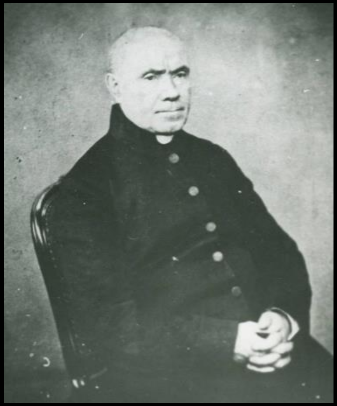
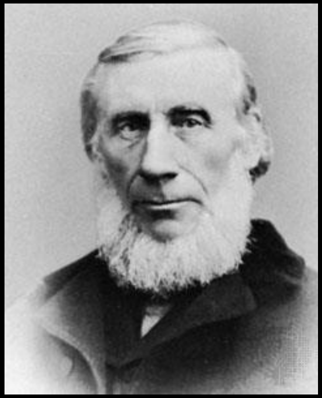
Irish Physics Heritage

Eoin Gill





Ollscoil Teicneolaíochta an Oirdheiscirt
SETU
South East Technological University

CALMAST
STEM ENGAGEMENT CENTRE

Some Irish Physicists

Boyle	1627	1691
Callan	1799	1864
Hamilton	1805	1865
Boole	1815	1864
Stokes	1819	1903
Tyndall	1820	1868
Marconi	1874	1937
Walton	1903	1995
Bell Burnell	1943	

ROBERT BOYLE

1627 - 1691

Father of Modern Chemistry”

Proponent of Experimental Philosophy

Founding fellow of the Royal Society

Pressures and Gases & Boyle’s Law

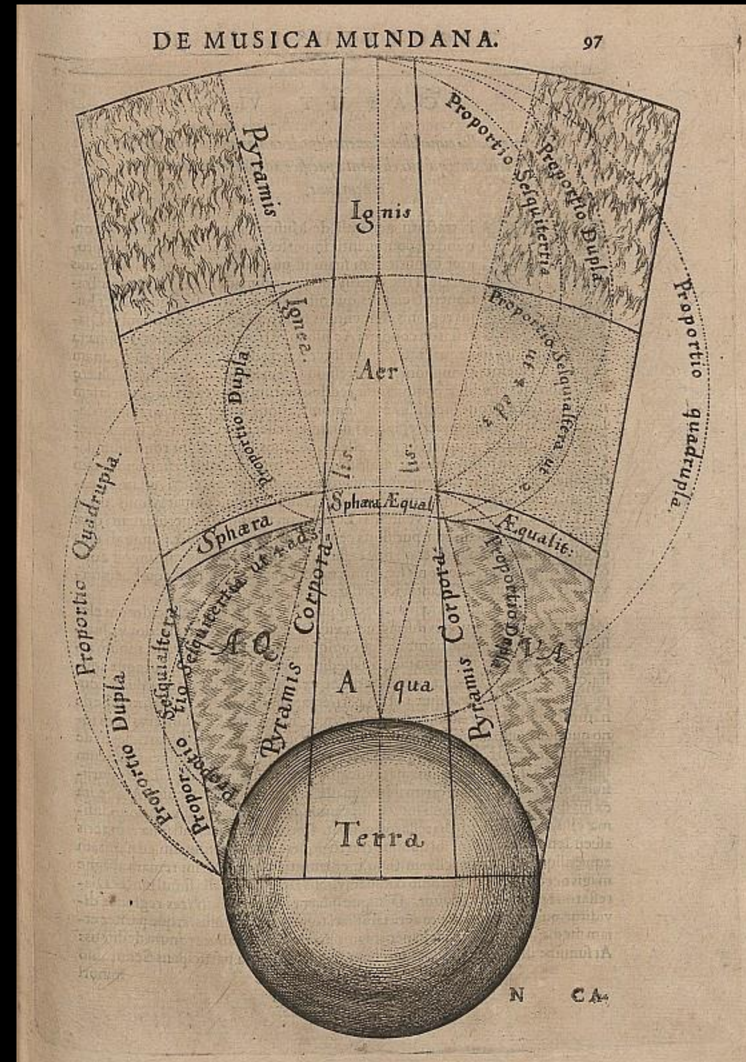
Leading scientist of the time

Fire

Air

Water

Earth



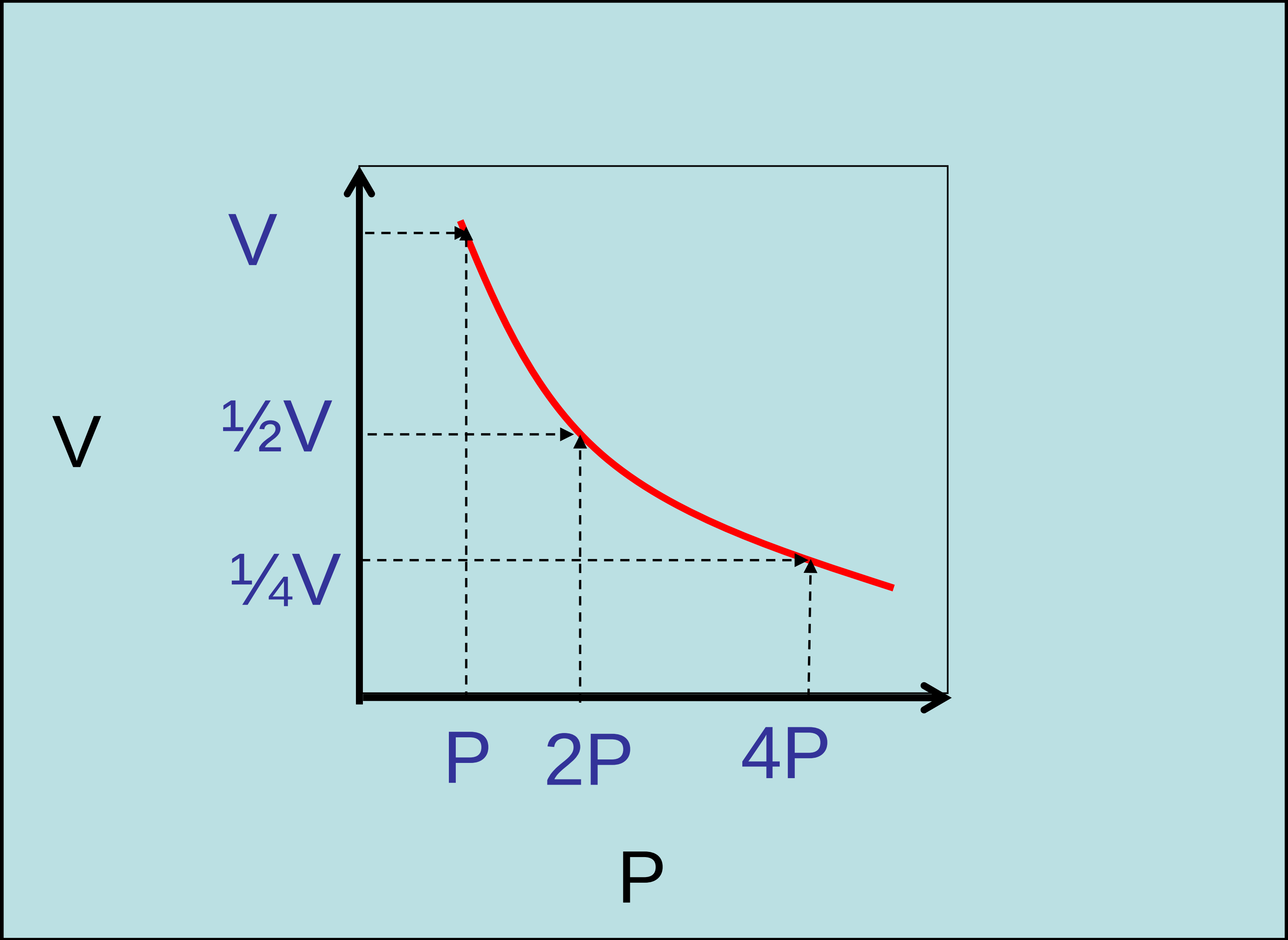
Quelle: Deutsche Fotothek

Vacuum Pump

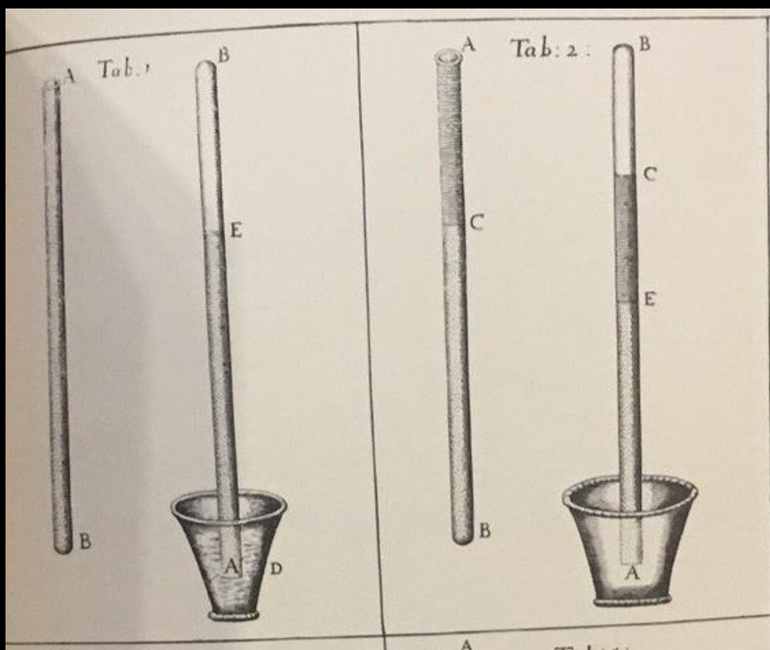
with Robert Hooke

Boyles Law

LENNOX
EDUCATIONAL


V
V
½V
¼V
P
2P
4P
P

Henry Power
Richard Townley



That you may at one glance behold all the varieties of theſe Dilatations of Ayr, and height of the *Mercurial* Standard, I have ſuppoſed the line A B to repreſent all the Tubes. A E ſtill repreſents the Ayr left in them, A D the Ayr dilated, B D the Quickſilver.

In the long Tube.

	At the top of the Hill.	*At the bottom of it at* Barlow.	
A E	50|15	50|15	Equal parts
A D	84|75	83|8	of Spaces,
B D	11|26	11|78	Inches.

In the leſſer Tube.

	At the top of the Hill.	*At* Barlow *with Ayr.*	*At* Barlow *with Valley-Ayr.*
A E	9	9	9
A D	17|8	17|35	17|58
B D	13|86	14|31	14|02

Now before we paſs to any further Experiment, we think it fit to make and denominate ſeveral conſiderable Spaces of the Tube in the *Mercurial* Experiments, which will avoid both confuſion and multiplicity of terms for the future.

Let A B be the Tube in which Quickſilver (in caſe it were totally void of Ayr) would ſtand in a perpen- dicular

A table of the condensation of the air.

A	A	B	C (Added to 22 1/8 makes)	D	E
48	12	00		29 2/16	29 2/16
46	11 1/2	01 7/16		30 9/16	33 6/16
44	11	02 13/16		31 15/16	31 12/16
42	10 1/2	04 6/16		33 8/16	33 1/7
40	10	06 3/16		35 5/16	35 - -
38	9 1/2	07 14/16		37 - -	36 15/19
36	9	10 2/16		39 5/16	38 7/8
34	8 1/2	12 8/16		41 10/16	41 2/17
32	8	15 1/16		44 3/16	43 11/16
30	7 1/2	17 15/16		47 1/16	46 3/5
28	7	21 3/16		50 5/16	50 - -
26	6 1/2	25 3/16		54 5/16	53 10/13
24	6	29 11/16		58 13/16	58 2/8
23	5 3/4	32 3/16		61 5/16	60 18/23
22	5 1/2	34 15/16		64 1/16	63 6/11
21	5 1/4	37 15/16		67 1/16	66 4/7
20	5	41 9/16		70 11/16	70 - -
19	4 3/4	45 - -		74 2/16	73 11/19
18	4 1/2	48 12/16		77 14/16	77 2/3
17	4 1/4	53 11/16		82 12/16	82 4/17
16	4	58 2/16		87 14/16	87 3/8
15	3 3/4	63 15/16		93 1/16	93 1/5
14	3 1/2	71 5/16		100 7/16	99 6/7
13	3 1/4	78 11/16		107 13/16	107 7/13
12	3	88 7/16		117 9/16	116 4/8

AA. The number of equal spaces in the shorter leg, that contained the same parcel of air diversly extended.

B. The height of the mercurial cylinder in the longer leg, that compressed the air into those dimensions.

C. The height of a mercurial cyllinder that counterbalanced the pressure of the atmosphere.

A table of the rarefaction of the air.

A	B	C (Subtracted from 29 3/4 leaves)	D	E
1	00 0/0		29 3/4	29 3/4
1 1/2	10 5/8		19 1/8	19 5/6
2	15 3/8		14 3/8	14 7/8
3	20 2/8		9 4/8	9 15/16
4	22 5/8		7 1/8	7 7/16
5	24 1/8		5 5/8	5 19/20
6	24 7/8		4 7/8	4 23/24
7	25 4/8		4 2/8	4 1/4
8	26 0/8		3 6/8	3 23/32
9	26 3/8		3 3/8	3 11/36
10	26 6/8		3 0/8	2 39/40
12	27 1/8		2 5/8	2 23/48
14	27 4/8		2 2/8	2 1/8
16	27 6/8		2 0/8	1 55/64
18	27 7/8		1 7/8	1 47/72
20	28 0/8		1 6/8	1 39/80
24	28 2/8		1 4/8	1 23/96
28	28 3/8		1 3/8	1 1/16
32	28 4/8		1 2/8	0 119/128

A. The number of equal spaces at the top of the tube, that contained the same parcel of air.

B. The height of the mercurial cylinder, that together with the spring of the included air counterbalanced the pressure of the atmosphere.

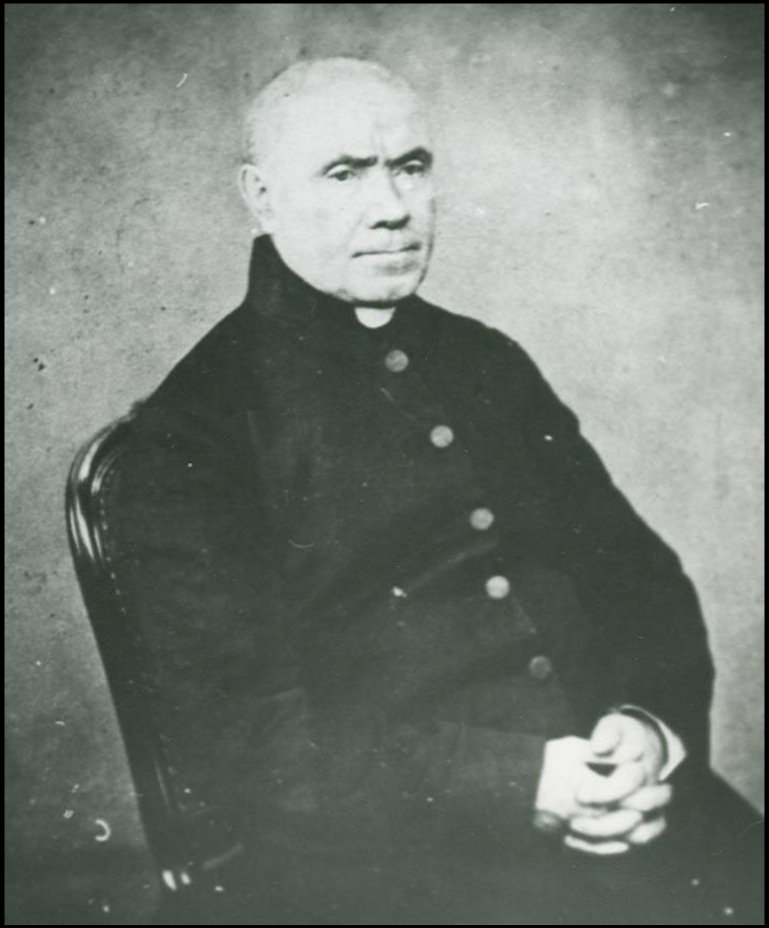
C. The pressure of the atmosphere.

D. The complement of *B* to *C*, exhibiting the pressure sustained by the included air.

E. What that pressure should be, according to the hypothesis.

To make the experiment of the debilitated force of expanded air the plainer, it will not be amiss to note some particulars, especially touching the manner of making the trial; which

Nicholas Callan



Born 1799

Darver Co Louth

Professor of

Natural Philosophy

Maynooth

Scientific Work

Batteries

Electromagnet

Induction Coil

Galvanisation

Motors / Dynamos

Teaching Philosophy

Believed in demonstrations in teaching

Demonstrations should be as close to the original as possible

Examples from everyday life

Hard task master and high standards

Largest Battery in the World

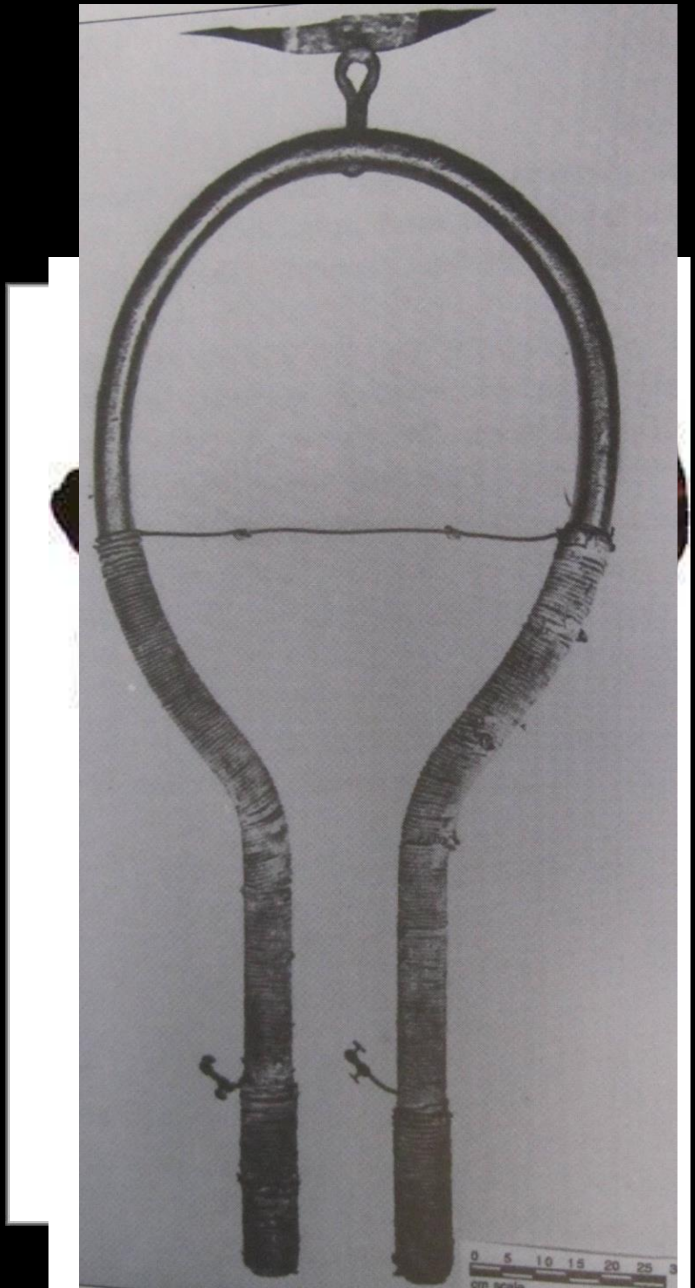
- 1848
- Zinc and cast iron
- Potassium Nitrate, Sulphuric acid and Water
- 577 cells

- Over 1,000 volts

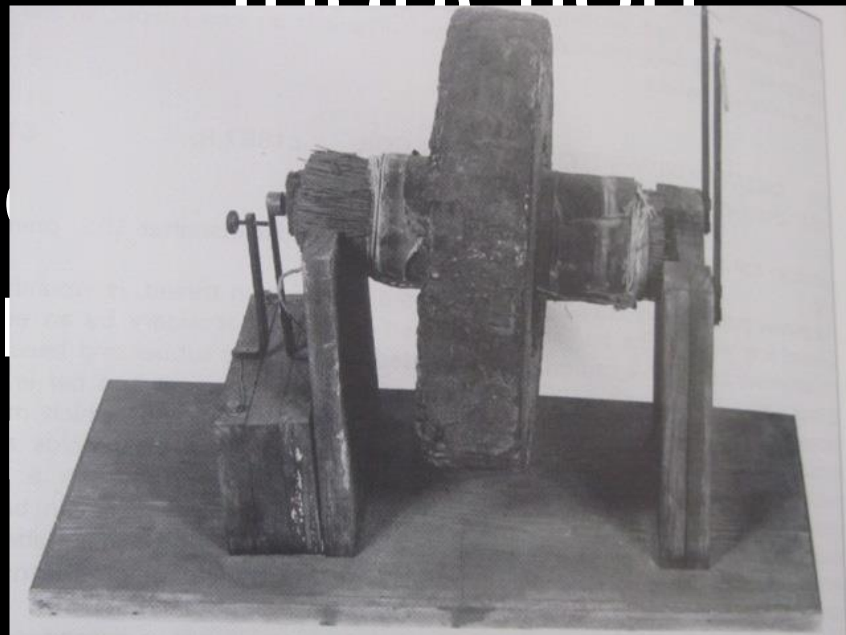
Maynooth Battery

Power Lifting

1825 Sturgeon	4 kg
1831 Henry	900 kg
1843 Callan	2,000 kg



Induction



- 1820
- 1831 ction
- 1831

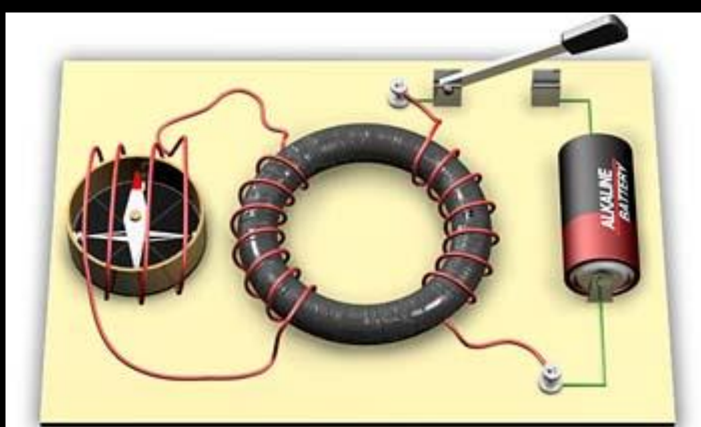
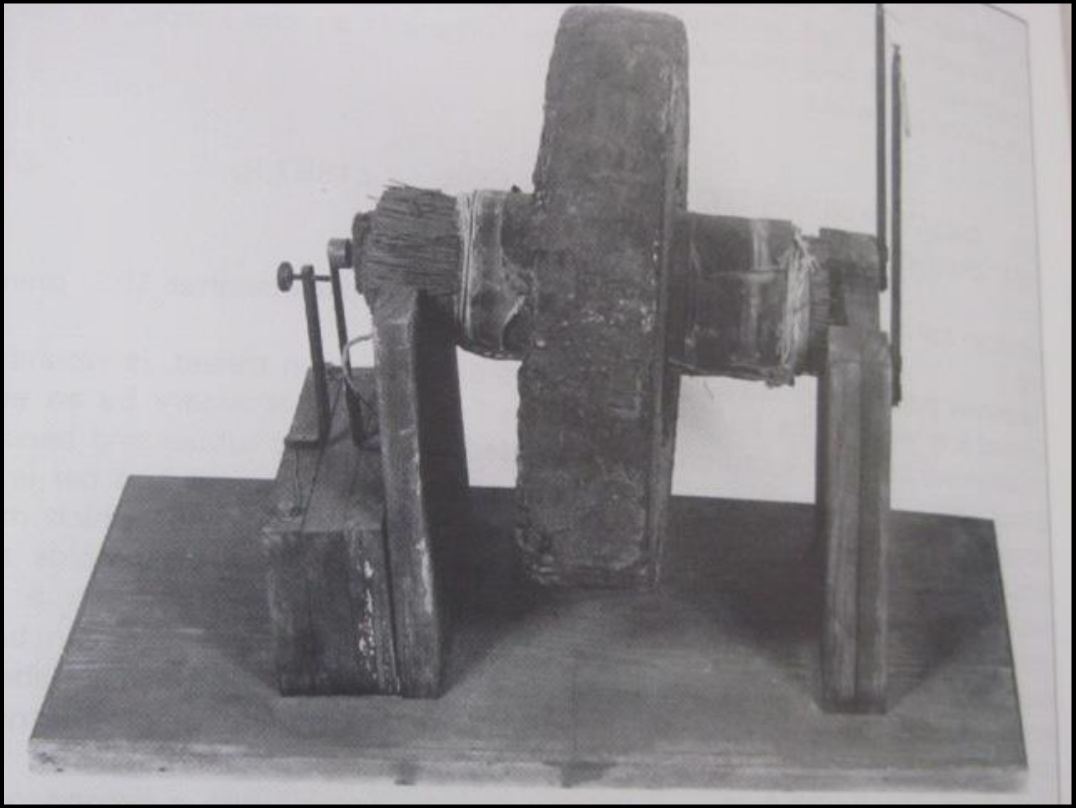


Figure 1

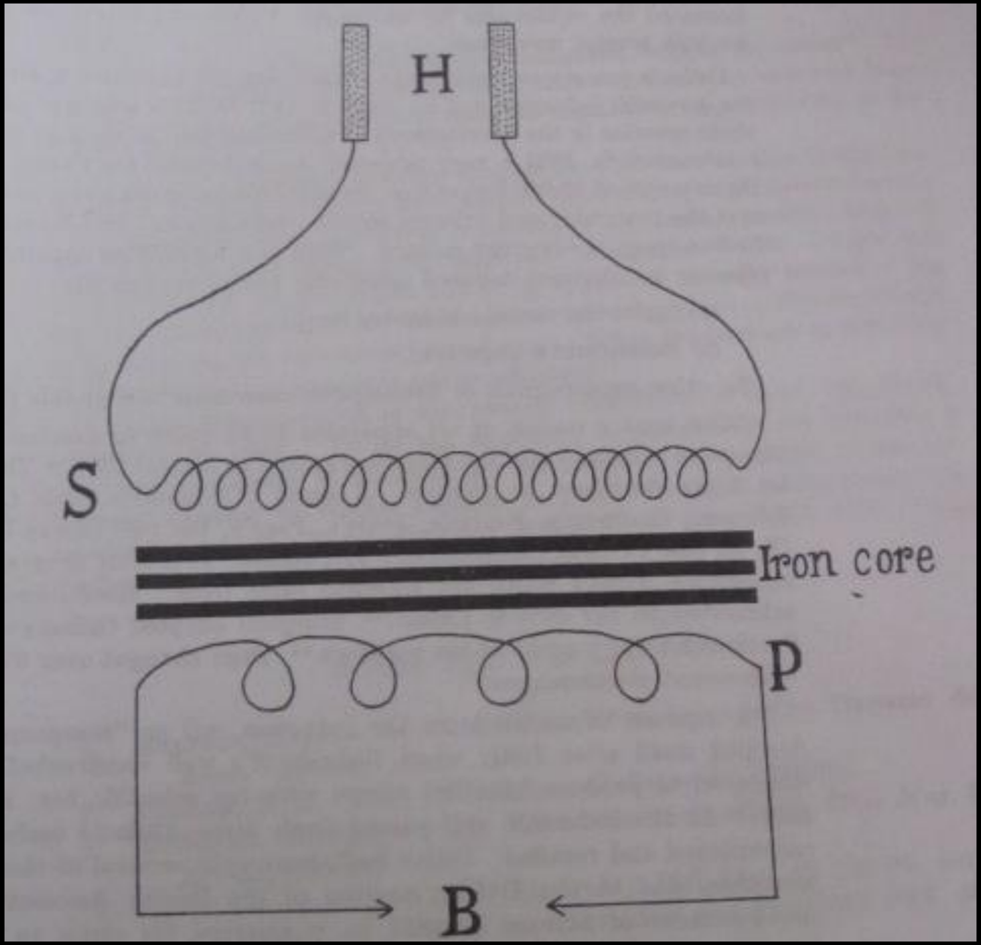
- nduction

Induction

- 1843 Callan – induction coil

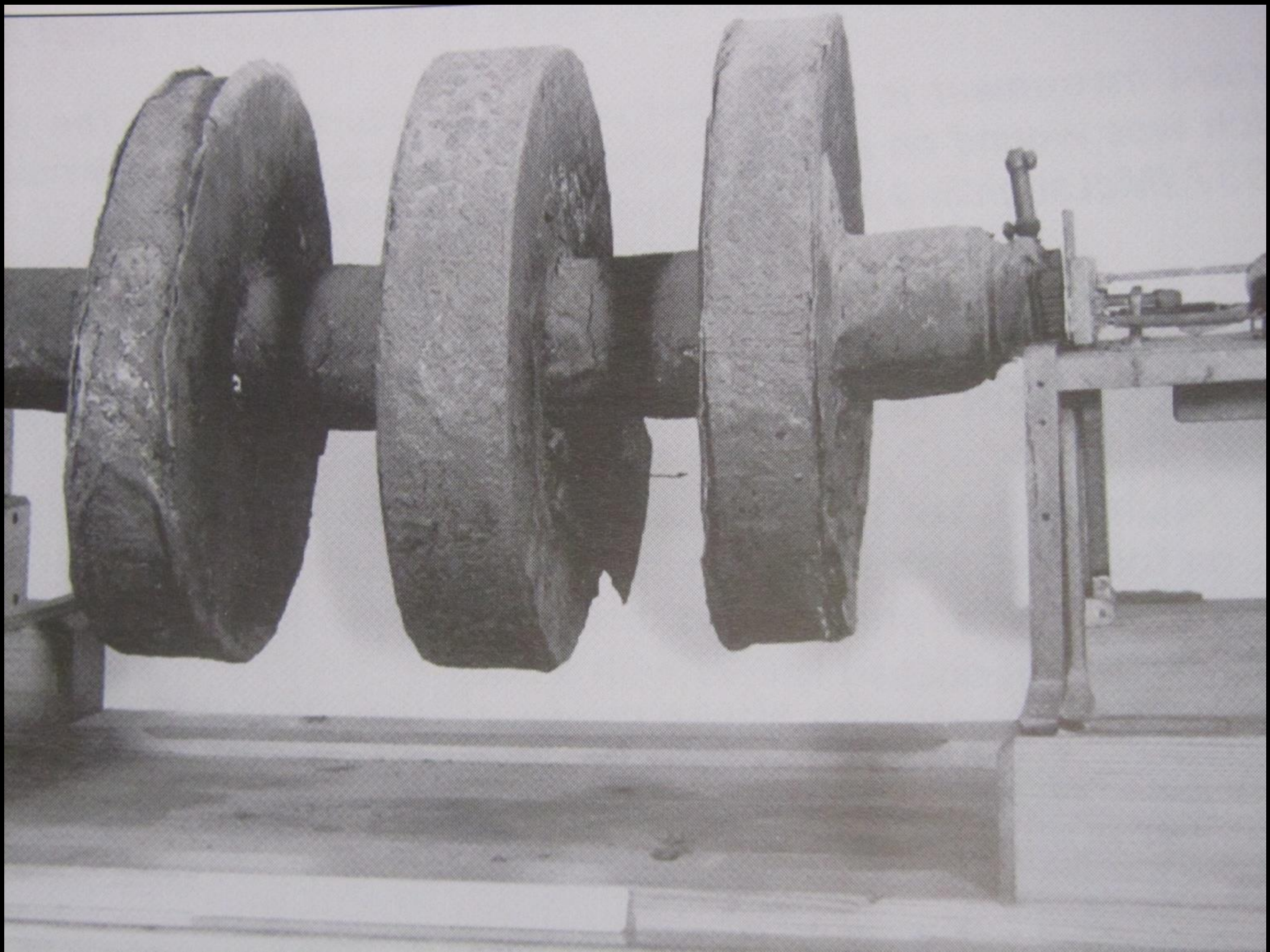


Induction



Induction

Callan's Great induction coil



Contested Priority

Charles Grafton Page invented the first high-voltage induction coil in 1836. The high-voltage induction coil became an important tool of scientific research, and a standard component of automobile ignition systems in the twentieth century. Page was born in Salem, Massachusetts. The National Inventors Hall of Fame

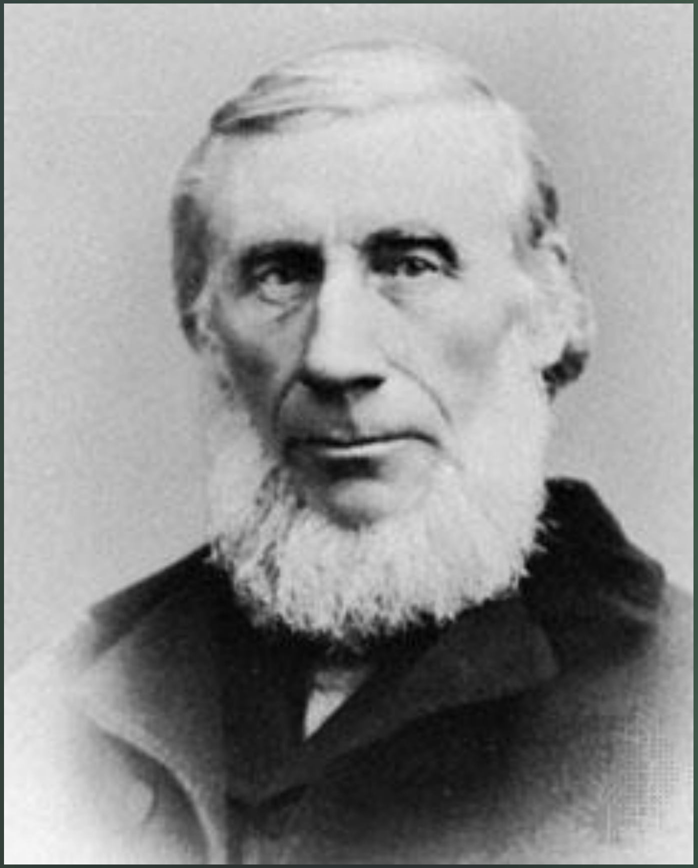
William Stanley, Jr. invented the induction coil. The induction coil was very important, in the 1880s, electricity (DC) was dangerous and could not be used for consumer uses such as lighting, but it was known that alternating current (AC) voltage could be varied by use of induction coils. https://theinventors.org/library/inventors/blstanley.htm#

Influenced by William Sturgeon and Michael Faraday, Callan began work on the idea of the induction coil in 1834. He invented the first induction coil in 1836

https://en.wikipedia.org/wiki/Nicholas_Callan

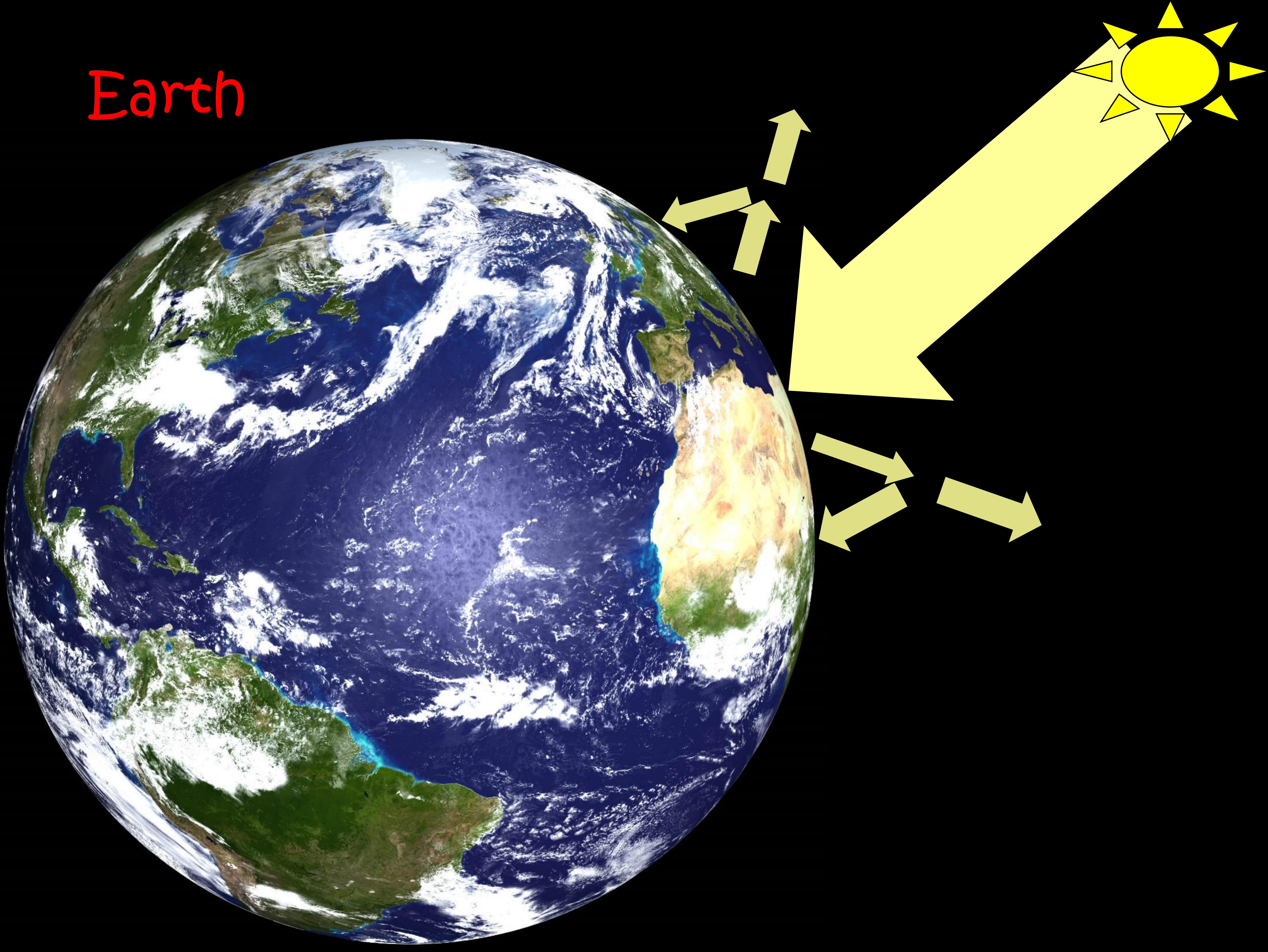
John Tyndall

- Leading figure of Victorian Science
- Great Experimenter
- Science Communicator



b. 1820 Leighlinbridge Co Carlow.

Earth



ART. XXXI.—*Circumstances affecting the Heat of the Sun's Rays;* by EUNICE FOOTE.

(Read before the American Association, August 23d, 1856.)

MY investigations have had for their object to determine the different circumstances that affect the thermal action of the rays of light that proceed from the sun.

Several results have been obtained.

First. The action increases with the density of the air, and is diminished as it becomes more rarified.

The experiments were made with an air-pump and two cylindrical receivers of the same size, about four inches in diameter and thirty in length. In each were placed two thermometers, and the air was exhausted from one and condensed in the other. After both had acquired the same temperature they were placed in the sun, side by side, and while the action of the sun's rays rose to 110° in the condensed tube, it attained only 88° in the other. I had no means at hand of measuring the degree of condensation or rarefaction.

The observations taken once in two or three minutes, were as follows:

Exhausted Tube		Condensed Tube.	
In shade.	In sun.	In shade.	In sun.
75	80	75	80
76	82	78	95
80	82	80	100
83	86	82	105
84	88	85	110

This circumstance must affect the power of the sun's rays in different places, and contribute to produce their feeble action on the summits of lofty mountains.

Secondly. The action of the sun's rays was found to be greater in moist than in dry air.

In one of the receivers the air was saturated with moisture—in the other it was dried by the use of chlorid of calcium.

Both were placed in the sun as before and the result was as follows:

Dry Air.		Damp Air.	
In shade.	In sun.	In shade.	In sun.
75	75	75	75
78	88	78	90
82	102	82	106
82	104	82	110
82	105	82	114
88	108	92	120

The high temperature of moist air has frequently been observed. Who has not experienced the burning heat of the sun that precedes a summer's shower? The isothermal lines will, I think, be found to be much affected by the different degrees of moisture in different places.

Thirdly. The highest effect of the sun's rays I have found to be in carbonic acid gas.

One of the receivers was filled with it, the other with common air, and the result was as follows:

In Common Air.		In Carbonic Acid Gas.	
In shade.	In sun.	In shade.	In sun.
80	90	80	90
81	94	84	100
80	99	84	110
81	100	85	120

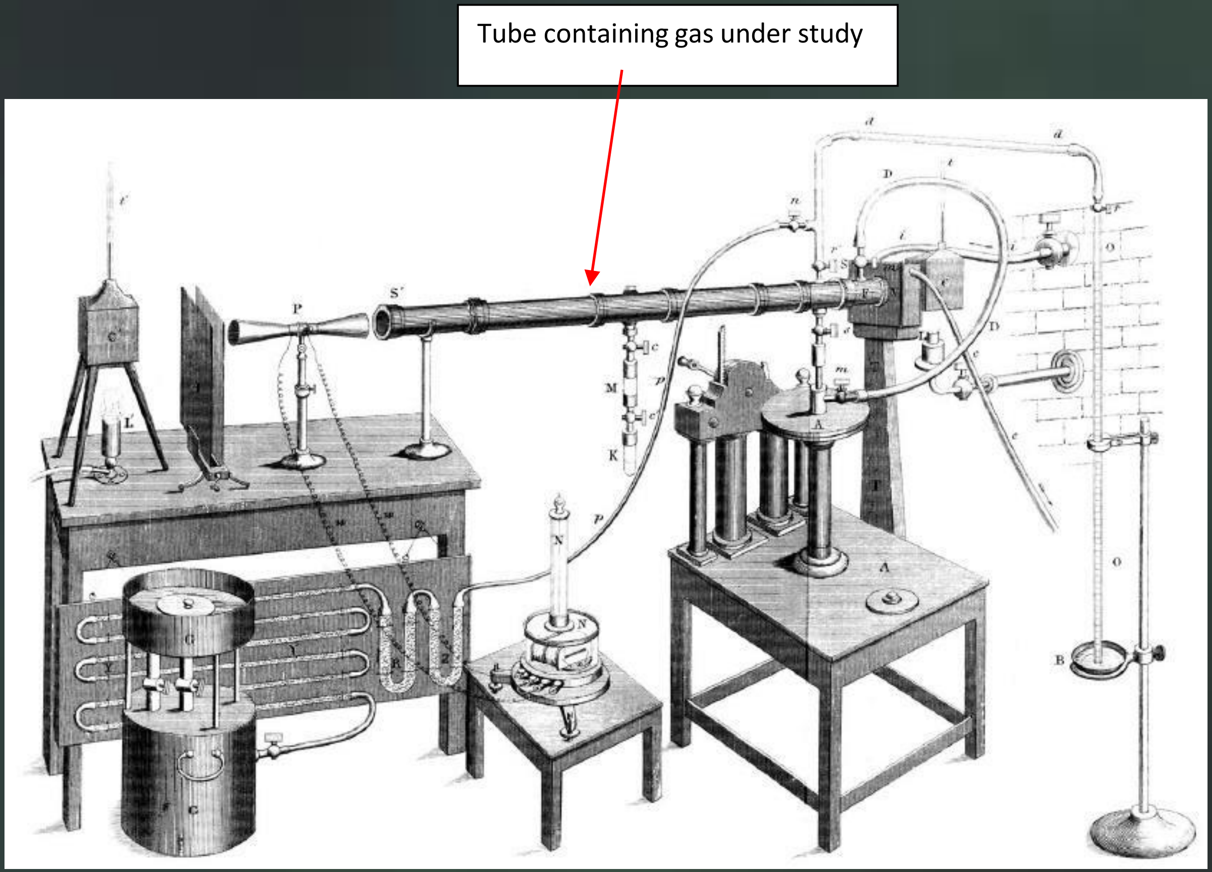
The receiver containing the gas became itself much heated—very sensibly more so than the other—and on being removed, it was many times as long in cooling.

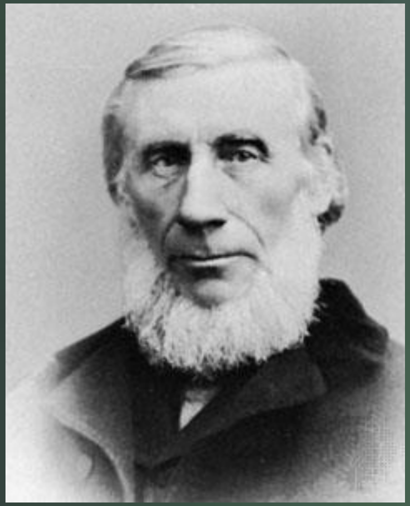
An atmosphere of that gas would give to our earth a high temperature; and if as some suppose, at one period of its history the air had mixed with it a larger proportion than at present, an increased temperature from its own action as well as from increased weight must have necessarily resulted.

On comparing the sun's heat in different gases, I found it to be in hydrogen gas, 104°; in common air, 106°; in oxygen gas, 108°; and in carbonic acid gas, 125°.

Eunice Foote (US 1819-1888)

Circumstances Affecting the Heat of the Sun's Rays (AAAS 1856)


Tube containing gas under study



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