Deconstructing Ubiquity: The Interpretative Value of Metal Drum Containers

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(Brian Allen photo)

Abstract

As 20th and 21st century artifacts, metal drum containers straddle historical and contemporary archaeological studies that will be conducted during the next 50 years. They are found across the globe as repurposed objects within site features, as components of expedient structures, and as vernacular landscape artifacts. Although often simply described in CRM reports as "ubiquitous 55 gallon drums," archival research and field data demonstrate that not all drums are created equal in terms of function, design or size. Current research has revealed datable drum attributes, including container manufacturer end marks that display the exact year of manufacture, making them a valuable asset for site interpretations. This poster presents drum nomenclature and highlights documented uses of drums in historical and contemporary contexts.

Introduction

Up until the 20th century, the bilge-shaped wood stave barrel was the most prevalent storage container in the western world. United States (U.S.) patents for bilge-shaped metal barrels began to appear as early as the 1860s, while the sheet steel cylindrical-shaped drum began to appear on the market around 1905, and it became the preferred container type by the mid-1920s. Throughout the 20th century, the U.S. iron and steel industry (e.g., U.S. Steel [USS], Bethlehem Steel, and Jones & Laughlin [J&L]) produced metal stock from raw materials using a variety of milling processes. These steel producers sold their products (e.g., sheets of steel) to steel "consumers" who manufactured containers such as tin cans and steel drums. Drum manufacturers (e.g., Draper Manufacturing Co. [DMC], Petroleum Iron Works [PIW], Wackman Welded Ware [WWW]) manufactured and sold drums in bulk to companies needing to ship large volumes of their various products such as petroleum, chemicals, paint and food stuffs (**Fig. 1**). During the first decades of the 20th century many companies (e.g., Standard Oil or Moore Oil, etc.) "owned" their drums and had their name embossed on the drum heads in order to reuse them over and over again. Both early on and later as the sheet steel drum market proliferated (i.e. producing millions of containers a year), the steel milling companies also created their own drum manufacturing divisions or bought out established drum companies to expand their market (e.g., east-coast USS purchased west-coast Boyce Manufacturing Co. [BOYCO]). The container industry also included independent recycling companies that gathered empty drums, cleaned, repaired and resold them. Several of these recycling companies (e.g., Myers Container Co. [MYERS]) later began producing their own drums for local markets. Today, no longer limited to steel, the drum industry thrives with the manufacturing of metal, plastic and fiber drums in both national and international markets.

I began researching the drum/barrel industry when I realized the modified and empty drum containers I was finding during field surveys had datable attributes, as well as base marks similar to glass bottles, ceramics, cartridges and other 20th century mass-produced artifacts. Also, since drums are too large to collect (and curate), I wanted to make sure I was capturing pertinent information in the field. Drum base marks (i.e., top or bottom, or both) include manufacturer initials, logo or code; steel gauge (e.g., 12, 14, 16, 18, 20 or 22); drum capacity in gallons (e.g., 10, 16, 30, 55 or 110); and production year. They may also display regulatory codes (e.g. ICC-5B, DOT-17E, etc.). My "drum project" database now includes detailed data collected from over 350 drums found at over 100 locations including historic sites, contemporary settings, within museum collections and as isolated objects located during field studies (**Fig. 2**). The database includes information on whole and partial drums ranging in date from 1908 to 2003, having a mean year of 1951, a median year of 1944, and represented by 48 different manufacturing companies. My sample consists primarily of 30 and 55 gallon drums that are "empties" or they have been modified to create other functional artifacts. My largest data gap includes drums manufactured from 1900 through 1925, which is a time when many innovations occurred in the drum industry.

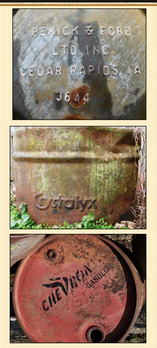

Figure 1. Product data; *Penick & Ford* corn syrup, *Crystalyx* farm animal food supplement, and *Chevron* gasoline.

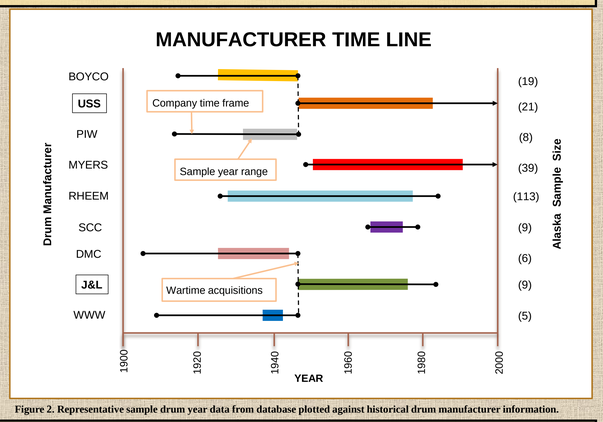

Figure 2. Representative sample drum year data from database plotted against historical drum manufacturer information.

Deconstructing Drums

To the untrained observer, cylindrical drums manufactured since the late 1920s look very similar to drums produced today, so it is imperative to locate drum base marks or examine drum attributes to determine age of manufacture. Also, since drum reuse is prevalent, it is important to understand the context of these artifacts within a site or cultural landscape. Historical research into the drum technological innovations resulted in a generalized typology based on the following characteristics:

- BODY STYLE (shape may be bilge or cylindrical; seams may be riveted or welded; body finish may be "black" or galvanized; sheet steel thickness may range from 12 to 22 gauge)
- SIZE (volume capacity from 10 to 110 gallons)
- HEAD STYLE (tight or open head)
- CLOSURES (location on the body, as well as type) (**Fig 3**).

Chronological U.S. drum manufacturing developments

- 1900-1910s: bilge and cylindrical drums with riveted seams
- 1910s: cylindrical drums with crimped and welded seams
- 1900-1930s: bilge and cylindrical shapes in use
- 1920s-Present: cylindrical metal drum is dominant shape
- 1970s: plastic drums enter market reintroducing bilge shape

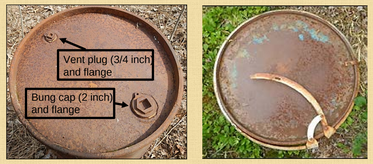

Figure 3. Typical tight-head drum with closures (left), and open (removable) head with lever closure (right).

Datable Drum Attributes

Drum diversity in body shape, size and closure types is greatest from 1900-1930s. Beginning in the 1930s, drums are generally cylindrical in shape, 55 gal. in capacity, and 18 gauge sheet steel (**Fig. 4**)

- Body shape and thickness (gauge)
- Patented closures and flanges (bung and vent)
- Manufacturer base marks
- Reinforced chime (applied rims) on 16 or heavier gauge tight-head drums
- Attached rolling hoops or impressed swedges
- Corrugation/ compression rings (on 18 and lighter gauge drums)
- Tamper-proof capping of bungs/plugs introduced in 1930s
- Open head rim clamp lever or bolt ring

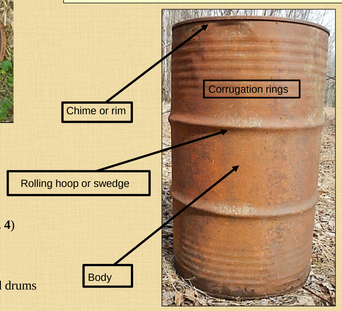

Figure 4. Cylindrical tight head drum body.

Regulatory, Manufacturer and other Marks

•Pre-1920 drums and barrels vary in how the manufacturer data is embossed. These drums may have been owned by the product manufacturer (e.g. Moore Oil), and thus the drum retains their name as well as the drum manufacturer's initials and other drum specifications (**Fig. 5**).

• In the U.S. from at least 1911 to 1969, the Interstate Commerce Commission (ICC) regulated the shipping of large containers holding potentially hazardous materials. The ICC required the drum manufacturers' identification (name, initials or logo) and a three part code (e.g., 16-55-38) that identified basic drum specifications: steel thickness (gauge), volume capacity (gallons), and year manufactured. If the container contained potentially volatile substances, then an ICC code (e.g., ICC-5 or ICC-5B) was also embossed that generally reflected what substance the drum was rated for (e.g., combustibles, non-combustibles, etc.). Starting in the 1930s, lighter gauge (i.e., 18 gauge) non-returnable drums began to appear on the market as "single trip containers." The ICC required these containers to bear embossed ICC-17E as well as the initials STC to signify that they were not to be used again as shipping containers for the original product after the container had been emptied of its contents (**Fig. 6**).

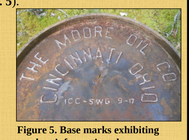

Figure 5. Base marks exhibiting product information, drum manufacturer and production year.

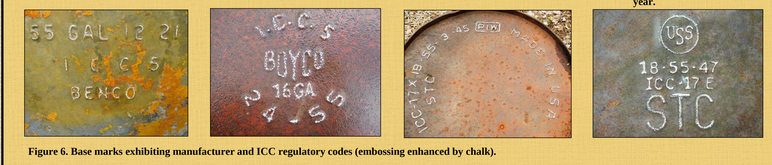

Figure 6. Base marks exhibiting manufacturer and ICC regulatory codes (embossing enhanced by chalk).

•The U.S. military is major user of drums to deliver to and store petroleum products at remote locations. Starting with World War II, the U.S. military branches embossed their names or initials, and later stenciled battalion and product information. (Note: In the past, the U.S. military surplused fuel or empty drums to the public so context of the drum is important.) (**Fig. 7**)

Figure 7. U.S. military identifying marks and stenciled information.

•In 1969, the Department of Transportation (DOT) replaced the ICC as the US government agency responsible for regulating the hazardous materials shipping industry (**Fig. 8**). This change is reflected in the base mark by the replacement of ICC by DOT but the regulatory code numbering system remained the same until 1993. So for purposes of dating drums that may have only partial date codes visible, if it has DOT embossed on it, then it post-dates 1969. Also, starting in the 1980s, DOT started issuing "M" and "R" numbers to hazmat packaging providers. For example, the single entity known as Myers Container Corporation initially marked their drums as MYERS; however by 1988, MYERS is replaced with symbols or identification numbers, e.g. M4026 (Myers Container LLC, of CA), or M4034 (Myers Container Corporation, of UT) or, M4035 (Myers Container LLC, of OR).

Figure 8. Base marks exhibiting post-1969 regulatory changes and DOT codes.

•After 1993, U.S. drum manufacturing and shipping regulations began to comply with international (i.e., global) standardization specifications. At this point, the old trinomial system was replaced with a United Nations (UN) specification that reveals new shipping standard codes, but has dropped the drum manufacturer initials. The code is usually embossed on the drum base as well as having a printed label affixed to the drum body (**Fig. 9**).

Figure 9. Base marks and paper shipping label displaying post-1993 regulatory changes to UN specifications and codes. The 1993 (*left*) base mark is transitional, displaying both the old trinomial system (*above*) and new UN specifications (*below*).

Drum Closures and Flanges

The leaky bung and spigot closures of the wooden barrel were always an issue. The steel drum started out with similar leaky closure methods, but several inventors attempted to solve the problem, which resulted in a variety of different closure types (both patented and unpatented) from 1900 to the 1950s (**Fig. 10 and 11**). The best solutions involved a combination gasket, flange and bung cap closure "system." Initially riveted on to the body, then later welded, then impressed into the head or body, the cap and flange "system" began to be perfected around 1930. The inventors of the American Flange & Manufacturing Company (AFMCo.) "*Tri-Sure* system" proved to be the most successful with their distinct embedded octagonal-shaped flange system that is easily distinguishable if present on drum heads. The Rieke Co. welded flange and gaskets systems have also been equally successful. Both AFMCo. and Rieke systems command the market today.

Figure 10. Closures used prior to the 1950s varied in styles and manufacturers. Some manufacturers are identified on the closure by name or patent number while others are not.

Figure 11. Patented closures such as this lug-like flange (*left*) by Rheem Manufacturing Co. had a short life (1936-1942); therefore they represent a datable attribute unique to Rheem drums when end marks are not present or visible.

CAUTION - Given the industry standard 2-inch diameter bung cap and ¾-inch closure plug sizes, users often mix caps and plugs although they are not designed to be inter-changeable (**Fig. 12**). Field recordation has determined that since drum closures may not be original to the drum you have located, attempting to precisely date drums by patented caps or plugs alone is cautioned. Using caps and plugs with their respective flange systems is more reliable for identification and dating purposes.

Figure 12. This example shows a later *Rieke* closure screwed into an earlier *Tri-Sure* octagonal flange.

Drum Reuse

This study evolved out of the application of an historical and archaeological perspective to modern material culture. Based on archival research and field observations, drums at sites usually come in three forms: "empties," partially filled, and modified. I have focused on empties and modified drums at sites to re-create drum chronology and technological attributes so that I can better describe and date partial drums, refine and interpret feature areas across multi-decadal surface sites, and more fully describe feature areas with datable artifacts. Arriving at a good date on a drum is key to determining its 'role' at a site; it may be your most definitive datable object (i.e., contextual anchor). However you also have to be aware that people like to reuse/repurpose drums; therefore, it is important to understand a drum's context at the site, and relationship with other objects/features. Steel drums are very durable, and it is this quality that makes them a desirable object having numerous modified uses. Modified drums demonstrate ingenuity, resourcefulness, craftsmanship, and making do (**Figs. 13-18**).

Figure 13. Drum (1940) modified into a cable spool located in a mining camp (1940s).

Figure 14. Drum feature (six drums connected by pipes to store water, c. 1950 – each drum had a different manufacturer mark and date range from 1923-1946).

Figure 15. Drum (1939) modified into a wash basin located in a mining camp (1940s).

Figure 16. Four drums welded together to form a canoe (1940s) (archival photo).

Figure 17. Four drums (1941-42) welded together to form an expedient water heater at a road construction camp (1940s).

Figure 18. Cold War era anti-aircraft building buttressed with soil–filled drums (1950s). (Brian Allen photo).

Above all, Alaska Natives (past and present) find many use for empty drums (**Figs. 19-21**). During material culture acculturation studies conducted in Alaska during the 1950s through 1970s, archaeologists and anthropologists documented many Native examples of drum reuse that included modifying drums into stoves but also for many other uses, such as: cooking pots for dog food, rendering pots for whale blubber, fish storage containers, support piers for storage racks and caches, siding and roofing for buildings, trash and burn barrels, human waste receptacles (i.e. honey pots) , sweat baths, and dog houses. Similar uses continue into the present.

Figure 19. Inupiat women cooking beluga whale meat in cut-down steel drum (1951). (Field Museum of Natural History neg. no. 110437).

Figure 20. Drums used as building support piers, and sheathing for siding and roofing (2010).

Figure 21. A tundra walkway through a village consisting of a linear series of drums (1970s).

Drum Stoves

Repurposing steel drums into radiant heating stoves is very common in the past and present in Alaska. Research demonstrated that drum stoves manufacture occurred earlier in the 20th century (ca. 1910s) than this author initially thought. This data is supported by historic photographs of drum stoves, advertisements in old newspapers, and the discovery of early stoves or their carcasses at archaeological sites. Not only were people making their own stoves from 30 and 55 gallon drums, an abundance of empty drums initiated an entire sub-industry of drum stove manufacturers within metal fabrication shops. From an economic perspective, this means at least two things: (1) these less expensive steel drum stoves produced by local smiths were undercutting the larger mass market cast iron and steel stove producers; and (2) steel drums intended to be recycled for reuse as mass-volume material containers were being pulled from the drum recycle/reconditioning system used by drum manufacturers and producing owners such as Standard Oil. At historic sites, the steel accessories (i.e., cast iron door, legs, and stove pipe flange) have often been removed and reused on the next generation of drum stoves.

POTENTIAL HAZARDS – Drums have a stigma of being associated with hazardous materials or hazardous waste sites. The drums I document are not hazardous – they are usually "empties" or they have been repurposed into cultural objects. However, as archaeologists, we should be aware of the potential for hazardous materials at any domestic, military or industrial site, or sites that used petroleum or chemical products. Certainly be on the lookout for signs of hazards that should be avoided (e.g., buried drums, dead vegetation around a drum, crystalized substances around drum closures and severe corrosion, etc.). Certainly avoid potentially hazardous drums, but don't unnecessarily associate ALL drums with hazardous materials (**refer to Fig. 1**). Also, even empty whole drums are generally heavy, but drums having substances in them or that contain residual water can weigh over 100 lbs – do not attempt to lift them without assistance.

c. 1905 bilge | 1913 bilge | 1917 cylindrical | 1919 cylindrical | 1920s cylindrical | 1920s bilge | 1924 cylindrical | 1926 cylindrical | 1927 cylindrical | 1929 cylindrical | 1937 cylindrical | 1941 cylindrical | 1942 cylindrical | 1947 cylindrical | 1952 cylindrical | 1954 cylindrical | 1967 cylindrical | 1988 cylindrical | 2016 cylindrical

Acknowledgments

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