Deep Time: How Humanity Communicates Across Millennia. GREGORY
BENFORD. New York: Avon Books, 01999 (cloth); Harper Collins, 02000
(paper). 225 p. ISBN 0-380-97537-8 (cloth); 0-380-79346-6 (paper).[1]

For archivists who believe they make it last longer, physicist and science-fic-
tion author Gregory Benford's book will come as a shock. Benford thinks in
time scales vastly larger than we mortal archivists dare dream. We do our best
from one generation to the next to preserve records. We hope that technology
will continue to salvage our mistakes and allow us to migrate new forms of
records into the future. But what if there is no room for error? What if life
itself, especially life in a distant future, depended on decisions made today,
decisions with unforeseen consequences and costs? These are the very ques-
tions with which archivists, especially appraisal archivists, are familiar as they
decide the fate of records entrusted to their care.

Benford's book examines four critical "deep time" issues in which human-
ity, consciously or not, communicates to the future: nuclear waste disposal,
outer space probe messages, species extinction and preservation, and environ-
mental degradation and restoration. The backbone of Benford's arguments is
that humanity needs to adopt a deep time outlook; in other words, we all need
to be more like archivists and other preservation specialists. Benford, how-
ever, does not place much stock in the present work of archivists or libraries to
keep their cultural treasures safe. The words "archives" and "archivists" do
not appear in the index but are briefly mentioned on page sixty-one. Libraries
fare little better with only the Library of Congress and the Vatican Library
being singled out. He notes in his introduction (p. 15) that "no libraries sur-
vived antiquity." He mentions cuneiform tablets, not as examples of archival
records, but as one of the earliest and most durable forms of dead media. Ben-
ford casts serious doubt on the stability and long-term survival of electronic
records. Oversimplifying, he writes, "Our modern digital libraries are more
vulnerable than monastic scrolls were to a barbarian's torch; a power surge
and all is lost" (p. 61).

Benford's introduction, "From Here to Eternity," contains many implicit
and a few explicit references to archives. For archivists, the introduction and
the first chapter, which comprise nearly half the book, are the most important
and what this review concentrates on. None of his examples of archival preser-
vation are complimentary to the profession, and he is right, in the sense that on
the scale of his book, despite the public perception of archives as eternal, our
efforts as records custodians are sometimes thwarted by activities beyond our
control, particularly unforeseen acts of social upheaval and natural disasters.

1 All quotations in this review are from the paperback edition, and all Web sites cited were last
  visited on 31 January 2002.

Many important archives are also in vulnerable geographic sites – underground or below sea level being a perennial favourite – which significantly increase the risk to non-digital records. We continue to plan for disasters which could be mitigated by preservation duplication and dispersal of records. Interestingly enough, one strategy for digital preservation known as LOCKSS (Lots of Copies Keep Stuff Safe; http://lockss.stanford.edu/) takes as its model "the old idea of preventing loss by multiplying copies" at the local level. How much is this technique being used for ensuring the survival of unique, archival, non-digital records? For example, how many archives have complete backups of their microfilm negatives in a distant geographic location?

What struck me about this work, especially the introduction, was the number of times Benford seemed to be addressing the two core concerns of archives: a "deep time outlook" (long-term preservation) and "deep time messages" (transmission of meaning in records). For Benford and others, such as Daniel Hillis, Stewart Brand, and friends of the Long Now Foundation (http://www.longnow.org), deep time is 10,000 years, roughly twice the age of our earliest known historic date (according to Benford, this is 4241 BC). The Long Now Foundation, which Benford cites as a concrete example of deep time thinking, established a Long Mail project "to better understand how to archive digital data for the long term (centuries) ... a long term E-mail archive" (http://epoch.longnow.org/ely/intro.html). Besides this project and the 10,000 Year Clock (see the publication dates of Benford's book above for the simple philosophy behind the clock), the Long Now Foundation's other significant project is the Rosetta Disk Project (http://www.rosettaproject.org/). Attempting to establish a permanent archive of 1,000 languages in different media, the project will be distributing the analog-encoded disk free to communities or individuals using the LOCKSS principle.

Benford shines the critical spotlight on archives a little too harshly and unfairly. He appears not to have done his homework and seems unaware of various international, national, and local efforts to resolve what the InterPARES Project identifies as "the permanent preservation of authentic records created in electronic systems" (quoted from its Web site start page, http://www.interpares.org). Benford cites several cases in which attempts by ancient civilizations to immortalize their cultures have failed. Their most successful efforts come down to us in stone or clay. Yet the durability of these media leaves them vulnerable to vandals, recyclers, and natural forces. Even should the medium survive into the distant future, will it contain a message? Benford describes two methods by which messages survive: one he calls "High Church," and the other "Kilroy Was Here." The former relies on reverence or a religious motivation, and the latter on persistent desecration. Understanding the significance of the message is the third and greatest challenge. Benford, who participated in a 1989 study involving the U.S. Waste Isolation Pilot

Project (http://www.wipp.carlsbad.nm.us/), suggests that the simplest way to ensure deep time survival of a message from the past is through the High Church approach of instilling a sense of fear and wonder or awe.

In the context of his book's first chapter – how to design a persistent message warning future generations of a nuclear waste storage site – Benford sums up the perils of digital records accurately enough:

In principle, digital is forever because it is easy to renew. Making exact copies is simple and costs much less than any other medium. But so far the burgeoning industry has not made a medium that can persist physically.... So far, digital lasts forever – or five years, whichever comes first.

Even if durable, digital media have an innate translation problem old-fashioned print does not. A document's meaning dissolves into a bit-stream of electronic zeroes and ones, meaningful only to the software that made it. Stored bits can represent text, a pixel dot in an image, an audio symbol, a number. There is no way to know which, or how to retrieve it, except by reading it with the proper software and hardware.

Even when translated to new media and software, material filtering through a new format is often distorted.... All this suggests that our recent passion for the digital is probably a passing fervor.... it seems an unpromising way to consign one's vital messages to the abyss of centuries....

Eventually, neither paper and CD-ROMs, nor any foreseeable computer-based method, are for eternity.... How to talk across the ages, to call out a warning? ... More deeply, how do we induce respect for whatever warnings we leave? Nobody will revere small, digital records, so they should be associated with larger, striking monuments (p. 62–63).

Benford's book reminds archivists that we are not as prominent as we might think we are. This is not necessarily a bad thing, since too much societal oversight would tend to politicize archival decision making and affect how and when records are created. Some have speculated this has occurred in jurisdictions where privacy and government disclosure (freedom of information) legislation has been enacted. Despite the increasing use of computers over the past thirty years, archives, unlike libraries, were latecomers to the field of digital preservation. Benford's work sounds another clarion for better cooperation between mutual spheres of cultural preservation. As digital age governments of industrialized nations embrace the electronic services delivery model (e-government), managing and preserving these virtual records are finally getting the attention they deserve. As Benford effectively argues, nevertheless, "[i]t is sobering to contemplate that our distant heirs may know us best not by our Michelangelos or Einsteins or Shakespeares, but by our waste markers, our messages aboard space craft, our signatures upon the soil and species, or our effect upon their landscapes, descended from ours" (p. 202–203). Archivists, though rarely mentioned in this text, will have directly con-

tributed in some fashion to at least the first three of those enduring monuments
to our existence as a species.

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**Building an Emergency Plan: A Guide for Museums and Other Cultural
Institutions.** VALERIE DORGE and SHARON L. JONES. Los Angeles: The
Getty Conservation Institute, 1999. 272 p. ISBN 0-89236-529-3.

The Getty Conservation Institute has been known for producing and publish-
ing a number of fine conservation texts, many of which are used in today's
conservation education programmes. This guide, compiled by Valerie Dorge
and Sharon Jones, is no exception. Though many may feel there is a flood of
disaster preparedness manuals available for reference and education, this one
is of particular use for the larger institution.

The manual is intended to guide all levels of staff through the creation and
implementation process of a new preparedness plan, beginning with an intro-
duction on how to use the book, and a list of terms to know. The manual is
divided into three parts, with a number of chapters in each part. Part one is
titled "For the Director," and gives a detailed overview of exactly what an
"Emergency Preparedness and Response Plan" entails and how to go about
developing it. It explains what everyone's roles and responsibilities should be
in developing and implementing the plan, and gives a number of good exam-
ples from other institutions to show the importance of having such a plan in
place. It then goes into specific details as to the role the director should take in
the development of an emergency plan, outlines important tasks with ques-
tions to consider for each one, and presents the immediate steps which are to
be taken to put the planning process in motion.

Part two, titled "For the Emergency Preparedness Manager," contains chap-
ters three through five. Chapter three explains the roles of the emergency pre-
paredness manager and the emergency preparedness committee. Chapter four
covers the importance of communication, both with staff and response person-
nel, and with the public. Chapter five stresses the importance of training all
staff members, and gives suggestions on how to offer staff training. Through-
out this section of the manual, tasks are outlined step by step, and suggested
exercises and questions are presented for consideration when completing the
development stage of an emergency plan.

The third part of the manual is titled "For the Departmental Team Leaders,"
and is divided into four chapters, each of which is geared towards four differ-
ent teams. These teams are safety and security, collections, buildings and
maintenance, and administration and records. The role of each team, the