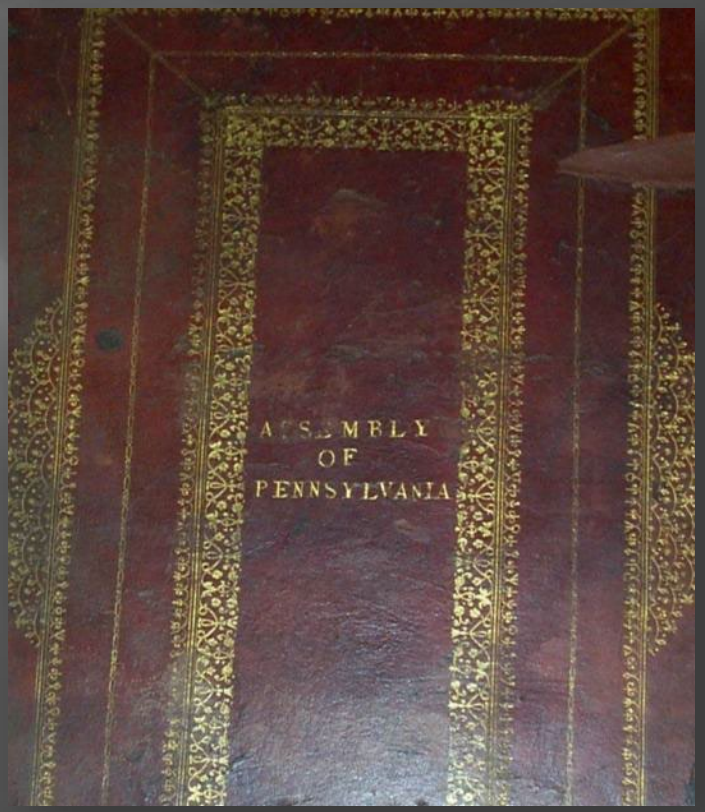
# RELOCATION & RENOVATIONS FOR PENNSLYVANIA'S RARE COLLECTIONS LIBRARY

"Books are the legacies that a great genius leaves to mankind, which are delivered down from generation to generation as presents to the posterity of those who are yet unborn."

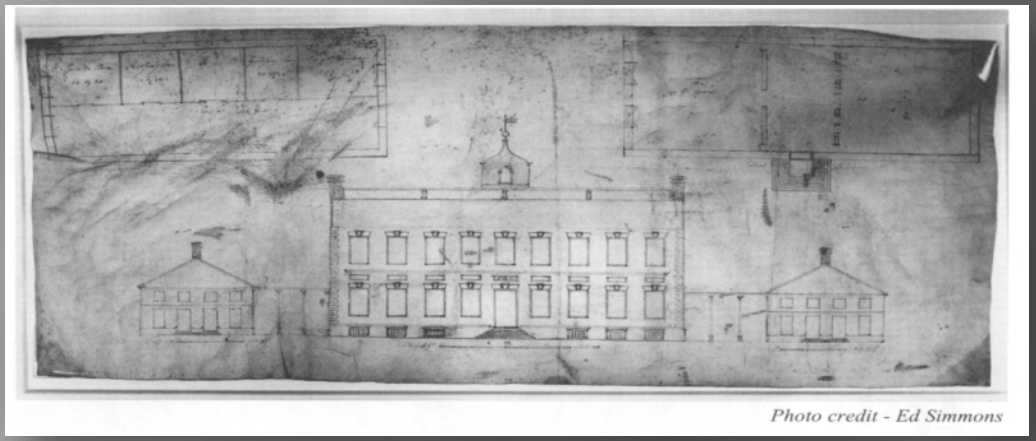
Joseph Addison
English essayist, poet, politician.
1672 - 1711



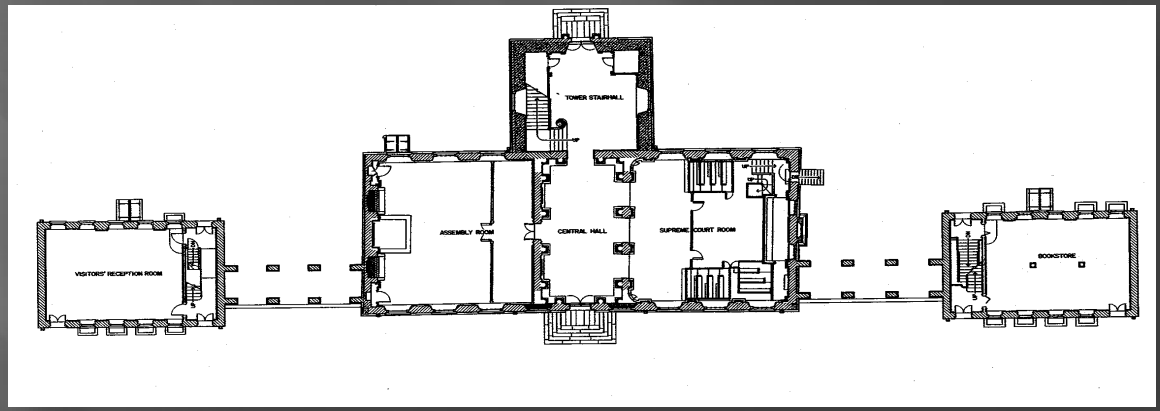

State Library, Forum Building Capitol Complex Harrisburg, Pennsylvania

# HISTORICAL SIGNIFICANCE

## Original Location – (Pennsylvania's State House)



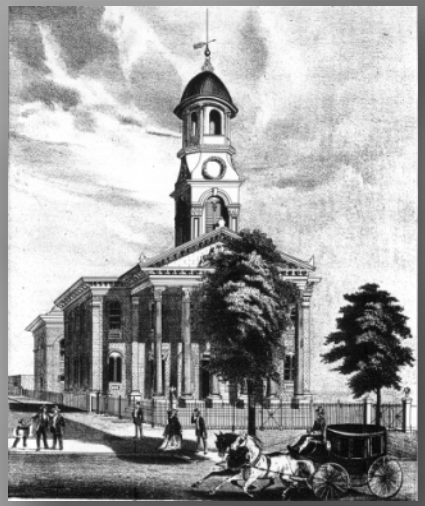

Main Façade, Independence Hall



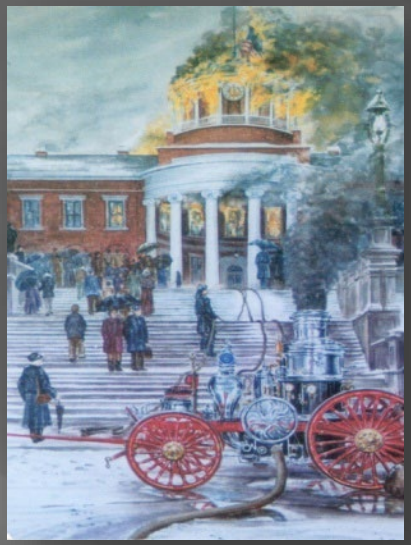

First Floor Plan, Independence Hall

# RELOCATION HISTORY

## Past to Present Location – Provincial Pennsylvania Assembly's Library



Dauphin County Court House circa 1820



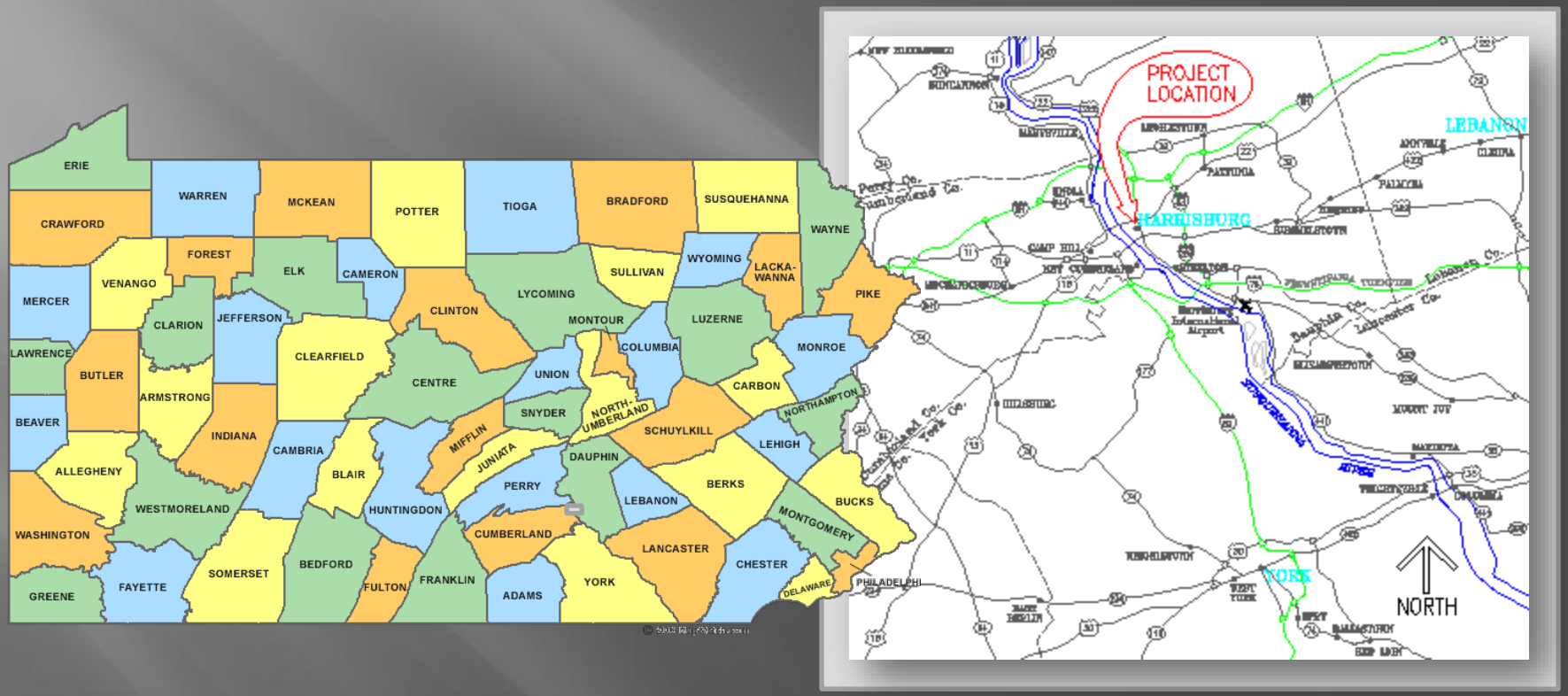
PA State Capitol, Burning Feb. 2, 1897


Annex Building, Capitol Complex circa 1930

Main Entrance to the Forum/Education Building

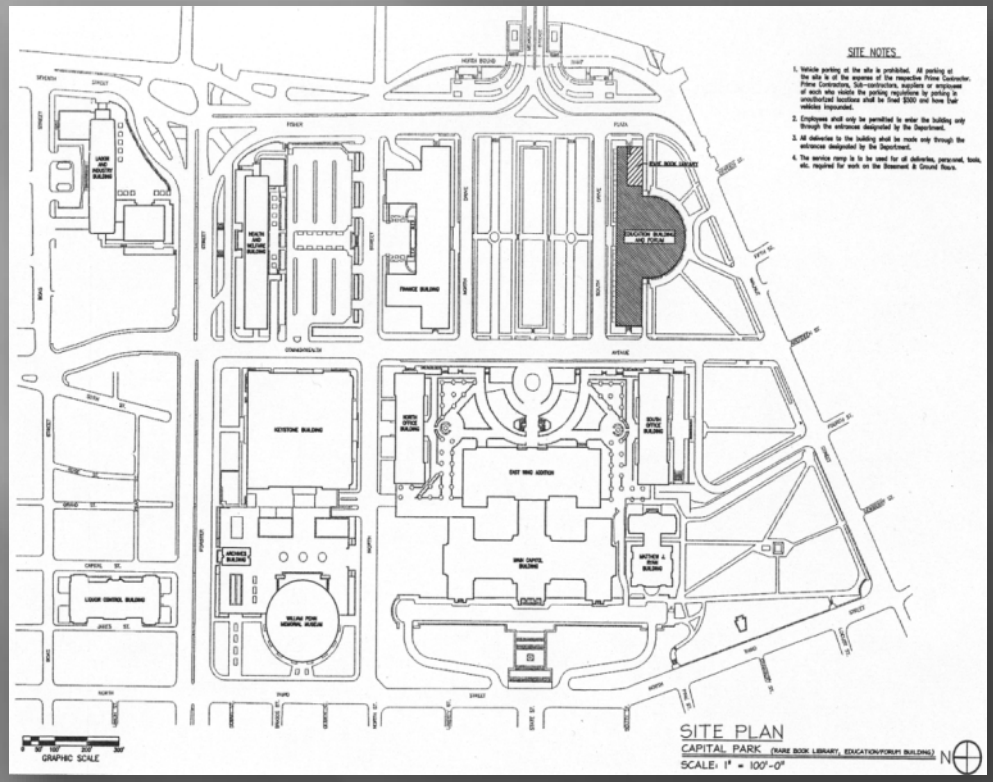
# REGINAL LOCATION

## Dauphin County , Harrisburg, PA ~ (Forum Building)



# CURRENT LOCATION

## Forum Building - (State Library)

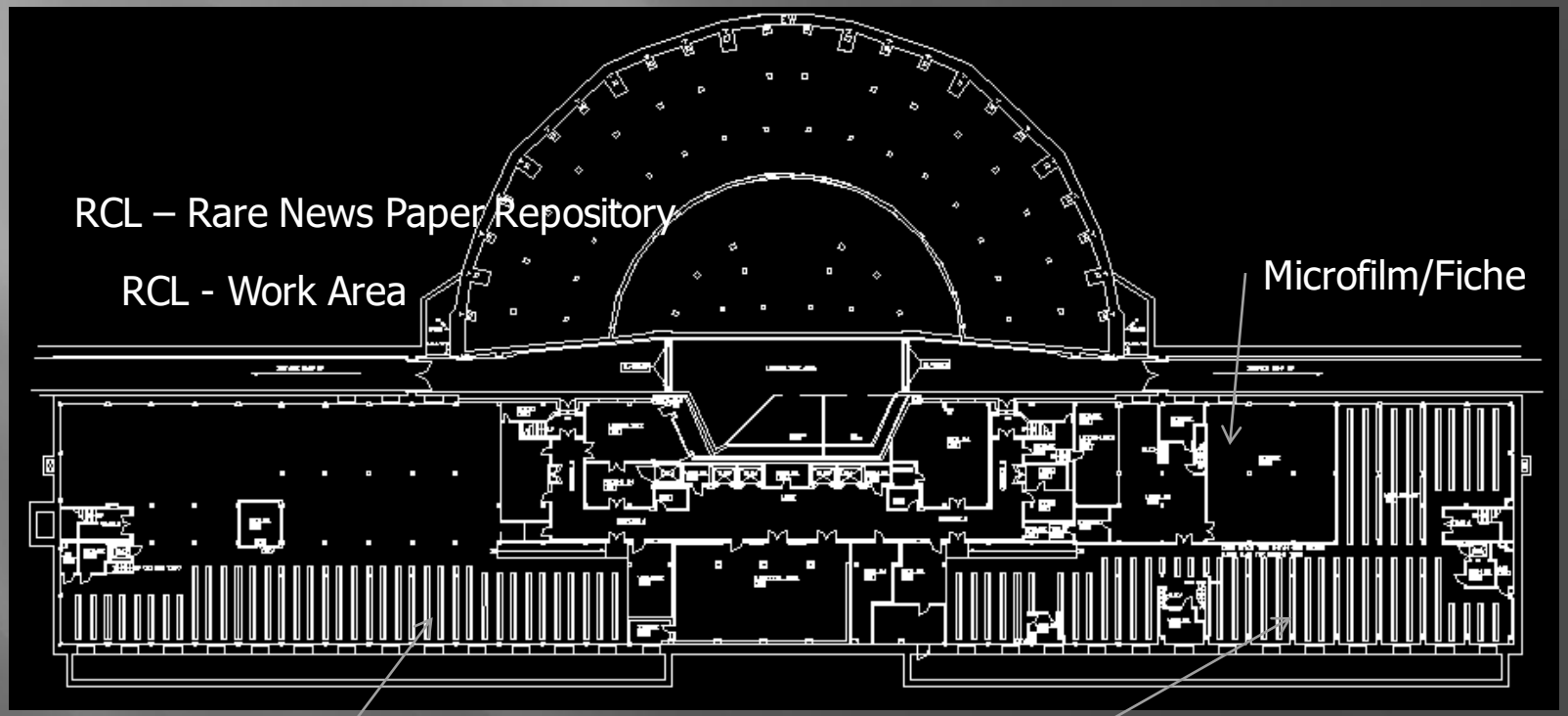



Capitol Complex, City of Harrisburg

Southern Elevation
East Wing Forum Building

# ARCHITECTURAL CONTEXT

## Forum Building ~ State Library, Lower Level

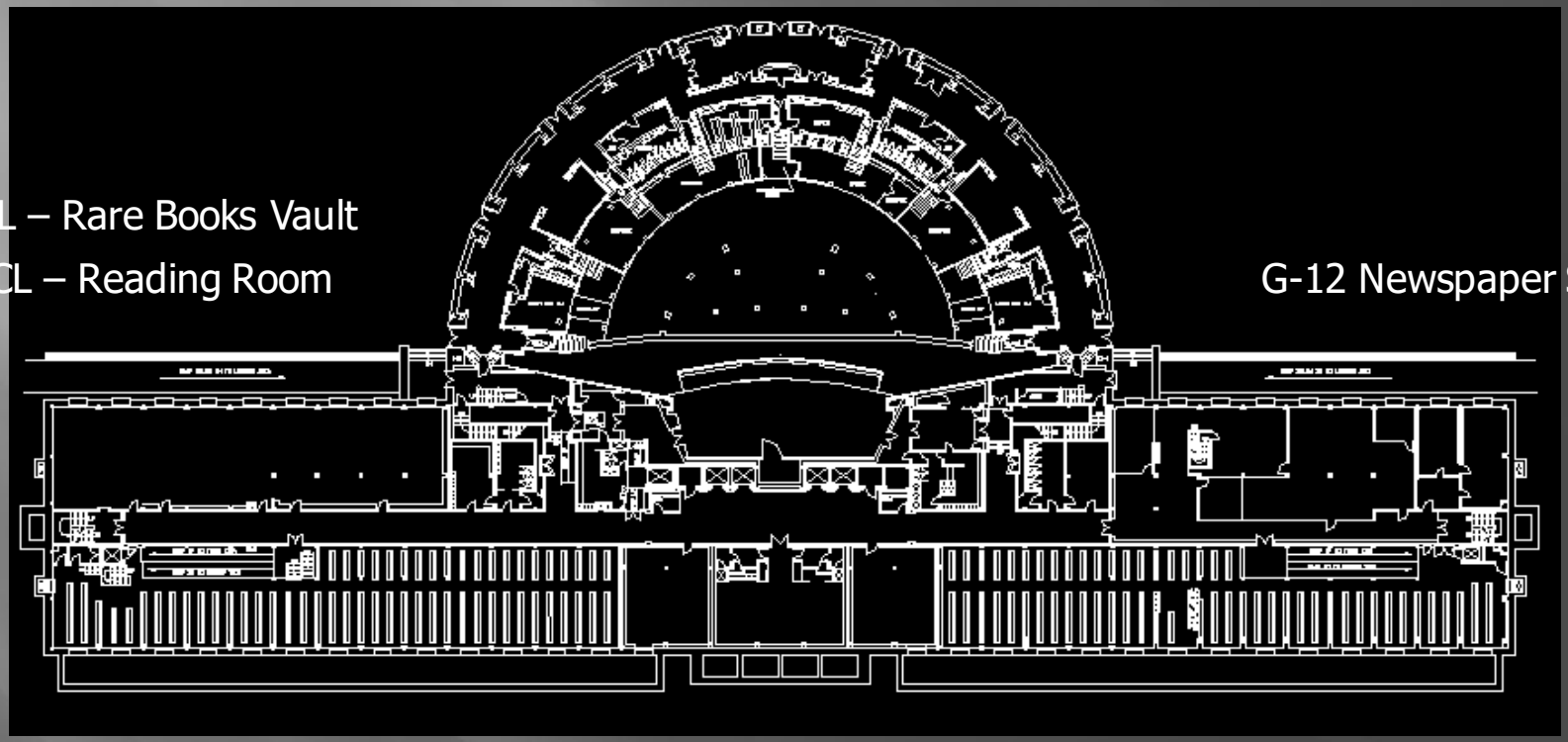


# ARCHITECTURAL CONTEXT

## Forum Building ~ State Library, Ground Floor

RCL – Rare Books Vault

RCL – Reading Room



G-12 Newspaper Storage

Exhibit Hall
Transitional Area

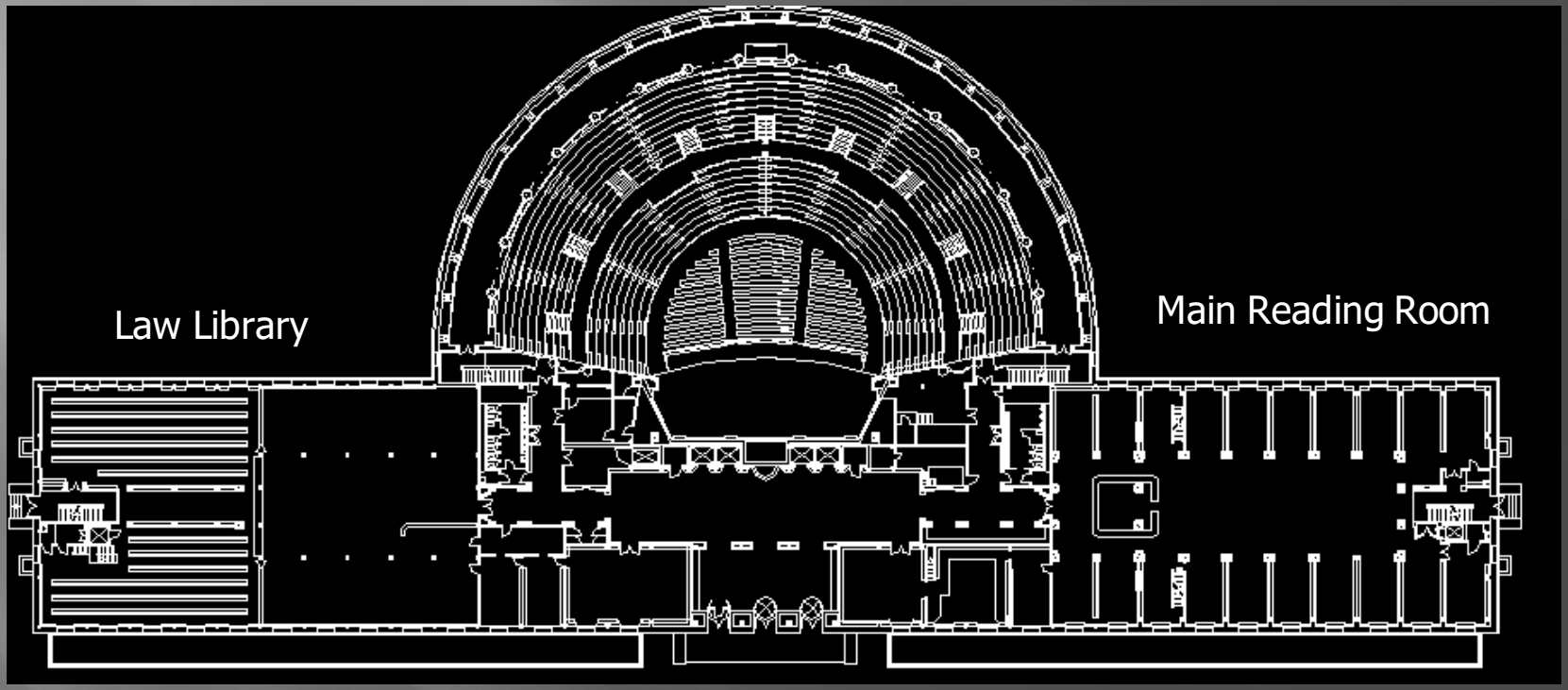
Green Room

Closed Stacks

# ARCHITECTURAL CONTEXT

## Forum Building – State Library, First Floor

Forum Auditorium



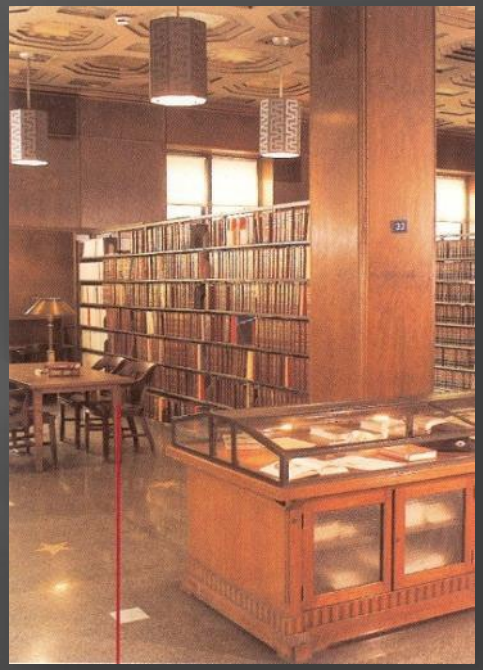

Main Entrance - Building

# ARCHITECTURAL CONTEXT

## Forum Building ~ State Library

Main Entrance - Lobby

Main Reading Room



Law Library

# CURRENT FACILITIES

## State Library – Rare Books Reading Room

# CURRENT FACILITIES

## State Library – Rare Books Reading Room

# PRE-CONSTRUCTION

## HOUSING CONDITIONS (State Library – Assembly Collection)

16th thru 17th Century Publications

# PRE-CONSTRUCTION

## HOUSING CONDITIONS (State Library – Rare Newspapers)

17h thru 19th Century Publications

# PRE-CONSTRUCTION

## HOUSING CONDITIONS (State Library – Heritage Collection)

18th & early 19th Century Publications

# Project Scope

## Rare Collections Library – (Design parameters)

NINE (9) DIFFERENT ENVIRONMENTS:

- Exterior of the Building
- Interior of the Building

RARE COLLECTIONS LIBRARY

Current Construction Phases

- Exhibit Hall Way
- Reading Room & Archivist's Office
- Rare Books Vault
- Work Area
- Rare Newspaper Repository

Future Construction Phasing

- Transitional/Heritage Collection
- Law Library

# Project Scope

## Rare Collections Library – (Design parameters)

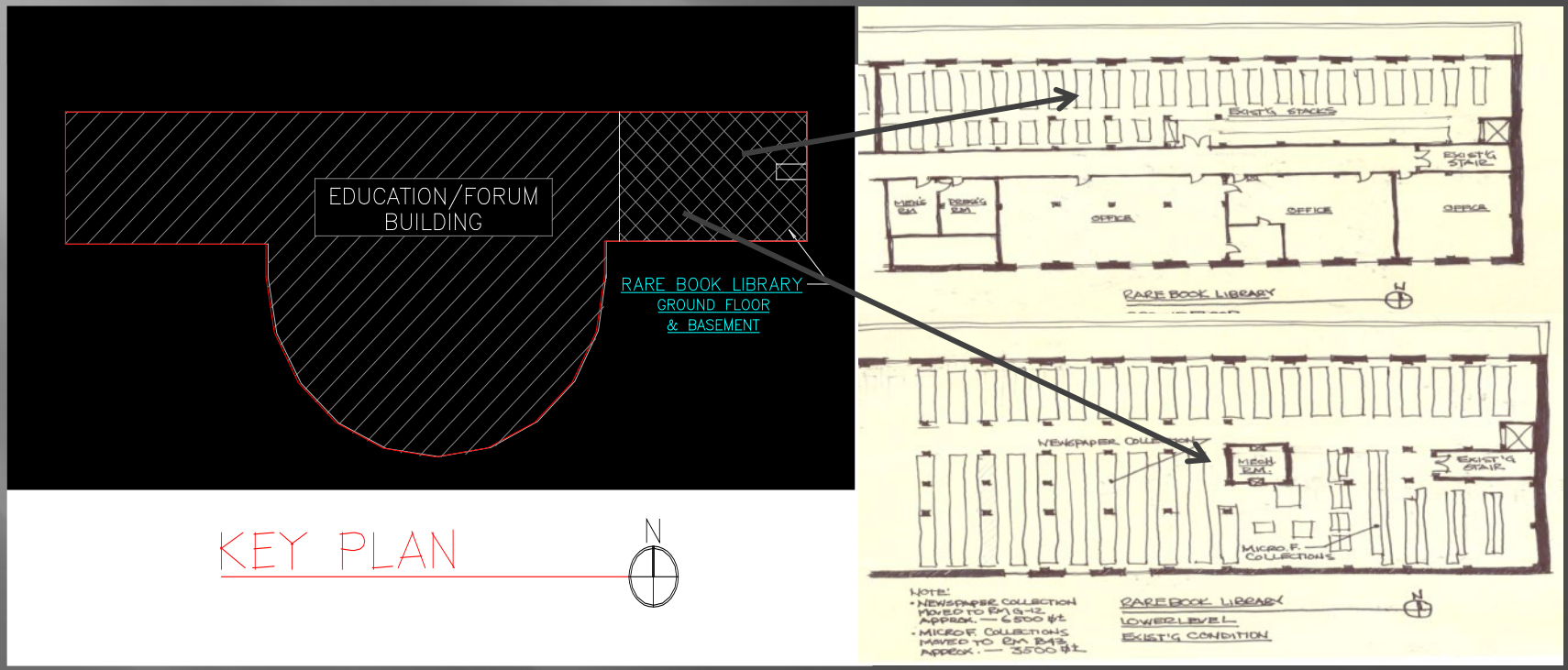
SEVEN (7) DIFFERENT DESIGN STANDARDS FOR EACH SEPARATE ENVIRONMENT

- ARCHITECTURAL
- HVAC
- LIGHTING
- FIRE DETECTION
- FIRE SUPPRESSION
- SECURITY
- HOUSING

# ARCHITECTURAL SPACE

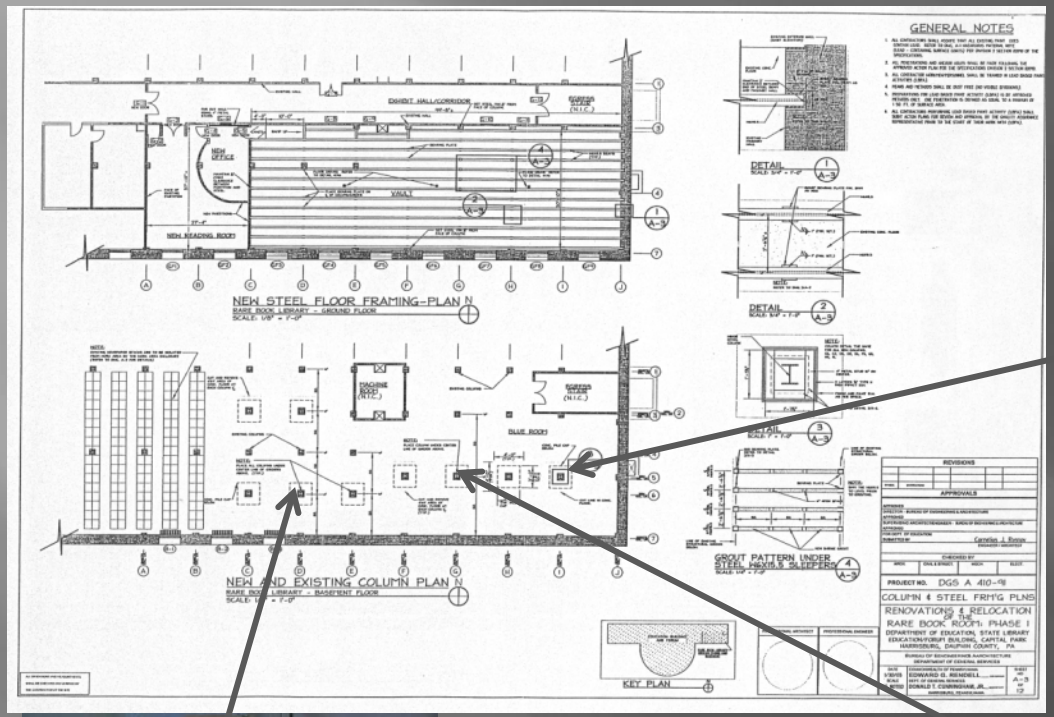
## Rare Collections Library – (New Home)

Ground Floor & Lower Level of the Forum Building's East Wing



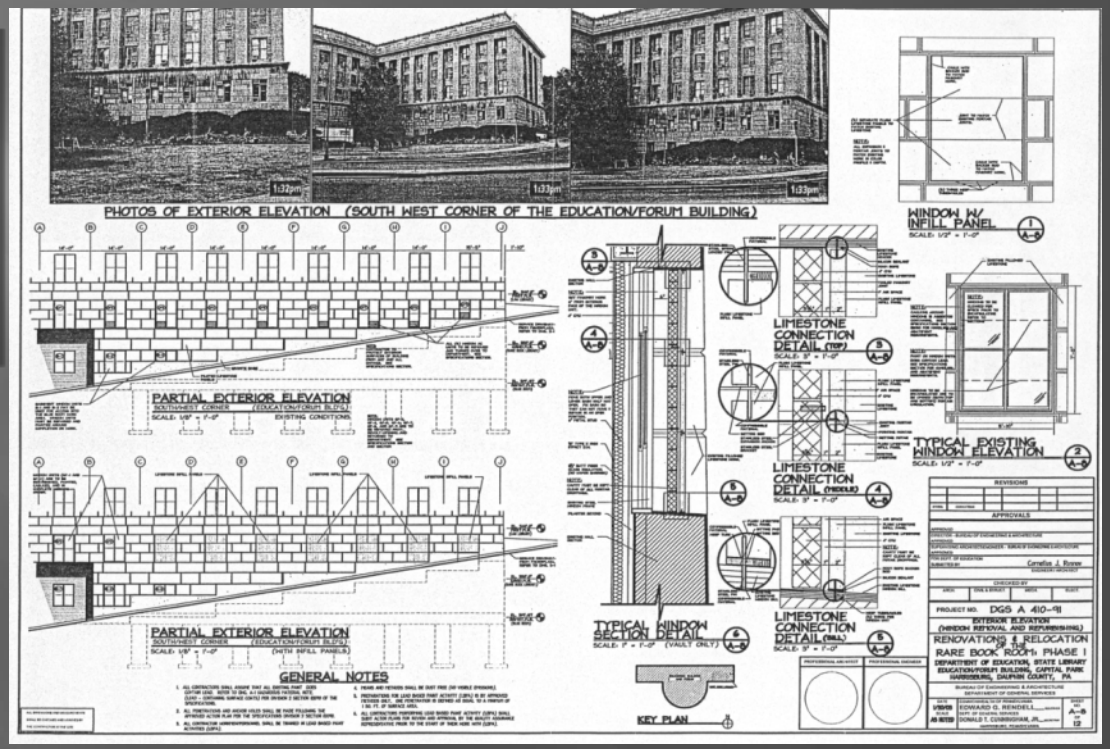
# Construction

## Rare Collections Library (RCL)




# Design & Construction

## Rare Collections Library (RCL)




# Design – Fire Protection
## Rare Collections Library (Alarm System)

**FIRE ALARM SYSTEM**

- Fully addressable
- Zoned
- Integrated into building & complex system
- Pre-alarm (EWSD)
  (Private/Storage Areas)

# Design – Fire Protection
## Rare Collections Library (Detection)

**PUBLIC AREAS:**

**Photoelectric Detectors, Ionization Detectors**

- Exhibit Corridor
- Reading Room
- Archivist's Office

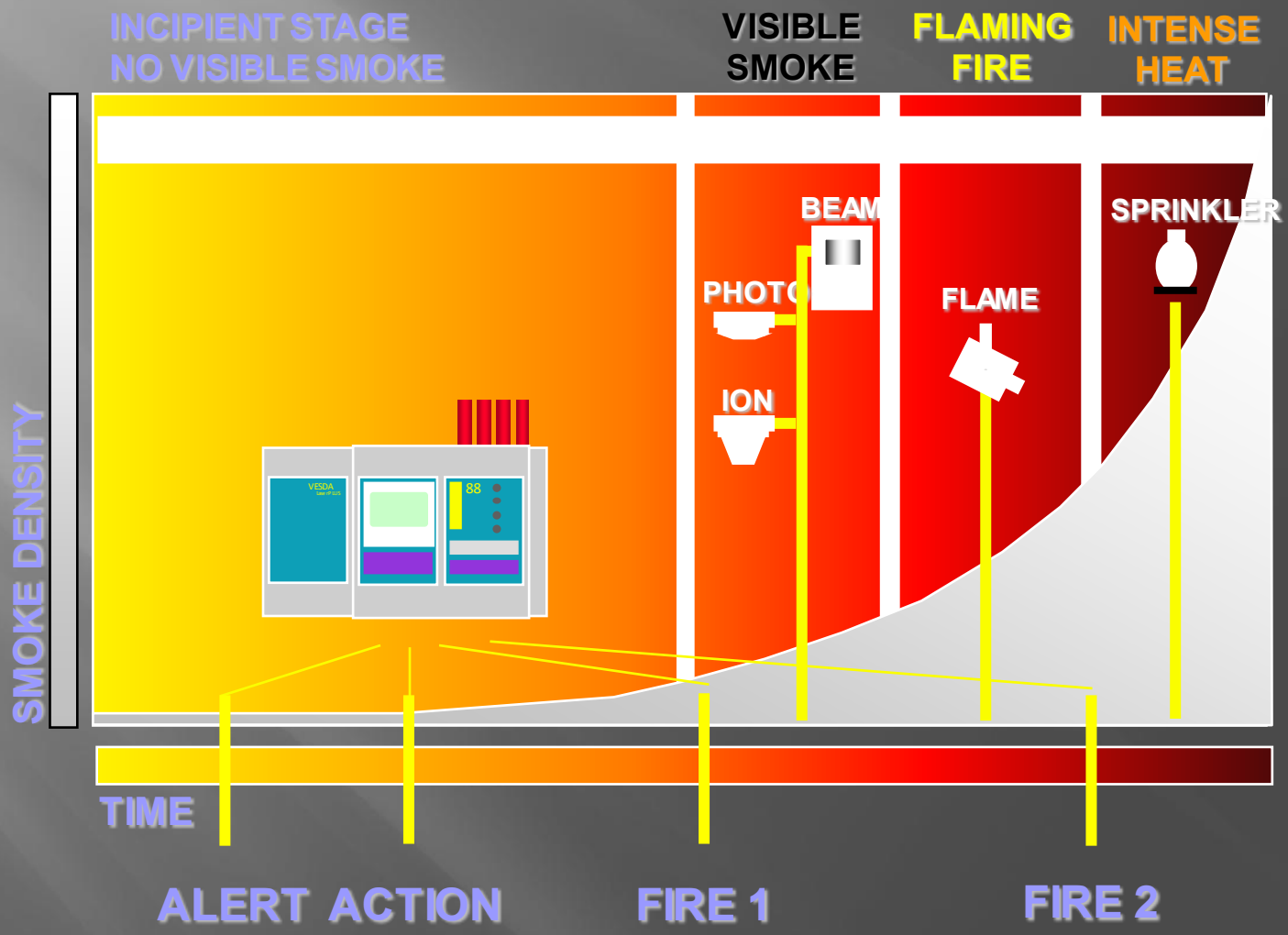
**PRIVATE AREAS:**

**Early Warning Smoke Detection (EWSD)**
**Photoelectric Detectors, Ionization Detectors**

- Rare Books Vault
- Rare Newspaper Repository
- Work Area

# Design – Fire Protection

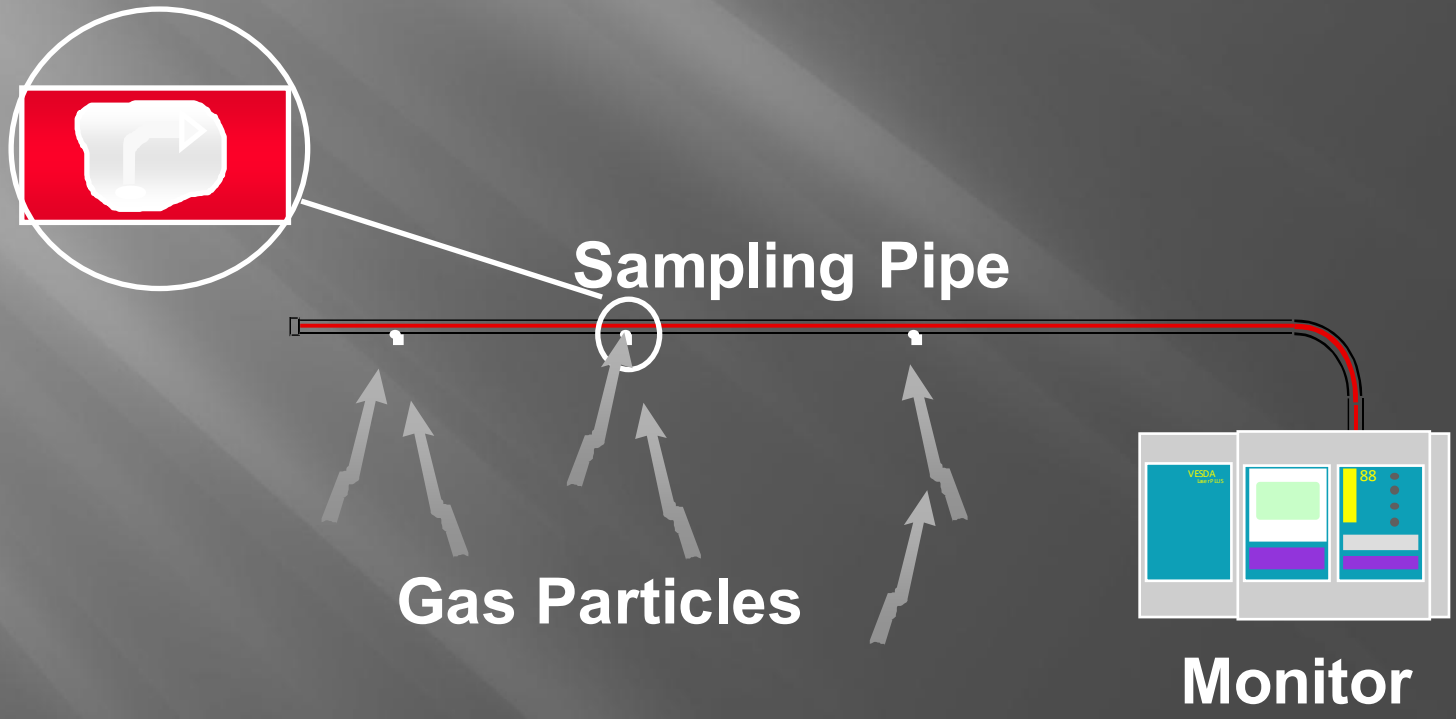
## Rare Collections Library (EWSD Fire Detection)



# Design – Fire Protection

## Rare Collections Library (Early Warning Smoke Detection)

- The system draws air from the "space", via a pipe network, to a central detector which monitors' for trace amounts of particulate and alert the Archivist to any changes in the environment.



# Design & Construction

## Rare Collections Library (Fire Suppression & Detection)

# Design – Fire Protection
## Rare Collections Library (Suppression)

**Public Areas - Water Misting System**

- Exhibit Corridor
- Reading Room
- Archivist's Office

**Private Areas – Clean Agent System**

- Rare Books Vault
- Rare Newspaper Repository
- Work Area

# Design – Fire Protection

## Rare Collections Library – (Public Area Suppression)

### Water Mist vs. Sprinklers/Deluge

- Fine/Controlled Spray
- Short Spray Duration
- Little Water
- Engineered

- Coarse/Crude Spray
- Long Spray duration
- Excessive Water
- Little Sophistication

# Design – Fire Protection
## Rare Collections Library (Public Area Suppression)

**Water Mist Fire Suppression System**

- Totally safe for humans.
- Natural and non-toxic.
- Effective protection without the damage of traditional deluge water-based systems.

# Design & Construction

## Rare Collections Library (Water Mist Fire Suppression)

# Design & Construction

## Rare Collections Library (Water Mist Fire Suppression)

# Design & Construction

## Rare Collections Library – (Fire Suppression & Detection)

# Design – Fire Protection
## Rare Collections Library (Fire Suppression Agents)

## CHEMICAL AGENTS & INERT GASES

**Chemical agents**

- Halon (CFC)
- Novec 1230™ Fire Fighting Fluid™ (FK-5)
- HFC 227ea (FM- 200)
- HFC 125 (Ecaro)

**Inert gas alternatives**

- INERGEN (Argon-Nitrogen-$CO_2$ mix)
- Argonite (Nitrogen – Argon only)

# Design – Fire Protection

## Rare Collections Library (Private Area Suppression)

### Clean Agent (Novec 1230) Fire Suppression System

- Effective protection without the damage of water-based systems.

- Deemed safe for humans, non-toxic @ concentration used.

- Deemed safe for the collections.

- Extinguishes fire during the incipient stage of combustion.

# Design – Fire Protection

## Rare Collections Library (Clean Agent Fire Suppression)

## NOVEC 1230 FLUID SAFETY MARGIN

| Agent | Use Conc. | NOAEL* | Safety Margin |
|---|---|---|---|
| Novec 1230 | 4% - 6% | 10% | 67% -150% |
| Halon 1301 | 5% | 5% | NIL |
| HFC-227ea | 7.5%-8.7% | 9% | 3% - 20% |
| HFC-125 | 8%-11.5% | 7.5% | 0% |

* No Observable Adverse Effect Level

# Design – Fire Protection

## Rare Collections Library (Clean Agent Fire Suppression)

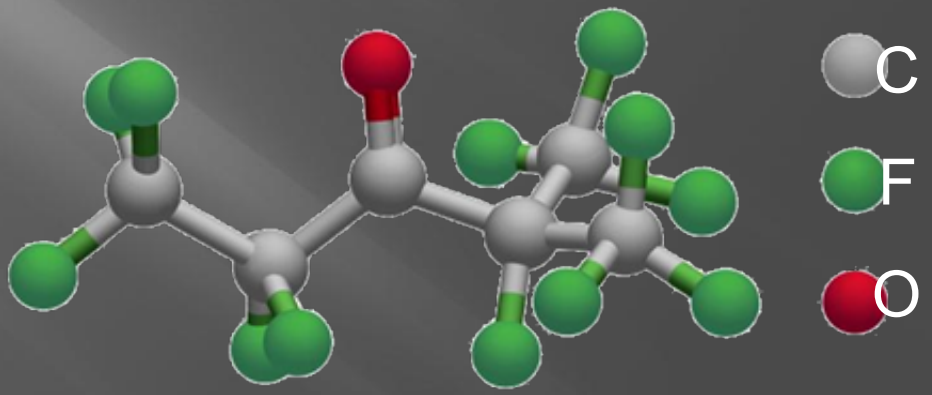
## ENVIRONMENTAL PROPERTIES

| Properties | Novec 1230 | Halon 1301 | HFC-227ea | HFC-125 |
|---|---|---|---|---|
| Ozone Depletion Potential (ODP) | 0.0 | 12 | 0.0 | 0 |
| Global Warming Potential (GWP)* | 1 | 6900 | 3500 | 3400 |
| Atmospheric Lifetime (years) | 0.014 | 65 | 33 | 29.0 |

# Design – Fire Protection

## Rare Collections Library (Clean Agent Fire Suppression)

$C_6$ Fluoroketone
FK-5-1-12 (ASHRAE)



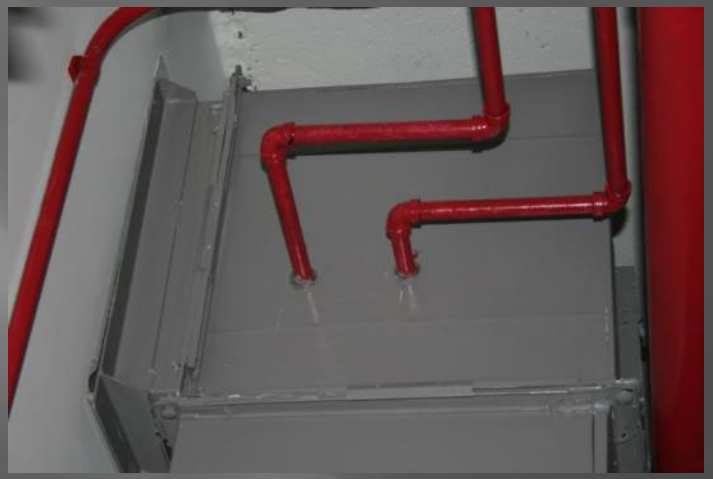

**The Clean Agent Fire Suppression System is a total flooding product that releases the agent as a gas.**

# Design & Construction

## Rare Collections Library (Fire Suppression & Detection)

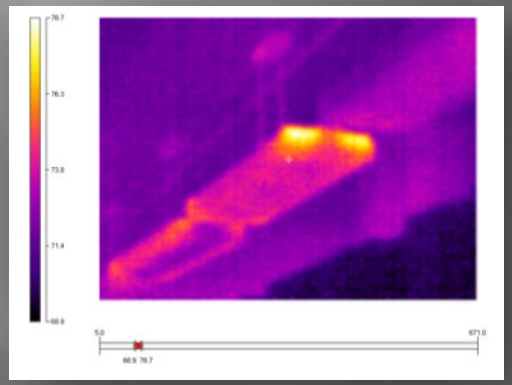

# Design & Construction

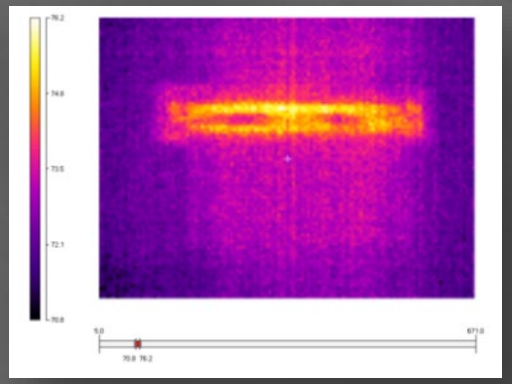
## Rare Collections Library (Fire Suppression & Detection)

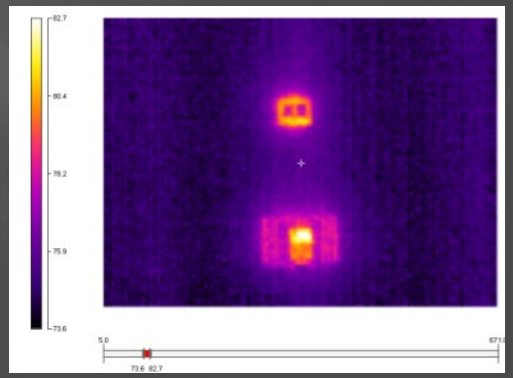


# Design

## Rare Collections Library – (Thermography)

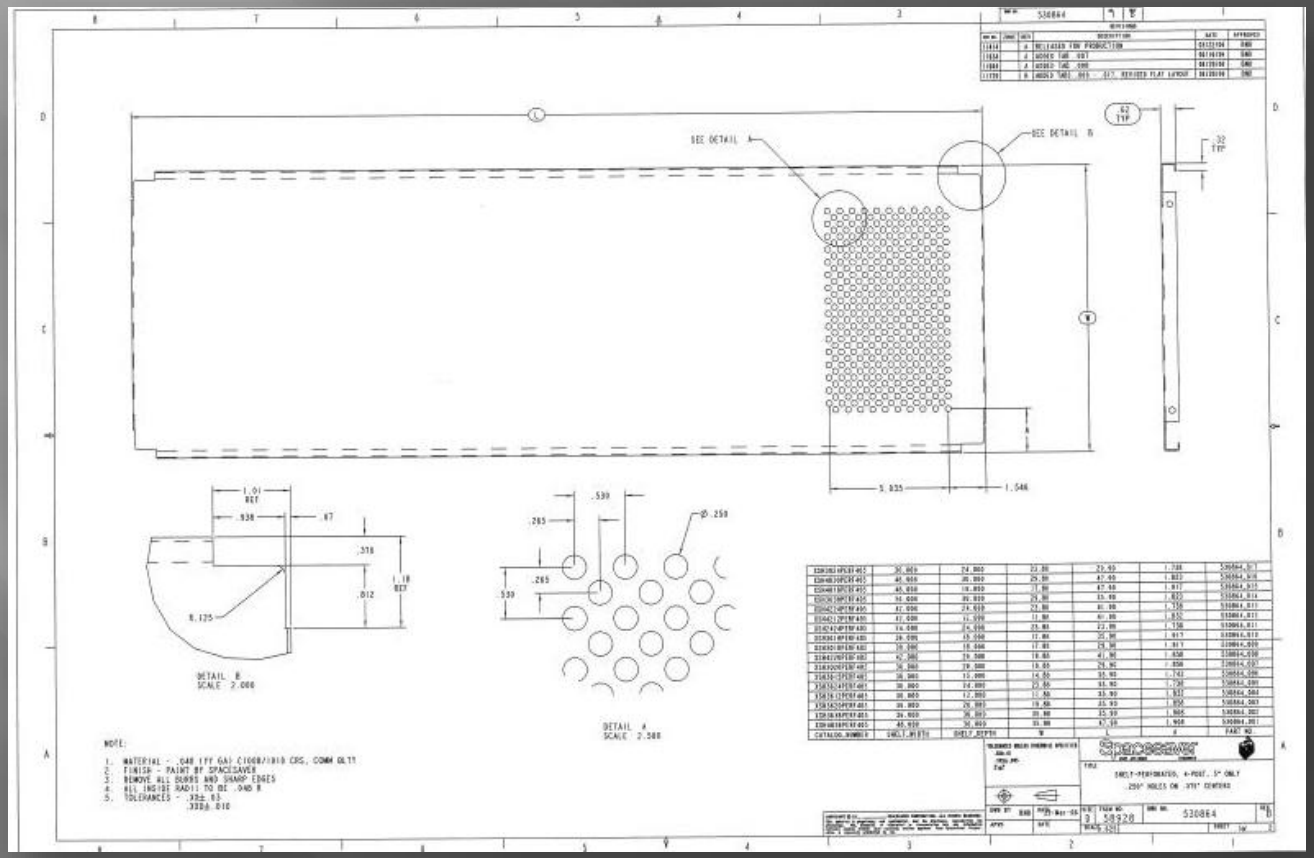






# Design – High Density Shelving

## Rare Collections Library (Perforation of Shelving)



# RARE COLLECTIONS LIBRARY

## Rare Books Vault – Ground Floor

# RARE COLLECTIONS LIBRARY
## Work Area – Lower Level

# RARE COLLECTIONS LIBRARY

## Rare Newspaper Repository – Lower Level

# Post Construction

## Rare Books Vault – Collection Relocation

# Post Construction

## Rare Books Vault – Collection Relocation

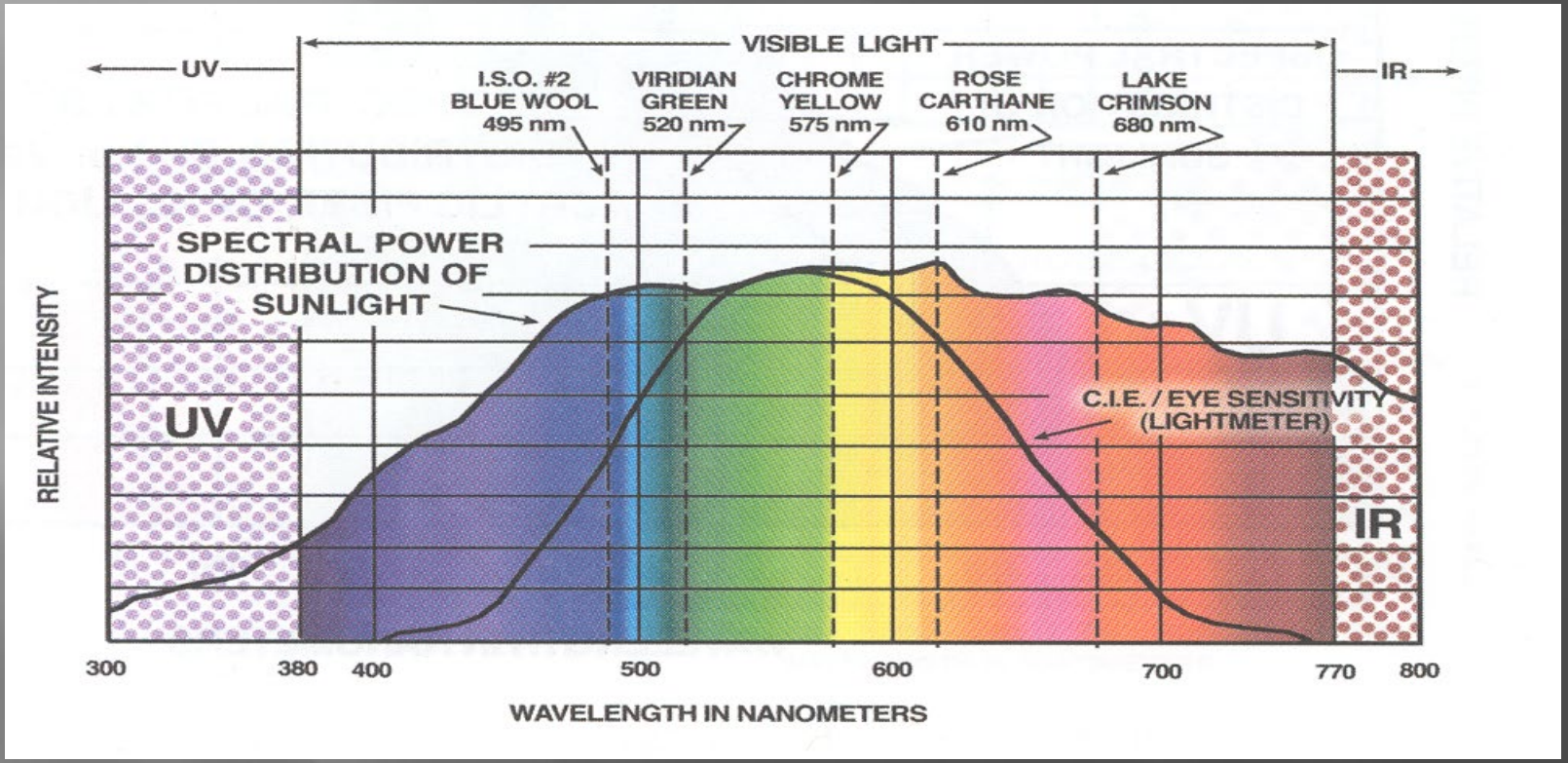
### Provincial Pennsylvania Assembly Collection

# Post Construction

## Rare Books Vault – Collection Relocation


# Design

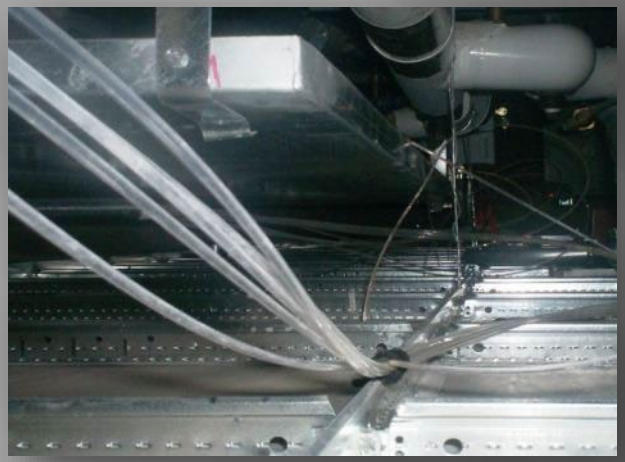
## Rare Collections Library – (Light)

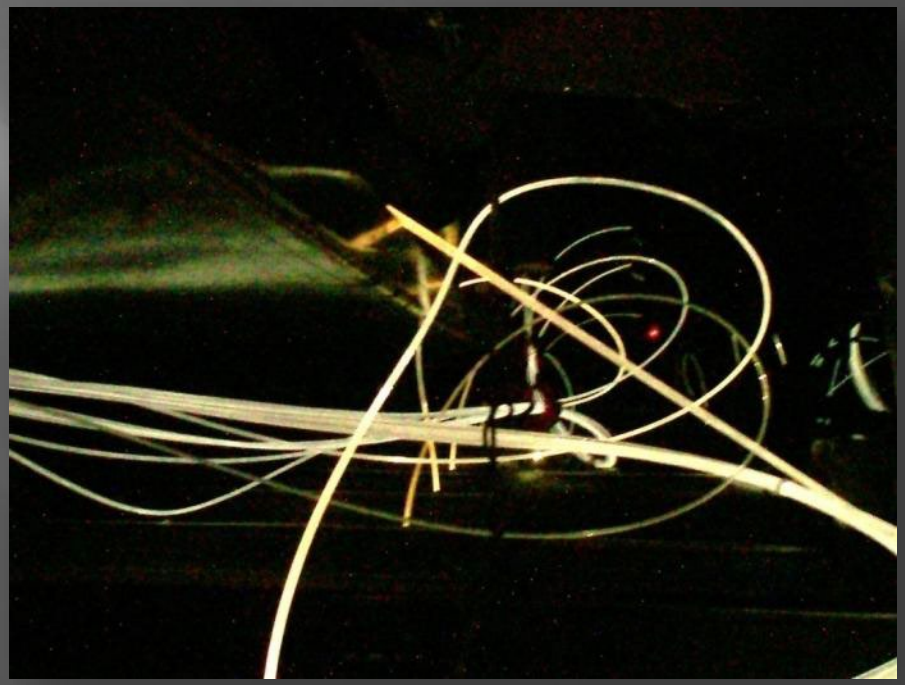



No Ultraviolet. No Infra-red.
Correct Intensity & Color for Collection(s)

# Design

## Rare Collections Library – (Light)





# Design

## Rare Collections Library – (Light)

# Design

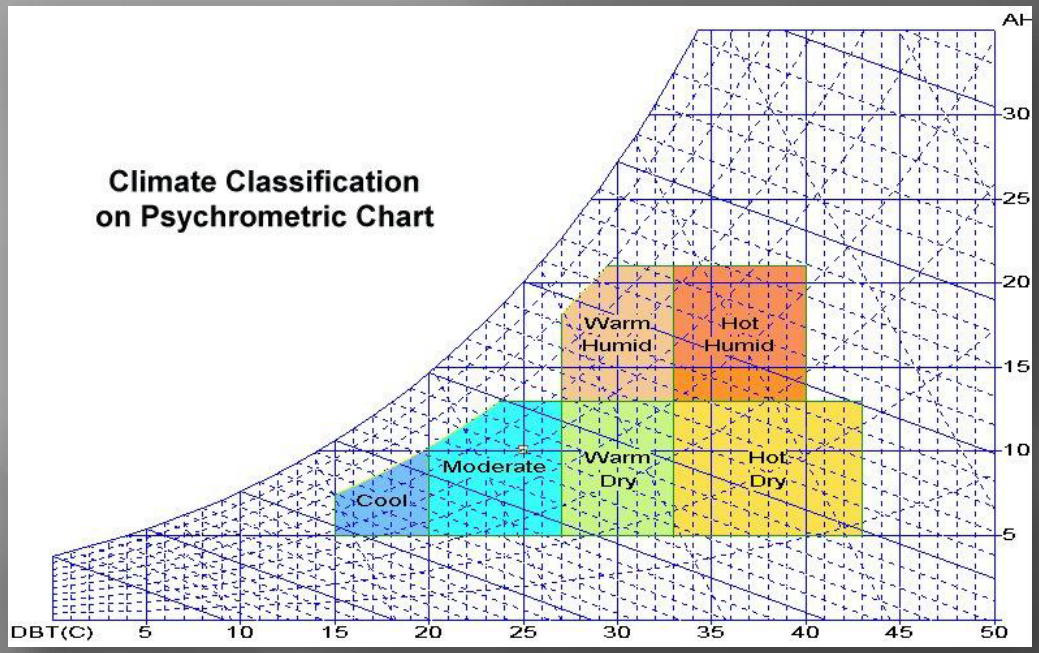
## Rare Collections Library – (Light)

# Design & Construction

## Rare Collections Library (ENVIRONMENTAL SENSORS)

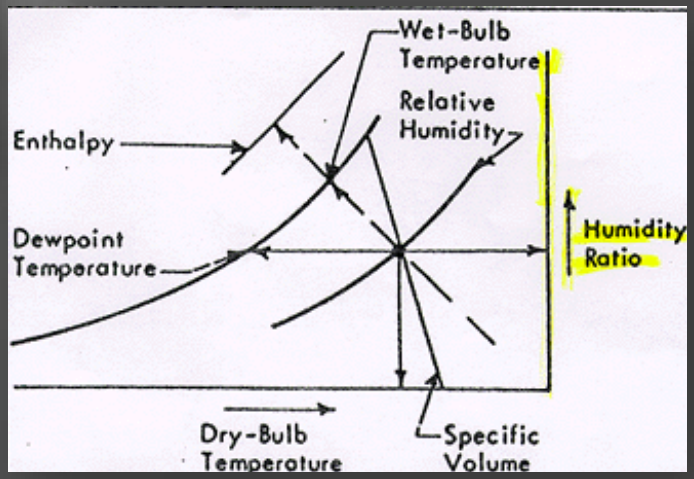

# Design & Construction

## Rare Collections Library – (Psychometrics)




MOISTURE CONTENT

DRY BULB TEMPERATUR (C)



# RARE COLLECTIONS LIBRARY
## IMLS 2006Research & Development Grant

2X air exchange rate → ? → ½ pollutant concentration

Efficacy of intermittent ventilation for providing acceptable indoor air quality.
(Dr. M.H. Sherman Lawrence Berkeley National Laboratory)

# RARE COLLECTIONS LIBRARY
## IMLS 2006Research & Development Grant

FAN LAW

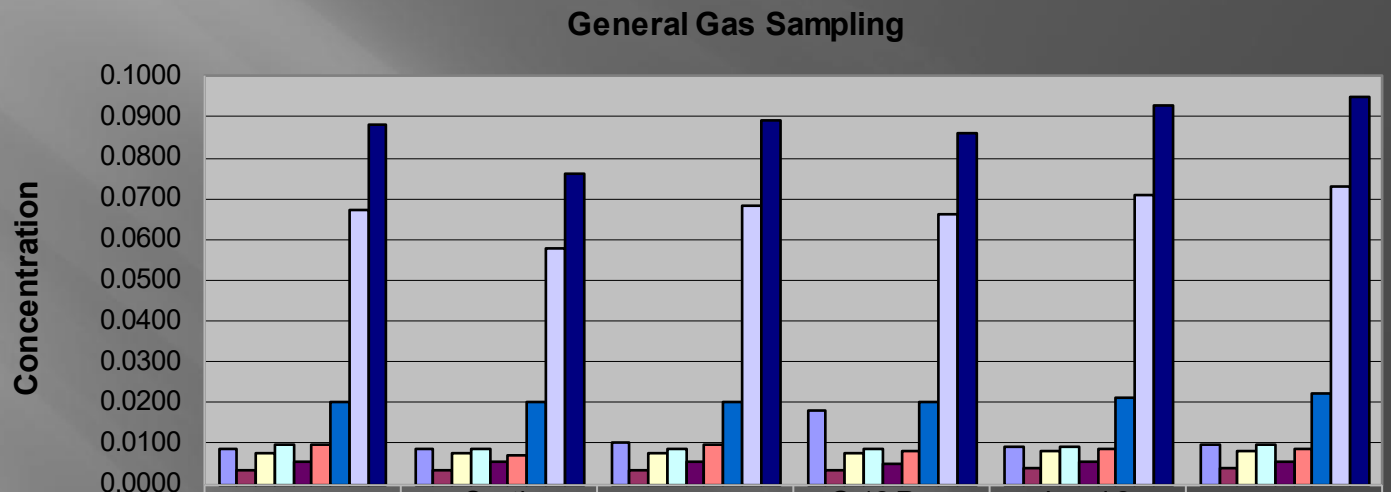
power needed to drive fan ~ (fan speed) $^3$

higher air exchange rate → much higher electrical cost

# RARE COLLECTIONS LIBRARY

## IMLS 2006Research & Development Grant

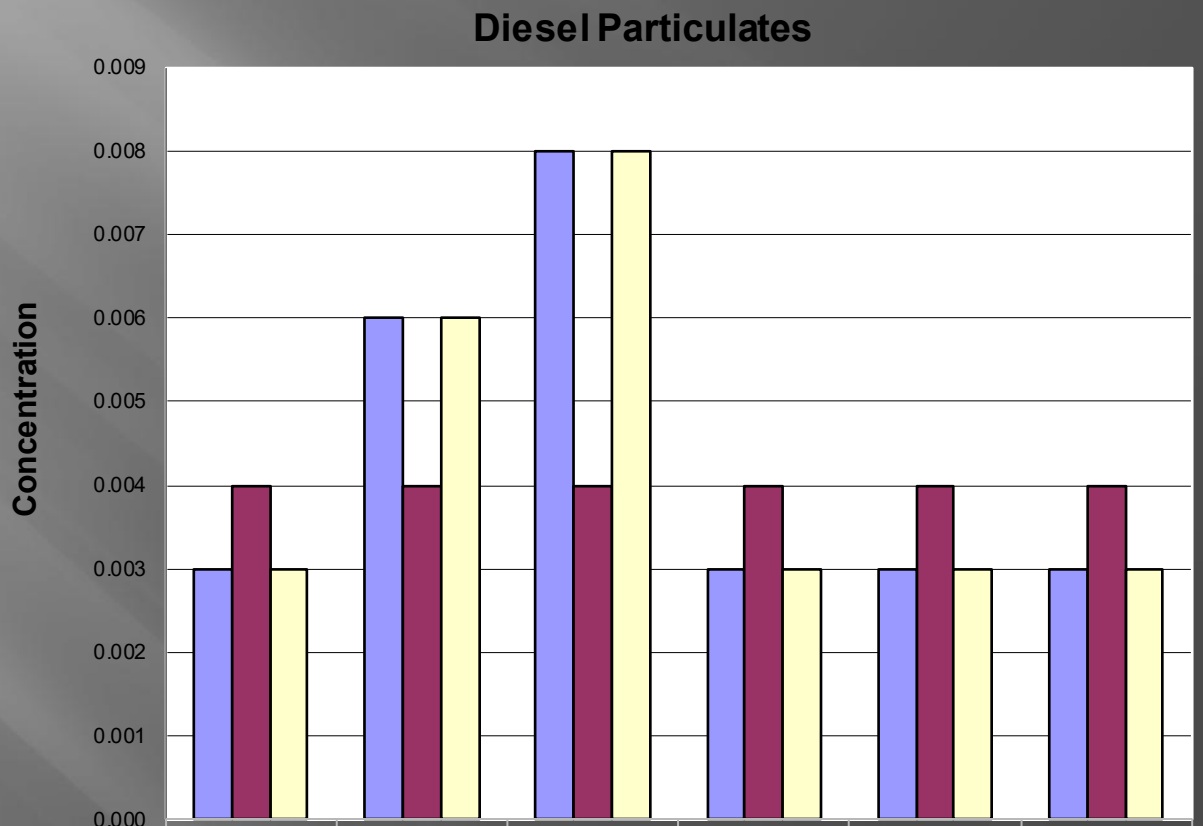
## Air Pollutant Base Line – 12/12/05




| | North Building Exterior | South Building Exterior | Basement Blue Room | G-12 Rare Newspaper Room | Level 2 Transitionally Rare | Rare Books Room |
|---|---|---|---|---|---|---|
| Acetic Acid | 0.0088 | 0.0089 | 0.0100 | 0.0180 | 0.0094 | 0.0095 |
| Furfural | 0.0035 | 0.0035 | 0.0035 | 0.0034 | 0.0037 | 0.0038 |
| Chlorine | 0.0075 | 0.0075 | 0.0076 | 0.0074 | 0.0079 | 0.0080 |
| Ozone | 0.0097 | 0.0089 | 0.0089 | 0.0087 | 0.0094 | 0.0095 |
| Sulfur Dioxide | 0.0053 | 0.0053 | 0.0053 | 0.0052 | 0.0056 | 0.0057 |
| Particulate Sulfate | 0.0097 | 0.0070 | 0.0098 | 0.0082 | 0.0088 | 0.0089 |
| Nitric Acid | 0.0200 | 0.0200 | 0.0200 | 0.0200 | 0.0210 | 0.0220 |
| Nitric Oxides | 0.0670 | 0.0580 | 0.0680 | 0.0660 | 0.0710 | 0.0730 |
| Nitrogen Dioxide | 0.0880 | 0.0760 | 0.0890 | 0.0860 | 0.0930 | 0.0950 |

# RARE COLLECTIONS LIBRARY

## Air Pollutant Base Line Readings – 12/12/05




| | North Building Exterior | South Building Exterior | Basement Blue Room | G-12 Rare Newspaper Room | Level 2 Transitionally Rare | Rare Books Room |
|---|---|---|---|---|---|---|
| Organic Carbon Concentration | 0.003 | 0.006 | 0.008 | 0.003 | 0.003 | 0.003 |
| Elemental Carbon Concentration | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| Total Carbon Concentration | 0.003 | 0.006 | 0.008 | 0.003 | 0.003 | 0.003 |

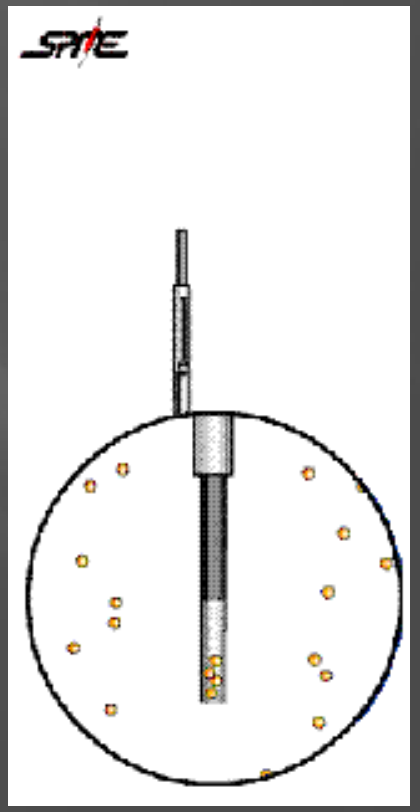
# RARE COLLECTIONS LIBRARY
## IMLS 2006Research & Development Grant

Specifications for Air Pollutants in Storage and Exhibit Areas

| | |
|---|---|
| Acetic Acid | 4.0 ppb |
| Formaldehyde | 4.0 ppb |
| SO2 | 1.0 ppb |
| NO2 | 2.6 ppb |
| Ozone | 2.0 ppb |

# RARE COLLECTIONS LIBRARY
## IMLS 2006Research & Development Grant

## Sample Collection Using SPME



https://www.sigmaaldrich.com

# RARE COLLECTIONS LIBRARY
## IMLS 2006RESEARCH & DEVELOPMENT GRANT

### SPME / GC/MS

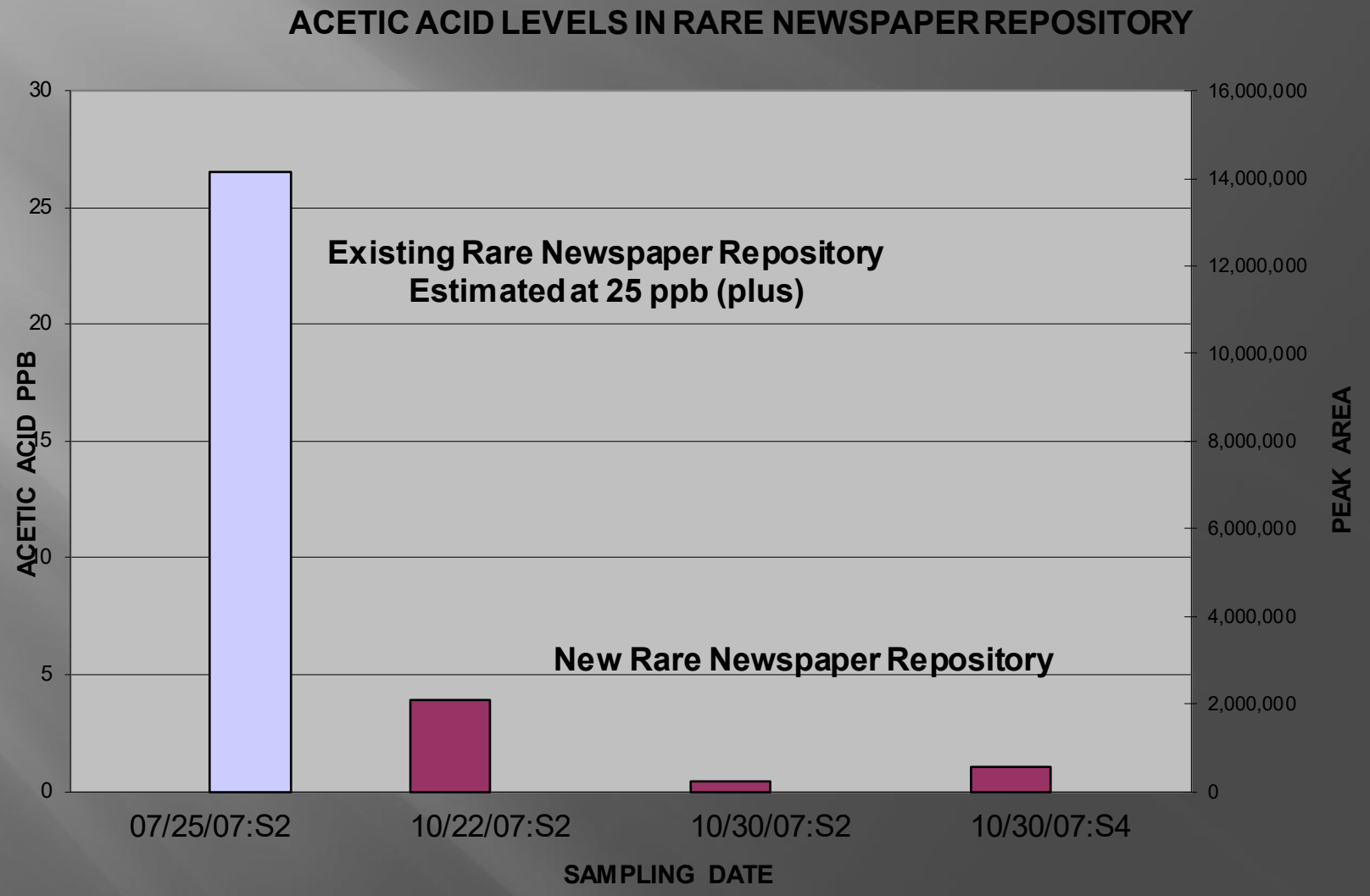
Heated injector: turn sample into a gas mixture


### Mass Spectrograph/Gas Chromatograph

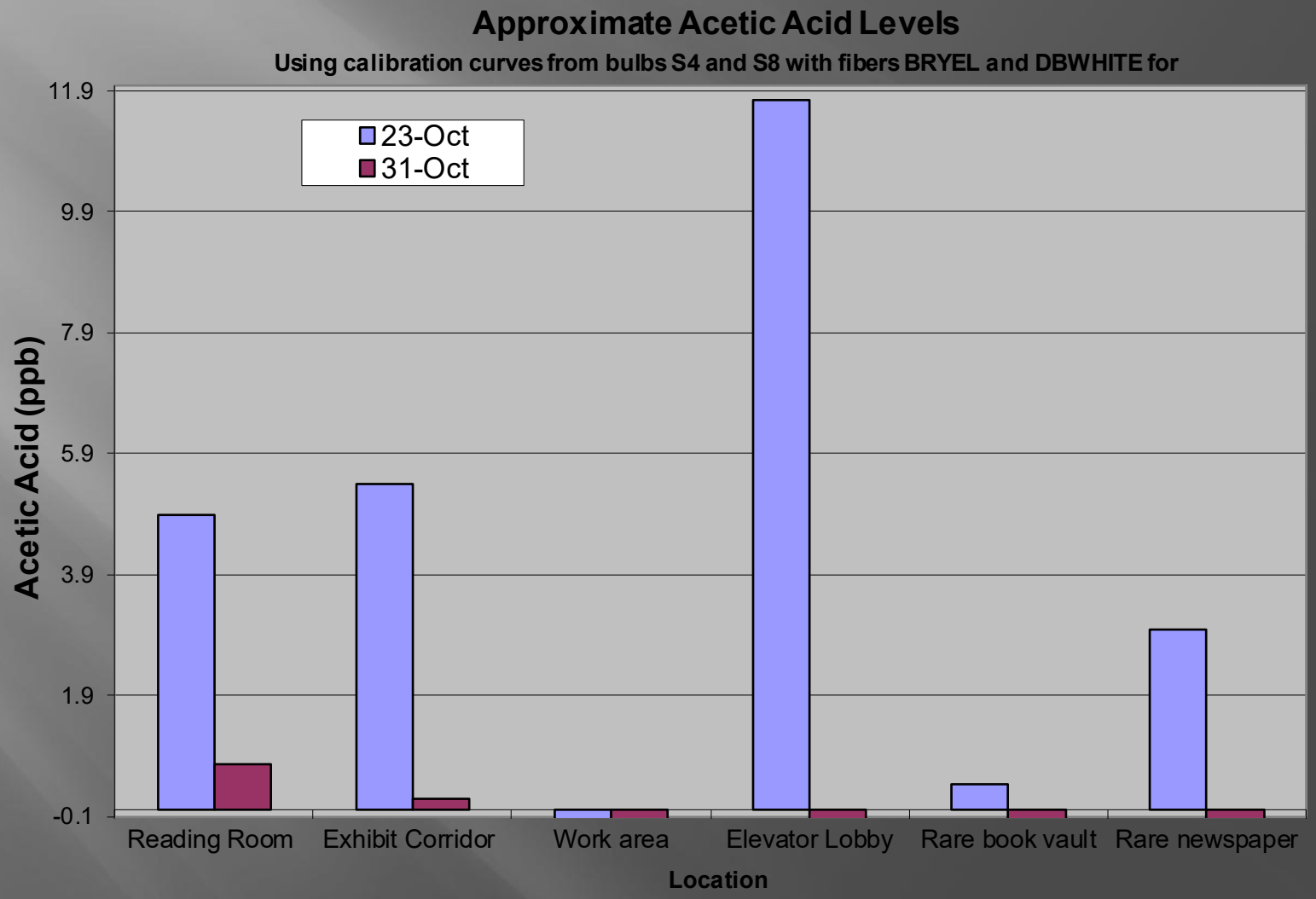
MS: identify components by mass spectrum of peaks

GC: separate the mixture, quantify, possibly identify

# RARE COLLECTIONS LIBRARY
## IMLS 2006Research & Development Grant



# RARE COLLECTIONS LIBRARY
## IMLS 2006Research & Development Grant



# RARE COLLECTIONS LIBRARY
## Exhibit Corridor – Ground Floor


# RARE COLLECTIONS LIBRARY
## Exhibit Corridor – Ground Floor

# RARE COLLECTIONS LIBRARY
## Exhibit Corridor – Ground Floor

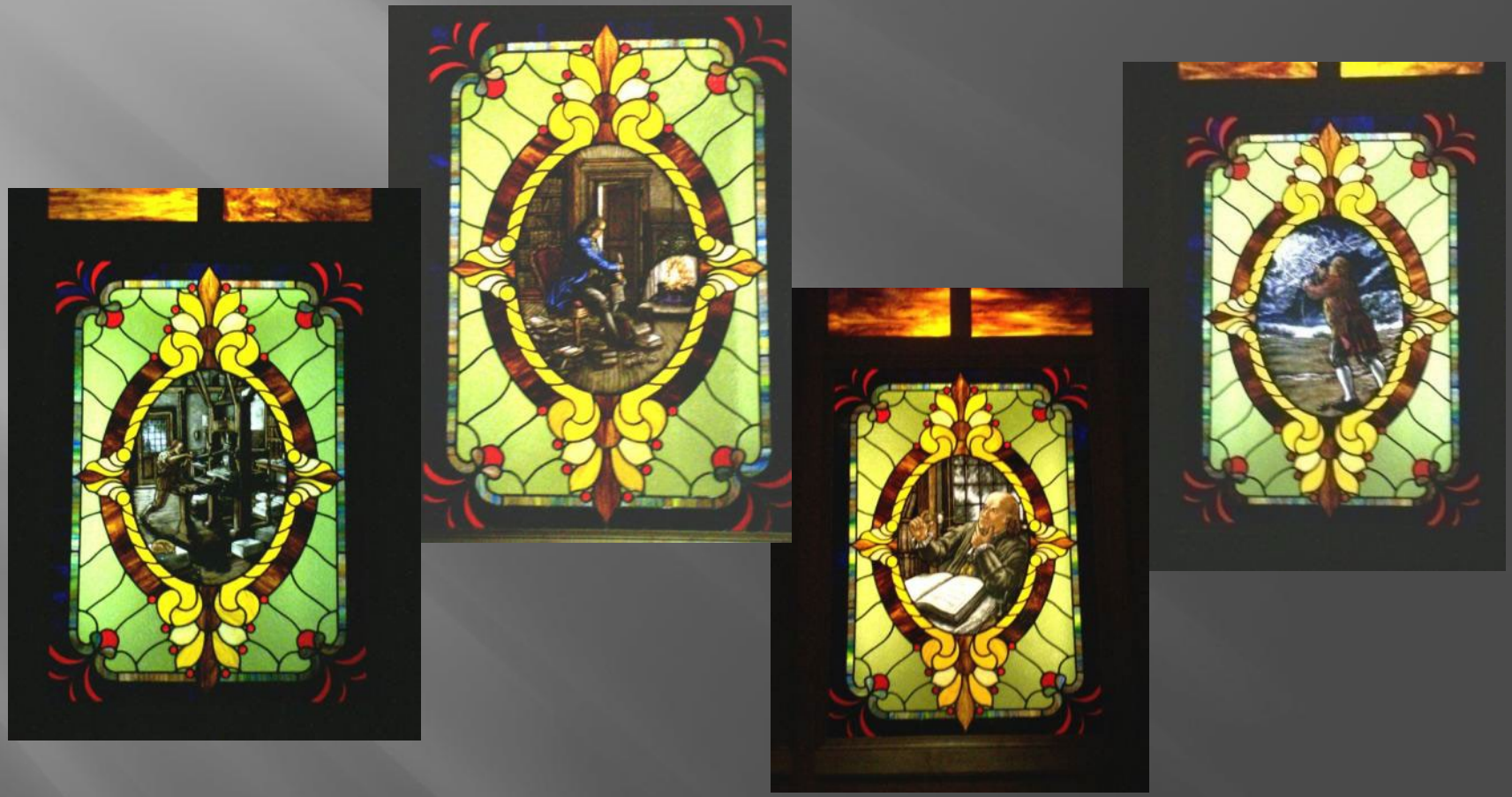

# RARE COLLECTIONS LIBRARY

## Entrance to Reading Room from Corridor

# RARE COLLECTIONS LIBRARY
## Research/Reading Room – Ground Floor

# RARE COLLECTIONS LIBRARY

## Research/Reading Room – Ground Floor



# RARE COLLECTIONS LIBRARY
## Research/Reading Room – Ground Floor

# RARE COLLECTIONS LIBRARY
## Research/Reading Room – Ground Floor

# RARE COLLECTIONS LIBRARY
## Research/Reading Room – Ground Floor

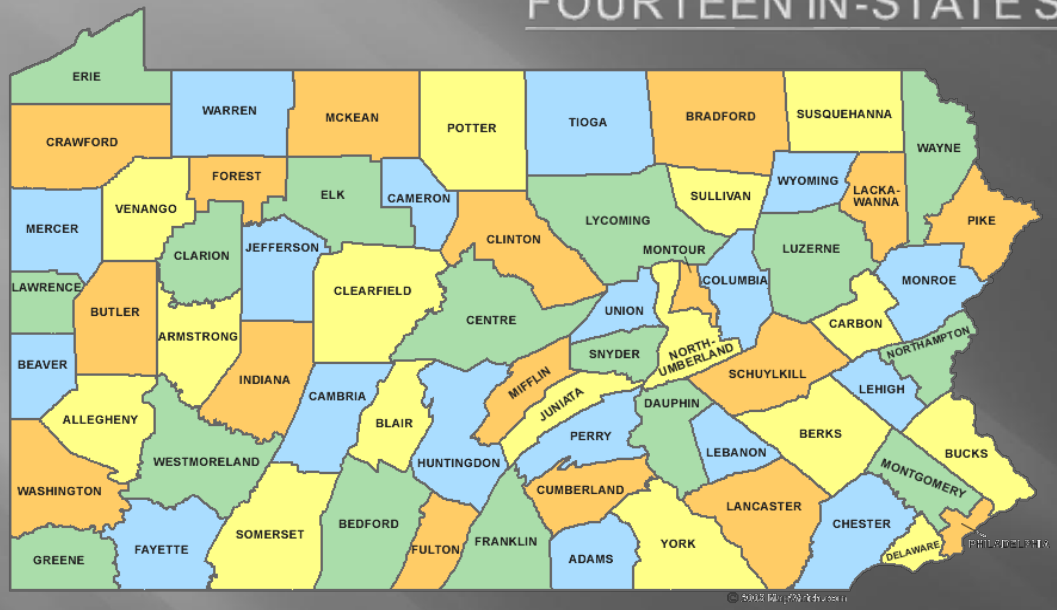
# RARE COLLECTIONS LIBRARY
## Archivist's Office – Ground Floor

# RARE COLLECTIONS LIBRARY

## 2006 IMLS Research and Development Grant

Office of Commonwealth Libraries/PALINET

## FOURTEEN IN-STATE SITES




### WESTERN REGION

Carnegie Library of Pittsburgh
4400 Forbes Avenue Pittsburgh PA 15213

Raymond M. Blasco MD Memorial Library
160 East Front Street Erie PA 16507

### EASTERN REGION

Albright Public Library
500 Vine Street Scranton PA 18509

Free Library of Philadelphia
1901 Vine Street Philadelphia PA 19103

The Library Company
1314 Locust Street Philadelphia PA 19107
National Canal Museum
30 Centre Square Easton PA 18042

### CENTRAL REGION

Ephrata Cloister
632 West Main Street Ephrata PA 17522

Kittochtinny Historical Society
Franklin Co. official historical society
75 East King Street Chambersburg PA 17201

Mansfield University, North Hall Library
5 Swan Street Mansfield PA 16933

PA Archives
350 North Street Harrisburg PA 17120

Pattee and Paterno Libraries
Penn State University Park Campus
510 Paterno Library University Park PA 16802

Southern York Public Library
P.O. Box 239
80 Constitution Avenue Shrewsbury PA 17361

State Library
607 South Drive
Harrisburg PA 17120

Millersville University
PO Box 1002
1 South George Street
Millersville PA 17551

# RARE COLLECTIONS LIBRARY

## 2006 IMLS Research and Development Grant

DGS/ Bureau of Engineering & Architecture, DOE/Office of Commonwealth Libraries, PALINET

**Project Technical Director**

- Neal Rusnov – Rare Collections Library, Design/Project Architect

**Advisory Panel**

- Mark Ormsby – Preservation Scientist, physicist
- Dr. John Baty – Preservation Scientist, chemist
- Monona Rossol – Industrial Hygienist
- Jim Green – Rare Book Librarian
- Glen Ruzicka – Conservator
- Dr. Chandru Shahani – Preservation Scientist, chemist

**Research Team**

- Mark Ormsby – Preservation Scientist, physicist
- Dr. John Baty – Preservation Scientist, chemist
- Dr. Chandru Shahani – Preservation Scientist, chemist
- Neal Rusnov – Project Architect

**Millersville University**

- Dr. Edward Shane – Dean, School of Science & Mathematics
- Dr. Sandra Turchi – Chairperson, Department of Chemistry

**Gladtfelter**

- Scott L. Mingus – Global Director (R&D Labs)

# Rare Collections Library

## Design and Construction