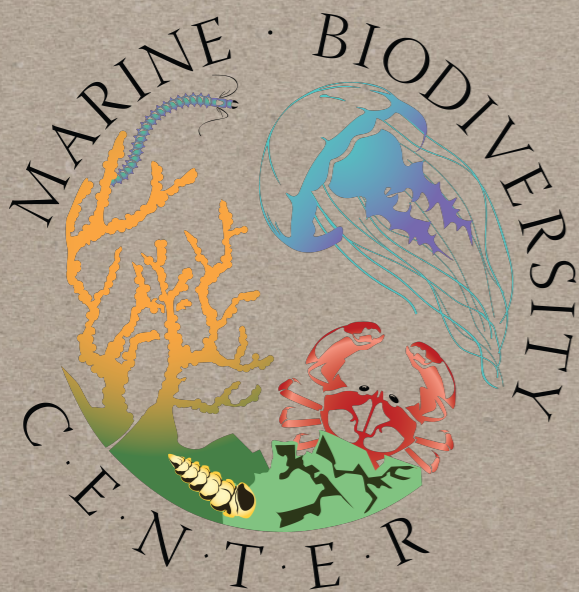


Pre-Digitization Challenges for Wet Collections

N. Dean Pentcheff

Natural History Museum of Los Angeles County



**NATURAL
HISTORY
MUSEUM**
LOS ANGELES COUNTY

BIOSCAN



Representative wet collections

- Ichthyology
- Herpetology
- Crustacea
- Malacology
- Echinoderms
- Polychaeta
- *Parts of many others*

What do they have in common?

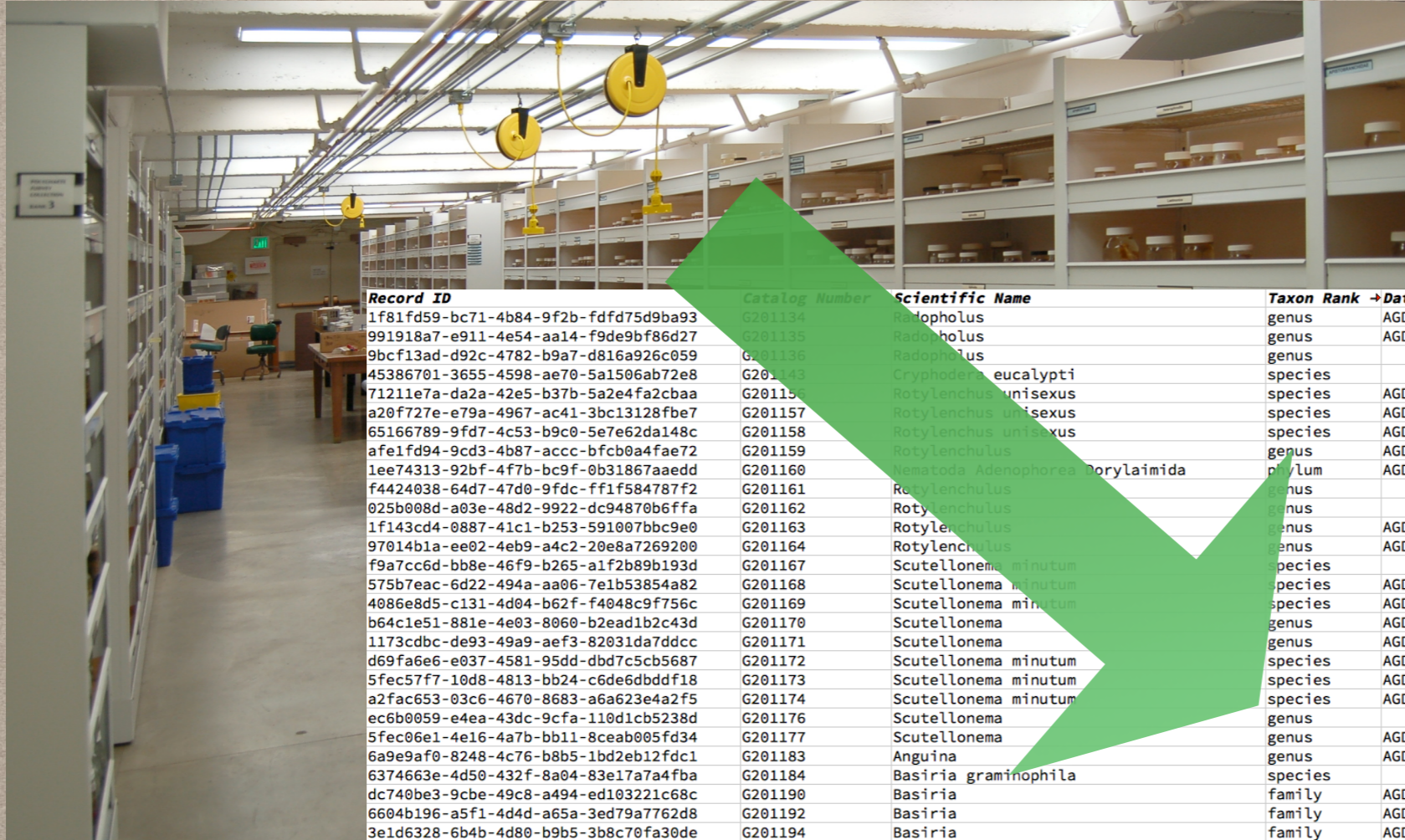


+

| | |
|---|---------------------|
| ALLAN HANCOCK FOUNDATION 137-02 | |
| ACC. NO. | CAT. NO. AHE 137-02 |
| Euphylax dovii Stimpson, 1♂, 4♀ | |
| Isla Manuelita, Costa Rica | |
| (1.1 mi. 343 ⁰ T from) | |
| 2 June 1973 swimming at surface Velero IV | |
| ID. BY J.S.G. 3/76 | STA. NO. 19043-73 |
| UNIVERSITY OF SOUTHERN CALIFORNIA | |

(and a specimen)

What do we want?



| Record ID | Catalog Number | Scientific Name | Taxon Rank | Datum | Latitude | Longitude | Country | IBRA Region |
|--------------------------------------|----------------|----------------------------------|------------|-------|-----------|------------|-----------|--------------------------|
| 1f81fd59-bc71-4b84-9f2b-fdfd75d9ba93 | G201134 | Radopholus | genus | AGD66 | -27.05 | 153.17 | Australia | South Eastern Queensland |
| 991918a7-e911-4e54-aa14-f9de9bf86d27 | G201135 | Radopholus | genus | AGD66 | -27.05 | 153.17 | Australia | South Eastern Queensland |
| 9bcf13ad-d92c-4782-b9a7-d816a926c059 | G201136 | Radopholus | genus | | -18.2 | 142.25 | Australia | Einasleigh Uplands |
| 45386701-3655-4598-ae70-5a1506ab72e8 | G201143 | Cryphodera eucalypti | species | | | | | |
| 71211e7a-da2a-42e5-b37b-5a2e4fa2cbaa | G201156 | Rotylenchus unisexuus | species | AGD66 | -26.9 | 153 | Australia | South Eastern Queensland |
| a20f727e-e79a-4967-ac41-3bc13128fbc7 | G201157 | Rotylenchus unisexuus | species | AGD66 | -27.35 | 152.07 | Australia | South Eastern Queensland |
| 65166789-9fd7-4c53-b9c0-5e7e62da148c | G201158 | Rotylenchus unisexuus | species | AGD66 | -27.35 | 152.07 | Australia | South Eastern Queensland |
| afe1fd94-9cd3-4b87-accb-bfcb0a4fae72 | G201159 | Rotylenchulus | genus | AGD66 | -23.2652 | 150.834134 | Australia | |
| 1ee74313-92bf-4f7b-bc9f-0b31867aaedd | G201160 | Nematoda Adenophorea Rorylaimida | phylum | AGD66 | -26.1819 | 152.667457 | Australia | South Eastern Queensland |
| f4424038-64d7-47d0-9fdc-ff1f584787f2 | G201161 | Rotylenchulus | genus | | -29.4333 | 153.25 | Australia | South Eastern Queensland |
| 025b008d-a03e-48d2-9922-dc94870b6ffa | G201162 | Rotylenchulus | genus | | -29.4333 | 153.25 | Australia | South Eastern Queensland |
| 1f143cd4-0887-41c1-b253-591007bbc9e0 | G201163 | Rotylenchulus | genus | AGD66 | -28.05 | 148.58 | Australia | Darling Riverine Plains |
| 97014b1a-ee02-4eb9-a4c2-20e8a7269200 | G201164 | Rotylenchulus | genus | AGD66 | -28.66521 | 151.934148 | Australia | New England Tablelands |
| f9a7cc6d-bb8e-46f9-b265-a1f2b89b193d | G201167 | Scutellonema minutum | species | | -26.85 | 152.95 | Australia | South Eastern Queensland |
| 575b7eac-6d22-494a-aa06-7e1b53854a82 | G201168 | Scutellonema minutum | species | AGD66 | -25.1819 | 152.617452 | Australia | |
| 4086e8d5-c131-4d04-b62f-f4048c9f756c | G201169 | Scutellonema minutum | species | AGD66 | -24.3319 | 151.567463 | Australia | South Eastern Queensland |
| b64c1e51-881e-4e03-8060-b2ead1b2c43d | G201170 | Scutellonema | genus | AGD66 | -24.3319 | 151.567463 | Australia | South Eastern Queensland |
| 1173cdbd-de93-49a9-ae73-82031da7ddcc | G201171 | Scutellonema | genus | AGD66 | -24.3319 | 151.567463 | Australia | South Eastern Queensland |
| d69fa6e6-e037-4581-95dd-dbd7c5cb5687 | G201172 | Scutellonema minutum | species | AGD66 | -24.3319 | 151.567463 | Australia | South Eastern Queensland |
| 5fec57f7-10d8-4813-bb24-c6de6dbddf18 | G201173 | Scutellonema minutum | species | AGD66 | -24.3319 | 151.567463 | Australia | South Eastern Queensland |
| a2fac653-03c6-4670-8683-a6a623e4a2f5 | G201174 | Scutellonema minutum | species | AGD66 | -24.3319 | 151.567463 | Australia | South Eastern Queensland |
| ec6b0059-e4ea-43dc-9cfa-110d1cb5238d | G201176 | Scutellonema | genus | | -23.5167 | 149.166667 | Australia | Brigalow Belt North |
| 5fec06e1-4e16-4a7b-bb11-8ceab005fd34 | G201177 | Scutellonema | genus | AGD66 | -23.0319 | 147.834173 | Australia | Brigalow Belt North |
| 6a9e9af0-8248-4c76-b8b5-1bd2eb12fdc1 | G201183 | Anguina | genus | AGD66 | -22.9819 | 143.867555 | Australia | Mitchell Grass Downs |
| 6374663e-4d50-432f-8a04-83e17a7a4fba | G201184 | Basiria graminophila | species | | -23.5167 | 149.166667 | Australia | Brigalow Belt North |
| dc740be3-9cbe-49c8-a494-ed103221c68c | G201190 | Basiria | family | AGD66 | -18.15 | 144.32 | Australia | Einasleigh Uplands |
| 6604b196-a5f1-4d4d-a65a-3ed79a7762d8 | G201192 | Basiria | family | AGD66 | -23.43 | 150.45 | Australia | Brigalow Belt South |
| 3e1d6328-6b4b-4d80-b9b5-3b8c70fa30de | G201194 | Basiria | family | AGD66 | -22.42 | 142.65 | Australia | Mitchell Grass Downs |
| 4d94c236-5454-4153-8b9f-3274bb93a42c | G201196 | Trophonema arenarium | species | | | | Australia | |
| 85640179-98fc-4bb9-96d5-725ee53a466f | G201197 | Trophonema arenarium | species | | | | Australia | |
| ec96fd76-3121-4473-a65b-7429cf070052 | G201198 | Trophonema arenarium | species | | | | Australia | |
| 94b8fb01-d662-4202-8327-218de91431da | G201199 | Paratylenchus coronatus | species | AGD66 | -26.8652 | 152.934123 | Australia | South Eastern Queensland |
| ec301f7e-e6f0-4817-a445-1711651f9b9e | G2012 | Echinodermata Echinoidea | phylum | AGD66 | -27.33 | 153.25 | Australia | South Eastern Queensland |
| 3071f39d-c9a1-4fec-881f-8c35058143b2 | G201200 | Paratylenchus coronatus | species | AGD66 | -28 | 152.4 | Australia | South Eastern Queensland |
| 9d99624e-fbb1-4638-9171-eb1646bee58e | G201203 | Paratylenchus microdorus | species | AGD66 | -27.0152 | 148.584185 | Australia | Brigalow Belt South |
| ad162e1e-30be-4ecf-b359-cf73730cd681 | G201205 | Trophurus | genus | AGD66 | -28 | 153 | Australia | South Eastern Queensland |
| 148c64d5-d5be-4e5b-816d-5bc14a335d52 | G201206 | Trophurus imperialis | genus | | | | Australia | |
| 5aeb2a1a-0180-4dc3-b6c0-ac6be75fe3d8 | G201207 | Trophurus imperialis | genus | | | | Australia | |
| 00720086-e831-42b5-bb5d-16c39f93d8a0 | G201209 | Morulaimus soldus | species | AGD66 | -24.87 | 152.35 | Australia | South Eastern Queensland |
| d393057d-d151-45f4-84f4-edde8bd2b6a0 | G201222 | Bitylenchus brevilineatus | species | AGD66 | -26.7319 | 150.634155 | Australia | Brigalow Belt South |
| baa614ce-43cb-422a-9d30-d1bd67a0a471 | G201223 | Bitylenchus brevilineatus | species | AGD66 | -26.7319 | 150.634155 | Australia | Brigalow Belt South |
| 9cc65240-4893-4769-ae2f-32ddd8d732c9 | G201224 | Bitylenchus brevilineatus | species | AGD66 | -26.7319 | 150.634155 | Australia | Brigalow Belt South |
| 9b97ddb4-1b3d-424a-8b87-61f5ad91df10 | G201225 | Bitylenchus brevilineatus | species | | | | Australia | |
| 531839bc-31f6-4cd5-a357-d52eadbe5112 | G201232 | Tylenchorhynchus | genus | AGD66 | -28.6152 | 148.434198 | Australia | Darling Riverine Plains |
| ff564af8-3bc4-4a2e-8e81-974ad00b4ecc | G201233 | Tylenchorhynchus | genus | AGD66 | -24.4819 | 150.584143 | Australia | Brigalow Belt South |
| b407c048-564c-4823-b52e-d11ff8a457fd | G201234 | Tylenchorhynchus | genus | AGD66 | -24.4819 | 150.584143 | Australia | Brigalow Belt South |
| 864c632b-e89e-4c81-9b25-a597aa5b264a | G201235 | Tylenchorhynchus | genus | AGD66 | -24.4819 | 150.584143 | Australia | Brigalow Belt South |
| 34131ec4-e2e1-4abe-83cb-2a29686c1454 | G201236 | Tylenchorhynchus | genus | AGD66 | -24.4819 | 150.584143 | Australia | Brigalow Belt South |

Label data or specimen images?

- Many invertebrates:
little/no value in specimen images
- Where specimen images are desirable, see:
iDigBio DROID workshop results (*Developing Robust Object-to-Image-to-Data Workflows*)

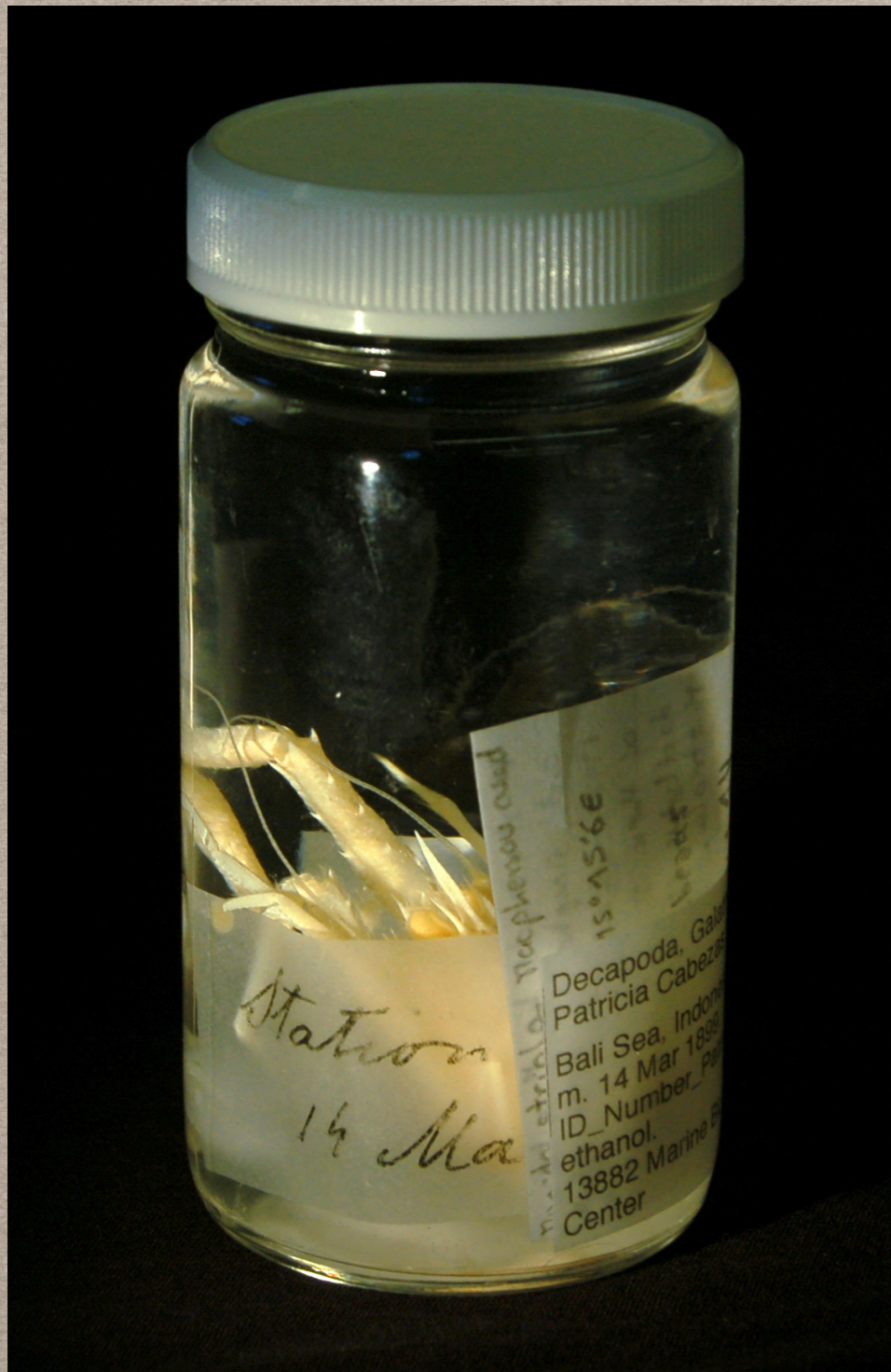
What are the problems?

- Label visibility
- Multiple labels
- Container nesting
- Container heterogeneity
- Label heterogeneity
- Expeditionary collecting

Label visibility



Multiple labels



Munida striola Stephens, 1899
Baba, 1993
10
Stn. 12 7°15'S 115°15'6"E
Depth: 289 m
14 March 1899
Ident: Patricia Cabezas Padilla
Sept 2013
ID - Number - Patri: 14

Decapoda, Galatheoidea, *Munida striola*, Id.
Patricia Cabezas Padilla, Sept. 2013

Bali Sea, Indonesia, 7.25°S 115.26°E, 289
m. 14 Mar 1899. Siboga Station 12.
ID_Number_Patri: 14. Preserved in 70%
ethanol.

13882 Marine Biodiversity Processing
Center

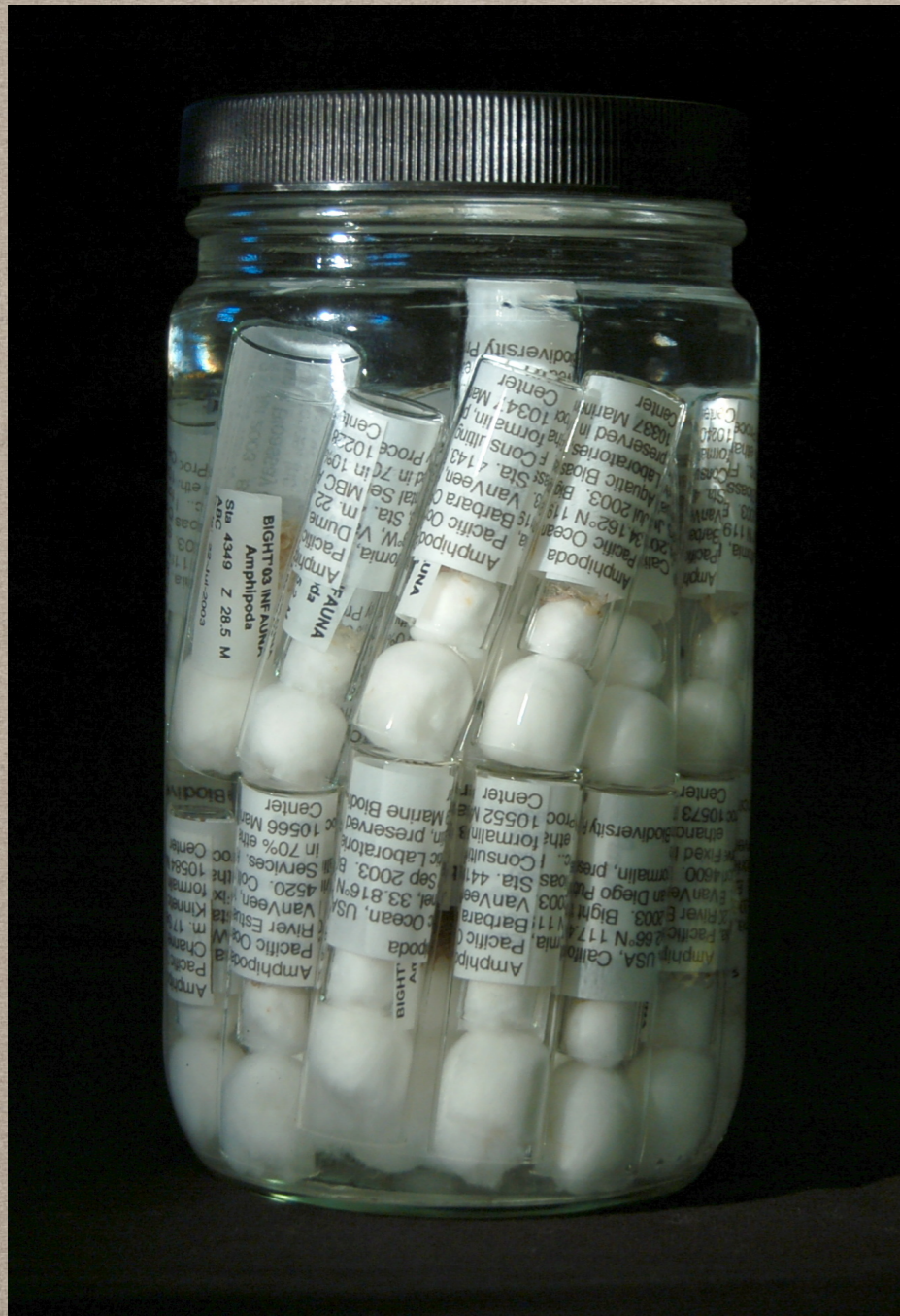
Siboga - Expedition

Stat: 12.

Station 12
14 March 1899

12

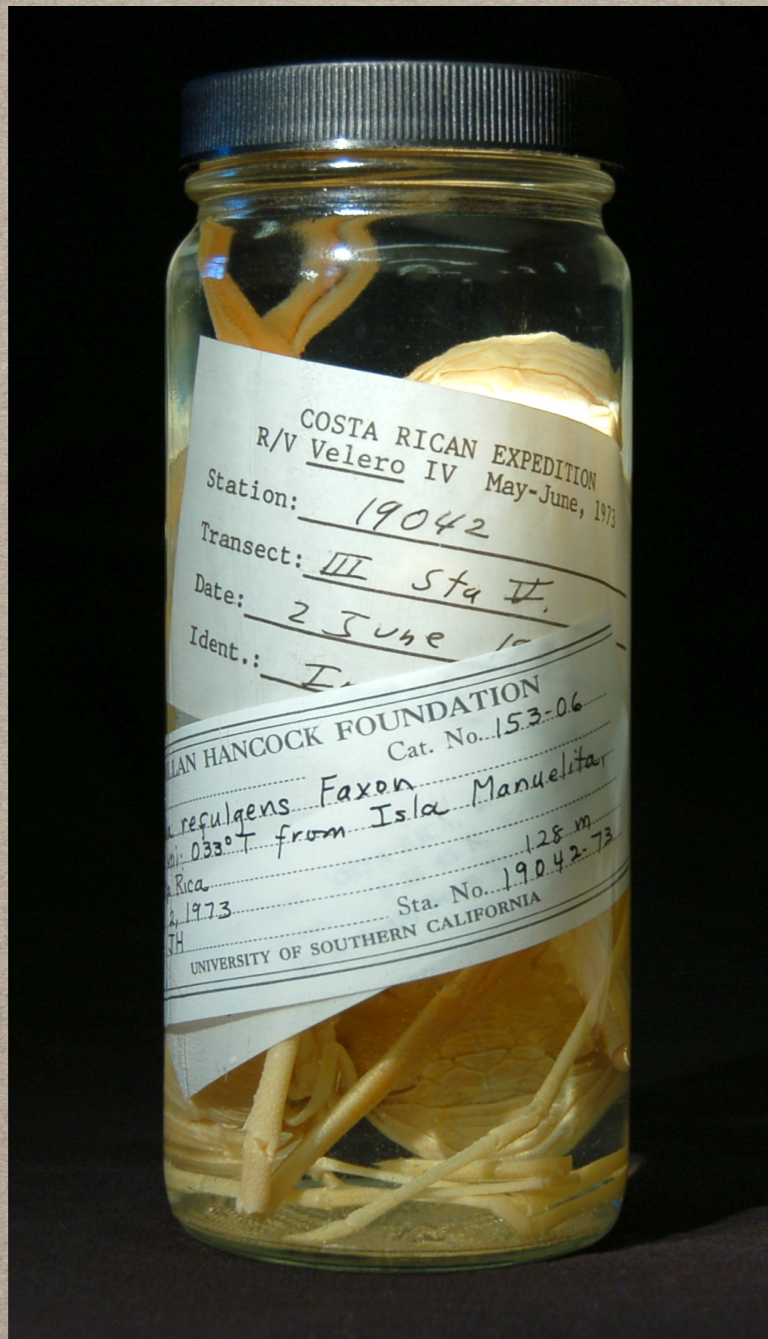
Container nesting



Container heterogeneity



Label heterogeneity



Expeditionary collecting



Echinoderms ↖
Fishes ↖
Crustacea ↖
Cnidarians ↖
...



Expeditionary collecting

| Station | Date | General Locality | Dredge Down | | | Dredge Up | | | Remarks |
|-------------|------------------|---|---------------------------|----------|-----------|---------------------------|----------|------|--|
| | | | Position | Time | Fms. Dir. | Position | Time | Fms. | |
| (Aug. 1941) | | | | | | | | | |
| 153 | ✓ 1373-41 | 2 Off White Cove, Santa Catalina Island | 33 24 10 N 118 20 25 W | 4:40 PM | 105 | 33 24 10 N 118 20 25 W | 5:16 PM | 105 | Gray sand |
| 154 | ✓ 1374-41 | 3 1 mi. E. of Empire Landing, Santa Catalina Island | 33 25 45 N 118 25 10 W | 10:30 AM | 22 | 33 24 10 N 118 20 25 W | 9:45 AM | 215 | Broken shell, coarse sand |
| 155 | ✓ 1375-41 | 3 1 mi. E. of Empire Landing, Santa Catalina Island | 33 25 45 N 118 25 15 W | 11:20 AM | 18 | 33 24 10 N 118 20 25 W | 9:25 AM | 290 | Worm tubes, kelp |
| 156 | ✓ 1376-41 | 3 Off Avalon, Santa Catalina Island | 33 21 10 N 118 17 40 W | 4:20 PM | 83 | 33 24 10 N 118 20 25 W | 4:40 PM | | Gray sand |
| 157 | ✓ 1377-41 | 3 Off Avalon, Santa Catalina Island | 33 21 03 N 118 19 55 W | 5:00 PM | 55 | | 5:15 PM | | Gray sand |
| 158 | ✓ 1378-41 | 4 1 mi. NW. of White Cove, Santa Catalina Island | 33 24 20 N 118 22 00 W | 10:00 AM | 2-3 | | | | Mask diving for kelp holdfasts |
| 159 | ✓ 1379-41 | 4 Santa Catalina Channel | 33 33 00 N 118 10 00 W | 3:25 PM | 84 | | 4:00 PM | 95 | Gray sand, mud |
| 160 | ✓ 1380-41 | 8 8½ mi. E. of Long Point, Santa Catalina Island | 33 24 10 N 118 11 20 W | 4:03 PM | 228 | 33 21 40 N 118 11 25 W | 4:55 PM | 228 | Mud, rock |
| 161 | ✓ 1381-41 | 9 ½ mi. off White Cove, Santa Catalina Island | 33 23 30 N 118 22 04 W | 10:00 AM | 33 | 33 23 30 N 118 22 02 W | 12:00 AM | | Kelp, rocks, sea fans, urchins, fish, sponge |
| 162 | ✓ 1382-41 | 10 Beach close in by Buoy, Wh. Cove, S. Catalina Isl. | 33 23 04 N 118 20 40 W | 7:00 AM | 2 | 33 23 30 N 118 21 00 W | 8:00 AM | 3 | Mud, sand, sticks, leaf debris |
| 41-163 | ✓ 1383-41 | 10 E. of Long Point, Santa Catalina Island | 33 23 40 N 118 20 04 W | 9:00 AM | 45 | 33 24 02 N 118 21 22 W | 11:00 AM | 50 | Sponges, lamp shells |
| 164 | ✓ 1384-41 | 10 ½ mi. NE. of Long Point, Santa Catalina Island | 33 24 30 N 118 21 30 W | 2:27 PM | 108 | 33 00 10 N 118 21 40 W | 2:50 PM | 109 | Green, sandy mud |
| H-165 | ✓ 1385-41 D-1 | 25 16½ mi. SSE. of E. Point, Santa Rosa Island | 33 41 00 N 119 52 58 W | 10:30 AM | 75 | 33 40 55 N 119 52 30 W | 10:50 AM | 76 | Rocks, crinoids, sponges |

No. 3 FRASER: SCIENTIFIC WORK, VELERO III, EASTERN PACIFIC 359

$\frac{32}{12}$ 120
 $\frac{39}{143}$ 130
 type for 24

Recommendations

- Accommodate heterogeneity
(either pre-digitization or in process)
- Diverse strategies for the range
of full-to-partial labels
(inspection from outside through unpacking)
- Develop inter-institutional databases for
expeditionary sample/locality information
- Recurate while digitizing

One size does not fit all

*Happy collections are all alike;
every unhappy collection is unhappy in its own way.*

(Apologies to L. Tolstoy)