGSLEY WOOD AUGUST 1938
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C-126 C

Der Oberste Befehlshaber der Wehrmacht
OKW/WFA Nr. 170 /39 g.K.Chefs. L I

Berlin, den 31.8. 39.

8 Ausfertigungen
2. Ausfertigung.

Weisung Nr. 1
für die Kriegführung.

1.) Nachdem alle politischen Möglichkeiten erschöpft sind, um auf friedlichem Wege eine für Deutschland unerträgliche Lage an seiner Ostgrenze zu beseitigen, habe ich mich zur gewaltsamen Lösung entschlossen.

2.) Der Angriff gegen Polen ist nach den für Fall Weiss getroffenen Vorbereitungen zu führen mit den Abänderungen, die sich beim Heer durch den inzwischen fast vollendeten Aufmarsch ergeben.

Aufgabenverteilung und Operationsziel bleiben unverändert.

Angriffstag: 1.9.39..

Angriffszeit .....

Diese Zeit gilt auch für die Unternehmungen Gdingen - Danziger Bucht und Brücke Dirschau.

3.) Im Westen kommt es darauf an, die Verantwortung für die Eröffnung von Feindseligkeiten eindeutig England und Frankreich zu überlassen. Geringfügigen Grenzverletzungen ist zunächst rein örtlich entgegen zu treten.

Die von uns Holland, Belgien, Luxemburg und der Schweiz zugesicherte Neutralität ist peinlich zu achten.



Josef Stalin (centre), ... on 23 August 1939

In this **directive**, Hitler ordered the invasion of Poland on 1 September 1939. A secret agreement made with Stalin to divide up Poland meant he could attack without fear of Soviet interference. Hitler expected to avoid British and French intervention by acting with 'speed and brutality'. But Britain and France kept their promise to go to war.



Josef Stalin (centre), at the signing of the German-Soviet pact, on 23 August 1939


"CORUNNA" HOLDS
NEARLY FOUR-FIFTHS OF THE
WHO WERE TRAPPED IN
HAVE NOW BEEN SNATCHED
ROYAL NAVY FROM SEEMINGLY
ANNIHILATION.
All last night ship after ship
through the storm of steel outside Dun
ports.
R-FIFTHS
E.F. HOME
DUNKIRK:
THE END
335,000 Men Saved: Port Wrecked
DUNKIRK —By RAF
ADMIRAL ABRIAL THE
LAST MAN OFF
DUNKIRK has fallen. The la
forces were withdrawn in th
This, the end of one of the
chapters in the history of the Bri
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to the shore.
heroic rearguard.
he town, cease
- attacking, fi
stepped to safety under
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by pa
rearguard
DUNKIRK EVACUAT
COMPLETED
FRENCH ADMIRAL
LAST TO LEAV
PREMIER'S STATEM
335,000 TAKEN O
R.A.F. to the rescue
WATER DROPPED TO CALAIS DEFENDERS
THIRTY-NINE R.A.F. planes have dropped water, food and ammunition to the heroic garrison of Allied troops and marines in Calais, the Air Ministry revealed early
The Museum Post
BEATEN ARMY ESCAPES FROM FRANCE
DRIVEN FROM


How
did war
spread
across
Europe?


Over 3
soldiers
from its
after sum
Germans
with photo
prisoners o
a Waffen-SS
wing of the N
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killings. When
prisoners appe
newsreels in Ge
audience membe
'shoot these black





Nationalsozialistische Deutsche Arbeiterpartei

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Berlin, Zimmerstr. 88, F A 1 Jäger 0022

Geschichtlich, historischer Gegenstand !

Mit diesen Federhalter wurde am 22. Juni 1940, 18.50 Uhr deutscher Sommerzeit, im Wald von Compiegne der deutsch=französische Waffenstillstandsvertrag unterzeichnet
Die Unterzeichnung nahmen vor:
Als Beauftragter des Führers und Obersten Befehlshabers der Wehrmacht der Chef des Oberkommandos der Wehrmacht,
Generaloberst Keitel.
Als Beauftragter der französischen Regierung,
General Huntzinger.

Die Handlung im Wald von Compiegne hat begangenes Unrecht gegen die deutsche Waffenehre ausgelöscht.

Das Oberkommando d. Wehrmacht

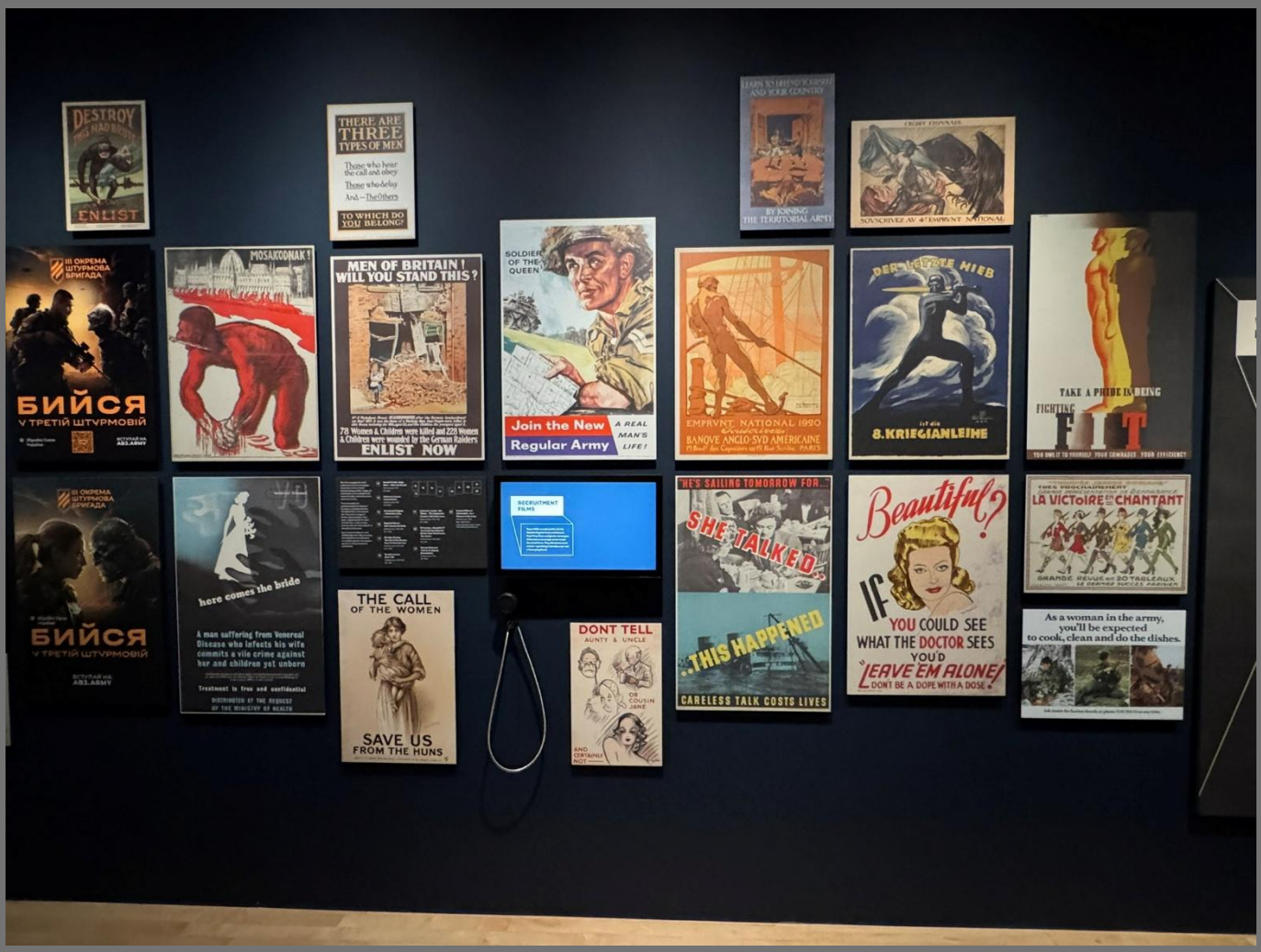
Der Chef der Präsidialkanzlei
des Führers und Reichskanzlers


Hitler visits Paris, 24 June 1940

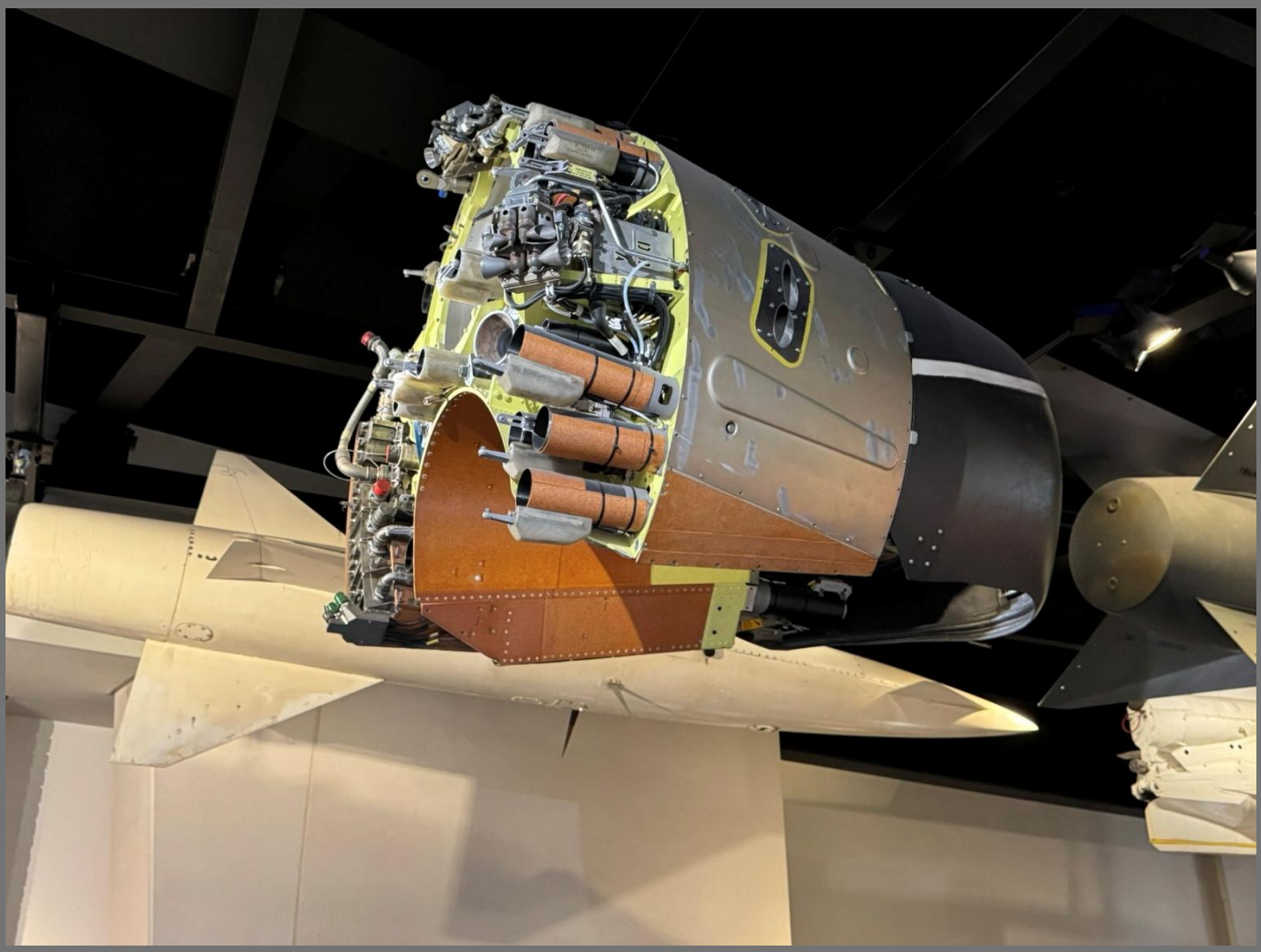


Hitler meets the leader of the French Vichy Republic, Marshal Pétain, in October 1940

The armistice between France and Germany was signed using this **framed pen**. France was divided into occupied zones and the so-called Vichy Republic. The Vichy Republic was an authoritarian right-wing state led by French First World War hero Marshal Philippe Pétain. Hitler treated the Vichy leadership with respect, because he wanted a weakened and obedient France as part of his new European order.


DESTROY THIS MAD BRUTE
ENLIST
THERE ARE THREE TYPES OF MEN
Those who hear the call and obey
Those who delay
And — The Others
TO WHICH DO YOU BELONG?
BY JOINING THE TERRITORIAL ARMY
SOUSCRIVEZ AU 4e EMPRUNT NATIONAL
III ОКРЕМА ШТУРМОВА БРИГАДА
БИЙСЯ
У ТРЕТІЙ ШТУРМОВІЙ
MOSAKOBNAK!
MEN OF BRITAIN! WILL YOU STAND THIS?
78 Women & Children were killed and 229 Women & Children were wounded by the German Raiders
ENLIST NOW
SOLDIER OF THE QUEEN
Join the New Regular Army
A REAL MAN'S LIFE!
EMPRUNT NATIONAL 1920
BANQUE ANGLO SUD AMERICAINE
8. KRIEGIANLEIHE
TAKE A PRIDE IN BEING FIGHTING FIT
YOU OWE IT TO YOURSELF, YOUR COMRADES, YOUR EFFICIENCY
III ОКРЕМА ШТУРМОВА БРИГАДА
БИЙСЯ
У ТРЕТІЙ ШТУРМОВІЙ
here comes the bride
A man suffering from Venereal Disease who infects his wife commits a vile crime against her and children yet unborn
Treatment is free and confidential
DISTRIBUTED AT THE REQUEST OF THE MINISTRY OF HEALTH
RECRUITMENT FILMS
THE CALL OF THE WOMEN
SAVE US FROM THE HUNS
DONT TELL
AUNTY & UNCLE
OR COUSIN JANE
AND CERTAINLY NOT
"HE'S SAILING TOMORROW FOR..."
SHE TALKED..
..THIS HAPPENED
CARELESS TALK COSTS LIVES
Beautiful?
IF YOU COULD SEE WHAT THE DOCTOR SEES YOU'D "LEAVE 'EM ALONE!"
DON'T BE A DOPE WITH A DOSE
LA VICTOIRE EN CHANTANT
GRANDE REVUE EN 20 TABLEAUX
As a woman in the army, you'll be expected to cook, clean and do the dishes.


Pears Foundation
2
Peace and Security: 1945–2014
On the Terraces
Please do not touch

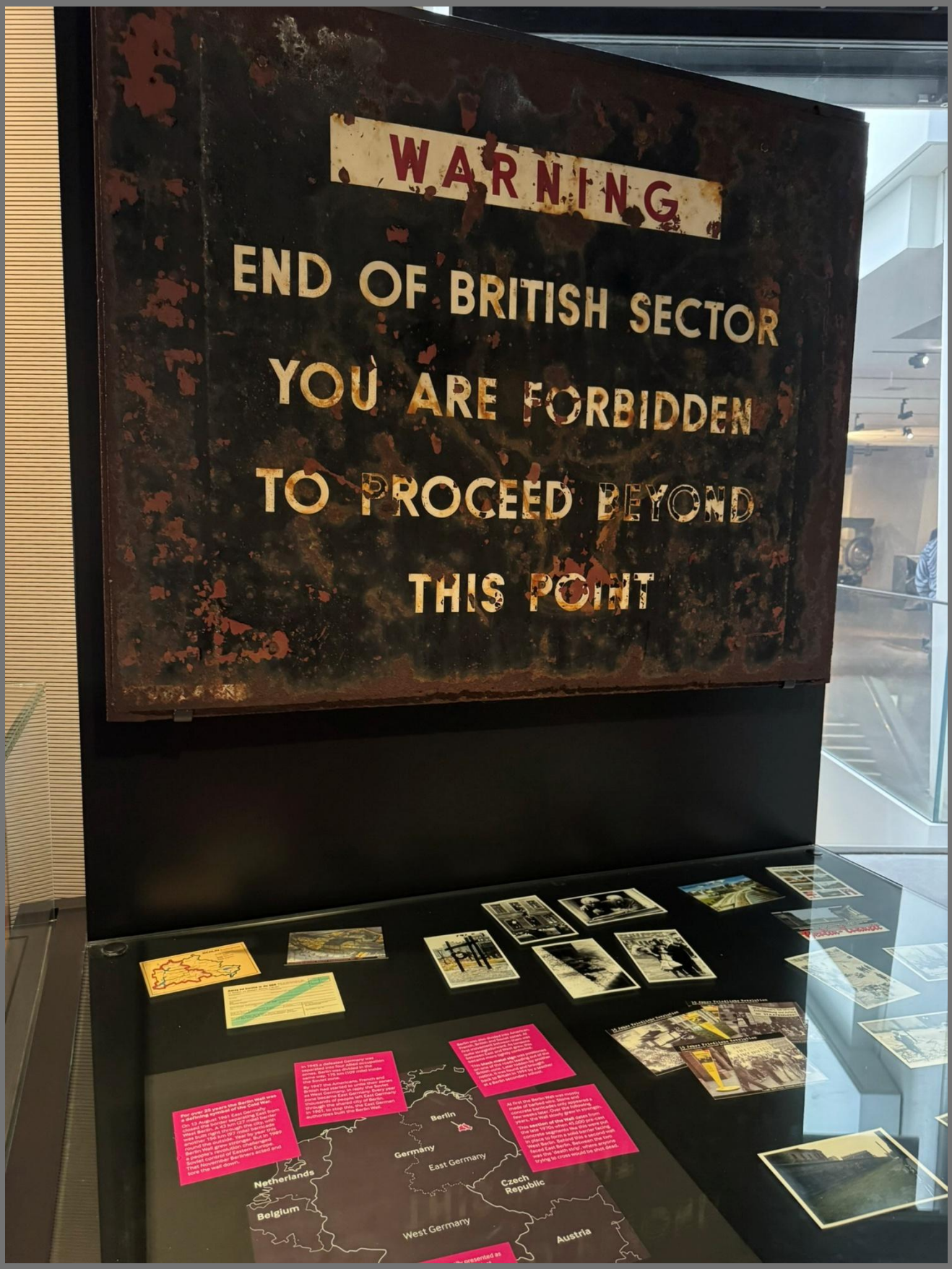



TRAINING USE ONLY
GUIDED MISSILE
LOT NO. 0UDJ
GROSS WT-327#
STORAGE TEMP. LIMITS -65°F
FIRING TEMP. LIMITS -40°F
TEST MISSILE
NO. 362.




STOP NUCLEAR SUICIDE CAMPAIGN FOR NUCLEAR DISARMAMENT 2 CARTHUSIAN ST LONDON EC1


END OF
YOU ARE
TO PROC
THIS


WARNING
END OF BRITISH SECTOR
YOU ARE FORBIDDEN
TO PROCEED BEYOND
THIS POINT
Berlin
Germany
East Germany
West Germany
Netherlands
Belgium
Czech Republic
Austria

The Berlin Wall at Bernauer Strasse, 1980

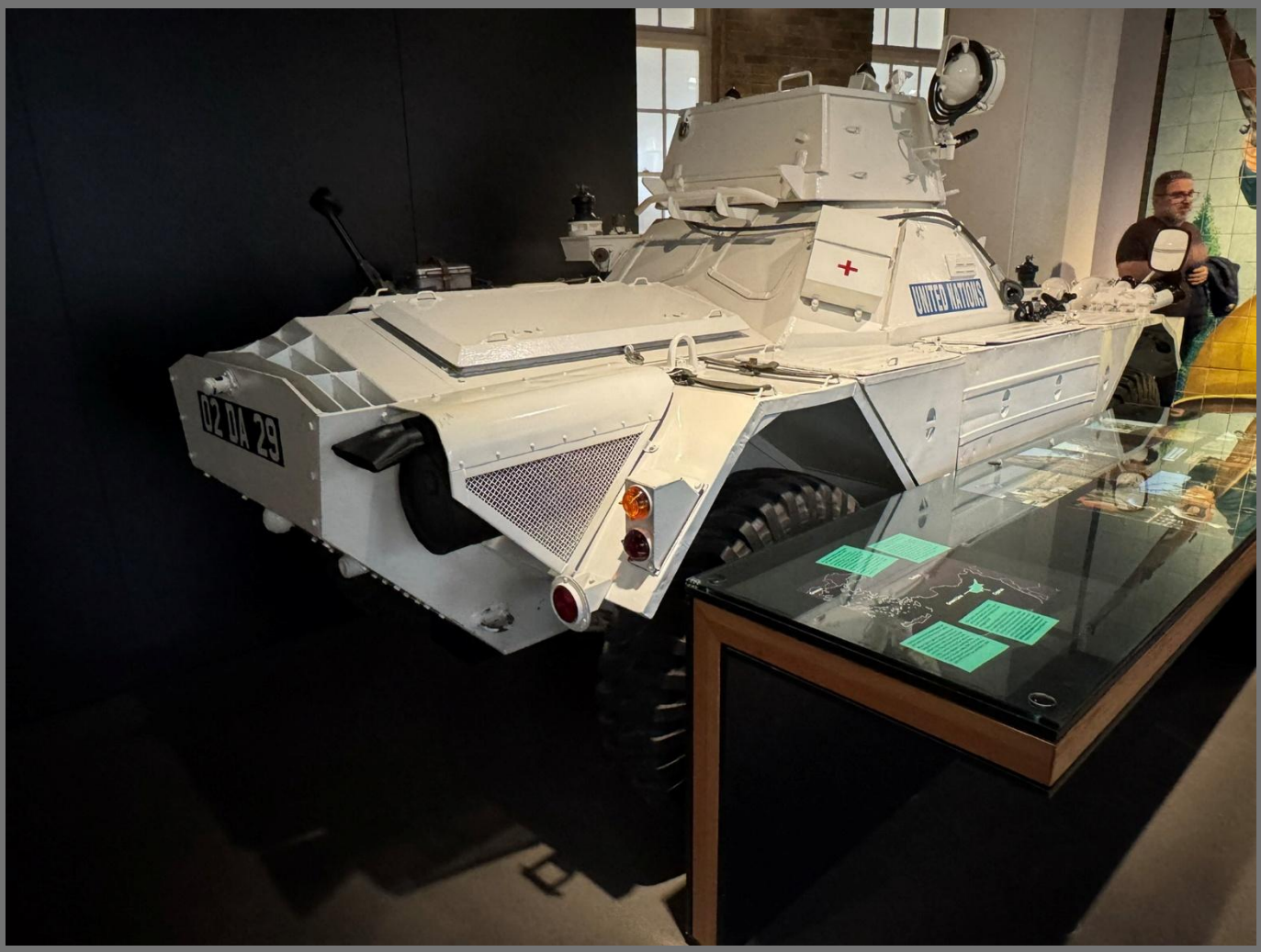
This model shows an area of the Wall, looking from West Berlin across to East Berlin.

The Wall consisted of:

1. A reinforced concrete wall facing West Berlin
2. A strip of raked sand, known as the 'death strip'
3. Anti-tank obstacles
4. A series of watch towers linked by a road
5. An electric fence which triggered arc lights
6. A wall facing East Berlin

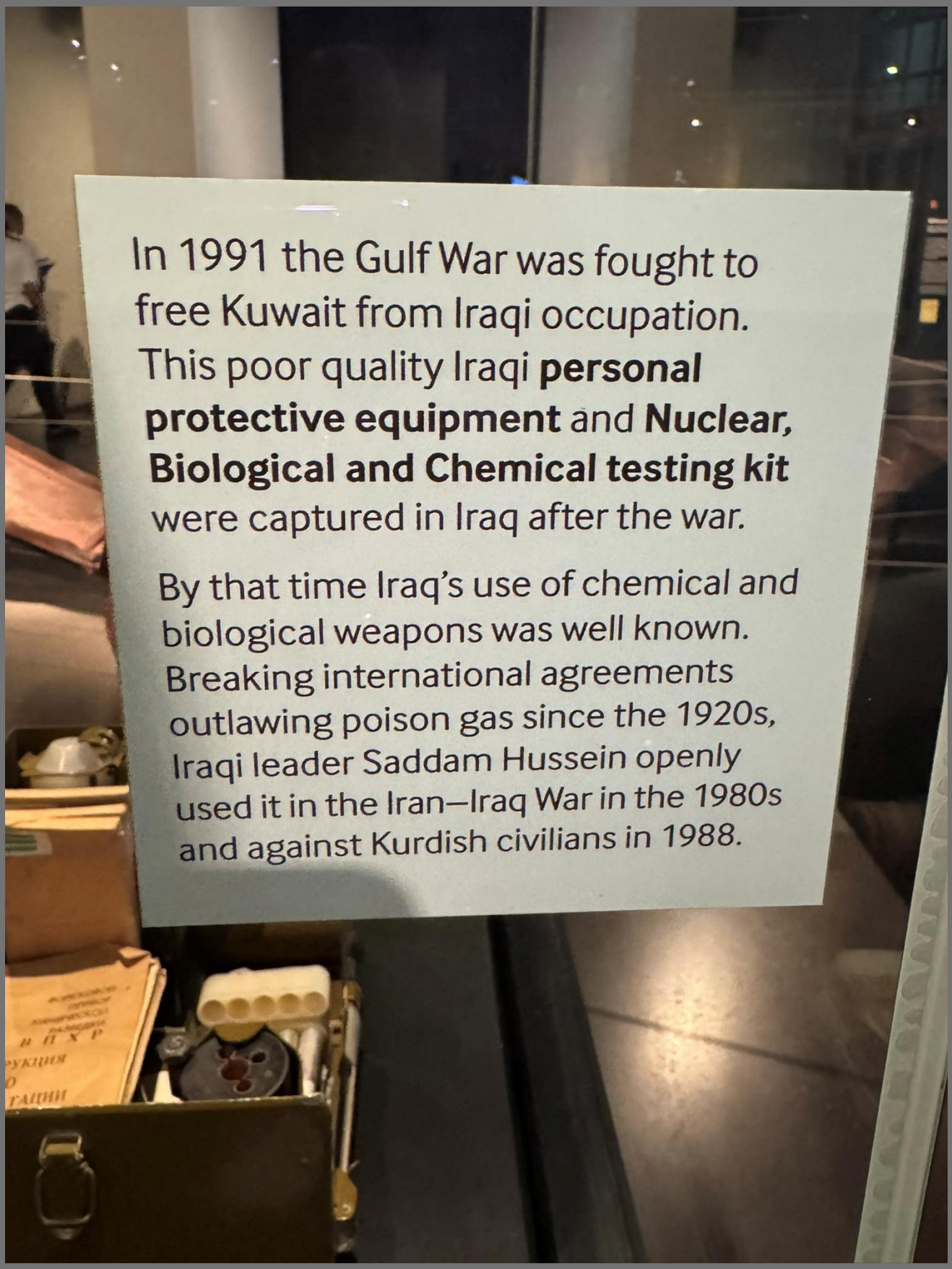
The Church of Reconciliation (*Versohnungskirche*), shown here in no man's land, is flanked by, anti-tank obstacles. The Church was destroyed in 1985.


The Berlin Wall at


UNITED NATIONS
02 DA 29


UNITED NATIONS
Turkey
Green Line
Cyprus


ВОЙСКОВОЙ
ПРИБОР
ХИМИЧЕСКОЙ
РАЗВЕДКИ
В П Х Р
ИНСТРУКЦИЯ
ПО
ЭКСПЛУАТАЦИИ


In 1991 the Gulf War was fought to free Kuwait from Iraqi occupation. This poor quality Iraqi **personal protective equipment** and **Nuclear, Biological and Chemical testing kit** were captured in Iraq after the war.
By that time Iraq's use of chemical and biological weapons was well known. Breaking international agreements outlawing poison gas since the 1920s, Iraqi leader Saddam Hussein openly used it in the Iran–Iraq War in the 1980s and against Kurdish civilians in 1988.


8
All Changed


RADIATION HAZARD
OBTAIN PERMISSION
FROM OOW/OOD
BEFORE PROCEEDING ALOFT


U P S NO 1
U P S NO 2
S/NO H990701140


440 VOLTS
INBDS CABIN FRIDGE
Biohazard
No food or drink to be kept in the refrigerator
2 x CFL 12 hour reagent packs
Stock 100mM HEPES solution
Stock 10% Tween 80
ATP free water
Sterilising solution (Bleach)
Sterilising Tablets
Sachet 100mM HEPES powder
Fraction Blocks
Syringes
Pipettes
Plate seals
Gloves

On 11 September 2001 (usually known by the American-style date as 9/11) two airliners were flown into the twin towers of the World Trade Center in New York. They had been hijacked by al-Qaeda terrorists. Both towers collapsed 90 minutes later, killing nearly 3,000 people.

This **steel window frame** was lifted from the ruins of the North Tower. The burnt and twisted metal still graphically expresses the sickening violence that destroyed the buildings.

Further labels telling the story of this World Trade Center window frame can be found on the **All Changed A** caption panel




STOP THE
WAR
COALITION

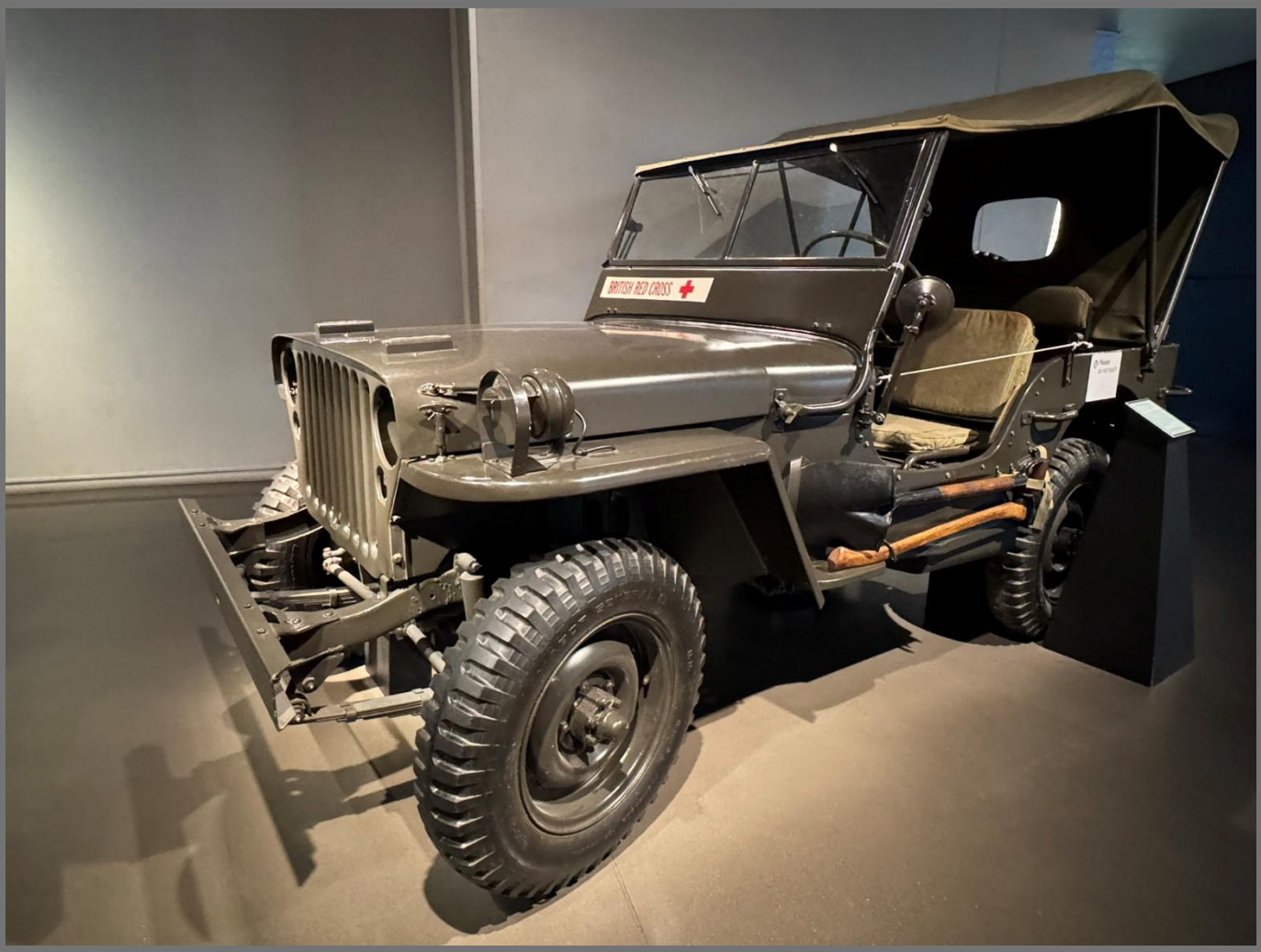

STOP THE
WAR
COALITION



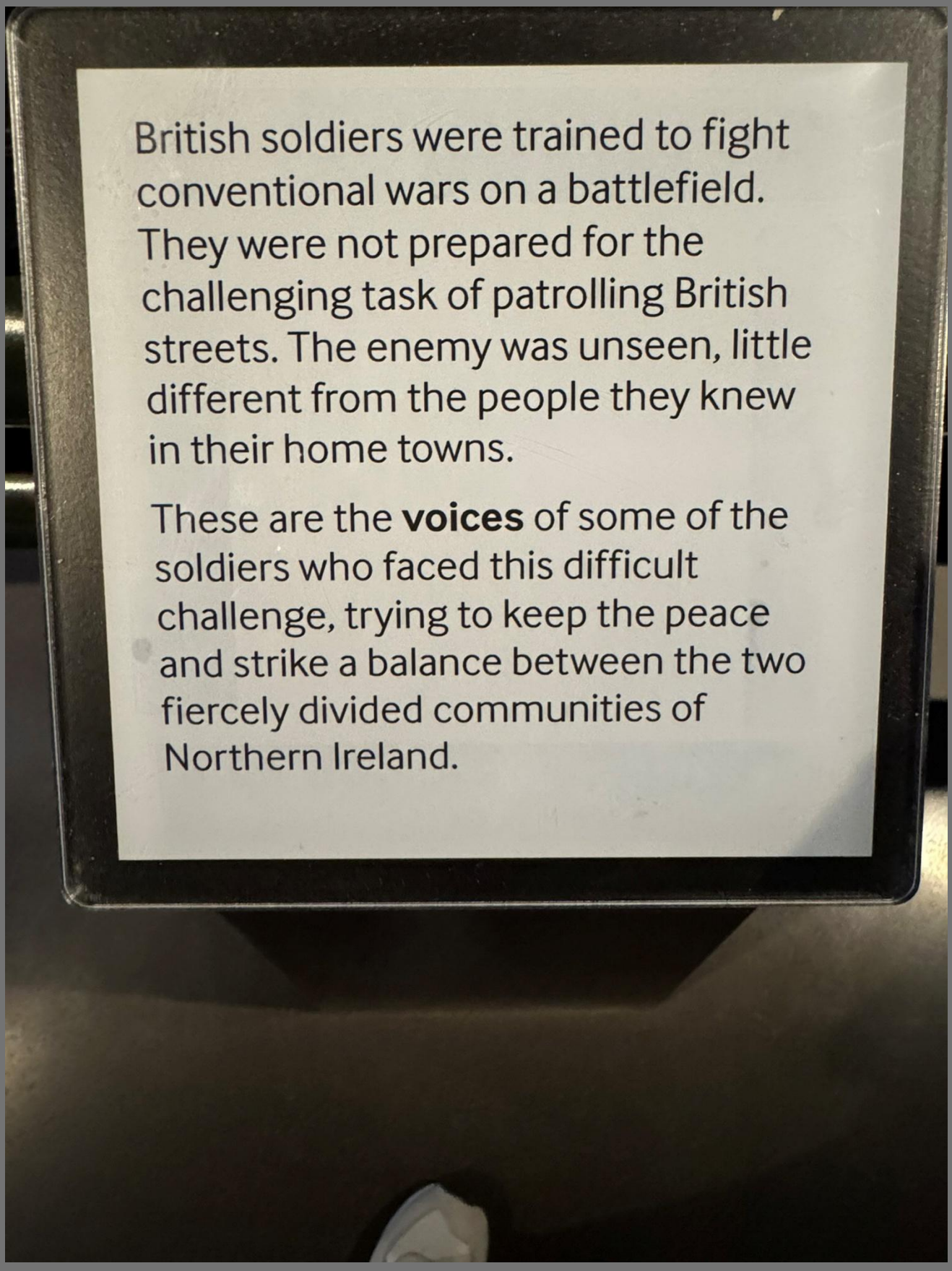


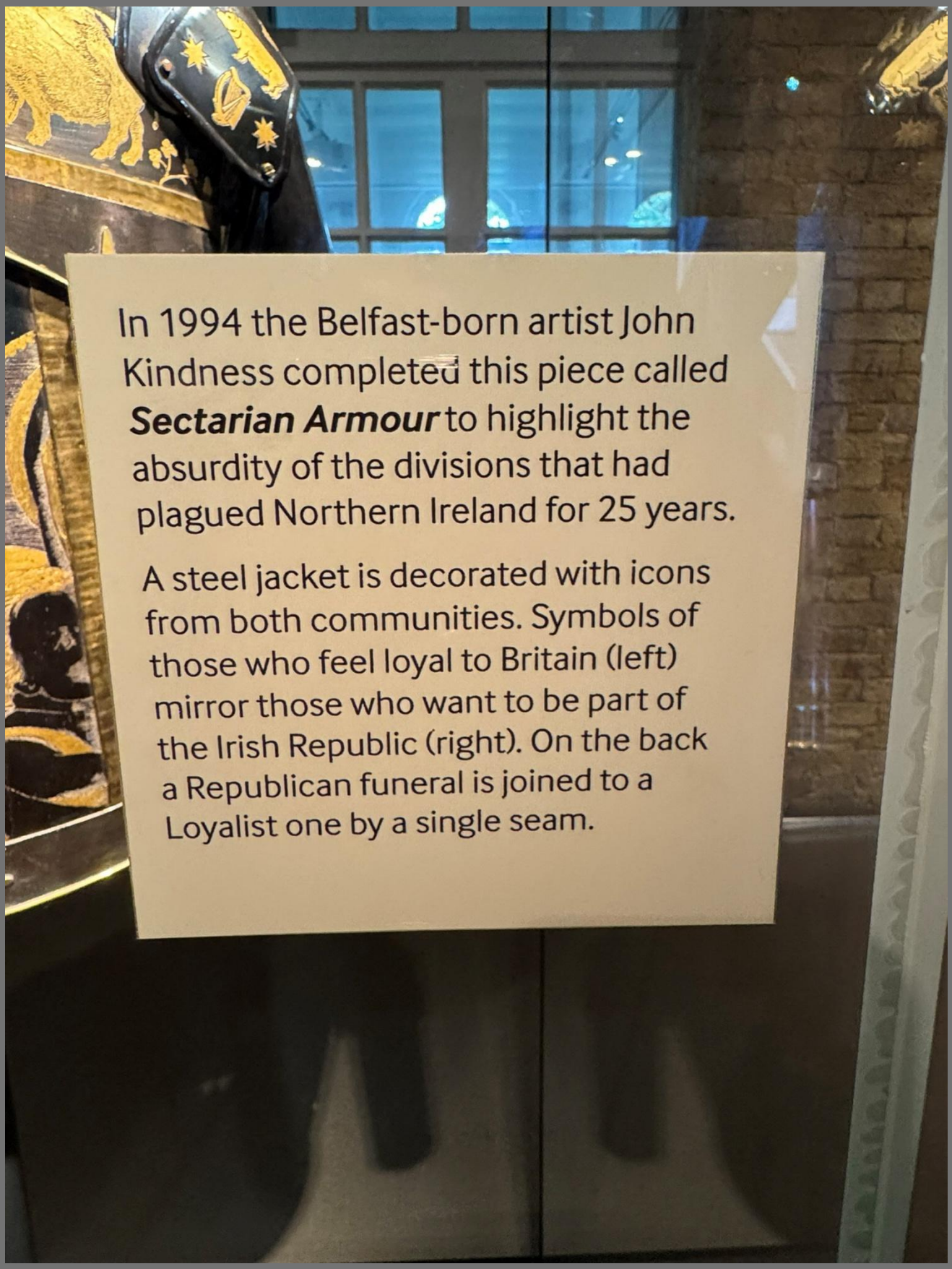

RED



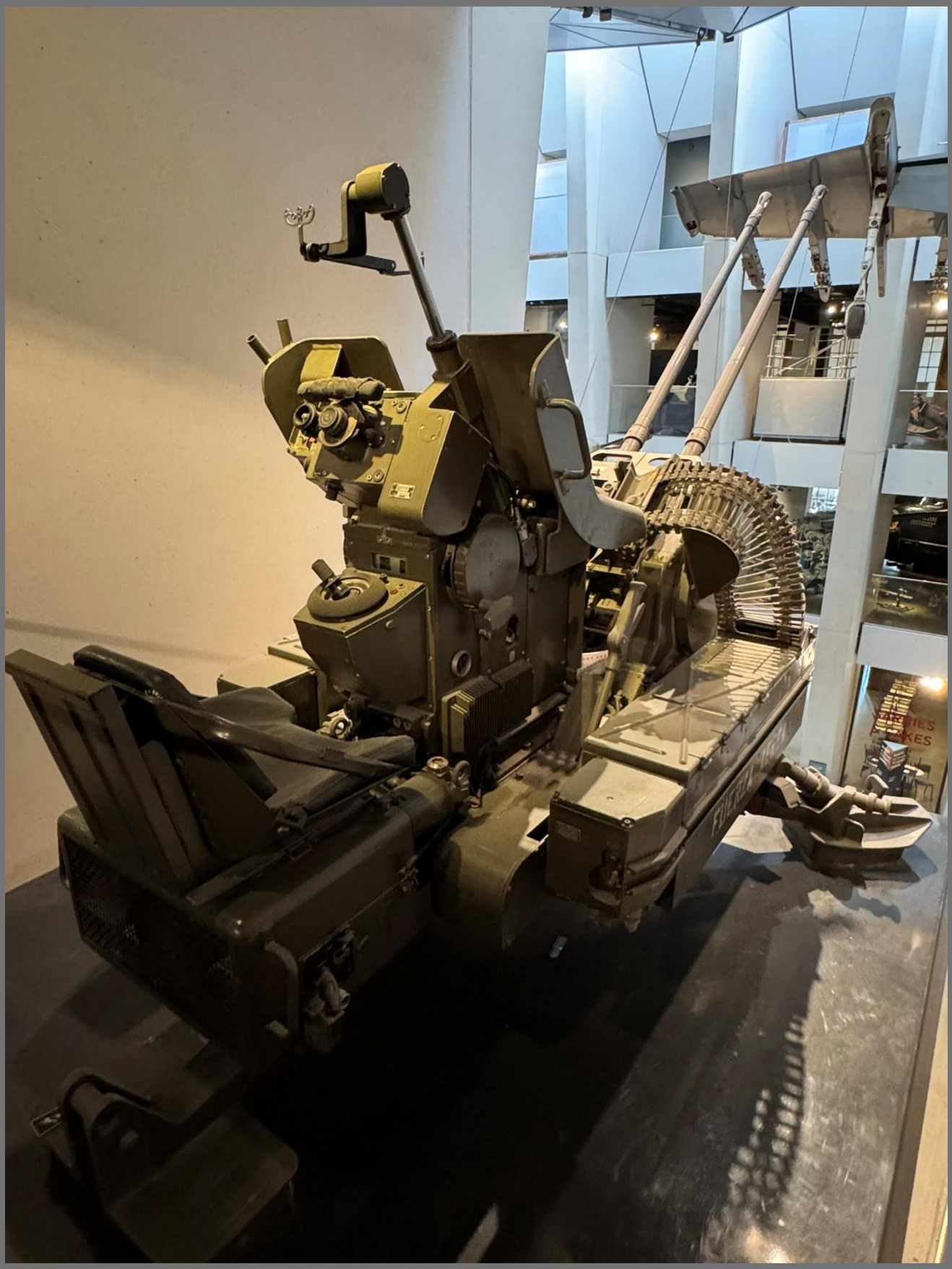

BRITISH RED CROSS




British soldiers were trained to fight conventional wars on a battlefield. They were not prepared for the challenging task of patrolling British streets. The enemy was unseen, little different from the people they knew in their home towns.
These are the **voices** of some of the soldiers who faced this difficult challenge, trying to keep the peace and strike a balance between the two fiercely divided communities of Northern Ireland.

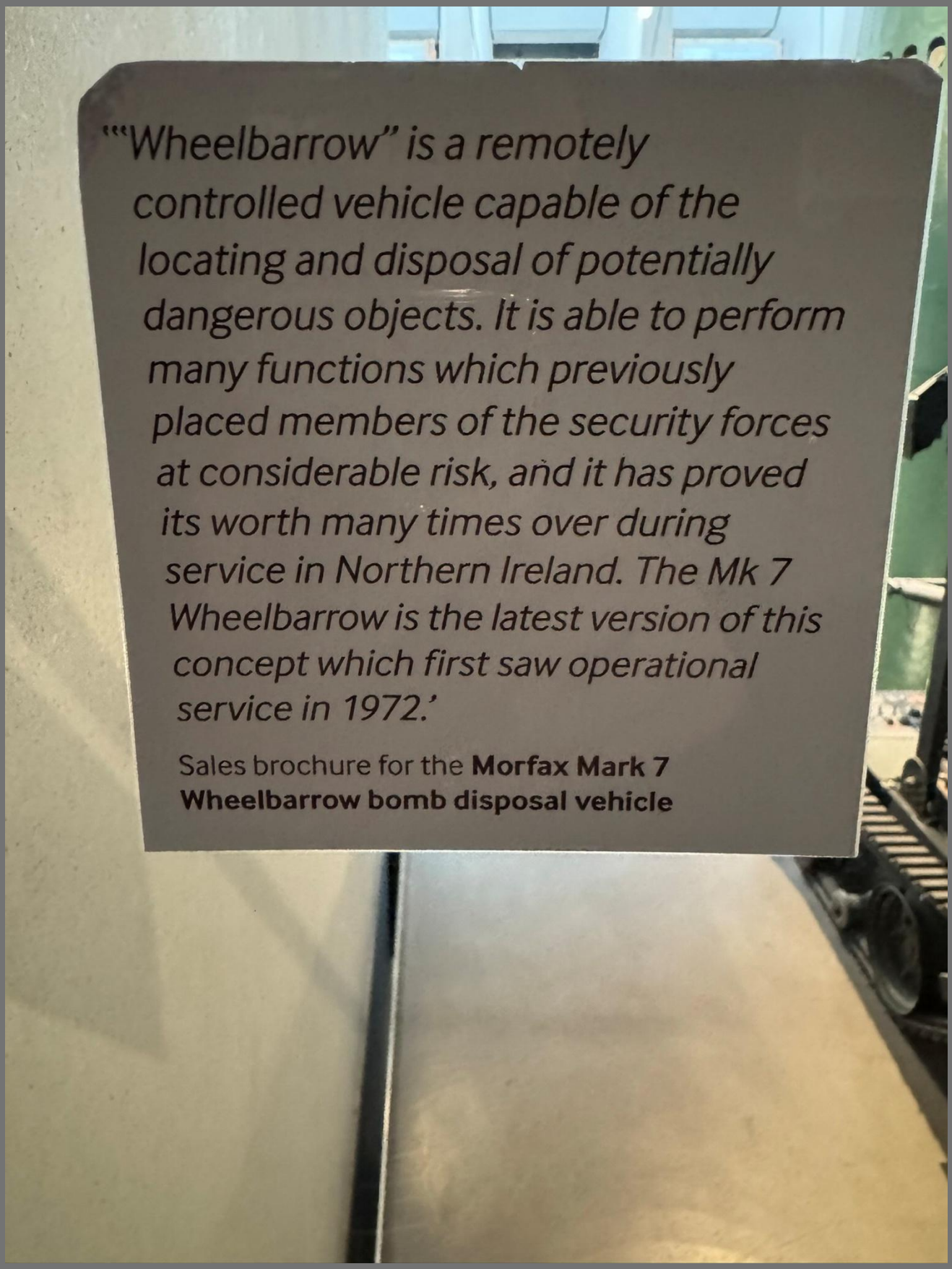

In 1994 the Belfast-born artist John Kindness completed this piece called ***Sectarian Armour*** to highlight the absurdity of the divisions that had plagued Northern Ireland for 25 years.
A steel jacket is decorated with icons from both communities. Symbols of those who feel loyal to Britain (left) mirror those who want to be part of the Irish Republic (right). On the back a Republican funeral is joined to a Loyalist one by a single seam.

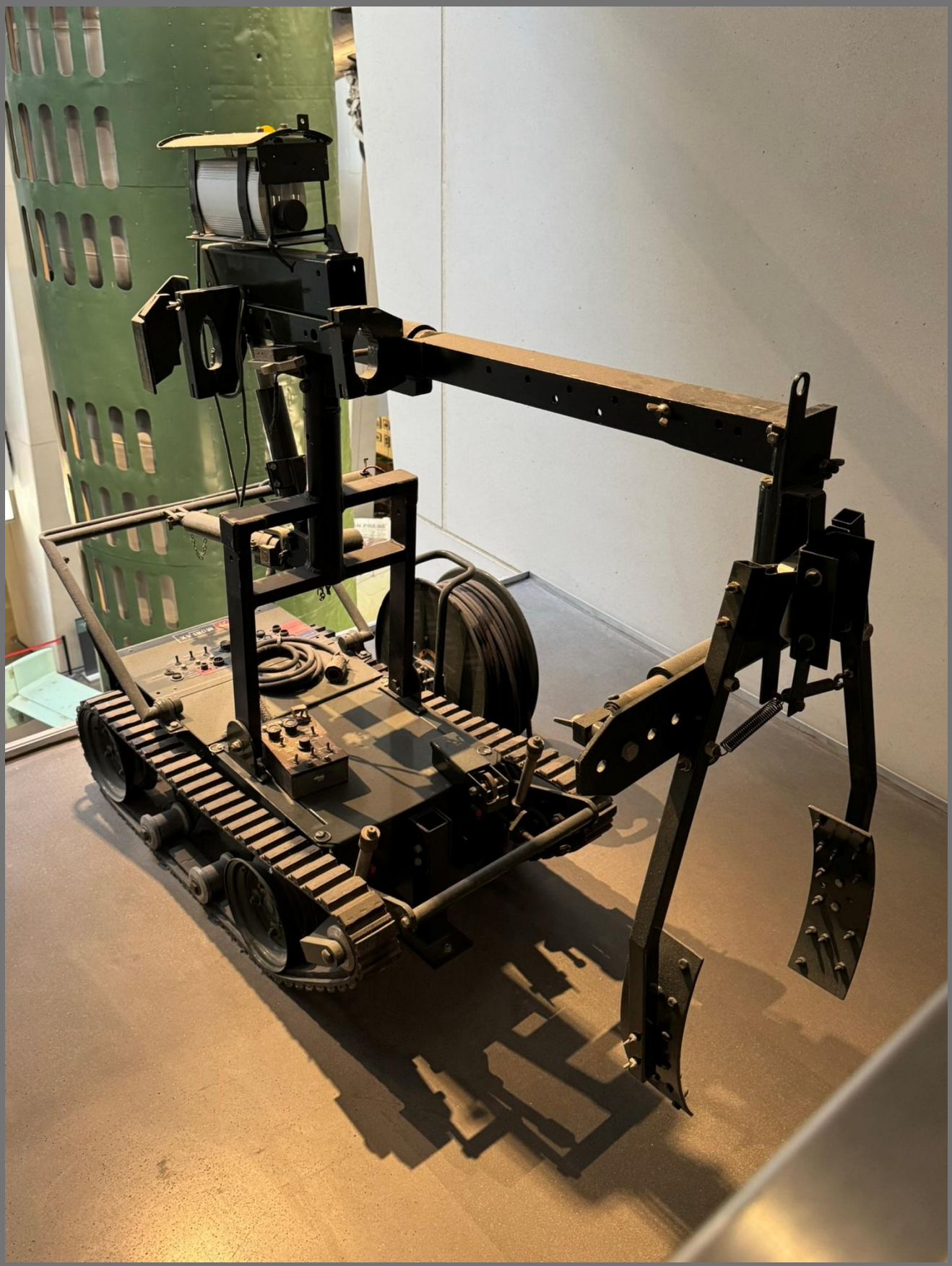


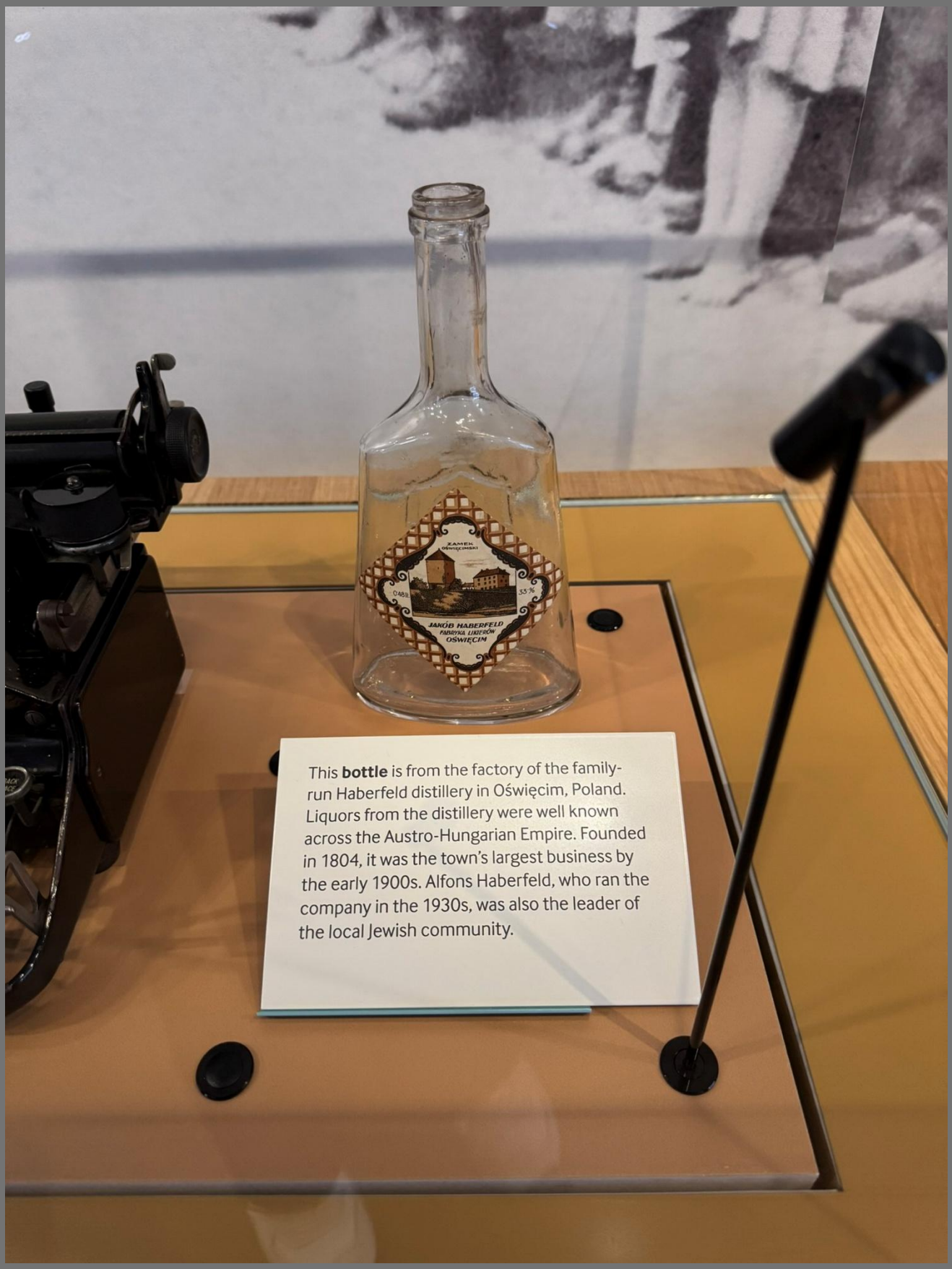



Blavatnik
Art, Film and
otography
Galleries
LEVEL 3
CAFE
TV
PRESS




'"Wheelbarrow" is a remotely controlled vehicle capable of the locating and disposal of potentially dangerous objects. It is able to perform many functions which previously placed members of the security forces at considerable risk, and it has proved its worth many times over during service in Northern Ireland. The Mk 7 Wheelbarrow is the latest version of this concept which first saw operational service in 1972.'
Sales brochure for the **Morfax Mark 7 Wheelbarrow bomb disposal vehicle**





This **bottle** is from the factory of the family-run Haberfeld distillery in Oświęcim, Poland. Liquors from the distillery were well known across the Austro-Hungarian Empire. Founded in 1804, it was the town's largest business by the early 1900s. Alfons Haberfeld, who ran the company in the 1930s, was also the leader of the local Jewish community.


BACK SPACE


BOMS