

BOOK REVIEW

IVEZ V. DE GRAY, JARREL H. CURRA AND WILTON R. GOYNES : *The Fine Structure of Cotton*. Marcel Dekker, Inc., New York, 1973.

This book is a pictorial essay on the internal architecture of cotton, which is still the world's most important textile fibre. The three authors belong to the Southern Regional Research Laboratory of the U.S. Department of Agriculture in New Orleans. They come from the school which had done extensive and distinguished work on the application of electron microscopy to cotton fine structure.

Until the advent of electron microscopy in 1940, the fibre physicist had no direct means of bridging the magnification gap between $\times 10^3$ and a conceptual $\times 10^8$, afforded by x-ray diffraction. It was speculated that the interiors of fibres consisted of ordered "micelles", held together by some kind of amorphous cement. The electron microscope abolished speculation and the pictures in this book are a splendid example of the adage that "seeing is believing".

The book starts off with an 18-page introduction by the editor on the history of cotton as a textile fibre. This is followed by the sections in light microscopy, transmission electron microscopy and scanning electron microscopy. In these sections, the pictures do most of the talking by themselves, the captions and explanations are minimal. The section on light microscopy really contains nothing new except that the quality of some of the micrographs is superb. It is a pity that the authors have chosen to ignore in this section the entire subject of polarized light microscopy.

The section on transmission electron microscopy describes, in great detail, the anatomy of the cotton fibre from outwards to inwards—the cuticle, the complexity of the primary wall and the winding layers, the growth ring in the secondary wall and the fibrillar nature of each element of structure. In keeping with the other work done at SRRL, the effect of a variety of chemical finishes on cotton has been studied by the electron microscopy in particular, of anti-crease and fibre retardant treatments. There are beautiful photographs of carbon replicas of the fibre surface which are caused by scouring, dry abrasion and wet abrasion.

The final section on scanning electron microscopy provides dimension and depth, sometime with breath-taking results. Looking at the photographs in all the sections, one understands more clearly why many physical properties of the cotton fibre are, what they are and why they change in known ways when we modify the fibre. All in all, this book will be of value to the textile student and the specialist alike.

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