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## *Preface*

Science plays a twofold role in our world, one at the cultural level and the other at the technological level. Chemistry is no exception. Indeed, it is one of the broadest branches of science, if for no other reason that, when we think about it, everything is chemistry.

Just one measure of chemistry's impact on culture is the effect biochemistry has had on our understanding of human nature. The fundamental unity of the biological world is now an accepted concept; the same molecules, the same structures form the basis of life in both amoebas and elephants. Precise studies on protein sequences have enabled a computer to write a phylogenetic tree of the human species. Thus Darwin's theory of evolution, so strongly opposed by the religious community on the one hand, and by part of the scientific community on the other, is now supported by solid and unassailable biochemical evidence. The mechanisms responsible for the hereditary transmission of genes and the storing of information in chemical molecules are now clearly understood, at least in principle. Recent studies have established a correlation between significant characteristics of information redundancy in human DNA molecules and analogous properties of man's language, thereby raising fundamental and fascinating questions about the mechanism of language formation. Research into the effects of exogenous and endogenous drugs has cast serious doubts on the independence of behavior from contingent factors.

Chemistry's impact on technological progress is equally impressive. Chemistry is drugs, insecticides, fertilizers. Chemistry is textile fibers, glasses, glues, telephones. Chemistry is underwater cables and television sets. Chemistry has invaded our lives, has provided us with new foods and new materials, has replaced wood and metal with less expensive products, has enabled low-income classes to acquire things that otherwise would have been inaccessible.

But the growth of the chemical industry has left in its wake very serious problems—widespread pollution and the alarming diffusion of unsafe products. What are the benefits of chemistry and what are the risks? How many of these risks can and cannot be avoided? How much of the negative side of chemistry is due to economic profit, how much to improvidence? Is a certain amount of risk a necessary consequence of the acquisition of goods and the battle against disease? These are all very difficult questions and are all too often uttered by voices as strident as they are misinformed or, worse, biased when not wholly self-serving.

I do not hope to settle such issues here and now, for it is not in my power—nor perhaps in anybody else's power—to do so. My intent is simply to examine in the light of hard facts the general framework within which the concerned scientists operate.

In an effort not to overload the text, I have only given there general information on the scope of chemistry's impact on modern society. The reader will find supplementary material and quantitative data in the appendixes.

This book is the result of readings, discussions, exchanges of ideas, and advice from friends. In particular, I wish to thank my father, who has been an inexhaustible source of advice and information; Enrico Cernia, whose knowledge has been the source of various paragraphs; and Mimmo Misiti, with whom I have discussed almost every line.