

breakfast'. A book by G. Elssner et al. describes the "Materialographic Preparation" of *Ceramics and Ceramic Composites* [44].

1.7. Units

Remember what Pedro Larroque used to say after reading your essays, that if you enjoy writing something, then what you write is bound to be enjoyed by others; remember how his eyes used to shine behind his glasses when he gave you a little pat on the shoulder: "Keep writing, Señorita Montalvo, always be a writer". Well, just for now, I am Pedro Larroque. Please, Sofía, keep writing and write about anything you want to. You can extract the essence from anything, you can turn the most banal and dull things into literature... You've no right to waste that gift.

Carmen Gaité, *Variable Cloud*

If you have a weak spot for thesauruses, books like Fowler's *Modern English Usage* and other such fascinating but time-wasting compilations, *Scientific Unit Conversion* by F. Cardarelli [45] is a must. The sober title of this splendid book gives no idea of the richness of its contents, which occupy 488 densely filled pages. After an account of SI, lists of other systems of units and conversion factors are provided but even in the relatively formal account of the SI, F. Cardarelli's erudition shines through. In what way was the Abbé Gabriel Mouton a precursor of modern units of length? What have Sir Christopher Wren, the Abbé Picard, Huygens and Charles Marie de la Condamine in common? And Lagrange, Monge, de Borda, Condorcet and Laplace? All these questions are answered in passing (the first suggested a rational standard of length, the milliare, with decimal multiples (centuria, decuria, virga) and submultiples (decima, centesima and millesima). Wren et al. proposed that the unit of length should be equal to the length of the seconds pendulum. And Lagrange et al. defined the mètre). It is in Part 3, 'Other systems of units', that F. Cardarelli gets into his stride. He begins gently with the cgs electrical units (esu, emu, Gauss) but soon we meet Imperial units (the BThU, the cran, the furlong, the HP, the cwt, the °F and even the ton were

condemned by Mrs Thatcher in 1980). A list on p. 23 reminds us of skeins, bolts, shackles, ropes (1 rope = 20 feet), ells, paces, nails (9 in), spans (the same), barleycorns, buttons (1 button = 1/2 in), calibers [sic], mils and thous. And this is only a foretaste. Surveyors used the Gunter's chain (22 yards) and the Gunter's link (1/100 of a Gunter's chain). For dry measures, one still occasionally meets the bushel and the peck but I have never heard chaldron or wey or kilderkin. Butt, hog-head, firkin and noggin are of course still in use for liquids. Hay and straw had their own units, as did wool. By the time we reach Section 3.5, 'Ancient and obsolete systems of weights and measures', we are completely enthralled and hang on F. Cardarelli's every word. He tells us about cubits (from *cubitum*, the elbow) and ells "from the Germanic word for 'forearm' ('elbow' being derived from the Old German *eluboga* arm-bend)" and then leads us from China to India, from Egypt to Persia before telling us about the Talmudic or Rabbinical units of weight (talent, mina, shekel, zuzah, mehah and pondiuscule) and the Hebrew units of capacity for dry products and liquids (the latter include the bath, which is 1/10 of a cor, 60 hin or 720 log); one woëbe, a unit of capacity in the Assyrian-Chaldean-Persian system, equals half an amphora (or 16.3 dm³ of water). Greeks, Romans, Arabs, French seamen, all had their personal units. In Italy the units were different in Venice, Milan, Turin, Bologna, Florence, Genoa, Rome, Naples and Palermo! In Holland, there was a unit of capacity (dry) called the mud and in Russia, a foute (= 1 ft). And so it goes on until we reach the shi, an old Japanese unit of weight, one komma-ichi-da = 400 million shi. Section 4 (280pp.) consists of conversion tables of every unit known to F. Cardarelli in alphabetical order, from a.u. of action (= $h/2\pi$) to zuzah (3.542 g). A minor pleasure of reviewing such a compilation is the detection of an omission. In my efforts to find out what an epitope is (see [15]), I discovered that a tope (not present in Cardarelli) is "a measure of hay, corn, etc"; I must however admit that although the OED gives the price of a tope of barley or oats in the 17th century, it does not say how much you got for your money. It is here too that I have to record an amazing challenge to the

laws of statistics. At first time, quite a mistake. I was quite taken to get things done. I have detected no errors of typos. Whatever are few if any exceptions known as Murphy's law, wrong, it will". (The origin of p. 334.) Let us not be herring that can be a volume of 37.5 £ 24.50 (\$ 50). F. M.J. Shields, who is smooth. He gives names of some units of yard (English) = v origin of the wide prowess (verge al

I have not yet read Cardarelli, *Material Reference* [46] rewarding in many indications.

1.8. Pleasure and

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laws of statistics. When I opened the book for the first time, quite at random, my eye fell on a mistake. I was quite upset, for this is a second edition and it is clear that immense care has been taken to get things right. Despite much browsing, I have detected no other error, apart from a number of typos. Whatever the statisticians may say, there are few if any exceptions to what is euphemistically known as Murphy's Law: "If anything can go wrong, it will". (The flaw is to be found at the top of p. 334.) Let us end on a crest, however, not in a trough: 1 mease \approx 750 herrings, the number of herring that can be packed in a standard box with a volume of 37.5 (UK) gallons. All this for a mere £ 24.50 (\$ 50). Finally, a word of praise for Mr. M.J. Shields, whose translation is remarkably smooth. He gives a list of French and English names of some units, from which I discovered that yard (English) = verge (French); perhaps this is the origin of the widespread beliefs about Gallic sexual prowess (verge also means penis).

I have not yet seen another compilation by F. Cardarelli, *Materials Handbook, a Concise Desktop Reference* [46] but I have no doubt that it is rewarding in more ways than its plain title indicates.

1.8. Pleasure and provocation

Few ultramicroscopists will be unfamiliar with Professor Hashimoto the electron microscopist but many may not know that he is also a very talented artist. Over the years, he has made some 700 watercolours in his sketchbooks, recording his travels in Asia, Oceania, Europe and the Americas. Of these, 205 have now been published with the title *Scenery in the World observed by a Researcher of the Microworld – Sketches made in the past 23 Years*. The paintings are exquisite and evocative, in bold and pleasing colours, and capture the atmosphere of scenes as different as "Road to the University of Tübingen" and "Elephant village in Chiang Mai" [Thailand]. We are shown bathers floating on the Dead Sea, Nagahama Castle, a Devil King lotus in the Amazon and a piranha fish luckily caught by Professor Hashimoto before it caught him. Professor Hashimoto is quite unjustifiably modest about his remarkable

talents – I was reminded of the scenes of everyday life of Raoul Dufy. I suspect that this beautifully produced volume [47] gives its author at least as much pleasure as any of his scientific publications.

The "provocation" of the section title is provided by A.G. Cairns-Smith, whose *Science of the Mind, a Tale of Discovery and Mistaken Identity* [48] is an absolutely riveting account of the meaning that can be given to such difficult notions as the mind, moods, emotions, feelings and consciousness. He sets the scene clearly in the Preface: "We will find that there are several secrets of the mind, and that they are of different kinds with clues to be found in different places. First of all there are open secrets. These are things we all know because they are within us. We know that we have feelings and sensations, emotions and moods; that they may be anything from barely perceptible to overwhelming. From our inner experience of their qualities we just know how pain and hunger, fear and lust work. Such elements of our consciousness nudge us or push us to behave in ways that are, on the whole, appropriate to our survival and the continued propagation of our kind. They are eminently understandable in these terms and in the terms of life and literature, but not in terms of physics and chemistry; not at all in terms of the molecules and forces through which we can describe so well how genes and brain cells work.

In darker rocky places we come across an ominous secret of nature that is revealed by today's science but whose implications have yet to be taken seriously. Feelings and sensations cannot be part of some other world, some 'world of the mind' immune to the methods of science as some would have us believe. They must be fully part of the physical world or the means to produce them could never have evolved. This may sound like an innocent enough thing to say, and most scientists would probably let it through on the nod. Yet I think that it is set to unhinge the whole view of the world that science currently presents." In breezy prose and everyday language (supplemented with a few borrowings such as "qualia" and "qualogens"), the author argues very persuasively not in favour of a new