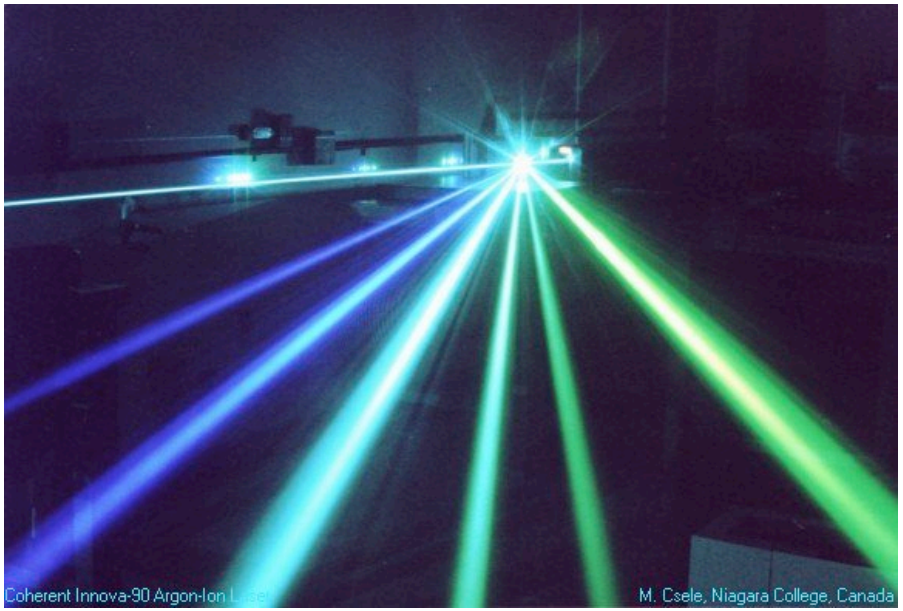
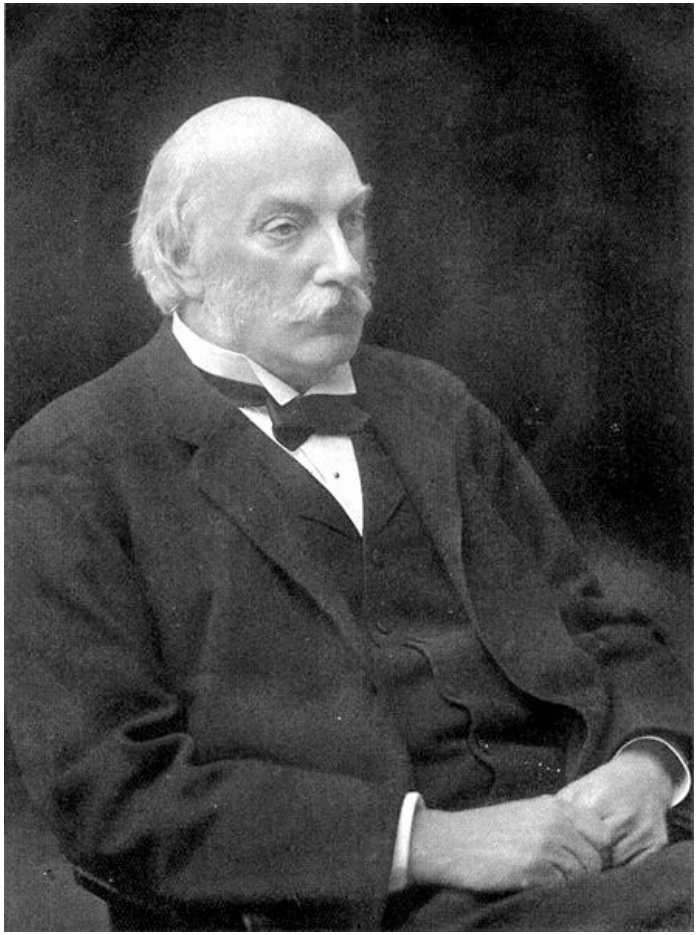
Atmospheric Analysis: The Discovery of Argon.



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 +/- 0.0004g

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 +/- 0.0008g

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!

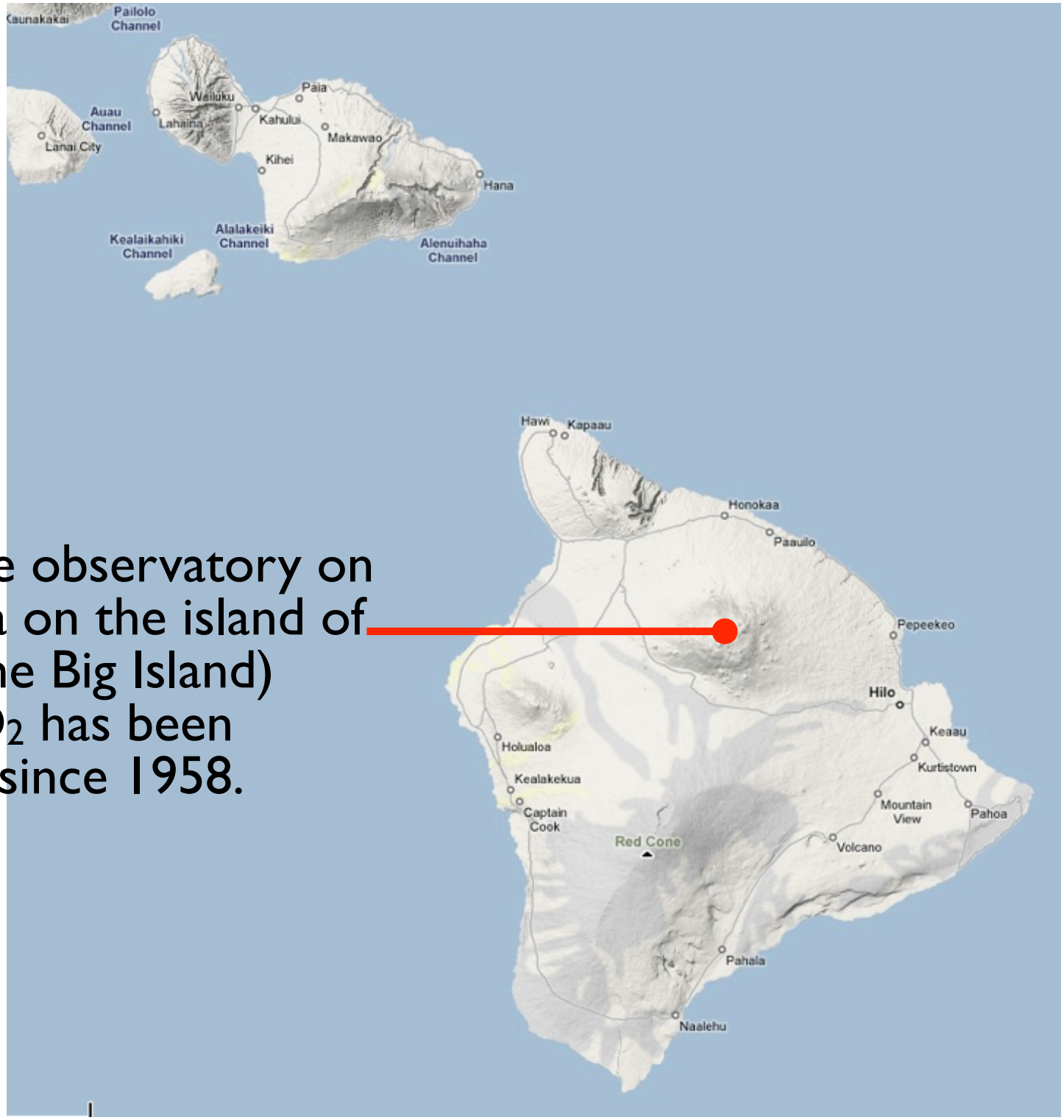
Lord Rayleigh wasn't too far off from the truth:

Real Atmospheric Content:

78 percent nitrogen
21 percent oxygen
0.9 percent argon
0.04 percent carbon dioxide
0.06 percent other

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

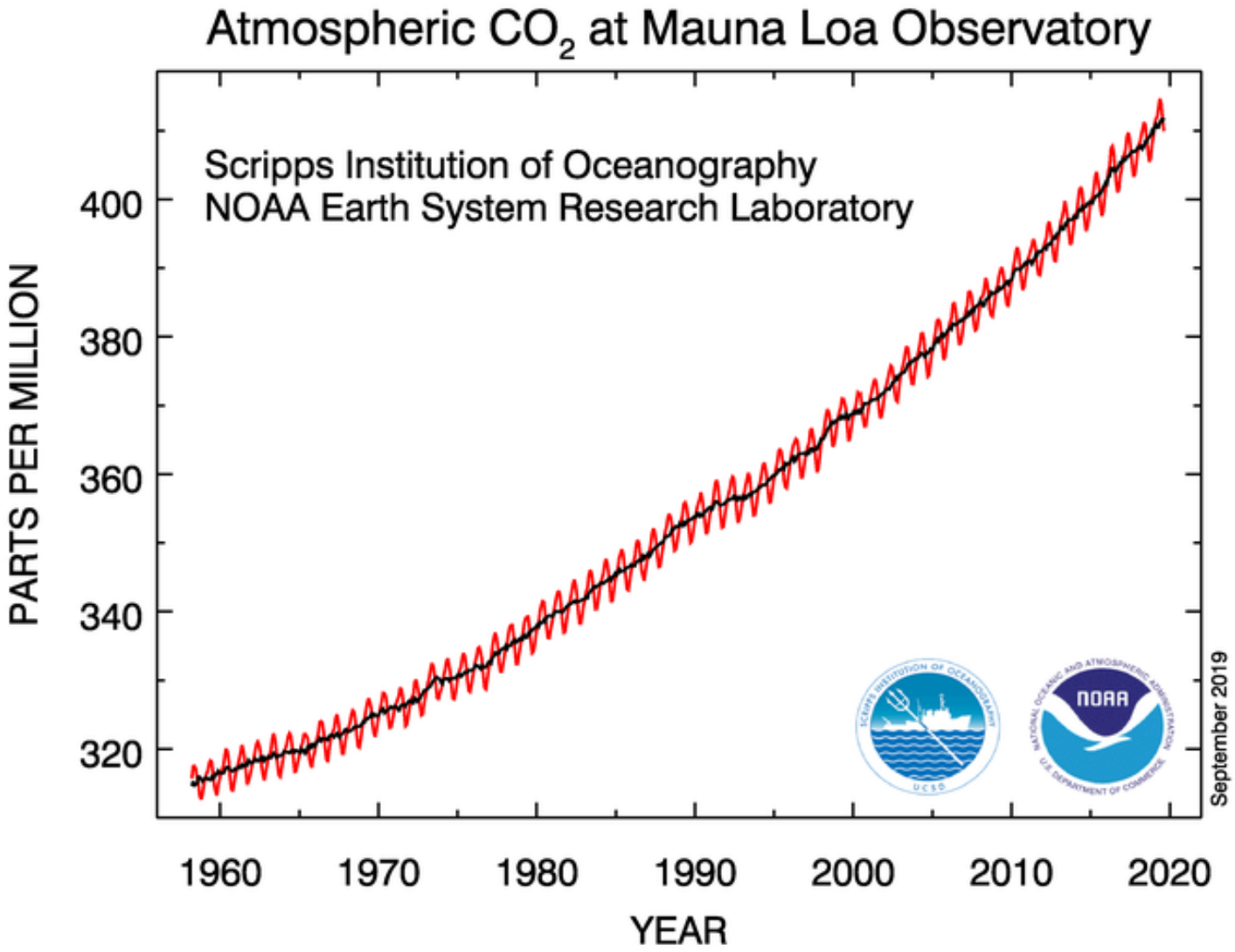
Here is the observatory on Mauna Loa on the island of Hawaii (The Big Island) where CO_2 has been measured since 1958.



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: https://www.esrl.noaa.gov/gmd/ccgg/trends/

Atmospheric carbon dioxide concentration has been steadily increasing for many years (1958-2019 data shown here).

August 2019: 409.95 ppmv (Source: https://www.co2.earth/)

How accurate is this number?