NATURE

100 YEARS AGO

As attempts are being made to found a domestic science, and to introduce exactitude into the operations of the kitchen, a note in the Monthly Weather Review recording the actual experience of a housekeeper at Albuquerque, New Mexico, is of interest. It appears that cooking recipes and practices which are trustworthy not far from sea-level are worthless at Albuquerque, the altitude of which is 4933 feet. Water boils there at 202 °F, instead of 212 °F; hence articles of food, the cooking of which depends upon heat applied through the medium of water, require a longer time for cooking than is given in the cookery books... But the worst difficulty is with cake-making. Ordinary recipes as to number of eggs and amount of baking powder break down altogether, and housekeepers have to modify them if they wish their operations to be successful. As the barometric pressure determines to what extent the disengaged carbon dioxide shall expand and aerate the dough, this may explain the different action of baking soda and egg batter. In any case, the observation is interesting, and chemists may find it worthy of their attention.

From *Nature* 30 August 1900.

50 YEARS AGO

Maui-of-a-Thousand-Tricks, his Oceanic and European Biographies. By Katharine Luomala.

From time immemorial adventure stories have taken hold of the imagination, and this is partly why the cult of Maui-of-a-thousand-tricks is so widespread in the Pacific. The origin of this hero is not unparalleled in other mythologies: born of human parents, he was brought up by the gods and learnt their magic, so that when he returned to earth he was able to use this knowledge in part to aid humanity, in part for his own diversion and pranks... . The cult of Maui, though predominantly Polynesian, is found also in Micronesia and Melanesia, principally where there has been contact with Polynesia. In some islands there is a long story cycle, in others merely a footprint... there can be no 'true' account of this hero, but the fact remains that he won the hearts of the islanders over a vast region and maintained that hold for centuries... Katharine Luomala is to be congratulated on her perseverance in collecting this vast amount of material... the fact that the bibliography runs into more than three hundred items speaks for itself.

From *Nature* 2 September 1950.

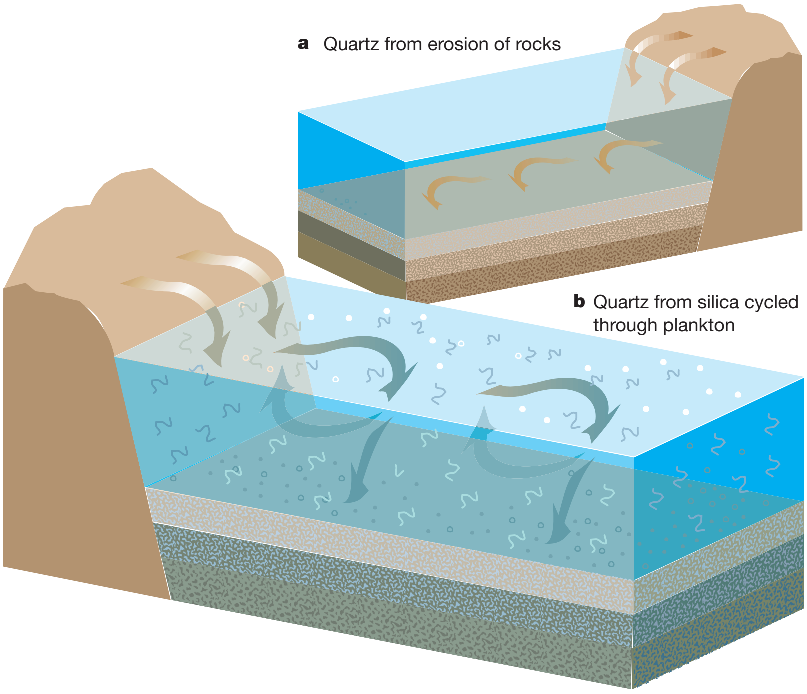

Figure 1 **What is the origin of the quartz found in ancient mudrocks? Previously, most of the quartz was thought to be eroded from older rocks** (a)**, but it could also come from the dissolved silica of plankton skeletons** (b)**. A study by Schieber *et al.*[1] now favours the latter process as the main source of quartz in some mudrocks, although ultimately the silica in the plankton would have come from weathered rocks.**

reconstructions of past climate in which large amounts of sedimentary quartz silt (thought to be carried by the wind) have been used to infer increased wind strength. Of course, to be present in the mudrocks at all, some SiO_2 must have been transported out to sea, but probably in its dissolved form, silicic acid, which is used by plankton to make skeletons, rather than as quartz grains. This in turn suggests that the main mechanism by which dissolved silicon is supplied to the oceans — the chemical weathering of rocks and subsequent transport by rivers[2] — was probably more intense than previously thought.

What, then, is the source of the quartz silt in these mudrocks? One might expect the sediment to contain remnants of ancient organisms, such as diatom algae that use SiO_2 for their hard shells. Unfortunately for those seeking to trace the fossil record of such organisms, their hard parts are made of opal — the hydrated form of silica ($SiO_2{\cdot}0.4H_2O$). Opal is structurally amorphous and unstable, and transforms rapidly on burial to crystalline quartz, destroying any delicate skeletal structures. But Schieber *et al.* did find evidence for radiolarians (unicellular protozoan zooplankton) in their samples. Some of their opaline skeletal structures were preserved in nodules that acted as sealed microenvironments and so stopped them from dissolving completely, yet it seems unlikely that radiolarians alone could have contributed all the quartz formed *in situ*.

The oldest known fossil diatom is around 190 million years old[3], but there is molecular evidence that suggests that diatoms first appeared 400 million years ago[4]. Schieber *et al.* speculate that the discovery of abundant quartz silt formed *in situ* may explain the 'missing' diatom fossil record, in so far as the silica from the vanished diatoms may have been transformed into quartz silt. But the reliability of the 'molecular clock' is no longer certain[5] and a more conservative molecular reconstruction gives a much younger date (266 million years ago) for the origin of diatoms[6], which is much closer to that of the existing fossil record.

If the quartz silt is not derived from diatoms, the next best candidate may be a diatom precursor, originally a naked cell that acquired a coating of siliceous scales[7]. Siliceous scales only a few micrometres in size, resembling those of modern chrysophyte algae, have also been found in much older rock strata (from 550 million years ago)[8]. Whatever the origins of the *in situ* quartz, the answer lies in further investigations of ancient mudrocks.

Last month, an article in these pages[9] drew attention to the close links between the biogeochemical cycles of silica and carbon over recent millennia through the key role played by siliceous plankton in the biological carbon pump (the flux of carbon to the sea floor). Significantly, the sediments studied by Schieber *et al.* are also rich in organic carbon. The actions of biogeochemical cycles