



ROBERTS BROTHERS, GLOUCESTER.

**Manufacturers of Games and Picture
Blocks.**

TO the courtesy of the Messrs. Roberts, Glevum Works, inventors, patentees, and manufacturers of indoor and table games, puzzles, picture cubes and A.B.C. blocks, the reader is indebted for the following account of a very interesting and unique industry.



View of Works, looking from Employees' Recreation Ground.

In 1892 Mr. H. O. Roberts (the present senior member of the Firm of Roberts Brothers) devised a simple but ingenious game, which he called "Piladex," and which has since become known in almost every household in England. It was designed with the one object of affording innocent amusement to a class of Sunday pupils taught by the inventor, and was only extensively pushed when actual use demonstrated its value. After some little negotiation with large game manufacturers and dealers, Mr. Roberts arranged with one firm to undertake the sale of "Piladex." Even this firm, however, would not assume the cost and risk of manufacture, but agreed to undertake to sell what games the inventor furnished. This led to the Brothers Roberts entering into partnership, and for some time they manufactured "Piladex" in odd moments, still devoting themselves wholly to their other occupations. But the game, which is far too well-known to need description here, gradually caught the popular fancy, and became a welcome guest in both the highest and lowliest houses in the land, as a proof of which may be mentioned that in 1898 copies of the game were sold by the inventor to the Princess



Saw Mill and Wood-Working Department.

of Wales, now H. M. the Queen, and H.R.H. Princess Henry of Battenberg. From time to time other games were invented and brought out, which ultimately resulted in both the partners devoting themselves entirely to their production, and after several removals to larger premises—each in turn proving inadequate for the increased turn-over—it was finally decided to build the present large and splendidly-equipped works.

The present buildings were erected in 1902, and are architecturally among the most imposing in Gloucestershire. The main building is a substantial and handsome three-storey structure. Two adjacent one-floor buildings are also used. All of the rooms are admirably lighted and ventilated, and the sanitary arrangements are such that the Government Inspector has not only highly commended them, but has even sent prospective factory builders to inspect them. When the present carefully-designed buildings were erected it was thought that they would be amply large to meet the requirements of a steadily growing trade for years to come; but so far is this from being the case that it has already been found necessary to erect several additional buildings for mess-rooms and other purposes, while it is clearly foreseen that an extensive enlargement of the main building will soon be necessary. Fortunately, the Firm own sufficient land to permit of any needed extension, two acres of ground being available. At the present time 150 operatives are kept busily engaged, and even a larger number would be employed during the busy season were it possible to accommodate them. The Messrs. Roberts Brothers have brought out between 200 and 300 successful games, several of which have been popular favourites both in Great Britain and abroad.

It will no doubt surprise many to learn that to quickly and economically manufacture a game is almost as great a puzzle as to how to invent one. This is demonstrated by the various departments, several of which will be mentioned by way of illustration.

Wood Working Department.

To produce the great quantity of wooden articles alone (of which there are some hundreds of patterns) a knowledge of timber, and how to economically convert it from the rough state into the finished article, is indispensable. This problem has been successfully solved by the equipment of a complete saw mill plant, including numberless circular saws, both large and small for coarse or fine work, band saws, planers, moulding machines, turning lathes, drills, sandpapering machines, etc., etc.

Cardboard Box Making Department.

This is also quite an extensive and busy department, as may be readily understood when it is stated that generally each game is separately boxed. In this department we noticed machines for cutting, scoring, stitching, metal edging, stapling and other operations which the uninitiated can scarcely understand the use of.

Game Boards Department.

As scores of the games have a board to play on—such as Drafts, Halma, Ludo, Snakes and Ladders (to mention a few old favourites)—

it will be seen that a huge quantity are required each season, and that many busy fingers are kept dexterously employed in their manufacture.

Wire Working Department.

The numerous wire articles used have necessitated the establishment of this department. Here are found many interesting and clever machines for twisting and converting the wire into fantastical shapes quickly. Frequently in making a game it is necessary to construct a complicated machine to turn out a single article in the game, this work requiring inventiveness of a high order, and a short study of this department clearly shows that this has been attained.

Painting and Varnishing Department.

This is a veritable hive of industry. Here may be seen the hundred and one small articles



Cardboard Box Making Department.

being painted and varnished, such as balls and mallets for table croquet, hockey clubs for hockey games, small metal figures for football games, and a host of others—all needing a deftness and neatness of execution which are but little less than marvellous to one whose fingers have been untrained in similar work.

Picture Cube and A.B.C. Blocks Department.

The great ingenuity required to produce games cheaply is illustrated by the picture cubes and A.B.C. blocks, which the Messrs. Roberts Brothers have recently brought out. Up to that time only one other firm in England had manufactured picture blocks, their output being limited to the more costly kind, the Germans having a monopoly in the popular priced lines. It was the work of many months for Messrs. Roberts Brothers to find out how the pictures were mounted and cut up so that the cubes could be turned out quickly and in large quantities. One is surprised at the enormous labour involved in simply turning out a 6d. box of Picture Cubes, and one can easily understand why the German firms have



View of Works, looking from Front Entrance Gates. (Roberts Bros.' Glevum Works.)



had it all their own way. Between four and five million pictures had to be ordered to get them cheaply enough; and, although they could have been bought more cheaply in Saxony, yet, as this line was to be called "British made," Messrs. Roberts placed the order with one of the largest litho firms in this country. The pictures are of a very high order, and are thoroughly British in design and colour.

The Ring Board Department.

In passing we noticed the "ring board" department (which appeared a very busy one), the blackboard and easel department (which is continually during the season working at high pressure), the general games department, (where there were scores of different games, some new and some old favourites, in various stages of completion), to say nothing of the modest 1d. game department, all presenting a scene of the greatest activity, and one cannot help wondering where all the enormous and varied productions go.

There would not seem to be much room for a difference in quality in a game retailing at anything from a penny to a shilling, but let anyone compare the games produced by various manufacturers, and he readily sees the difference. For instance, the beautifully-coloured labels and linings for the boxes and game boards manufactured at the Glevum Works are real works of art, designed by first-class artists and lithographed and printed by some of the best firms in the country.

The present members of the Company are Messrs. H. O. and J. O. Roberts, both of these gentlemen devoting their entire time to the business they have created in but little more than a decade. They have not only added very materially to Gloucestershire's importance as a manufacturing district, but have brightened the fireside in countless homes throughout the world. It is but just to add that they have throughout shown that integrity which is peculiarly necessary to their business. In collaborating with others in perfecting games, and in their connection with dealers, they have proved worthy of every confidence that may be placed in them.



THE STONEHOUSE BRICK AND TILE CO., LTD., STONEHOUSE.

Manufacturers of Plain and Ornamental Bricks, Flooring Squares, Roofing, Drain Pipes, Terra Cotta Goods, etc.

A VERY gratifying illustration of Gloucestershire's industrial development in recent years is afforded by the Stonehouse Brick and Tile Company, Limited, whose works have become one of the most important of the kind in the country. This business was established in 1890, when the present limited liability company was organised by Mr. E. Jenner Davies, J.P., in conjunction with Mr. J. F. Hayward, of Bath, and the late Mr. M. P. Hayward, of Cheltenham, and from the very beginning its growth has been uninterrupted.

The works were begun on a small scale on the present site, where the Company own in freehold twenty acres of land in one tract, immediately adjoining the Great Western Railway, a private siding extending along the whole front of the works and directly opposite the kilns from which the goods are loaded directly into the railway wagons. The property covers a large hillside, with practically inexhaustible deposits of the finest clay to be found in this entire section. The clay deposits, which have already been worked to a depth of 100 feet, comprise four distinct seams: Yellow Plastic, Brown Marl, Blue Lias, and Metford Sands, all of which, as determined by both



General View of the Stonehouse Brick and Tile Company's Works, Stonehouse

analysis and actual use, are of excellent quality.

When the Company began operations a small portion of the hillside was levelled to permit of the erection of the necessary buildings, which were but a fraction of their present size. As the cuttings extended farther back into the hillside additional buildings were erected in the room thus made available, the present compact plant covering a level area of several acres. The present capacity of the works is 10,000,000 bricks yearly, while the staff of workmen number nearly one hundred.

The works as at present constituted are not only the largest in the county, but in point of arrangement and equipment they represent the latest and most approved ideas known to brickmaking. While we shall not attempt a technical or detailed description of the plant, it may be proper to refer in a word to several noticeable features of construction. The motive power is furnished by two large steam engines by Lees, of Hollingwood, for the main plant, with four auxiliary engines, two of which are by "Robeys," Lincoln, in as many separate departments, and two large boilers, of Cornish and Lancashire type. The chimney stack, which was erected in 1900, taking the place of two which were in use before then, is the tallest in the county, having a height of 202 feet, with a base diameter of 17 feet at ground level and foundation. This chimney is not only connected with the three boiler fires, but also removes the products of combustion from the entire plant, including eight drying floor fires and fifty-four kiln furnaces. The enormous draught of the chimney may be inferred from the fact that some of the flues leading into it are not less than 700 feet long, and yet sufficient draught is generated for the fires at that distance from the base of the chimney. The premises are lighted throughout, both inside and outside the buildings, with incandescent gas, and the various rooms are heated with steam; and in every possible way the comfort and efficiency of the workmen have been provided for. It may be proper to add here that the Company pay the fees for such of their employees as desire to take special courses at the School of Science and Art, a fact which not only attests the cordial relations existing between employers and employed, but which shows the constant effort made by the Company to increase efficiency.

The latest important addition made to the plant, and one which illustrates the Company's progressiveness, is the new hot-air drying plant completed last year. This addition consists

of six "tunnels," each 110 feet in length, in a building 165 feet long, the whole having a capacity for drying 25,000 bricks per day. Each tunnel contains a line of trucks with roller bearings, the track gradient being such that as fast as the trucks of dried bricks are removed at one end the remainder move down to make room for new trucks ready for drying. The heated air, which has a temperature of about 180 degrees, is forced into the tunnels by a powerful fan. From the drying room the bricks are taken, on the same tracks, to the kilns directly opposite.

In every department the mechanical equipment is of the most efficient type. All the clay is drawn by steam power up an inclined plane to the upper floor, whence it descends by gravity through several sets of rollers, by which it is reduced to the necessary fineness by the time it reaches the presses on the ground floor. While brickmaking is the most primitive of industries it is also among the most highly-developed, and those who remember the old hand process that prevailed but a few decades ago can scarcely realise the extent to which machinery and modern scientific methods are now used in plants such as that to which we are briefly referring.

The Stonehouse Brick and Tile Company make literally hundreds of different styles of plain and ornamental bricks, varying in hardness from the "rubber" bricks, which can be cut with a knife, to the hardest vitrified brick for street paving and similar purposes. They also design and manufacture large quantities of terra cotta balustrades, mouldings, etc., having gained particular prominence in this class of work. From having started with a purely local patronage they now execute orders for deliveries over a very wide area. They recently received an order for over 3,000,000 bricks for buildings for the Government, to be used in the barracks now in course of erection on Salisbury Plain.

The present directors of the Company are Messrs. J. F. Hayward and E. Jenner Davies, Mr. M. P. Hayward, the former chairman, having died on March 5th last, at the age of 86 years. Mr. A. W. Anderson is the manager of the works. Mr. Anderson adds theoretical to practical knowledge, and is constantly studying to improve his methods of production. He has travelled abroad, making use of his observations of other works wherever possible to effect an improvement. It is but just to say that his efforts have been very successful, as the splendidly-appointed works testify.