

## VISITS TO ART-MANUFACTORIES.

## No. 8.—THE PAPIER-MÂCHÉ WORKS OF MR. BIELEFELD, AND THE WORKS OF THE FIBROUS SLAB COMPANY.

WITHIN the entire circle of English worthies, there is not to be found another man possessing the same grasp of mind, united with powers of minute observation, as Robert Boyle. There was a remarkable far-seeingness about him, and, although we find numerous matters treated seriously by Boyle, at which we are now disposed to smile, yet, it must be remembered, that he was born in an age which was yet surrounded by the dark and fantastic clouds of superstition. There was no one question of too vast a character for his speculative mind; there was no one subject too familiar for his eager curiosity. We are led to these remarks from reading the very apt quotation from Boyle's Essay "Of Man's Great Ignorance of the Use of Natural Things," which the proprietor of the papier-mâché works has attached to his pattern-book. This fine old philosopher says:—

"Though paper be one of the commonest bodies that we use, there are very few that imagine it is fit to be employed other ways than in writing and printing, or wrapping up of other things, or about some such obvious piece of service; without dreaming that frames of pictures, and divers fine pieces of embossed work, with other curious moveables, may, as trial has informed us, be made of it."

The origin of the manufacture of articles for use or ornament from paper is not very clearly made out; we are naturally led to believe, from the name, that the French must have introduced it. We find, however, a French writer ascribing to the English the merit of producing paper ornaments. In an article in the "Encyclopédie Méthodique," entitled, "Sur l'Art de Moulage," we find the following words:—"Les Anglois font en carton les ornemens des plafonds que nous faisons en plâtre: ils sont plus durables; se détachent difficilement, on s'ils se détachent, le danger est nul et la réparation est peu dispendieuse."

The writer clearly understood the peculiarities of the material of which he wrote, and in those few words he points out many of the more valuable properties of papier-mâché ornaments.

Papier-mâché is of several varieties, but these seem resolvable into two well-marked distinctions. For some works, all that is necessary appears to be the cementing together of sheets of ordinary paper, in a manner similar to that employed in the manufacture of cards, described in our visit to De la Rue and Co.'s Manufactory. Layer upon layer of paper is pasted together, until the required thickness is obtained, and then the sheet is subjected to great pressure. In some cases the pasted papers are pressed into moulds, and thus, at once, and at the same time as they are condensed, they receive the required form; in others, the prepared papier-mâché is shaped after it has been manufactured. Another variety is that made from paper pulp, which is formed into hard sheets, or moulded at once into the required designs.

It is not of much moment that we should, in the present article, attempt to trace the history of this Art-manufacture. The patentee of the processes we are about to describe, thus speaks of the introduction of paper ornaments for architectural decoration. Premising that the decorations in high relief, which are still to be found in the mansions of the seventeenth, and the beginning of the eighteenth, century, were generally worked, or rather modelled, by hand, upon the stucco in its place, whilst still in a soft and plastic state, the writer proceeds:—"As this work had to be done on the spot, and with much rapidity of execution, in order to prevent the stucco from setting, before it had acquired the intended form, the art was somewhat difficult; the workman had to design almost as he worked; therefore, to do it well, it was necessary that he should have some acquirements and qualities as an artist. This circumstance, of course, tended very much to limit the number of workmen, and their pay became proportionally large. It was no unnatural consequence that artizans thus circumstanced assumed a consequence that belonged not to their humble rank in life; it is said that they might have been seen coming to their work girt with swords,

and having their wrists adorned with lace ruffles. Such a state of things was, as may be conceived, attended with many inconveniences to their employers; it was scarcely possible to preserve that subordination so essentially necessary in carrying on the business of a builder, and ultimately the workers in stucco, laying aside all restraint, combined together to extort from their employers a most inordinate rate of wages. It would be superfluous here to detail all the circumstances that followed; it is sufficient to state that, as might have been anticipated, the total ruin of their art was the final result of these delusive efforts to promote their individual interests.

"Contrivances were resorted to by the masters, which soon supplanted the old mode of working in stucco. The art of moulding and casting in plaster, as previously practised in France, was generally introduced, and the art of preparing the pulp of paper became improved and extended, so as ultimately to render practicable the adoption of papier-mâché in the formation of architectural decorations. Thus at last was extinguished the original mode of producing stucco ornaments, and there probably has not been for many years a single individual in England accustomed to that business.

"The superior cheapness of the process of casting in plaster brought it into almost universal use; for, although in the course of the last century an immense trade was carried on in the manufacture of architectural and other ornaments of papier-mâché, yet the poverty of taste they generally displayed, and the imperfection of machinery at that time, which prevented this material from coping with plaster in respect to price, ultimately caused its disuse. The manufacturers of papier-mâché at that period do not seem to have been aware of the great improvements of which every process of their art proves now to have been susceptible." Wilton, the father of the Royal Academician and sculptor, was one of the chief manufacturers; his manufactory was in Edward Street, Cavendish Square, and many of the decorations of the older mansions of the metropolis were the productions of Wilton.

"A most mischievous effect, however, was produced in the art of decorative designing by this change in the mode of execution. All the deep undercuttings and bold shadows which marked the style of design in the age of Queen Anne, became impracticable when ornaments were to be cast. A meagre, tame, *petite* manner ensued almost of necessity, until, by the end of the last century, the art of designing architectural ornament had fallen into a deplorable state of imbecility.

"The subsequent introduction of Greek ornament formed a new era: the limited capabilities of plaster-casting became then less inconvenient, for the broad, flat character of the Greek style was favourable to the process of casting; and had that manner of designing continued to prevail generally up to the present day, it is probable that no material change would have taken place in the manufacture of ornament. But great fluctuations have occurred in the public taste: the pure and elegant simplicity of Greek ornament is in its nature appreciable only by the more highly cultivated tastes; the generality of persons do not understand its merits; therefore, after the stimulus of novelty had ceased to operate, fashion soon led the public favour into other channels. The bold originality of the Gothic school, the gorgeous and meretricious richness of the Flemish and French schools, the picturesque and fantastic forms of the Elizabethan style, soon found many admirers; and it is this great change in the manner of designing ornament that has given rise to the important improvements in the manufacture of the highly plastic substance called papier-mâché. Plaster is totally inapplicable to the exact imitation of the bold florid carvings in the above-named styles, whilst to carve in wood all these fanciful forms would occasion a cost far beyond the means of all ordinary purses. As to the putty-composition, a material introduced at the latter end of the last century as a substitute for wood-carving in picture-frames, &c., its weight, its brittle, impracticable nature, and the difficulties and heavy expenses necessarily incurred in its manufacture, as well as in fixing it up, render it applicable to a limited range of purposes."

From the *Gentleman's Magazine* we learn that many of the fine old ceilings, in deep relief, of the

Elizabethan era, are of papier-mâché. The handsome ceilings in Chesterfield House are also of papier-mâché. Smith, in his "Life of Nollekens," mentions a curiously ornamented ceiling of this material in the parlour of No. 41, Leicester Fields, which is painted in imitation of parts of the ceiling of Whitehall Chapel. On the front of a house in the Strand, are, says the *Gentleman's Magazine*, three profiles of the three first Georges, which are formed of papier-mâché. These facts prove the exceeding durability of this material.

Having first examined the great variety of designs produced by Mr. Bielefeld, and displayed in Wellington Street North, we proceeded to the manufactory, at Staines. It is necessary that we state that the works at Hall Mills are divided into Mr. Bielefeld's Papier-Mâché Works proper, and the larger establishment of the Fibrous Slab Company, who are working, under Mr. Bielefeld, a patent of a different material. In this now quiet corner of Middlesex, once gay with the excitement of stage-coach travelling,—being on the great western road, over which flew the Quicksilver Mail, the renowned Subscription Coach, and the Defiance, the Telegraph, and many others, that still live in our memory,—in this spot, once all excitement, but now silent, save the heavy roll of the water-wheel, which is urged by the waters of the Colne, stand these especially interesting Art-manufactories. Water-power and steam-power are both bound to the task of producing articles for ornament and use from fibre. In the establishment devoted to the manufacture of architectural ornaments, &c., we find mills for grinding and preparing the pulp, for combining this fibrous material, so as to ensure a firmer and more endurable substance than can be obtained from fibre alone, and presses of all sizes and of almost all powers, for producing large or small ornaments, as they may be required.

Let the reader reflect for a moment on the infinite variety in the style of ornamentation which year after year is introduced for merely architectural decoration, and then add to this the additional number of patterns required for picture-frames, and for those of mirrors, with brackets, console legs, and yet many other things, and he may have some idea of the vast number of metal moulds required to meet the demands of this manufactory. The preparation of the models from which those moulds are cast requires the aid of the artist and of the skilled artizan, and is one of those subjects which we may shortly treat of, when we visit one of the great manufactories of ornamental iron and bronze work. The first requisite here, however, is the mould from which the papier-mâché ornament is to be produced: those used by Mr. Bielefeld are of brass and iron, and, we understand, cost more than £20,000. These being procured, with presses of a power sufficient to secure that cohesion of the material which is necessary, the whole proceeds with much tranquillity—and the quiet of this establishment is a distinguishing mark of its orderly arrangement.

We need scarcely remind our readers that paper-pulp is always composed of some vegetable fibre. An immense variety of fibres has been, from time to time, brought forward, as capable of being converted into excellent pulp, but, with a few exceptions, they have not been received with favour by the manufacturers. Hemp, or flax, and the cotton-fibre, are still the materials from which nearly all our paper is manufactured: we do indeed hear of straw-paper, and of paper made from the nettle-fibre, but these are rather exceptions than the rule. Every description of flax-fibre, whether hemp, or flax, or tow, or codilla, or jute, finds its way into paper; and the same may be said of cotton, though it is only for some kinds of paper that this can be employed. We must not stop to describe the manufacture of paper, but proceed at once with our description of these very interesting works for a different material. The pulp of any required degree of fineness is prepared. For the base of any design there is an advantage as it regards strength, and also for economy, in employing the coarser fibres; but for the purpose of ensuring the perfect sharpness of the finished surface, the finest fibrous pulp is necessary. The composition, when prepared in the mills, is still in a semi-fluid condition, and it requires the action of a machine for bringing it into a condition resembling dough, or putty. When brought to this state, it is rolled out into flat sheets of the required thickness, and being cut of the required size, a piece is placed on

the mould, above which is adjusted the counter-mould, fitting into the first, and then the whole is subjected to the action of the screw-press. The first result is not of that character which is desired for a finished work, yet it is quite necessary for the production of the complete article. The moulded papier-mâché is removed from the mould, another sheet of the soft material, much finer than the former, is placed on the mould, and the first impression is adjusted to it, both being covered with a cementing material. The moulds being adjusted, the arrangement is now submitted to another, and yet more powerful, squeeze in the press. This is repeated until the requisite thickness and finish are produced; it is then subjected to a graduated heat, by which it becomes eventually perfect, dry, and hard. It can now be submitted to any process of colouring, or, if desired, as is sometimes the case, colour can be introduced into the material itself.

From the papier-mâché manufactory we passed through a counting-house built of the fibrous slab, and by a pretty cottage, situated in the centre of a neat garden, constructed of the same material, on to that division of the works which belongs to the Fibrous Slab Company. Here everything is on a more gigantic scale, since the result is to be the production of slabs 14 feet in length, and 6 feet wide, varying in thickness from about the eighth of an inch to an inch or more, according to the purposes for which the fibrous slab may be required. For the preparation of this important material, the coarser varieties of fibre are required. These are heated, and subjected to much agitation, to secure the reduction of the fibre to the proper size. This being effected, the pulp is removed, and subjected to the action of a desiccating apparatus, or centrifugal drying machine. This consists mainly of a drum fixed on a vertical axis, the periphery of the drum being of wire-gauze; this is enclosed in an outer case of metal. Into this the fibrous pulp is placed, and the cover being adjusted, the drum is, by its connection with the steam-engine, set into rapid revolution. The result of this is, that the water is driven by the action of centrifugal force from the fibre, and it can thus in a few minutes be obtained of an equal and proper degree of dryness, and this without the application of any heat. The mass thus obtained may be regarded as a very coarse amalgam. It is now placed in vessels fitted with revolving arms, or masticators, in which it is mixed with the other materials necessary to ensure all the ends required in a substitute for wood. This fibrous pulp is combined with some earthy matter to ensure its solidity, and certain chemical preparations are introduced for the double purpose of preserving it from the attacks of insects, and to ensure its incombustibility. The whole, being mixed with a cementing size, is well kneaded together, steam being supplied to the mass during the whole of the operation. While this kneading process is going forward, an iron table, running upon a railway, is properly adjusted, and covered with sail-cloth; this table being so arranged that it passes under an enormous iron roller. The fibrous mixture is removed from the kneading troughs, and is laid in a tolerably uniform mass upon the sail-cloth, so as to cover about one half of the table; over this is placed again a length of sail-cloth equal to that of the entire slab, as before. This being done, the table and roller are set in action, and the mass passes between them. It is thus squeezed out to a perfectly uniform thickness, and is spread over the whole table. The fibrous slab is passed through some three or four times, and it is then drawn off upon a frame prepared to receive it, fixed upon wheels, by means of which it can be removed to the drying ground. It should be stated that the slab is now attached to the sail-cloth. In this state, laths of the length and width of the slab being screwed on to its edges, it is taken to the open field, and placed in a vertical position, supported by cross-pieces temporarily nailed to the ends of the frame. The drying process of course varies much with the temperature of the weather, the humidity of the atmosphere, and other meteorological causes. It does not appear desirable that these slabs should dry too quickly, and there are many reasons why the process should not be too prolonged. When the slabs are considered to be perfectly dry, they are turned down, the sail-cloth is stripped away from them, and they are placed in drying-rooms, and subjected

to 150 degrees of heat to season and harden them. By this process is produced a slab of great size, and possessing remarkable firmness and strength. From the way in which the fibres are knitted together, it will be seen how difficult it would be to break such a slab, and from its being a mass of vegetable fibre, felted together, and all the interstitial spaces filled in with mineral matter, it is unyielding, under any ordinary circumstances. The patentee thus describes the advantages of his invention:—

"The patent wood, or fibrous slab, is a fibrous material, combining the properties of wood, and adapted, in a superior degree, to almost every purpose to which the various descriptions of wood are applicable. The material is also applicable to many purposes for which marble, slate, lath and plaster, or internal brick-work, are now used.

"To render wood available for purposes where the ordinary width of boards (9 to 13 inches) is insufficient, it is requisite to join two or more boards together by what is technically termed 'glueing up,'—an operation involving much labour, expense, and loss of time, and attended with all the continuing risks of shrinking, expanding, splitting, winding, &c., as well as the natural imperfections of knots, shakes, &c. The patent fibrous material can be manufactured in slabs of any required thickness, from  $\frac{3}{8}$  to 1 inch, provided the sizes do not exceed 14 feet by 6 feet. It is not flammable; it is a non-conductor of heat, and is poisonous to vermin. The fibrous slab is easily worked, although equal in density to the hardest woods; and it can readily be adapted, where bending is necessary, to any form required by the cabinet-maker or joiner. It may be used for circular joiners' work, spherical, ogee, elliptical, and other shapes, and also for the bases of veneers for tables, desks, and all other cabinet works; and it has the advantage of being always ready for immediate use, superseding the expense and risk of keeping large stores of seasoned timber for cabinet, joiners', and carpenters' works. The fibrous slab is applicable for large panels, ceilings, floors, and partitions of theatres, assembly and concert rooms, public halls, government and other public offices, hotels, and other houses, warehouses, counting-houses, shops, and railway carriages; and also for interior fittings of ships,—viz., panels, bulk-heads, partition of cabins, floors, and ceilings; the property of being unflammable will render it incalculably superior to any other material, and its being a non-conductor of heat, it is admirably adapted, and has already been used, for cross bulk-heads between engine and boiler rooms, and coal and cargo spaces: it must, therefore, secure a very large consumption in ships of every class, and more especially in large steam-vessels for passengers. Amongst other properties, it is valuable as a coating for every description of steam boilers, as jackets for steam cylinders, pipes, &c., superior to any material now in use, and for powder-magazines, or lining the same, in ships of war."

We tried an experiment upon the non-inflammability of this material, by having a fire of wood made upon a slab, and maintained thereon for some time. When the ashes, still in a state of vivid combustion, were swept away, the slab was found to be merely charred by the intense heat. Beyond this, a piece of the fibrous slab was thrown into the middle of the fire, and the flames were urged upon it: under the influence of this intense action it did not appear possible to kindle it into a flame, it smouldered very slowly, the organic matter charring, but nothing more.

This important invention has been applied to the dome and other parts of the new reading-room of the British Museum; the domed ceiling of the New Opera House, Covent Garden; the concave and ogee fronts of the boxes, and various other works, of the New Adelphi Theatre; the reception rooms of the London Necropolis (Woking Cemetery); the London and Westminster Bank, St. James's Square, and other places; and to the following steam-ships,—the *Royal Charter*, the *Royal Bride*, the Pacha of Egypt's yacht, *Faid Rehana*, the steam-ships of the Milford Haven and Waterford Steam Packet Company, and the *Cleopatra*, built by Mr. Scott Russell for the present pacha; in addition to which the slab is now used in the construction of private carriages, omnibuses, cabs, vans, parcels' delivery, and other light carriages

and carts, for artists' and sign-board work, and for roofs in hot climates.

The dome of the new reading-room of the British Museum, which (with the exception of the iron girders) is internally constructed of the patent fibrous material, has double the area of the dome of St. Paul's Cathedral, and is equal to the dome of St. Peter's at Rome. This dome was erected under the direction of Mr. Sydney Smirke, the government architect. The sizes of the panels, composed of three pieces, are 22 feet long by 11 feet 6 inches wide. Perhaps no better evidence could be adduced of the superiority of the fibrous material over wood for covering large surfaces, than the fact of these panels, in their spherical form, being raised from the ground to a height of 110 feet, and fixed in one piece to the roof.

Numerous other examples might be cited as showing the applications of paper, under its new modifications, to purposes of use and ornament. The works of Mr. Bielefeld are of the highest interest, and are marked by evidences of the best taste in design. The material is light and durable.

The Fibrous Slab Company is certainly producing a material which, in many of its applications, must prove of the greatest utility, while great additional value is given to it from the circumstance of its resisting the attacks of insects, and being non-inflammable under any of the ordinary operations of combustion.

ROBERT HUNT.

## THE ART-SEASON OF 1859.

THE results of the exhibitions of the present season are more satisfactory than could have been anticipated; so susceptible is Art of evil influence from even a menace of political convulsion, that, in the spring, the worst apprehensions as regards sales were entertained. That there is a shortcoming must be admitted, and it falls where certainly it was least to be expected—that is, on the Academy. Whoever may hereafter call up in memory the Art of these years, his vision will be as a dream of having trodden a *via lactea* of small pictures. Our neighbours across the channel dwell with rapture on Ivon's crowning "Charge against the Malakoff;" but we doubt that among ourselves the most gallant version of the Battle of Trafalgar would have any chance against a well-stippled dead pensioner, or a bunch of hollyhocks, wherein the circulation of the sap is shown by the microscope. The loohest of all painting is to be seen in certain examples of the feeling of men whose names figure on the list of the founders of our own school. When Reynolds painted his "Death of Cardinal Beaufort"—one of the conspicuous curiosities of the great master's practice—or Fuseli gave forth his Hamlet or Macbeth subjects, not less remarkable for contempt of models and draperies, who in those days would dream that the character of British Art would degenerate into the painful realism which now characterises it? Even when Haydon kept school—nay, but yesterday, when William Etty, favoured beyond all men of nymphs and nereids, painted trees and draperies with such a studious vagueness as to be inimitable,—no one would have ventured to predict that any reaction would resolve itself into the precision of line and surface that distinguishes certain of the prominent works of our exhibitions. The encouragement all but exclusively extended to the production of small pictures, has produced an emulation in the finish of these cabinet gems that is now carried to a point beyond which it cannot be carried by the ordinary means of manipulation. But in this method of practice there are entirely lost two of the essentials of good Art: these are effect and substance. In personal narratives all the figures are flat, and so far from keeping their prescribed places in the composition, all jostle each other in the nearest plane of the picture. These demerits are observable principally in the works of the rising school—those members of it who are misled by the *ignis fatuus* called "pre-Raffaellism." When the fallacies of the principle are demonstrated in landscape art, the impossibilities of the dispositions become more grotesquely distinct than in figure compositions, where it might be argued in certain cases that the artist intended to crowd his figures—an explanation which might