

**Cover image**

Courtesy of Institution of Engineering and Technology Archives.

---

Typeset by Nova Techset Private Limited, Bengaluru & Chennai, India. Printed in the UK by Cambrian Printers.

This paper meets the requirements of ISO 9706:1994(E) and ANSI/NISO Z39.48-1992 (Permanence of Paper) effective with volume 338, issue 1649, 1992.

*Phil. Trans. R. Soc. A* (ISSN 1364-503X) is published 26 times a year for US\$6531 per year by the Royal Society, and is distributed in the USA by Agent named Air Business, C/O Worldnet Shipping USA Inc., 149-35 177th Street, Jamaica, New York, NY11434, USA. US Postmaster: Send address changes to *Phil. Trans. R. Soc. A*, C/O Air Business Ltd, C/O Worldnet Shipping USA Inc, 149-35 177th Street Jamaica, New York, NY11414.