

## Artful scientists

SIR — In 1878, J.H. van't Hoff (who became the first Nobel laureate in chemistry in 1901) read an inaugural lecture at the University of Amsterdam entitled "Imagination in Science". In that lecture, van't Hoff suggested a correlation between scientific eminence and creativity in the fine arts and literature based upon a study of more than 200 scientific biographies. I am attempting to verify van't Hoff's thesis with regard to important scientists since 1800. Van't Hoff himself was a poet, as were his colleagues Walther Nernst, Fritz Haber and Richard Willstätter. One can add to the list Ronald Ross, Julian Huxley, E.N. da C. Andrade and Jacob Bronowski. van't Hoff's friend Wilhelm Ostwald was a painter, as were Louis Pasteur, F.F. Runge, Ogden Rood, Ernst Haeckel, Theodor Boveri, Frederick Banting, Lord Adrian and C.G. Jung. C.H. Waddington wrote a history of twentieth century science-art interactions. Ernst Mach, Hermann von Helmholtz, James Jeans, Max Planck, Albert Einstein, Woldemar Voigt and many others had an intense interest in music. J.B.S. Haldane, C.P. Snow and Leo Szilard wrote works of fiction.

The problem is that all too often these nonscientific activities are not mentioned in obituaries or standard biographies since they are regarded as unimportant. The actual products (paintings, sculptures, manuscripts and so on) are even more difficult to locate. Yet to those interested in nonverbal thinking and scientific creativity, van't Hoff's hypothesis is an intriguing one that can only be studied in the light of the relevant non-scientific products of the scientist's imagination. Further references to scientists of significant professional stature who were notably creative in other fields would be appreciated, as would descriptions of collections or sources of reproductions of creative artefacts.

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## Proxy records

SIR — The article "Frost rings in trees as records of major volcanic eruptions" by LaMarche and Hirschboeck (*Nature* 307, 121-126; 1984) included the phrase "Recent development of proxy records of past eruptions . . ." But what does this mean?

This use of "proxy" is unknown to the *Oxford English Dictionary*, and two US colleagues I have consulted cannot tell me the precise meaning of the phrase "proxy records".

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## A Homeric riddle solved . . . again

white + red + black + grue + yellow + yellow + grue + green + blue + purple and or pink and or orange

SIR — I note with interest the recently preferred explanations of Homer's "wine-dark sea". The field of anthropological linguistics provides another, more elegant solution.

All languages possess between two and eleven basic colour terms, that is, colours that cannot be described as "shades" of other colours<sup>1</sup>. They enter a language in a fixed order<sup>2</sup>, as shown above, where "grue" covers both the green and blue areas of the spectrum. "Grey" can enter at any time after the first five.

As English has all eleven basic colour terms, we find it difficult to cope with

systems such as Homeric Greek, which divides the spectrum into only four parts, the equivalents of "white", "black", "red" and "yellow"<sup>3</sup>, and the related adjectives cover a correspondingly wide spectral band. (Compare Old Irish *fion dubh* "black wine" and *glas-muir grue sea* "within a five-colour system.")

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SIR — Homer's seas were not always "wine-dark". Often, they were "gray" (*Iliad* 14:190, *Odyssey* 2:261. . .) or, "bright", "black", even "violet" (*Od.* 5:57, 11:107). Surprisingly, oxen could be "wine-dark" too (*Il.* 13:703), while ships might have "purple-red" cheeks (*Od.* 11:124, 23:271. . .). Cloaks worn by nobility were invariably plain "purple" (*Od.* 4:154). Yarn and wool, however, might be "sea-purple" (*Od.* 6:53, 6:306) or "violet-dark" (*Od.* 4:135). Sometimes a "steel" or, "bright blue" was mentioned (*Il.* 18:564, *Od.* 7:87) or a "grayish blue green" — glaucous.

The mysterious, often-used epithet "wine-dark" very possibly did come, in part, from the bluish-purple colour of wine mixed with water (*Od.* 7:164. . .) — as has been suggested by others.

Mostly, however, it was probably a discreet salute to the surly, dark-haired sea-god, Poseidon, ever raging against Odysseus to take his life. "Flaming" or "swarthy" wine, αἶθρα (*Il.* 1:462, 4:259 . . .) was used for libations to the gods. Poseidon spent his leisure moments feasting with the Ethiopians, Αἰθρα, "who dwell sundered in twain, the farthest of men, some where Hyperion sets and some where he rises". His watery realm divided Zeus's heaven and Hades' underworld (*Il.* 15:189). He was the jealous husband to Amphitrite, the ancient sea goddess and his vengeful roiling of the sea with quakes, storms and winds was akin to a besotted spirit's. His name, Ποσειδάων surely derived from ποος, (1) "drink", (2) "husband" and, δαω, (1) "set ablaze", (2) "divide" (as with the trident).

Like Odysseus, Homer the poet-minstrel was probably a frequent sailor from kingdom to kingdom. He may also have felt assailed by treacherous seas.

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SIR — It has been suggested<sup>1,2</sup> that Homer addressed the sea as "wine-dark" either because his wine was blue or because dust clouds at dusk made his sea crimson.

The true reason is quite different but equally wonderful. Our colour system is primarily based on the frequency spectrum of light: not so the Homeric one. It was that great classical scholar and part-time Prime Minister, William Ewart Gladstone, who first noted that Homer used colour terms to refer primarily to distinctions of light and shade<sup>3</sup>.

Thus the word *khloros* describes both green leaves and yellow sand: meaning something like "pale". Whereas *glaukos* describes grey eyes and green willow leaves: meaning "glinting". So Homer's wine-dark sea merely had the albedo of wine, not its frequency.

Gladstone suggested "the organs of colour and its impression were but poorly developed among the Greeks of the heroic age" (cited in ref.4). But we need not assume there was anything physiologically the matter with the ancient Greeks. Indeed several tribes today have a notion of colour remarkably similar to that of Homer. For example<sup>5</sup> the Jale of New Guinea have but two colour terms, corresponding to "dark" and "light"; and the Tiv of Nigeria have three colour terms, meaning "dark", "light" and "reddish".

One final speculation. According to tradition, Homer was blind. Perhaps he was just colour blind?

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