

# Scientific Instruments on Display

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## The Display of Twentieth-Century Instruments at Humboldt State University

*Richard A. Paselk\**

### Introduction

This paper discusses how a number of challenges are addressed in operating and maintaining a small university museum of scientific artifacts. The first challenge is justifying the collection's very existence. Why should this collection exist or be on display? What are the motivations to save and display these artifacts? What unique and/or culturally important information do they represent? Over time the museum's collection and exhibits have been tied into the Humboldt State University's history and development as an important regional center of science and natural resources education; a related extensive web site has made the museum a resource for mid-twentieth-century instrument history.

### The Genesis of the Museum

There has been much discussion about the reason for museum collections, particularly at universities, as addressed for example by Richard Kremer.<sup>1</sup> In his article Kremer describes university collections as often beginning as personal collections or hoards of artifacts by university employees. A local 'guardian angel' may then consolidate and organize the aggregations into more formal collections. The collection may then become more museological as artifacts are documented, cleaned, conserved and cataloged. Finally the collections can gain a degree of permanence with the acquisition of funding for storage and display space, staff and the recognition by other university bodies.

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\* I thank my wife, Gail Paselk, for her careful reading, comments and editorial help on earlier drafts and illustrations for this paper, and Steve Turner for reading and commenting on the subsequent draft.

1 Richard L Kremer, "A Time to Keep, and a Time to Cast Away: Thoughts on Acquisitions for University Instrument Collections", *Rittenhouse* 22 (2008), pp. 188–210.

Interestingly, the development of the museum at Humboldt State University (HSU) at Arcata, California, has followed Kremer's analysis rather closely. First, it began as a result of collecting, hoarding, and 'dumpster diving' (rescuing from trash containers and trash piles), with the curator keeping/collecting whatever was appealing or 'cool' for the author's personal collection. Second, much of the initiating museum collection came as the result of the dispersal of two campus hoards, one held by the College machinist/electronics technician, and the second held in a Physics Department storage area. Both hoards were 'cleaned out', in 1986 and 1989 respectively, by the University due to space reallocation with unwanted objects going to landfill. Fortunately, the author was made aware of each situation and was able to rescue many items, though many were let go because of the overwhelming number and volume of artifacts—there was no museum yet, and no storage outside of the author's home, garage and on-campus faculty office until the on-campus museum was built in 2000.

About this time the growth of this personal collection initiated the author's thoughts about the direction this personal collection should take—there was too much potential for growth, so it was resolved to focus on chemistry.<sup>2</sup> However, this focus didn't last long as a new collection theme became apparent with the sudden wealth of artifacts from the physics and shop hoards. The new wealth created a potential collection of instruments illustrating the history of science teaching at HSU from its establishment in 1913 through the third quarter of the twentieth century.

While researching and documenting this collection, including items obtained from Humboldt State, starting in the mid-1990s, a real turn came with the development of the World Wide Web and its implementation at HSU around 1995. The timing was propitious, as the author had just completed involvement as Principle Investigator in a seven-year series of educational multimedia development projects and was looking at the web as an educational tool. After years of experience as a developer, constantly requiring the learning of new software and watching key development tools become obsolete, the author was looking for a development platform for his teaching where time could be spent on content, not software. It was already clear that the

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2. Ultimately this led to the author's collection of refractometers largely obtained via eBay to enable close observation and manipulation of a variety of these instruments. Because of the isolation of HSU (a six hour drive to the closest large airport or major research university: the University of California, Berkeley) it was impractical to 'visit' instruments elsewhere for the most part. The eBay and HSU instruments provided material for the museum's temporary exhibit, *The Chemist's Refractometer, 1890–1980*, from 2003 to 2005: <http://humboldt.edu/scimus/RefracExhibit/Index.html> (accessed 10 March 2014).

worldwide use of the web and thus html by hundreds of millions and then billions of users would make html a very stable platform, and that has proven to be the case. Early web pages can still be read and used—html evolves and improves, but it does not go out of date.

To encourage faculty to take advantage of this new technology, HSU established a web development support office, manned mainly by students to help faculty with web projects. The author took early advantage of this situation by first posting course notes and materials on the web for his chemistry courses. The creation of the author's first web museum of university artifacts quickly followed, though the items themselves remained part of a personal collection. Much of the information collected by the author concerning the Humboldt State artifacts in the author's personal collection, originally placed in Word files, was quickly transferred by copy-and-paste into html. Photographs taken earlier on 35 mm film were scanned, digitized and inserted onto instrument web pages. Trade-catalogue descriptions of the instruments were scanned whenever available. After requesting and receiving copyright permissions to post these descriptions from the appropriate makers and vendors, they were also inserted. As a result of these efforts and with help from the campus web development support office, the first web-museum was posted in the spring of 1997. This was the origin of the HSU Chemistry Department Scientific Instrument Museum.<sup>3</sup> However, the 'real' museum, with the artifacts in a university rather than a personal collection, would wait until 2000, as described below.

The HSU museum was fortunate early on to have strong moral support from two successive Deans of the College of Natural Resources and Sciences at HSU who shared an interest in the University's heritage and public image. In 1998, Dean James Smith gave the museum (on-line only at this time) official recognition as a Chemistry Department museum and appointed the author as Curator (new additional title, no new benefits or salary, but it recognized that the museum had academic value to the University and to the author's professional development as a Professor in the Chemistry department). Smith's interim successor, Dean Steve Carlson, discovered the on-line museum and encouraged the creation of a physical museum. He also suggested locating the latter in the university library and negotiated with the Library Dean to arrange it. This was followed by collaboration with the Library faculty and our Art department's "Art Museum and Gallery Practices" faculty to design the museum, followed by case construction and installation by the HSU campus cabinet shop. To fund the cases the author and his spouse donated a sum from an

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3 The current museum, now renamed The Robert A. Paselk Scientific Instrument Museum, may be found at <http://humboldt.edu/scimus/> (accessed 10 March 2014).



FIGURE 8.1 *Main display cases of Robert A. Paselk Scientific Instrument Museum located in Humboldt State University Library.*

inheritance and received a match from his brother (encouraged by the naming of the new museum after their father, Robert A. Paselk). The museum was officially dedicated October 13, 2000 (by unplanned coincidence, our deceased father's birthday). To accompany the new museum the author completed a major redesign and rework of the entire web site, posted to the web shortly after the dedication (Fall 2000).

The stability of html and the limited resources of the museum (very limited budget, a single individual—the author—to accomplish all coding, research, writing, photography, conservation, cataloging, exhibit design and installation) also recommended it as a single platform for all inventory and other functions of the web museum. The only software development tools currently used at the museum are Adobe Dreamweaver for coding and editing html, Adobe Photoshop for image preparation and editing, and MS Word for writing text, and creating exhibit labels and signs.

Does a local museum like the one at HSU have a rationale beyond the passion of its founder? The collection does not include historically important or valuable objects for the history of science on a national or international scale; it focuses on instruments used in science instruction at Humboldt State. Thus a significant justification of the collection is to tell a local story of science education and the establishment of Humboldt State as an important educational institution in the natural resources and sciences during the mid-twentieth century. The core collections and displays, both online and physical, reflect this in their chronological arrangements.

In the main Library display cases (*Fig. 8.1*), the south case (*Pl. 8*) contains instruments from HSU's early period (1913–1935), when it was named Humboldt State Teachers College. The north case (*Fig. 8.2*) presents instruments from



FIGURE 8.2 Main display cases, *Right-hand (North) case*.

HSU's formative period as Humboldt State College, when it developed into an institution with an international reputation in natural resources and science education. As the collection has expanded it has become possible to place satellite displays in buildings where the instruments were actually used and where the display supports a connection between the teaching activities of the present with the use of classic instrumentation and apparatus before the digital age. Two display cases installed in 2007–2008 highlight the balances used in chemistry courses from 1950–1980 (*Fig. 8.3*) and a grouping of high-quality, state-of-the-art instruments used in HSU's physical and analytical chemistry laboratory in the 1960s (*Fig. 8.4*). A case enclosing a Cary 14 UV-Vis scanning spectrophotometer and some accessories is in progress. In 2011 a third case was added to the main Library display area allowing for temporary, thematic exhibits of current interest, e.g. "Early North Coast Scientific Instruments c. 1850–c. 1950" (January 2012–June 2013),<sup>4</sup> or an exhibit focusing on instruments taken by the University's namesake on his Latin American Expedition, "Alexander von

4 The online version of the exhibit still lives on at: [http://humboldt.edu/scimus/NorthCoastInst/N\\_C\\_InterDis.htm](http://humboldt.edu/scimus/NorthCoastInst/N_C_InterDis.htm) (accessed 10 March 2014).



Humboldt's Latin American Expedition (1799–1804) Instruments, Geography & Botany" (August 2013–August 2014) as part of HSU's Centennial celebrations (Fig. 8.5). Clearly, the museum showcases local university history and the practice of chemistry there since c. 1930.



FIGURE 8.3 *Display case for The Chemical Balance at Humboldt State, 1926–1986. This case is located near the Chemistry labs where balances are now used, allowing students to see the precursors to our modern digital balances.*

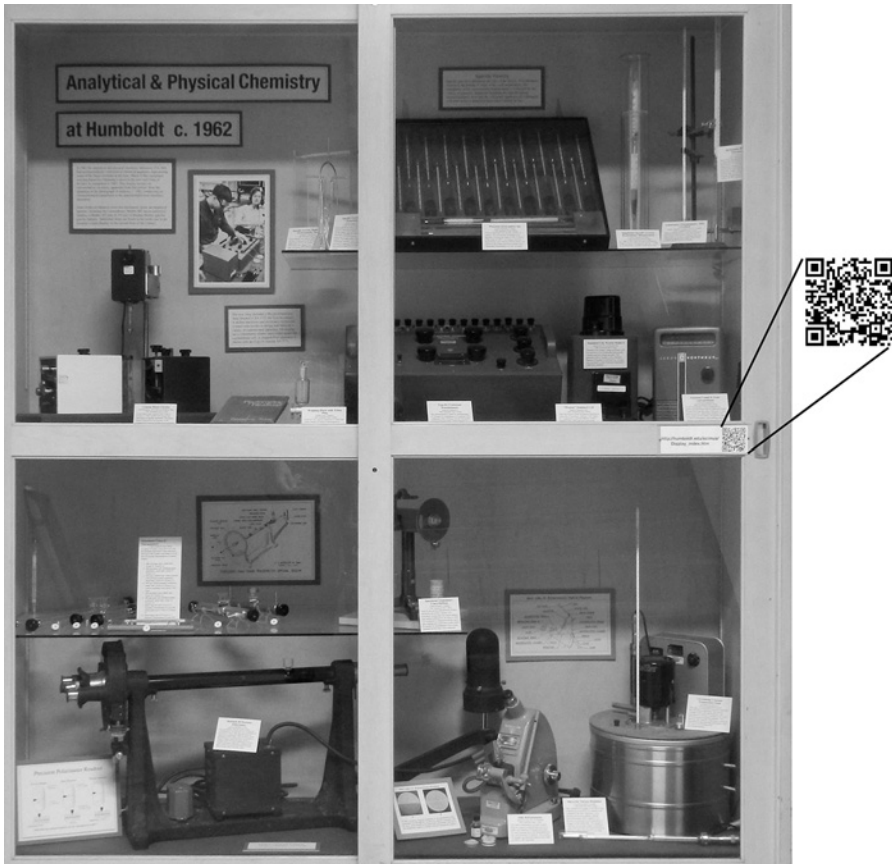


FIGURE 8.4 *Display case for From the Analytical/Physical Chemistry Lab, c. 1963. This case is located just down the hall from the two laboratories where this equipment was used. Note the magnified QR code that can take the visitor with appropriate technology to the web page for this display.*

### Physical vs. Virtual Visitor Experience

A visit to the museum's web site exemplifies the museum's dual web vs. physical nature.<sup>5</sup> The visitor may choose two complimentary paths to explore the museum: a university visitor enjoying the displays may click on the display case pages to access information on the individual displays and artifacts;<sup>6</sup>

5 See the museum's home page: <http://humboldt.edu/scimus/index.shtml> (accessed 10 March 2014).

6 See: [http://humboldt.edu/scimus/Display\\_index.htm](http://humboldt.edu/scimus/Display_index.htm) (accessed 10 March 2014).



FIGURE 8.5 *Display case for Alexander von Humboldt's Latin American Expedition (1799–1804) Instruments, Geography & Botany.*

a virtual visitor may click the on-line exhibit pages for greater access to the museum, including objects, documents, a literature collection, some maker histories and web pages for past temporary displays.<sup>7</sup> For public access in the HSU Library,<sup>8</sup> university-maintained computers are conveniently located within the museum area, as can be seen in the upper image on the introductory web page and in *Figure 8.1*.

The university visitor using the display case page may go to specific web pages for any of the museum's display cases by clicking on either the display case titles or case icons. Alternatively, the web site for each display case is designed to enable instant access via hand-held devices (WiFi or 3G) to the case collection documentation for visitors. Each case has a QR code (two-dimensional or matrix barcode) affixed to it, allowing smartphone and iPad or tablet computer users to go directly to the display case web page simply by aiming their QR code-enabled device (*Fig. 8.4*). The display case pictures

7 See: [http://humboldt.edu/scimus/Virtual\\_index.htm](http://humboldt.edu/scimus/Virtual_index.htm) (accessed 10 March 2014).

8 All students, staff and faculty have open access. University visitors may obtain temporary passwords to access university computers.

are image-mapped—clicking on the instruments in a display case image takes the user to the specific artifact web page with digital photos of instruments and components, curator discussions and descriptions, and links to trade catalogue descriptions, manuals, brochures and other literature when available.<sup>9</sup> Students and others can not only marvel at the equipment used by their predecessors, they can also explore the use, maintenance and other aspects of these tools of education and discovery, both at the main displays in the library and in displays near the labs where exhibited instruments were once used.

The visitor to the virtual museum can find all of the information provided to the on-site visitor, plus information on additional artifacts in the collection that are not displayed. In addition the curator has provided maker histories, brochures, catalogues, references, and other literature when available such as personal narratives of users and ex-students.

The primary organization of the artifact collection in the virtual museum is in three parts based on the designation of the institution and time period when they were obtained and first used, as seen at the top of the on-line exhibit main page.<sup>10</sup> Clicking on any of these links takes the user to an overview page with links to some institutional history and the instrument collection for each part. These three instrument pages are intended to include all of the museum's catalogued collection of artifacts. Those displayed in the Main Library cases and satellite cases may be alternatively accessed via case display pages. The satellite links take the visitor to the respective Exhibit Catalogues, which include both instruments in the case and related apparatus in the collection plus, particularly for the Balance and Refractometer exhibits, related literature and other documentation. Web pages for Special Exhibits are also maintained and are accessible via this page after the actual exhibits are taken down. Finally, various pages indexing the museum's collections of brochures, essays, and other supporting documentation are linked at the bottom of the on-line exhibit page. All of these web pages have been created and maintained by the author.

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9 For an example of a typical 'complete' artifact web page visit <http://humboldt.edu/scimus/HSC.54-70/Descriptions/Tensiometer.htm> (accessed 10 March 2014). Not all instruments are this well documented. Catalogue descriptions, manuals, company histories, and original literature descriptions are often unavailable and not included.

10 See: [http://humboldt.edu/scimus/Virtual\\_index.htm](http://humboldt.edu/scimus/Virtual_index.htm) (accessed 10 March 2014).

## Americans with Disabilities Act (ADA) Compliance

Recent actions in the State of California have set deadlines for making all on-line materials accessible to people with disabilities in accordance with national and international standards.<sup>11</sup> The California State University (of which HSU is a part) and HSU's campus also embrace a philosophy ("Universal Design") of making our web pages as usable and 'friendly' as possible to all. In this light I will discuss briefly some of the steps that have been taken to make the web museum more accessible to visually impaired or disabled users. Because the museum was first posted before many accessibility standards were in place, early and updated examples of one of the instrument pages will be compared. Differences that are not visually obvious but which affect users of screen readers will also be described.

In designing the original pages bold and italics as well as font sizes were used to emphasize titles, important points, etc. Unfortunately these signals do not translate well for screen readers (software and/or devices converting written text to audible words) used by visually impaired users. First 'bold' and 'italic' are reimplemented as 'strong' and 'emphasis' respectively, while font sizes are replaced with 'heading' sizes. The heading designations allow sophisticated screen readers to skip from heading to heading much as a sighted user does when scanning a page. These changes do not alter the appearance of the pages, but they make the screen reader experience more convenient and closer to the experience of sighted users.

Another design change is to avoid the use of tables as layout tools. Screen readers for visually challenged users read through the formatting as well as the content for the table as it is read, thus tables are discouraged for formatting. Tables are acceptable for actual tabulated information or data as long as proper table formatting tags are used in the code, an operation built into HTML coding software such as Adobe Dreamweaver™, the tool now used to write the pages for the HSU's web museum. Current pages show some differences, most notably the illustrations and headings, formerly arranged across the page formatted using a one-row table, are now 'stacked' and centered making the pages a bit taller and less compact than in the original. Finally, all images now have 'alt tags'—short descriptions of the images that are read by screen readers to help the user to interact with the images. For 'decorative' images a simple tag is reasonable. Accordingly

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11 International guidelines and help for accessible development may be found at [www.w3.org/WAI/](http://www.w3.org/WAI/) (accessed 10 March 2014).

short tags “photo icon” and “catalogue scan icon” are routinely used for the images used as visual ‘buttons’ on the web site.

### Conclusion

In summary the origins and growth of the Robert A. Paselk Scientific Instrument Museum at Humboldt State University closely followed the historical patterns noted by Kremer and listed at the beginning of this article: initiated as hoards and private collections followed by consolidation by a ‘guardian angel’ and then formalization after recognition by university authorities. This evolution and the desire to create a sustainable museum resulted in the development of a philosophy and reason d’être for the museum, viz., to tell local institutional history, to contribute to university heritage. However, the development of the World Wide Web and its availability at the time of the consolidation of the initial collection also played a major role in the shaping and formalizing of the museum; without the web the museum would likely have remained a private collection to be dispersed by the collector or his heirs. The World Wide Web originated and remains a central focus of the museum. Because of limited time and resources the web display has also become the central record of the museum, with all notes, descriptions, etc. kept online and accessible to all—no other inventory software is currently used. The evolution of the web and society has required on-going redesign to accommodate visually impaired users.

So what does the future hold? The author’s career at HSU will end in just over a year, and there is currently no one else involved with the museum. From my dozen-plus years experience with the museum displays, I project that the displays will be stable with no curatorial care for at least a decade. One of my goals over the next year is to try to create a mechanism to sustain the museum and/or find a successor as curator. I may continue maintaining the website for the intermediate future as that can be done remotely, but ideally I will be able to pass this on as well. Time will tell.