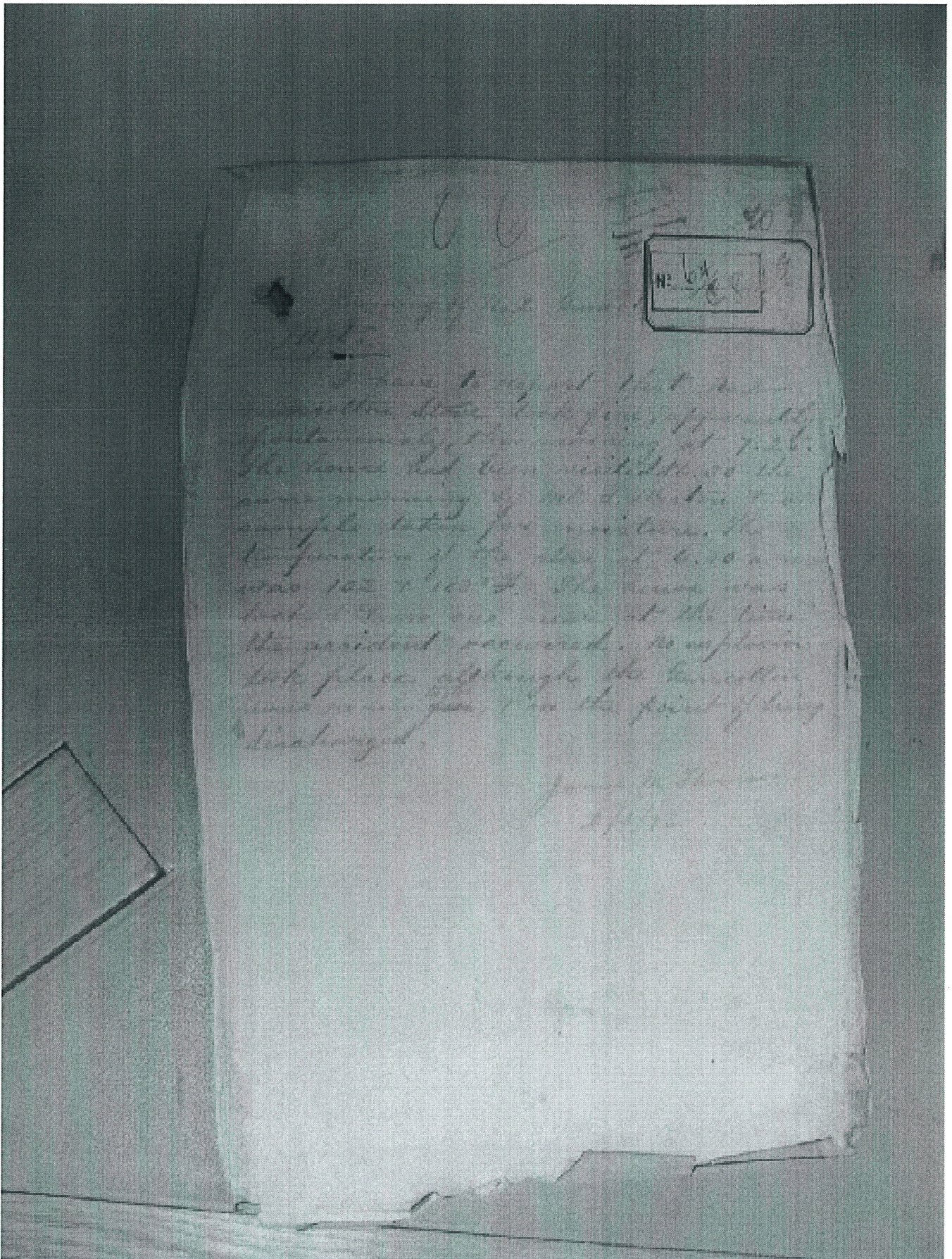


2.3.1893

128-12



GC Dipping Room

2.3.1893.

128-12

The *explosive* effect was very slight, the house being merely burned down, without any fracture or disturbance of the only wall (at south end) built of masonry. The water-wheel and the four cam machines were practically uninjured.

The coroner's jury returned an open verdict; they, however, expressed an opinion that the grouping of the machines in sets of four had contributed to the accident. Also that nightwork should be abolished; that steel tools should not be allowed except in the hands of experienced mechanics; and that the machines should be stopped whilst powder boats were alongside.

They requested that these points should be strongly represented to the Home Office.*

continued in 1894 report

Destruction
by fire of
guncotton
drying stove
at Waltham
Abbey.

An interesting example of the burning, without explosion, of a considerable quantity of guncotton, was afforded by what occurred in a guncotton stove at Waltham Abbey on the 2nd March.

The following particulars are derived from a report furnished by the War Office:—The stove was a circular building, 30 ft. 3 ins. in diameter, with conical roof, height at the eaves 10 ft., at the centre 16 ft. The walls were double and of wood, the boards being nailed to wooden uprights, the space between the inner and outer walls was about 3 inches. A wooden partition divided the interior of the stove into two equal portions. The roof was of zinc, the floor was of wood covered with lead. The whole of the interior of the stove was lined with Willesden paper secured to the sides and roof by means of wooden fillets. The stove was surrounded by a circular brick traverse, backed by earth, with a slope of about 30°. The stove was entered by a tunnel through the traverse 7 ft. 6 ins. high and 6 ft. 6 ins. broad, which was match-boarded inside. The outer end of the passage was closed by a double door, the stove end had two doors, one leading into each side of the stove. A door in the left side of the passage at the stove end gave access to the space, about 2 feet broad, between the wall of the stove and the wall of the traverse.

The stove was heated by means of a hot-air blast, produced by a combined engine and fan and lead through a steam-heater.

The hot-air pipe was carried overhead through the passage into the stove. On entering the stove, the pipe, which was of copper, covered with painted canvas, and 9 ins. in diameter, was turned down and carried round the stove about 6 ins. from the walls and 6 ins. from the floor. There were seven outlets from the pipes, on both sides of the stove, the open ends of which were covered with fine copper gauze, and arranged so that the blast impinged on to the floor. The temperature of the stove was regulated by means of valves in the pipes outside the stove, which determined the proportion of hot and cold air which was allowed to enter. The air escaped from the stove by means of six windows, about 1 foot square. The stove was lighted by external electric lights, the passage by one light inside.

The interior of the stove was fitted up with movable wooden racks, round the sides and against the partition, arranged for five tiers of trays, of which there were 200. The trays were light wooden frames, with fine copper wire-gauze bottoms; each tray held 48 moulded discs, 4½ ins. high by 3 ins. diameter, each weighing 9 ozs. when dry, and containing when wet 42 per cent. of moisture.

The stove was charged on Friday, the 24th February 1893, at 6 p.m., with 4,212 lbs. of guncotton; there were no discs on the bottom tier of trays.

The stove was visited by the man in charge at 6.30 a.m. on the morning of the accident. He found the temperature to be 102° F. on one side and 103° F. on the other. The electric light was not on.

The men were on their way to the stove to prepare for removing the dry guncotton, when at 7.25 a.m., a bright flame was observed to shoot high up into the air with a roar, but no explosion took place. The roof disappeared entirely, some melted zinc being deposited on the crest of the traverse, and some sheets on the slope. The outer door of the passage was found locked, and had to be opened to admit the firemen with the hose. The woodwork burnt fiercely, but the flames were subdued before the outer wood wall and the uprights were consumed. The lead floor was much melted, and the copper pipes distorted and fused. Not a single brick of the traverse was displaced.

* While this Report has been in preparation a War Office Committee has been appointed, with Lord Sandhurst as President, and Her Majesty's Chief Inspector of Explosives as one of the members, to investigate the whole subject, and we reserve, therefore, until another occasion, detailed remarks on the accident and its probable cause, and as to the precautions proper to be taken.

A fresh south-westerly breeze was blowing at the time; on the south-west side of the stove little debris was found, and that only in the immediate vicinity. On the north-east side a few light articles were carried some distance, evidently by the wind, the most distant article being that of the charred framework of a guncotton tray, which was lying 140 yards from the centre of the stove. Minute particles of what appeared to be charred paper were found as far as 640 yards distant from the stove. The War Office authorities stated that they were unable to assign a cause for this accident.

We believe that there is no previous case on record of the destruction of so large a quantity of guncotton by fire without explosion.

The largest quantity, so far as we are aware, which has burnt inexplosively was about 1 ton of (compressed) guncotton discs of Stowmarket make stored in a magazine at Penryn, in October 1869, which caught fire and burnt harmlessly away.*

Again, on 25th July 1882, 1,500 lbs. of potentite (nitrated guncotton) burnt without explosive effect in the store of the (then) Potentite Co. at Melling.†

On the other hand, there have been a large number of experiments, and some accidents, in which very much smaller quantities of guncotton, when set on fire, have exploded with tremendous effect.

One of the most striking of the accidents, at any rate in contrast with the present case, was the destruction by explosion on 27th October 1882 of a nitro-cotton drying stove at Ardeer.

On that occasion the stove did not contain more than 308 lbs. of nitro-cotton (distributed in two compartments).

The ignition (probably by friction) of this guncotton resulted in an explosion of considerable violence, by which two men were killed, and the stove was destroyed.‡

Other instances of explosion of quantities of guncotton, considerably less than the amount which now has burnt harmlessly away, may be mentioned; one of the most striking being the explosion of about 1 ton of guncotton (contained in 896 tins) at Lydd, on 24th January 1884, with considerable injury to Sir F. Abel, who had undertaken to light the fire by which the guncotton was to be ignited.§

Then there was the explosion at Eastbourne in April 1872 of only 6 cwt. of guncotton packed in strong wooden cases.||

Other instances might be cited, but the above will suffice to show the necessity which exists for accepting with the greatest caution any conclusions based on a few results of accidents or experiments—and not too readily accepting the view, that because a certain quantity of an explosive material burns harmlessly away, therefore the same, or a less, or possibly even a larger quantity would behave in the same way under all circumstances.

The fact is, that very minute variations in the conditions may make the difference between explosion and fire only, as was very strikingly shown at the Eastbourne experiments above referred to, when a slight difference in the thickness of the boxes made the difference between an explosion and a fire.

The sound view to take is to accept the conclusion as establishing merely a probable and useful margin of safety, not too narrowly to be encroached on, but one which, while it affords a reasonable expectation of fewer serious accidents, does not justify any diminution of precaution.

An accident, fortunately unattended with serious consequences, is stated to have occurred at Woolwich on 21st June, during the inspection of the Royal Horse and Field Artillery. One of the 12-pr. batteries had recently returned from a course of target practice at Okehampton, and it appears that a shrapnel shell remained undischarged in one of the guns. On coming into action the gun was fired, the shell struck a large elm tree; it passed over the Royal Military Academy and two ranges of buildings in the rear, eventually falling harmlessly into a road near the cadets' workshops.

The gun's line of fire was in the direction, it was stated, of some houses occupied by staff officers, but the tree interposing deflected the projectile.

An accident occurred at Chattenden on 28th September, during the Volunteer Manœuvres, by which Sergeant J. Cowley, a volunteer, met his death. The sergeant

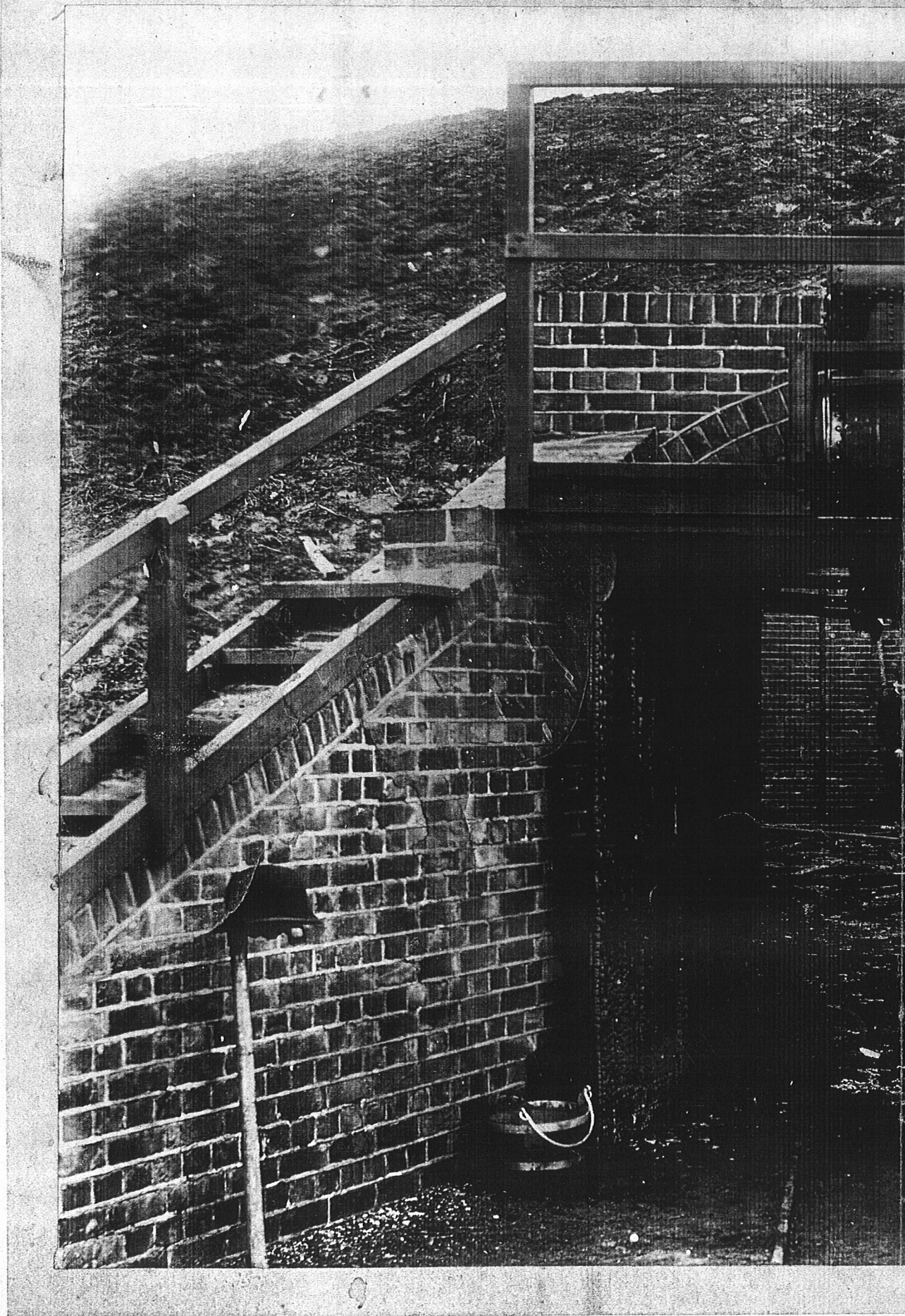
* Report on the Stowmarket Explosion by Colonel V. D. Majendie, 9th September 1871, pp. 17, 18.

† See Special Report XLV., dated 28th November 1882.

‡ Special Report, No. XLIV., of 9th December 1882.

§ Annual Report for 1884, pp. 55, 56.

|| Report and proceedings of Select War Office Committee on Guncotton, &c. (1871-74), pp. 10, 11.



No. 2. Guncotton Drying Stove
which "fired" on 2nd

122/73



WASC 89

No 2 Gunpowder Drying Store which ^{is} ~~was~~ built March 1893

2.3.1893

122/73

128/74



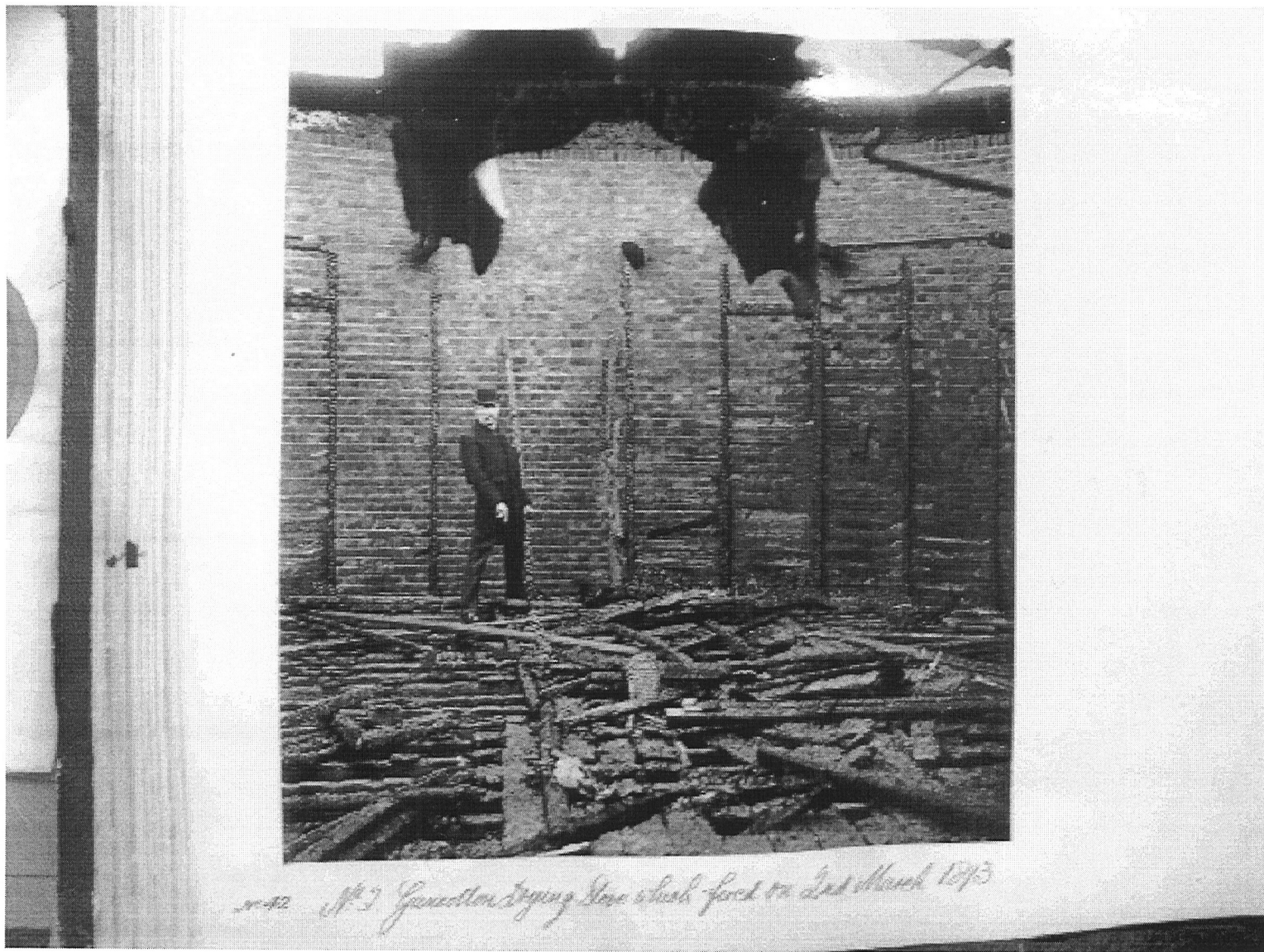
No 2 Gunston Drying Store which fired on 2nd March 1893

No 2 Gic Drying Store which fired on 2nd March 1893

2.3.1893

128/74

128/75



No 2 Tobacco Drying Store which fired on 2nd March 1893

No 2 Tobacco Drying Store which fired on 2nd March 1893

2.3.1893

128/75