Calculating Machines

Man's attempts to devise aids to calculation are almost as old as man himself.

Derek de Solla Price
Yale University

Calculating machines, the modern electronic marvels that seem to run as deep as a man's mind and much faster, have a history that is almost as old as man himself. It may at first seem paradoxical that anything so exquisitely sophisticated as a combination of the most complex machines that have ever been built and the most abstruse mathematics that have ever been thought could have roots that run back beyond the last few decades or the last few centuries. Yet the truth is that this combination of instrument building and rational mathematical thinking is a continuous thread that runs through the whole of recorded history. It is a thread that links together and dominates the pattern of scientific thought and technological development throughout recorded history, a thread that traces back to perhaps even before man had invented the written word that gives us this record.

Man the Maker, craftsman, and Man the Thinker, the mathematician, are often conceived as opposite poles of human action; we shall show through this history how the coming together of these two extremes has given us so much of the modern world. We shall show that although the most direct product of this combination has been the calculating machine, other offshoots have dominated the growth of pure sciences like mathematics, astronomy, and physics, technologies such as those of clockwork and all sorts of engines, the arts of business and finance, and philosophies and theologies that have...

To commemorate the one-hundredth year of the IEEE, we present this review of the history of pre-electronic calculation. Probably few engineers are aware of the story Derek Price tells here, and so it may be appropriate—especially in this centennial year—to consider the origins of our profession. Computer engineers, as it turns out, have intellectual forebears stretching back to furthest antiquity. In a distant mirror, we see reflections of ourselves. Though we work in metal, oxide, and semiconductor rather than stone, wood, and bronze, the task remains fundamentally the same—science and technique, mind and hand, have joined forces since the earliest times to build instruments for counting and measuring.

Consider this: one day 80 years before the birth of Christ a group of men—today we would call them a design team—met to plan and build a machine that would enable its users to accurately predict celestial motions. Like their distant successors, before they were done they had solved problems—in both elegant and inelegant ways—and produced a working model.

—Ed.