few isolated grains. Vesuvian matches were flung into the powder, and were ignominiously extinguished. A red-hot poker was stirred through the powder, with no better (or worse) effect. But by far the most convincing test is that which was was proposed by Lord Bury, namely, that a quantity of pure gunpowder should be placed in the centre of the protected gunpowder and the former fired. This experiment was also exhibited on Saturday; and if we remember the keen, permeating power of flame, especially where that flame has been propelled in every direction by a vigorous explosion, we can understand how gunpowder that may resist this attempt at ignition may, with some show of reason, be pronounced safe. The pure gunpowder was placed in a sort of pit inside the vessel, and carefully covered over with the protected powder; when the former exploded, it simply blew what was above it into the air, and had no effect in igniting the great mass which lay beneath and around it. Thereafter a portion of surrounding mass was riddled in the usual way, and the residue exploded as ordinary powder will explode. We may assume this test to be conclusive, and proceed to mention a few of the advantages accruing from the practical use of the invention.

In the first place, the cost of carriage of or-dinary gunpowder is $\pounds 7$ 10s per ton, the highness of the rate being, of course, caused by the dangerous properties of the material. The carriage of a ton of protected powder for the same distance is 10s. But, if mixed in the proportion which Mr. Gale suggests as being indubitably safe, there are three tons weight of his powder to every ton of gunpowder; so that the cost of carriage of an actual ton of gunpowder, accompanied by its sufficient quantity of protective material, is £2, thereby saving £5 10s. per ton.

Then, as to storage of gunpowder, great difficulty is experienced in obtaining sites for magazines, Government not allowing above a certain quantity of powder to be stored in any mill or magazine, however remote or apparently safe. Mixed with Gale's protective material it matters not where the powder be stored. Thousands of barrels might with perfect safety be placed in vaults beneath the House of Commons, and a dozen black-visaged Guy Fawkes allowed to brandish torches in whatsoever subterranean Walpurg's-dance they pleased. The cost of forming shell-proof magazines within our shore batteries is at once done away with; and the enormous expense of building strong powder magazines in or near large cities is no longer necessary. Iron ships need no longer resemble gigantic bomb-shells which only require a spark to send them flying into the air; barrels of this powder may be kept with perfect safety on the deck of a ship while in action. In short, the cost of the storage of this powder is no greater than that of so many barrels of flour; while the further recommendation greater than any saving of cost-that hereby the absolute prevention of explosion is ensured, is so apparent that it need scarcely be mentioned.

It requires only to be seen bow larger machinery for the sifting of the powder and restoring it to its original state, may be constructed so as to be used in a sudden emergency. For though the | all material substances, and points out as the re-

advantages which the invention offer to the use of po der at home are sufficiently great, it is necessary to its adoption by the army and navy that its mechanical appliance should be of the swiftest and readiest kind. An objection has been raised on the ground that, after the gunpowder had been sifted, some portion of the protective powder would adhere to the grains. This is not the case, as has been proved by microscopic investigation; though Mr. Gale shows that, though it were the case, it would be no objection, as at present the coating of the powder with blacklead, while in course of manufacture, gives an additional force to the explosion.

The material which thus renders gunpowder temporarily innocuous is simple glass ground down to an exceedingly fine powder; various other substances have been tried (especially flint, which, however, became too floury and dusty), but no one has been found so useful and successful as glass. The cost of it, as we have already stated, is 30s. per ton, and Mr. Gale is prepared to furnish any quantity of it on the shortest notice, as the advertisements say, at that price. It may be used, besides, for a variety of purposes : scours copper and other metals into a brilliancy sufficient to make the inventor of polishing-paste die of envy. At present Mr. Gale advances three pounds of his powder to one of gunpowder as the safest proportion; but a much smaller proportion renders the gunpowder perfectly non-explosive ; with this difference, however, that in equal parts of gunpowder and protective powder the former will burn, though it does not explode. A proportion of two to one burns slowly, three to one allows a few grains to ignite at haphazard, four to one is mere dead material. The rapidity with which the powder can be separated is somewhat remarkable; perhaps owing to the nature of the material with which it is mixed. The proportions we have mentioned are weight, not bulk; the protective powder being heavier than the gunpowder, what forms a proportion of three to one in weight is only two to one in bulk, and this is an important fact in considering storage. Another advantage offered by this material is that it keeps the powder perfectly dry, however the mixture may be exposed to the air; and it is well known that by itself gunpowder rapidly absorbs moisture from the atmosphere and becomes for the time useless.

Among the gentlemen present at Torwood on Saturday were Sir John Hay, Mr. Chambers, M.P., Mr. Gilpin, M.P., W. E. Rendle, Esg., and others more or less interested in the matter; but we should say that these partially private experiments are now almost unnecessary; and that Mr. Gale should bring his invention more immediately before the public, confident that its efficiency and simplicity will be apparent to all who may witness its results.

ON DYEING .- Br W. EDMUNDS.

So numerous and of such importance are the applications of chemistry to the arts, that scarcely any of them can be successful y or profitably carried on without the assistance of this science, as it indicates the nature and inherent properties of