

## Gas Turbines for Autos and Trucks

This book is composed of a collection of selected papers and is presented as part of the SAE Progress in Technology Series. The papers were given between 1959 and 1980 and therefore represent, with their references, a comprehensive historical review of the progress and development efforts made in bringing this new application of gas turbine technology into the market place. The majority of the papers came from the USA automotive industry but at least one British entry was able to claim the world's first gas turbine car, tested by the RAC in 1950.

In spite of a certain amount of repetitiveness regarding the problems to be overcome before serious competition with conventional engines can be attained, the papers are very readable, and tell the story of rapid progress made in most of the technologies involved. With the huge amount of funding fed into gas turbine applications for both aircraft and land-based power plants, it might be thought surprising that after 30 years or so, the gas turbine driven transport vehicle has not yet arrived; has not the true engineer an instinctive feeling that rotating rather than reciprocating motions are to be preferred? However there are very different operational requirements and the resulting problems, recognised early by researchers, have still not been overcome well enough for commercially viable mass-production to be given the go-ahead. They provide the thread running through the papers and are still threefold: better fuel economy at part-loads and idling, lower production costs and satisfactory response characteristics.

The background work of the various companies is described in some detail, covering overall

test rig and instrumentation development and component research on turbines, compressors, regenerators/recuperators, combustion, transmission and fuel systems. Of particular interest is the concept of an all-ceramic engine to raise the inlet temperature to 2500 °F (1370 °C) for projected units for the 1990's and beyond. It is not hard to see why this demand, plus the requirements for sophisticated high-speed bearings and sealing clearances, movable guide vanes and turbine nozzles etc, has made low-cost manufacture a serious obstacle. However, modern trends on exhaust pollution, noise and advantages of a multi-fuel power plant are all favouring the gas turbine, so future progress can be awaited with some interest.

Researchers and designers of other turbomachinery units will find plenty of useful and stimulating data relating to their own designs, for example on aerodynamics and flow paths, materials and bearings. The conflicting requirements of stress, component efficiency and manufacturing costs which they have also to contend with gives an additional value to the book. There is a salutary reminder, for example, of the use of static efficiency rather than total efficiency for turbine and exhaust systems, which can modify the optimum design values of both work and flow coefficients.

The book is well bound and indexed, as befits the price level. It is a pity therefore that the photographic reproductions are so poor, although the diagrams and graphs are quite readable.

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### Books received

Two-Phase Flow Dynamics, *A. E. Bergles*, \$75.00, pp 554, Hemisphere Publishing Corporation

Decay Heat Removal and Natural Convection in Fast Breeder Reactors, *A. K. Agrawal and J. G. Guppy*, \$60.50, pp 423, Hemisphere Publishing Corporation

Nuclear Reactor Safety Heat Transfer, *ed. O. C. Jones Jr*, \$99.00, pp 959, Hemisphere Publishing Corporation

Modern Compressible Flow, *John D. Anderson Jr*, £24.95, pp 466, McGraw-Hill Book Co (UK) Ltd

Solar Heating and Cooling, *J. F. Kreider and F. Kreith*, \$29.95, pp 479, Hemisphere Publishing Corporation

Convective Boiling and Condensation, *John G. Collier*, £39.95, pp 435, McGraw-Hill Book Co (UK) Ltd

Modern Fluid Mechanics, *Shih-I Pai*, £31.90, pp 570, Van Nostrand Reinhold Ltd

Applied Heat Transfer, *James P. Todd and Herbert B. Ellis*, £18.95, pp 545, Harper and Row Ltd

Methods of Experimental Physics, Parts A and B, *ed. R. J. Emrich*, £33.50 and £34.30 (\$50.00 and \$52.00), pp 877, Academic Press Inc

The Physical Principles of Heat Pipes, *Ivanovskii*, £25.00, pp 262, Oxford University Press

Unsteady Viscous Flows, *D. Telionis*, DM 83.00 (\$38.70), Springer-Verlag

Hydrodynamic Instabilities and the Transition to Turbulence, *H. L. Stivney and J. P. Gollub*, DM 96.00 (\$50.40), pp 292, Springer-Verlag

Elementary Fluid Mechanics, *J. K. Vennard and R. L. Street*, £22.25, pp 704, John Wiley & Sons Ltd

Developments in Boundary Element Methods-2, *ed. P. K. Banerjee and R. P. Shaw*, £34.00, pp 888, Applied Science Publishers Ltd

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