defined uniquely by the particularity of its elements. Each species is a small universe in itself, from its genetic code to its anatomy, behavior, life cycle and environmental role, a self-perpetuating system created during an almost unimaginably complicated evolutionary history. Each species merits careers of scientific study and celebration by historians and poets. Nothing of the kind can be said (at the risk of stating the obvious) for each proton or inorganic molecule.

The taxonomic foundation

Taxonomy, the scientific study and practice of classification, is the foundation to the all-species encyclopedia. However, it is still one of the most underfunded and weakly developed biological disciplines. Worldwide, as few as 6000 biologists work within it. Most people are surprised to learn that most of biodiversity is still entirely unknown. They assume that taxonomy all but wound down generations ago, so that today each new species discovered is a newsworthy event. The truth is that we do not know how many species of organisms exist on Earth even to the nearest order of magnitude. Those formally diagnosed and given latinized scientific names are thought to number somewhere between 1.5 and 1.8 million, with no exact accounting having yet been made from the taxonomic literature. Estimates of the full number, known plus unknown, vacillate wildly according to method. As summarized in the *Global Biodiversity Assessment* [1], they range from an improbable 3.6 million at the low end to an equally improbable 100 million or more at the high end. The commonest order-of-magnitude guess is ten million.

The smaller the organisms, the more poorly known the group to which it belongs. About 69 000 species of fungi have been distinguished and named, but as many as 1.6 million are thought to exist. Of the nematode worms, making up to four of every five animals on Earth (and, it is said, so abundant that if all solid matter on the surface of the planet were to disappear, its ghostly outline could still be seen in nematodes), ~15 000 species are known but millions more might await discovery. Nematodes in turn are dwarfed in diversity by the bacteria and archaeans, the black hole of biological systematics. Although only ~6000 have been formally recognized, approximately that many, almost all new to science, can be found in only a few grams of rich forest soil. Our ignorance of these microorganisms is epitomized by bacteria of the genus *Prochlorococcus*, arguably the most abundant organisms on the planet and responsible for a large part of the organic production of the ocean, yet unknown until 1988. *Prochlorococcus* cells float passively in open water at 70 000–200 000 ml $^{-1}$, multiplying with energy captured by sunlight. They eluded recognition so long because of their extremely small size. Representing a special group called picoplankton, they are much smaller than conventional bacteria and barely visible at the highest optical magnification.

Even the largest organisms await a full accounting. The global number of amphibian species has grown in the past 15 years by more than a third, from 4000 to 5400. The flowering plants, for centuries among the favorite targets of naturalists, could rise from the present 272 000 to over 300 000: each year ~2000 new species are added to the standard world list of the *International Plant Names Index* (http://www.ipni.org).

The biodiversity agenda

How best might the taxonomic foundation be laid? From 13 to 15 October, 2001, a 'summit' was held at Harvard University by leaders of organizations devoted to comprehensive taxonomic surveys on a global or continental scale. Their aim was to find a way to complete a world census in a foreseeable period of time. Included were the Africa Biodiversity Foundation (headquartered in Bulawayo, Zimbabwe), Census of Marine Life (New York, USA), the Global Biodiversity Information Facility (Copenhagen, Denmark), the Global Taxonomy Initiative of the Convention on Biological Diversity (New York), the Integrated Taxonomic Information System (Washington, DC, USA), and NatureServe (Arlington, USA). Also present were scientist representatives from major collections in North and Latin America, as well as experts in bioinformatics technology. The summit was hosted by the All Species Foundation, newly formed as a facilitator of the overall effort. Its aim is to provide a clearing-house for the frontline initiatives, to assist them in their funding initiatives and development of bioinformatics, to initiate new projects, and to monitor and report progress in the overall enterprise on a continuing basis.

The attendees of the all-species summit agreed that a complete or, more realistically, a nearly complete global biodiversity census is technically feasible within 25 years. The magnitude of the task can be visualized as follows: whereas 10% of species on Earth out of, say (at an educated guess) 10 million–20 million, have been diagnosed during the first 250 years, beginning with Carolus Linnaeus' *Systema Naturae* in the mid-1700s, it is proposed to complete the remaining 90% in one-tenth that time.

The idea of a complete global biodiversity census with a timeline and coordinated initiatives had first been proposed in 1992 [2]. By the mid-1990s, the importance of the new technologies of bioinformatics in descriptive biology had also become apparent [3]. In 2000, explicit proposals were put forth for a census timeline and practical bioinformatics in systematics research [4–8]. By 2002, the implications of the new initiatives were being explored by biologists in several disciplines [9–11], and it could be said quite fairly that a 'biodiversity commons' [12] had come into being within the 'bioinformatics nation' [13].

The full agenda of biodiversity exploration is now unfolding in three overlapping phases. The first is the Catalog of Life, aimed at the organization of information about existing species into an electronic global framework [11]. The Catalog was born of the collaborative efforts of Species 2000, a federation of data bases begun in 1994 by the International Union of Biological Sciences, and headquartered at the University of Reading, UK; the Integrated Taxonomic Information System, begun in 1995