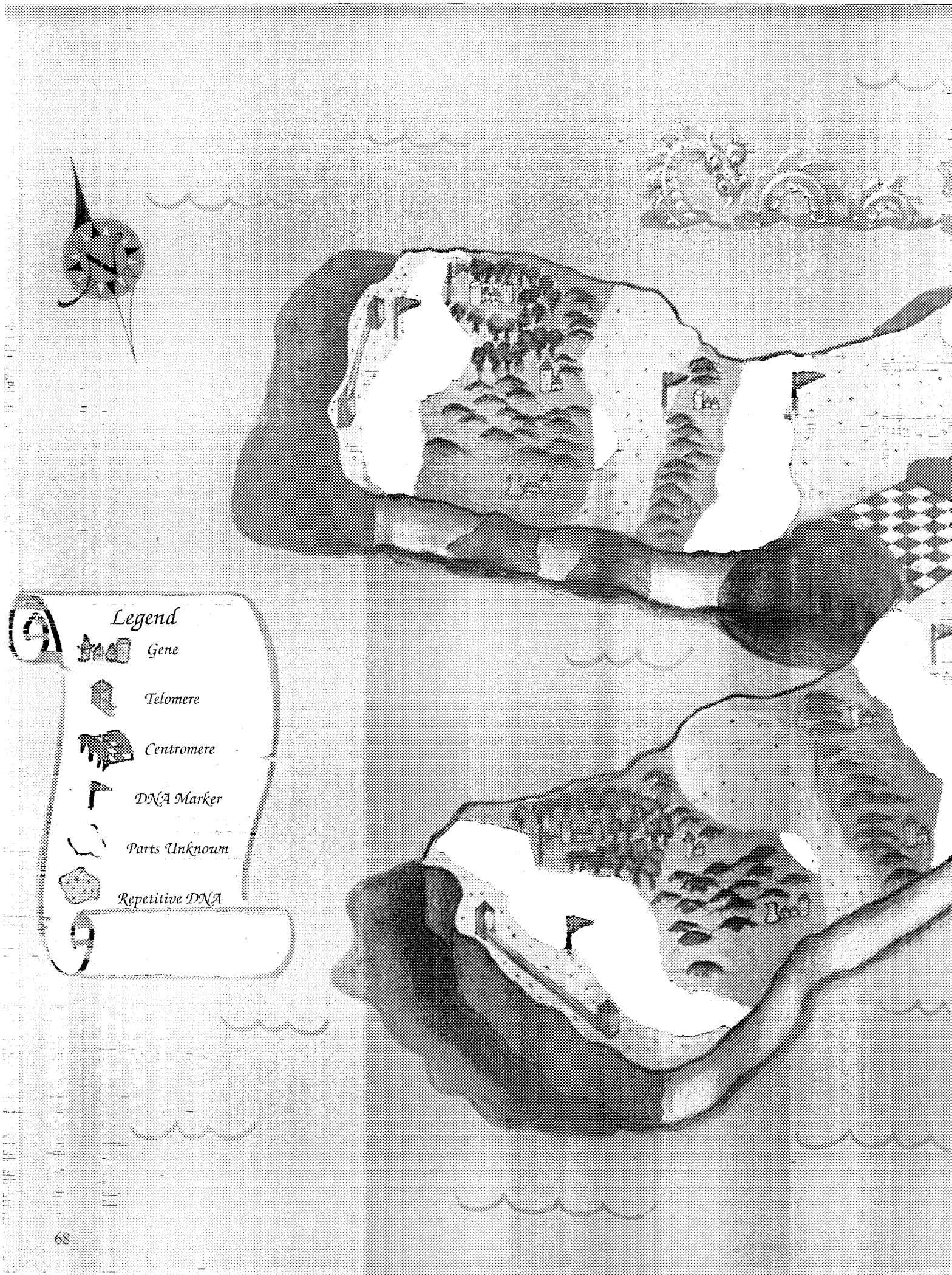
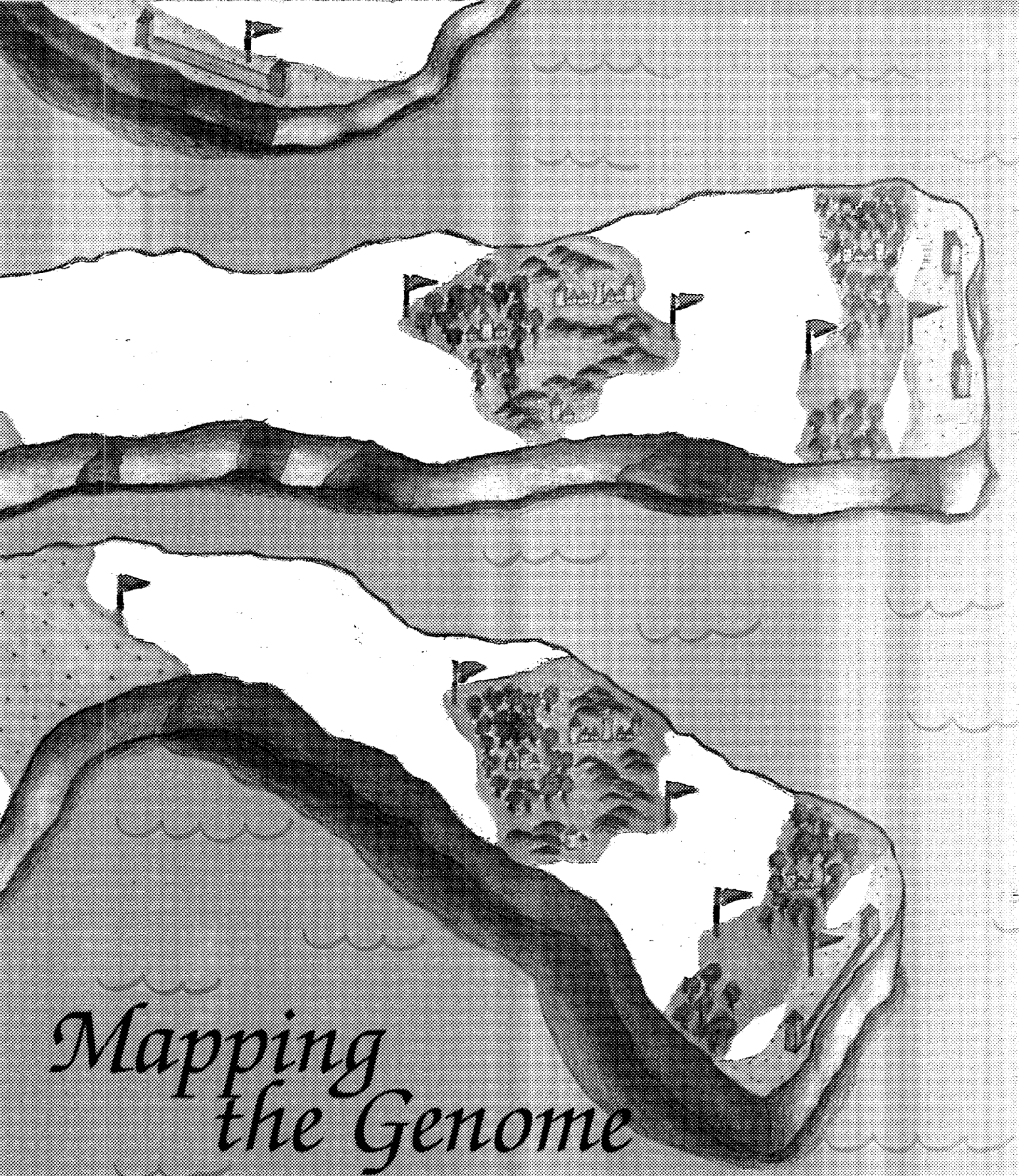

Legend
Gene
Telomere
Centromere
DNA Marker
Parts Unknown
Repetitive DNA



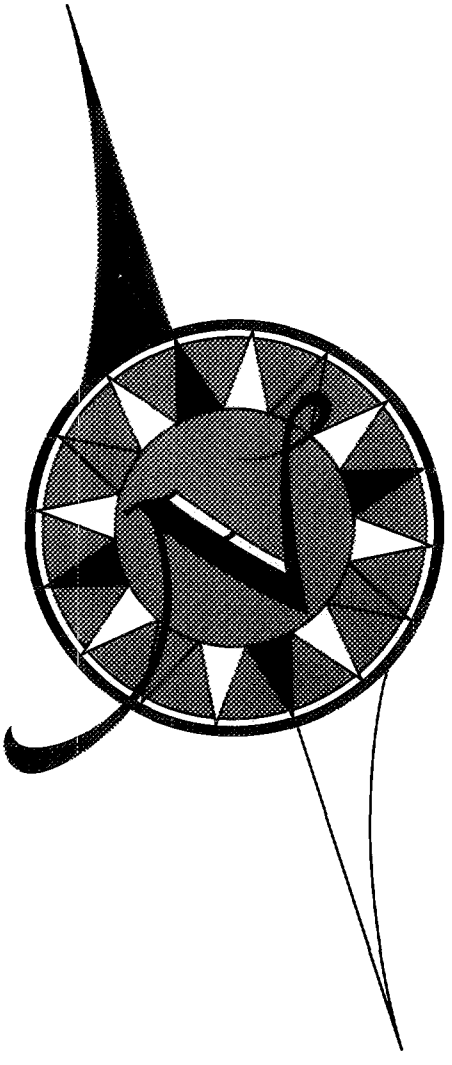
Mapping the Genome

the vision, the science, the implementation

The Human Genome Project is the first large coordinated effort in the history of biological research. The aim is to make a detailed map of human DNA—the hereditary instructions inscribed in DNA that guide the development of a human being from a fertilized egg cell.

Like sixteenth-century maps of the new world, present maps of the human genome contain few landmarks and many parts unknown. And like the explorers of the new world, the genome explorers are pushing forward into vast uncharted territory in the face of great uncertainties—both political and technological.

Some conservatives in the genetics community have expressed skepticism about the ultimate value of the project, and many biologists worry about the lack of funds for other projects. The project itself is fraught with technical uncertainties. But there is also a sense of creating a new order in biology, a revolution in which computers and automation are joined with advanced technologies in molecular biology to speed the process of DNA analysis. The far-reaching goal is to sequence not one human genome but many and routinely, to sequence the genomes of many other organisms and compare those sequences with the human sequence, to store all the data in computers and share them electronically, and to make cooperation the rule instead of the exception.



Egos are apparent in this ambitious enterprise—a self-consciousness of being part of a historic project and of having the chance to stake a claim in this wide-open territory. The goal is tantalizing. But to overcome the danger of promising too much, the disappointment of slow beginnings, the threat that dissension in the community will destroy the effort, the fear of centralization, the discomfort with quantitative analysis, the difficulty of the task, the inertia of the establishment—will require great determination and skill.

During 1991 and early 1992, we invited some of the modern-day explorers to discuss their vision, their answers to the skeptics, and their progress toward their goals. The following compilation of those discussions reveals a rapidly changing panorama of problems and priorities, as should be expected in this emerging field. It also reveals differences of opinion about strategies and timing. But the participants agree unanimously that this project is not only the culmination of the recombinant-DNA revolution of the 1970s but also the beginning of a new technological revolution enabling us to answer some of the great mysteries of evolution and human development. It promises to increase our understanding of our place among species and to reveal new limitations and new potential for shaping our individual destinies and those of future generations.