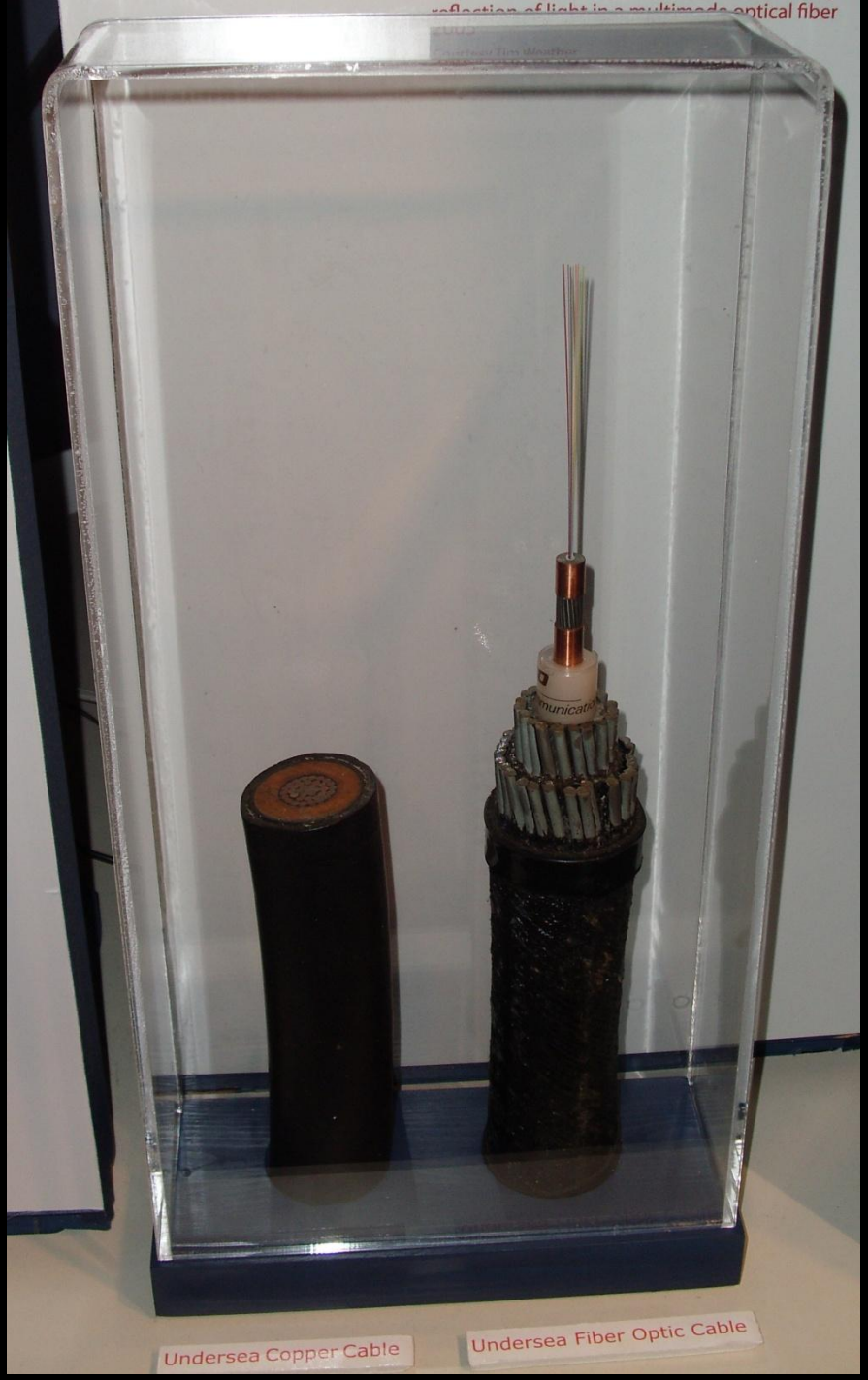
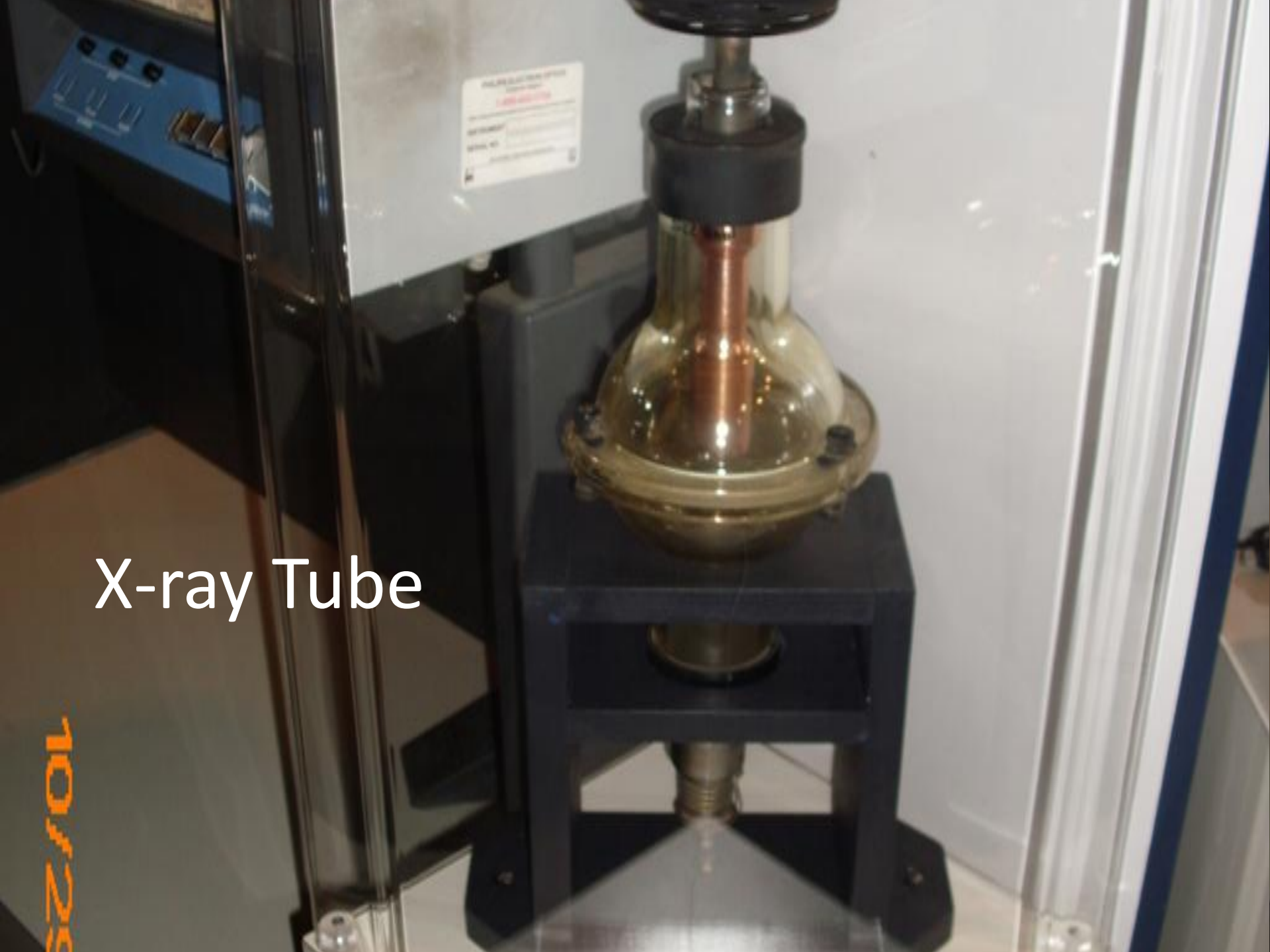
Steps Of Product

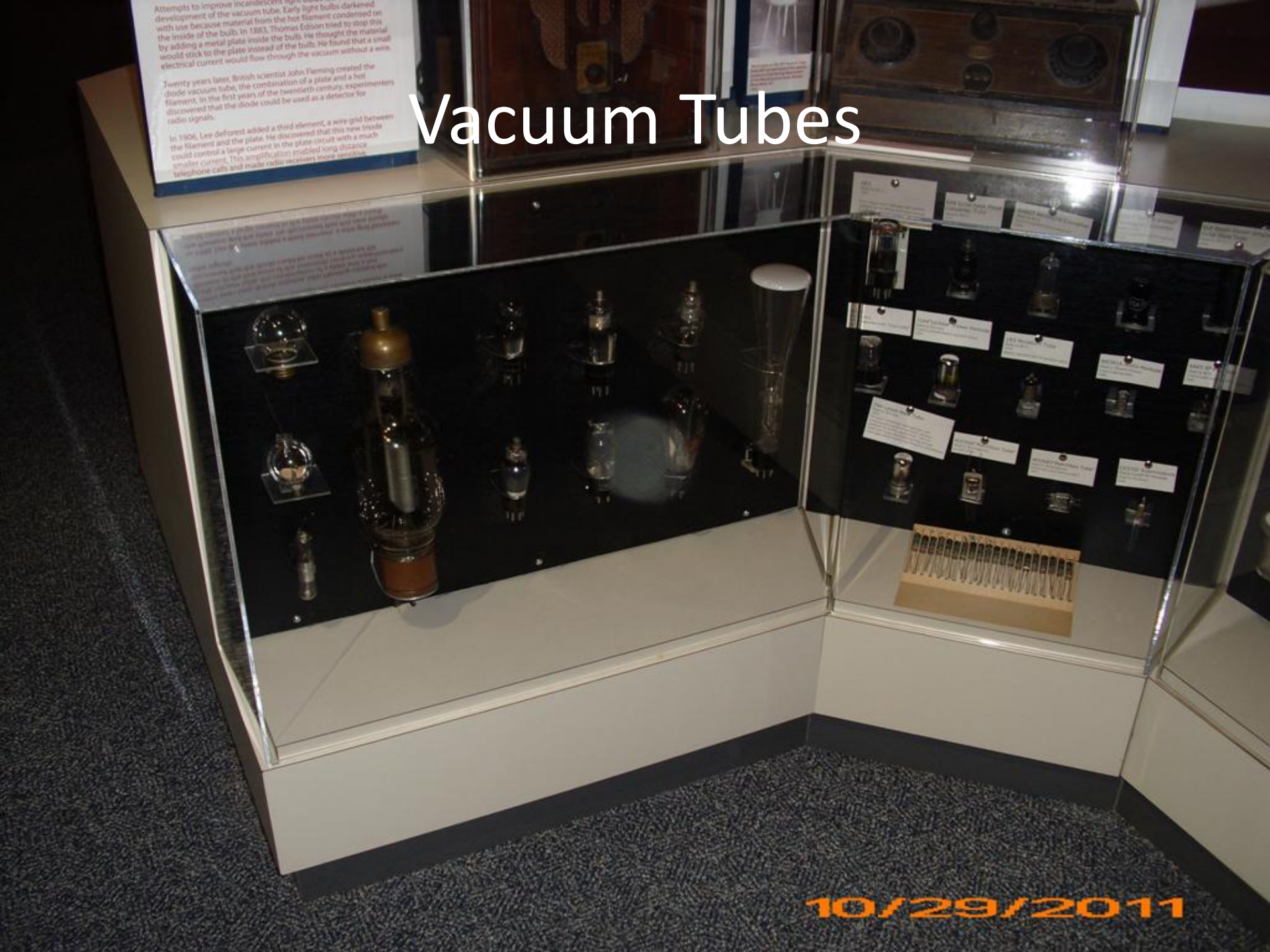
- Idea of Product
  - Need
  - Concept Development
  - Prototype Development
  - Production
  - Legal & Support
  - Product Delivery

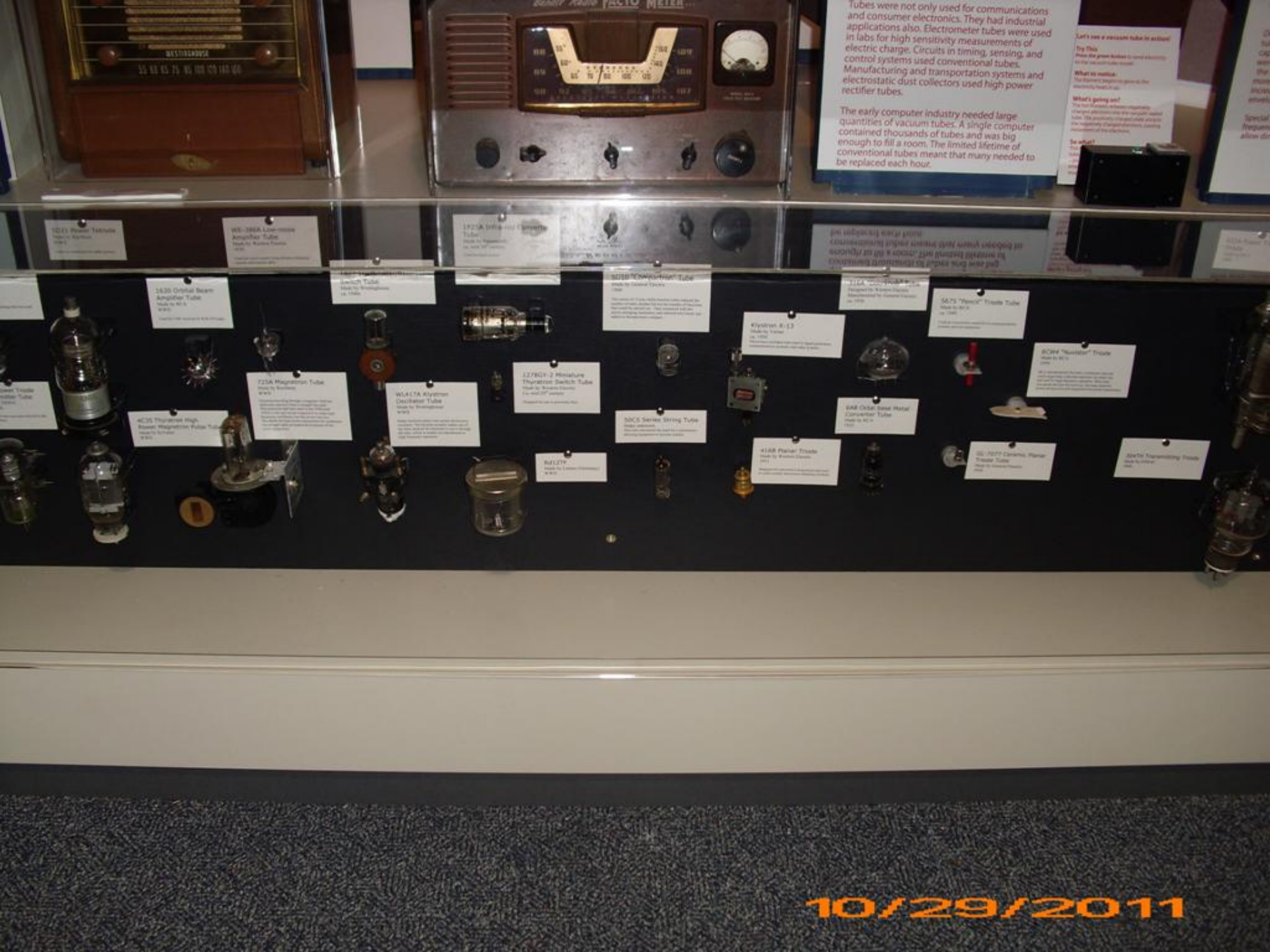
Piece of Undersea Fiber Optic Cable



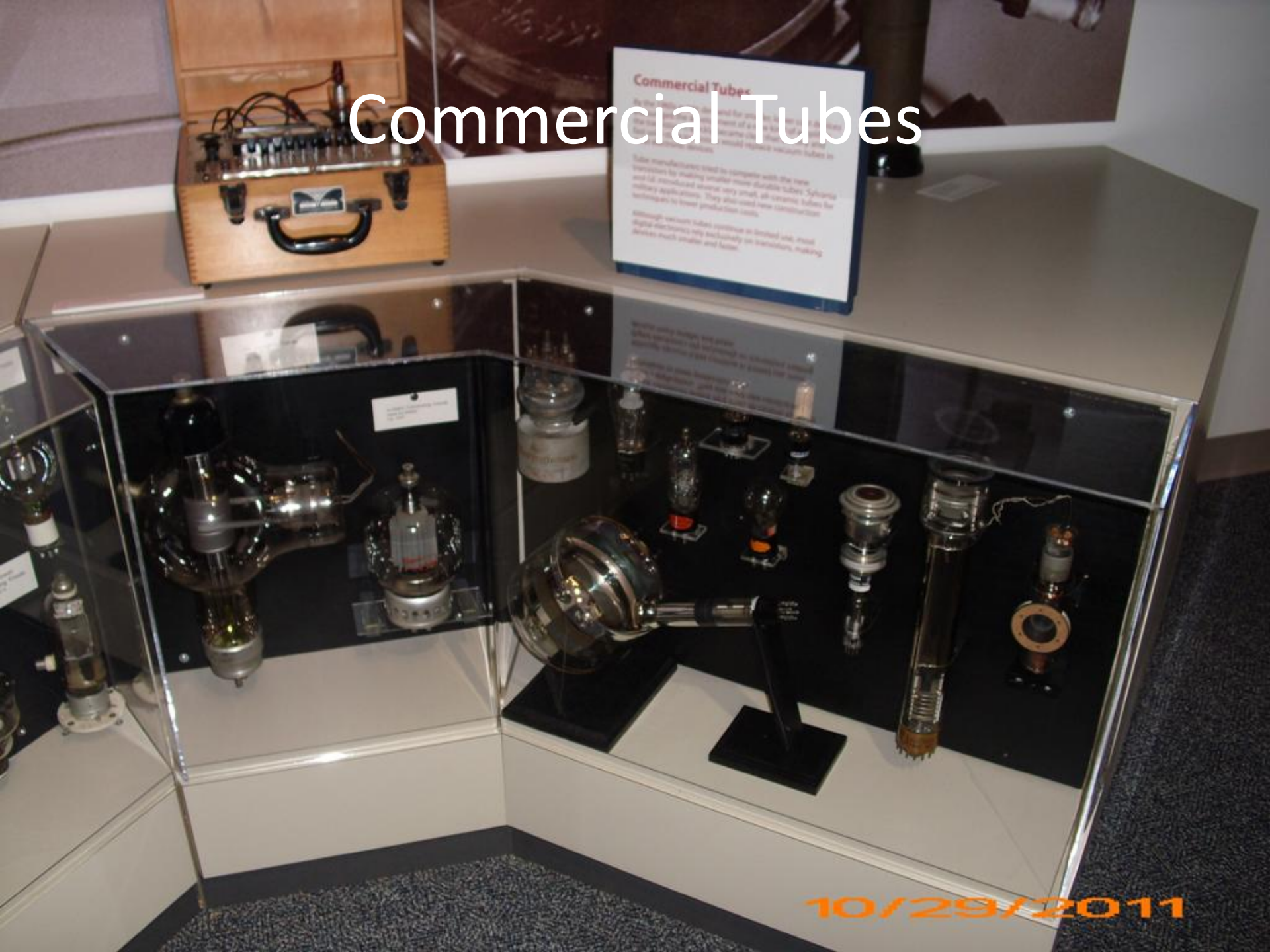

X-ray Tube

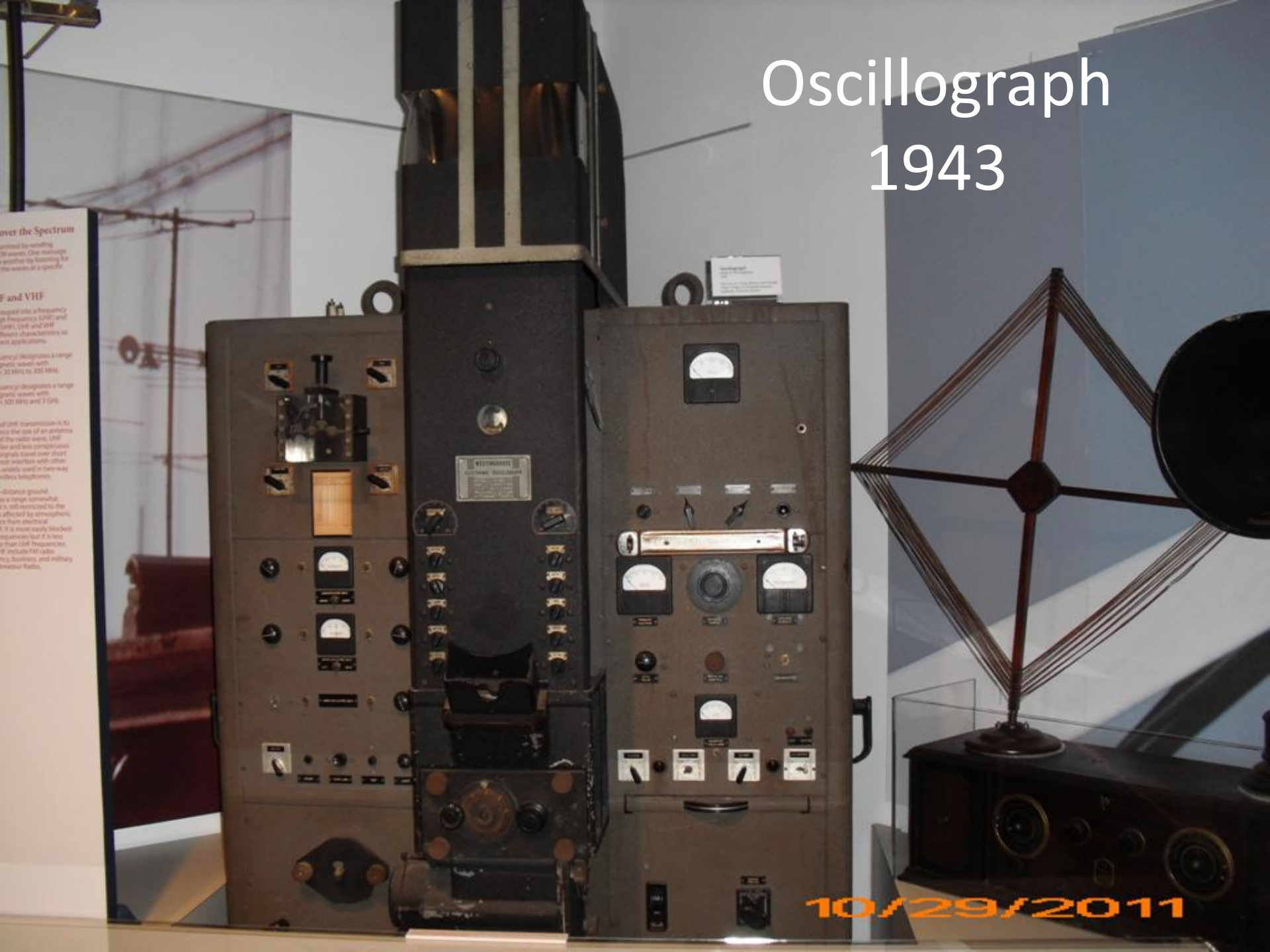
Vacuum Tubes

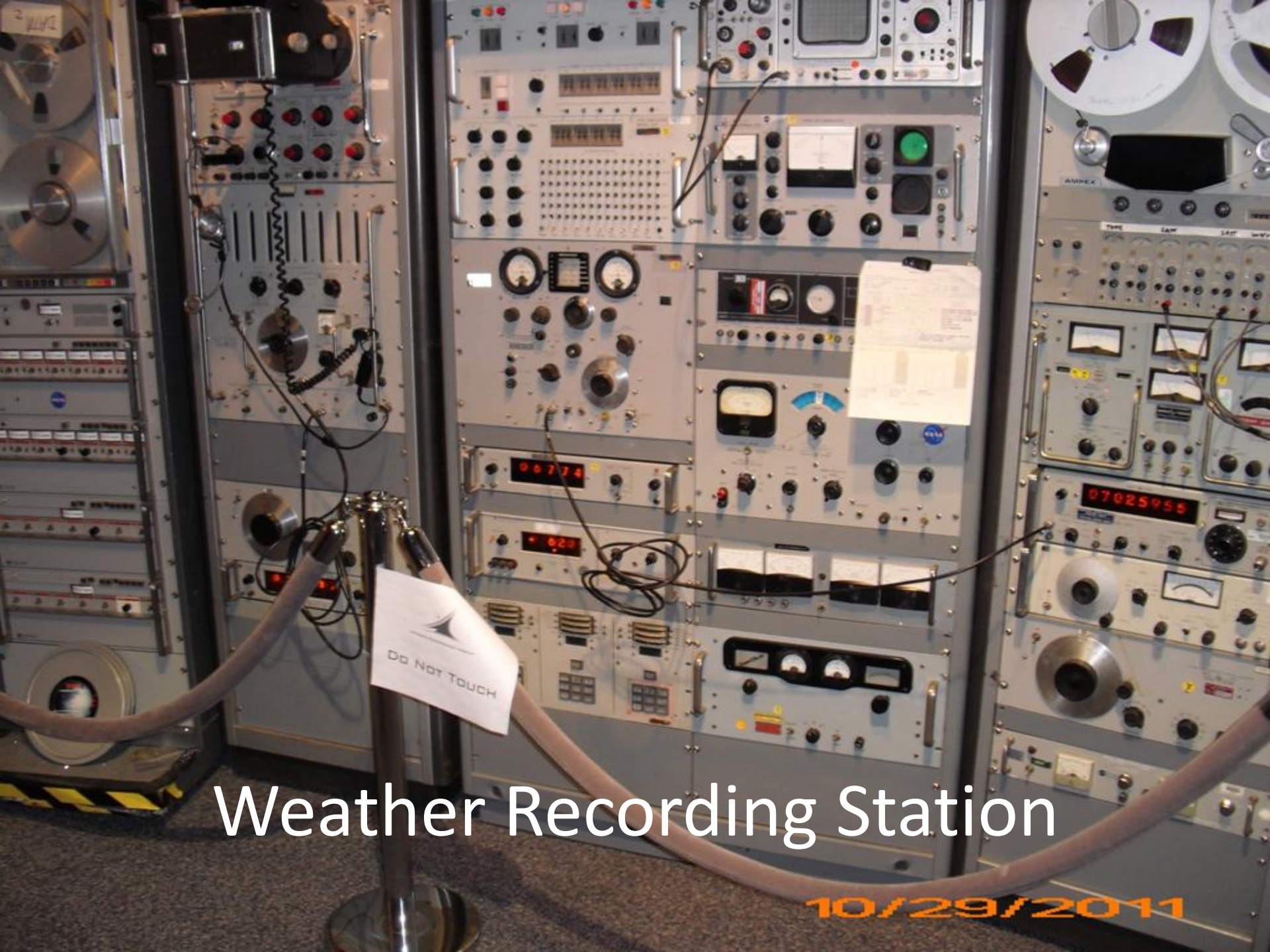



Tubes were not only used for communications and consumer electronics. They had industrial applications also. Electrometer tubes were used in labs for high sensitivity measurements of electric charge. Circuits in timing, sensing, and control systems used conventional tubes. Manufacturing and transportation systems and electrostatic dust collectors used high power rectifier tubes.
The early computer industry needed large quantities of vacuum tubes. A single computer contained thousands of tubes and was big enough to fill a room. The limited lifetime of conventional tubes meant that many needed to be replaced each hour.
10/29/2011

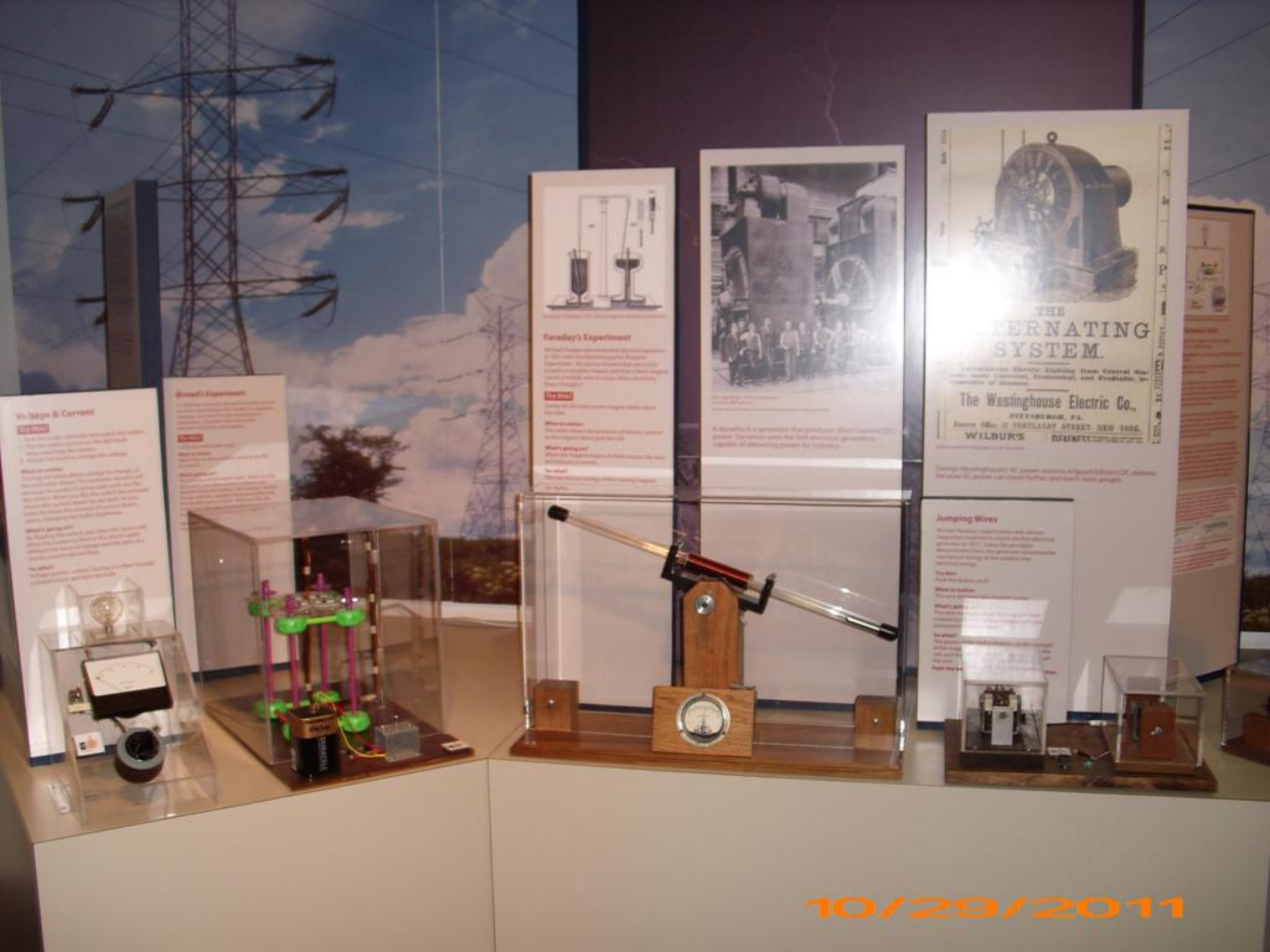
Commercial Tubes

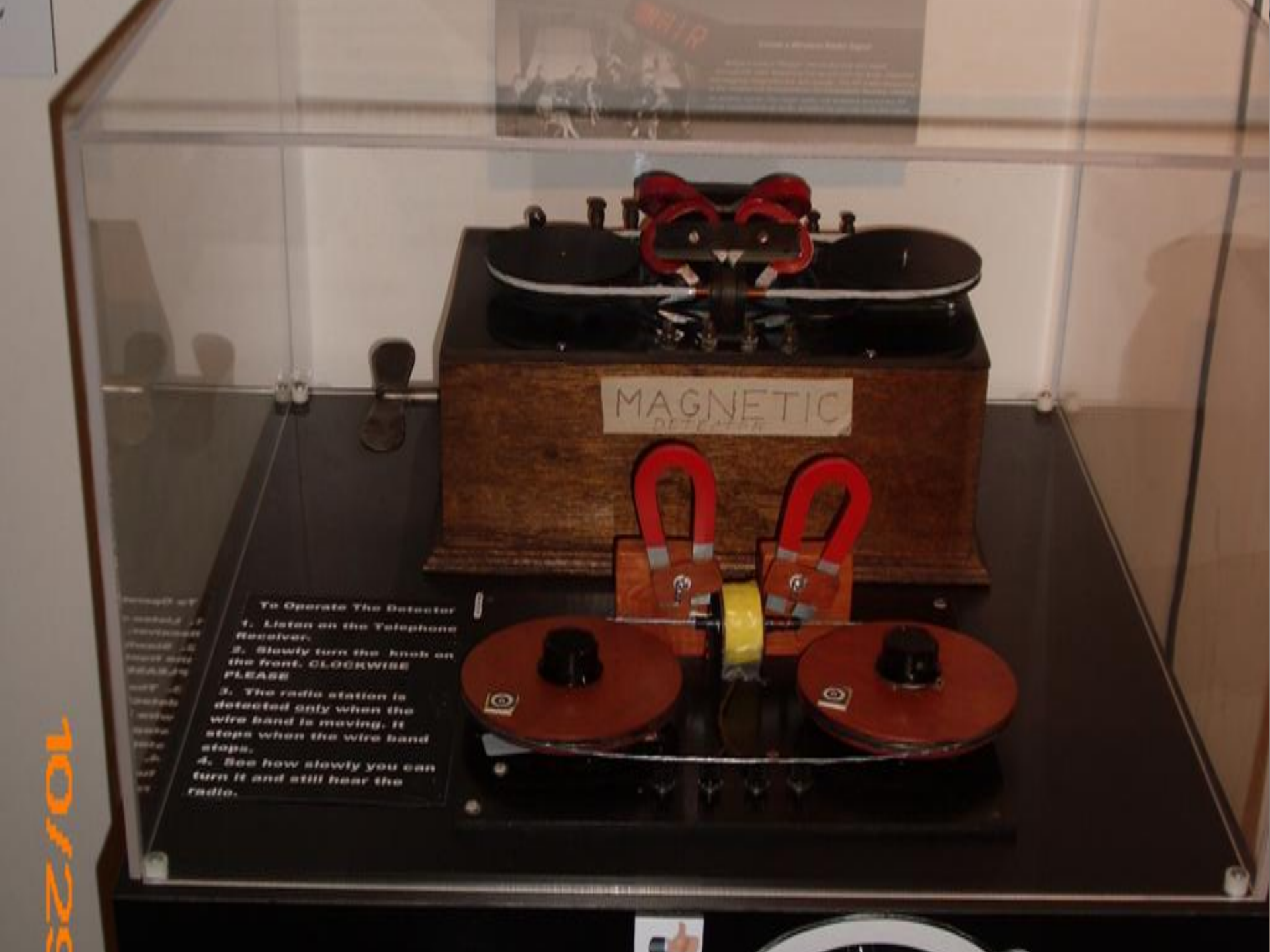


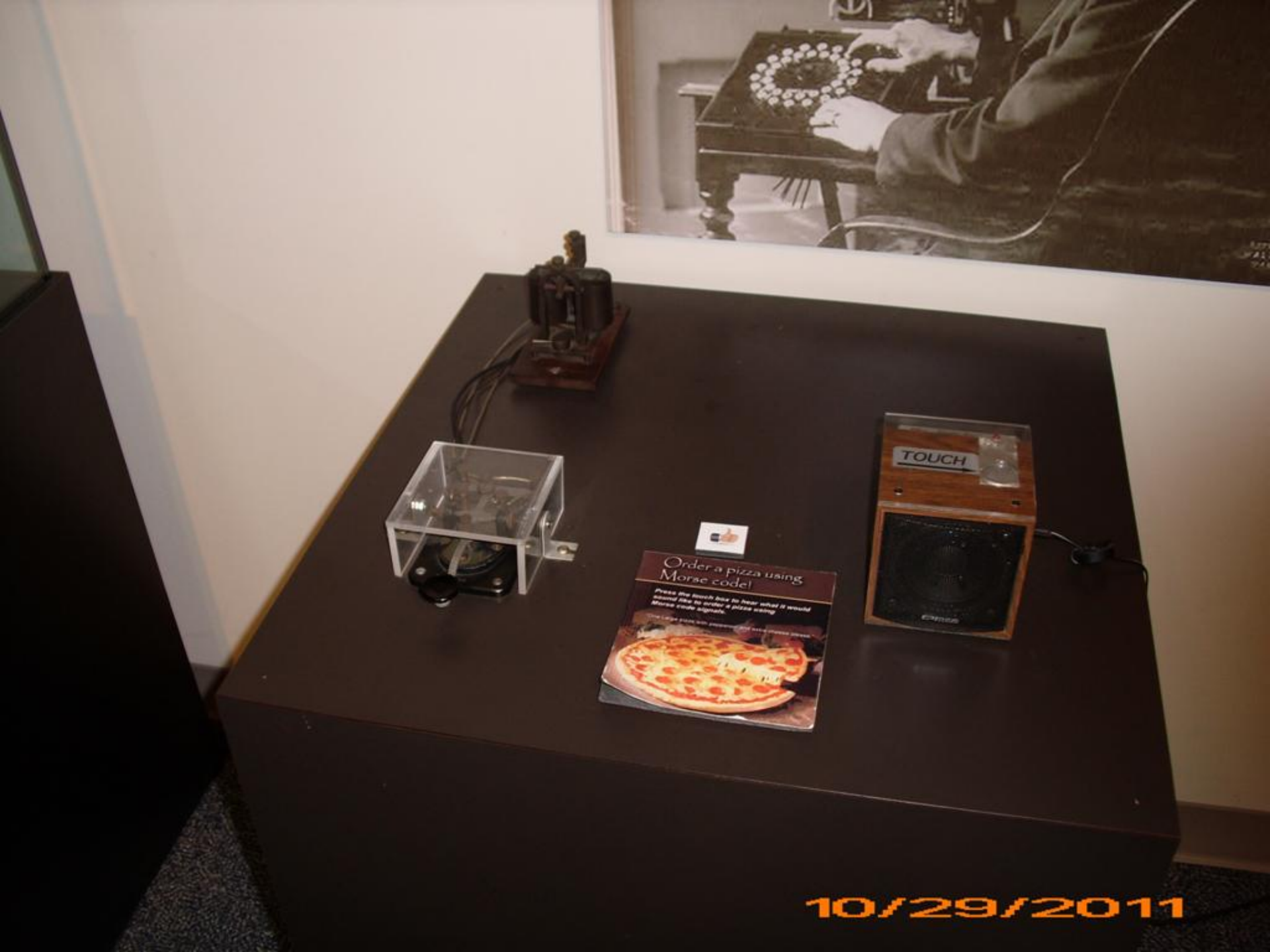

Oscillograph
1943
10/29/2011

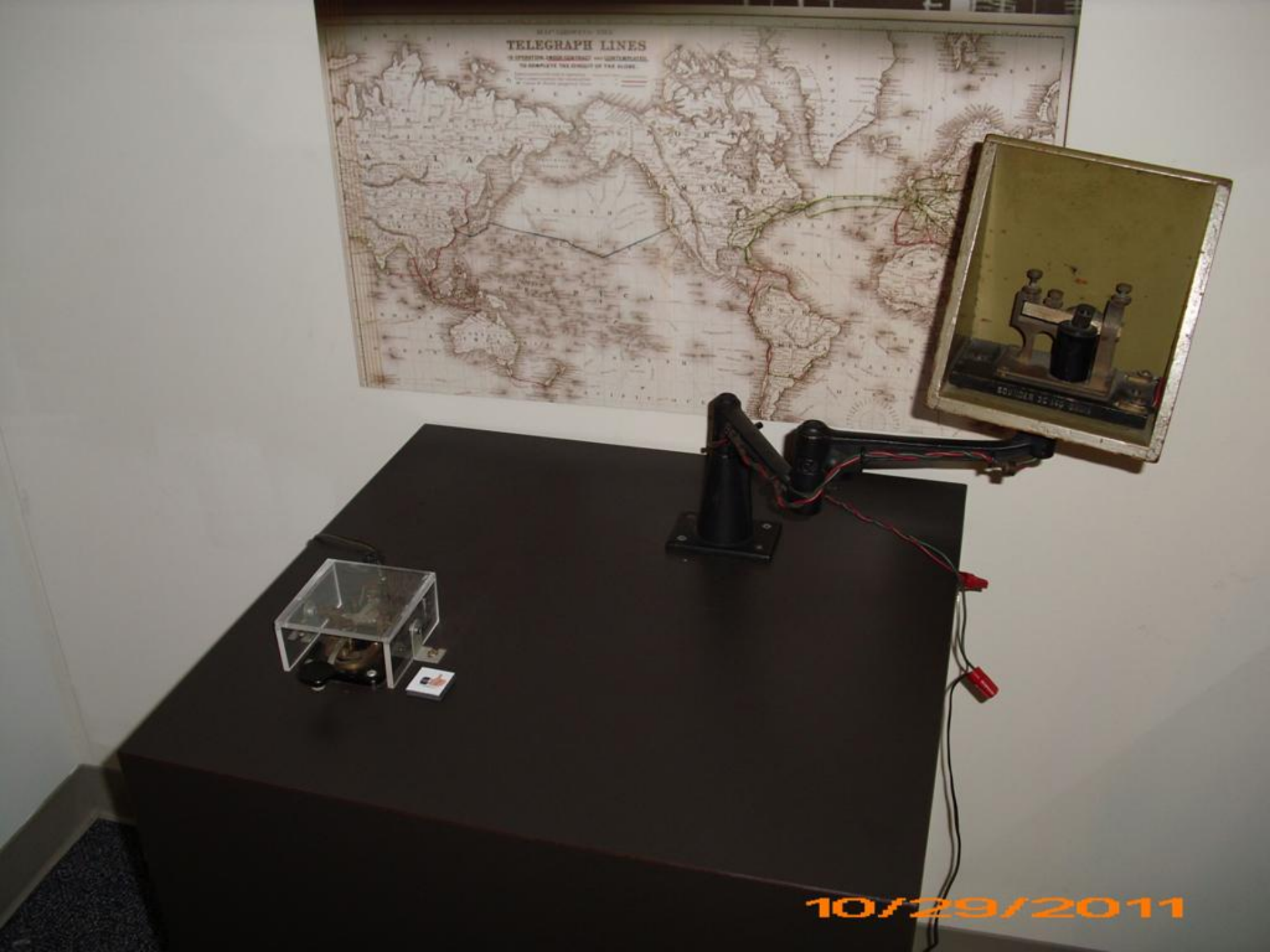


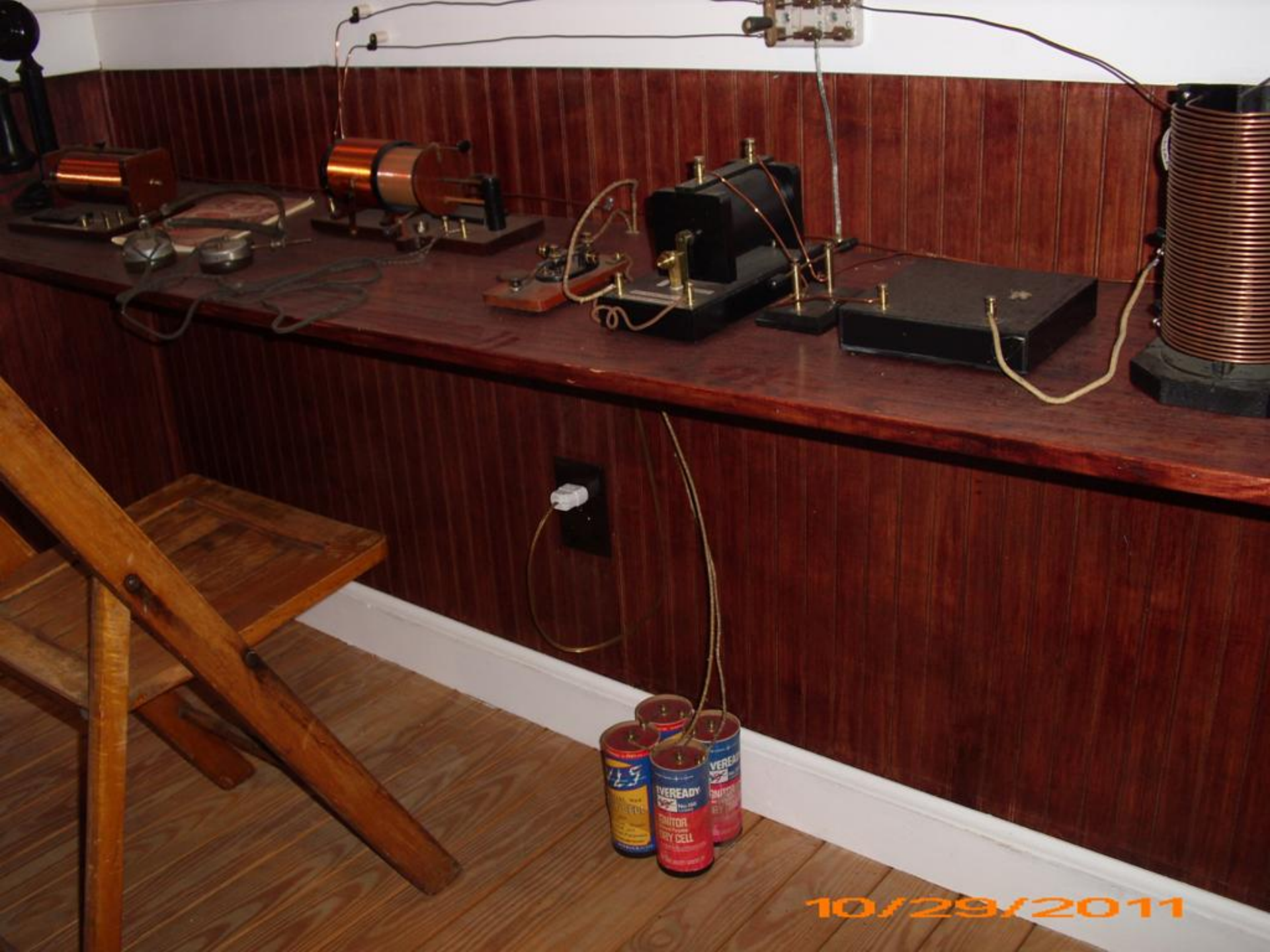
Weather Recording Station

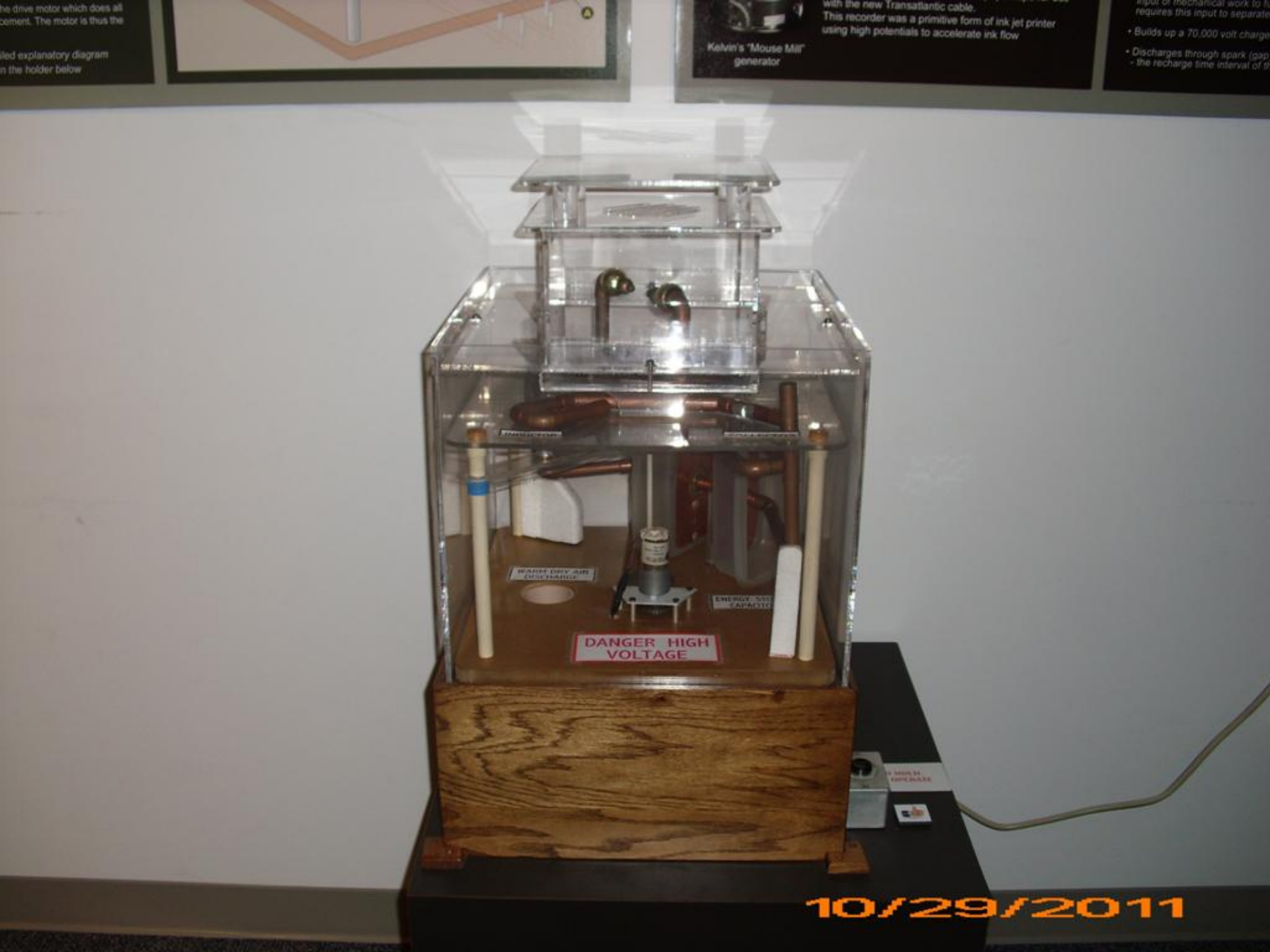

Faraday's Experiment
THE
ERNATING
SYSTEM.
The Westinghouse Electric Co.,
WILBUR'S
Jumping Wires
10/29/2011


MAGNETIC
To Operate The Detector
1. Listen on the Telephone Receiver.
2. Slowly turn the knob on the front. CLOCKWISE PLEASE
3. The radio station is detected only when the wire band is moving. It stops when the wire band stops.
4. See how slowly you can turn it and still hear the radio.


Order a pizza using Morse code!
TOUCH
10/29/2011


TELEGRAPH LINES
10/29/2011


EVEREADY
10/29/2011


Kelvin's "Mouse Mill" generator
with the new Transatlantic cable.
This recorder was a primitive form of ink jet printer
using high potentials to accelerate ink flow
DANGER HIGH VOLTAGE
10/29/2011

How It Works

These 3 Principles are at Work in the Following Sequence of Operation

- "Induction" of electrostatic charges on a conductor
- Separation of opposite charges to achieve high potentials
- Charge transport and placement on another Conductor

1. Drive Motor **A** spins insulating rotor disk **B** which carries charge transport rods **C**.
2. The rotation brings each rod under the influence of inductor electrode **D** which carries stray (assume negative) electrical charges from the environment.
3. When neutralizer brush **E** makes momementary contact with the rod, the negative charge on inductor **D** attracts positive charges to the rod - from grounded neutralizer bar **F**.
4. As the rod moves on from brush **E**, it carries an "excess" positive charge. This is an induced charge, and the process is called "induction".
5. As the rod moves away from inductor **D**, its packet of charge rises in potential during transport as mechanical work is done in separating charges of oppsite polarity (**D** negative, **C** positive).
6. When the rod contacts the brush of collector electrode **G** its positive charge packet is transferred raising **G**'s potential - and that of connected inductor **H**. This process of charge emplacement also entails mechanical work.
7. Now that inductor **H** has a positive charge it can induce "excess" negative charges on the rods passing beneath, and these are transported at elevated potential to collector **I** - which in turn reinforces the negative charge on connected inductor **D**.
8. The entire sequence is self sustaining and self reinforcing, with each half of the machine storing positive and negative charge respectively in its associated energy storage capacitor **J** - via conductors **K**.
9. As the cycle continues the capacitor charge potentials rise until the spark gap **L** breaks down at a potential difference of the order of 70,000 volts. Almost all of the stored energy is dumped into the spark and the entire process repeats.
10. There is no electrical input to the machine except for the drive motor which does all the mechanical work of charge separation and emplacement. The motor is thus the fundamental source of the stored energy and spark

For those who may be interested - a more detailed explanatory diagram and sequence of operation is available in the holder below