

## Introduction

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*Phil. Trans. R. Soc. Lond. A* 1980 **294**, 409  
doi: 10.1098/rsta.1980.0048

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## Introduction

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This is the third meeting on fibres and composite materials organized by the Royal Society. The first, in 1963, was a discussion on strong and stiff materials, since it was considered that conventional methods of producing strong materials were approaching their limits. The necessity for strong stiff fibres of low density with especial reference to their use in fibre reinforced matrices was emphasized and attention was also drawn to the possibilities of making them from cheap abundant materials of intrinsic high modulus and therefore high strength.

This meeting can fairly claim to have initiated considerable research in the United Kingdom and a second meeting, held in 1970, discussed the advances made in the interval, both in the development of new fibres and of a better understanding of the mechanics of composite materials.

Since then research and development throughout the world has led to the invention of further new strong and stiff fibres, more knowledge of the properties and behaviour of fibres and composite materials under various conditions, e.g. structural, mechanical, and environmental.

There has also been a slow but increasing rate of applications of fibrous composites in modern technology. Indeed, I personally believe that we are now at the start of the more steeply rising portion of the utilization curve after a slow induction period.

It was therefore considered timely to have a third meeting, which my co-organizers and I have arranged in three distinct parts.

The first part deals with the preparation and properties of new fibres and it is worth noting that they contain only elements which are very abundant. The second part is on fibrous reinforced materials and will deal fairly with their advantages and disadvantages and hopefully show where knowledge is lacking and thus stimulate new work to fill the gaps. The third part is a description of a few specific composite materials for applications in modern technology, comprising fibres in metallic, resinous, and brittle matrices. This is to refocus the meeting on recent advances in the utilization of composite materials.

This meeting is sponsored by the Hooke Committee of the Royal Society, named after Robert Hooke, the discoverer of Hooke's law, 'Ut tensio sic vis'. He was curator of experiments to the Royal Society in its formative years. I found the following quotation in his book *Micrographia, or description of minute bodies made by magnifying glasses*, which was published under the imprint of the Royal Society in 1665. The following philosophical thought occurred to him after he had examined silk fibres and fabrics, and since it appears very appropriate to this meeting I quote exactly as he wrote. 'And I have often thought that probably there might be a way found out to make an artificial glutinous composition much resembling if not full as good, nay better than that excrement or whatever substance it be out of which the silk worm draws his clew. If such a composition were found it were certainly an easy matter to find very quick ways of drawing it out into small wires for use. I do not mention the use of such an invention nor the benefit that is likely to accrue to the finder, they being fully obvious. This hint may I therefore hope give some inquisitive person an occasion of making some trials which if successful I have my aim and I suppose he will have no occasion to be displeas'd.'

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