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Historical recipes for preparatory layers for oil paintings in manuals, manuscripts and handbooks in North West Europe, 1550-1900: analysis and reconstructions

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Appendix 20 Tables belonging to Chapter 13

Table 13.1: Nineteenth century lead white production: processes and their names

<i>19th century name/process</i>	<i>Stack process</i>	<i>Chamber process</i>	<i>Wet process</i>	<i>Semi-wet process</i>	<i>Other lead containing whites</i>
Ceruse	X	X	X	X	
Lead white ^{a-d}	X	X	X	X	X
Flake white ^{a-d}	X	X			
Venice white ^f	X	X	X	X	
Dutch white ^{a-d}	X				
English white ^d	X				
German white ^a		X ('basic' chamber process)			
Hamburg white ^d	X	X ('basic' chamber process)			
Nottingham white ^e	X				
Krems white ^a		X ('basic' chamber process)		X (tray with paste of litharge and acetic acid/lead acetate in chamber, exposed to carbon dioxide)	
Kremnitz white ^a		X ('basic' chamber process)		X (tray with paste of litharge and acetic acid/lead acetate in chamber, exposed to carbon dioxide)	
Vienna white: is Krems white ^e		X ('basic' chamber process)		X (tray with paste of litharge and acetic acid/lead acetate in chamber, exposed to carbon dioxide)	
Klagenfurth lead white ^d		X (lead exposed to vinegar and wine lees, heated in chamber)			
Creed process ^a		X (lead in chamber)			

<i>19th century name/process</i>	<i>Stack process</i>	<i>Chamber process</i>	<i>Wet process</i>	<i>Semi-wet process</i>	<i>Other lead containing whites</i>
		exposed to carbon dioxide)			
Maxwell Lyte process ^a		X			
Hatfield Process ^a		X ('basic' chamber process)			
Mullins process ^a		X (sponges with lead acetate in chamber)			
Thompson's process ^a		X (lead soaked in solution of lead acetate before chamber process)			
Gardner's electric process ^a		X (tin shelves form electrolytic couple with lead, lead soaked in lead acetate or nitrate, moist chamber, acetic acid and carbon dioxide gasses)			
Thénard process ^{a,b} /Clichy process ^b			X (lead acetate, litharge and water boiled, carbon dioxide gas passed through)		
Cory process ^a			X (basic Thénard/Clichy process, other set-up)		
Noble process ^d			X (lead and lead acetate solution, carbon dioxide and air passed through)		
Martin process ^a			X (lead acetate, granulated lead and litharge mixed in water, carbon dioxide passed through)		
Fourmentin process ^a			X (litharge and salt reacts to lead oxychloride, carbon dioxide passed through)		
Crompton process ^b			X (lead oxide, nitric acid/lead nitrate, carbon dioxide)		

<i>19th century name/process</i>	<i>Stack process</i>	<i>Chamber process</i>	<i>Wet process</i>	<i>Semi-wet process</i>	<i>Other lead containing whites</i>
Spence process ^a			passed through) X (a lead salt and caustic soda boiled, carbon dioxide passed through)		
Maclvor process ^a			X (litharge and ammonium acetate form basic ammonium acetate and lead, carbon dioxide passed through)		
Watt and Tebbutt process ^a			X (lead sulphate treated with lime, then potash)		
Rowan process ^a					
Delafield process ^a			X (lead nitrate and mixed with potash)		
Button and Dyer process ^{a,d}			X (basic lead nitrate and carbon dioxide)		
Brown's process ^a			X (sodium nitrate in electrolytic cell, positive electrode of lead, negative of copper. Nitric acid formed at positive electrode, this reacts with lead to lead nitrate. Sodium hydroxide formed at other electrode. Solutions mixed react to lead hydroxide. Lead hydroxide reacts with sodium bicarbonate)		
Mulhouse white lead ^a			X (sulphuric acid and lead oxide)		
Brown and Young process ^a			X (lead nitrate and carbon dioxide and caustic soda)		
Ozouf process ^a			X (basic lead acetate with carbon dioxide)		

<i>19th century name/process</i>	<i>Stack process</i>	<i>Chamber process</i>	<i>Wet process</i>	<i>Semi-wet process</i>	<i>Other lead containing whites</i>
Cookson process ^a			X (basic lead acetate sprayed with carbon dioxide into chamber)		
Sewell process ^b			X (lead oxide + carbon dioxide (+ alkali))		
Lowe process ^a			X (lead acetate or lead nitrate with sodium bicarbonate or potash bicarbonate. Lead acetate and litharge dissolved and mixed with first solution)		
Milner process ^a			X (litharge and salt in water form lead chloride, carbon dioxide or chloride mixed with caustic soda and carbon dioxide passed through)		
Dundonald process ^a			X (litharge, salt and water react into lead oxychloride, boiled in potash)		
Pattinson process ^{a,g}				X (lead chloride mixed with calcium carbonate, ground with water)	X (wet process. Result: lead oxychloride)
Dale and Milner process ^a				X (litharge ground with water and sodium bicarbonate)	
Mullin process ^a				X (tray with paste of litharge and water, carbon dioxide and acetic acid fumes passed over)	
Benson and Gossage ^c				X (tray with lead acetate and litharge, carbon dioxide passed over)	
Condy process ^a				X (lead granulate exposed to vinegar to form lead acetate. Lead acetate ground with litharge and water, dissolved in water, sodium bicarbonate added)	

<i>19th century name/process</i>	<i>Stack process</i>	<i>Chamber process</i>	<i>Wet process</i>	<i>Semi-wet process</i>	<i>Other lead containing whites</i>
Torassa process ^{a,d}				X (granulated lead and water rotated in cylinder)	
Woolrich process ^a Benson process ^b				X (granulated lead and lead acetate rotated, carbon dioxide passed through)	
Gannal process ^b				X (granulated lead and oxygen and carbon dioxide, then nitric acid or lead nitrate added)	
Versepuy process ^b				X (granulated lead first rotated, then washed in lead acetate)	
<i>Lewis process^a</i>					X (lead ore sublimed with anthracite coal, result prob. lead sulphate)

^a Hurst 1892

^b Malepeyre, Riffault, Vergnaud, Toussaint 1874

^c Ure 1853

^d Pulsifer 1888

^e Field 1850

^f During the nineteenth century, the term Venice white was used to describe a standardised mixture of lead white (produced by any method) and barium sulphate. Simultaneously it cannot be ruled out that the name may still have appeared as 'lead white from Venice', or as plain stack-process lead white

^g Pattinson developed two processes, one for a wet-process lead white, the other for lead oxychloride. Both whites were called Pattinson white. (Hurst 1892: 36-37)

Table 13.2: Recipes for lead white adulteration which include proportions

<i>source/date</i>	<i>lead white name</i>	<i>proportions</i>	<i>quote</i>
De Mayerne 1620–44: 11–12	ceruse commune	1 pt chalk 1 pt lead white	Blanc de plomb. The best is the one that breaks easily, is in shells and very white. In the Ceruse commune there is half chalk.
'Recepten-boek,' Frans Hals Museum, c.1650–1700: 1 [143, when counting from earlier section]	slecht wit [bad white]	1 pt chalk 1 pt ceruse	om slecht wit tot een gront. [in margin] Neemt ceruys en krijt wit van elc even veel vrijft het in lijn olij getempert van pas strijkt het gelijk.
Weber 1781: 7	Gemeine Gattung von Bleiweiß, welche in Holland fabrizirt ... wird [ordinary grade of lead white, made in Holland]	2 pts or more of chalk 1 pt lead white	Die gemeine Gattung von Bleiweiß, welche in Holland fabrizirt, und zu uns und andern Weltgegenden in der grösten Menge und um einen sehr geringen Preis gebracht wird, wird aus dem Blei gemacht, das sie durch Biereßig zerfressen lassen, und das feine zerfressene Blei mit zweien und mehrern Teilen Kreide vermischen, oder vilmehr verfälschen, damit sie den Preiß an dieser Waare so geringe machen können, als es möglich ist.
Wiener Farbenkabinet 1794: 151	Bleiweiß [lead white]	2/3 part chalk 2/3 part flake white	Man mahlt nämlich 2/3 Schieferweiß und 2/3 Kreide mit einander, und verfährt hierbei, wie bei dem unvermischten Schieferweiß. Die Kreide wird vorher zerschlagen, und es müssen alle Steine ausgelesen werden. Beim Mahlen muß man diese Vermischung gleichfalls mit Wasser begießen, und es wird auch wie das Schieferweiß geformt und getrocknet.
Oeconomische courant No 168 1800: 91	Bleyweiss [lead white]	1 pt chalk 2 pts lead white	De Hollanders verplichten de Berlynsche fabriek, ten einde tegen hen te kunnen markten, om haar Leywit meestal met Kryt te vermengen, en dit mengsel heet alsdan byzonder Loodwit (Bleyweiß), gelyk men eigenlyk zuivere, gemalene Loodkalk noemt. By 2 deelen van deze Kalk mengt men naamlyk 1 deel Kryt, handelende men daarmede even zoo, als met onvermengd Loodwit. Het Kryt wordt vooraf klein geslagen, en alle steentjes worden daaruit gezocht. By het maalen moet men dit mengsel ook met water begieten, en hetzelfde wordt even als de zuivere Loodkalk gevormd en gedroogd. Deze laatste is doorgaands ¼ of 1/5 duurder; dan het vervalschte Loodwit; het laatste deugt weinig voor schilders, en de apothekers kunnen hetzelfde in 't geheel niet gebruiken.
Sertzen 1801: 138	Loodwit [lead white]	5-20% chalk 95-80 % lead white	Nog diende deze byzondere Gang [i.e. grinding stage in mill] daartoe om 5 à 20 pCt. schoon Engelsch Kryt onder het Loodwit te vermengen. De Knechts verzekerden my dat eene vermenging van 10 pCt. Kryt met het Loodwit slechts door het oog van een' kenner te ontdekken ware.
Leuchs 1825: 39–40	Bleiweiß	1 to 2 pts of a mixture of	Gausaurane in Paris *) nimmt Alabaster, den er glüht, bis er zu Pulver zerfällt,

<i>source/date</i>	<i>lead white name</i>	<i>proportions</i>	<i>quote</i>
		(1 pt alabaster and 1 pt Champagne chalk) 1 pt lead white	dann mit der gleichen Menge Champagner Kreide vermischt, mit Wasser übergießt und oft umrührt, die aufschwimmenden Unreinigkeiten abschäumt, und wenn keine mehr erscheinen (nach 8 oder 15 Tagen), das Wasser abläßt, die Kreide durchsiebt, in einer andern Kufe zweimal mit frischen Wasser übergießt, und nach 5 oder 6 Tagen in Weidenkörben 6 oder 7 Tage zum Abtropfen hinstellt. Zuletzt bringt er sie auf Trökenbretter, wo sie mit der Zeit immer besser wird, daher es gut ist viel in Vorrath liegen zu haben. Man vermischt davon 1 bis 2 Th. Mit einem Theil Bleiweiß,
Leuchs 1825: 40	Bleiweiß zu Decorationsmalerei [lead white for decoration painting]	1/12 pt chalk 1 pt lead white	Kreide. ... Immer verschlechtert aber ihr Zusatz das Bleiweiß da es als Oelfarbe bald gelblich wird. Doch verbessert ein Zusatz von etwas (1/12 Kreide) das Bleiweiß, wenn es zu Decorationsmalerei dienen soll, da es sich dann besser mit dem Pinsel zertheilen läßt.
Leuchs 1825: 40–41	Hamburger Bleiweiß [Hamburg lead white:]	2 pts barium sulphate 1 pt lead white	Hamburger Bleiweiß, 1 Th. reines Bleiweiß und 2 Th. Schwerspat.
Leuchs 1825: 40–41	Venetianer Bleiweiß [Venetian lead white]	1 pt barium sulphate 1 pt lead white	Venetianer Bleiweiß, gleiche Theile reines Bleiweiß und Schwerspat.
Leuchs 1825: 40–41	Holländer Bleiweiß [Dutch lead white]	3 to 7 pts of barium sulphate 1 pt lead white	Holländer Bleiweiß, 1 Th. Reines Bleiweiß und [3] Th. Schwerspat, zu geringen selbst 7 Th. Schwerspat auf 1 Th. Bleiweiß.
Montabert 1829: 200	Blanc de Venise [Venice white]	1 pt barium sulphate 1 pt lead white	Après le blanc de Crems, qui est le blanc de première qualité, on distingue la seconde sorte, qui est formée d'un mélange, par parties égales, de carbonate de plomb et de sulfate de baryte; on l'appelle blanc de Venise.
Montabert 1829: 200	Blanc de Hambourg [Hamburg white]	2 pts barium sulphate 1 pt lead white	Le blanc de Hambourg forme la troisième qualité; il est composé d'une partie de carbonate de plomb et de deux de sulfate de baryte.
Montabert 1829: 200	Blanc de Hollande [Dutch white]	3 pts or more barium sulphate 1 pt lead white	Enfin, la dernière qualité est un mélange de trois parties de sulfate de baryte et d'une de carbonate de plomb; on la désigne sous le nom de blanc de Hollande. Il arrive souvent, cependant, que la quantité proportionnelle de carbonate de plomb est encore plus faible, et qui semblerait devoir établir une dernière variété.
Jacobson 1855: 60	Venetiaansch loodwit. [Venetian lead white]	1 pt barium sulphate 1 pt lead white	Het loodwit dat daar, in Zuid-Duitschland, vervaardigd wordt, vermengt men met gelijke deelen zwaarspath en noemt het dan Venetiaansch loodwit
Jacobson 1855: 60	Hollandsch loodwit [Dutch lead white]	2 or 3 pts barium sulphate 1 pt lead white	met 2 tot 3 maal zijn gewigt zwaarspath vermengd, noemt men het daar [= Zuid-Duitschland], en zelfs ook in Belgie, Hollandsch loodwit !
Schmidt 1857: 70	Hamburger-Weiß [Hamburg white]	2 pts barium sulphate 1 pt lead white	Bleiweiß dritter Qualität. Es besteht [aus] einer Mischung von zwei Theilen schwefelsaurer Schwererde und einem Theil kohlenaurem Blei. Es führt [den]

<i>source/date</i>	<i>lead white name</i>	<i>proportions</i>	<i>quote</i>
			Namen Hamburger-Weiß.
Schmidt 1857: 70	Holländisches Weiß [Dutch white]	3-7 pts barium sulphate 1 pt lead white	Bleiweiß vierter Qualität. Es besteht [aus] einer Mischung von 3 Theilen schwefelsaurer Schwerverde und 1 Theil kohlsaurem Blei und führt den [Namen] Holländisches Weiß. Auch belegt man wohl [...] diesem Namen eine Mischung von 7 theilen schwefelsaurer Schwerverde und 1 Theil kohlsaurem Blei.
Standage 1892: 27	Venetian white	1 pt barium sulphate 1 pt lead white	Venetian White is compounded of equal parts of barium sulphate and 'carbonate of lead'
Standage 1892: 27	Hamburg white	2 pts barium sulphate 1 pt lead white	Hamburg white is a mixture of two-thirds barium sulphate and one third white lead
Standage 1892: 27	Dutch white	3 pts barium sulphate 1 pt lead white	Dutch white contains 25 per cent. of white lead and 75 per cent. of barium sulphate.