NATURE

50 Years Ago

As regards technical development, very high frequency, "VHF", is undoubtedly the radio system of the future. The possibility of stereophonic broadcasting on some regular scheduled basis is just beginning to show above the horizon. Even to-day, some 6 million people who have no television depend entirely on sound for their broadcasting service, and the needs of this audience are as diverse as ever. Extensions which the British Broadcasting Corporation has in mind at present concern particularly the Light Programme and the Third Network.
From *Nature* 25 July 1964

100 Years Ago

The Progress of Eugenics. By Dr. C. W. Saleeby — Dr. Saleeby divides eugenics into natural or primary and nurtural or secondary. Natural eugenics is further sub-divided into positive, negative, and preventive … In treating these subjects Dr. Saleeby says, "We must be scientific or we are lost," and it is certainly true that he would have succeeded better if he had himself maintained a more scientific attitude. He falls far short of it in particular in that he appears to judge of the validity of scientific work by the conclusions it arrives at … Nevertheless, there is much contained in the book that is sensible … and this circumstance makes its faults all the more regrettable. Besides that to which allusion has already been made there are two others, first the obtrusive egotism of the writer, and secondly his habit of misrepresenting people from whom he differs in opinion. To say that "for years the chief object of the biometrical laboratory at University College has seemed to be, and now clearly is, to prove the inheritance of this or that human character is 'not Mendelian'" is little short of libellous.
From *Nature* 23 July 1914

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Figure 1 | Thermokarst lakes in Siberia. Walter Anthony *et al.*[4] report a substantial carbon sink in sediments that formed at the bottom of lakes created from melting permafrost.

and methane are emitted to the air, sinking particles form sediment at lake bottoms and thereby bury carbon. This process is well understood, and happens in a similar way in the ocean. But most studies on the carbon balance of lakes, including thaw lakes, have focused on greenhouse-gas emission — perhaps because gas emission is more obviously linked to climate change than is mud.

Walter Anthony and colleagues used shovels to dig up to 20 metres deep into the sediments of thaw lakes in Siberia (Fig. 1). This was possible because the thaw lakes have gone through a typical series of different phases: once formed, meltwater continued to erode the frozen soil until eventually a lateral or below-ground channel opened up and drained the water from the lake basins. The sediments were suddenly exposed to cold Arctic air and froze, forming a carbon-rich permafrost soil type called alas.

The authors found that carbon accumulated at high rates in permafrost thaw lakes that had formed after the most recent ice age. On the basis of observations of present-day thaw lakes, they infer that high nutrient levels supplied from thawing permafrost boosted the growth of aquatic plants such as mosses and sedges, and that near-zero oxygen levels and low temperatures in bottom waters inhibited microbial degradation of accumulating plant remains.

By calculating gas emission and carbon burial back in time, Walter Anthony and co-workers conclude that thaw lakes acted as strong methane sources starting 15,000 years ago, but switched to become carbon sinks about 5,000 years ago. Summing up this behaviour for the past 15,000 years, it seems that thaw lakes have buried more carbon than they emitted to the atmosphere. The researchers estimate that this massive burial has resulted in alas carbon making up about one-third of today's carbon stock in permafrost soils in the region where yedoma is the dominant soil type.

Revealing a significant carbon sink in a region that is thought to be a hazard for climate change is a spectacular achievement. But, needless to say, uncertainties in the authors' large-scale, back-in-time calculations are large. Pronounced variations in gas emissions over space and time[7,8] make generalizations challenging, even for fairly well-studied, present-day lakes; estimating gas emissions for the past 15,000 years necessarily relies on numerous assumptions.

For example, shifting environmental conditions may change the ratio of the amount of CO_2 and methane produced, as well as the extent of methane oxidation to CO_2 by aquatic microbes, thereby affecting estimates of the climate effect of gas emission. Also, the accumulated plant remains count as a carbon sink only if the plants used atmospheric CO_2 for growth, but intensive degradation of yedoma in the thaw lakes may have provided growing plants with yedoma-derived CO_2 — how much is uncertain. Irrespective of these and other uncertainties, Walter Anthony and colleagues' paper adds another layer to our picture of permafrost landscapes, and shows clearly that conclusions about ecosystem carbon balances that rely solely on atmospheric gas exchange are misleading[9,10].

But does the paper dispel the idea of massive, warming-induced carbon release from thaw lakes? Certainly not. The authors' calculations reveal that a pronounced methane-emission pulse occurred on thaw-lake formation, resulting in a climate-warming effect that lasted several thousand years. Even if sedimentary carbon burial in presently forming thaw