Out with the old and in with the new?

A preliminary assessment of storage conditions in the Yale Babylonian Collection

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Background

- The Yale Babylonian Collection consists of 45,000 clay tablets, seals, and metal objects
- Objects are housed in 100-year old wooden drawers in one room (Room 325), and new Delta Designs cabinets in an adjacent room (Room 326); tablets are in padded cardboard boxes with glass or plastic lids
- The collection occupies 5 connected rooms, heated by radiators in the winter, cooled by window AC units in the summer; all are external rooms with large, poorly-sealed windows; no additional ventilation; room 326 has a sink and kettle; windows are sometimes opened to provide air flow

Purpose of Study

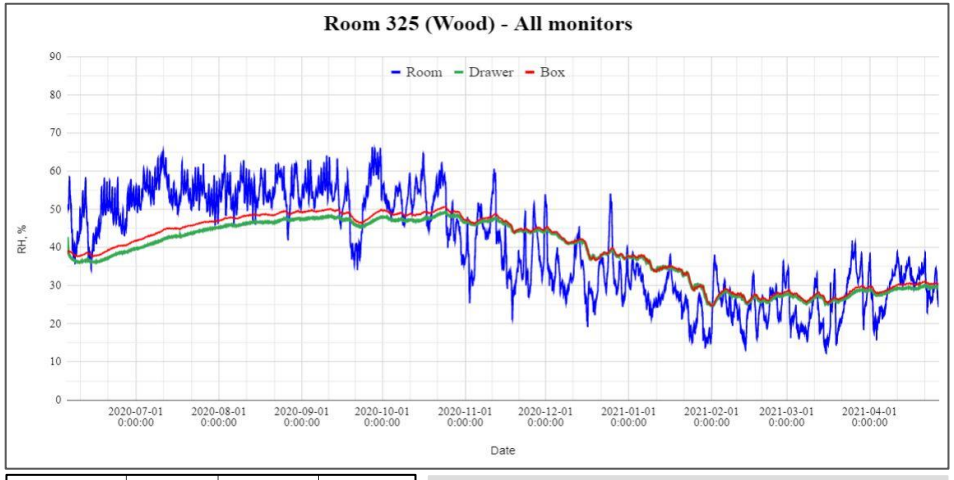
- Storage is the primary line of defense for buffering fluctuations in humidity in this collection, which has documented soluble salt problems
- Large fluctuations and high RH values can lead to repeated crystallization/deliquescence of soluble salts; bronze disease becomes active >45% RH
- Old wood vs new metal storage is a matter of debate in tablet collections
- Will environmental control factor into decisions to purchase new cabinetry?

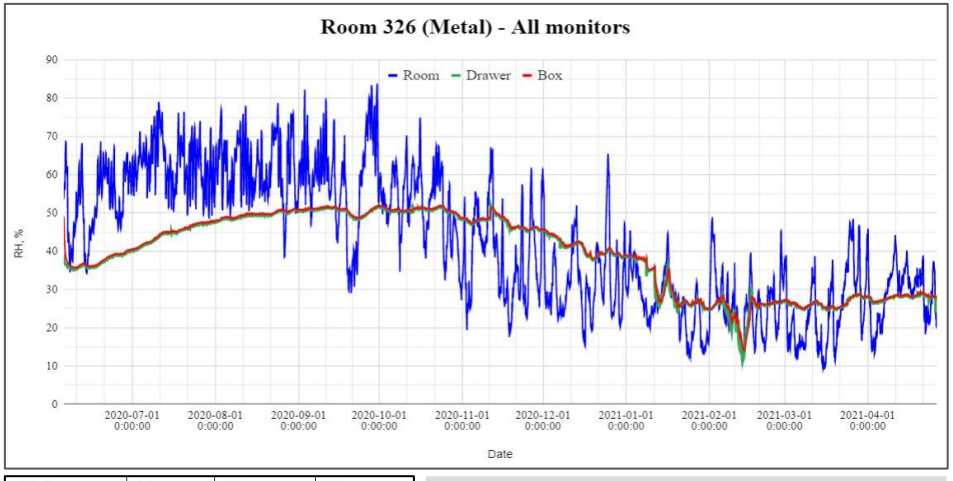
Question

- Which storage system is better at buffering changes in humidity - wooden drawers or gasketed steel cabinets? Do the boxes provide any additional buffering?

Method

- 6 HOBO MX1101 data loggers placed in the tablet rooms: ambient RH in each room, a drawer in each room, a tablet box in each drawer
- Temperature and RH logged every 30 seconds between June 5, 2020 and April 26, 2021





325 (Wood)	Room	Drawer	Box
Mean RH	40.22	38.74	39.81
St. Dev.	13.53	8.03	8.44
Min RH	12.15	24.71	24.69
Max RH	66.32	49.21	50.7

Summary: Wood drawers (Room 325)

- Mean 20% difference between room and drawer
- RH in the room fluctuated above and below 60% between July and November; the drawer never went above 50%
- 34% of counts in the drawer were >45% RH

326 (Metal)	Room	Drawer	Box
Mean RH	42.45	39.38	39.65
St. Dev.	17.48	10.06	10.05
Min RH	9.16	11.63	13.87
Max RH	83.87	52.19	51.97

Summary: Metal cabinets (Room 326)

- Mean 28% difference between room and drawer
- RH in the room fluctuated above and below 60% between June and December; the drawer never went above 53%
- 42% of counts in the drawer were >45% RH

Conclusions

- The metal cabinet appears to do more "work" within its room, but drawers from the two rooms cannot be compared directly because ambient conditions are very different
- Both types of cabinetry offer significant buffering - tablets should not be left out overnight, especially from July-October
- Drawers and cabinets should be closed when not in use to avoid spikes in RH
- Closed boxes within drawers do not have a significant impact on RH buffering
- Metal objects need to be rehoused with silica gel - the cabinet RH is in the bronze disease danger zone
- Environmental control will not necessarily factor into decisions to purchase new cabinetry

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