Preface

Some time ago, the authors collaborated on a book entitled "Atomic Dynamics in Liquids", which has subsequently been reprinted by Dover. This book, it is fair to say, was motivated by advanced lecture courses the two authors had presented at a variety of venues, notable among these being the Abdus Salam International Centre for Theoretical Physics in Trieste.

Subsequently, because of our mutual interests in charged fluids, we followed up the above Volume (Dover, 1991) with "Coulomb Liquids". This naturally had a narrower range of coverage: dominantly classical ionic melts and liquid metals, where the valence electrons are fully quantal.

Trends in the subject of the "Liquid State" since these two books were published have impressed us to the extent that both of us judged that the time was ripe for a more general book on this area. Thus, the subject has become important for workers in a wide range of disciplines. Two that came to our minds were the glassy (amorphous) state, concerning materials which have large technological relevance, and the need to understand, fully quantitatively eventually, the phenomena of turbulence.

It is also true that the massive increase in computational power available now in science and technology has had a big impact on the development of the ability to calculate a whole variety of liquid state properties. However, we were also conscious that the output of massive computer simulations is often analogous to, say, that of radiation scattering experiments. No one doubts, in the latter area, the importance of attempting to interrelate many experimental facts by some simple theoretical ideas. In turn, such ideas often spring from somewhat oversimplified models (e.g. hard spheres or one-component plasma models, depending on whether the force law between building blocks has a very well defined region of excluded volume, or whether the forces are long-range).

This is the background against which the present Volume has come into being. It has, for reasons expounded above, much greater breadth than our two earlier Volumes. We feel as an Introduction to the liquid state, including importantly a variety of chemically bonded liquids, it should be useful to students, both at advanced undergraduate and research levels, in a variety of disciplines: physicists, chemists, chemical and mechanical engineers, and also to workers in the important interfaces between chemistry, biology and medicine, as well as in environmental technology.

Because of breadth, we have also covered areas in which our own personal contributions have been minimal (unlike our earlier Volumes). Therefore our indebtedness to other workers is greater in the present case. Especially, we acknowledge that we have at times drawn heavily on existing books, e.g. Faber's on hydrodynamics and turbulence, and various accounts on polymers and liquid crystals. We trust, without being more specific (and inevitably then more tedious) such workers will accept our grateful thanks.

Should our book prove useful, we hope that readers who feel that there are places where we should do better will write to us and we shall do our utmost to respond constructively in the future.

Finally, we thank staff of World Scientific for their patience and understanding.

Oxford and Pisa
N. H. March
M. P. Tosi