

# The Mount Savage Locomotive Shops

by Patrick Stakem

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This one in a series of articles on the production of railroad iron and industrial machinery at Mt. Savage, Maryland covers the repair and manufacture of railroad locomotives in the remote site of Mt. Savage, Maryland. (Mr. Stakem's article on the Mount Savage Iron Works will be available for download in the "Industrial History and Tourism section of Vagel Keller's Industrial Heritage Homepage, ed.)

The Cumberland & Pennsylvania Railroad, a coal-hauling short line in Maryland, Allegany County, was one of the earliest such railroads in the United States. Completed by the Maryland and New York Iron and Coal Company in 1846 to serve its iron furnace in Mt. Savage, Maryland, the C&Pa eventually became a major feeder of bituminous coal to the Baltimore & Ohio RR and to the Western Maryland Railway.

The earliest C&Pa locomotives were inherited from other lines through acquisition and the roster was a veritable who's who of contemporary builders, including Winans, Hayward Bartlett, Baldwin, Smith & Perkins, Danford & Cooke, and Norris. But the C&Pa was soon building locomotives for itself and external customers. The C&Pa locomotive shops were established in Mt. Savage in 1866, under the direction of James Millholland.

**James Millholland's Locomotive Shop.** The original locomotive shop was constructed of stone and was 90 feet x 250 feet in size with a 33 foot high roof. An adjoining car shop, built at about the same time, was also of stone and was later extended with a wooden structure. These buildings still stand in Mt. Savage.

James Millholland was 54 years old when he and his family came to Mt. Savage from the Philadelphia & Reading Railroad. Millholland was a master mechanic

and an "advocate of plain engines and simplicity." He had extensive experience in keeping Winans camel engines running from his earlier work in Pennsylvania and with the Baltimore & Susquehanna and he was credited with many important locomotive innovations. Millholland also bought good machine tools, which were still in use 40 years later as evidenced by the 1917 ICC valuation. He equipped the shops with metal working machinery from Bement & Dougherty, probably a predecessor of Wm. B. Bement & Son of Philadelphia.

Initially, the work supervised by Millholland at the Mt. Savage Shops was limited to repairing and rebuilding the Winans Camels and other early C&Pa locomotives. The shop force gained much hands-on experience during the first twenty years; at least 15 of the C&Pa's camel-backed locos were rebuilt at Mt. Savage (some twice). Typical of the rebuilds was the engine Highlander, a Winans Camel inherited from the Mt. Savage Rail Road. It was a modernization project in which, among other things, the cab was relocated from on top of the boiler to the rear position. The C&Pa shops also provided repair services to its rivals in the Georges Creek coal region.

**From Repair to Full Production.** By the 1880's, Millholland apparently had built quite an extensive operation, able to offer custom built locomotives for sale in addition to meeting the requirements of the parent C&Pa. The period beginning in 1883 was an exciting one for heavy manufacturing in Mt. Savage. A locomotive catalog listing five types of engines for sale and their specifications was issued for the Works by their agent, Thomas B. Inness & Co. of Broadway, New York. Customization of the design could be had by the customer for an additional charge. extended past Cumberland.

## MT. SAVAGE EXPORT LOCOMOTIVE CHARACTERISTICS

TYPE	ARRANGEMENT	GAUGE	CYLINDERS	WHEEL DIA.	WEIGHT
1	0-6-0	36"	9 x 14"	30"	22,000 lbs
2	4-4-0	36"	12 x 18"	44"	38,000 lbs
3	2-6-0	36"	14 x 18"	40"	49,000 lbs
4	2-8-0	36"	15 x 18"	36"	56,000 lbs
5	2-8-0	4' 8.5"	20 x 24"	50"	95,500 lbs

Evidence suggests that the catalog was successful, as numerous sales to other roads resulted. The production figures for 1882 list 19 passenger and freight engines produced for external customers, with 16 more in 1883 helping to finance production for 31 standard gauge engines for the C&Pa, spur industrial development, and increase employment. Narrow gauge engines, in particular, proved so popular that a third rail was installed up the main line from Mt. Savage for customer acceptance testing. Mt. Savage engines wound up all across the United States, with some going to Cuba, Central and South America, and to Europe in World War I.

**Design Characteristics.** Locomotive manufacturing at Mt. Savage proceeded according to numerous OERules of thumb, developed by the master mechanic over the years. Innovations were introduced slowly, although there were continuous efforts to reduce costs and increase performance. Locomotive frames were usually built-up from riveted wrought iron. The typical boiler was constructed of 5/16" wrought iron, starting as plate, and rolled to shape. Boiler tubes were typically iron tube of 2" diameter. They were lap welded, and reportedly hard to flange. Although there was some standardization, frame bolts were body fit and made to order by a machinist. Thus, they were not interchangeable. Valves, air tanks, and other accessories were generally interchangeable.

The locomotive cylinders were usually cast and bored to size, the most complex and expensive operation of the whole locomotive assembly process. The pistons were cast structures with brass piston rings. Millholland was an early advocate of feedwater heaters, using them as early as 1855. His designs placed the feedwater heaters on the right side under the engine running board. About 10 feet long and 80/oo in diameter, they provide a visible clue to engines produced in Mt. Savage. Most Mt. Savage C&Pa engines were equipped with Stephenson valve gear. The gear was hard to work on, but the shops personnel were familiar with it. Finally, Mt. Savage locomotives never, ever had a trailing truck.

**C&Pa. Engine Classes.** Late in the locomotive production period two classes of C&Pa engines were recognized. These are the characteristics of those classes:

Class K, 2-8-0, first built 1899, 148,500 lbs, 50" drivers, 21 x 26 cylinders, 160 psi operating boiler, 135,000 lbs on drivers, tractive effort = 31, 395 lbs.

Class L, 2-8-0, built 1901-1917, 174,500 lbs, 50" drivers, 21 x 26 cylinders, 200 psi operating boiler, 157,500 lbs on drivers, tractive effort = 39,000 lbs.

## C&Pa Locomotive Construction, 1868-1897

No.	Date	Config.	Notes
24	1868	0-10-0	First Engine
19	1885/1897	2-8-0	
3	1888	2-8-0	Former #18; sold to Miller's Creek
4	1889	2-8-0	Former #20; sold to Miller's Creek
11	5/1889	2-8-0	2-8-0 ex-51
12	9/1889	2-8-0	ex-52
13	9/1890	2-8-0	ex-53
14	5/1891	2-8-0	ex-54
15	12/1891	2-8-0	ex-55
16	8/1892	2-8-0	ex-56
7	11/1892	2-6-0	sold to 'a steel Co. in Pa.'
8	1892	2-6-0	
17	1895	2-8-0	ex-57
18	1896	2-8-0	ex-58
19	8/1897	2-8-0	ex-59; sold to Miller's Creek

## C&Pa Locomotive Construction, 1898-1917

No.	Date	Config.	Notes
20	6/1898	2-8-0	ex-60
21	1899	2-8-0	
22	1899	2-8-0	ex-61
26	9/1899	2-8-0	ex-62
24	9/1901	2-8-0	
9	5/1902	4-6-0	
25	12/1902	2-8-0	
10	10/1903	4-6-0	ex-30
23	10/1904	2-8-0	ex-19
32	1910	2-8-0	
27	2/1910	2-8-0	
28	6/1910	2-8-0	
29	1912	2-8-0	
30	1913	2-8-0	
31	1915	2-8-0	
33	1917	2-8-0	Last Unit
34	1917	2-8-0	Not Completed

**The Mt. Savage Shops in the 20th Century.** Construction of locomotives ceased at Mt. Savage around the time of the First World War, but heavy repair and rebuilding of locomotives continued until the time of the Second World War and the machine shops were used into the 1950,s. New technologies were introduced, such as electrical lighting and motors and electrical welding. Mt. Savage shops produced piece parts for the war efforts of World War I and II. Gun mounts were made by the war department in WW-II. Between the wars, a half day shift on Saturday was the norm, for cleaning and shop maintenance.

# Locomotive Shops Heavy Machinery

(Equipment from Bement & Dougherty, unless otherwise noted)

- Engine lathe, 28" x 8 foot bed
- Horizontal boring and drilling machine, table size 24" x 44" x 48" engine lathe, C&Pa
- 18" x 24" engine lathe, C&Pa
- Vertical boring mill 54"
- Car wheel boring mill, 48" table
- 10" slotter
- Wooden jib crane, 20, mast, 15, boom, 4.5 ton capacity, C&Pa
- Punch & shear, 30"throat (used for rivet holes)

## Car Shop

- 18" rip saw
- Lowell drill press
- Tice shaper/molder

## Blacksmith Shop

- Fulten 500 pound power hammer (for forging)

All of the rotating power machinery was driven by leather belts from overhead master shafts. These, in turn, were powered by a stationery steam engine in the adjacent power house. A similar facility can be seen preserved today at the East Broad Top Railroad, in Rockhill Furnace, Pennsylvania. The key differentiator of the Mt. Savage Shops was their production of locomotives from the rail up, as opposed to just repair and rebuilding.

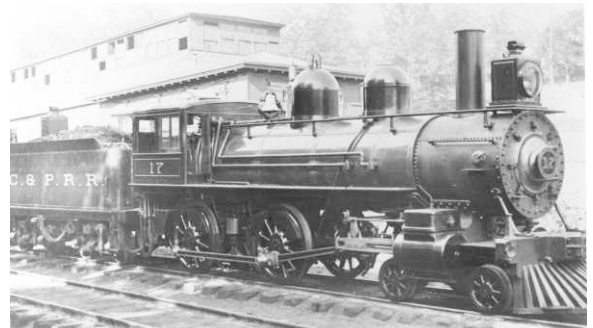
## Locomotive Rebuilds

<u>No.</u>	<u>Original</u>	<u>Date</u>	<u>Notes</u>
3	Winnans	1866-75	Weight increase
10	Winnans	1866-75	
12	Winnans	1866-75	
1	Winnans	12/1868	Weight increase
2	Winnans	6/1868	Weight increase
22	Winnans	1870	Due to boiler explosion
23	Winnans	1870	
4	Winnans	1874	ex-30
31	Baldwin	1879	ex-19
5 (32)	Baldwin	1885	
14	H-B	1887	
25	Baldwin	1888	
15	H-B	1888	
16	H-B	1889	
17	Norris	1898	
25	Baldwin	9/1901	2nd Rebuild
17	Norris	1902	2nd Rebuild

As built, the Mt. Savage shops were constructed of 30 inch thick stone walls with a floor space of about 22,000 square feet. Dirt floors were preferred for the forge and blacksmith shop and for welding. Concrete pads were poured for the machine tools at a later date. Motive power was overhead lineshafts and shop [compressed] air. When a lot of machines came on line at the same time or there was an excessive use of shop air, the power shop foreman would come running. The power shop also generated electricity and heated the building. Until World War II spurred the development of small, lightweight handheld power tools, most industrial shops used air tools.

The Mt. Savage shops did not have a large overhead crane capable of lifting and transferring a locomotive, so these operations were done through an incredibly complex manual system. Before a locomotive was lifted it was important to remember to first remove the whistle or it would be knocked off by a roof beam as it was moved along the floor. To unwheel a locomotive, it would be jacked and blocked. Jacking was done with hydrolic (water) units. To move a locomotive in the shop, a series of pulleys, chains, and fixed floor anchors would be used with a transfer table arrangement. The shop engine served as the motive power.

When the C&Pa was bought out by the Western Maryland Rwy and merged into its operations, all of the surviving C&Pa steam engines were scrapped. The Mt. Savage facilities were shut down and operations moved to the WM facility at Maryland Junction, WV. However, the WM did keep the C&Pa shops open for a short time and, in fact, installed some new lathes. New main rods for WM,s class 800 H-9 Consolidations were fashioned there.



C&Pa 4-6-0 No. 17. Photo in the collection of the Mt. Savage Historical Society.

Mt. Savage is remembered, if at all, as the site of manufacturing of the first iron rail in America. This was acknowledged with a plaque presented by the Western Maryland Chapter, NRHS, Inc. in 1994. But, more than just the rails, Mt. Savage started with coal, iron ore, and fireclay dug from the earth, built a railroad, and shipped locomotives and rolling stock across the country. They operated their line with motive power and rolling stock they themselves built and maintained. Not many lines can make that claim. Now a sleepy backwater -- not even on the map -- Mt. Savage rests after its significant contribution to the development of the American railroad system. Today, there are no known surviving examples of the output of the Mt. Savage Shops. When the C&Pa was bought out by the Western Maryland Rwy and merged into its operations, all of the surviving C&Pa steam engines were scrapped. The Mt. Savage facilities were shut down and operations moved to the WM facility at Mary-

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View images of C&Pa locomotives and facilities at the website of the Mt. Savage Historical Society:

<http://www.mountsavagelhistoricalsociety.org>



The Cumberland & Pennsylvania yard in Mt. Savage, ca. 1940. The roundhouse and shops are visible beyond the station and roofed platform. Photo in the collection of the Mt. Savage Historical Society.