

sploshed in. In the "Design for a Baptistry" (40 and 41), by Calvert Vaux, a lantern light is made to rise from the octagonal intersection of groining, cleverly devised.

The approved design for Heptonstall Church, by Malinson and Healy, is Perpendicular, and somewhat common-place. In the Parsonage of St. John's, Lacey-green, by J. P. Seddon, some effect is cheaply obtained by the mixture of red and yellow bricks. 62 is the "Interior of new Church at Walkden," by W. Young: the style of the structure is Early English, but the roof belongs to a later period. 72. "Design for Rebuilding Church of St. Thomas, at Newport," by G. Truefitt, is an excellent drawing of a very good design. It is decorated in style, and has a lofty slate spire. Of (No. 30) "A Wrought Iron Sign Lamp," now being erected in Manchester, by the same, we shall speak next week when on the spot. 79. "The Timber Bridge over the Witham," is a beautiful drawing, by G. H. Andrews, and the same may be justly said of Nos. 110 and 160, "Views of Mr. Peto's Seat, Somerlayton-hall, Suffolk," by the same artist. No. 96. "Perspective Elevation of a Design for a Public Museum," in which the lunette formed by the vaulting of the portico is filled in with stained glass, after the manner of a fresco, is one of Mr. Leeds's ingenious strivings after novelty, in a difficult path. The figures within the pediment are confined to a centre compartment by uprights, which alter the horizontal tendency of the lines to perpendicular. 100. "A Mansion," by Aehpitel and Whicheord, is set forth by pen and ink artistically. 122. "A Design for a Contemplated Public Building," by R. Kerr, is both novel and effective. 157 shows Mr. Kerr's design for the clock-turret on the Guildhall at Norwich, now being executed. The interior of the library at University College, London, by Prof. T. L. Donaldson, is set forth in 154. It is a handsome apartment, with vaulted ornamented ceiling, which would seem to be of plaster, but is grained oak. Nos. 123 and 113 show the proposed restoration of West Drayton Church, by Charles Jones; 140 shows the proposed restoration of a very interesting old house, Ware Priory, by Sidney Godwin; and 199, the Victoria Tower, Guernsey, by W. B. Collings. Mr. J. K. Colling, Mr. Street, Mr. Geogheghan, Mr. J. D. Wyatt, Mr. Edward Walters (a clever design for a mansion to be built near Manchester), Mr. G. F. Jones, Mr. Habershon, Mr. Collmann (design for a ceiling at Luton Hoo), Mr. Papworth, &c., should also be mentioned. Mr. Fergusson exhibits his design for a National Gallery, and some drawings of Indian temples. Mr. E. B. Lamb has, amongst others, a design for the Dundee arch, elaborate in ornamentation, but not so successful as his Gothic designs. Mr. W. P. Griffith sends a bold drawing of Pincas at St. Alban's; Mr. Allom some well-known drawings; Mr. Cave Thomas a clever design for a carpet; and Mr. Britton his design for a Cenotaph Gallery.

On Tuesday, more than 500 persons visited the Gallery.

#### THE BUILDING ARTS IN BOMBAY.

A COMMITTEE is at work in Bombay collecting specimens of native arts and manufactures, to be forwarded to the Industrial Exhibition in 1851, and they intend (we are glad to hear) to send with them as large an amount of statistical and descriptive matter as they can get together. In connection with these endeavours, the *Bombay Times* has commenced a series of articles on the native arts, from which we glean the following memoranda:—

**Cement.**—The only cement here is chunam, in its various forms: the only building-stones, which differ materially from those of the rest of the world, are littoral-concrete and kunkur. Kunkur is described as a variety of limestone mostly nodular—always fresh water and recent—in most cases in the act of being formed under our eyes. It is sometimes found in thick stratified beds like the travertine near Rome, and seems in this case to have been formed by calcareous springs; more generally it is met with in clay or alluvial soil, in the shape of small pieces, from the size of peas or filberts to that of the hand. In the blue clay which stretches along all our shores it is

found in vast abundance, generally assuming the most fantastic forms; indeed, it abounds in every rice-field and open soil all over the country. The more recent varieties seem to be formed by the agency of the rains; when the earth abounds with vegetation, the tepid waters are charged with fixed air and dissolve the lime prevailing in the soil everywhere around,—the mineral being again thrown down as the advancing season dispels the excess of gas. It in this state absorbs the clayey matter around, and cements it into kunkur. This is collected by the limeburner, placed with firewood in small-sized conical kilns, and burnt in the usual way. It contains 72 of carbonate of lime, 15 of sand, and 11 of clay and oxide of iron. Mixed with half its weight of river sand, it makes an excellent mortar: burnt in pieces of a cubic inch or so in diameter, and then powdered without slaking, it forms a first-rate water cement, setting in a few minutes, and becoming as hard as stone. At Poona the finer varieties of kunkur are burnt with charcoal all throughout the city, in neat, pigmy-looking kilns, 2½ feet high and about as much in diameter at the base. These hold about a cubic foot of material, or about 36 lbs. of charcoal and kunkur in equal parts. When burnt, it is slaked, and then made up into bricks, which are sold in the bazaar for the purpose of whitewashing. The finer kinds of chunam on the coast are made from shells, brought chiefly from Rattaherry.

**Building-stones.**—To pass from cements to building-stones, we first come to Laterite. This rock seems peculiar to India. It covers the western coast almost continuously, and for the most part up to the very foot of the ghats, and from close by Bombay to Ceylon. It is found in detached beds along the Coromandel coast, near Madras and Nellore, Rajahmundry and Samulcottah, extending into Cutch. It caps the loftiest summits of the eastern and western ghats, and some of the isolated peaks in the table-land in the interior. Its colour is of a red iron or brickdust hue, sometimes deepening into dark red. It is marked with whitish stains, and is occasionally cellular or perforated with tubiform holes. It quickly hardens and darkens in hue by exposure to the air, and is not at all liable to decomposition or injury from the weather. The Arcade Inquisition at Goa is built of it, and also the old fortress of Malacca. A curious variety of trap-tuffa, sometimes white sometimes greenish or purple, found in Bombay and many other parts of India, resembles laterite in the quality of being easily cut when raised, afterwards hardening on exposure to the air. It is used as a building-stone, and suits well for basins, troughs, and aqueducts: it is not very extensively employed. Littoral-concrete is a variety of rock which has not hitherto found a specific place in our geological catalogues; the name has been conferred on it from its being invariably found close by the sea-shore, and from its resemblance to the artificial stone formed by the cementation of sand, gravel, or other coarse material, by lime-water or mortar.

There is but little to boast of at Bombay in architecture in any way: in the Deccan the most massy structures are raised, and carved from trap, with a delicacy and correctness quite astonishing. The vaults and domes of tombs and temples are commonly bolted with iron from top to bottom, and in many cases, instead of scaffolding, the structure is surrounded with a rough wall ten or twenty feet off, the interval between being filled up with earth, a long inclined plane serves for raising the stones. A magnificent structure of this sort, the tomb of one of the Gwalior princes, has stood half-finished near Poona for some thirty years, and here native architecture may be seen in perfection in all stages of advancement. The only building materials at the presidency, besides that already described, consist of green-stone, trap, and a fine-grained variety of numulite like Bath oolite, called, from the name of the place whence it comes, Porabunder-stone.

The writer denies that the natives refuse to adopt English improvements through obstinacy. He says:—The natives cling to their old customs in most cases, not because they are old and they refuse to open their eyes to improvement, so much as because they are, on the whole, well suited to their circumstances,

and, taking them altogether, more convenient than any proposed to be substituted in their place. Before they could alter them as desired, a whole generation over the whole surface of the land must undergo a second apprenticeship, and go again to school. An Englishman is at once the most inconsiderate and considerate, the most reflecting and unreflecting, of human beings. Set him to construct a machine, to build a ship or a house, and he will examine with the utmost care all the materials and contrivances presented to his choice, and select those best suited for his purposes, taking all in all. He will choose wood or cast iron according to its cheapness, where thrusts or cross-strains are indispensable,—worked iron to resist a pull,—masonry stones or bricks for a wall, and light slabs, tiles, or slates for a roof; and the excellence of the results brought about will be found to justify the course and skill resorted to for their accomplishment. But an Englishman abroad forgets these things; everything that is unlike what he meets with at home, no matter how well adapted to the different state of things in which it prevails, is wrong. He must have strong wine and roast beef in the south of Europe,—wear a cloth coat, a stiff collar, and black hat, and make his visits in the hottest time of the day in India; and this for no reason whatever but because he desires to do here as he does at home—to defy the laws of nature, and treat the thermometer at 120° exactly as he treated it at 60°. Of course, he reaps the reward of those who strive with what is too strong for them—be it overcome, sickness, and dies—killed, as he says, by the climate, but in reality by his own folly.

Look into the houses of our Hindoo or Parsee aristocracy: the walls are hung with portraits of their English friends by English artists—with prints from Reubens, Rembrandt, Reynolds, Wylie, Martin, and Allan—with the pictures of Nelson, Napoleon, and Wellington—the busts of Byron and Scott—or, still more dear to them, of Elphinstone, Malcolm, and Sir Charles Forbes; things not to be procured, even if desired, in the days of their grandfathers.

It is not the mere workman only who suffers from want of instruction, and is most anxious to learn could he get any one to teach him; the contractor and master-builder are quite as ignorant as their employees of that which it concerns them most to know. Let any one look at the largest and most expensive houses in the presidency—"The Mount," for example,—or observe the buildings at present in progress of erection, and he will find a plan of roof invariably adopted wherein every piece of wood is exposed to a cross strain, or has the load placed in the direction where it is least capable of being resisted. To make a combination of beams of this sort keep its form during the period of its construction, timbers of enormous size and cost are made use of, but no sort of timber will, in the long run, avail against the laws of pressure: the beams swing or bend downwards in the middle—their original weakness being aggravated by the mortices cut out just where strength is most needed—and if not supported by uprights from beneath, the roof sinks, the walls are forced out, and the building falls. Thousands and tens of thousands of rupees are in this way wasted at the presidency annually—as much, probably, as might maintain a college to teach something useful, in addition to the one where the purely useless is at present mainly in favour. Engineers have introduced the ordinary king-post roof in most Government buildings, and it has been copied very extensively by natives, but, as usual, without the slightest discrimination or attention to the principle of strain. One of the first rules in carpentering is to avoid as much as possible all cross strains where mixed material is resorted to, to stay with iron, strut with wood, and to make the strain on wood a thrust as far as possible. To not one of these maxims in the slightest heed paid by the natives; but, nothing would delight them more than to be shown, without regard it might be to principle, how they could make a house equally strong as at present, with a large saving of material. These things are not acquired intuitively, and the authorities are above teaching them; they are too busy with astronomy to think of carpentry.