



## IN FIREWORK-LAND.

By W. J. WINTLE.

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ENGLAND in one respect, if in no other, lags behind her compeers. She has no national fête day, no fourth of July, no annual carnival. Thus it comes about that the fifth of November is welcomed by the multitude, who

... Don't see no reason  
Why Gunpowder Treason  
Should ever be forgot.

Guido de Fawkes and his ignoble company are in a fair way to be some day regarded as national benefactors. They were unfortunate in the season they selected, so far as the annual commemoration is concerned. The flowers have vanished, and the trees stand gaunt and bare; it is wet underfoot and damp overhead. Guy Fawkes certainly managed things badly. Human ingenuity has, however, overcome the difficulty, and the flowers once more appear in the land, but now they blossom by night, and they smell of gunpowder. The fairyland of old-time fiction has become the firework-land of modern fact. The fearsome but unsubstantial apparitions of All-hallows Eve find their modern counterpart in the fiery serpents and whistling rockets of the fifth.

It was with thoughts such as these that I lately betook myself, in company with a WINDSOR artist, to South Norwood, where

Messrs. C. T. Brock & Co. carry on the largest firework business in the world. Passing along devious roads we soon reached a gateway opening into an enclosure thickly belted with trees. No Blue Beard's chamber could be more rigidly barred against the unauthorised intruder. A painted board bade us "Beware of the Dog;" a proclamation under the Explosives Act warned us that we were liable to forcible ejection and a fine of five pounds if we trespassed, a large bell announced the presence of strangers, a monster bulldog rushed open-mouthed to meet us, and a watchful attendant was promptly on the scene. But the mention of the WINDSOR closed even the capacious mouth of Little Billee, the bulldog, and we were warmly welcomed by Mr. Arthur Brock, the present head of the firm. Under his courteous guidance we were soon exploring the mysterious region which lay hidden behind the trees.

Imagine a field of many acres, dotted over with about a hundred little wooden, brick, and iron buildings of peculiar construction placed at a good distance apart, and you have a rough notion of the great firework manufactory. There is no whirr of machinery and bustling of many hands; all is silent save for sundry tapping sounds which come from certain of the sheds. A large part of the field is carefully fenced off,

and here the stillness is even greater. The seven iron buildings in this section are far more strongly built, and each is protected by a screen. Behind those screens are stored 140,000 pounds of explosives, and this is but a fraction of the quantity which the firm have stored in magazines elsewhere and in the floating hulks off Gravesend.

Starting with the paper stores, we are shown the largest shells ever produced in pyrotechny. Turning the scale at 2½ hun-

lances, or coloured lights, of which large set-pieces are mainly composed. How great is the demand for these will be realised when we mention that 400 gross of them have been used in one set-piece. Close by the rolling sheds we see the carpenters' and fitters' shops, for a large number of trades are more or less included in that of pyrotechny.

Passing now to the more serious part of the business, we are introduced to the wooden buildings which lie scattered over the great green field. Here we learn something of the precautions which have rendered serious accident a remote contingency. Each structure is about 16 feet by 12 (though some vary in size), and is lightly constructed of boards. The interior is varnished, and the floor covered with lead or linoleum fastened with copper nails. Any artificial light which may be needed is obtained from gas-jets placed *outside* the windows, and the most scrupulous cleanliness is observed. Every part of the building, floor, sides, and ceiling, must be carefully dusted every day. Even the presence of a cobweb would render the firework manufacturer liable to a penalty. All this is to avoid the presence of grit.

Similar precautions are taken with the workpeople. Each is thoroughly searched on entering the premises, and dons a thick non-inflammable guernsey and overshoes of brown leather without nails. The number of persons allowed in each building is subject to Government regu-

lations, and is clearly indicated on a board beside the door, where is also stated the kind of work and quantity of composition allowed in each. When the workpeople need anything they hang out a red flag, and an attendant comes at once. All fireworks have to be carried to the magazines in closed trunks covered with tarpaulin. Hydrants are placed at frequent intervals throughout the field, and buckets of water are everywhere.



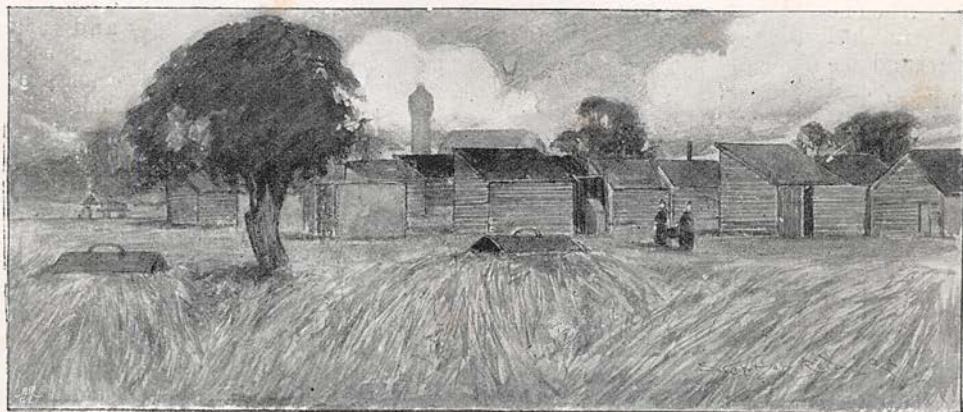
MAKING FIREWORKS.

dredweights and measuring 25 inches in diameter, they are a striking contrast to the little 3-inch shell which represented the utmost advance of the art in the days of Mr. Brock's great-grandfather. Near at hand are the rolling sheds, where busy hands are making paper cylinders of various sizes, from the tiny tubes which are used for squibs and crackers, to the massive cases of the latest rockets and other large goods. Here a number of young women are making the tubes for the little

We visit the buildings in turn and witness the processes. In one the ingredients are being very cautiously mixed, in others various kinds of rockets, etc., are being filled, the composition being driven home by taps from a boxwood mallet, while in another the quick-match is being made. This is simply a cotton wick steeped in a mixture of gun-powder and starch and then dried on a frame. It is used for connecting the coloured lights in set-pieces. In another building a strong odour of methylated spirits greets us, and we see the process of making the brilliant stars which fall in such graceful showers from rockets and shells. They consist of small cubes of composition moulded with methylated spirits and shellac and afterwards hardened.

While our artist is sketching the scene, Mr. Brock tells a few interesting facts about

article, but my readers may be interested to know that Messrs. Brock's greatest achievement in set-pieces was no less than 207 yards long, representing the battle of Trafalgar. The amount expended upon fireworks is enormous. The display at Delhi, when the Queen was proclaimed Empress of India, cost £3000, and during the Jubilee year £250,000 was similarly spent. In this country 5000 rockets have been let off at a single time, and this number has frequently been doubled on the Continent. The amount annually spent upon fireworks for the fifth of November is estimated at £100,000, and would no doubt be increased if the supply equalled the demand. Mr. Brock told me that for a few weeks before the Jubilee he was compelled to refuse orders to the extent of £300 or £400 per day, owing mainly to the official



THE FIREWORK BUILDINGS AT THE CRYSTAL PALACE.

the history of his firm. For seven generations the family have been firework makers, and the present head declares that the pyrotechnist, like the poet, is born and not made. Their connection with the Crystal Palace dates from 1865, when the famous C. T. Brock was successful in a competitive display for the position of pyrotechnist to that well-known place of amusement. Three years later the manufactory was established at Nunhead, and from that time the business has increased by leaps and bounds. As an illustration of its recent growth it may be mentioned that in 1881 the storage power of the firm was 34,000 pounds; at the present time it is 500,000 pounds, of which 70,000 pounds have been added this year. To enter upon an account of the development of pyrotechny during late years would be impossible within the limits of the present

restrictions which limit the production of fireworks.

By this time our artist has finished his sketch and we return to the office, where we inspect a unique collection of old engravings of fireworks and a series of photographs of the principal set-pieces constructed by the firm. Thence we make our way to Penge and enter the grounds of the Crystal Palace. Passing by the muster ground and the unfinished cycle track, and ignoring even the seductive attractions of a switchback railway, we soon arrive at some trenches strongly railed around. A conspicuous notice informs the public that neither the Crystal Palace Company nor Messrs. Brock will be responsible for the safety of persons who linger there on firework nights. We are comfortably independent of such considerations, for is not the great pyrotechnist with us?

Descending into the trenches we view the massive mortars of varying size, from whence will presently arise huge shells to hurtle through the air and burst into showers of many-coloured stars. It is pleasant to know that the mortars are fired by means of a slow match, and that the operator is in a place of safety before the discharge takes place.

We next betake ourselves to the firework enclosure on the terrace and find a gentleman with a cooking stove, performing culinary operations on a wire in mid-air. When he has finished the crowd disperses, and only a few stragglers remain to watch the motor cars as they run their jerky course. Then, under the same able guidance, we inspect the preparations for the evening display. A large set-piece is in process of completion. A huge framework of laths has been constructed, divided into convenient square sections, and on this an immense design has been outlined in lath and cane. With the aid of wire nails some 60,000 coloured lights have been arranged along the design, all being connected with quick match. The entire affair is hoisted by an ingenious hydraulic contrivance to a frame of scaffold poles, and the various moving parts of the design connected to long cords for the convenience of the operators. Hard by we find

a cow and horse ingeniously built of wood, outlined with fireworks and attached to small trucks. Sundry laths are attached to the different limbs, and explain the mystery of their subsequent performances. An unfolding star, a revolving chromatope, a gigantic chrysanthemum of cane and fireworks, and a peacock with expanding tail stand all around, and we admire the ingenious mechanism by which the various moving effects are brought about.

But time is flying and we pass on into the Palace, where the Lumière Cinematographe attracts our attention for a few minutes and transports us alternately to the shores of the Mediterranean, the plains of Southern France, the interior of a beer garden and a host of other places. We next find ourselves, but this time in reality, in the Bear Pit Club, an institution known to the chief Palace officials and their friends. Hidden away in a corner an unobtrusive door leads into the pleas-



WATCHING A SET-PIECE AT THE CRYSTAL PALACE.

ant quarters known as the Bear Pit. The motto "Bear and Forbear" adorns the pipe-rack, and two stuffed members of the ursine family mount guard upon the sideboard. A pleasant place withal wherein to rest from the noise and excitements of the palace of glass. Here Mr. Henry Brock joins us, and over the dinner-table we enjoy many a merry tale of adventures in India in 1875, when Messrs. Brock visited that country for the

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purpose of letting off fireworks in connection with the visit of the Prince of Wales. Some hundreds of tons of fireworks were used on that occasion, ten separate displays being given, at costs varying from £1000 to £2500 each. Presently a loud report announces that it is display time, for this is a children's day and so good hours are kept, and we make our way to the front of the Palace, where, from the safe altitude of the royal box, we survey the scene. The last occupant of the box was Li Hung Chang, and we listen with amusement as Mr. Brock tells of the excited enthusiasm of the wise man of the East, who declared that the fireworks for which China is famous were completely eclipsed by the splendours of English pyrotechny.

It is a wonderful scene that we are looking down upon. Massed along the terrace are nearly 20,000 persons, for a firework display increases the attendance here from five to ten-fold. Many of them are children, and a hum of delighted expectation rises in the air, changing into a prolonged "O-o-o-o-h" of astonishment as the whole scene lights up with many-coloured fires. It is a strikingly beautiful effect, for the fires are hidden away behind the trees which stand out in strange, weird combinations of light and shadow.

Now follow a series of sharp reports in the direction of the trenches, and the air is suddenly alive with shells which burst in mid-air, at heights of from 700 to 1000 feet, and descend in showers of coruscating stars.

The set-pieces, though less effective from an artistic point of view, ever have most attraction for the youthful mind. Very soon the cow burst forth in colours more bright than any recognised breed possesses, and was promptly taken in hand by Jack of the fable and sold to the artful butcher for a bag of beans. These were duly sown, all in fire, and after sundry splutterings from the outraged earth, a giant bean-stalk grew rapidly heavenwards and burnt while Jack nimbly climbed to the summit. It will astonish my juvenile readers to hear that these men of fire are real men, clad in suits of incombustible asbestos and wearing on their sides and limbs wooden frames which carry the fireworks. Not a pleasant task, by any means, for, though they seldom get burnt, the smoke often blows into their faces until they fairly choke.

More shells and rockets, and then a beautiful chromatrope appeared in the form

of double wheels of variously coloured fireworks revolving in opposite directions. The effect was as tasteful as it was brilliant.

Next came a forge, where busy blacksmiths hammered horse-shoes and shod a wooden horse whose head and tail wagged in singular union. A large and elaborate star now lit up the scene and presently unfolded its rays like the petals of a water-lily and grew to double its original diameter. Immediately followed an immense grandfather's clock, up which a mouse ran until the clock struck one, with a report like a cannon. Then the mouse lost heart and ran away, and the principal set-piece was quickly displayed before us.

It represented a Burmese temple, in the various parts of which were native jugglers plying their art. One spun a fiery tub on a fiery stick, others performed feats of balancing, while yet others were engaged in the well-known butterfly and fan trick. Above all squatted a genial figure whose flaming neck elongated and contracted with rhythmic regularity.

After a bicycle race came the chrysanthemum, certainly the largest botanical specimen in the world. Formed of yellow gerbs, it combined simplicity with splendour and yielded to none of the items in effectiveness. Meanwhile shells rose in the air, some singly, others in flights, and dazzling magnesium lights gave the impression that the moon had suddenly risen on the multitude of upturned faces.

A flash of light ran suddenly along the top of the great frame whereon the Burmese temple and the nursery rhymes had been illustrated, and a perfect Niagara of fire poured down from a height of over a hundred feet. The display drew near its close, and Messrs. Brock introduced their speciality of the season.

It was a mechanical peacock, and probably represents the greatest advance that has yet been reached in the realistic representation of a living creature by pyrotechny. The bird first appeared with its splendid train of feathers trailing on the ground; these were slowly erected, then expanded, and the favourite of Juno stood forth in all his pomp and beauty. Nothing could have exceeded the fidelity with which the eyed feathers of the train were represented; there is only one word for it—it was perfect.

The fountains now burst forth and changed from gold to green, and from silver to crimson, under the influence of coloured lights, and the show was over.