THE EXPLOSION AT ERITH.

From the London *Mechanics' Magazine.*

The daily press has done its duty, and long since the people of Britain have been presented with full and possibly accurate details of perhaps the most fearful explosion which ever occurred within our shores. The *Mechanics' Magazine*, however, has a higher and infinitely more important duty to fulfil than the mere catering of news for the masses. Its pages will be read by future generations, and we therefore feel no hesitation in recording certain particulars of an event which has been the absorbing topic for days, and will bear an interest far into the future. It is to be regretted that the details of past explosions, and these have not been few, have not been more carefully treasured up in a readily accessible form than they have been. Particulars of the kind possess to the man of science much more than a passing interest, and it is quite certain that our magazines and powder factories can never be rendered even moderately safe, until each individual cause which may lead directly or indirectly to the ignition of gunpowder shall have received a thorough, calm, and searching investigation at the hands of men qualified to deal with the acknowledged difficulties of the subject. Accurate and reliable records of the attendant circumstances of past explosions are of the highest value. They act at once as guides for the future, and afford the best of all evidence from which future deductions may be drawn. Unfortunately, as it is, such records scarcely have any existence.

The marshes at Erith in one sense form an extremely suitable locality for the establishment of a magazine. They are moderately near the metropolis, and yet so far distant that it is to the last degree unlikely that any explosion, however tremendous, could materially affect the well-being of the great city. They are also near a great shipping port, water carriage is always available, and in a word, the site holds out many advantages to the powder merchant. But it must be remembered that the marshes are dangerously near to Woolwich and Plumstead, places where very large stores of Government powder are kept; and as far as our present knowledge of the effects of concussion upon explosives tells us anything, it teaches that there is nothing improbable in the notion that an explosion at Erith might, if severe enough, be immediately followed by another at Plumstead or even Woolwich. Some six years ago the Messrs. Hall & Co., of Dartford, erected a magazine at the head of Erith-reach. We understand that a good deal of local opposition was brought to bear at the time; nevertheless the magazine was built and had been used regularly up to the moment of the explosion. Close by stood another and older structure of a similar kind, the property of the Lowood Company. They were very imprudently situated close within the embankment or tidal wall of the Thames, and from the destruction of a section of this wall very disastrous consequences would have followed but for the prompt measures taken by the authorities. Powder was ordinarily conveyed to and from the stores by means of river barges, usually worked by two men and a boy each. At about a quarter to seven on the morning of the first day of October, two of these barges lay in the stream, unloading powder brought from Faversham. A timber stage running out into the river formed a roadway along which the barrels were conveyed to the magazine in barrows fitted with copper wheels. The work was proceeding satisfactorily when the explosions took place. Whether the work of destruction commenced in the barges or on shore we cannot say. The boats have disappeared, for the present at least, as completely as though they had never existed. The second explosion, following almost instantaneously on the first, effectually destroyed the magazines and the neighboring cottages. The unfortunates in immediate propinquity have also gone to that land from which there is no return. Already some eight or nine deaths are recorded, and it is to be feared that the tale is not nearly full. The effects of the explosions were in every way tremendous; there is little doubt that they made themselves plainly felt through a radius of at least fifty miles. The consternation at Woolwich was excessive, windows and doors being blown in, and many of the inhabitants suffering severe injuries in consequence, while at a distance the general impression existed that an earthquake had paid us a passing visit. The destruction has been so complete that there is little opportunity for scientific detail, and the direction of the destroying force does not appear to have varied sensibly from radial lines proceeding from the magazine as a center. One exception exists: the mansion of Sir Culling Eardly, although very near, has suffered but a little, a gentle hill intervening between it and the seat of the explosion, which has apparently exercised a protecting influence.

Strangely enough, the quantity of powder exploded is not accurately known. At one time the report got about that not less than 30,000 barrels had been ignited. We need scarcely assure our readers that, had this been the case, not only Woolwich, but London would have been half destroyed. The Messrs. Hall state the quantity at about seven hundred and fifty barrels in the larger magazine, and two hundred in the barges, but the amount in the smaller magazine is wholly unknown. The destruction of the books and papers, and the lamentable deaths of those in charge, in some measure account for this ignorance. Still, under a proper system, it is not too much to say that particulars of every pound of powder brought in and sent out should have been accurately registered at the chief offices in Lombard and Fenchurch streets. The fact that so much uncertainty exists upon a very important point, is very fair evidence of lax discipline somewhere. In all probability, about one thousand three hundred barrels of powder exploded in all, or some sixty tuns. It is fortunate that the explosion was in some degree divided, or the results might have been yet more disastrous.

Our contemporary then proceeds to discuss the cause of the explosion, and argues that it may have been from percussion or spontaneous combustion.

Steel in Locomotive Construction.

From an interesting article on steel in the *Mechunics' Magazine*, London, we extract the following passages:—

"As would be naturally expected, the locomotive makers of the country of Krupp have been forward in the application of steel. At the last great exhibition Borsig's locomotive was particularly remarkable on this score. The cast steel he employs for the different parts of his engines is of the quality used for springs. The engine at the exhibition had its driving, coupling and piston rods, and the crank and coupling rod pins of this material, as also, we believe, the slide links and the expansion slide bars. According to a letter from Herr Borsig, published last year at Paris, in one of our foreign contemporaries, all these parts are, when forged, tempered by being heated in an air furnace to a red heat. They are then re-heated to a deep cherry red, and they are then again cooled down to the degree of consistency required for the finishing of the detail. Any bad material shows fissures or cracks that indicate at once 'a waster.' For this reason the parts are best finished after the tempering, and any warping is not to be dreaded. The tempering is also the test of the general quality of the steel, and of the security of any particular detail—an additional safety over their use compared with that of wrought-iron.

"The portable engine for agricultural and other purposes, and the traction or locomotive engine on common roads, will always be more or less similar to the railway locomotive. It is, therefore, to be expected that any great improvement in the locomotive will be followed by corresponding progress in the portable engine. The best portable engines, those of Clayton and Shuttleworth for instance, approximate the nearest to the locomotive in the make of boiler and form of working parts. Some of the makers of traction engines have turned out engines with steel boilers; but up to the present we cannot chronicle much in the application of steel to agricultural engineering. And yet agricultural engineers should, above all others, be aware of the importance of steel, as the use of the steel wire rope first made steam plowing a practical thing. We should thus be glad to see our agricultural friends making a larger use of steel than they do at present. The lessening of weight of something like at least a third that would result to the traction engine by a complete adoption of steel, ought to be of immense service in many of the circumstances in which traction engines are placed. Such would also be the case with the steam plows and scarifiers, and the draught, both static and dynamic, on the steel wire rope would be clearly very much lessened by a subtraction of useless dead weight. At least, we hope to see the larger adoption of steel on the 'racing engines' at the competitive trials of 1866. Other things being equal, the engine with moving parts of steel, and more especially if with a steel fire-box and boiler, must carry off the prize. In the first place, as the working parts would be lighter, less work would be acccordingly consumed in moving them. The economy, however, would be found in the steel fire-box, and the, perhaps, steel tubes. The sides of a steel fire-box being formed of a material practically twice as strong as wrought iron, are only about half as thick, and this tenacity results in a remarkable saving of fuel, doubtless produced by the speedier conveyance of the heat to the water. With steel there would also be a less volume of material exerting its absorbing powers on the heat generated by the coal, and tending to shorten the run of the competing engine. The steel boiler would thus tend to permit a quicker starting of the engine—a quicker rise of the steam—while the engine would also be enabled to stop rather later. Competitors at these trials are only too well aware of the advantage of thin sides; but in this case, the thinness would not be obtained at the expense of safety. There would also, no doubt, be an absolute saving in fuel, as the waste gases would probably have more of their heat abstracted before reaching the smoke-box."

The English Turret Ship Laid Up.

We regret to state that the extraordinary report relative to the *Royal Sovereign*, referred to in the *Times*, proves to be correct in all its anticipations, an order having been received by the chief authorities of Portsmouth dockyard to pay the ship out of commission, and place her in the first-class steam reserve at that port. Parliament is not sitting, and the chief members of our political Board of Admiralty are away on their combined business and pleasure trip to Malta, and, consequently, no reasons can be given officially for this seemingly inexplicable proceeding with regard to England's first turret ship; but the facts remain, nevertheless, for public consideration and discussion. The *Royal Sovereign* has been but a very short time in commission. She is a vessel of an entirely novel class, and one that from recent American naval operations we are deeply interested in testing in every respect. Her crew have not been together long enough yet to learn their turret gun exercise sufficiently to take the ship into action. The ship herself has not been tested either in her behavior in a seaway or in the working of her turrets and guns further off the land than in Portland-race. Her officers have been put each to some £50 expense in joining the ship for any ordinary term of commission; and, in fact, there are a hundred other cogent reasons against this inexplicable step of putting the ship out of commission. It is openly asserted in naval circles at Portsmouth—and that, too, without distinction of rank or position—tnat the success of the turret ship has been so marked that the advocates of the broadside gun principle, now paramount at Whitehall, have caused this order to be issued for the *Royal Sovereign* to haul down her pennant.—*London Mechanics' Magazine.*

Strength of Anchors.—The English Admiralty have lately tested a new anchor constructed on an improved plan. This anchor weighed two thousand four hundred and sixty-eight pounds, on being placed on the testing machine. The distance from the center of the pin, which fastens the shackle to the shank, to a point near the extremity of one of the flukes, was five feet and five inches. Although subject to strains varying from nine to a weight of twenty-four and five-sixteenths tuns, its deflection was but one-half inch, and the shackle yielded only one-sixteenth of an inch; at fifteen tuns it was decreased by three-sixteenths; at nine tuns the permanent set was one-eighth less; and when all pressure was removed, the original dimension was regained. The Admiralty test was twenty-four and five-sixteenths tuns; and the result was highly satisfactory.