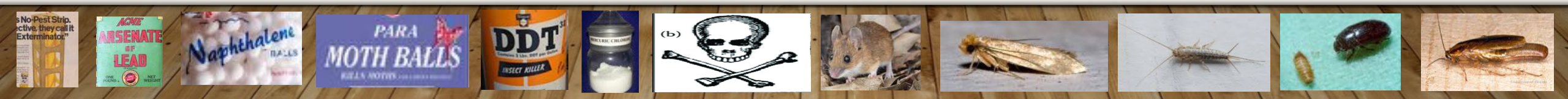
SOMETHING WICKED THIS WAY COMES: HAZARDOUS PESTICIDES IN MUSEUMS

INTEGRATED PEST MANAGEMENT FOR CULTURAL INSTITUTIONS

CCAHA/ARCS

Presentation by Elise V. LeCompte, Registrar and Coordinator for Museum Health and Safety, Florida Museum of Natural History

Day 2, Thursday, Nov. 15, 2018



BUBBLE, BUBBLE, TOIL AND TROUBLE
THE HISTORY OF PESTICIDE USE IN MUSEUMS

BUBBLE, BUBBLE, TOIL AND TROUBLE
THE HISTORY OF PESTICIDE USE IN MUSEUMS

- Museums also used interior and exterior building-wide applications of pesticides as a preventative measure until relatively recently.

Dickinson Hall, Florida Museum of Natural History's Collections and Research Building

WHY WERE/ARE PESTICIDES NECESSARY?
PESTS ARE BAD, PESTICIDES ARE GOOD

- Pests love organics as a food source.

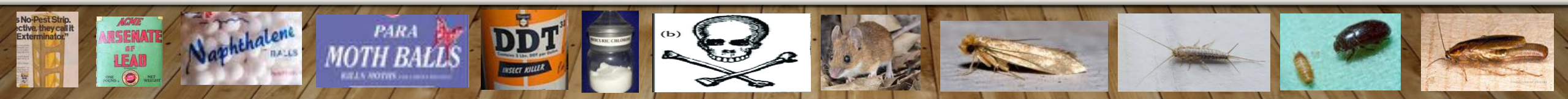
Roach damage

Silverfish damage

Rodent damage

Dermestid beetle damage

- Museums' #1 Priority—Protect our collections from harm.
- In the past, people thought chemicals were good because they prevented and eradicated pest infestations.



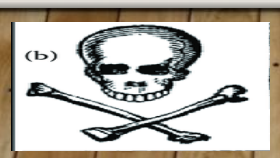
UH OH-PESTICIDES ARE NOT GOOD

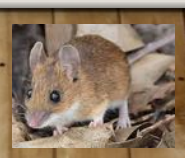
- People did not understand the ill effects of chemicals.

Working in hat manufacture without protective equipment
put this man at risk for mercury poisoning

The Mad Hatter

Hat making in the 19th century

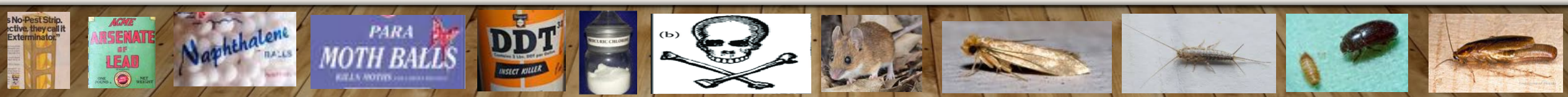




UH OH-PESTICIDES ARE NOT GOOD

Raphaelle Peale as painted by his father Charles Wilson Peale, 1795

Still Life with Orange and Book, 1815, Raphaelle Peale

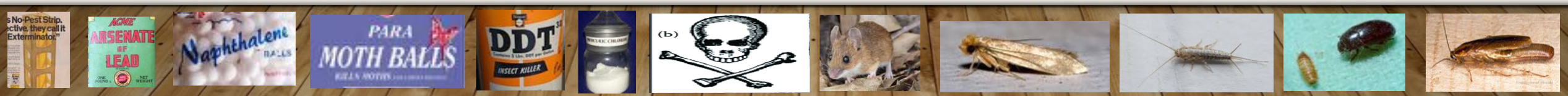


UH OH-PESTICIDES ARE NOT GOOD

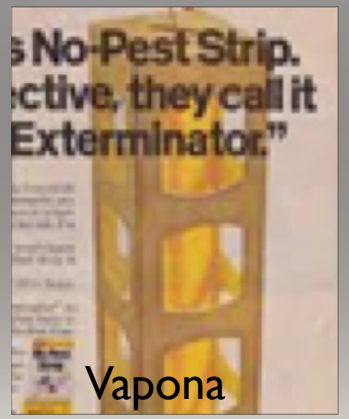
- People came to understand the toxicity of chemicals.

- The U.S. Government passed federal regulations to protect people and the environment.

- We began to look for safer ways to control pests.

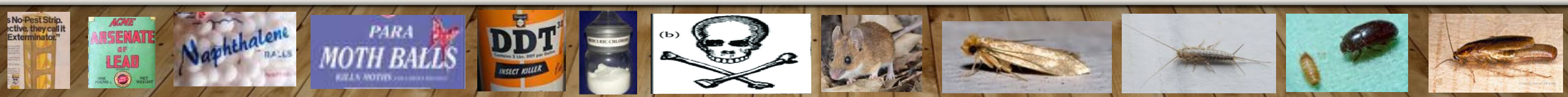


CHEMICALS USED



Vapona

From Old Poisons, New Problems, p. 12

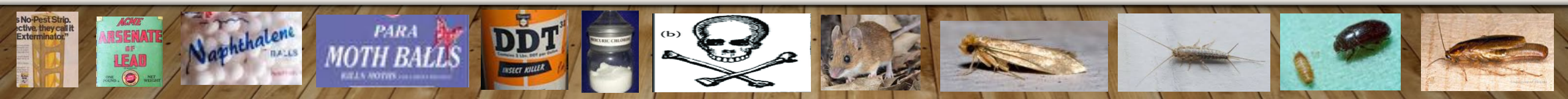


CHEMICALS USED

SOME COMMON MUSEUM PESTICIDES

Pesticide	Approximate dates of use	Persistence
EPA Category I (highly toxic)		
arsenic compounds	1700s—1977	high
carbon tetrachloride	1927—86	low
Dichlorvos (DDVP)	1960—95	low
ethylene oxide	1960—84	high
mercuric compounds	1830s—1976	high
methyl bromide	1938—99	low–moderate
sulfuryl fluoride	1959—98	low–moderate
Vapona (TEPP)	1947—88	moderate
EPA Category II (moderately toxic)		
camphor	1830s—continued use	moderate
carbaryl carbamate powder	1959—continued use	low–moderate
Chlordane	1952—94	high
dichloro-diphenyl-trichlorethane (DDT)	1944—52	high
Dursban (chlorpyrifos)	1964—97	low–moderate
Lindane (benzene hexachlorocyclohexan)	1940—78	high
paradichlorobenzene (PDB)	1912—continued use	low–moderate
EPA Category III (slightly toxic)		
Dowfume (ethylene dichloride)	1918—86	low
malathion	1951—continued use	low–moderate
naphthalene	1887—continued use	low–moderate
thymol	1958—continued use	low–moderate

Ogden, *Caring for American Indian Objects*

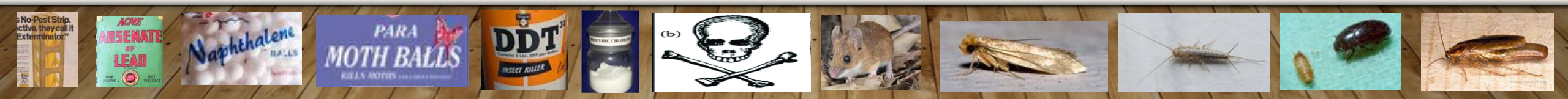


IDENTIFYING THE CHEMICALS USED IN PAST TREATMENTS

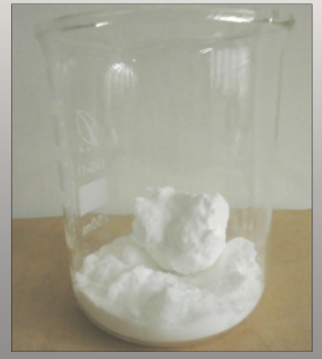
- Research collections records.
- Research other museum records and files (e.g., facilities maintenance files, financial records)
- Interview staff, especially retired staff.

APPLICATION METHODS

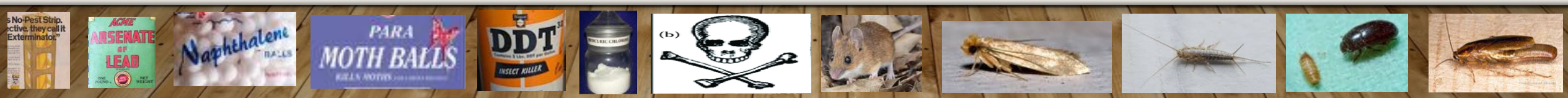
- Spraying
- Dipping
- Brushing
- Rubbing
- Bombing with aerosols
- Fogging
- Gassing.



TOXICITY

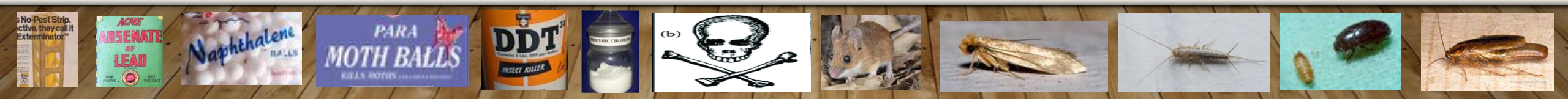


- The level of toxicity depends on:
  - Nature of the chemical
  - Method of entry into the body
  - Exposure levels and time duration
  - Application process
  - Safe, prescribed methods for labeling, handling, and using hazardous collections.



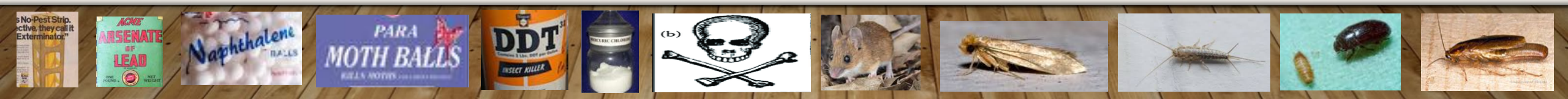
TESTING

- Testing methods include:
  - Swab test
  - Spot test
  - Commercially treated papers
  - Screening kit



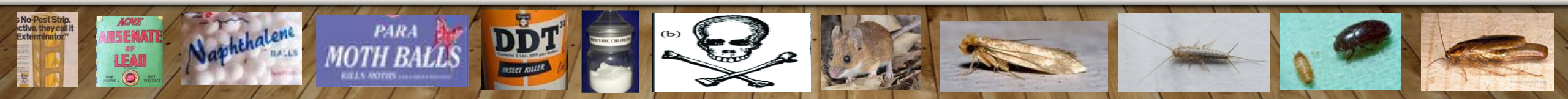
TESTING

- Testing methods include:
  - Analytical tests like:
    - X-ray spectroscopy
    - X-ray fluorescence
    - Gas chromatography
    - Gas chromatography/mass spectroscopy [GC/Mass Spec]



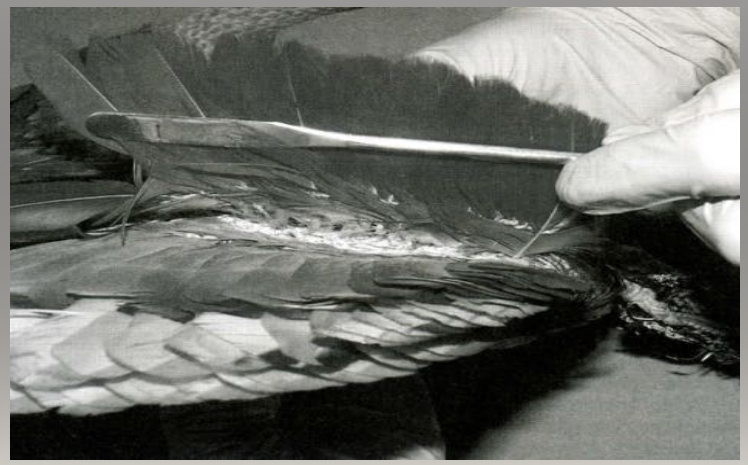
TESTING

- Testing is often complicated or difficult, requiring a high level of precision.
- It cannot be carried out by a museum collections staff member, unless they have a certain level of scientific and/or certified training.



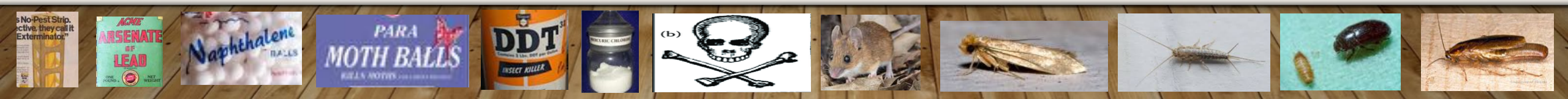
TESTING

- If possible, two kinds of questions should be asked:
  - What is the particular substance? (Qualitative)
  - How much is present? (Quantitative)



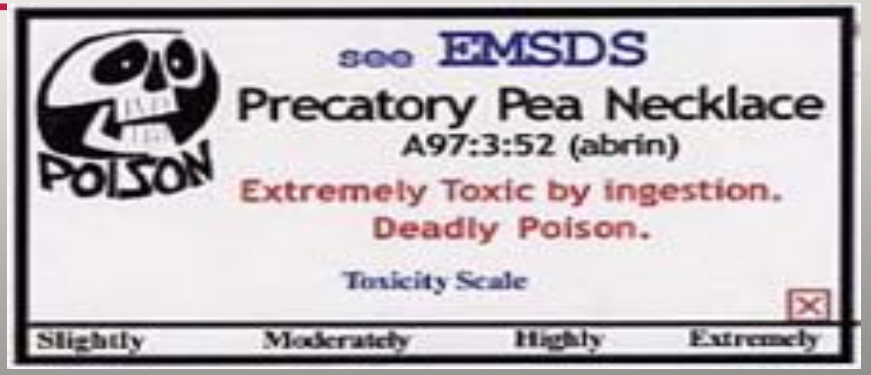
From Old Poisons, New Problems, p. 37

SAFE STORAGE AND HANDLING
HAZARDS COMMUNICATION PLAN

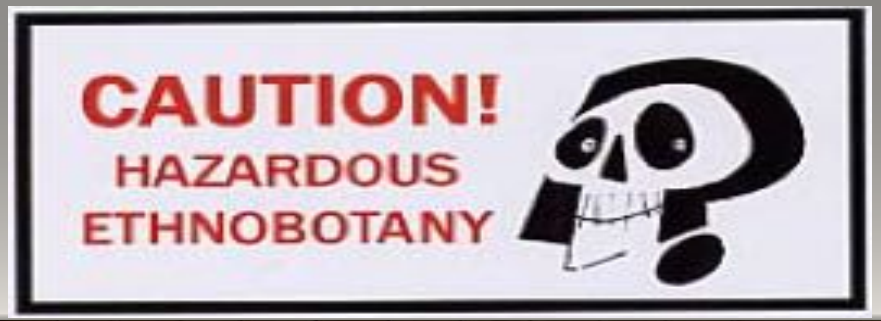


SAFE STORAGE AND HANDLING
HAZARDS COMMUNICATION PLAN

Museum specimen tag suggesting
the presence of arsenic
From From Old Poisons, New Problems, p.

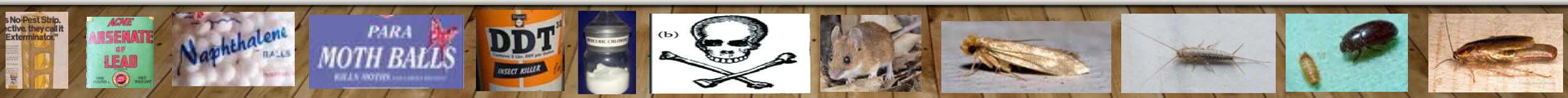


Labels used in the *Oh No, Ethnobotany* program designating the presence of hazardous specimens or materials
http://www.smm.org/anthropology/ohnoethnobotany



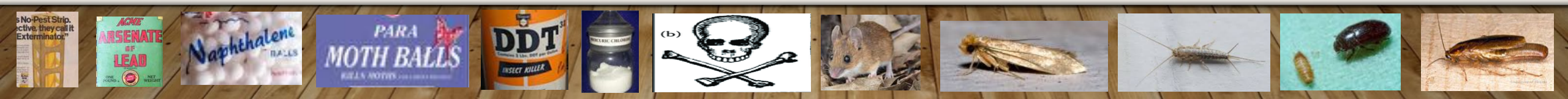
SAFE USE
RESEARCH AND EXHIBIT STAFF

- If known, tell them what chemical residues contaminate the collections with which they will be working.
- Describe the possible health hazards of handling the objects and specimens.
- Train staff to recognize the labeling that accompanies contaminated collections.
- Train staff how to protect themselves using the proper PPE.
- Get them certified to wear a respirator.



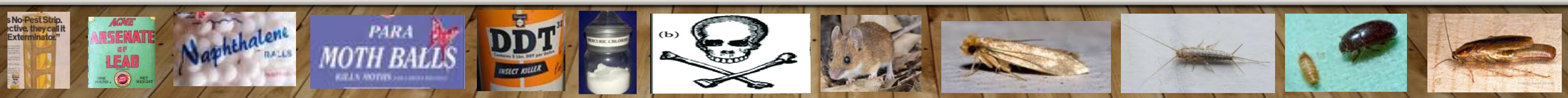
SAFE USE
MUSEUM EXHIBITS AND EDUCATION PROGRAMS

- Use another, uncontaminated object or specimen.
- Hands off!!!!!!
- If it's absolutely necessary to use a contaminated object or specimen, isolate it from visitors. **NEVER** use it in a hands-on program.



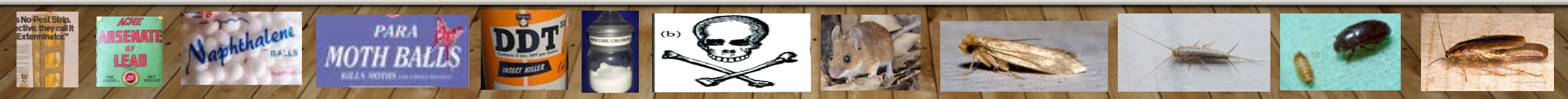
DECONTAMINATION
IS IT POSSIBLE?

- There is often no good way to decontaminate pois objects and specimens.
- Attempts to decontaminate objects or specimens pose risks for human exposure and work-site contamination.
- Powder residues may be removed using a HEPA vacuu but not completely.



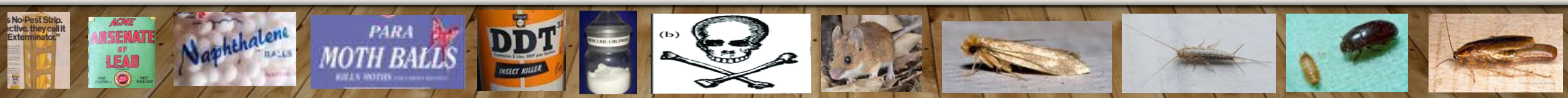
DECONTAMINATION
IS IT POSSIBLE?

- Discourage staff from shaking or blowing off dirt and debris.
- Disposal of hazardous material is federally regulated and complicated, and has the potential to continue to contaminate people and the environment if not done properly.



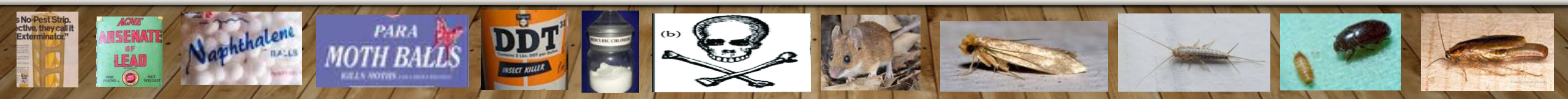
PROTECTION – LEGAL COMPLIANCE

- 1970s-Today – Federal and state laws and regulations exist to control the use and disposal of pesticides.



PROTECTION – LEGAL COMPLIANCE

- Right-to-Know laws
- ADA and state laws protecting people with chemical sensitivities.



PROTECTION – LEGAL COMPLIANCE

- MSDS (Material Safety Data Sheets) are available for all chemicals sold in the U.S.

Alfa Aesar

Safety Data Sheet
per OSHA HazCom 2012

Page 1/5
Printing date 11/24/2015
Reviewed on 09/23/2008

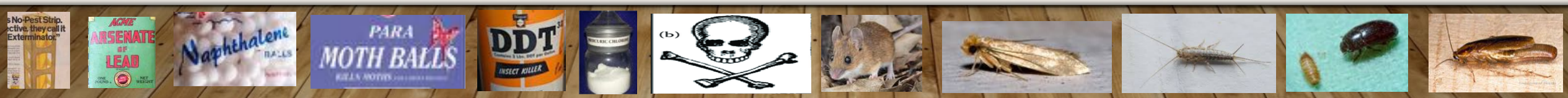
1 Identification

Product identifier

Product name: Arsenic, Oil based standard solution, Specpure ®, As 1000ug/g

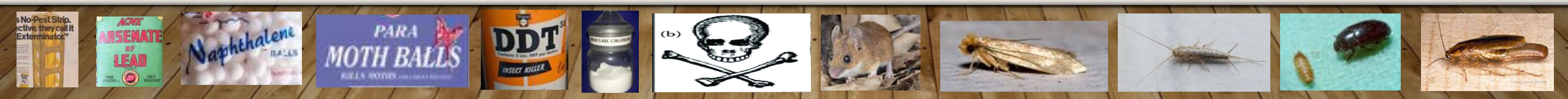
Stock number: 43864
Relevant identified uses of the substance or mixture and uses advised against.
Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com
Information Department:
Product Safety Department
Health, Safety and Environmental Department
Emergency telephone number:
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.



PROTECTION – LEGAL COMPLIANCE

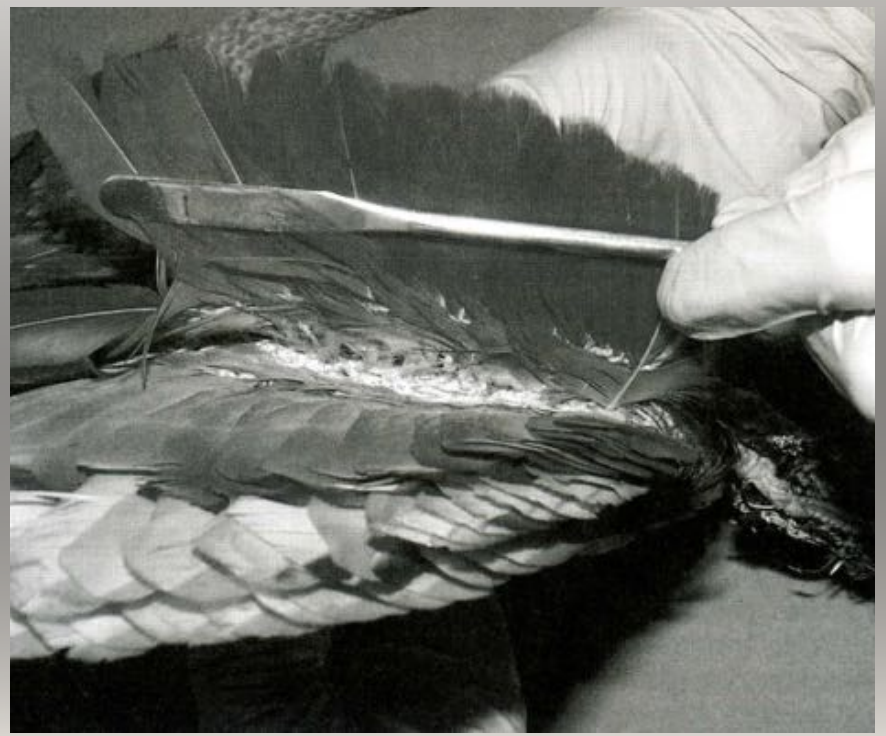
- Two of the agencies that regulate compliance:
  - NIOSH (National Agency for Occupational Safety and Health)
  - OSHA (Occupational Health and Safety Administration)

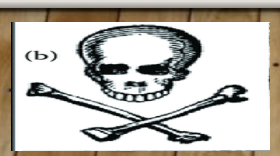


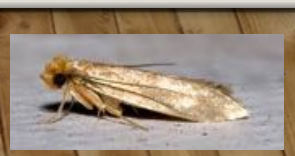
PROTECTION – HANDS OFF!

- Isolate contaminated objects/specimens.
- Restrict handling to trained personnel (e.g., registrar, collections manager, conservator).

Arsenic residue, dispersed between feathers on a headdress. From *Old Poisons, New Problems*, p. 37

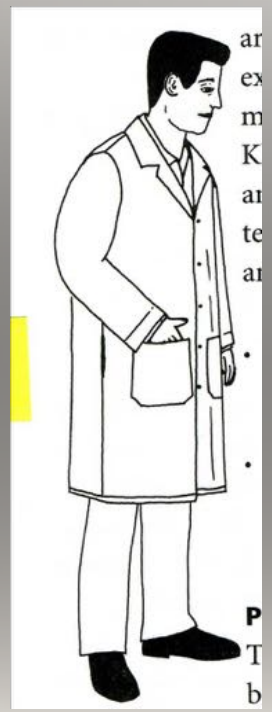


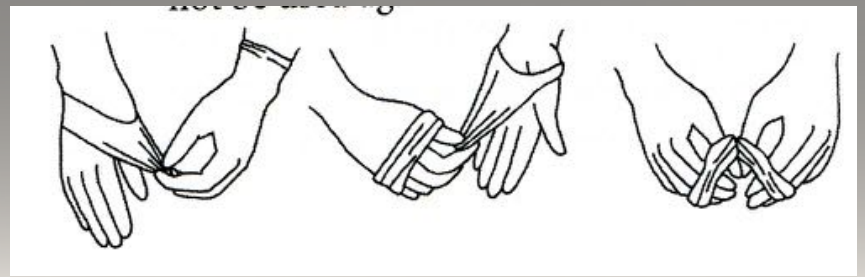




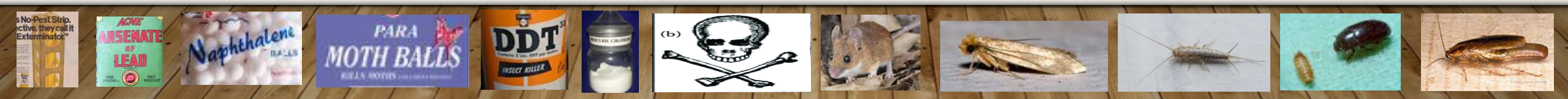
PROTECTION – HUMAN SAFETY

- Personal Protective Equipment—Referred to as PPE



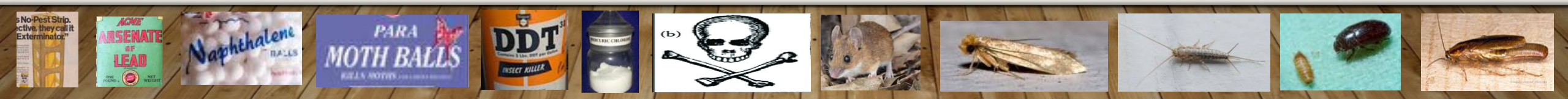


Proper method for removing gloves



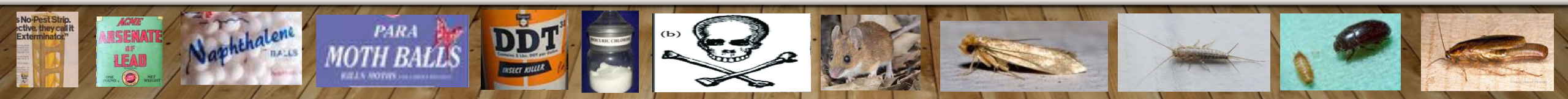
PROTECTION – HUMAN SAFETY

- Provide adequate ventilation.



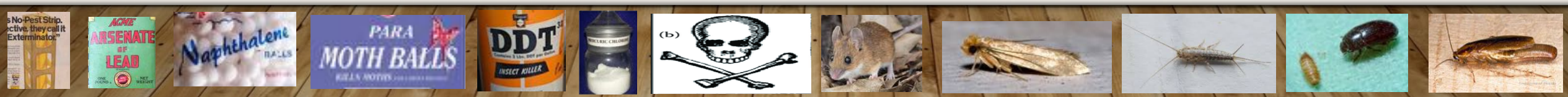
PROTECTION – HUMAN SAFETY

- Seek medical attention if individuals develop poisoning symptoms.
- Symptoms include:
  - Headache, fatigue, dizziness, nausea or vomiting, blurred vision, abnormal sweating or salivation, stomach cramps, diarrhea, tightness in the chest, generalized aching, and muscle twitching.



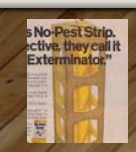
PROTECTION – HUMAN SAFETY

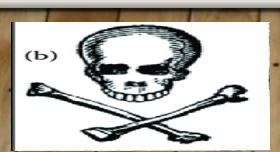
- Enroll museum staff in medical surveillance programs if they routinely work with contaminated collections.



CURRENT USE

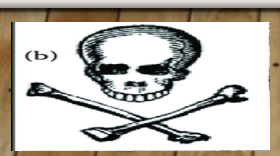
- Some museums still use chemicals to combat active infestations.

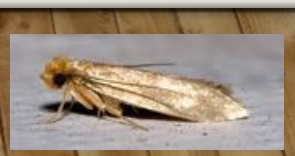




CURRENT USE

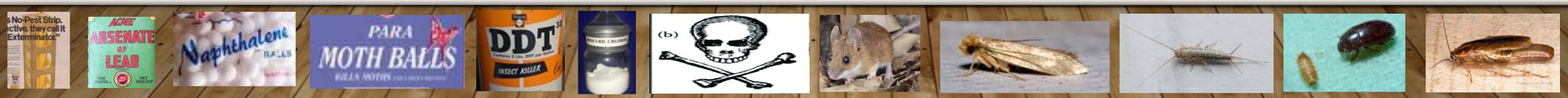
- Some museums still store objects and specimens in cabinets containing vapor-producing chemicals.

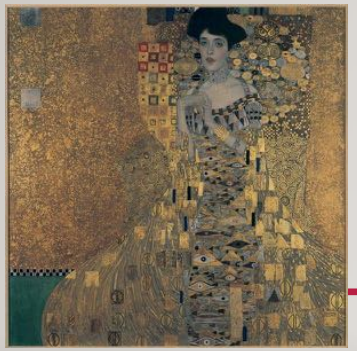




REPATRIATION, RESTITUTION

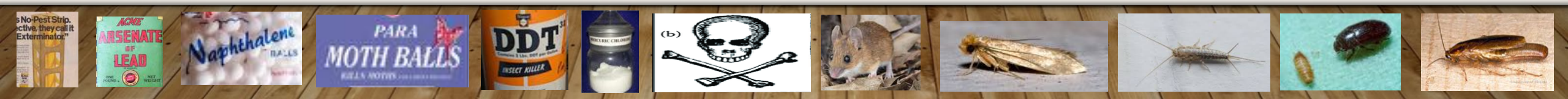
- Return of contaminated materials raises concerns about injury of those to whom the objects/specimens are being returned.
- Once an object or specimen "goes home," the museum relinquishes control over what happens with that item (e.g., how it is stored, handled, displayed, and used).





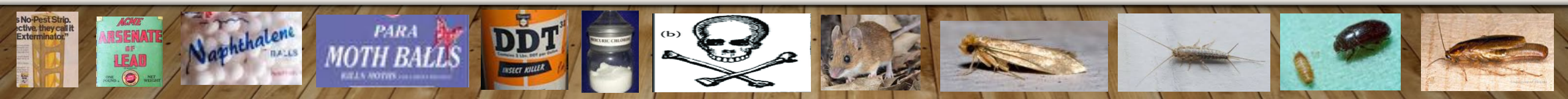
REPATRIATION, RESTITUTION

- Accurate disclosure is the legal and ethical responsibility of the museum, but it is often difficult to provide such information because of vague or non-existent records of treatment.
- It takes a team of diverse parties--tribal representatives or representatives of the individual or group to whom the item is being returned, museum collections professionals, conservators, chemists, medical toxicologists, industrial hygienists, and public health officials.



CONCLUSION

- Past wide-spread pesticide use by museums = hazardous collections.
- Handling and use of contaminated collections can be dangerous to staff, interns, volunteers, researchers and visitors.
- There are ways to deal safely with such collections.
- There are safe methods to deal with such collections.



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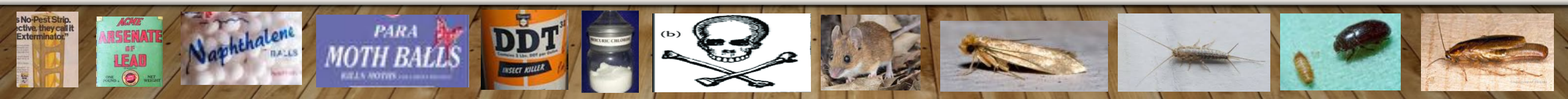
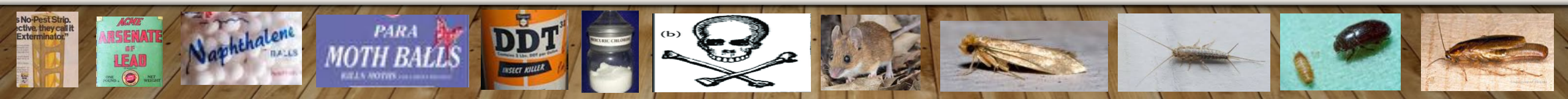


HELPFUL PUBLICATIONS AND RESOURCES

- **Publications:**
- Canadian Conservation Institute (CCI), Notes and Technical Bulletins,
- *Health and Safety for Museum Professionals*. AIC and SPNHC.
- National Park Service (NPS), Conserve O Grams, *Curatorial Safety* bulletins, and *The Museum Handbook*.
- Northeast Document Conservation Center (NEDCC), Preservation leaflets.
- *Old Poisons, New Problems: A Museum Resource for Managing Contaminated Cultural Materials.*
- *Pest Management in Museums, Archives and Historic Houses*
- *Pesticide Mitigation in Museum Collections: Science in Conservation Proceedings from the MCI*
- *Storage of Natural History Collections: A Preventative Approach*
- Society for the Preservation of Natural History Collections (SPNHC), Leaflets and *Collections Forum*

- **Resources:**
- American Institute for Conservation of Historic and Artistic Works (AIC), Health and Safety,
- Risk Management for Pesticide-Contaminated Collections
- Canadian Conservation Institute (CCI), Preventive conservation guidelines for collections,
- Care of objects and collections, and Agents of Deterioration
- Museum Pest.net, https://museumpests.net/



THANKS


danke
謝謝
ngiyabonga
teşekkür ederim
спасибо
dank je
gracias
thank you
tapadh leat
mochchakkeram
bedankt
dziękuję
go raibh maith agat
obrigado
sukriya
kop khun krap
arigatō
dakujem
terima kasih
grazie
merci
мерси


No-Pest Strip.
ective, they call it
Exterminator"


ACME
ARSENATE
OF
LEAD


Naphthalene
BALLS

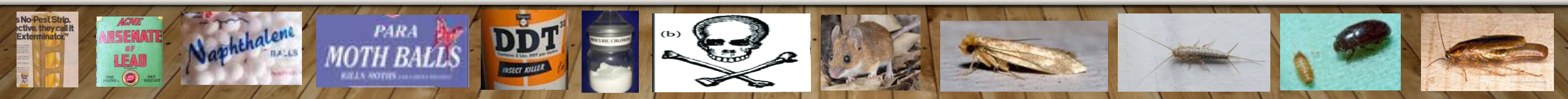

PARA
MOTH BALLS


DDT
INSECT KILLER


(b)

QUESTIONS


Good
Question


ACME
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OF
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BALLS
PARA
MOTH BALLS
DDT
INSECT KILLER
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