

Innovation THROUGH THE Ages

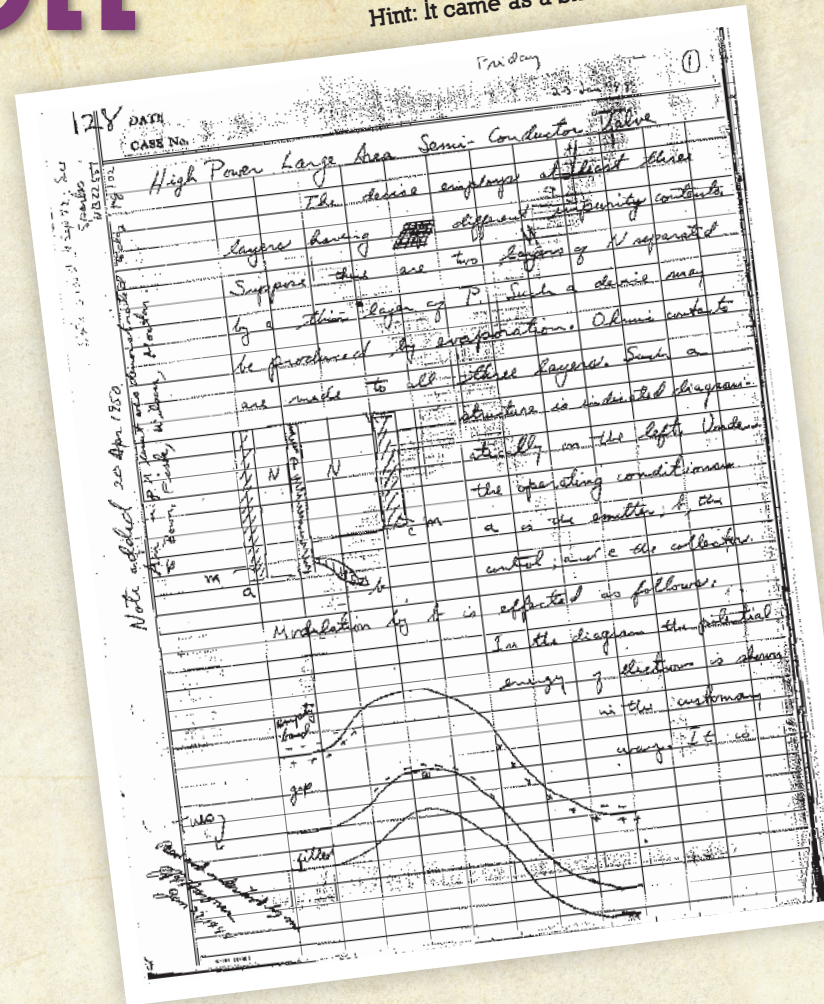
EXPERIMENT #4:
Hint: It came as a Shockley.

Discoveries in the physical sciences have a long history of fueling innovation. They often lead to new devices and new inventions that even the discoverers could not have imagined.

Working with the Emilio Segrè Visual Archives at the American Center for Physics in College Park, Maryland, we dug up images from classic physics experiments conducted over the last two centuries. We also found some swell pics of technological advances ranging from police radar guns to space telescopes.

Can you match each experiment (on this page) to the innovations it made possible (on the next page)?

See the bottom of the next page for the answers.



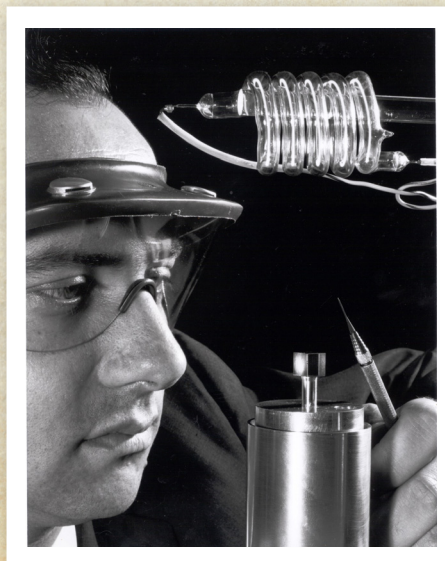
EXPERIMENT #1:

Hint: He saw right through her.



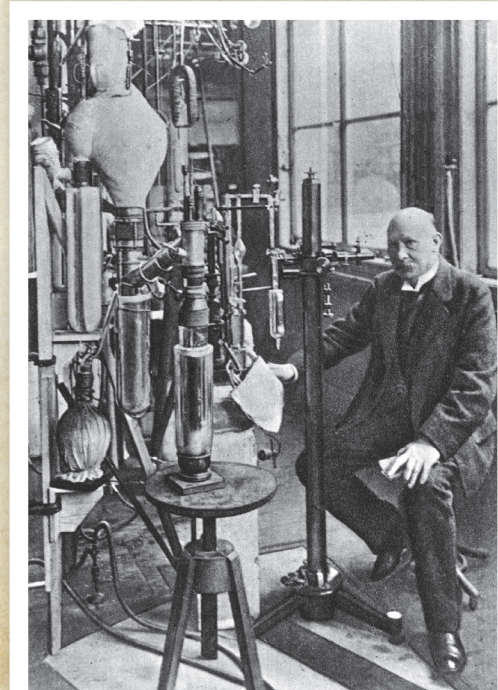
EXPERIMENT #2:

Hint: Red as a ruby, it was.



EXPERIMENT #3:

Hint: Resistance was futile.





a E. Brun



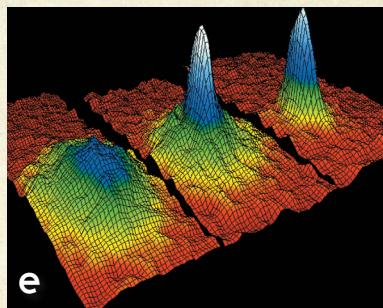
b Alex Needham



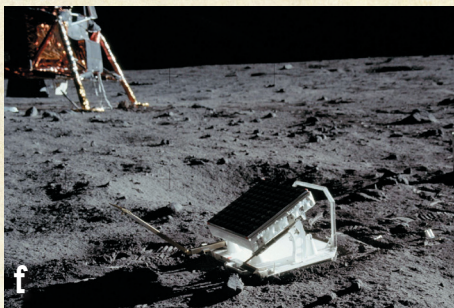
c gallica.bnf.fr / Bibliothèque nationale de France



d © Plamen Agov · studiolemontree.com



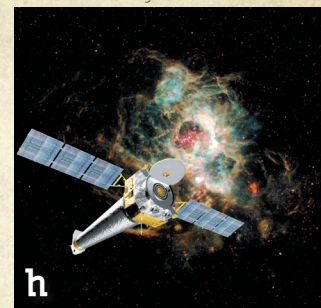
e NIST/JILA/CU-Boulder



f NASA



g Fábio Pozzebom/ABr



h NASA

Answers

EXPERIMENT #1:

Wilhelm Röntgen, discoverer of X-rays, took this radiograph of his wife's left hand, setting the stage for a) recent scans of Roman scrolls burned by the Vesuvius eruption revealing what appear to be letters; c) Marie Curie's "petite Curie," a mobile X-ray unit used on the front lines of World War I; and h) the Chandra X-ray Observatory, which provided the first X-ray images of many stars, supernovae, and black holes.

EXPERIMENT #2:

Theodore Maiman's ruby laser made possible, among other things, e) the creation of Bose-Einstein condensate through laser cooling; and g) the radar guns used by police to catch speeders f) the photoreflectors NASA bounced lasers off of to measure the distance to the Moon.

EXPERIMENT #3:

Heike Kamerlingh Onnes (shown here in his lab) demonstrated that mercury is a superconductor, opening the door to the creation of b) maglev trains such as this one shown in front of the Shanghai airport; d) cell phone towers, which use high temperature superconductors to boost bandwidth; and e) Bose-Einstein condensate, a phase of matter in which separate atoms function as a single quantum entities.

EXPERIMENT #4:

William Shockley's early sketches illustrate the transistor, developed with John Bardeen and Walter Brattain, an invention so fundamental to modern life that it plays a role in every innovation shown here!