
Preface to Third Edition

As the Earth has made more than 5,000 rotations since *The Sciences of the Artificial* was last revised, in 1981, it is time to ask what changes in our understanding of the world call for changes in the text.

Of particular relevance is the recent vigorous eruption of interest in complexity and complex systems. In the previous editions of this book I commented only briefly on the relation between general ideas about complexity and the particular hierarchic form of complexity with which the book is chiefly concerned. I now introduce a new chapter to remedy this deficit. It will appear that the devotees of complexity (among whom I count myself) are a rather motley crew, not at all unified in our views on reductionism. Various among us favor quite different tools for analyzing complexity and speak nowadays of “chaos,” “adaptive systems,” and “genetic algorithms.” In the new chapter 7, “Alternative Views of Complexity” (“The Architecture of Complexity” having become chapter 8), I sort out these themes and draw out the implications of artificiality and hierarchy for complexity.

Most of the remaining changes in this third edition aim at updating the text. In particular, I have taken account of important advances that have been made since 1981 in cognitive psychology (chapters 3 and 4) and the science of design (chapters 5 and 6). It is gratifying that continuing rapid progress in both of these domains has called for numerous new references that record the advances, while at the same time confirm and extend the book’s basic theses about the artificial sciences. Changes in emphases in chapter 2 reflect progress in my thinking about the respective roles of organizations and markets in economic systems.

This edition, like its predecessors, is dedicated to my friend of half a lifetime, Allen Newell—but now, alas, to his memory. His final book, *Unified Theories of Cognition*, provides a powerful agenda for advancing our understanding of intelligent systems.

I am grateful to my assistant, Janet Hilf, both for protecting the time I have needed to carry out this revision and for assisting in innumerable ways in getting the manuscript ready for publication. At the MIT Press, Deborah Cantor-Adams applied a discerning editorial pencil to the manuscript and made communication with the Press a pleasant part of the process. To her, also, I am very grateful.

In addition to those others whose help, counsel, and friendship I acknowledged in the preface to the earlier editions, I want to single out some colleagues whose ideas have been especially relevant to the new themes treated here. These include Anders Ericsson, with whom I explored the theory and practice of protocol analysis; Pat Langley, Gary Bradshaw, and Jan Zytkow, my co-investigators of the processes of scientific discovery; Yuichiro Anzai, Fernand Gobet, Yumi Iwasaki, Deepak Kulkarni, Jill Larkin, Jean-Louis Le Moigne, Anthony Leonardo, Yulin Qin, Howard Richman, Weimin Shen, Jim Staszewski, Hermina Tabachneck, Guojung Zhang, and Xinming Zhu. In truth, I don't know where to end the list or how to avoid serious gaps in it, so I will simply express my deep thanks to all of my friends and collaborators, both the mentioned and the unmentioned.

In the first chapter I propose that the goal of science is to make the wonderful and the complex understandable and simple—but not less wonderful. I will be pleased if readers find that I have achieved a bit of that in this third edition of *The Sciences of the Artificial*.

Herbert A. Simon
Pittsburgh, Pennsylvania
January 1, 1996