



L O T S O F C O P I E S K E E P S T U F F S A F E

Victoria Reich  
Director LOCKSS Program  
Stanford University Libraries  
[www.lockss.org](http://www.lockss.org)



# What Is It?



Open Source

Peer to Peer

Decentralized

Digital Preservation Infrastructure



# 2 ASSUMPTIONS



# #1 Democracy -->Libraries

"Libraries are directly and immediately involved in the conflict which divides our world, and for two reasons. First, because they are essential to the functioning of a democratic society. Second, because the contemporary conflict touches the integrity of scholarship, the freedom of the mind, and even the survival of culture, and libraries are the great tools of scholarship, the great repositories of culture, and the great symbols of the freedom of the mind."

*--Franklin Delano Roosevelt*



## #2 Library --> Collections

A {research} library contains an in-depth collection in a particular subject field ...or in-depth collections in several subject fields ...

# The Web

Accidentally changed the business relationship between librarians and publishers.

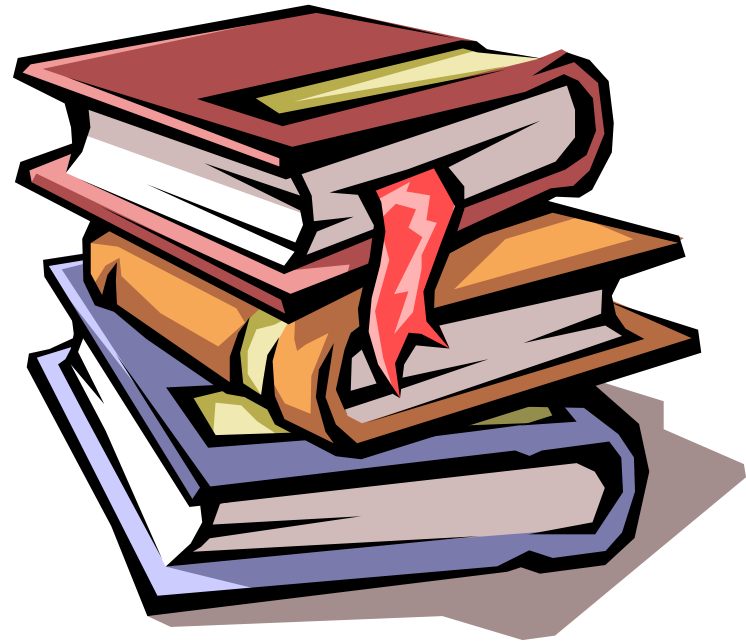
With rare exceptions, libraries provide access to web materials and do not take physical custody of the content.

The role libraries have played in society for hundreds of years as trusted keepers of information and culture was disrupted.

Our digital cultural and intellectual heritage is at risk.



# Archival Assets



## 2 Key Questions

From this moment on,

- who will have custody
- who will control and govern societies archival assets?





# Community Governance Community Custody





# Community Governance Library Custody

To start: 12 Publishers and 7 libraries

Building a distributed, validated,  
comprehensive archive

Held on behalf of the community

Global access to content post trigger

*HANDOUT*





## Community Governance Library Custody

Libraries are using LOCKSS to build libraries;

to build & preserve e-collections

- Subscription materials: eliminating perpetual payment for perpetual access
- Freely available materials: truly and immediately at risk



# The Community Is Keeping LOTS OF STUFF SAFE

Content that meets these criteria

1. Delivered via the web, http://
2. Has a stable URL structure
3. Has an authoritative version

*FORMAT AGNOSTIC -- ALL FILE TYPES*

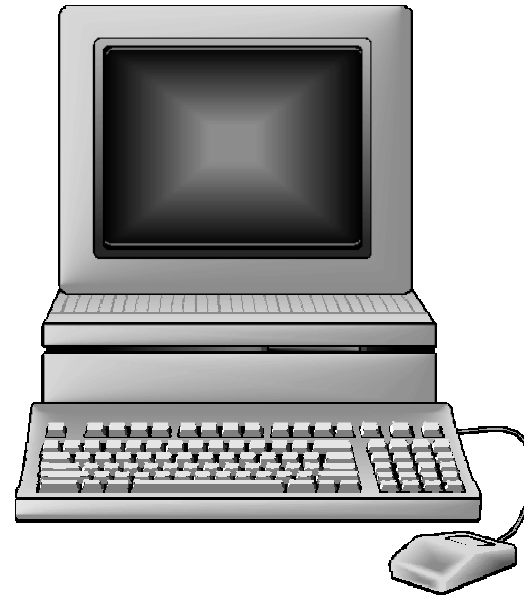


# How Does It Work?



# Two Requirements

Library installs a  
LOCKSS Box  
[www.lockss.org](http://www.lockss.org)  
[install]



Publisher gives permission



QUICK SEARCH: [advanced]  
Author: Keyword(s):  
Go    
Year:  Vol:  Page:

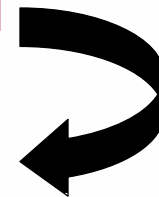
Archive of 2003 Online Issues:

← 2003 →		
January <a href="#">January</a> ; 51 (1): 1 - 132	February <a href="#">February</a> ; 51 (2): 133 - 267	March <a href="#">March</a> ; 51 (3): 271 - 404
April <a href="#">April</a> ; 51 (4): 407 - 554	May <a href="#">May</a> ; 51 (5): 555 - 696	June <a href="#">June</a> ; 51 (6): 697 - 852
July <a href="#">July</a> ; 51 (7): 853 - 980	August <a href="#">August</a> ; 51 (8): 981 - 1112	September <a href="#">September</a> ; 51 (9): 1113 - 1248
October <a href="#">October</a> ; 51 (10): 1249 - 1391	November <a href="#">November</a> ; 51 (11): 1393 - 1574	December <a href="#">December</a> ; 51 (12): 1575 - 1712

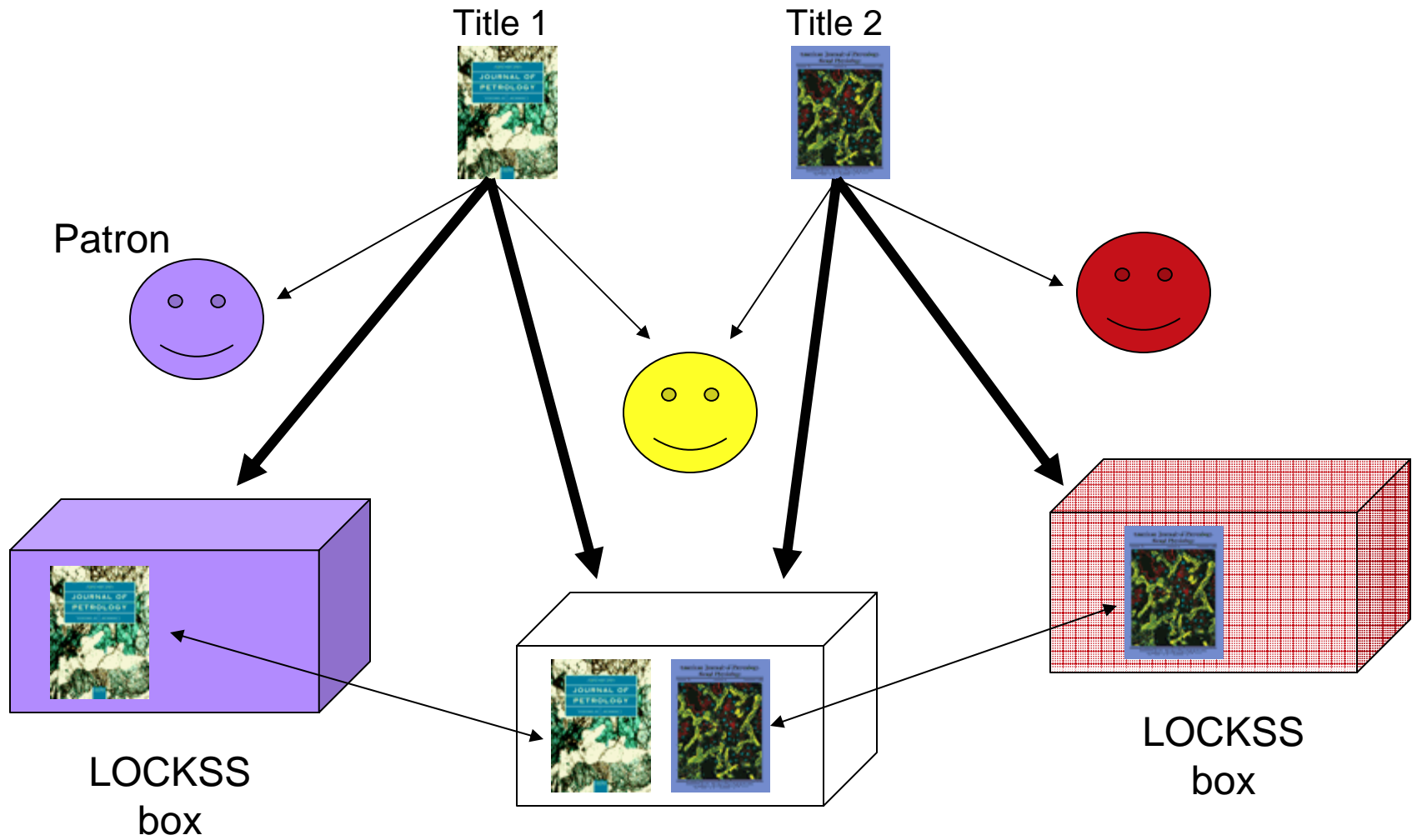
# Publisher Gives Permission



LOCKSS system has permission to collect, preserve, and serve this Archival Unit



# Collection

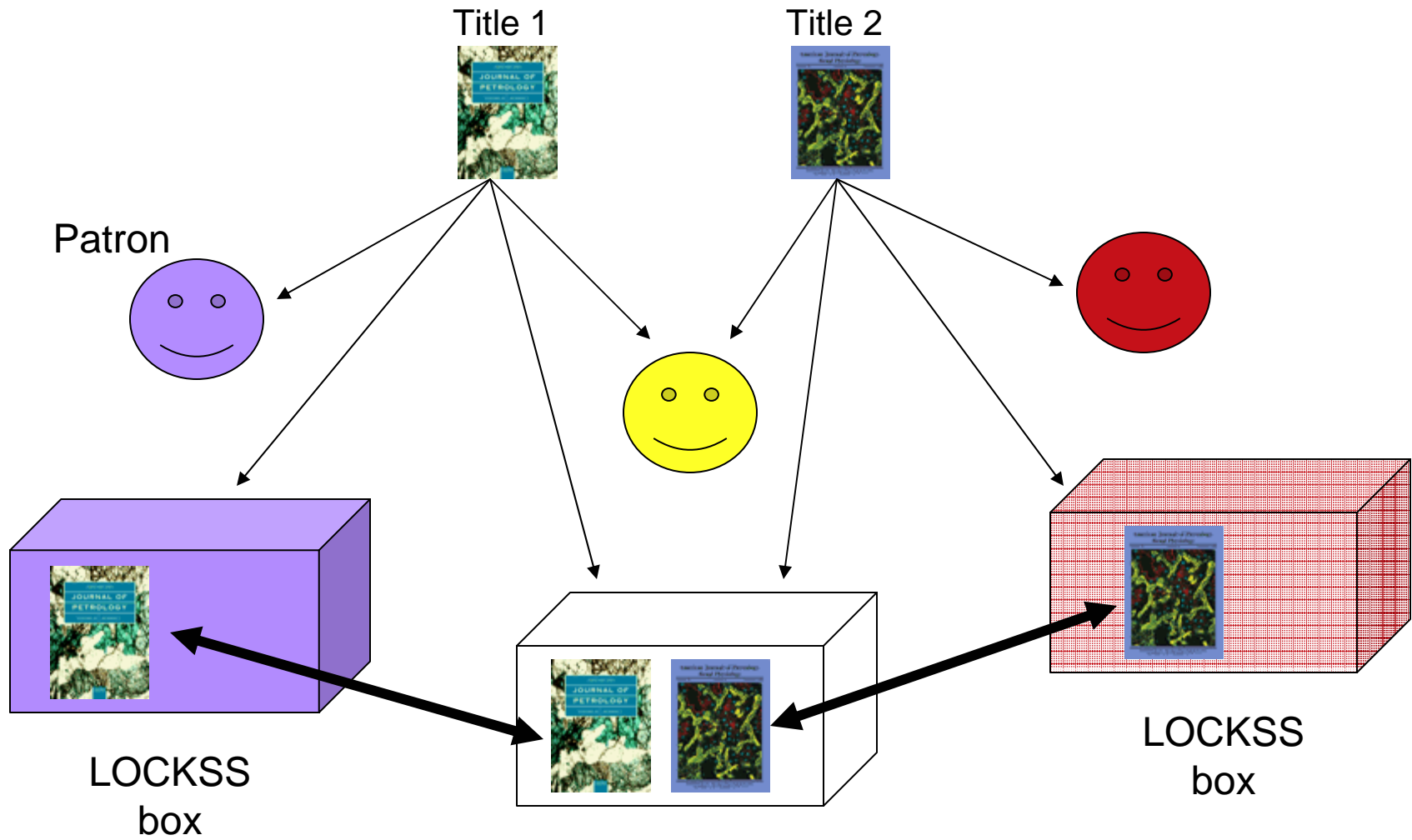


LOCKSS Boxes





# Preservation



LOCKSS Boxes





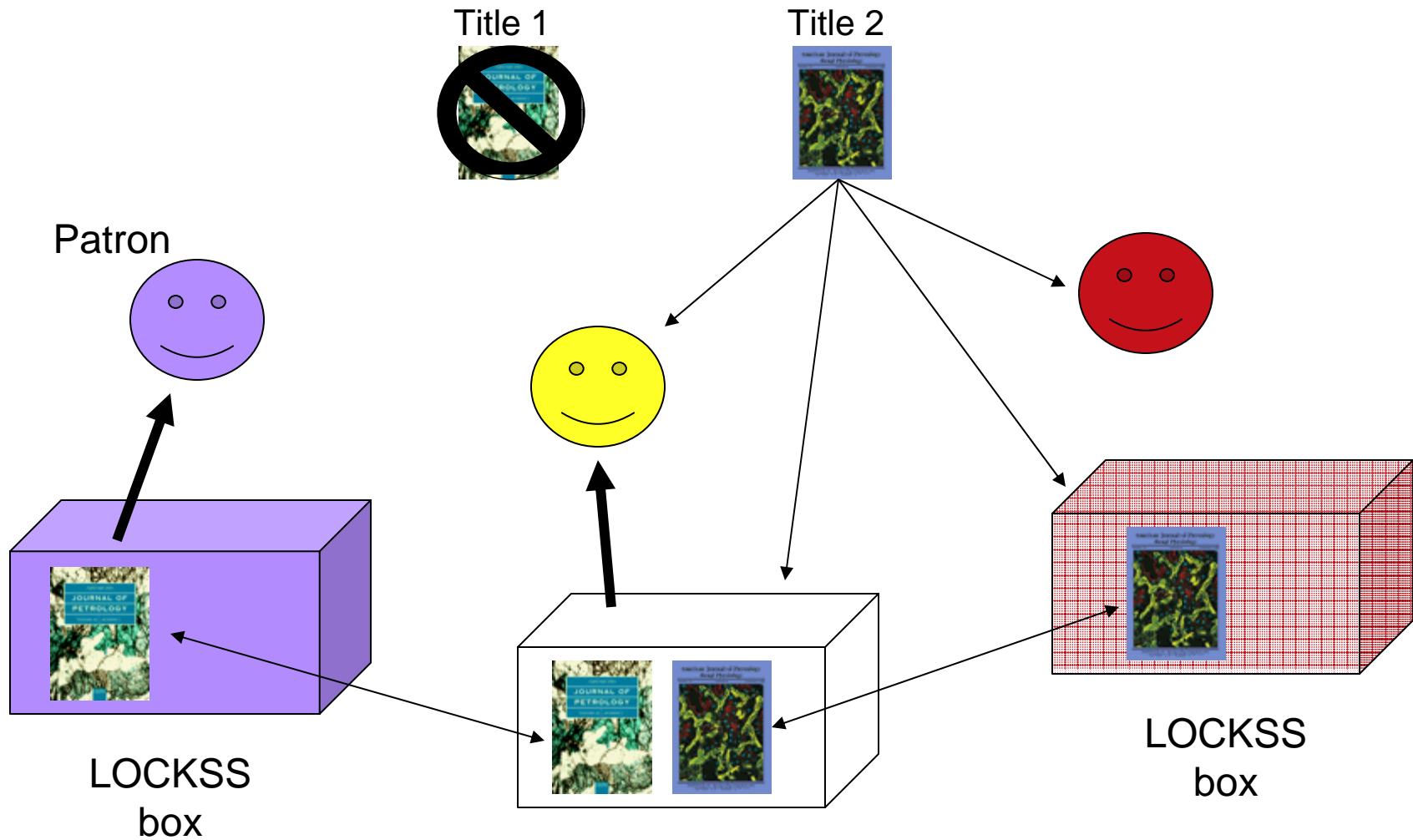
## Daemon Status

- [Journal Configuration](#)
- [Manual Journal Configuration](#)
- [Admin Access Control](#)
- [Proxy Access Control](#)
- [Proxy Info](#)
- [Daemon Status](#)
- [High CUS](#)
- [Logs](#)
- [Thread Dump](#)
- [Contact Us](#)
- [Help](#)

Archival Units ▼

Archival Units								
Volume	Content Size	Disk Usage (MB)	Peers	Polls	Status	Last Poll	Last Crawl	Last Tree/Walk
<a href="#">Abolition: Literary Review 2003</a>	1,254,583	7.2	<a href="#">peers</a>	<a href="#">13 polls</a>	Ok	06:43:51 05/22/05	06:30:53 05/20/05	17:59:52 05/22/05
<a href="#">Africa Today Volume 51</a>	14,566,800	16.7	<a href="#">peers</a>	<a href="#">36 polls</a>	Ok	15:45:48 05/17/05	23:51:54 05/20/05	10:50:56 05/23/05
<a href="#">AMBIO: A Journal of the Human Environment Volume 33</a>	79,371,556	97.8	<a href="#">peers</a>	<a href="#">19 polls</a>	Ok	16:35:56 05/13/05	17:46:04 05/22/05	17:55:11 05/23/05
<a href="#">The American Biology Teacher Volume 66</a>	40,376,438	59.2	<a href="#">peers</a>	<a href="#">79 polls</a>	Ok	09:37:17 05/23/05	15:18:39 05/20/05	01:25:19 05/23/05
<a href="#">American Fern Journal Volume 94</a>	6,364,079	13.2	<a href="#">peers</a>	<a href="#">22 polls</a>	Ok	16:56:09 05/19/05	19:00:52 05/20/05	08:16:04 05/23/05
<a href="#">American Historical Review Volume 108</a>	21,788,288	31.3	<a href="#">peers</a>	<a href="#">1 polls</a>	Ok	09:01:39 04/24/05	06:38:38 05/16/05	01:55:43 05/23/05
<a href="#">American Image Volume 60</a>	4,510,300	12.2	<a href="#">peers</a>	<a href="#">4 polls</a>	Ok	06:19:21 05/23/05	06:07:59 05/22/05	13:55:37 05/23/05
<a href="#">American Jewish History Volume 91</a>	17,493,000	24.9	<a href="#">peers</a>	<a href="#">32 polls</a>	Ok	06:08:07 05/23/05	04:22:32 05/22/05	16:03:16 05/23/05
<a href="#">American Journal of Mathematics Volume 125</a>	15,297,978	18.6	<a href="#">peers</a>	<a href="#">1 polls</a>	Ok	15:55:08 05/23/05	12:31:24 05/23/05	12:29:22 05/23/05
<a href="#">American Journal of Philology Volume 124</a>	11,874,436	17.7	<a href="#">peers</a>	<a href="#">29 polls</a>	Ok	10:18:38 05/22/05	09:59:39 05/22/05	11:02:53 05/23/05
<a href="#">The American Midland Naturalist Volume 152</a>	9,177,858	16.6	<a href="#">peers</a>	<a href="#">8 polls</a>	Ok	01:52:54 05/23/05	20:44:41 05/20/05	07:21:46 05/23/05
<a href="#">American Museum Novitates Volume 3460</a>	943983	2.5	<a href="#">peers</a>	<a href="#">31 polls</a>	Ok	08:30:04 05/23/05	21:35:08 05/21/05	06:27:52 05/23/05
<a href="#">American Quarterly Volume 55</a>	10,869,147	19.6	<a href="#">peers</a>	<a href="#">1 polls</a>	Ok	17:48:41 05/22/05	06:33:38 05/22/05	09:39:28 05/23/05
<a href="#">American Zoologist Volume 41</a>	51,975,406	80.3	<a href="#">peers</a>	<a href="#">0 polls</a>	Ok	23:17:16 05/20/05	14:26:17 05/18/05	21:39:47 05/23/05

# Access



*Prevents the publisher from revoking access rights to back content*



# Look and Feel to Readers

When content is served to the user  
from a LOCKSS Box

- Look and feel is as close as possible to what the publisher published
- Preserve content & presentation



# THE EXQUISITE

A JOURNAL OF LETTERS AND LIFE  
EDITED BY ANDREI CODRESCU

HOME ARCHIVES SUBMIT! BLACK MARKET COMRADES HOT SPOTS SEARCH

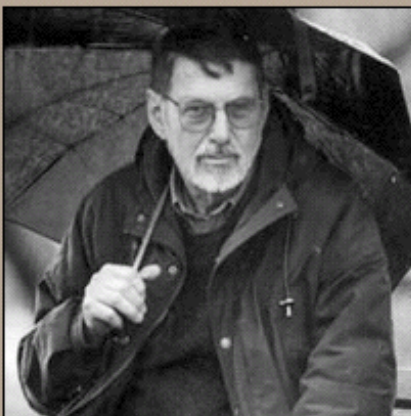
# СОПРСЕ #14



EC CHAIR | POETICK KULCHUR | ANTI-ANTHROPOMORPHISM  
DIARIES AND MEMOIRS | TRANSLATION AND HER RETINUE | NEW ECONOMICS OF LATE CAPITALISM | GALLERY | ZOUNDS | THE MAKING AND  
UNMAKING OF PERSON | THE CORPSE READS CLASSICS | LETTERS | THE BOOK OF REVELATIONS AND EPIPHANIES | WORKING CLASS SWEAT



DIARIES AND  
MEMOIRS OF THE  
STRICTLY  
FABULOUS



ROBERT CREELEY 1928-2005

### CREELEY'S BIRTHDAY DRIVE By [Andrei Codrescu](#)

Bob Creeley's birthday parties were legendary, but nobody in their right mind would get in a car with Bob for his traditional birthday drive. Not even

### THE CORPSE READS CLASSICS (THE CORPSE ALWAYS READS AND RE-READS THE CLASSICS, WITH POUND'S INJUNCTION IN MIND)

[Robert Casella](#) knows his Greeks; they guide him; he gets up to Christos, then stops, wisely.

[Dennis DiClaudio](#) revisits the case of Hypatia

[Kevin McLellan](#) transcribes certain oracles, from Sicily to Jamaica Plains, concerning homosexuality

[Frank Eannarino](#) revisits Genesis for a poetic treatise on "the evolution of panspermia." We are not sure what he's after, but the sounds pleased us

[Julie Keltges](#) dips her lyric pail into the Renaissance and comes up with a noble English serial killer; not the classics, exactly, but we are selling this one to the History Channel

[David Schwartz](#) asks "Where Does Midrash Derive?" and then proceeds to answer like a rabbi



# Format Migration

*“on the fly”*

When content is requested  
Process is transparent to the  
reader

D-Lib Magazine, Volume 11, Number 1, January, 2005

[http://www.dlib.org/dlib/january05/  
rosenthal/01rosenthal.html](http://www.dlib.org/dlib/january05/rosenthal/01rosenthal.html)



# Format Migration *“on the fly”*

**Preserve the original look & feel.** Value in increasing amounts of content.

**Reduce the cost of ingest.** Preserve more material per dollar.

**Postpone costs of migration.** Leverage time value of money & technology cost curve.

**Migrate material upon reader request.**  
Vastly lower the amount of content processed.

*What the readers sees is the result of the best possible technology at time of access.*





# Audit: Threats Models

# Audit: Bit Preservation





# Audit Threat Models

2005 National Science Board report to  
NARA

.....the designers of a digital preservation system need a clear vision of the threats against which they are being asked to protect their system's contents, and those threats under which it is acceptable for preservation to fail.



# Threats

*Continuous and Abrupt changes*

## Technology

- storage media, hardware, software, formats

## Money

- here one day, gone the next

## Organizations

- shifting priorities, politics, staffs

## Natural disasters

## Human errors and attacks



# Biggest threat to digital preservation is money

Digital bits are dynamic.

If you don't preserve them you lose them.

Digital preservation has to be a “marginal expense”; you can't “halt” the preservation process and continue to have collections.



# Bit Preservation

Digital bits are dynamic

- Must be preserved on a dynamic system

Must have lots of copies

- Copies must be loosely coupled
- Don't make Winston Smith's job easy



# Audit Bit Preservation

Develop low-level system protocols  
and standards

Build on peer to peer LOCKSS audit  
and repair protocol

Build on draft LC bit preservation  
functional requirements



# Join Us

