EUGENE F. ADIUTORI, **The New Heat Transfer,** Vols. 1 and 2. Venturo Press, Cincinnatti. Volume 1 was reviewed in *Int. J. Heat Mass Transfer* **17**(12), 1629–1630 (1974).

IN THE second volume just published the author continues to develop his ideas as applied to the design and performing of experiments and the expression and analysis of results. As with the first volume, the book makes intriguing reading, drawing attention to weaknesses which have crept into the way the vast amount of heat transfer data published today is derived and presented. It will do any worker in the field good to read this book and to make sure that he himself is as firmly based in his fundamental thinking as he should be; and as an experimenter to be sure that he is going about his work in a sound and efficient way. It must be said, however, that it is a pity the author presents his ideas in the way he does, tending to overplay his innovations and to denigrate the work of others in a field in which enormous advances have, after all, been made in both science and practice, during the last 40 years. He appears to believe that others have not the wit or fundamental understanding to appreciate even the simplest of his arguments, and, perhaps more unfortunate, that others know quite well in their hearts that he has outwitted them but are determined not to admit it, as when in his own words in the foreword to Vol. 2 he says, "I am not blind to the fact that honesty is publicly proclaimed and privately condemned". It is most unfortunate that a work which purports to be a kind of treatise on heat transfer should include in Chapter 11, several pages of somewhat acrimonious correspondence between the author and editor and others (the anonymous Professor C, etc.) on the acceptability or otherwise of his writings. If his work is valid, and I believe some of it is, it will be recognised; and in so far as this does not occur, the fault lies quite considerably in his way of presenting it.

Perhaps a few instances of the rather unfortunate way of presenting the ideas may be given. In Chapter 2 of Vol. 1 he makes much criticism of the concept of the heat transfer coefficient, $q/\Delta T$, one argument being that if you want to read off the value of ΔT for a given q you can do this immediately from a plot of q version ΔT, whereas starting with a plot of $q/\Delta T$ version ΔT involves some form of more cumbrous trial and error process. Hardly a shattering discovery; indeed any schoolboy would see this; and in any case what is to stop the user drawing his own plot of q version ΔT from the other plot, which has the merit of showing clearly any departure from linearity.

In his rather scornful condemnation of dimensional analysis he confuses the issue by saying on pp. 3–4 of Vol. 2 that one of the "keystones of dimensional analysis" is his assumption 3 namely that "nature always requires the parameters to express themselves in exponential functions". This is wrong. It completely ignores the fact that all the well known dimensionless groups may be derived simply by rewriting the basic differential equations of fluid flow and heat conduction in dimensionless form. The use of indices in correlation data is simply a convenient way of expressing experimental results in a formula, and is in no way essential to dimensional analysis. Adiutori claims the dimensional analysis "clouds the mind". I see his point; but if it does the fault lies in the mind rather than in dimensional analysis; and the particular mind can be unclouded without abandoning dimensional analysis.

Again, in Chapter 1 of Vol. 2, he spends a great deal of time convincing readers that experiment rather than theory is the basis of modern science. I should have thought that heat transfer was an excellent example of the truth of this assertion, which practically no one would dissent from. Just who are the people who have disagreed so strongly with the author on this point is not clear, but they were not very good scientists.

Having made these comments, it must be said that the books contain much useful and stimulating material. One of his main points is his dislike of the concept of the heat transfer coefficient. In so far as many heat transfer processes are non-linear in temperature dependence (a good example being radiation which he doesn't quote), this is a valid point, although there are many processes in conduction which are close to linear, and $q/\Delta T$ is quite a convenient starting basis. When he turns to the use of dimensionless groups in plotting data he makes many valid points. It is of course quite wrong to assume that a dimensionless group plot must deal perfectly with the effects of every individual variable over values varying beyond those covered in the original experiments, because there may well be other phenomena at work which have not been taken into account in deriving the groups (or in writing down the basic differential equations). If the correlated data do not all fall exactly on a single curve, or group of curves, the reason may not be experimental error but these of ignored effects, and much more attention than is usually paid should be given tracing the cause of such deviation. No one would claim that dimensional analysis is a universal panacea, but it is a very useful starting point in presenting data. Adiutori is also on good ground when he calls for more attention by authors to giving actual experimental results rather than just correlated data, and, I would add, to assessment of experimental error. Without the original results, the reader is deprived of any chance of putting his own interpretation on them, and is constrained to follow the author's.

When he turns to the relative merits of theory and experiment in science, it is a little hard on theory to say as on pp. 1–11, Vol. 2 that they "possess only one virtue, that it is better than nothing". How about boundary layer theory, Stefan's Law, and, in other fields, Maxwell's Electromagnetic Theory (incidentally an excellent example of the use of dimensions in arriving at the form of the expression for the velocity of light in terms of electrostatic and electromagnetic properties), quantum theory, metal dislocation theory, and many others.

It is to be hoped that many will read these volumes carefully and, where necessary, critically, and that their influence will be brought to bear on the whole community of heat transfer workers, resulting in a refreshing look at what we are doing. They would be excellent material for critical student seminars. Whilst perhaps the title "*The New* Heat Transfer" is a little unfortunate since it implies that everything done in the old way is useless and should be scrapped, the ideas are useful and to some extent novel. All that is needed is an open mind, and that is not a monopoly of any one individual.

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