

## CALIFORNIA POWDER WORKS

by Eric Twitty

At the outbreak of the Civil War, the Union Government enacted a shipping embargo to prevent mining powder and gunpowder from falling into Confederate hands. This had a severe impact on the West because the chief powder supplier, E.I. DuPont de Nemours & Co., was forced to close its magazines in San Francisco for want of stock. The embargo created a seller's market in which buyers came begging for powder. No doubt there was plenty of room in the West for an independent powder company, and one short year later the California Powder Works was organized in San Francisco to take advantage of the demand. In addition to the lack of powder in the Western states and territories, several other factors played significant roles in the formation of CPW. The newly-formed Central Pacific Railroad prepared to let lucrative contracts for blasting powder as it began blasting its way through half a continent of mountains. The

other major reason that prodded capitalists to form CPW was a heavy demand for explosives associated with development of the Comstock Lode, and the subsequent resurgence of activity in other Western mining districts. The first powder maker to capture even a portion of this market would enjoy all the business it could handle, and the California Powder Works was organized to be that company.

**THE CALIFORNIA POWDER WORKS.**  
MANUFACTURERS OF  
 Sporting, Cannon, Mining, Blasting and  
**HERCULES POWDER**

HERCULES POWDER will break more rock, is stronger, safer and better than any other Explosive in use, and is the only Nitro-Glycerine Powder chemically compounded to neutralize the poisonous fumes, notwithstanding bombastic and pretentious claims by others.  
 It derives its name from HERCULES, the most famous hero of Greek Mythology, who was gifted with superhuman strength. On one occasion he slew several giants who opposed him, and with one blow of his club broke a high mountain from summit to base.

**No. 1 (XX) is the Strongest Explosive Known.**  
**No. 2 is superior to any powder of that grade.**

PATENTED IN THE UNITED STATES PATENT OFFICE.  
**ORDERS RECEIVED FOR HERCULES CAPS AND FUSE.**  
**JOHN F. LOHSE, SEC'Y.**  
Office, No. 230 California Street - - San Francisco, Cal.

CPW ran this and similar advertisements for its dynamite through the 1880s in Pacific Coast mining journals. The ad holds an indirect attack on Giant in its fine print, which notes how Hercules was the almighty slayer in Greek mythology.

In 1861 San Francisco entrepreneurs John Baird and John Peck enlisted Santa Cruz paper-maker John Simes to build a powder mill for the new California Powder Works. Simes chose a fine site deep in a Redwood valley on the tiny San Lorenzo River about five miles north of the small seaport town of Santa Cruz. High quality Redwood lumber abounded, there was plenty of hardwood available for making charcoal, and powder could be shipped easily and quickly by schooner from Santa Cruz north 80 miles to San Francisco. Although the plant was completed by 1863, it did not begin

**BLASTING POWDER.**

—

**PRICE, \$3.00 PER KEG.**

—

-ALSO-

**PORTING, CANNON AND MUSKET  
 POWDER,**  
Of superior quality.

**FUSE AND SHOT,**  
Always on hand and for sale at the office of the

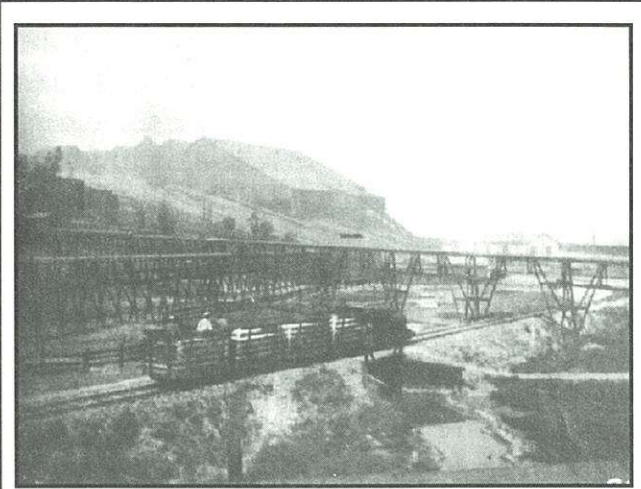
**CALIFORNIA POWDER WORKS,**  
No. 218 California Street.

**JOHN F. LOHSE, Secretary.**  
2514qr

Advertisement run by CPW in September, 1867 issue of the Mining & Scientific Press.



turning out powder until 1864 because of clumsy management. Consequently, Bernard Peyton replaced the original manager and he hired a number of ex-Hazard Powder Co. employees as bosses to supervise a mainly Chinese crew.



Advertising poster released in the 1880's depicting CPW's Santa Cruz mills. The illustration depicts the Santa Cruz & Felton Railroad, several water flumes, and various mill buildings aligned on one of the flumes to harness its power (left portion of image). Courtesy of Hagley Museum & Library.

Business was good for the first few years while CPW tried to satiate the heavy demand for blasting powder. Profits were high. So was the price of CPW blasting powder at \$7.00 per keg, while the going rate for powder in more competitive regions in the nation was about \$2.50 per keg! However, in the late 1860's several events clouded CPW's rosy picture. First, DuPont reinstated a sales agency and magazine in San Francisco after the Union dropped its shipping embargo. Due to the new competition, blasting powder prices in the West dropped to a more-competitive \$2.75 per keg. Second, DuPont managed to buy a significant portion of CPW's stock in 1869, which jeopardized the control CPW's directors held over the company. The third event was one of the most momentous in American history, the

Giant Powder Co., organized in 1867, began to manufacture Alfred Nobel's new dynamite in substantial quantities. Although the price for dynamite was exorbitant at \$1.75 per pound (compare this with approximately 10¢ per pound in the 1890's!), demand was surprisingly heavy. Even though the price of blasting powder was approximately 12¢ per pound, "Giant Powder" enjoyed a heavy demand at the expense of blasting powder because it was much better for blasting hard rock encountered through-out Western mining districts.

CPW officials quickly moved to imitate Giant, being motivated by the potential profits and the foresight that dynamite would displace blasting powder. In 1869, CPW President John Baird decided to compete head-to-head with Giant, and from that moment the relationship between CPW and the Giant Powder Co. turned strictly adversarial.

The first product CPW released to compete with Giant Powder was high-grade gunpowder packaged in paper cartridges. The product fooled no one and it did not become very popular, but it did buy CPW a little time to find someone who had the knowledge to make dynamite.

In 1869 CPW's directors secured the expertise of James Howden who previously operated a nitroglycerine plant near Donner Lake, California for the Central Pacific Railroad. Howden supervised the construction of a small, experimental nitroglycerine plant on land owned by Baird in the sand dunes west of San Francisco. Satisfied with initial operations, he built a larger plant which employed himself and a handful of Chinese workers.

Howden's first product, a mealed black powder with a nitroglycerine coating, was released in 1871 under the trade name of "Black Hercules". However, it did not perform as well as Giant Powder in hard rock and therefore did not enjoy the same demand.



Black Hercules was very similar in constitution to one of Nobel's first nitroglycerine-based explosives that also used blasting powder. Like Nobel, Howden found that the powder did not hold onto the nitroglycerine well and that the behavior of this product's explosion was too much like blasting powder, not like the shattering explosion of nitroglycerine. On a side note, ten years later Egbert Judson realized this formula had distinct applications in blasting softer rock and he patented and successfully sold a version as "Judson Powder".

Finally Howden developed a nitroglycerine dynamite with an active base capable of competing with Giant Powder. He played around with compounds until he found a satisfactory mix of magnesium carbonate, India saltpeter, potassium chlorate, and sugar. CPW released this new explosive in 1874 under the brand name of "White Hercules". It enjoyed instant success and put CPW in direct, heated competition with the Giant Powder Co. throughout California, Nevada, Oregon and Arizona.

CPW's dynamite brand-name "Hercules" originated during a brainstorming session held between two of the company's directors, General W. R. Rosecrans and Joseph Willard. They thought their deliberate choice of "Hercules" as CPW's brand-name was very amusing because it was the mighty Hercules who slayed the giant in Greek mythology.

Howden was considered by CPW directors to be unreliable because of his deep affection for liquor. Therefore, they appointed Thomas Powning as superintendent of operations and retained Howden merely as a technical advisor until his death in 1874. Unfortunately, Powning died a year after Howden when he inhaled vapors during the excitement which accompanied an unusually large accidental nitric acid spill.

CPW ran into the same frustrating

distribution problem experienced by the Giant Powder Co. There was a strong market for dynamite in mining districts in the Rocky Mountains, the Midwest, and in the eastern states, but because of a number of disasters the Central Pacific, other railroads, and freight outfits refused to ship dynamite. Like the Giant Powder Co., CPW was forced to move its operations to where the demand was. In 1875 Joseph Willard traveled to territories east of the Rocky Mountains to locate a branch plant. Blackhawk, Colorado was his first choice because it was in the heart of Colorado's gold and silver mining country. However, it was not to be; high-grade chemicals were not available anywhere near Denver and shipping them from capable manufacturers in the east would have been too costly. The next best location was Cleveland, Ohio. Cleveland was proximal to iron, copper, lead, and coal mining and it was the home of the Grasselli Chemical Co. which was known for pure chemicals. CPW's directors ordered a twin to the San Francisco plant built in 1877. The first case of dynamite rolled off the line in 1878, by 1879 production reached upwards of a ton of dynamite per day, which doubled by 1880.

Hercules Powder enjoyed great popularity east of the Rocky Mountains, keeping the new Cleveland plant going full time. But, despite the branch plant's success, it was sold in 1881 to officials associated with E.I. DuPont de Nemours & Co., the Laflin & Rand Powder Co., and the Hazard Powder Co. Why did CPW's directors let go of their lucrative plant? The most likely explanation was that the "Big Three" powder makers considered the plant an invasion of their cartel's market regions and they "suggested" to CPW that it sell its plant to them or suffer serious competitive repercussions. Because CPW was also a member of their explosives cartel, the Gunpowder Trade Association, CPW wished to maintain friendly relations with GTA members.



California Powder Works' gun and blasting powder mill on the San Lorenzo River had developed into a sizable self-contained village by 1875. At that time the mill facilities included miles of flumes to carry water, a saltpeter refinery, a charcoal house, mills for composing, mixing, and pressing powder, a corning mill, a glazing mill, drying houses, a cooper shop, machine shop, carpentry shop, materials supply houses, a 30,000 keg magazine, goods and powder warehouses in Santa Cruz, and a schooner which plied the Pacific Ocean between San Francisco and Santa Cruz.

In 1875 a narrow-gauge rail siding was built down into the mill grounds by the Santa Cruz & Felton Railroad. Mill workers loaded cars with kegs of powder which were drawn by leather-shoed mules up to the main line where they were switched. The rail line which ran through the San Lorenzo River gorge was a steep and treacherous one, and it was the site of several train break-in-two's. In one harrowing event, a railroad crew lost a full car of powder it was trying to switch out of the siding. As the car rolled out of the siding it picked up speed with no one on board to apply the break, and it became a run-away! The engine managed to catch it on the fly, link up with it, and bring it to a stop uncomfortably close to Santa Cruz. Lo for the daring brakeman who coupled the cars back together at what must have been great speed.

CPW's powder mill experienced few serious explosions or fires, the worst of which happened in 1891 and 1894. A "small loss of life" was reported in each case and as the workers were almost all Chinese, subject to prejudice, little note of their death and injury was made at the time.

CPW was almost the only supplier of blasting powder in the western states, in part because the Gunpowder Trade Association had granted the territories west of the Rockies to CPW as per agreement, and the

GTA kept its member-companies from selling their powder in CPW's market. CPW experienced minor competition not worth worrying about. Between 1881 and 1886 the Granite Powder Co. sold its blasting powder to California mercury mines and Nevada mining districts. In 1891 the Giant Powder Co. built a blasting and gunpowder mill at Clippergap, near Auburn, California to muscle in on the uncompetitive blasting powder market. But this venture proved to be no match for a well-entrenched CPW. Curiously, Giant, CPW's arch-rival, leased the mill to CPW from the mid-1890s until 1901.

In 1877 CPW's dynamite plant in San Francisco experienced its first large explosion. The sand dunes around the plant reverberated as 600 pounds of nitroglycerine blew up, wrecking the nitrating house on one of the rare days when the superintendent was not carefully watching the process. A similar event occurred at the Giant Powder Co. plant located not far away in 1879. Except, this time more than just the sand dunes were disturbed. Accompanying the enormous explosion was a disastrous fire which consumed Giant's plant and threatened nearby public structures as winds blew from the west. Before Giant had the chance to rebuild its plant, the city of San Francisco "invited" both CPW and the Giant Powder Co. to leave and do business somewhere else. In a hurry to relocate the company and minimize downtime, Baird and Bernard Peyton surveyed the territories encompassing San Francisco for a suitable plant site. The best location was in empty land on the San Jose & San Francisco Railroad between San Francisco and San Bruno, to the south. But Peyton correctly surmised that it would not be long before this region would be heavily settled. The site which company officials settled on was a 3,000 acre tract near Point Pinole across the bay from San Francisco. The property had access to San Francisco Bay and was serviced



along the shoreline by the South Pacific Coast Railroad and at its rear by the Santa Fe Railroad.

As soon as the site was finalized, CPW's engineers rapidly pushed construction of a massive plant. By 1881 boxes of dynamite began to roll out of its boxing houses. For a period of time the plant and supporting village was named Powning, after Thomas Powning, but company directors ultimately changed the name to Hercules.

The 1880's saw several changes to CPW's product line. In 1881 chemists instituted a formula change in which inactive magnesium carbonate was substituted for a more active compound. With CPW's improved product, its brand-name was changed from "White Hercules" to "Hercules Powder". After Egbert Judson proved to the explosives industry his patented railroad powder indeed filled a niche in mining and construction, CPW created its own formula in 1885, sold under the brand-name of "Champion Powder".

CPW's directors, in search of a capable manager for the Hercules Plant, lured Lieutenant William Quinan away from the California Vigorit Powder Co. in 1883. He had proved his worth by winning a patent infringement lawsuit for California Vigorit, despite a lack of formal training in law, and under his leadership the California Vigorit turned around into a competitive manufacturer.

Quinan, a hands-on manager, immediately set to work modernizing and mechanizing CPW's plant. In 1884 he invented the first hand-operated machine for stuffing paper shells with bulk dynamite to form finished cartridges. Due to Quinan's improvements in the plant, by the mid-1880's production jumped from two to six tons of dynamite per day, and by 1895 production had increased four times to a little over 24 tons per day! At that time, the Hercules plant held the world's record for production and was

recognized as being one of the world's most modern and largest dynamite plants.

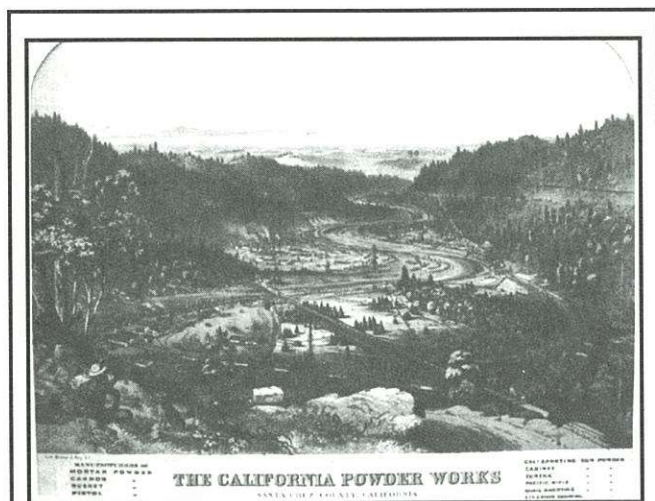
By the early 1890's the town which grew up around the plant was officially incorporated as Hercules, California. CPW was the first explosives company to provide for its employees a social club in 1896, known as the Hercules Club, with enthusiastic support from Quinan. At the club, employees could play billiards, cards, board games, read in its library, attend dances and imbibe beer and wine.

During the 1890's CPW added several dynamites for mining to its product line. CPW began manufacture of ammonium nitrate in 1893 under the rights of Penniman & Schrader, who developed the explosive at the Atlantic Dynamite Co. The success of this product as a pure explosive was limited, but with it CPW manufactured an improved extra dynamite. CPW became one of the earliest companies to manufacture gelatin dynamite, which it did in 1895. The trade mark CPW used was the California Bear printed on its boxes.

Similar to the major eastern explosives manufacturers, in 1884 dynamite makers in the Bay Area struck a secret deal to reduce what they considered "injurious competition". Their agreement stated that companies' production levels and sales quotas were to be strictly regulated, and based on then-recent sales figures. Naturally this meant that CPW and the Giant Powder Co. received the largest portions of the cartel's quotas, amounting to 37.5% each, while the Vulcan Powder Co., the California Vigorit Powder Co., and the Safety Nitro Powder Co. held only approximately 6% each. Like many other cartels, the members of this one squabbled over market shares and accused one another of breaking the set quotas. The cartel finally fell apart in 1888 after the Vulcan Powder Co. made angry accusations implying that its members chronically broke their production quotas and under-priced their dynamite. A



devastating price war ensued which ultimately took its toll on the smaller explosives companies. Only the Giant Powder Co., the Judson Dynamite & Powder Co. (formed in 1890), and CPW were in any position to really slug it out. Much to the delight of the mining industry, prices of dynamite dropped from approximately 20¢ to 10¢ per pound.



The Hercules plant had its own baby-gauge rail network for moving freight and supplies around the sprawling facility. Here a baby-gauge train is hauling four cars loaded with boxes of dynamite, probably bound for the storage magazines. Courtesy of Hagley Museum & Library.

Due to the trade war prices were so cut-rate Bay Area dynamite became cheaper in the Rocky Mountain states and Midwest than dynamite from Midwestern and Eastern companies. In fact, CPW explosives were so cheap that large shipments were sent as far away as gold fields in Australia! Needless to say, the Gunpowder Trade Association was very agitated over Bay Area company infringements into its established Midwestern sales regions. A team of senior officials from E.I. DuPont de Nemours & Co. and dynamite companies which it controlled in the east were promptly dispatched to San

Francisco in the late 1890's to mediate a solution to the price war. J. Amory Haskell and Hamilton Barksdale helped Bay Area explosives manufacturers settle on another arrangement similar to the original, but quotas were based on 1896 sales figures. The Vulcan Powder Co. and the California Vigorit Powder Co. were crippled by this settlement because in 1896 the price war was at its zenith and the disparity between production levels of the massive CPW and Giant Powder Co. and the other, smaller companies was greatest. Basically, CPW and the Giant Powder Co. gained market shares while the smaller companies lost them.

1903 was the beginning of the end of independent explosives makers in the Bay Area. In that year an agent set up by DuPont in San Francisco posing to help administer to the business of CPW, bought out the California Vigorit Powder Co. and the Judson Powder & Dynamite Co. These two companies were dissolved but their plants continued to make dynamite under their original names. Also in 1903 DuPont bought the rest of the shares of stock in CPW and installed R.S. Penniman as president, formerly with DuPont's Atlantic Dynamite Co. In 1906 DuPont dissolved CPW's and Judson's corporate structures and absorbed their assets. CPW's plant then manufactured products under DuPont brand-names such as Hercules Powder (connected to the Hercules Powder Co.) and Red Cross.

When the U.S. Supreme Court ordered DuPont to dismember portions of its dynamite empire in 1911 for violating the Sherman Antitrust Act, the Hercules Plant changed hands again. DuPont handed it over to the new Hercules Powder Co. in 1912 and Hercules ran it profitably into the 1970's.

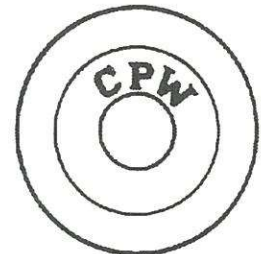
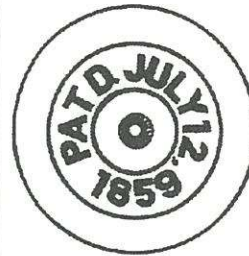
*The following illustrations show the Lineage of the California Powder Works dynamite boxes and powder kegs.*



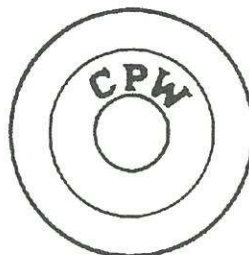
Lineage of CPW's blasting powder kegs. Rarity rating is based on the relative number of kegs known to exist.



- 1. Wood keg end**  
Age Range: 1861-early 1870's  
Label is stenciled  
*Rarity: one known - Mark Bohannan.*



- 3. Powder Keg: steel with threaded zinc bung**  
Age Range: Late 1860's-Early 1890's  
Lettering is embossed.  
*Rarity: several known - Author.*

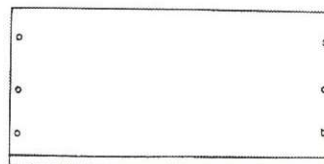
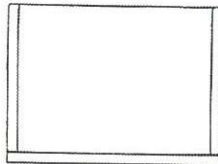
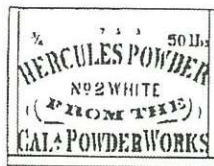


- 2. Powder Keg: steel with threaded zinc bung**  
Age Range: Late 1860's-Late 1880's  
Heavy lettering is embossed, light lettering is stenciled.  
*Rarity: one known - Author*

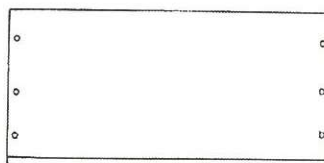
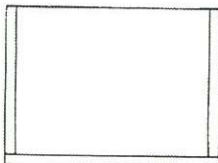
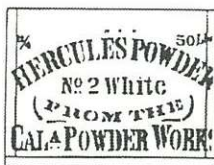


- 4. Powder Keg: steel with cleat seal bung**  
Age Range: Late 1880's-1906  
Lettering is embossed  
*Rarity: several known - Author.*

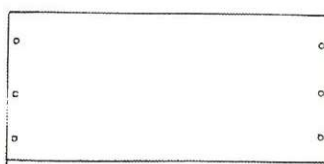
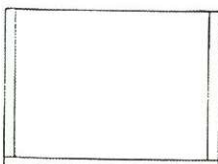
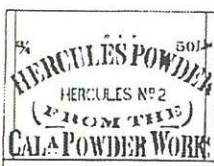
Lineage of CPW's dynamite boxes predating approximately 1890. Rarity rating is based on the relative number of boxes known to exist. Many thanks to the mining artifact community for sharing data.



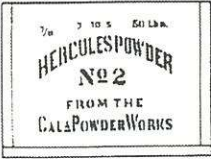
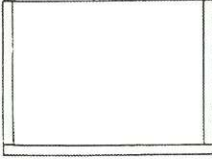
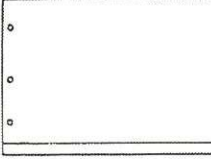
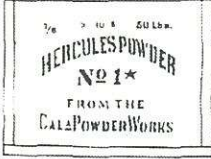
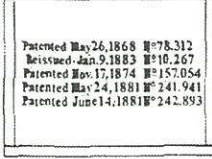


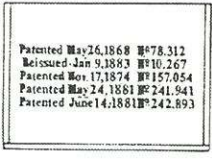


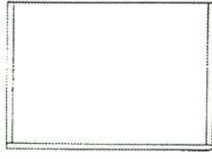
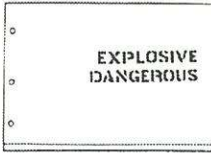
1. CPW's earliest style of box, dating from the early 1870's-late 1870's.  
*Several known - Author*




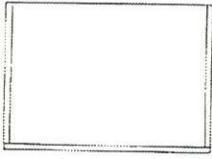
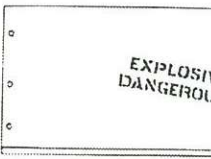

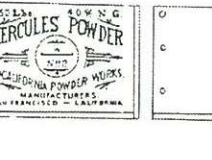
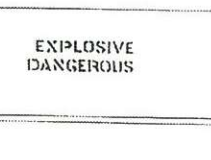


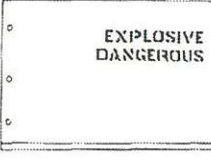
2. Late 1870's - 1881. Note that the stenciled lettering bleeds onto the side panels.  
*Several known - Author*



3. 1881. Note that the stenciled lettering bleeds onto the side panels. The "No.2 White" product reference has been replaced by "Hercules No.2", reflecting the changed dynamite formula manufactured beginning in 1881.  
*One known - Brian Schrage.*

			4. CPW's standard box used after 1881 until the late 1880's, following the switch to another dynamite formula. The product reference is now "No.2". <i>Several known - Author.</i>
			5. Mid 1880's-late 1880's. The addition of the patent dates may reflect the trade war fought among Bay Area explosives makers during the mid 1880's. Most dynamite boxes of this vintage from Bay Area companies feature an identical listing of patent dates. <i>Several known - Lane Griffin</i>
			6. Late 1880's, featuring the same list of patent numbers. <i>Several known - Author</i>
			7. Late 1880's, featuring no patent numbers. The box using this lettering format, without the patent numbers, marks the transition from assembly with cut nails to wire nails. <i>Several known - Andy Martin</i>

Lineage of CPW's dynamite boxes postdating approximately 1890. Rarity rating is based on the relative number of boxes known to exist.

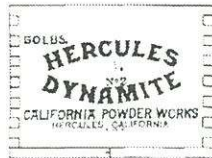
			8. 1889-mid 1890's. Several exceptions post dating 1900 have been encountered. Side and end panels are assembled with wire nails, and they are thinner than boxes assembled with cut nails, because wire nails do not split thinner wood. <i>Very rare - Author</i>
			9. 1889-mid 1890's. The box's shape is long and narrow, and it is assembled with wire nails. This particular specimen was encountered in the Rocky Mountains. Other dynamite makers, including the Giant Powder Co., the California Vigorit Co., the Judson Dynamite and Powder Co., and the Repauno Chemical Co. also sent boxes of this shape and size to Colorado. <i>Rarity: several known - Author</i>
			10. Mid 1890's; construction continues to consist of the sides nailed with wire nails to the end panels. Note that the product reference is "Hercules Dynamite", no longer "Hercules Powder". <i>Rarity: several known - Author</i>





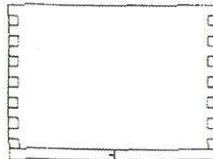
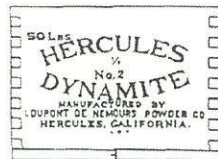
11. Mid 1890's-1906. In the mid 1890's CPW began manufacturing boxes with "lock corner" joints, instead of nailing on the side panels. Such joints allowed all box panels to be cut from uniform lumber, with nail-together boxes the end panels were thicker to accommodate the nails driven into them. Note that the lettering is slightly thinner than the previous box.

*Rarity: rare - Author*



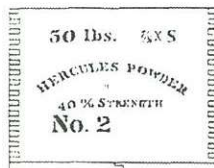
12. 1906; possibly an "earthquake box". Boxes of this style when encountered underground have been associated with 1906 artifacts, including California Cap Co. tins with earthquake markings. These boxes tend to be poorly made with half inch lumber, and their labels are often askew.

*Rarity: three known - Author*



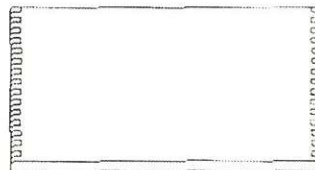
13. 1906; also possibly an "earthquake box". Boxes of this style when encountered underground have been associated with 1906 artifacts, including California Cap Co. tins with earthquake markings. These boxes tend to be poorly made with half inch lumber, and their labels are often askew.

*Rarity: several known Author*



14. 1907-1909. This appearance of this label format marks DuPont's take-over of the Hercules plant. The format was adopted from the Hercules Powder Co., which DuPont owned and absorbed in 1903. In 1909 DuPont replaced the tall "DuPont" block letters on the back panel with the company's famous oval logo.

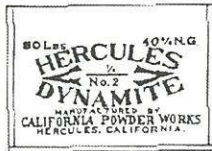
*Rarity: rare Author*



15. 1885-1906. CPW's version of Railroad Powder, which was a blasting powder with nitroglycerine-coated grains.

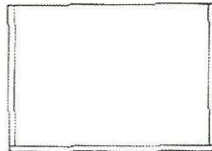
*Rarity: one known - Steve Koehler*



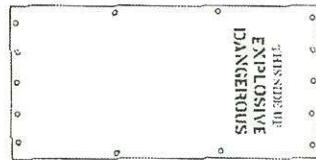


16. 1895-late 1890's. CPW's gelatin dynamite, packed in boxes marked with the California state bear. Undoubtedly the fancy, elaborate image printed by CPW was intended to compete with the Giant Powder Co.'s gelatin labeled with a spread-eagle on the box.

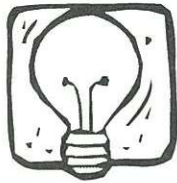
*Rarity: one known - Author*



17. 1895-late 1890's. CPW gelatin box marked with the California state bear on the face, and a blank rear panel.



18. CPW used this label format for lids on all types of boxes manufactured from the late 1870's until 1906.



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