Schwartz's article ends with a list of open problems. V. S. Sunder and N. J. Wildberger give a good introduction to the theory of actions of finite hypergroups. (Readers interested in exploring the connections between hypergroups and von Neumann algebras should consult ref. 2.) In 'Wavelets on Hypergroups', K. Trimeche defines wavelets on hypergroups and proceeds to give an account of the theory of continuous wavelet transforms on hypergroups. (In the context of the real line, wavelet-theory happens to be one of the 'hot' areas of modern Fourier analysis.)

Notable among the articles not directly connected with the theme of hyper-groups are 'Disintegration of Measures' by H. Helson and 'Multipliers of de Branges – Rovnyak spaces II' by B. A. Lotto and D. Sarason.

There are fifteen articles in all, but for the sake of brevity we have restricted ourselves to mentioning just a small sample. This by no means implies that the other articles are not interesting! To conclude, this collection of articles will be very useful to researchers in harmonic analysis as well as advanced Ph D students, and Ross *et al.* should be thanked for compiling this collection.

1. Gangolli, R. and Varadarajan, V. S., *Harmonic Analysis of Spherical Functions on Real Reductive Groups*, Springer-Verlag, 1988.
2. Sunder, V. S., *Contemp. Math.*, 1995, **183**, 331–340.

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The Physics of Fluids and Plasmas. Arnab Rai Choudhuri. Cambridge University Press, The Edinburgh Building, Cambridge CB2 2RU, UK. 1998. pp. 427. Price: $29.95. Indian edition, Price: Rs 350.

The book under review provides a pedagogical introduction to the core disciplines of fluid and plasma physics to graduate students of astrophysics. The author has set himself the challenging task of developing the material from first principles. I enjoyed reading this book, and found the author's viewpoints fresh and interesting. He manages to entertain the reader and succeeds in conveying the essentials of the subject simultaneously. It is a rare textbook that is as well written and presented as this. In the minds of most physics students, and unfortunately too many physics teachers, 'modern physics' and 'classical physics' are regarded as polar opposites, with the latter having an air of past grandeur, now sadly decrepit. Nothing can be farther from the truth! As is made amply clear in this book, a very large part of the Universe is governed mostly by classical (including Einstein's theory) gravity, gas dynamics, statistical mechanics, plasma physics and electromagnetism. Contrary to popular misconceptions, there are many outstanding problems yet to be solved in this supposedly 'worked out' area of knowledge. One could say with justification that the outstanding unsolved problem of classical physics, namely the construction of a truly predictive theory of fluid/plasma turbulence, is as challenging as any that occurs in quantum theory or particle physics. Solving that problem would broaden the frontiers of knowledge in fields as disparate as aerodynamics and astrophysics and bring untold benefits to mankind in the bargain. It is often the case that physics students miss out virtually completely on a proper background in fluid and plasma physics, because these subjects are mistakenly thought to be branches of applied mathematics or engineering. Astrophysics provides the natural forum for a true appreciation of the physics content of gas dynamics, and it is gratifying to find at last a textbook in which the close relationship between these areas is justly emphasized. As a fusion plasma theorist with a fluids background, I have sometimes been surprised by the relative lack of appreciation by plasma physicists of potent and useful analogies between plasma dynamics and fluid mechanics. In the present book, the organic relation between the two subjects, so vital for a true understanding of astrophysical and laboratory phenomena, is clearly and explicitly discussed. The book falls naturally into two parts, the theory of neutral fluids and that of plasmas. After a brief but thoughtful general introduction, the author presents the theory of neutral fluids in Part I. A 'top–down approach is adopted, deriving gas dynamics in the usual Chapman–Enskog way from kinetic theory: Although I liked the treatment in general, references to the literature seemed to miss out some classics: for instance, Harold Grad's wonderful article in the *Handbuch der Physik* and Sommerfeld's treatment in his lectures on statistical mechanics (required reading for every student of transport theory) are not mentioned. In the next few chapters, the author manages to discuss an astonishing range of topics, often pausing to offer interesting astrophysical applications on such topics as the solar corona, accretion disks, supernova explosions and galactic dynamics. The choice of problems for the student is also generally excellent. Fluid mechanics is a deep and mature subject with many ramifications, and endowed with many excellent texts. The author's course should equip aspiring students with the tools and fundamental understanding necessary to move on to more advanced treatments. Inevitably, given the constraints, there are regrettable omissions: shock waves could have been illustrated by the exactly soluble Burgers' equation; the Kutta condition, separation and stall are not mentioned in the theory of lift; there is no mention of the Rayleigh–Orr–Sommerfeld–Heisenberg–Lin theory of flow shear instabilities. The latter is surely an important topic to which every student should at least have a basic introduction? The same comment would seem to apply to the complete absence of any discussion of G. I. Taylor's work on flows between rotating cylinders, a truly beautiful paradigm for transition from laminar to turbulent flow. In particular, the chapter on Turbulence seems dated. I am somewhat surprised that the author does not discuss perturbation methods, at least in outline, with some well-chosen examples. A more disappointing omission is the lack of presentation, however brief, of the only really *general* (the emphasis is Feynman's) method of solving problems in the physical sciences, viz. the numerical method. It is vital that students should have the confidence to tackle 'analytically impossible' problems

computationally early in their training and understand the intimate connection between judiciously chosen numerical methods, analyses of physics models which underpin them and the observational data they are required to explain. In my experience, 'arithmetizing' realistic problems in this way is a mind-clearing exercise which invariably yields deep insights into the *physics* behind them. It is not always true that one needs enormous computing power to do this; modern PCs can do a lot!

Part II of the book treats plasma physics in general with remarkable clarity, authority and felicity in the variety of applications. However, I do have some reservations, especially relating to choice and treatment of some topics. Landau damping is treated in a pedagogically awkward 'formulaic' manner, with no mention made of the key concept of 'phase mixing'. Why not introduce a small collisional rate and exhibit the damping result as an ordered limit? This is more 'realistic' and does away with mysteries having to do with the complex plane, regularity requirements and such artefacts. Further, it should be stressed that only the electric field and velocity moments damp, if at all, and not the distribution function itself (*H* and an infinity of invariants are conserved by Vlasov's equation). There is no mention of Case and Van Kampen's essential clarifications of the issues related to 'continuum damping' which can (and does) occur in ordinary fluids without any 'wave-particle' interactions. This issue is also of importance in fusion plasmas where shear Alfvén 'continuum damping' can occur. References to readily accessible, recent literature are somewhat incomplete: I missed mention of Braginskii's famous article on plasma transport theory and the derivation of two-fluid equations (treated magisterially by Lifshitz and Pitaevskii, who are referenced), as well as recent excellent texts by Bateman, Goldston and Rutherford, Hazeltine and Meiss, and Wesson. The author does not mention effects due to trapped particles in confined systems (so-called 'neoclassical theory') which are significant in strongly magnetized plasmas. More surprising still is the lack of discussion of such key topics as the famous ideal MHD 'energy principle' of Bernstein *et al.*, low-frequency 'drift waves' in a two-fluid, spatially inhomogeneous plasma (plasma analogues of Rossby waves in rotating fluid systems), current-driven tearing and pressure-driven 'ballooning' instabilities. There are now many accessible treatments of linear and nonlinear tearing modes, which, together with drift and ballooning modes, are currently thought to be the most important low frequency plasma instabilities relevant for stability and confinement. These topics surely belong to the 'minimum foundation' for every student of modern plasma physics, and a brief introduction to them is more important than many of the 'fundamental' theories such as BBGKY, which could be safely left for self study projects. In spite of the above caveats, I have nothing but praise for the topics the author does discuss, and the refreshing way he has set about his task. In my view, he has largely succeeded in achieving the ambitious aim of providing a systematic, eminently readable and enjoyable introduction to two great continents of classical physics: fluid mechanics and plasma physics. The spirit of Eugene Parker's teachings pervades this book, and it is justly dedicated to that great pioneer of plasma astrophysics.

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Cyanobacterial Biotechnology. G. Subramanian, B. D. Kaushik and G. S. Venkataraman (eds). Oxford and IBH Publishing Co. Pvt. Ltd., 66, Janpath, New Delhi 110 001, India. 1998. pp. 465. Price: Rs 990.

This book is a compilation of papers presented in an international symposium in 1996. It is an excellent and timely collection covering a wide range of topics in the frontline area of cyanobacterial biotechnology. Areas such as cellular and molecular characterization, biochemical pathways, stress and adaptation to applied aspects such as use of cyanobacteria as food additives and fertilizers have been highlighted in this book.

The last two decades have led to major advances in research with cyanobacteria. Cyanobacteria with their free living autotrophic nature, prokaryotic genome and organization and commercial applications form an extremely interesting discipline in biology. Several scientists who have made contributions in the area of cyanobacteria have contributed articles in this book. The opening chapter by Lindbald highlights the role of hydrogenase and hydrogen evolution in cyanobacteria along with their gram-negative prokaryotic genome but with the same type of photosynthetic apparatus as seen in higher plants. Mohanty has highlighted the effects of stress on photosynthesis. The role of primordial cyanobacteria in the evolution of life on our planet 3 billion years ago has been discussed by Brown in his article. He has emphasized the involvement of alternative bioenergetic patterns in cyanobacteria as factors in biochemical adaptations.

The chapters on 'Spirulina Farms' by Fox and on 'Spirulina by 2001 AD' by Venkataraman throw light on the importance of cyanobacteria in the future. Stress regulated gene expression has been extensively reviewed in Apte's article while the genetics of heterocyst differentiation has been elaborated by several authors. Kaushik and Subramanium have reviewed several biotechnological applications of cyanobacteria as biofertilizers, fine chemicals and pharmaceuticals.

Novel applications of cyanobacteria such as their use in the control of diabetes mellitus as well as biosensors for environmental protection have been discussed. Research in USA, Germany, Hungary, Ukraine, Sweden along with Thailand, India and Sri Lanka has been highlighted. The chapters by various authors on the basic physiology, photosynthetic activities and stress response provide a lot of information.

This book thus provides an excellent review of basic and applied information on cyanobacterial biotechnology. However, there are several things which could have been avoided. Firstly although the meeting was conducted in 1996, the book was published in 1998. Thus recent material and research is not