give, on taking in turn the pairs of values 1, 1; 1, −1; $\cos B$, $\sin B$; $\sin B$, $\cos B$ for λ, μ,

$$\cot \tfrac{1}{2}A = \frac{1+\cos A+\sin A}{1-\cos A+\sin A} = \frac{1+\cos A-\sin A}{\cos A+\sin A-1}$$
$$= \frac{\cos B+\cos(A-B)}{\sin B+\sin(A-B)} = \frac{\sin B+\sin(A+B)}{\cos B-\cos(A+B)}.$$

Similar identities stem from the forms

$$\sec A+\tan A = \frac{1+\sin A}{\cos A} = \frac{\cos A}{1-\sin A}.$$

The converse application depends on using the fact that $(a\lambda+c\mu)/(b\lambda+d\mu)$ is independent of λ and μ if and only if $ad=bc$, when the fraction has the equal values a/b and c/d. Thus, for example, to simplify the fraction

$$F = \frac{\sin B+\cos(B-A)}{\cos B+\sin(B-A)}$$

we first write

$$F = \frac{\cos B\cos A+\sin B(1+\sin A)}{\cos B(1-\sin A)+\sin B\cos A}.$$

As $\cos^2 A = (1-\sin A)(1+\sin A)$,

$$F = \frac{\cos A}{1-\sin A} = \frac{1+\sin A}{\cos A} = \sec A+\tan A.$$

This form for F is in fact rather more general than the one which W. F. Grieve cites at the end of his note.

F. CHORLTON

Department of Mathematics, University of Aston in Birmingham, B4 7ET

Correspondence

To chant or not to chant . . .

SIR,

I was honoured to be mentioned twice in a Presidential Address (*Mathl Gaz.* No. 409, October 1975). As the references were necessarily condensed, may I be permitted a few remarks in amplification?

I believe my views on learning multiplication tables are close if not congruent to the presidential ones. "Professor Matthews claims that this method [learning by rote if necessary] drives many children away from learning mathematics, but I maintain that not knowing tables so undermines the self-confidence of the pupils that they actually do

https://doi.org/10.2307/3615653 Published online by Cambridge University Press

not like mathematics . . ." The only word I would question is "but". Many people have indeed been disenchanted with mathematics through a diet of table-learning *too early* (at 8, or even 5). However, if a child reaches secondary school not knowing his tables, he is at a serious and unnecessary disadvantage (this is not the first time I've said this!). If necessary, in the end, at 10, or even 9, he'd better start chanting. But before this, let the teachers use all their arts to foster that understanding which breeds persistence as well as pleasure. There are ideas galore on multiplication in, for example, the Nuffield publication *Computation and structure 3*.

I am, in fact, grateful for the presidential comment that the Nuffield Mathematics Project had produced "many interesting ideas, some valuable". This is so much more than could be said of most of the material produced during the past 15 years (matrices for the million, critical paths for the cretin, etc.). But was this enough? Nuffield Mark I was devised with substantial help from about 90 Teachers' Centres, and of course these comprised the enthusiasts. But the Nuffield story is not yet ended. Nuffield Mark II should be starting to publish in a couple of years' time. This will build on the experiences of Mark I to provide a comprehensive range of resource materials for the 'other' teachers and, I hope, cater even more for the really least able children.

Yours faithfully,

GEOFFREY MATTHEWS

Chelsea College Centre for Science Education, Bridges Place, London SW6 4HR

Reviews

Mathematical biofluiddynamics, by Sir James Lighthill. Pp ix, 281. $24·75. 1975 (Society for Industrial and Applied Mathematics)

I am delighted and more than a little awed at reviewing this book by Lighthill; as a sometime plunger into the icy depths of hydrodynamics I have often worshipped the very water on which he walked. I was also fortunate enough to be able to attend an IMA branch meeting at which I first heard of his researches into aquatic animal propulsion delivered in his own exquisite style.

Of such stuff is living mathematics made and of such stuff—and of much, much more—is *Mathematical biofluiddynamics* composed. But before rushing out to buy the volume on the basis of my so far uncritical praise (it has to be said that, as a reviewer, getting free a book costing well over £10 in the United Kingdom—less if you are a member of SIAM—cannot help but pre-dispose one to say something nice about it), pause to reflect that eight chapters out of a total of fourteen have been published elsewhere. Couple this with the thought that one of the outlets (for the paper on *Animal flight*) was the Bulletin of the IMA and also that Sir James will by now have delivered an address of the same title to the SIAM Annual Conference at Rensselaer Polytechnic (and that, indeed, the book itself is a treatment of the material presented at a research conference of the same name at Rensselaer in July 1973) and one finally concludes that unless one is going to be one of the new "zoomathematicians" advocated by the author as an evolutionary breed necessary for the successful study of biofluiddynamic problems, £10+ is too high a price to pay merely to satisfy a superficial interest. Of course, $24·75 ($18·25) may not 'feel' quite as much to our American (SIAMese) colleagues as £10+ feels to the United Kingdom fluiddynamicist and if one is prepared to swallow (one of the few bio-flows not treated in the book!) the price, then the book is, indeed, not only great value but a *tour de force* of tight yet explorative applicable mathematical exposition.

But first, a description of the contents: