1. A suspended block of cement, 3½ inches wide, and 2½ inches thick (one month old), was pulled asunder by 3,240 lbs., including the weight of the scale.

2. Sixteen stock-bricks, attached to each other with neat cement, supported at one end, and projecting from the bearing point 3 feet 2½ inches, broke in the eleventh brick with 256 lbs., exclusive of scale, suspended on the extreme end.

3. A solid step, 6 feet 5 inches long, and 7½ inches deep at the back, formed of two parts Portland cement and one part broken bricks, held up at one end, carried itself, and broke off close to the bearing-point when the third 56 lb. weight (168 lb.) was placed on the extreme end. The weight of the step was called 4½ cwt.

4. Two blocks of neat cement, 1 foot 5½ inches long, 9 inches wide, 4½ thick, cemented together with neat cement, bore 6,000 lbs., when the lower part of the lower block gave way.

5. Twenty stock-bricks, united side by side with cement, composed of one of cement and one of sand, 3 feet 6½ inches in bearing, were supported at each end by iron clamps: the weights being applied to the centre, the bricks broke with 1,200 lbs.

6. Six fire-bricks, in courses, cemented together with pure cement, were suspended, and weights were applied to pull them apart: the upper brick broke with 2,836 lbs. in the scale.

7. The five fire-bricks from the last trial were again tested, iron being inserted in the second brick from each end: the upper brick broke, carrying away also part of the lower, with weight of 4,600 lbs.

8. Two pieces of Portland stone, 2 feet by 11½ inches, 7½ inches thick, cemented together with neat cement, took a weight of 7,272 lbs.; when the lower stone yielded, carrying away a small portion of the cement joint.

Our readers will find other experiments on the same material, both by Messrs. White, and Sons, and Messrs. Robins and Aspdin, in our sixth volume, pp. 343, 351, and 471.

MINERAL PRODUCTS IN CLASS I. OF THE GREAT EXHIBITION WHICH RELATE TO THE BUILDING ARTS.*

GRANITES.

Besides the Cornwall and Devonshire granites and porphyries which have been noticed, the Exhibition contains representatives from most of the localities in the British Isles. Thus we have a specimen of the granitic, or rather syenitic, rock from mount Sorrel in Leicestershire, in which the mineral called hornblende is substituted for the mica. This stone is commonly used for walling, road-pitching, and as a covering of broken stone where a very hard surface is required, as on the roads near London. Scotland is represented by the Barnton Mount granite from Edinburgh, by the Aberdeen granite, by the two kinds of Peterhead granite, by the granites of Argyleshire and the Isle of Mull, by that from Kirkcudbrightshire, and by the Glenorchy and Loch Etive granites and chlorite slates. The Barnton Mount stone is unlike most other granites, being a greyish uniformly coloured variety, compact and fine grained, can be procured in blocks of any size, and would, perhaps, be more extensively used if it were not for the proximity of the celebrated Craig Leith, Red Hall, and Carlingnose quarries, which furnish stone, perhaps of equal durability and certainly easier, and less expensive to work. The Aberdeen granite is generally fine grained, crystals small and undefined, colour a pleasing speckled black and white, in which the two are about equally mixed. This granite is well adapted for curb-stones, street-pitching, and for the larger class of hydraulic works, and has been used in Sheerness Dock and other works. It is also used for statuary and for a variety of ornamental works. Owing to the very crystalline structure of this granite and the metallic lustre of the mica, it takes a very beautiful polish. Specimens of Aberdeen granite may also be sometimes seen with a light pink tinge of colour, derived from the felspar. The Peterhead granite, is of two kinds, one termed the red granite the other the grey. This difference is occasioned by the colours of the felspar. Like the Aberdeen granite they are both susceptible of a very beautiful polish. The Peterhead granite has been used in Trafalgar-square, the British Museum, and the Carlton Club-house, and is well adapted for sculpture and statuary. Besides the use made of the Aberdeen and Peterhead granite for building, paving, and statuary purposes, it is also, by the aid of the lapidary, manufactured into a variety of small articles, for which its beautiful polish admirably adapts it. For instance, it may be met with in the first shops of Edinburgh and elsewhere, handsomely mounted in the shape of pencil-cases, penholders, bracelets, brooches, necklaces, handles for paper-cutters and other knives, studs, buttons, seal handles, paper-weights, &c. Considerable employment might be obtained by working up the beautiful granites of Devon and Cornwall, especially those of Dartmoor, into similar articles. The *Encyclopædia Britannica* states that granite stones to the value of 30*l.* to 50*l.* have been raised from an acre of ground under preparation for tillage in Aberdeenshire, and sold for paving the streets of London; that the exportation of granite to the capital from this country employed at one time 400 men and 70 vessels of 7,000 tons burthen, and that the value of all the granite exported yearly was stated at 40,000*l.*

The Argyleshire granite from Inverary is very compact, greyish coloured, with black specks, and is much recommended for street-pitching. The Bonar granite varies from a very fine to a coarse grain; the prevailing tint a clear black and white, not so grey as the Inverary. The Argyleshire granite from the Forest of Glenorchy contains pink-coloured crystals of felspar. The Isle of Mull granite very nearly resembles the red variety from Peterhead. The specimen from Craignair Quarry, Kirkcudbrightshire, is a black and white variety, with moderately sized crystals not well defined, mixed with largish light pink crystals. This is a strong, compact, highly crystalline granite.

The Glenorchy and Loch Etive granites will be found in No. 7: some of these are mixtures of white felspar and quartz in moderately sized crystals, with black mica or schoel. In other specimens, where the felspar is still white, the grain or crystallization is much finer. In others, the felspar is flesh-coloured, the tint varying in intensity in different blocks, and sometimes even attaining a scarlet red. Sometimes, but in few specimens, the felspar is decomposed. The same number contains specimens of garnets, chiefly of small size, probably procured from micaceous schist, in the neighbourhood of the granite: there are also specimens of chlorite slate from the quarry near Taymouth, which furnished the stone for building the castle of that name. The stone is a light faded green colour, with very fine lamination, and a very smooth surface when dressed. Inverary Castle, the seat of the Duke of Argyle, is also built of chlorite slate.

The channel islands of Herm, Guernsey, and Sark, as well as the Orkneys, furnish specimens of their granites. The channel islands granite has frequently very large crystals of pink-coloured felspar. Other varieties from Herm and Guernsey have a very dark green base, with whitish crystals of felspar. These are excellent for street pitching, and are also very extensively used in the broken state for metalling the surface of the metropolitan roads. The granite from the Orkneys has a cloudy, indistinct appearance on the surface, having large masses of white and black much intermixed, and sometimes intersected by long straight veins. The Herm granite is also much used for steps and curb-stones, and was employed for the steps of the Duke of York's column, and for the blocks of the tramway laid down in the Commercial-road for the heavy traffic to and from the West India Docks.

The Irish granites are represented by specimens from Dunleary, and from Carne, in the county Wexford. The Dunleary and Kingstown granites resemble that of Aberdeen, except that the colour is lighter, the white tint prevailing to a greater extent. The Wexford granite is porphyritic, sometimes very fine grained, with sparry white crystals in a dark green ground, sometimes with pink crystals of a larger size and coarser crystallization. No. 160 contains some beautiful blocks of serpentine from Connemara, in the county Galway. This exquisitely variegated marble is in two blocks, each of which is about 5 feet long, by 2 feet 6 inches wide, and a foot deep, one face of each being polished. This serpentine is exceedingly well adapted for ornamental work, and has even been exported from the coast of Galway to New York. No. 155 also contains a beautiful specimen of serpentine from the Darcy estate, near Clifden, Connemara. This marble is also exported in considerable quantities. No. 142 contains specimens of green granite from Rossmore, county Monaghan. This has a black ground, with numerous green crystals (felspar?) of all sizes up to one inch by a quarter of an inch. In one specimen the crystals are smaller. Well adapted, when polished for interior ornamental work.

BUILDING STONES OF THE OLD RED SANDSTONE AND DEVONIAN SERIES.

Although a vast extent of country is comprised within this geological formation, yet the specimens of building stone sent up to represent it are comparatively few, and with one or two exceptions are confined to Devonshire. The old red sandstone nevertheless contains many quarries of building stone, but they are little valued locally, chiefly because superior stone frequently exists in the same neighbourhood. Hence, with the exception of a single specimen from the neighbourhood of Hereford, another from Tortworth, in Gloucestershire, and one from Bristol, not much used for any purpose but common fence walling, the old red sandstone is quite unrepresented. We have a specimen of sandstone from the neighbourhood of Taunton, which probably belongs to the rocks of the Quantock Hills, and the other stones classed under the head of the Devonian series are from the coralline limestones of Plymouth and the south-east of Plymouth.

The specimen from near Hereford is No. 194 in Catalogue, from Jennings' Quarry, Three Elms, Hereford. It is a moderately fine grained stone of a yellowish cream colour, and dresses with a clean, sharp arris. It is used in the neighbourhood for cider-mills, and is said to be suitable for sea walls, railway blocks, &c. It is said to stand equally well on its edge and on its bed, but this property is doubtful of any laminated stone, as wherever lamination exists there must be a tendency to scaling off when the stone is placed on its edge. This arises from the percolation of moisture which will be absorbed at the joints, will penetrate between the laminæ, and the action of frost will separate flakes or sheets from the face of the stone. The specimen from Tortworth (see No. 29) is also a grey variety, moderately fine grained, with particles of mica, and a somewhat earthy cement uniting the grains—weight per cubic foot 162½ lbs. The Bristol specimen (No. 29) is from the Avon defile, and underlies the great mass of mountain limestone exposed in that section. It is the ordinary dun red stone so extensively prevailing throughout the old red sandstone district, the colour being due to the peroxide of iron. The grains are not well cemented, and generally speaking the stone is of little value, except for rubble walling and buildings of an inferior class. The specimen from Bishop's Lydiard, near Taunton (No. 193), is the same dun red sandstone, but of somewhat

* See p. 467, *ante*.