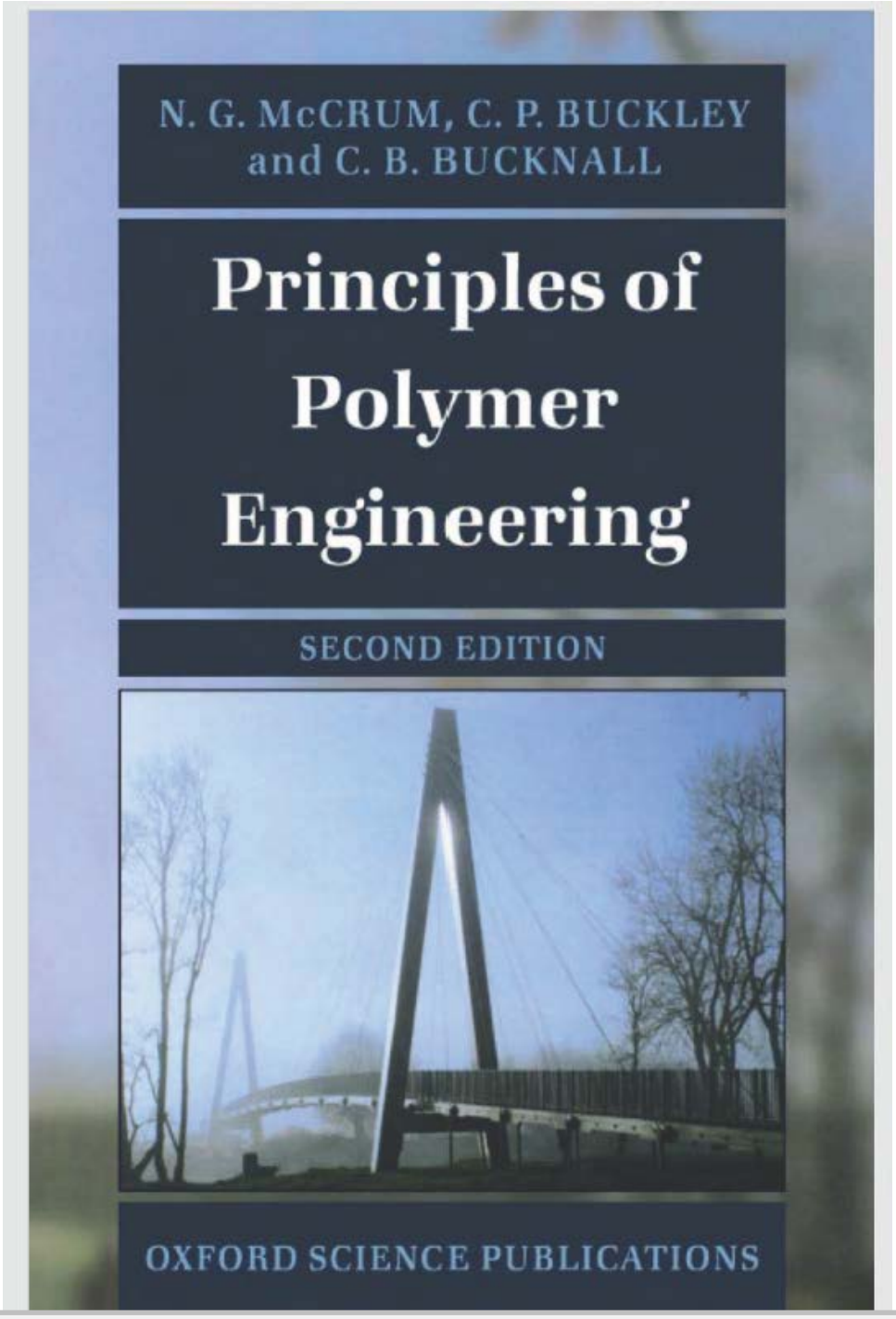

Principles of Polymer Engineering

Second edition

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0 *Introduction*

Despite the central role that plastics play in life today, there remains a trace of the old view that plastic products are cheap and nasty. This is reflected in a poll held recently in Italy. Of those interviewed, 15% were neutral, neither for nor against plastics, 25% had no view, 35% thought they were essential and approved, but a surprising 25% of those surveyed were quite opposed to them.

Polymers, in the form of plastics, rubbers and fibres, have for many years played essential but varied roles in everyday life: as electrical insulation, as tyres, and as packaging for food, to mention but three. There is no other class of material that could substitute for them. It might be thought that the public's view of plastics in food packaging would be favourable: after all, plastics packaging in the developed world leads to low wastage (less than 2%) whereas in the undeveloped world about 50% of the food produced becomes rotten. Plastic packaging brings with it also a great improvement in hygiene. Yet the public image of plastics as food packaging is poor, much lower than that of traditional materials such as glass, paper and tinplate. How is it, then, that the word 'plastic' is frequently used as a term of abuse in the sense of plastic bread or a plastic smile?

The root of this apparent contradiction is psychological. First and foremost is the feeling that plastics, having been conceived as substitutes, are inferior to the real thing: imitation marble laminates for the bathroom? polypropylene grass? mock onyx table lamps? Historically, there is no doubt that plastics were developed by entrepreneurs as imitation materials and that this form of replacement was intended. But what of the essential replacements that plastics also permit? False teeth are inferior to the real thing but are desirable if you have no other choice. And what of the artificial hip joint? Most people today have a close friend or relative whose life has been improved immeasurably by the polyethylene hip prosthesis. There are a vast number of other replacements, not quite so essential as these, which are highly advantageous. For instance, in automobile engineering, great improvements in safety, noise reduction, comfort and fuel economy are being derived from the increasing replacement of metal alloys with plastics.

The basic argument in favour of plastics is that they provide a choice,