

Explosions.

BY FRAMLEY STEELCROFT.



OMEHOW, one sits down to write an article on this subject with a distinct sense of exhilaration—even recklessness. And this after an interview at the Home Office with Sir Vivian Majendie, K.C.B., and his able and courteous assistant, Captain Thomson. It must be the influence of the subject; there is about explosions a certain irresponsibility—wild, whirling, magnificent—which makes one revel in the telling of their Titanic strokes. Explosions of gunpowder we know, and explosions of wrath, of dynamite (and many other “ites”); gas, too, and fireworks; steam, and the rest. But think of an explosion of flour! Think of the very staff of life rising up, as it were, and distributing vast mills in fragments over a great city! The photo. reproduced on this page shows the tremendous havoc wrought by an explosion of flour-dust at the Tradeston Flour and Grain Mills, Glasgow.

This explosion took place on July 9th, 1872, and resulted in the loss of *fifteen lives*. The great buildings—mill, stores, bakehouse, granaries, etc.—stood in seven blocks, and were totally destroyed by the explosion and the subsequent fire. At ten minutes past four o'clock, when work was going forward as usual, a terrific explosion was heard proceeding

from the mill. The roof of this huge building was blown upwards, and the east and west gables outwards. Adjoining roofs and windows were completely shattered, and two massive gates blown to pieces in the wool-store opposite. Alongside the last-named building stood a number of cabs, and one of these was literally pulverized, though the horse escaped.

Among the extraordinary fatalities on this occasion was the death of Jane Mulholland, a servant girl at the Bute Hotel close by. Jane was hanging out some clothes on the green behind the hotel, when the west gable fell upon and buried her. At first the explosion was attributed to the bursting of a boiler, and then to gas. Nobody thought of flour.

And yet I learn that it is highly dangerous to take a naked light into a flour mill, where the air is filled with highly inflammable particles. Equal precautions are necessary in the case of dust from coal, sugar, and charcoal. Explosions of flour are by no means rare. In 1878 came the tremendous explosion at Washburn Corn Mills, Minneapolis, which killed eighteen men, and did damage computed at £200,000. On the 5th of April, 1886, a flour explosion occurred at the Leith Flour Mills. Six persons were killed, one being a scavenger who was sweeping the street outside.



From a Photo. by]

GREAT EXPLOSION OF FLOUR AT GLASGOW

[T. Annan, Glasgow.



From a

THE REGENT'S PARK EXPLOSION—RUINS OF THE BRIDGE.

[Photogr., etc.]

The famous Regent's Park explosion is the next to be dealt with here. It occurred on board a canal-boat belonging to the Grand Junction Canal Co., in the Regent's Canal, Regent's Park, on October 2nd, 1874.

This memorable explosion took place at the Macclesfield Bridge over the Regent's Canal. At about 2 a.m. on the 2nd of October, five canal-boats left the City Road Basin in tow of the steamboat *Ready*. One of the boats had five tons of powder on board, another twenty-four casks. Benzoline, petroleum, and naphtha completed the appalling cargo. When the flotilla had traversed some $3\frac{1}{2}$ miles of the canal, a blue flame was seen to shoot up from the middle boat (the *Tilbury*). Some excitement followed among the men, but suddenly came the awful explosion itself, which utterly destroyed the bridge (its ruins are seen in the photo.) and devastated the entire neighbourhood, including the harmless, necessary Zoo.

Laxity is not the word to describe the state of things that obtained in those days. The steerer of the *Tilbury*, a few moments before the explosion, complained of being almost blown out of the hatches by "a sudden burst of flame." He didn't trouble about it, however, nor did he give a thought to the five tons of powder which was presently to blow him and his two mates to atoms.

"Go ahead," said he airily to the master of the tug.

Sir Vivian Majendie says in his report: "An experienced Thames powder lighterman recently told me that he once saw $12\frac{1}{2}$ tons of gunpowder stowed on board an outward-bound ship, on the top of a cargo of lucifer matches, without any intervening planks or merchandise."

The damage done to the Zoological Gardens was rather interesting. No building entirely escaped injury, the reptile-house being completely destroyed.

The parrot-house had a tremendous shaking, and fragments of the hapless boat *Tilbury* were picked up between the elephant-house and the superintendent's house. The animals were fearfully excited for days after the explosion, and had to be systematically visited and calmed. Many birds escaped through the broken roof of the western aviary; and the superintendent soon began to receive letters from people living in the country around London saying that strange, beautiful birds had been haunting their gardens and grounds.

On the 14th of May, 1878, occurred a disastrous explosion of toy-caps, or "amorces," as they are technically called. The scene of this explosion was No. 22, Rue Béranger, Paris, which house was occupied by a M. Matthieu, manager of the toy-cap business of M. Blanchon. This was a serious affair, illustrating in a remarkable manner the danger of an excessive accumulation of explosives which singly, or in small quantities, are perfectly harmless.

The following photograph was forwarded to the Foreign Office by the French Government, who appointed six experts to inquire into the explosion. The building itself, as one may see, was entirely destroyed, and the effects extended to the adjoining house (No. 20). Astonishing to relate, fourteen persons were killed, and sixteen more



From a] EXPLOSION OF TOY-CAPS IN PARIS. [Photograph.

or less seriously injured. There were two distinct explosions—one in M. Matthieu's shop, and the other in an outhouse at the back.

So dreadful were the effects, that the authorities suspected that some far more deadly explosive must have been secretly manufactured and stored—picrate of potash, perhaps, or dynamite. "Toy-caps, such as children play with, would never have done all this," said the police, as they carried the dead and injured from the ruins. Hence the inquiry and the six experts. But it was conclusively proved that it was the caps that did it, and nothing else. You see, there were 20,772,000 of them in stock, or a potential explosive force equal to 1,620 lb. of gunpowder. For sixteen years had M. Blanchon carried on the manufacture, storage, and transport of these things without a single accident.

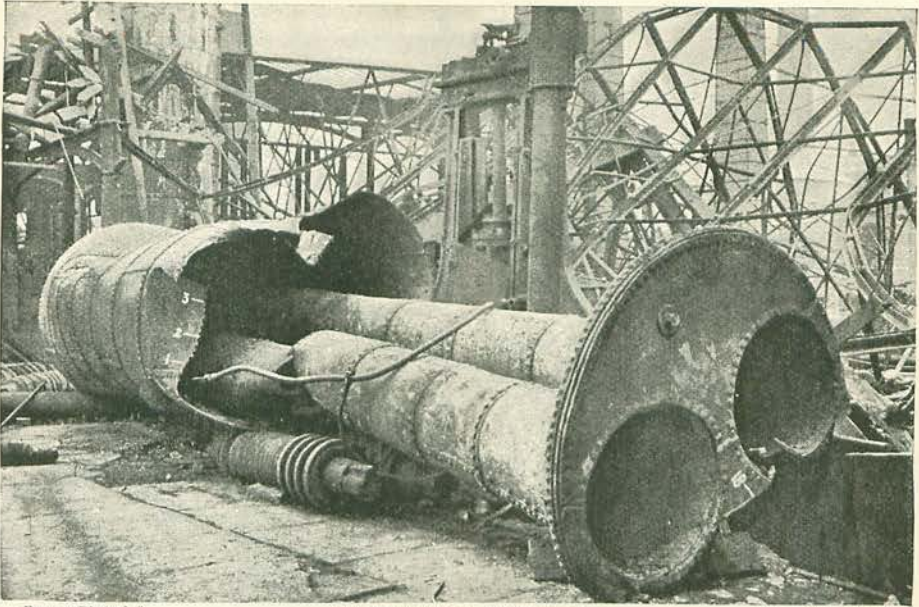
The cause of the explosion was more than a little obscure. The committee of experts com-

menced a series of interesting experiments. They set fire to 288,000 caps by means of a litre of petroleum, but they merely crackled for thirty-five minutes. Then a gunpowder cartridge was exploded in a packing-case full of the mysterious scraps of pink paper, but all to no purpose. Then percussion or detonation was tried, and that "touched the spot!" A well was dug; blocks of oak embedded in stones and mortar were placed at the bottom, and on this floor no end of grosses of boxes of caps were deposited. The well was then shut down and earth heaped on top. A hole was left, however, and through this a weight was dropped. That did it. A tremendous explosion followed; the planks and earth were hurled here and there, and branches of trees in the vicinity torn off. From this it was inferred that something must have fallen on the caps and thus acted like the hammer of a toy pistol.

Of all the dangerous and extraordinary explosions imaginable, that of war-rockets is the most erratic. The next photo. shows a building at Mr. John Macdonald's War Rocket Factory, near Gravesend, after an explosion which occurred on September 13th, 1878. The foreman and one of his men were engaged in pressing a twelve-pounder rocket. The pressure on the charge was all but complete when the rocket exploded with great violence, splitting the cast-iron mould, which was 2 in. thick, and projecting the halves with great force against opposite corners of the building. The end



From a Photo. by] WAR-ROCKET EXPLOSION. [F. C. Gould, Gravesend.



From a Photo. by]

BOILER EXPLOSION AT GLASGOW.

[T. Annan, Glasgow.

wall was more than half down and the roof nearly destroyed. The two workmen had miraculous escapes. This explosion was probably due to undue friction, favoured by the presence of gritty matter.

Next we have a view of an upright boiler which exploded at the Glasgow Iron Works on March 5th, 1880. The photo. was given to Sir Vivian Majendie by the Procurator Fiscal; it conveys an excellent idea of the tremendous havoc wrought by a big boiler bursting or exploding in a confined space. Boiler explosions, however, do not come under the notice of the Home Office. They are investigated by the Board of Trade.

Many extraordinary incidents are, of course, recorded in connection with big explosions. On one occasion a man was blown right across a river, and this human projectile

actually laid low a good-sized tree, against which he was hurled horizontally. The exploding buildings at a certain powder mill literally played shuttlecock with another poor fellow. One explosion blew him high into the air over a second building, which at a certain moment likewise exploded, and sent him still further along.

The devastation caused by the great gas explosion at the Victoria Station, Norwich, was so



From a Photo. by]

GAS EXPLOSION, VICTORIA STATION, NORWICH. [W. L. Shrubsole, Norwich.

extensive, that gas was the last thing thought of. "It must be dynamite," said everybody; and at that time (January 26th, 1886) people had dynamite on the brain. Our photo. shows the interior of the goods office under which the explosion occurred. This part of the station was utterly wrecked. It was proved that there was an escape of gas under the floor of the goods office. This leak was probably caused by a carpenter, who had that morning been engaged on some alterations.

The curiosities of explosions would fill volumes. Dr. Barber, assistant to Professor Marsh at the Peabody Museum, New Haven, Conn., was knocked insensible by the explosion of an ostrich egg, and narrowly escaped with his life. The egg was 18in. in circumference, and weighed 4lb.; it had been sent from Cape Town. With a file the doctor proceeded to open the egg (which was one of several), so as to preserve the embryo. Suddenly there was a loud hiss and an explosion, which shook the whole building.

An extraordinary explosion took place, on June 22nd, 1887, at Messrs. Roberts, Dale and Co.'s chemical works, Cornbrook Road, Manchester. In the first place

chemical works, as such, do not fall within the scope of Sir Vivian Majendie's interesting work. However, the Mayor of Manchester wired to the Home Office, and that Department took the matter up. First came an outbreak of fire at the works. This originated near the picric acid drying-stove. Then came a slight explosion, which created mild wonder. Some thought it was the report of a cannon in the Pomona Gardens hard by—part of the Jubilee rejoicings, in fact. The second explosion left no room for doubt; the interval between the two was about a minute. The great explosion was tremendous and destructive. The photo. reproduced shows its site.

"The works themselves," says Sir Vivian Majendie, "were practically annihilated. Roofs and fabric were blown in all directions; the machinery and apparatus were distorted and destroyed; the air was filled with dense clouds of smoke, and dust, and acrid vapours, to say nothing of masses of projected *débris*. Much of this dust and *débris* was on fire, and thus carried fire to other buildings, such as the Pomona Palace, Mr. Reilly's extensive factory, and the Agricultural Hall in the Pomona Gardens. The

roofs of these buildings were set on fire in more than fifty places." Fragments of iron standards and piping, slate, stone, bricks, etc., bombarded the neighbourhood in fearsome fashion. The force of the explosion was felt within a radius of two miles, and the sound was distinctly heard at Warrington, twenty miles away.

An explosion of blasting gelatine took place at Aden in May, 1888. This explosion is interesting as being a case of spontaneous ignition. It did great



EXPLOSION AT MESSRS. ROBERTS, DALE AND CO.'S CHEMICAL WORKS, MANCHESTER

From a Photo by Molyneux, Manchester.

damage locally. Some 9in. projectiles, stored at the neighbouring guns, were hurled three-quarters of a mile away. Two 9in. guns were dismounted and their carriages shattered. Seven natives were more or less seriously hurt.

The photo. here reproduced is a curious one. It shows the monstrous "plume" of smoke that towered over the city of Antwerp on September 6th, 1889, on which day occurred one of the greatest explosions of modern times. The factory in which the explosion took place was established by a M. Ferdinand Corvilain for the purpose of breaking up obsolete metallic cartridges. Close at hand were a guano store, some extensive petroleum works, containing thousands of barrels of oil, and a group of dwelling-houses, forming a small hamlet. Altogether, about as unsuitable a site for the storage of explosives as could well be imagined.

The Municipal Council had a sort of a fuddled idea of the unfitness of things, and they remonstrated feebly with

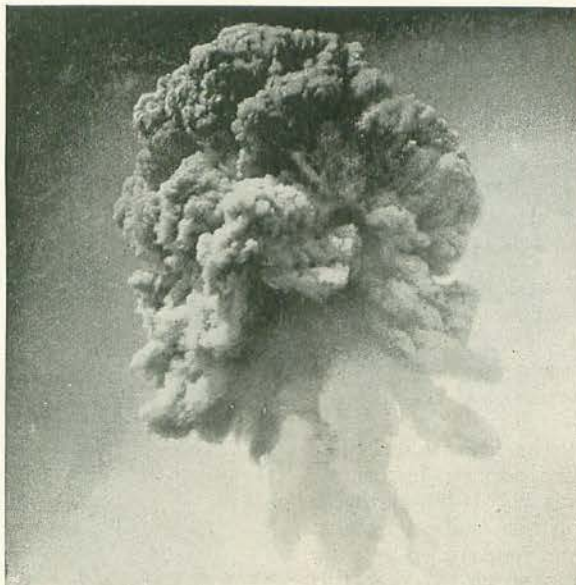
M. Corvilain. At length, however, that gentleman was allowed to go on with his work, on condition that his stock should never contain more than 660lb. of powder!

Within one month of these wobbly negotiations came the terrific explosion. The report was plainly heard at Flushing, thirty miles away, and a column, or enormous "plume," of white smoke immediately ascended from the site of the factory. The wind being light at the time, this "plume" remained suspended in the air for some moments, while an enterprising photographer exposed a couple of plates.

Millions of loaded cartridges were projected into the air, and fell like a shower of hail over an immense area ("fifteen to the square foot"). Windows were shattered and houses damaged to the extent of half a million

francs; whilst on the site itself, nothing but a crater remained, two-thirds of an acre in extent, full of hot, smoking *débris*. Volumes of thick, black smoke soon displaced the great "plume"; the vast petroleum stores were on fire. These burned for thirty hours, and 55,750 barrels of oil were destroyed. Corpses and human fragments were dug out of the ruins daily after the disaster. The number of killed was given as ninety-five, and the injured 150. Among these latter were children who picked up and handled the cartridges that lay thickly in the streets of the city. M.

Corvilain had not kept to his storage limit of 660lb. Six tons of powder it was that devastated Antwerp. The cause of the explosion will never be known accurately, for every soul in the factory was killed. The shed which contained the bullet-melting furnace *adjoined the powder-sifting house*. It is satisfactory to learn, therefore, that Corvilain got 4½ years' imprisonment and his manager 1½ years'; in addition to which



THE GREAT "PLUME" OF SMOKE FROM THE ANTWERP EXPLOSION.
From a Photograph.

they were fined 12,000 francs.

On January 17th, 1894, a mysterious explosion occurred on board the Messageries Maritimes steamer *Equateur*, as that vessel was coming up the Gironde from Pauillac. Towards two o'clock, as the officials entered the safe-room, in which postal parcels of value were deposited, a formidable explosion occurred, which shook the whole vessel from stem to stern. The safe-room was shattered, as well as the adjacent cook's galley and the steward's cabin. The bulkheads of the galley and the thick cast-iron plates of the lower deck were broken and bent, and all that portion of the between decks was left fully exposed.

Two sailors were killed on the spot. A third had his face cut to pieces, and was removed in a dying condition. A high



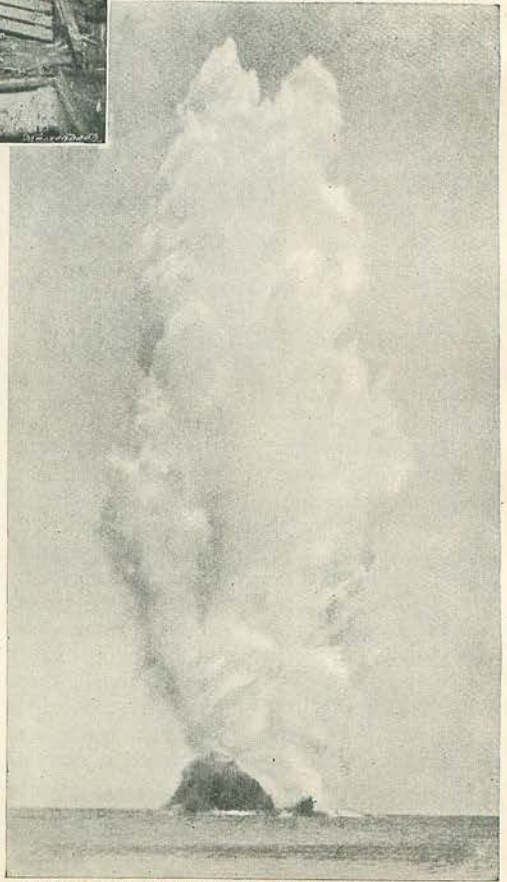
MYSTERIOUS EXPLOSION ON BOARD THE "EQUATEUR."
From a Photo. by Charles, Bordeaux.

explosive had evidently been at work. The explosion seems to have occurred just as one of the sailors—who was killed—was lifting a package containing ostrich feathers; and a quantity of fine plumes were strewn over the wrecked ship. It was suspected that this explosion was part of a plot to rob the treasure chamber of the vessel.

Next is seen a column of water and mud 1,000ft. high caused by the explosion of 3,500lb. of gelignite. Here is the story of this explosion: Some shipments of gelignite from England to Melbourne were found on arrival to be in a dangerous condition, so Mr. C. Napier Hake, H.M. Inspector of Explosives in Victoria, prepared to destroy the whole consignment. He shipped the condemned explosive in a lighter to a shallow part of Port Philip Bay, about ten miles from Melbourne. Here the 50lb. cases were opened, and the 5lb. packets thrown overboard in a heap, in quantities varying from 3,500lb. to 10,000lb.; the water at this spot was 12ft. deep. The explosive was fired by electricity from a steam-launch moored about 300yds. away. "The vast column of water," says the report, "glistening

in the bright sunshine, made an extraordinary and beautiful spectacle."

The Johannesburg explosion of February 19th, 1896, is one of the biggest on record. It appears that about fifty-five *tons* of blasting gelatine and ninety cases of detonators—virtually a train-load—exploded on a siding of the Netherlands South African Railway, about 300yds. to the west of Johannesburg Railway Station. A series of photographs of extraordinary interest was secured. The first of these shows the vast column of smoke from the explosion itself—a fortuitous photo., recalling the smartness and presence of mind of the Antwerp photographer. This photo. was taken at a distance of four miles. This stupendous accident



EXPLOSION OF 3,500LB. OF GELIGNITE BENEATH THE SEA.
From a Photograph.



THE GREAT JOHANNESBURG EXPLOSION (SNAPSHOT TAKEN AT A DISTANCE OF FOUR MILES).
From a Photo. by Gannon, Johannesburg.

which was being shunted, running into the trucks containing the explosive. This was the fault of a pointsman. A great pit or crater was torn in the tough red clay, and this is seen in the second photo. The crowd are searching for bodies and ghastly fragments generally. This crater was 300ft. long, 65ft. wide, and 30ft. deep.

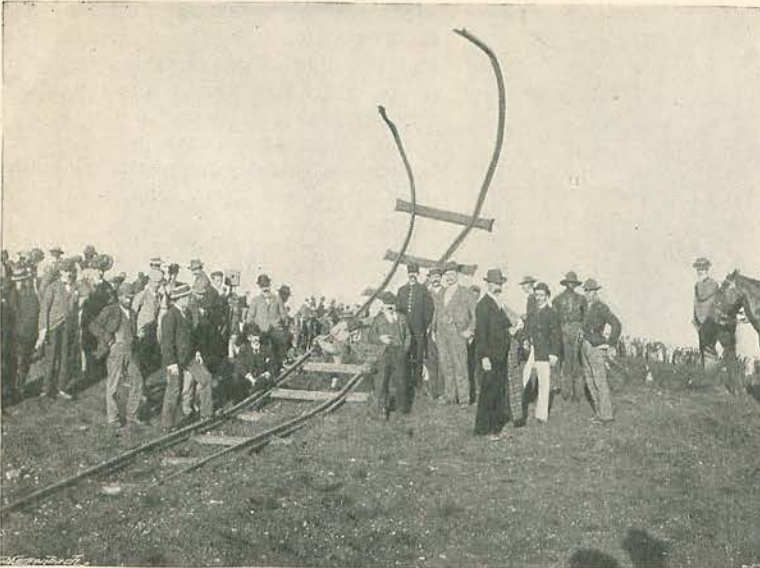
One would need the pen of a Zola to describe that awful *debâcle*. "The ground was strewn with Kaffirs' skulls," wrote one eye-witness. The huge pit was a ghastly sepulchre, filled with pitiful, sickening scraps of humanity, black and white (twenty sacks were filled with these fragments). Dismembered mules and horses; fragments of waggons and railway trucks, and miscellaneous *débris* lay on every side. The damage was computed roughly at a million sterling. Pieces of the engine were hurled a mile away. Crowds of people wandered among the ruins of their houses—mere heaps of splinters, furniture, and iron. The exact number of dead will never be known, but more than fifty bodies were found. Many died in the improvised hospitals.

appears to have been due (as usual, the precise cause is lost in obscurity) to a train,

There were numerous interesting incidents. The dynamite company had a magazine



JOHANNESBURG EXPLOSION—SEARCHING FOR BODIES IN THE GREAT CRATER.
From a Photo. by Nicholls, Johannesburg.



JOHANNESBURG EXPLOSION—SHOWING THE RAILWAY TRACK AT THE EDGE OF THE CRATER.
From a Photo. by Davies Bros., Johannesburg.

near the town that contained 400 tons of dynamite. Into this magazine came a red-hot bolt from the explosion, but the missile providentially fell into a pail of water. A baby six months old was dug out alive from a pile of wreckage. A Kaffir also was brought out alive after having been buried for five days. The railway lines were torn up and twisted as though they had been tin. Over the edge of the yawning pit the rails curled up twenty or thirty feet, presenting an extraordinary spectacle, such as may be seen in the photograph reproduced here.

Fortunately, Johannesburg is a city of millionaires. Within a few hours no less than £40,000 had

been collected for the relief of sufferers, and this sum speedily grew into £100,000. A kind of asylum or hospital for relief was at once opened, and here 600 homeless people were given food, shelter, and clothing.

Lastly, we see the coat and hat worn by Sir Frederick Abel, the eminent chemist, on the occasion of a premature explosion of one ton of gun-cotton during some experiments at Lydd. Sir Frederick had a perfectly marvellous escape. He was only thirty yards from the building containing the gun-cotton when the explosion occurred, and he was thrown down very violently on the shingle, and much shaken and bruised. The hole noticeable in the coat just beneath the collar was caused by a stone projected by the explosion, which made a very ugly wound. Sir F. Abel was laid by for a week or two; but we understand that, except for a slight deafness, he has suffered no permanent injury.

We have to acknowledge our great indebtedness to the ever-courteous War Office authorities for the loan of this very interesting photograph.



SIR FREDERICK ABEL'S COAT AND HAT AFTER AN EXPLOSION.
From a Photograph.