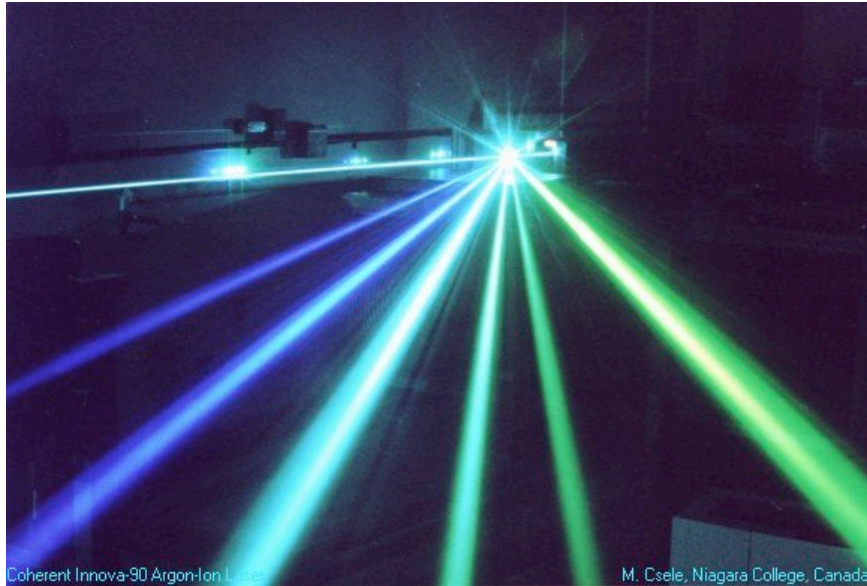
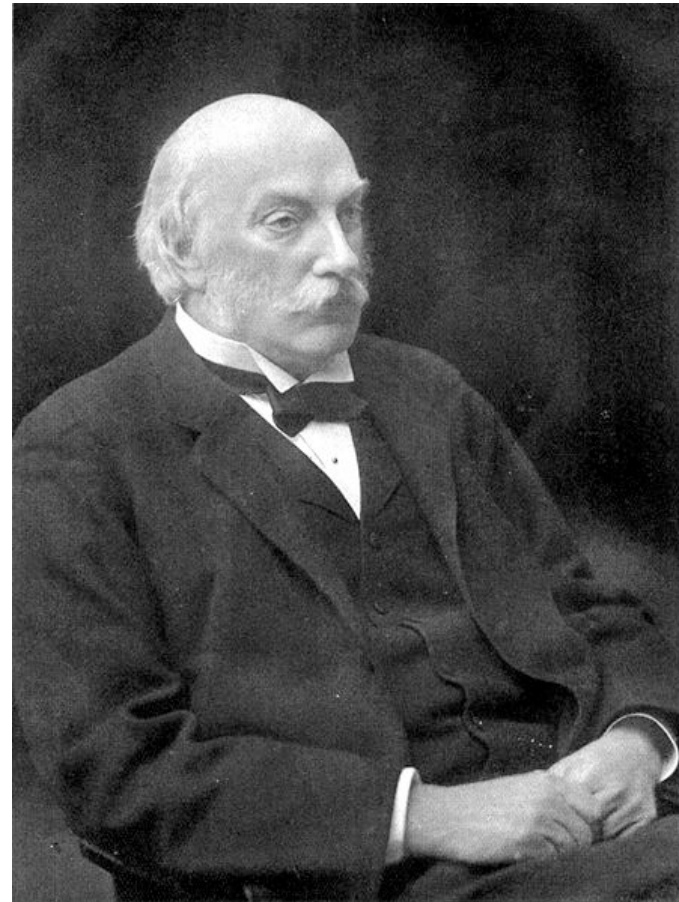


Atmospheric Analysis: The Discovery of Argon.



Argon ion laser

Nobel Prize in Physics (1904)
Also explained why the sky is blue
(Rayleigh Scattering)



John Strutt
Lord Rayleigh
(1842-1919)

Atmospheric Analysis: The Discovery of Argon.

In 1894, Lord Rayleigh lectured the Royal Society on the difference in the weight of Nitrogen gas derived from chemical and atmospheric sources. This difference was explained in terms of a new, hitherto undiscovered element. Sir William Ramsay (an Analytical Chemist who worked for Bunsen) later isolated this element, which he called Argon.

Here are the data that Lord Rayleigh presented:

Atmospheric Nitrogen:

2.3103g by hot copper
2.3100 by hot iron
2.3102 by ferrous hydrate
2.3102 $\pm 0.0004\text{g}$

Chemical Nitrogen:

2.3001g from nitric oxide
2.2990 from nitrous oxide
2.2987 from ammonium nitrite purified at red heat
2.2985 from urea
2.2987 from ammonium nitrite purified in the cold
2.2990 $\pm 0.0008\text{g}$

From this data, Lord Rayleigh determined that there was 1% of something ELSE in air:

Atmospheric Content:

78 percent nitrogen

21 percent oxygen

1 percent Something Else – Argon!

Lord Rayleigh wasn't too far off from the truth:

Real Atmospheric Content:

78 percent nitrogen

21 percent oxygen

0.9 percent argon

0.04 percent carbon dioxide

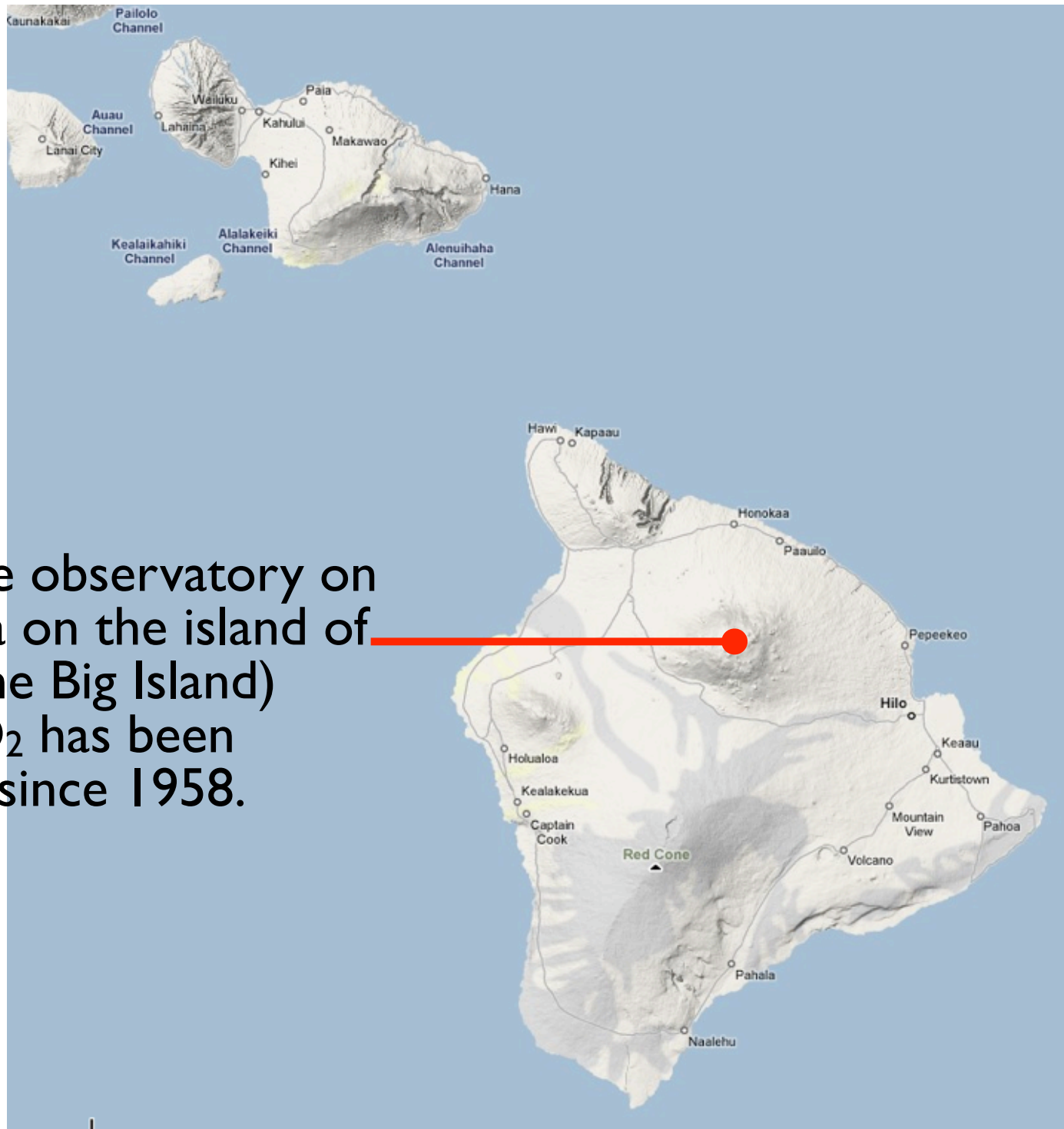
0.06 percent other

One percent was
not a bad guess!



The remaining 0.06 percent is a mixture of hydrogen, water, ozone, neon, helium, krypton, xenon, and other trace components.

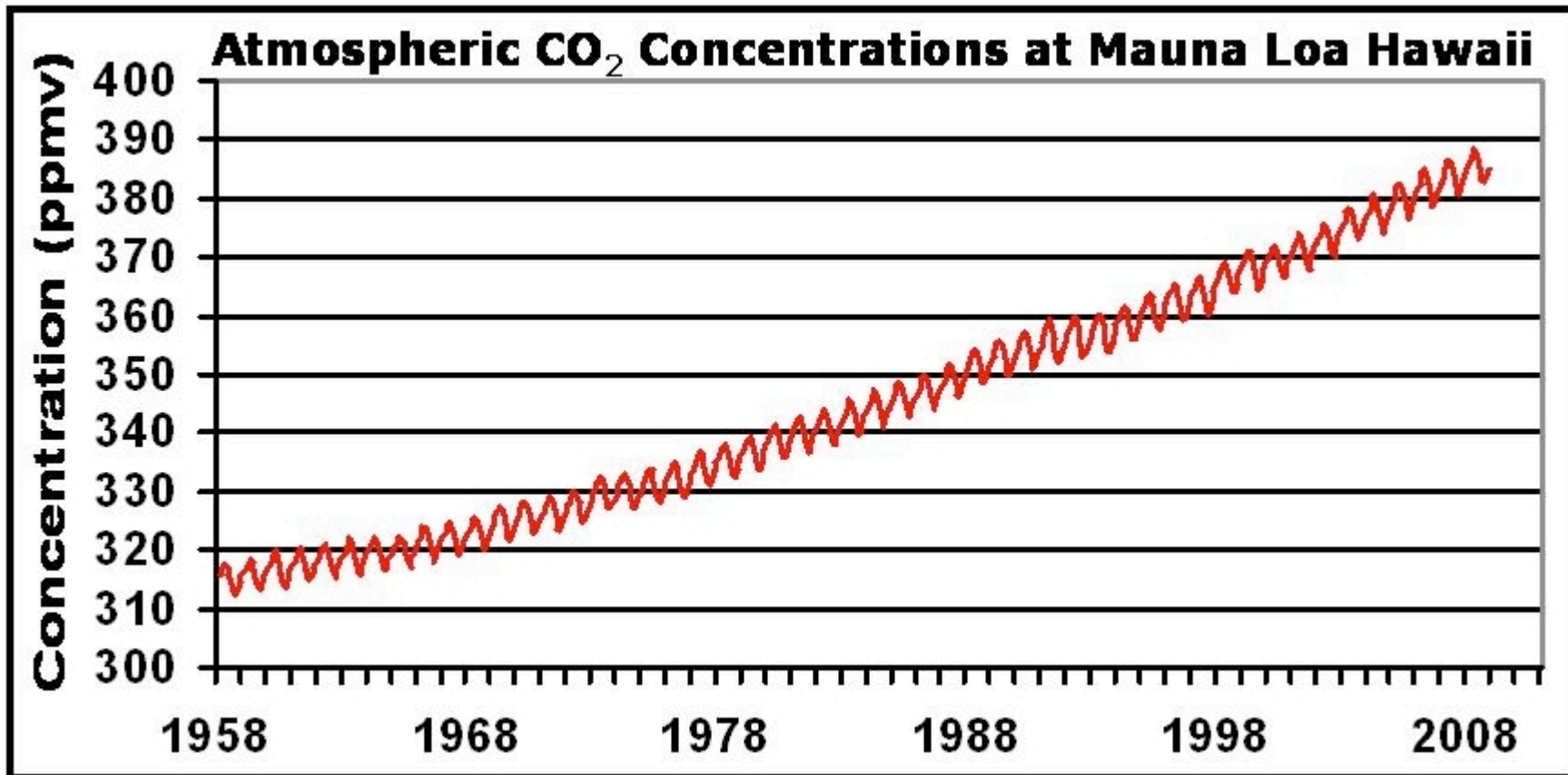
Here is the observatory on Mauna Loa on the island of Hawaii (The Big Island) where CO₂ has been measured since 1958.



Carbon Dioxide Research Group, Scripps Institution of Oceanography, University of California, La Jolla, California 92093-0444, U.S.A.

Hourly averages of atmospheric CO₂ concentration, wind speed, and wind direction are plotted as a basis for selecting data for further processing. Data are selected for periods of steady hourly data to within ~0.5 parts per million by volume (ppmv); at least six consecutive hours of steady data are required to form a daily average.

Keeling, C.D. and T.P. Whorf. 2005. Atmospheric CO₂ records from sites in the SIO air sampling network. In Trends: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A.



Source: <http://cdiac.ornl.gov/trends/co2/sio-mlo.html>

Atmospheric carbon dioxide concentration have been steadily increasing for many years.

February 2013: 396.80 ppmv (Source: <http://co2now.org/>)

The image is a screenshot of the CO2Now.org website. At the top left is the logo "CO2Now.org" and a search bar. Below the logo are navigation tabs: "CO2 Home", "Historical CO2", "Current CO2", "Future CO2", and "@ This Site". The main content area features a globe with chemical formulas (CO2, CH4, H2O, NO2) and the heading "What the world needs to watch". Text below the globe explains that global warming is due to rising CO2 levels and that the site provides real-time data. A quote at the bottom of this section reads: "Watch CO2 now and know the score on global warming, practically in real time." Below this is the "Earth's CO2 Home Page" section, which prominently displays "396.80 ppm" in large font. Underneath, it says "Atmospheric CO2 for February 2013" and "Preliminary data posted March 5, 2013 (Mauna Loa Observatory: NOAA-ESRL)". To the right of the main content is a sidebar with three sections: "CAUSE AND EFFECT" (listing Climate System, Climate Changes, Effects, Scientific Predictions, Climate Science, Temperature, Climate FAQs, Presentations), "KNOW CO2" (listing The Need to Know CO2, CO2 Monitoring), and "KNOW GHGS" (listing Emissions, Methane, CH4).

How accurate is this number?