

of turbulent combustion. The second part includes details of a model of two-phase annular flow, a further development of work on bubble growth in binary mixtures and two papers each on peak boiling heat flux and condensation. Papers in other areas include two on fluidized bed heat transfer, and studies on non-Newtonian flow in pipes and combined heat transfer from extended surfaces. There is also a short paper on measuring devices for heat transfer in buildings and a study of radiation on Jupiter and Saturn.

The latter section of the book contains the English abstracts of the Conference papers. (A total of 580 papers according to the Contents and the Editors' Preface, but only 476 according to the reviewer's arithmetic.) Indication of whether an English translation is likely to appear in *Heat Transfer – Soviet Research* or *Fluid Mechanics – Soviet Research* is also given. In summary the book contains an interesting (but non-representative) collection of papers from the Conference, which together with the many abstracts make it a useful reference work.

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New Heating Systems – Decentralised Heat-Power-Coupling by Combustion Engines, VDI Report No. 287.

(Neue Heizsysteme – dezentrale Wärme-Kraft-Kopplung mit Verbrennungsmotoren, VDI-Bericht 287). VDI, Düsseldorf (1977). Price DM41.

TO THE engineer accustomed to think in terms of entropy and reversibility the modern oil- or gas-heating must always have been a nuisance. It may have been the reasonable answer to the low cost fuel of past years, but times have changed and the matter has to be thought over again. Taking the waste heat of big power plants for heating purposes involves the problem of distribution, not solved so far. This problem decreases however with decentralised small plants, for which the internal-combustion motor is the appropriate thermal engine.

The "Verein Deutscher Ingenieure" (VDI) has organized two meetings confined to this subject, the first in 1976 in Stuttgart and the second in 1977 in Amsterdam. The VDI-Report No. 287 to be reviewed here contains the papers of the second meeting, which was arranged commonly by the VDI-Societies for Power Engineering and Automotive Engineering under the auspices of Prof. F. Pischinger (Aachen).

In four sections eleven papers were presented. Section 1, "Alternative energy supply models", contained fields of application from an economical point of view, new concepts such as total-energy-systems, and the application of automotive engines for small units. The papers of Section 2, "Available plants (experiences, reports)", reflect the main field of application, i.e. public open-air and indoor swimming baths also large buildings with centralised heating and cooling facilities such as universities and hospitals. In Section 3, "Motor and plant components", gas engines for stationary use in big and medium units are described. For small units car-engines may easily be converted to stationary gas-operation. The somehow

predominant role of legal constraints compared with technical and economical considerations is dealt with in Section 4. "Legal and economic problems", taking as an example the unequal taxation of fuel oil and gas in West Germany, when used for internal combustion engines.

The report, containing numerous pictures and tables, gives on 76 pages a good insight into state and development of its subject and demonstrates that the application of internal combustion engines in decentralised systems of power-heat coupling is in certain domains already profitable and that its realisation is state of the art.

E. L. SCHMIDT

M. VAN DYKE, J. V. WEHAUSEN and J. L. LUMLEY (Editors); Annual Review of Fluid Mechanics, Vol. 10. Annual Reviews, California (1978). 475 pp.

THIS volume is the latest in an annual series which reports contemporary developments in fluid mechanics, although it begins with interesting historical notes by A. M. Binnie on fluid mechanics studies at Cambridge, England, by Stokes, Rayleigh, Darwin, Farren, Dean, Melville Jones and G. I. Taylor, together with those of Binnie himself. The topics covered elsewhere are wide-ranging and, as might be expected in a collection of nineteen articles by different contributors, somewhat disparate and difficult to classify. However, a fair balance is preserved between those dealing with liquids and those concerned with gases; among the former are reviews of river meandering and river ice, the hydrodynamic problems of ships in restricted waters, turbulence and mixing in stably-stratified waters and numerical methods in water-wave diffraction and radiation. There are also discussions of drag reduction by polymers, flows of nematic liquid crystals and the magnetohydrodynamics of the earth's dynamo.

Presentations in compressible fluid mechanics include articles on viscous transonic flows, the Monte Carlo simulation of gas flows, flow through screens, dust explosions and objective methods for weather prediction. Perhaps of more general interest are the sections dealing with oscillations of long-period Rossby waves in oceans and atmospheres, the structure of vortex breakdown and turbulence generated-noise in pipe flow. This may also be said of the contributions on relativistic fluid mechanics and numerical methods in boundary-layer theory which, together with those earlier referred to on water-wave diffraction and radiation and weather prediction, could with advantage have been co-ordinated with the review of prospects for computational fluid mechanics. Other possible groupings come fairly readily to mind.

One is left after detailed scrutiny with the feeling that in a number of instances contributors have been inhibited by space limitations from presenting as complete an account as they would otherwise have wished. If the objective of the Editorial Committee is the publication of authoritative reviews on currently-important topics, this might be better achieved by a reduction in the number of contributions in a volume of predetermined size.

B. W. MARTIN