Instructions, Scraping, Gauging, Painting, and Piling Shot and Shell (A.C. 1868, Cl. 81 & 115).

1. Shot runs and trestles are to be supplied to all working parties employed in cleaning shot and shell. The shot or shell is to be placed on the run, and scraped with the swords until quite free from all paint and rust.

2. The plugs or corks of the shells are to be removed, and the interiors examined; those of spherical shells are to be scraped with a copper scraper, and freed from rust; as the interiors of rifled shell are lacquered, they are not to be scraped, but simply inverted to ensure their being free from water.

3. The collars should be examined, and, if necessary, removed and replaced by new ones.

4. The rivet holes should be examined, and, if necessary, cleaned out and re-waxed.

5. The threads of the screw plug are to be smeared with a solution of beeswax and rangoon oil,* and the plug screwed home into the metal bouche.

6. Previous to painting, the shot and shell are to be gauged with a high gauge by the non-commissioned officer in charge of the party, who is to put aside all that do not gauge properly, and report the circumstance to his Commanding Officer.

7. The shot or shell are to be painted on the runs with two coats of paint; the second coat is not to be given until the first coat has thoroughly set. Tarpaulins are to be supplied for placing over the projectiles after they have received the first coat.

8. The paint is to be applied over the whole of the exterior iron surface, including the portion inside the fuze-hole as far as the metal bouche, the metal plug being for the time removed; in the case of lead-coated projectiles the painting should extend at least half an-inch over the lead at either end of the projectile.

9. The bases for all piles should be firm and level, and formed of stone, concrete, or other hard material. Unserviceable shot or shell may be used.† Shot and shell should never be piled on sand, mud or loose shingle, even when garlands are used. Spherical shell are to be piled with their fuze-holes downwards. Projectiles for rifled ordnance should be piled on their sides, especial care being taken not to injure the lead-coating or the studs.

It is important to remember that mixed paint deteriorates by keeping; if kept too long it dries up and becomes useless. Cl. 173 A. C. 1872 states, "The paint and composition will be supplied from Woolwich on demand, prepared ready for use." In order, however, to ensure as far as possible that these articles may always be in good condition, they must not be demanded in larger quantities than will suffice for the requirements of each district for 12 months.

The chief constituents of the most important paints are spirits of turpentine, boiled oil, and some metallic body which is not liable to be oxodised or altered when exposed to the air.

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* A mixture of equal parts of finely powdered chalk and cocoa nut oil is now used for this purpose.

† All spherical projectiles, from 32-pr. calibre upwards, make good bases. Wood is *not* suitable.

Spirits of turpentine possess the property of dissolving fatty and resinous substances. On exposure to the air it absorbs oxygen and hardens; this quality renders it suitable as an ingredient for paints.

Linseed oil takes up oxygen on exposure to air, and hardens; from this quality it is known as a drying oil. Its drying powers are much increased by boiling along with litharge, red lead, or binoxide of manganese; after this process it is known as boiled oil.

From the above properties it will be seen that paint when mixed will soon become unserviceable when exposed to the air. It is not desirable to mix paints long before they are wanted for use; even in closed tins they are apt to spoil.

An oxide of iron is the metallic body employed in the paint for projectiles; it is termed "Pulford's magnetic paint," (called "magnetic" from the property of being attracted by a magnet). Pulford's paint is obtained by contract.

Oxides of metal are suitable for the body of paint, as they are cheap, easily obtained in a state of fine division, and not subject to oxidation on exposure to the air. Other metallic bodies, such as white lead, &c., are largely used for paints, but are more expensive.*

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* Much information on the subject of paints will be found in a lecture by Mr. Dent, Chemical Department, R.L., contained in Lectures on Building Materials, Chatham, 1871.