

ence of its gradual breakdown, especially upon heating and upon even small amounts of mechanical shearing. Although definite figures are impossible to give because of the quantities available, we are sure that not a single worker in the field shares Dr Donahoe's science fiction worries.

There is still no adequate explanation of the phenomenon, and no coherent picture of its properties. One of the greatest difficulties in even accepting the existence of a more stable phase is its apparent absence in nature. Indeed, this is the most persuasive evidence of its inability to grow at ordinary water's expense, for it has stood the test of billions of years. The classic conditions for its formation—a quartz surface and greater than 95 per cent humidity—are very widespread in nature, yet no anomalous water has been detected. If it can grow at the expense of ordinary water, we should already be a completely dead planet.

Yet we are not, and totally unlikely to become so from this source. By all means draw the attention of scientists to the dangers of their work, but make sure it is a real danger before alarming everybody else.

Yours faithfully,

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STR.—Donahoe's recent letter (*Nature*, **224**, 198; 1969) prompts us to draw attention to the present uncertainty concerning the nature and properties of "anomalous" water. First, it must be emphasized that, whatever the correct interpretation may be, several of Derjaguin's experimental observations have been confirmed by recent work in several laboratories including our own. Anomalous properties are readily observed when saturated water vapour is allowed to condense in silica (or 'Pyrex') capillaries with diameters less than 50 micrometres, and the bulk of the ordinary water removed by lowering the vapour pressure by about five per cent. This is true even when the experiment is done in the presence of air and atmospheric pressure.

Because of the difficulty of making precise measurements on such small samples, some of the physical properties of "anomalous" water are still subject to some uncertainty. In particular, those listed by Donahoe cannot all be accepted without question. "Anomalous" water does not have negligible vapour pressure for it can be distilled; and although a density of 1.4 g/cm<sup>3</sup> has been reported, this value has been challenged recently by Mansfield<sup>1</sup>. Nor is there yet any conclusive evidence that "anomalous" water is more stable than ordinary water. The decreased vapour pressure of mixtures of "anomalous" and ordinary water is certainly no evidence for the greater stability of the anomalous species.

The mechanism by which "anomalous" water is formed is still not understood. The available evidence suggests that it forms only at the silica surface at the onset of condensation; subsequent condensation forms ordinary water which dilutes the anomalous species. There seems to be no evidence at all that, in solution in ordinary water, further "anomalous" water is formed spontaneously.

In view of the comparative ease with which "anomalous" water can be produced in the laboratory, it seems highly probable that it is also formed under terrestrial conditions, where suitable media and appropriate humidity fluctuations occur. Indeed, some of the earliest suspicions of the existence of an anomalous form of water are to

be found in work done thirty-five years ago on natural materials<sup>2</sup>. Ordinary and "anomalous" water must then surely have coexisted on Earth throughout geological time, without the kind of catastrophe envisaged by Donahoe. While, therefore, we respect Donahoe's concern that proper vigilance should be maintained in any research involving the preparation of new materials, we consider that none of the existing evidence warrants the pessimistic conclusions he reaches.

Robert Burns's affections were guaranteed to remain constant "till all the seas run dry". While he may not have envisaged the possibility that the oceans might instead become anomalous, we feel that his shade may derive some consolation from the fact that they have not already done so.

Yours faithfully,

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<sup>1</sup> Mansfield, W. W., *Abst. IUPAC Conf.* (Sydney, Australia, 1969).

<sup>2</sup> Wilson, B. H., *J. Soc. Chem. Ind.*, **53**, 397 (T) (1934).

### Teaching and Scientific Research

STR.—Professor M. C. R. Symons, in his excellent article "Teaching and Scientific Research" (*Nature*, **223**, 353; 1969), reports his experience with the scientific literature as follows: "The routine coverage of current literature is a task of very considerable magnitude, which gets progressively worse. Unfortunately, . . . one can spend hours trying to understand one paper. There may be hundreds of papers each month that need to be read carefully, and so this is clearly a dominant aspect of our work".

Professor Symons's experience accords with my own and, I believe, with that of most other scientists. Consequently, I suggest that we scientists study our method of reporting research and thereby try to find a way of designing the research report for rapid reading and quick comprehension.

From my own brief studies, I predict that on the average we can at least double the rate at which research reports can be read understandingly and that we can simultaneously decrease, by at least one-half, the accompanying reader fatigue.

Should we succeed in designing reports for extremely rapid comprehension and ease of reading, the benefits to science would be incalculable.

Yours faithfully,

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### University News

**Dr L. Rotherham**, Central Electricity Generating Board, has been appointed Vice-Chancellor of **Bath University of Technology** from September 1, 1969.

**Professor D. K. Britton**, University of Nottingham, has been appointed to the chair of agricultural economics tenable at **Wye College**, University of London.

**Professor C. P. Whittingham**, Imperial College of Science and Technology, **University of London**, has been elected Dean of the Royal College of Science.

**Mr B. Shackel**, EMI Electronics Ltd, has been appointed a professor of ergonomics in the department of ergonomics and cybernetics, **Loughborough University of Technology**.