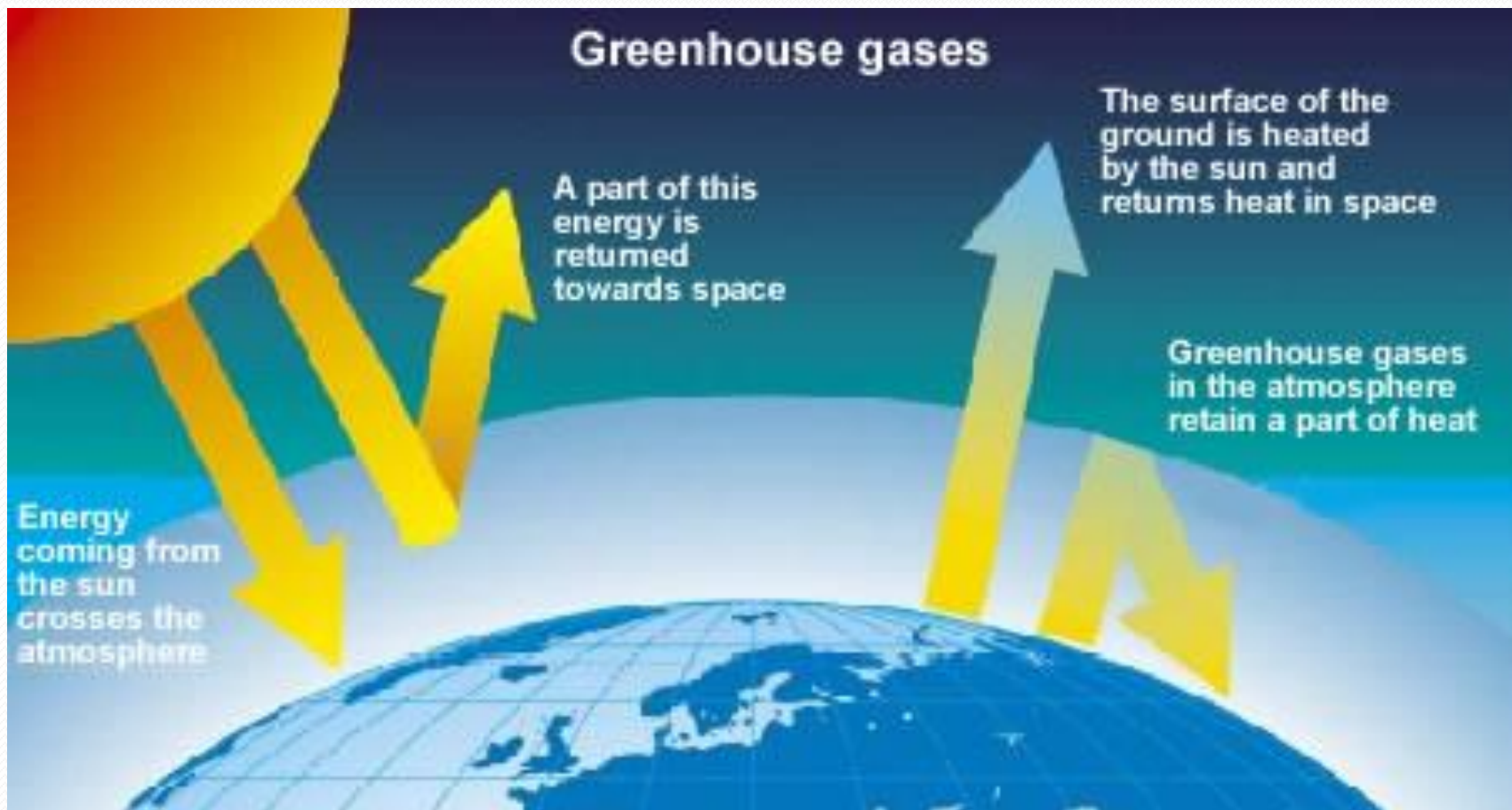


Mudança Climática Global

Estudos precursores

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Scientific Director
Fapesp

Efeito Estufa



Fourier, 1827



MÉMOIRE
DES LES
TEMPÉRATURES DU GLOBE TERRESTRE
ET
DES ESPACES PLANÉTAIRES.

Mémoires de l'Académie Royale des Sciences de l'Institut de France,
t. VII, p. 570 à 604. Paris, Didot; 1827 (1).

La question des températures terrestres, l'une des plus importantes et des plus difficiles de toute la Philosophie naturelle, se compose

John Tyndall, 1863



XXVII. *On Radiation through the Earth's Atmosphere.* By JOHN TYNDALL, F.R.S., Professor of Natural Philosophy, Royal Institution*.

NOBODY ever obtained the idea of a line from Euclid's definition that it is length without breadth. The idea is obtained from a real physical line drawn by a pen or pencil, and therefore possessing width,—the idea being afterwards brought, by a process of abstraction, more nearly into accordance with the conditions of the definition. So also with regard to physical

* From the Proceedings of the Royal Institution for Jan. 23, 1863.

Tyndall, 1863

This aqueous vapour is a blanket more necessary to the vegetable life of England than clothing is to man. Remove for a single summer-night the aqueous vapour from the air which overspreads this country, and you would assuredly destroy every plant capable of being destroyed by a freezing temperature.

Svante Arrhenius, 1896



THE
LONDON, EDINBURGH, AND DUBLIN
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE
[FIFTH SERIES]

APRIL 1896.

XXXI. *On the Influence of Carbonic Acid in the Air upon
the Temperature of the Ground.*
By Prof. SVANTE ARRHENIUS (1)

Arrhenius, 1896

A great deal has been written on the influence of the absorption of the atmosphere upon the climate. **Tyndall** (2) in particular has pointed out the enormous importance of this question. To him it was chiefly the diurnal and annual variations of the temperature that were lessened by this circumstance.

Another side of the question, that has long attracted the attention of physicists, is this: Is the mean temperature of the ground in any way influenced by the presence of heat-absorbing gases in the atmosphere?

Fourier (3) maintained that the atmosphere acts like the glass of a hot-house, because it lets through the light rays of the sun but retains the dark rays from the ground. This idea was elaborated by **Pouillet** (4); and **Langley** was by some of his researches led to the view, that “the temperature of the earth under direct sunshine, even though our atmosphere were present as now, would probably fall to -200°C , if that atmosphere did not possess the quality of selective absorption” (5).

Callendar, 1938



THE ARTIFICIAL PRODUCTION OF CARBON DIOXIDE AND ITS INFLUENCE ON TEMPERATURE

By G. S. CALLENDAR

(Steam technologist to the British Electrical and Allied Industries
Research Association.)

(Communicated by Dr. G. M. B. Dobson, F.R.S.)

[Manuscript received May 18, 1937—read February 16, 1938.]

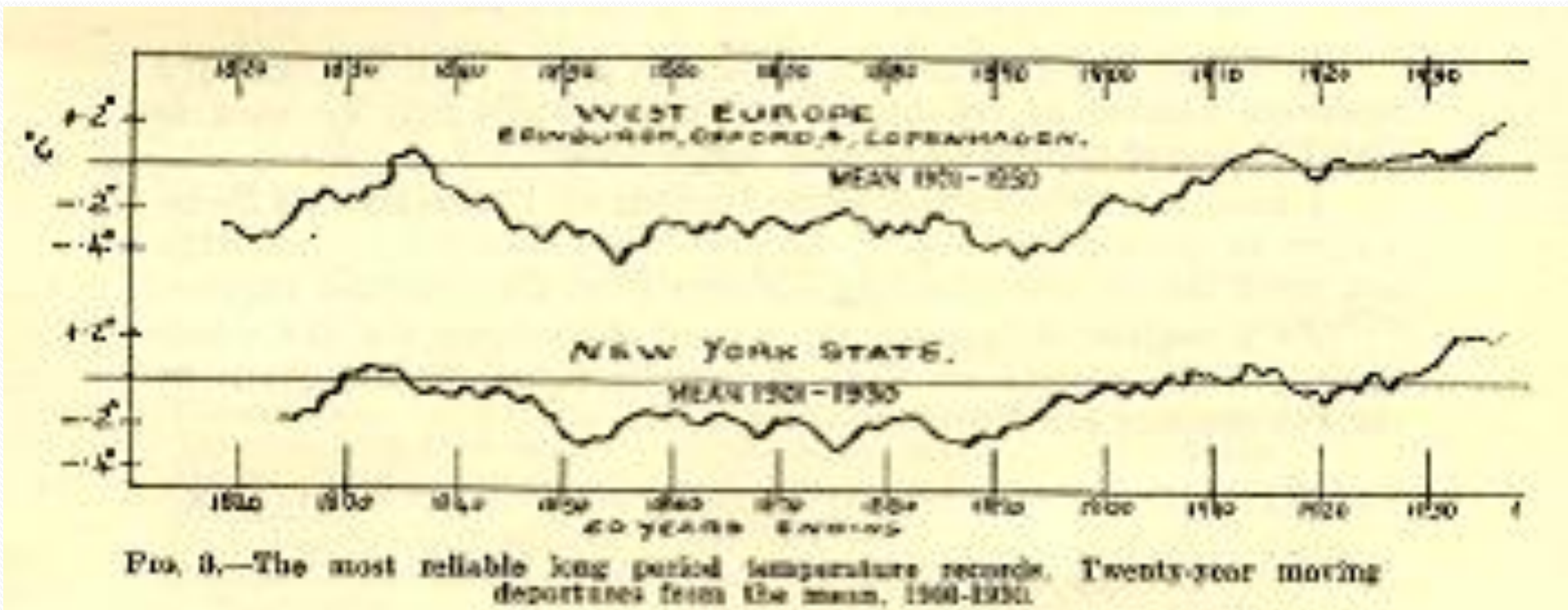
SUMMARY

By fuel combustion man has added about 150,000 million tons of carbon dioxide to the air during the past half century. The author estimates from the best available data that approximately three quarters of this has remained in the atmosphere.

The radiation absorption coefficients of carbon dioxide and water vapour are used to show the effect of carbon dioxide on "sky radiation." From this the increase in mean temperature, due to the artificial production of carbon dioxide, is estimated to be at the rate of 0.003°C . per year at the present time.

The temperature observations at 200 meteorological stations are used to show that world temperatures have actually increased at an average rate of 0.005°C . per year during the past half century.

Callendar, 1938



Callendar, 1938

In conclusion it may be said that the combustion of fossil fuel, whether it be peat from the surface or oil from 10,000 feet below, is likely to prove beneficial to mankind in several ways, besides the provision of heat and power. For instance the above mentioned small increases of mean temperature would be important at the northern margin of cultivation, and the growth of favourably situated plants is directly proportional to the carbon dioxide pressure (Brown and Escombe, 1905). In any case the return of the deadly glaciers should be delayed indefinitely.

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Keeling, 1957

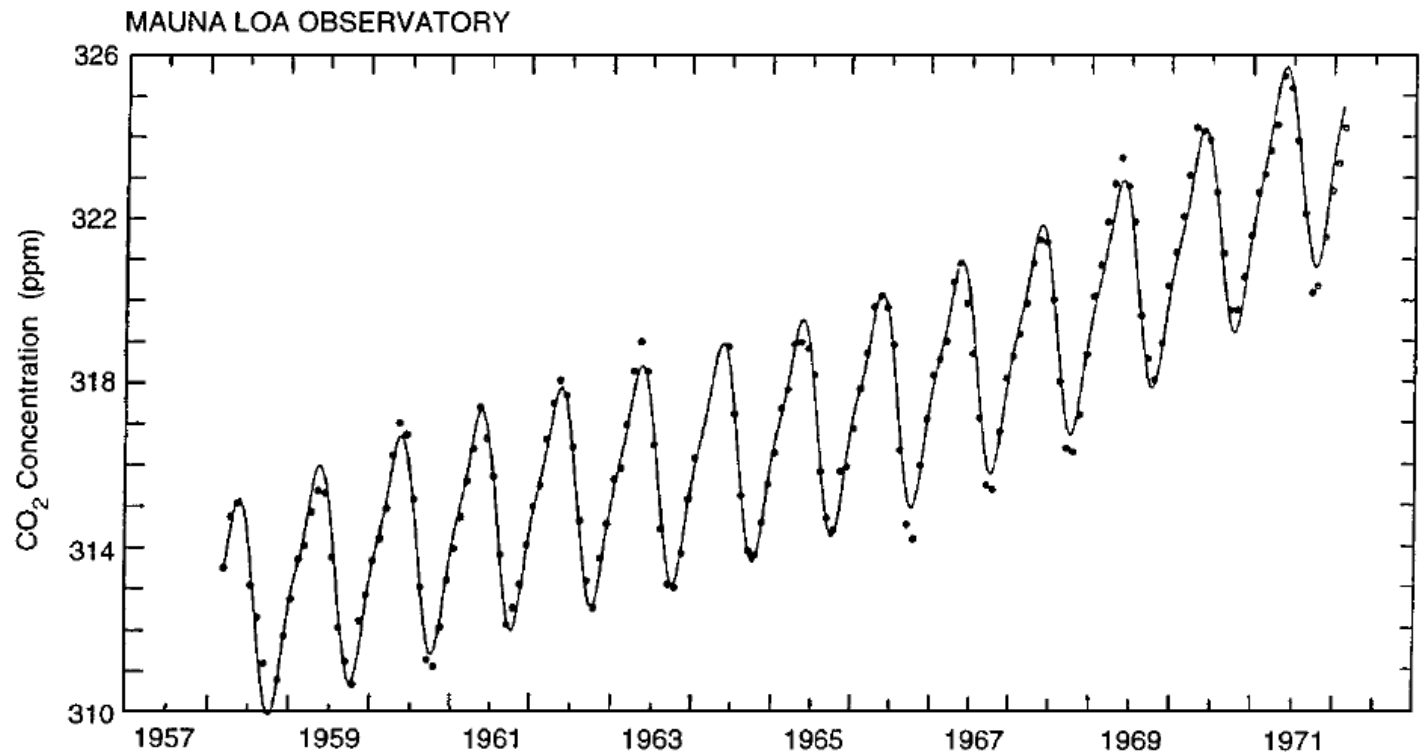
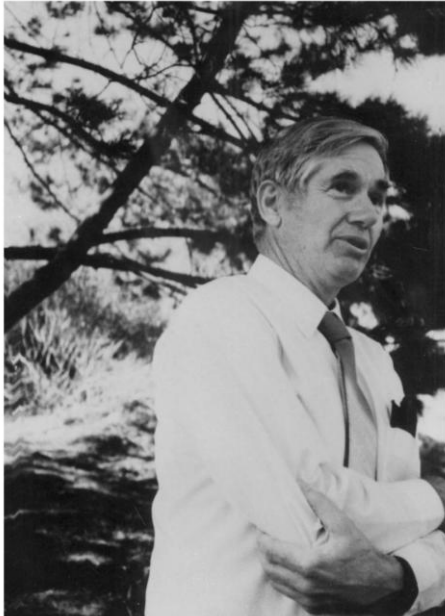
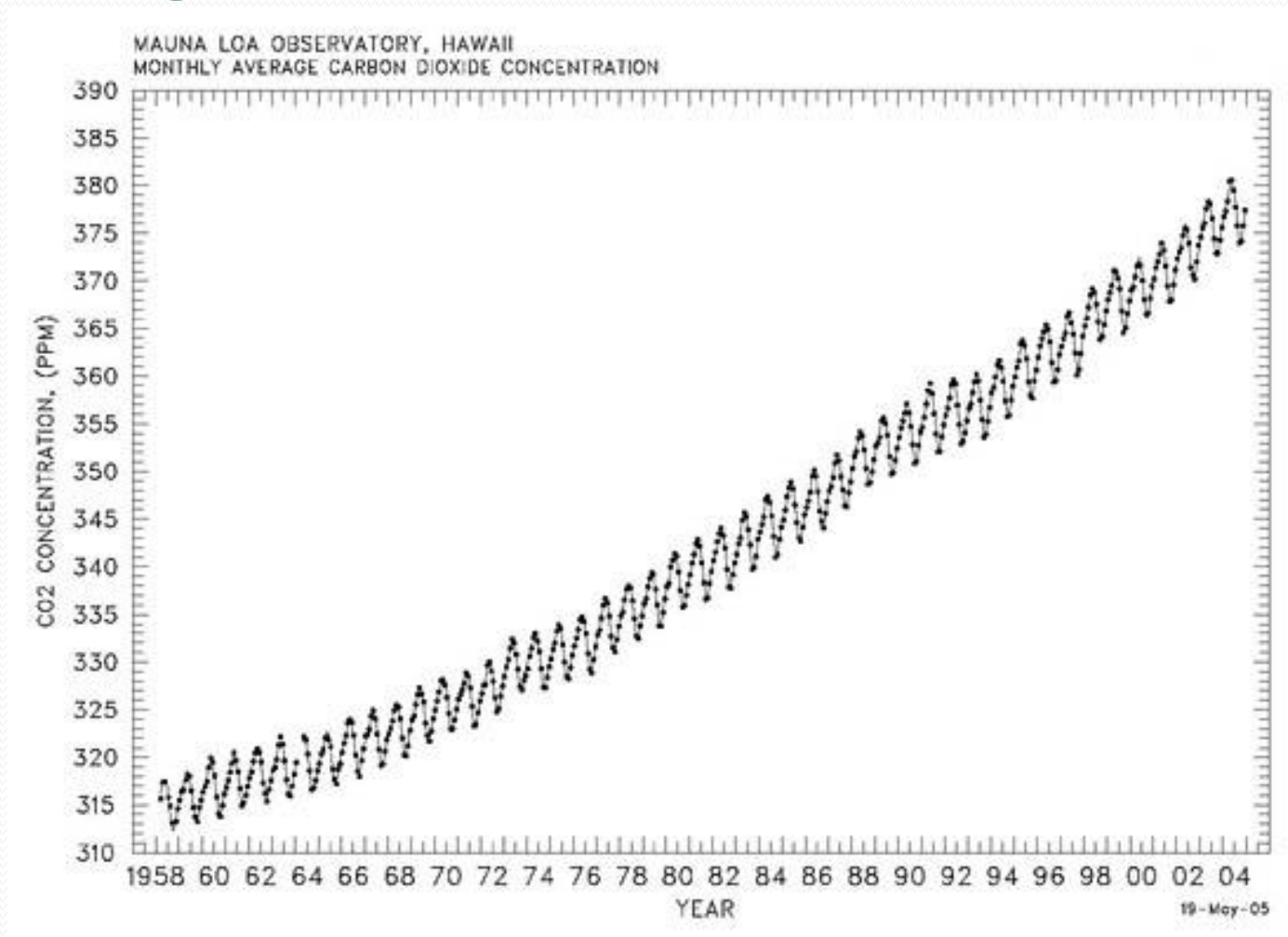


Figure 7 Long-term variation in the concentration of atmospheric CO₂ at Mauna Loa Observatory, with data through 1971. Monthly data are shown as *dots*. The *oscillatory curve* was obtained using the same function as in Figure 6. (Source: Ref. 15)

Keeling Curve, 2004



Keeling : Rewards and Penalties of Monitoring the Earth, 1998

ABSTRACT

When I began my professional career, the pursuit of science was in a transition from a pursuit by individuals motivated by personal curiosity to a worldwide enterprise with powerful strategic and materialistic purposes. The studies of the Earth's environment that I have engaged in for over forty years, and describe in this essay, could not have been realized by the old kind of science. Associated with the new kind of science, however, was a loss of ease to pursue, unfettered, one's personal approaches to scientific discovery. Human society, embracing science for its tangible benefits, inevitably has grown dependent on scientific discoveries. It now seeks direct deliverable results, often on a timetable, as compensation for public sponsorship. Perhaps my experience in studying the Earth, initially with few restrictions and later with increasingly sophisticated interaction with government sponsors and various planning committees, will provide a perspective on this great transition from science being primarily an intellectual pastime of private persons to its present status as a major contributor to the quality of human life and the prosperity of nations.

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