

Lighting up Sustainable Development

The International Year of Light and Light-based Technologies 2015



United Nations
Educational, Scientific and
Cultural Organization



International
Year of Light
2015



John Dudley

Chairman of the International Year of Light Steering Committee

Context

The General Assembly of the United Nations has declared 2015 the International Year of Light and Light-based Technologies

Missions & Themes

Provide technological solutions to global problems

Promote education in science, engineering, mathematics ...

Improve links between science & society

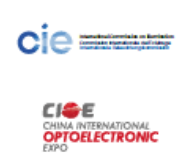


This has only been possible thanks to hard work among many partners since 2009!

FOUNDING PARTNERS



PATRONS

**GOLD+ ASSOCIATES****GOLD ASSOCIATES****SILVER ASSOCIATES**

BRONZE ASSOCIATES



Opening Ceremony

Paris, January 19-20 2015



Light is a unifying symbol that signifies wisdom and excites the imagination across the world.

Paintings and murals in all cultures show how artists have used light, shade and colour to illustrate mood and create atmosphere.

Light sciences are a cross-cutting discipline in the 21st century.

Kim Moon Ban

Themes



Origin of Life

Innovative Lighting

Healthcare

Basic Science

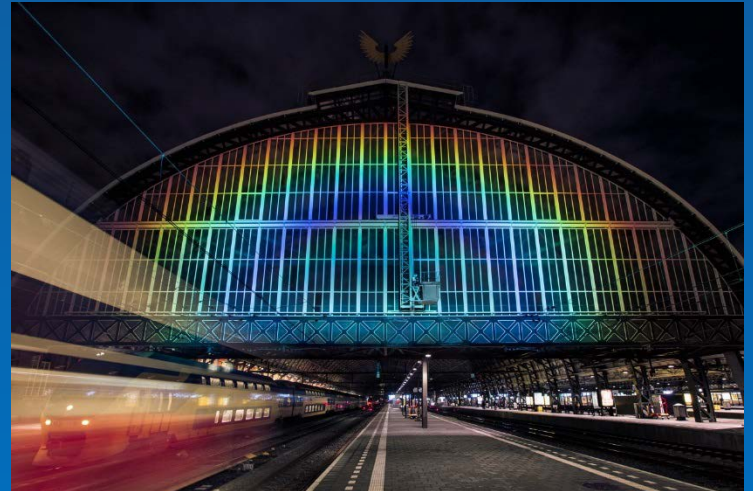
Architecture

Development

Culture and Art



International

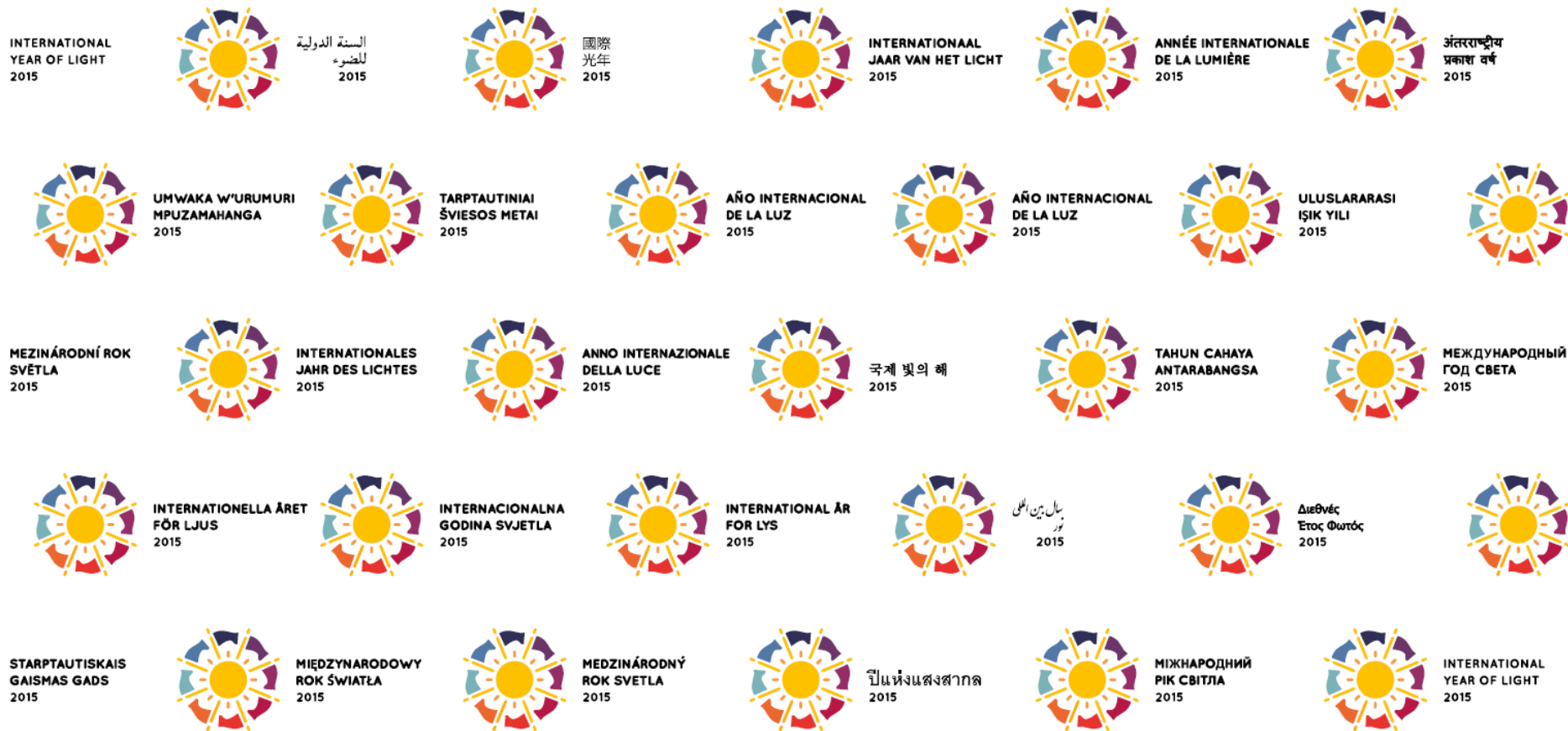


International



Stamps & Coins: Antigua & Barbuda, Guyana, Kyrgyzsta, Israel, Italy, Liechtenstein, Montserrat, Nevis, Romania, Serbia, Sierra Leone, South Africa, Spain, Vatican, UK ... more coming

International




Not just about wealthy countries, not only in the English language ... inclusive & international

light2015.org


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2015 INTERNATIONAL YEAR OF LIGHT AND LIGHT-BASED TECHNOLOGIES



United Nations
Educational, Scientific and
Cultural Organization



International
Year of Light
2015

[HOME](#) [ABOUT THE YEAR OF LIGHT](#) [EVENT PROGRAMME](#) [WHY LIGHT MATTERS](#) [LEARN ABOUT LIGHT](#) [HANDS ON INVOLVEMENT](#) [COSMIC LIGHT](#) [LIGHT FOR DEVELOPMENT](#) [SCIENCE STORIES](#)

light2015blog.org

Laser Fun Day

© APRIL 23, 2015 1 COMMENT

The Student Optics Chapter, or SOCK, at the College of Optical Sciences at the University of Arizona put on its fifth annual Laser Fun Day this year in conjunction with the International Year of Light and Light-based Technologies (IYL 2015). This is our largest outreach event every year, and we had a record attendance this time, between 1200 and 1400 people. We invited the entire Tucson community by sending out hundreds of flyers to the schools and other educational organizations.



Visitors watch Bill Durnan, the SOCK Treasurer, dissect a cow eye. Credit: SOCK.

Night is Canvas

© APRIL 28, 2015 LEAVE A COMMENT

At the [Light Painting World Alliance website](#), you'll find the phrase "Night is Canvas". Night is no ordinary word for me, I suffer from night blindness. It's a powerful, often frightening word, separating me from the able bodied, putting me in the folder labelled "Unable" - legally blind, asking for help to cross the street. Night, and its draining, light-less hardships, needn't be only that. After all, the other part, "canvas" is what matters more in the end.




Kindom Chrome. Credit: Mark Andres, Donald Martinez, Benjamin Paige and Phil Malek.

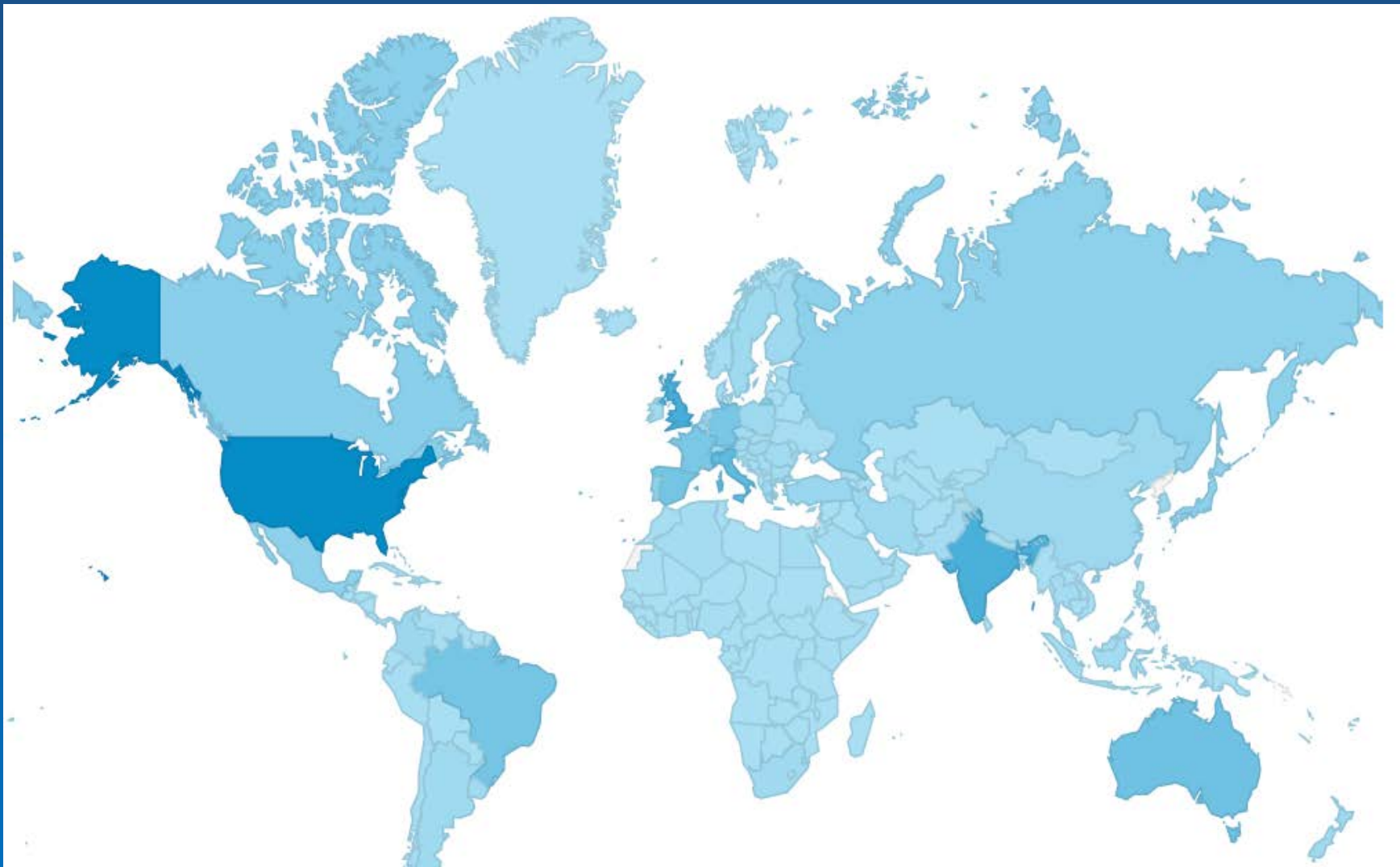
Skyglow: measuring light pollution in the UK

© APRIL 27, 2015 1 COMMENT

Skyglow is the halo-like artificial illumination of the night sky above towns and cities. It's also the name of a major new study into light pollution in the UK by Hillarys. Using satellite images taken between 1992 and 2014, Skyglow shows how the UK's night time skies have changed. The research charts a 24% decrease in light pollution*, with falls in every region - and projects this data into the future. You can see the interactive satellite imagery and full study on the [Skyglow project page](#). Or keep reading to find out the story behind the story.



www.light2015.org




Unexpected places ...

THE MAGAZINE OF ETIHAD AIRWAYS JANUARY 2015

etihadinflight


Light-headed

Did you know 2015 is the International Year of Light (and light-based technologies)? Well, it is. So here are three ways to appreciate light (and light-based technologies).

- 1 Watch a Blu-Ray. Like DVDs and CDs before them, Blu-Rays use lasers to read information from a disc. Those lasers? That's concentrated light.
- 2 Look at some paintings. Light is a huge part of fine art – check out Vermeer, Caravaggio and their contemporaries for the best examples.
- 3 Go to hospital. Not that we wish you ill – it's just that MRI scans, X-Rays, ultrasounds and so on all showcase light technologies that save lives. 

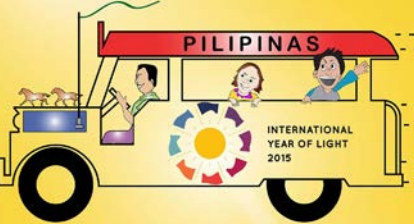
www.light2015.org

January 2015 | etihadinflight | 13

 GIRL GUIDES AUSTRALIA

IlumINASYON

(International Year of Light 2015)



INTERNATIONAL YEAR OF LIGHT 2015

National Institute of Physics
University of the Philippines Diliman
Quezon City, Philippines
www.nip.upd.edu.ph
March 9, 2015 (9am - 12nn)

SYMPOSIUM TOPICS:
GENERATION, DETECTION, & CONTROL of LIGHT; PHOTONS & MATTER
LIGHT in the ARTS & DESIGN, BIOLOGICAL SYSTEMS, MEDICINE, SCI-TECH & COSMOLOGY
INDIGENOUS KNOWLEDGE ABOUT LIGHT; MULTI- & INTER-DISCIPLINARY RESEARCH



Politics



PHOTONICS PUBLIC PRIVATE
PARTNERSHIP ANNUAL
MEETING 2015 - KEYNOTE BY
COMMISSIONER OETTINGER
- PRESENTATIONS
AVAILABLE FOR DOWNLOAD

[> MORE](#)



Issues » Educational and Cultural Affairs

2015 is the UN International Year of Light

**International Year of Light comes to Washington
D.C. Sept. 12**

Two events to celebrate achievements in science and engineering of light and light-based technologies, and raise awareness of contributions to humanity



Obama admin. announces \$200 million to create an
integrated photonics manufacturing institute



Why politics?

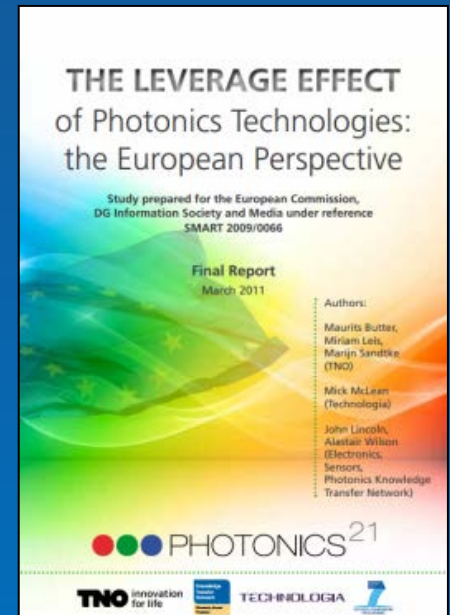
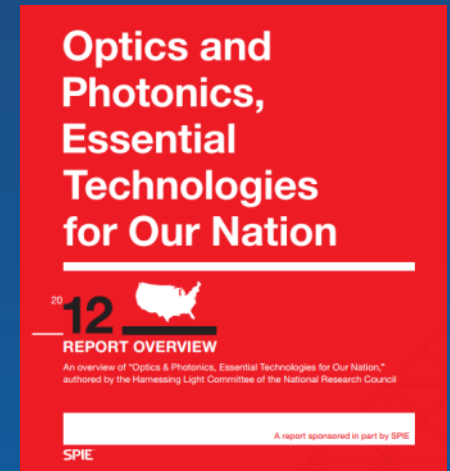
Total Direct Photonics Market ~ €300 bn

Much larger multiplier effect along value chain
(e.g. in USA, 7.4 million high value jobs)

European photonics market ~ €60 bn

Estimated growth rate ~ 8-10% p.a.

Photonics21 , National Photonics Initiative ...



Why politics?

Climate change and sustainability are topics of immense importance for us all

Energy-efficient buildings, smart cities and homes, architecture & design can better exploit daylight and use low consumption lighting

Smart lighting can both mitigate global warming and lead to improved well being



2015 and 2016 set to break global heat records, says Met Office

Next two years likely to be hottest recorded as the world's climate reaches major turning point - but UK summers may be cooler, report predicts



Manmade-driven global warming and other factors could make this year and next break heat records. Photograph: Philippe Huguen/AFP/Getty Images

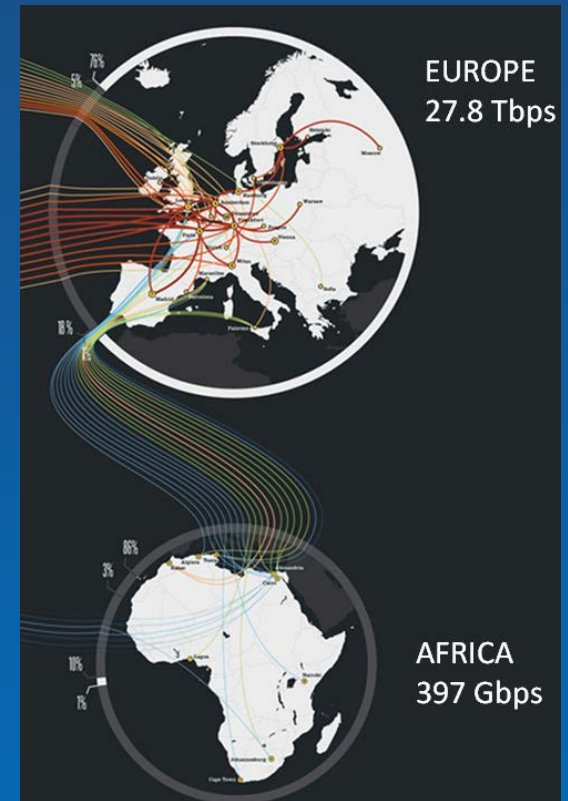
The world's climate has reached a major turning point and is set to deliver record-breaking global temperatures in 2015 and 2016, according to a new report from the UK Met Office.

Why politics?

80% of the world's population lives in developing countries

Over 90% of people in the 49 least-developed countries are totally unconnected

22000 children die each day from easily-preventable causes



Light-based Technologies

Study after Sunset

A billion people do not have access to safe light when the sun sets

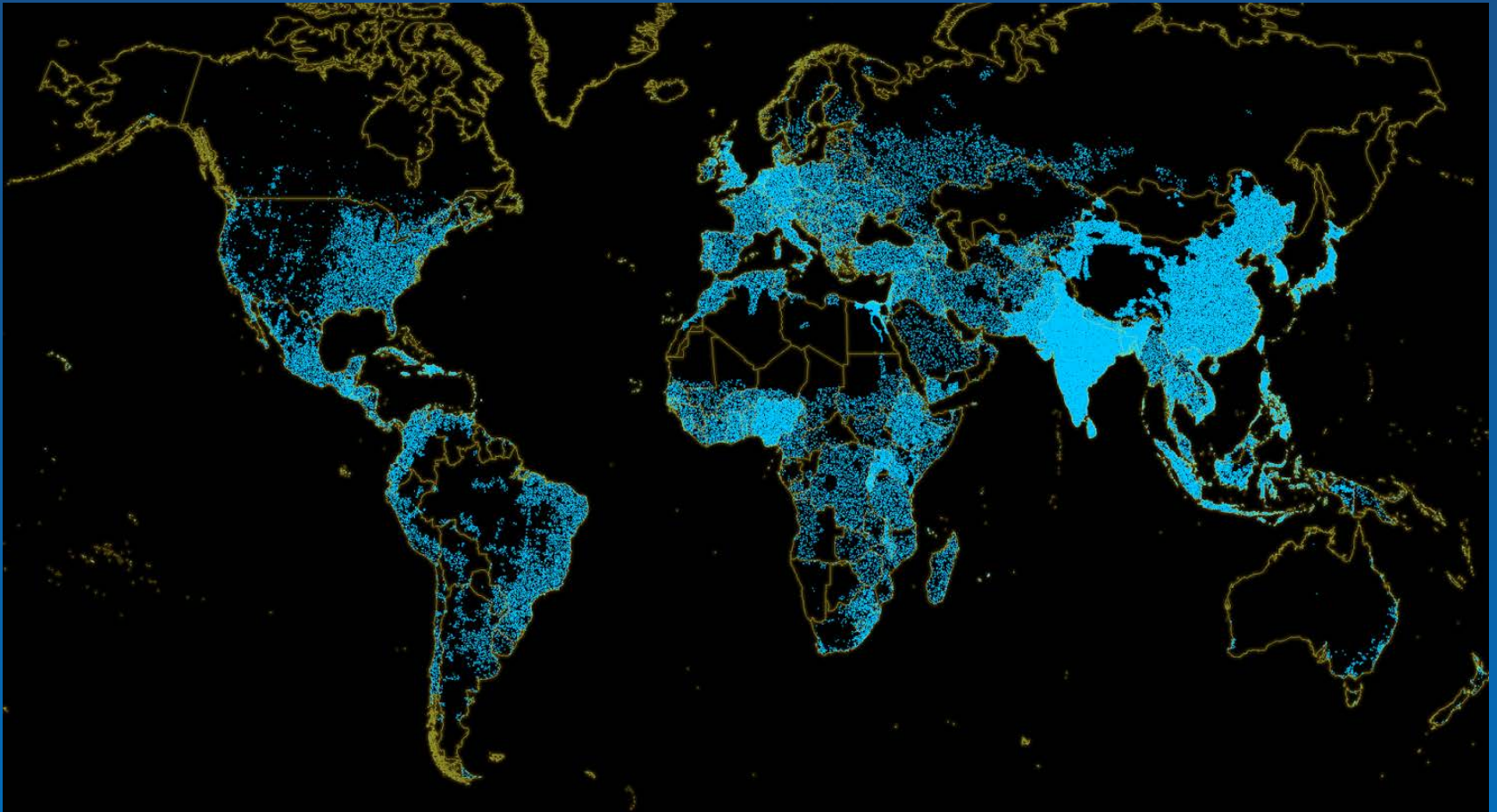


Seeing Clearly

100's of millions – billions can have improved quality of life with simple eyeglasses



Population



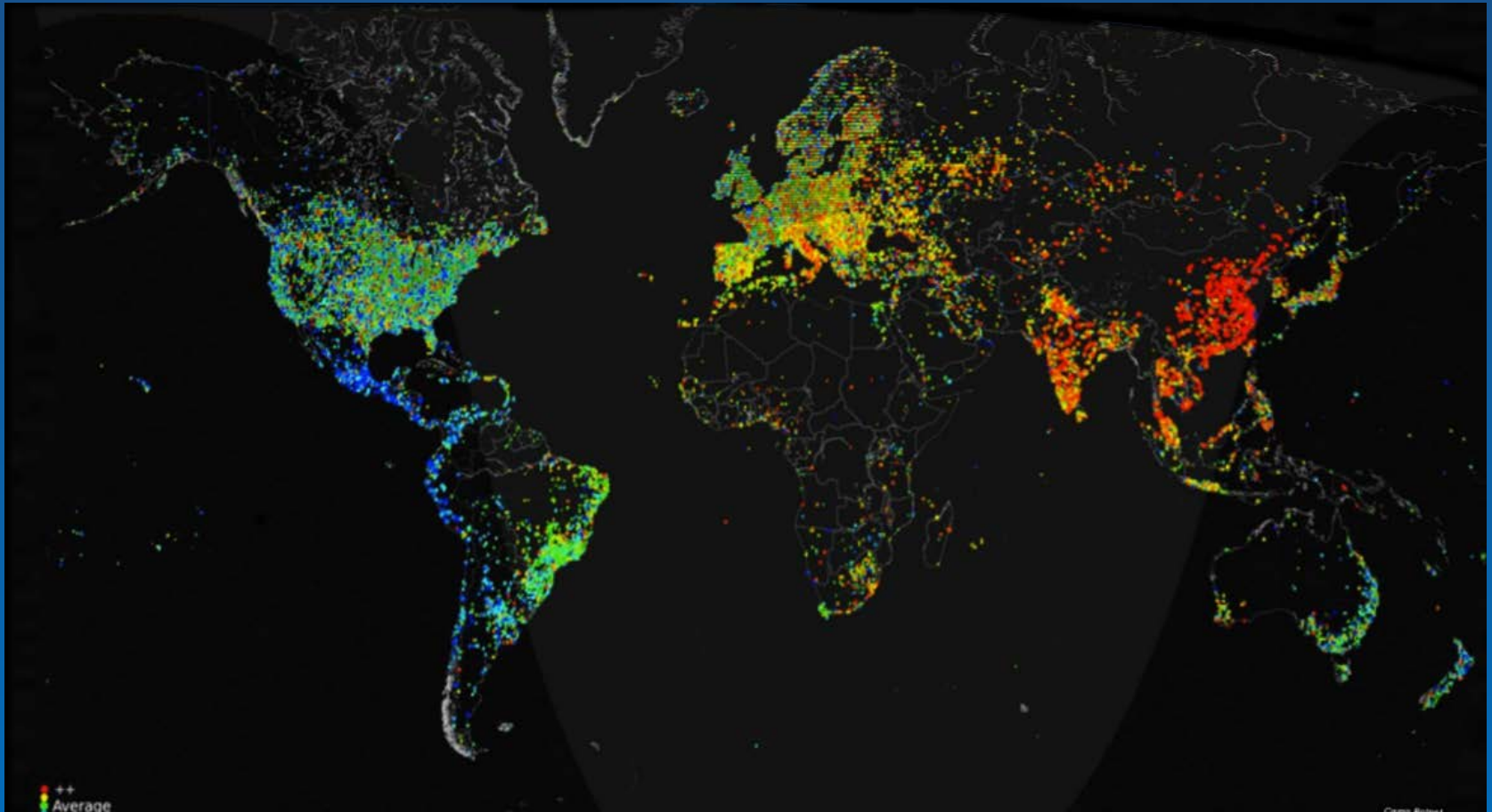
NASA

Lighting



Sky & Telescope

Internet



2012 Carna Botnet

Light-based Technologies

Mobile Broadband

More mobile subscriptions than people
2.1 billion of these are broadband
82% of new internet users since 2010
are in developing countries

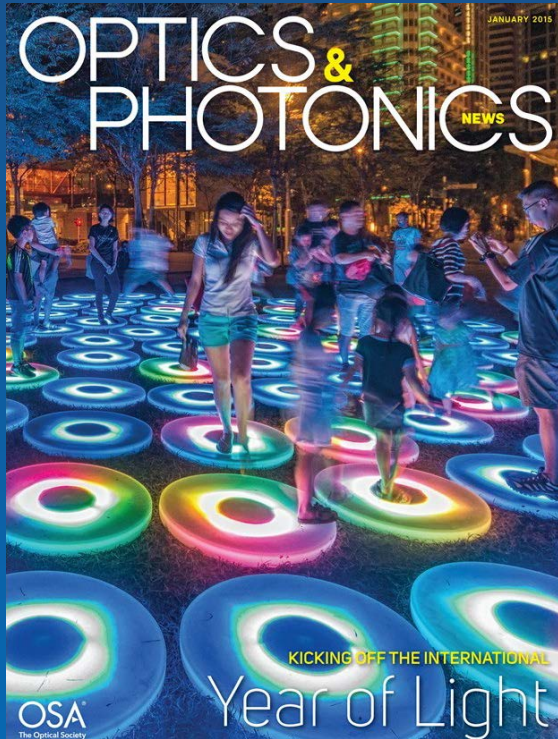


Advanced Healthcare

Technology-based mobile health
Geotagged microscopy add-ons

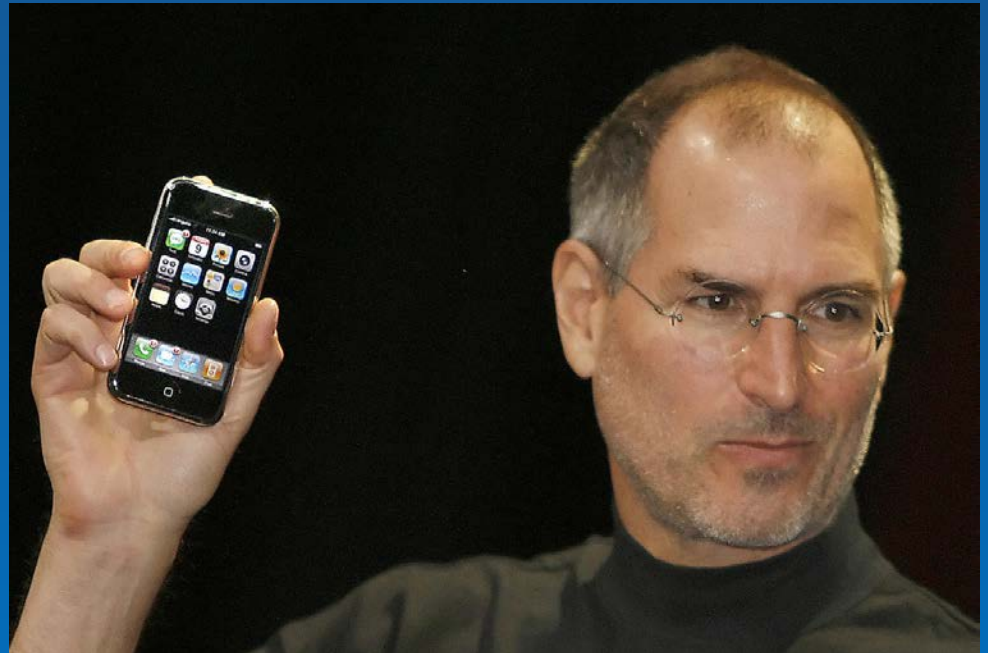


Basic Science



Raising Awareness

There is probably no easier time to explain the societal benefits of long term vision in science ...



Raising Awareness

There is probably no easier time to explain the societal benefits of long term vision in science ...



... Lippmann, Wein, Planck, Einstein, Bohr, Bardeen, Brattain, Shockley, Basov, Prokhorov, Townes, Gabor, de Gennes, Zewail, Alferov, Kroemer, St Clair Kilby, Chu, Cohen-Tannoudji, Phillips, Cornell, Ketterle, Wieman, Haensch, Hall, Glauber, Fert, Gruenberg, Kao, Smith, Haroche, Wineland, Akasaki, Amano, Nakamura ...



Nobel Prizes in your pocket

Raising Awareness

Public interest in science is high ...



The History of Light

~ 8th century BC



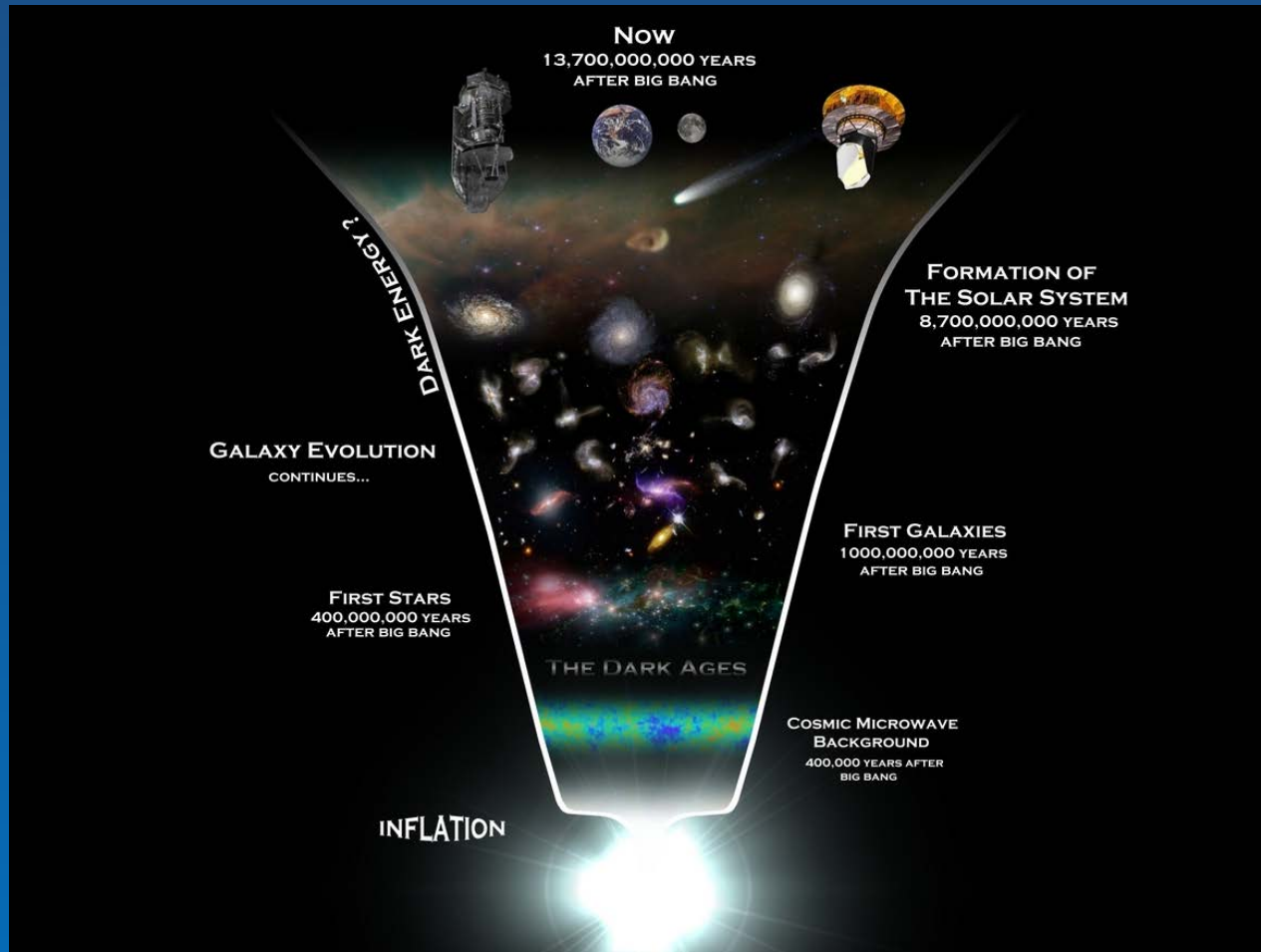
Greek Mythology
Prometheus (Προμηθεύς)

~ 8 – 7th century BC



Let there be Light! Book of Genesis

The History of Light



Or perhaps a more contemporary perspective ...

The History of Light

4th-2nd century BC



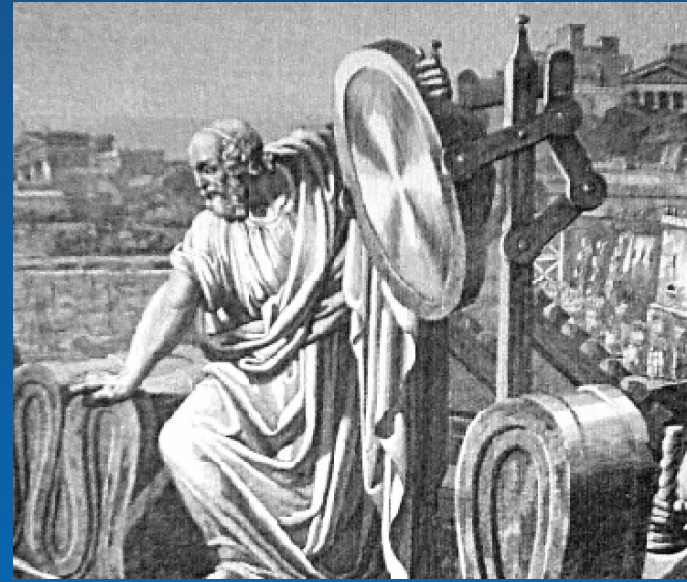
*Mo Zi
Houai-nan tseu*

300 BC



Euclid

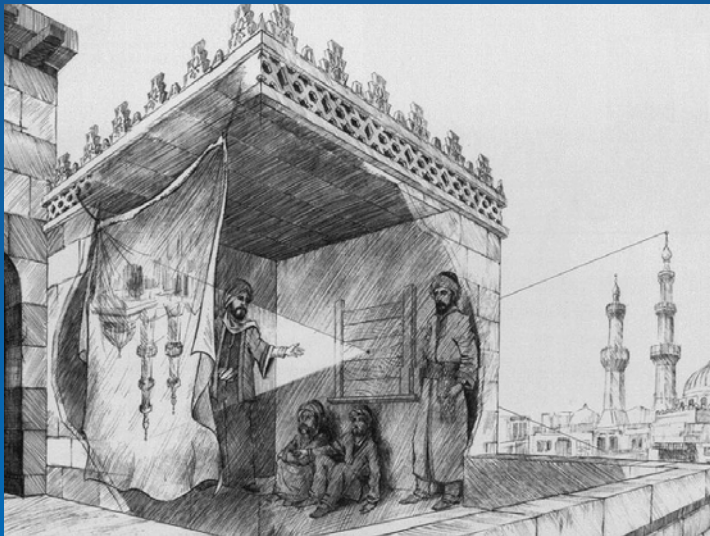
212 BC



Archimedes

Ibn Al Haytham (Alhazen)

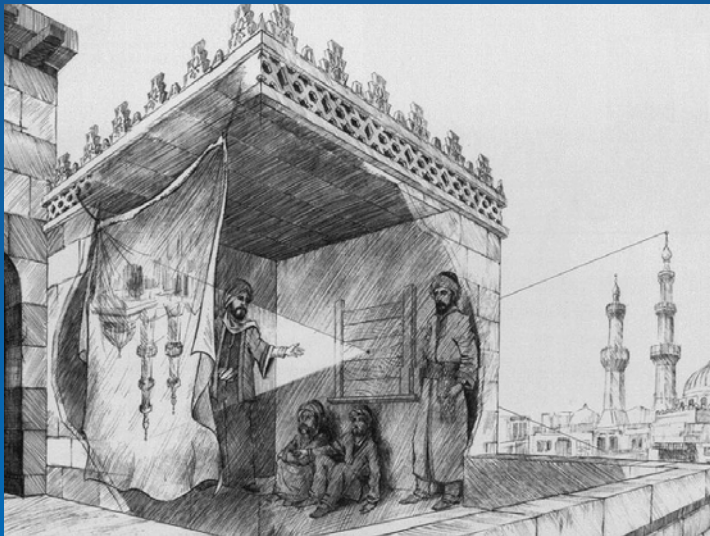
Kitab al-Manazir
Book of Optics
c. 1015



Opticae Thesaurus (1572, Risner)

Ibn Al Haytham (Alhazen)

Kitab al-Manazir
Book of Optics
c. 1015



The seeker after truth is not the one who studies the writing of the ancients and puts his trust in them, but rather the one who suspects his faith in them and questions what he gathers from them...

Ibn Al-Haytham c. 1015

Anniversaries in 2015

1015: 1000 years of Arabic optics

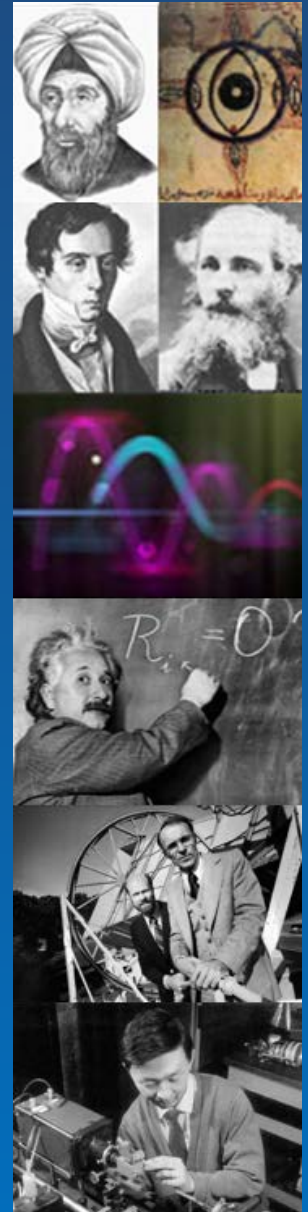
1815: 200 years of Fresnel's theory of diffraction

1865: 150 years since Maxwell's electrodynamics

1915: Einstein Centenary, General Relativity.

1965: Discovery of Cosmic Microwave Background,
Penzias & Wilson

Invention of Optical Fibre Technology
Charles Kao



Anniversaries in 2015

Penzias & Wilson used a maser to detect the cosmic microwave background

Einstein – cosmological constant – big bang – CMB

American Astronomical Society • Provided by the NASA Astrophysics Data System

A MEASUREMENT OF EXCESS ANTENNA TEMPERATURE AT 4080 Mc/s

Measurements of the effective zenith noise temperature of the 20-foot horn-reflector antenna (Crawford, Hogg, and Hunt 1961) at the Crawford Hill Laboratory, Holmdel, New Jersey, at 4080 Mc/s have yielded a value about 3.5° K higher than expected. This excess temperature is, within the limits of our observations, isotropic, unpolarized, and free from seasonal variations (July, 1964–April, 1965). A possible explanation for the observed excess noise temperature is the one given by Dicke, Peebles, Roll, and Wilkinson (1965) in a companion letter in this issue.

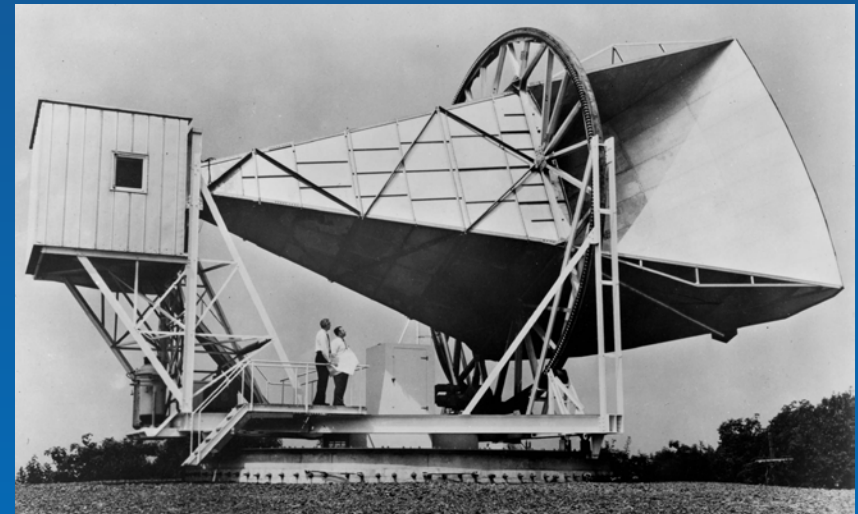
The total antenna temperature measured at the zenith is 6.7° K of which 2.3° K is due to atmospheric absorption. The calculated contribution due to ohmic losses in the antenna and back-lobe response is 0.9° K.

The radiometer used in this investigation has been described elsewhere (Penzias and Wilson 1965). It employs a traveling-wave maser, a low-loss (0.027-db) comparison switch, and a liquid helium-cooled reference termination (Penzias 1965). Measurements were made by switching manually between the antenna input and the reference termination. The antenna, reference termination, and radiometer were well matched so that a round-trip return loss of more than 55 db existed throughout the measurement; thus errors in the measurement of the effective temperature due to impedance mismatch can be neglected. The estimated error in the measured value of the total antenna temperature is 0.3° K and comes largely from uncertainty in the absolute calibration of the reference termination.

A. A. PENZIAS
R. W. WILSON

May 13, 1965

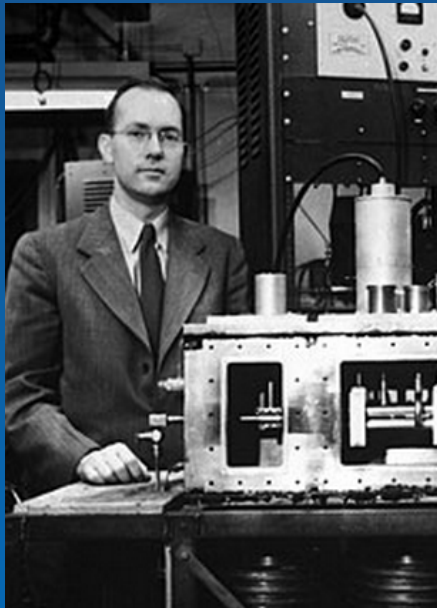
BELL TELEPHONE LABORATORIES, INC
CRAWFORD HILL, HOLMDEL, NEW JERSEY



It is up to us to engage

Charles Townes

Maser and laser (Nobel 1964)



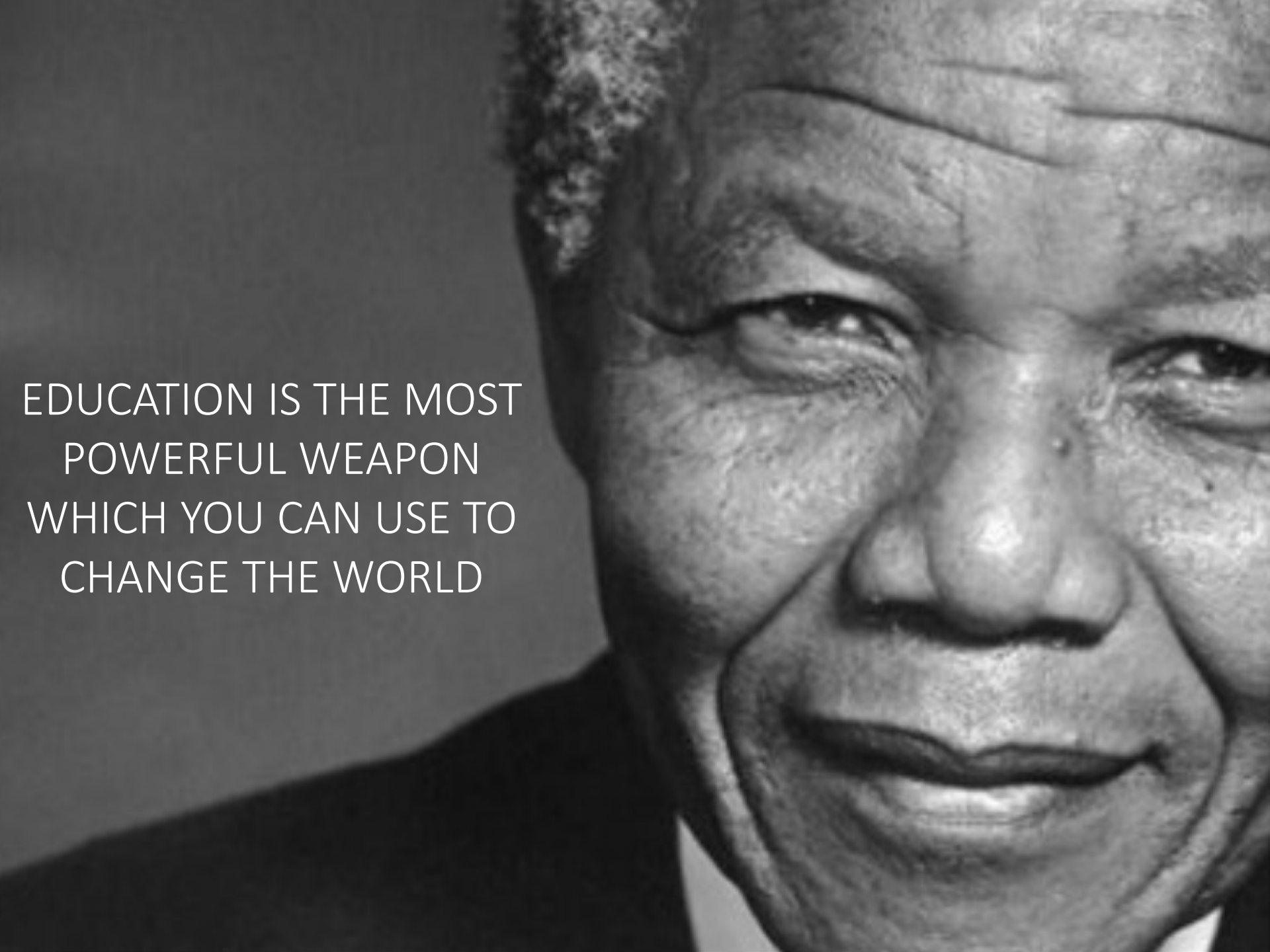
I have always felt that scientists should provide public service from time to time ...

How the Laser Happened: Adventures of a Scientist.

Scientists have often shown great social leadership ...

Light-based technologies can change the 21st century

EDUCATION IS THE MOST
POWERFUL WEAPON
WHICH YOU CAN USE TO
CHANGE THE WORLD



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Educational, Scientific and
Cultural Organization



International
Year of Light
2015



We will only get one chance

www.light2015.org #IYL2015

@johnmdudley