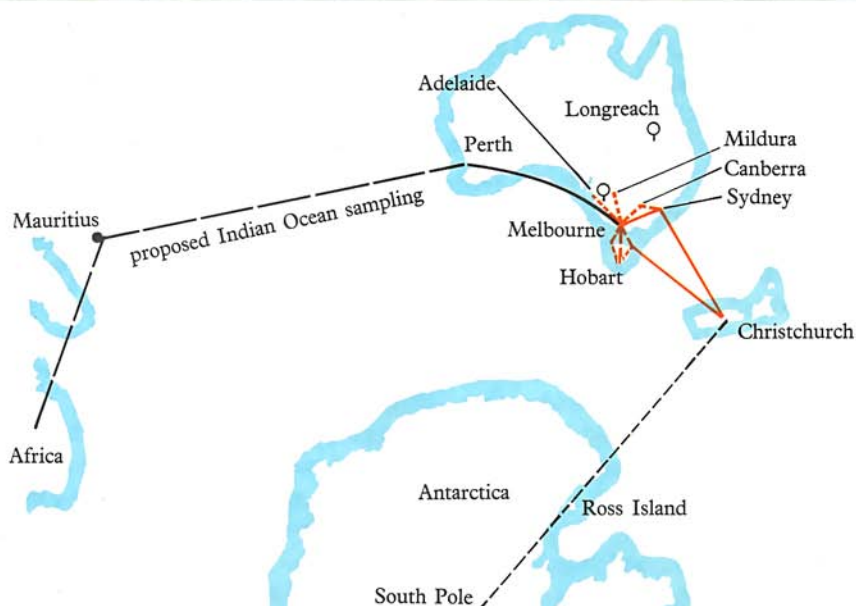


Monitoring carbon dioxide

Sampling by balloon and by aeroplane

agency	altitude	measurement frequency
----- Department of Transport	3-5 km	weekly
----- N Z Department of Scientific and Industrial Research	10-13 km	irregular
===== QANTAS	3-13 km	bi-weekly
===== TAA	11-13 km	bi-weekly
♀ Department of Supply (balloon)	23-35 km	irregular
CSIRO, Aspendale, Melbourne	surface	weekly



For many years people have been issuing dire warnings against allowing ever-growing amounts of carbon dioxide to pour into the atmosphere. Burning coal, oil, and other fossil fuels always produce this gas, and world output has shot up in this century.

What worries people is the way carbon dioxide absorbs heat emitted by the earth and lower atmosphere more effectively than it does incoming radiation from the sun. This produces a 'greenhouse effect' that should result, if there were no off-setting influences, in temperatures rising near the earth's surface as levels in the atmosphere build up. It would take an average increase of only a few degrees to melt the Arctic and Antarctic ice caps, and the water released would raise ocean levels, flooding vast areas.

The carbon dioxide content of the atmosphere is increasing. In 1880 it was

about 290 parts per million (p.p.m.) and it is now about 320 p.p.m. Recently it has been increasing by about 1 p.p.m. each year.

Between 1890 and 1940 average temperatures in the northern hemisphere rose by 0.6°C. However, since 1940 they have fallen about 0.4°.

Clearly there isn't a simple relation between increases in carbon dioxide levels and temperature changes. Some scientists have suggested that dust released into the atmosphere has a cooling effect that is cancelling out the heating effect of the gas.

However, recent evidence disputes this, and just what is happening is not known.

The annual output of carbon dioxide from the burning of fossil fuels now equals about 0.5% of the total in the atmosphere, but there is no certainty that this is the major cause of the measured increases. Many questions still need answers.

Two years ago Dr Graeme Pearman and Dr John Garratt, of the CSIRO Division of Atmospheric Physics, began a large-scale monitoring program by aeroplane and balloon, with the co-

operation of the organizations named on the map. Air samples are collected along the routes and at the altitudes shown. Carbon dioxide content is measured at the Division's Melbourne laboratories.

The southern hemisphere data collected by the CSIRO group, and regular measurements being made by other groups in three areas of the northern hemisphere and in Antarctica, are providing details of carbon dioxide movements as well as concentrations. Hopefully, they will eventually lead to a thorough understanding of the causes and effects of the build-up.



'The CSIRO (Australia) Baseline Atmospheric Carbon Dioxide Monitoring Program—Progress Report No. 2.' G. I. Pearman and J. R. Garratt. (CSIRO Division of Atmospheric Physics: Aspendale 1973.)