

THE
CRYSTAL PALACE



LONDON PRINTING & PUBLISHING COMPANY

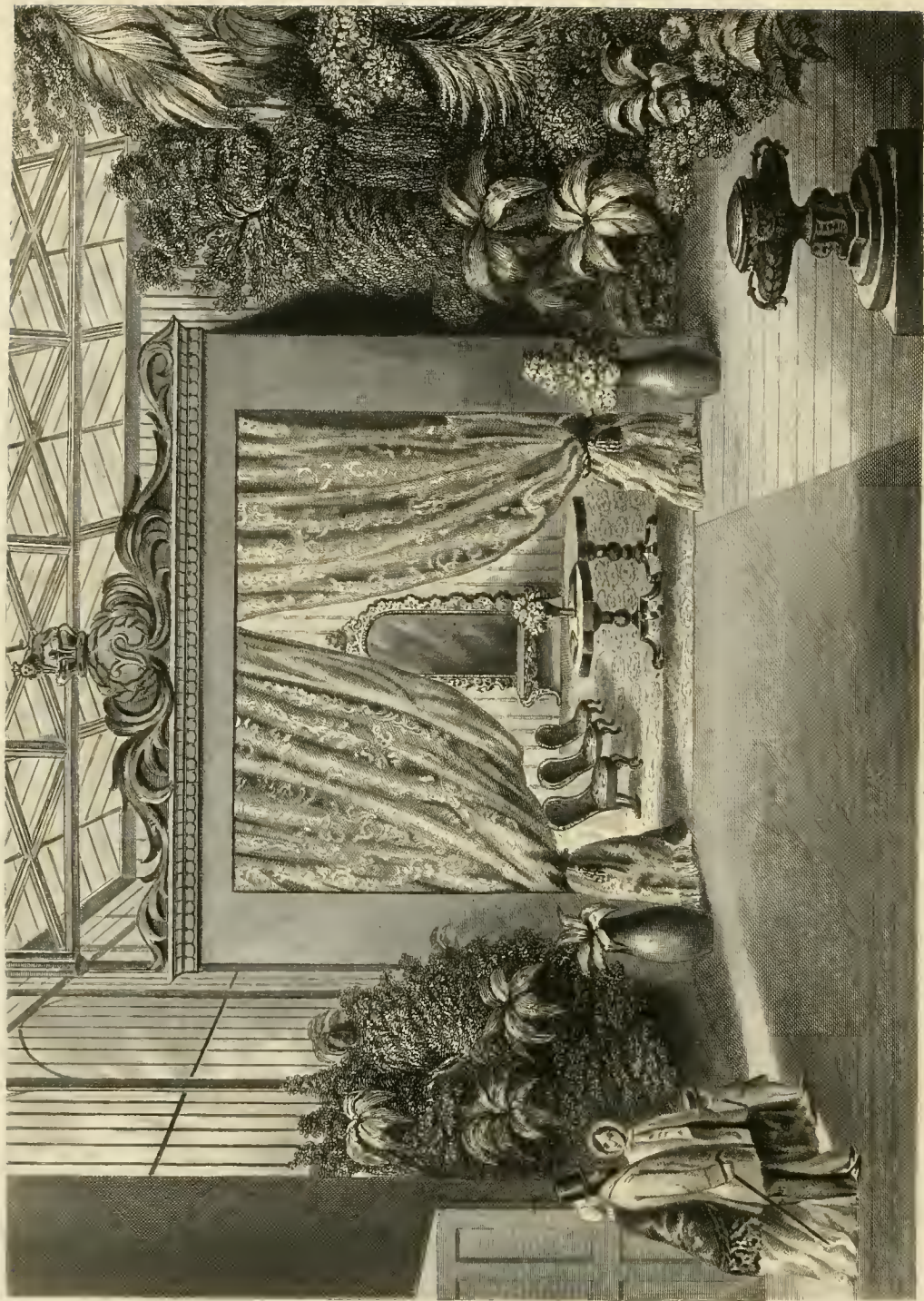


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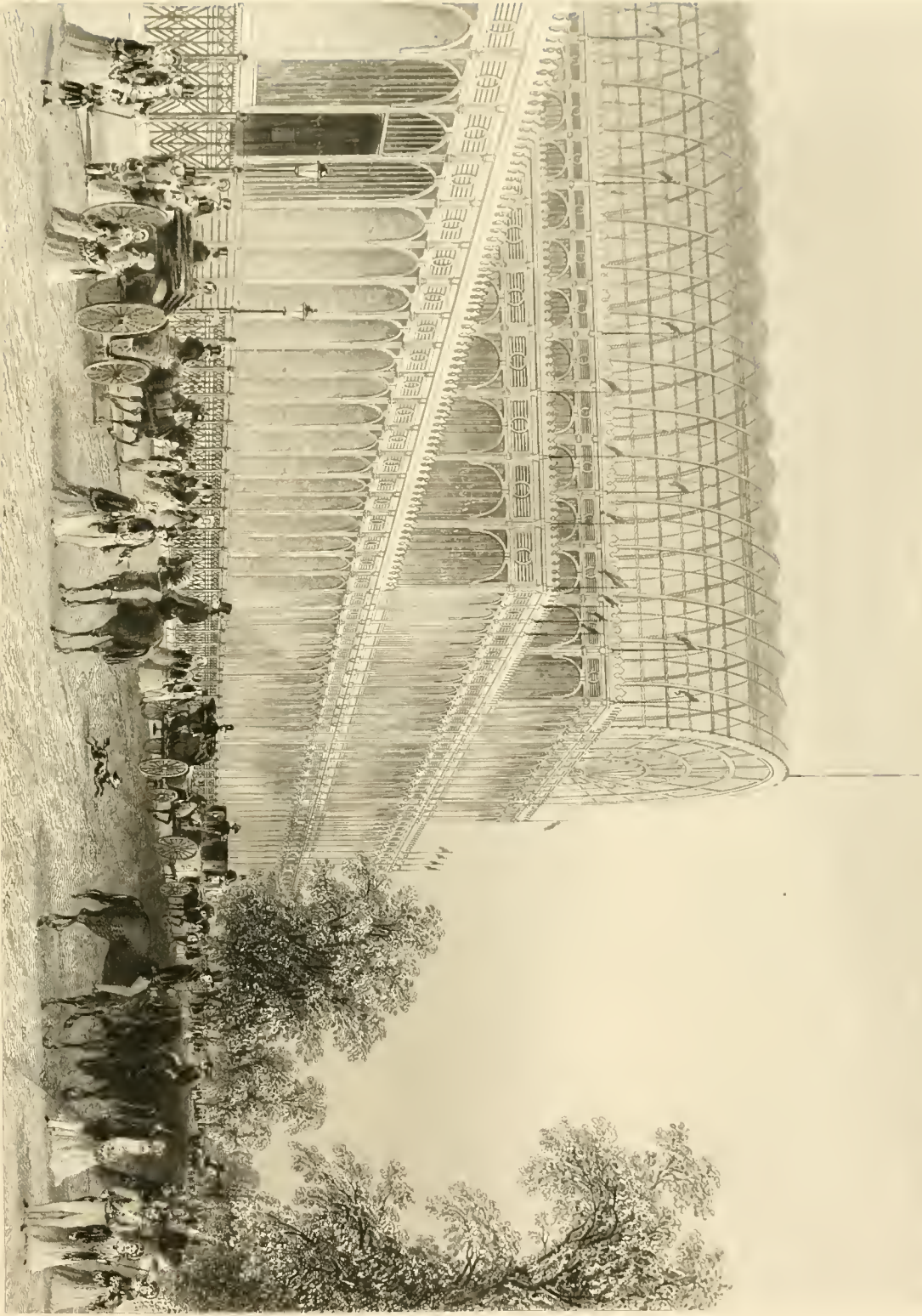


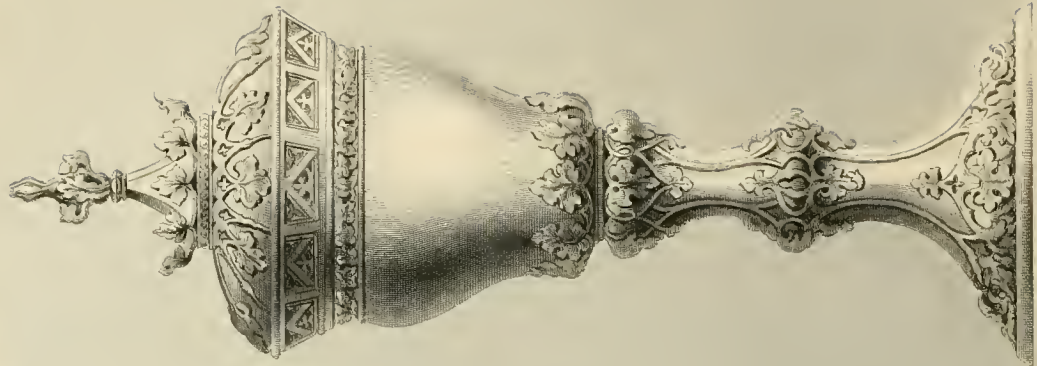
Engraved by J. H. Smith. From the Drawing, by J. H. Smith.

THE GENERAL'S DRAWING ROOM. GENERAL ARTHUR WELLESLEY.

THE GREAT EASTERN RAILWAY BRIDGE

By J. G. Thompson. 1854.





Designed by the artist for the... by T.B.

POKAL FOR DRINK NO. 11

ROYAL PORCELAIN MANUFACTURE AT CHAMPIGNY

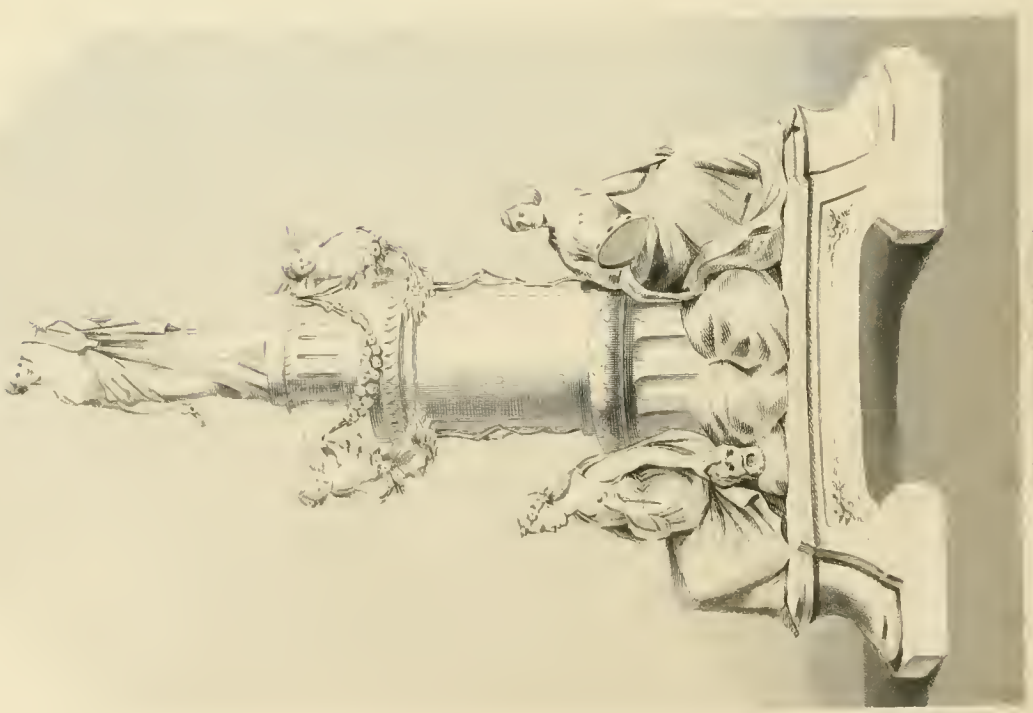
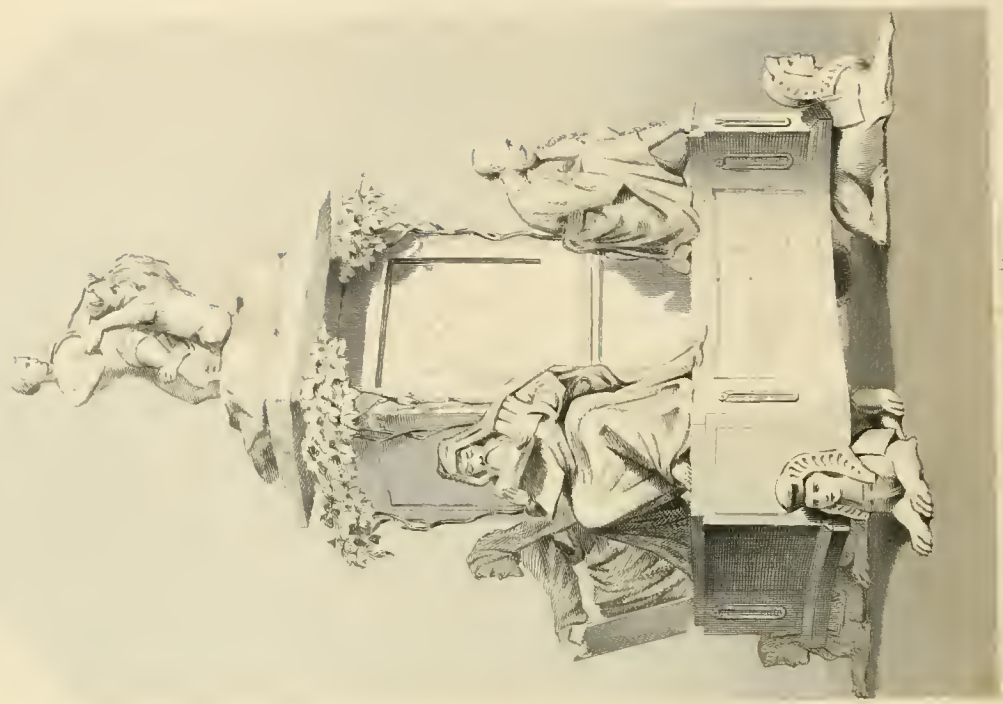


Designed by the artist for the... by W.

POKAL FOR DRINK NO. 12

ROYAL PORCELAIN MANUFACTURE AT CHAMPIGNY

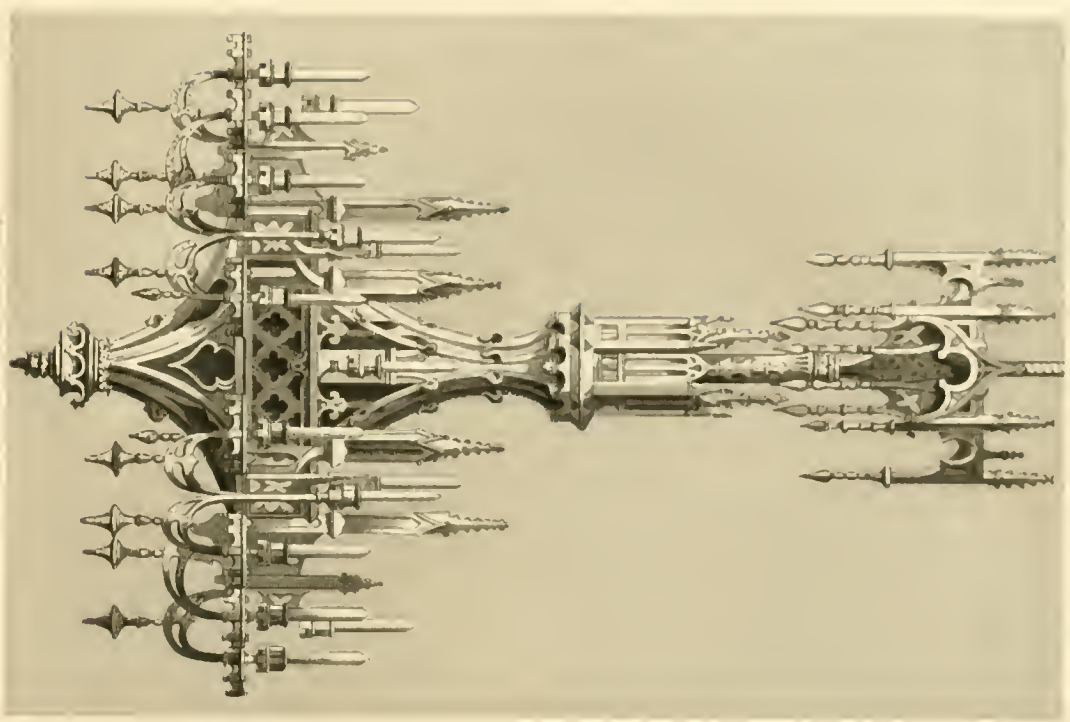




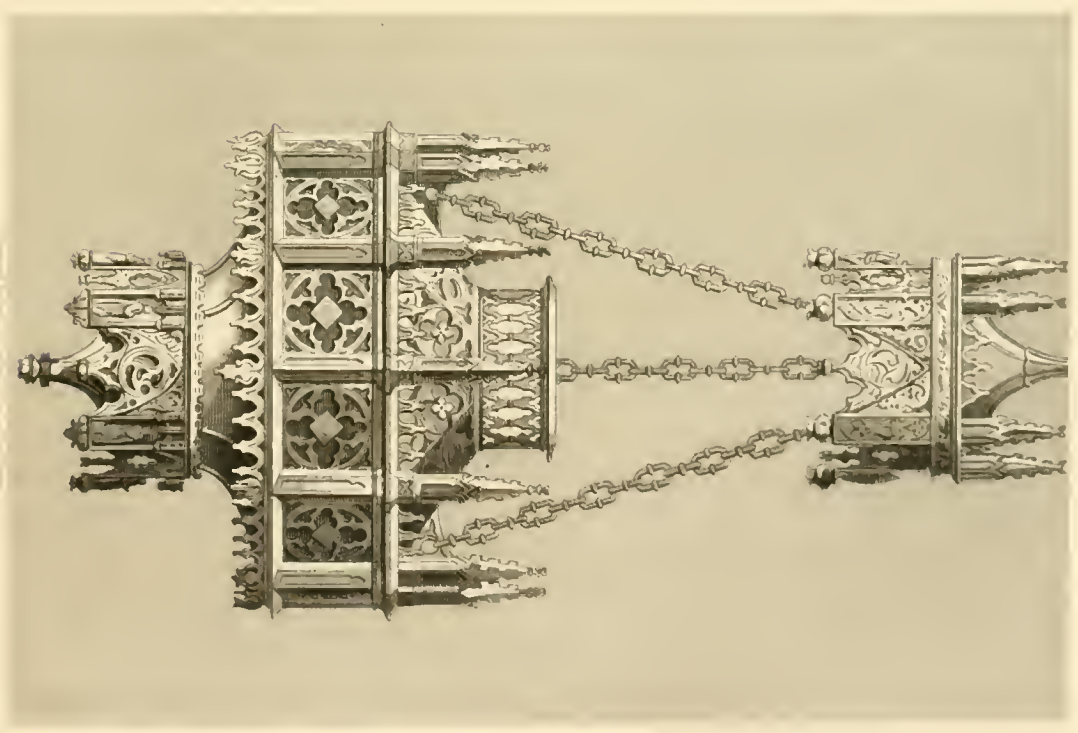
SCULPTURE. — THE SEATED FEMALE FIGURE.

SCULPTURE. — THE SEATED FEMALE FIGURE.

THE GREAT CHANDELIER



THE GREAT CHANDELIER

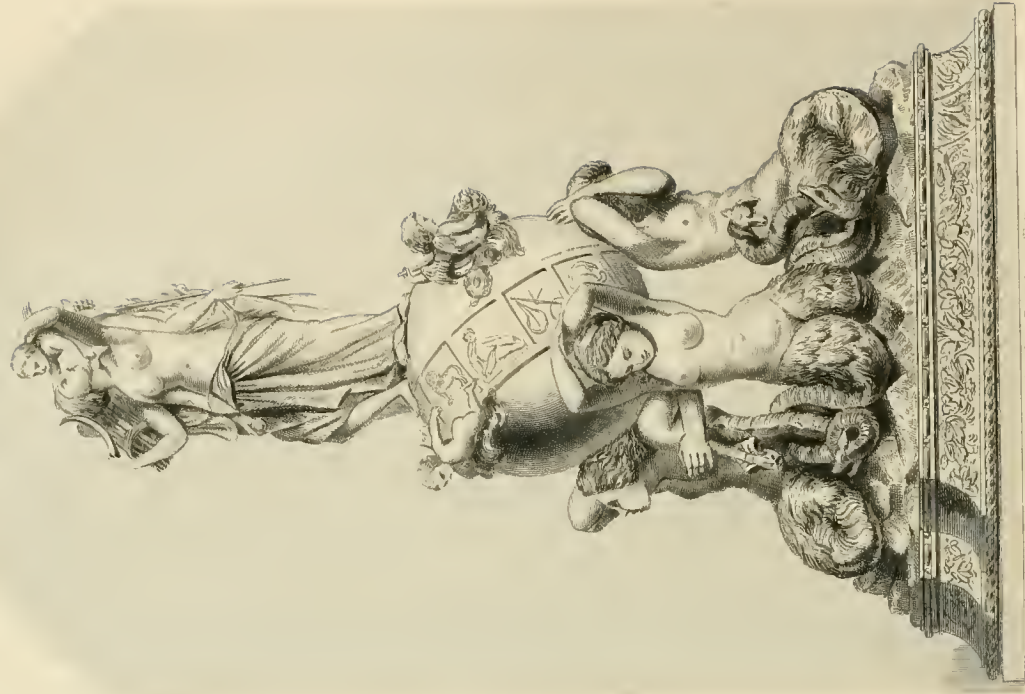




Engraved by J. B. Huet, 1810.

THE FOUNTAIN OF SALT

DESIGNED BY JEAN-BAPTISTE MEUNIER, AND EXECUTED BY M. DE LAUNAY.

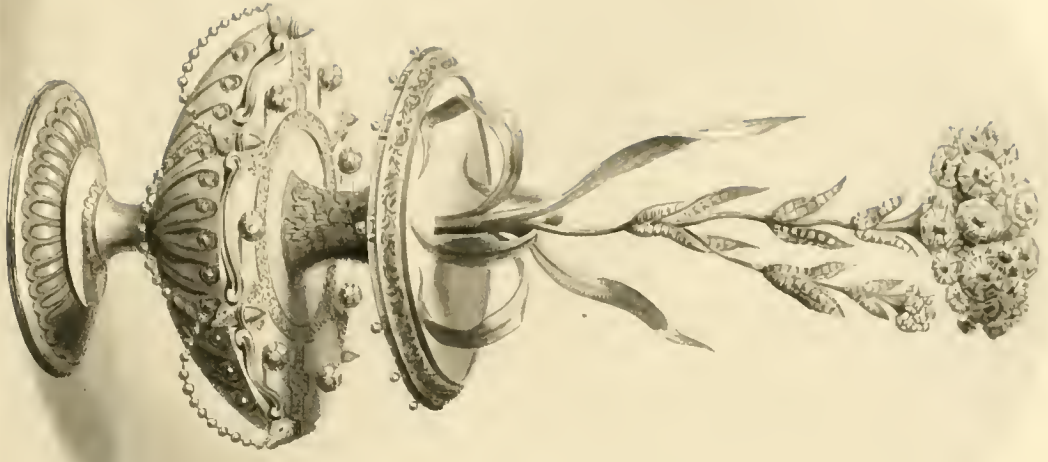


Engraved by G. Huet, 1810.

CENTRE PEECE THE SEASONS

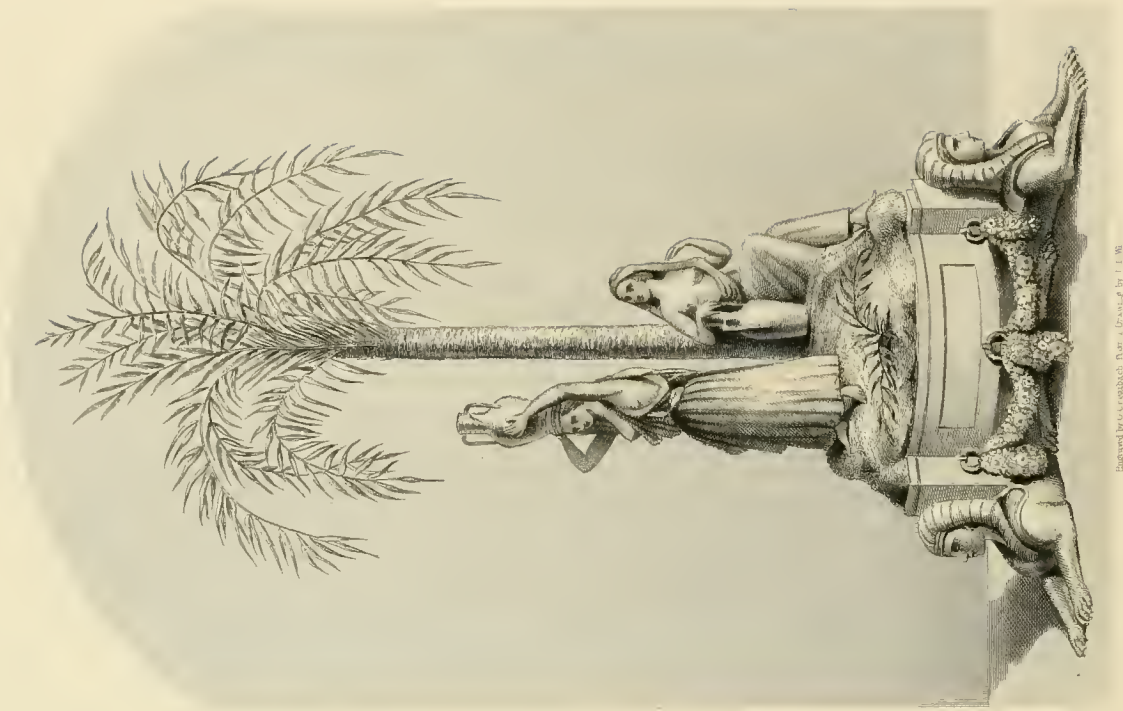
BY FROMENT MEURICE

W. & A. G. B. & C. ...
...
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W. & A. G. B. & C. ...
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Engraved by W. C. Cresswell. From a Drawing by T. H. Whittier.

SILVER CENTRE PIECE

31 MEAS. U.S.A.



Engraved by W. C. Cresswell. From a Drawing by T. H. Whittier.

SILVER CENTRE PIECE

BY J. B. S. WILKINSON & CO.

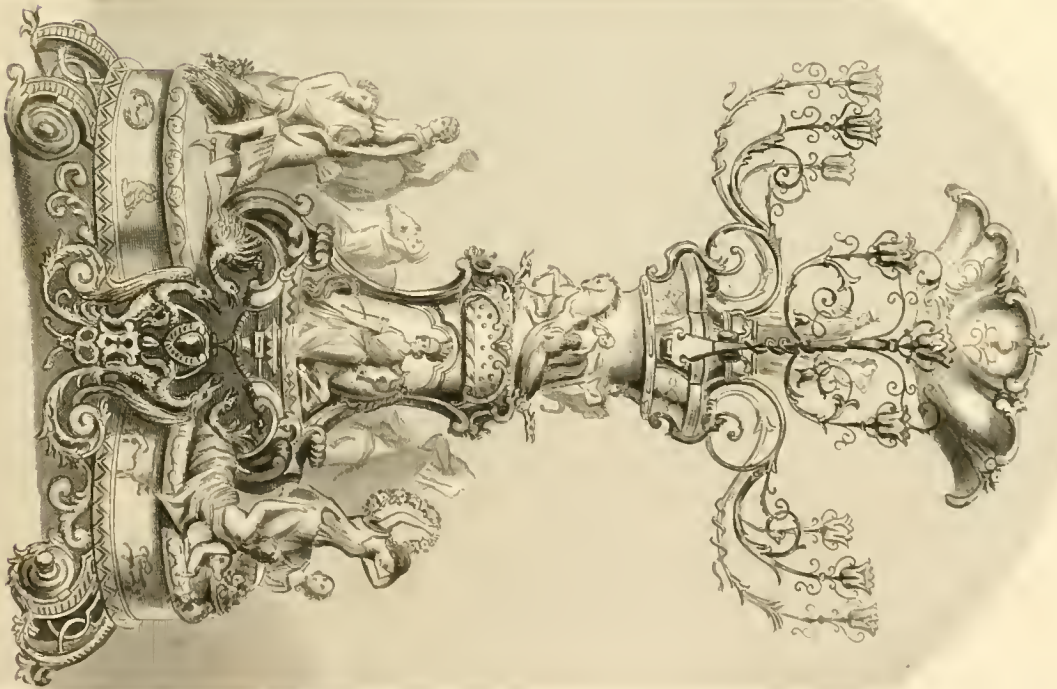
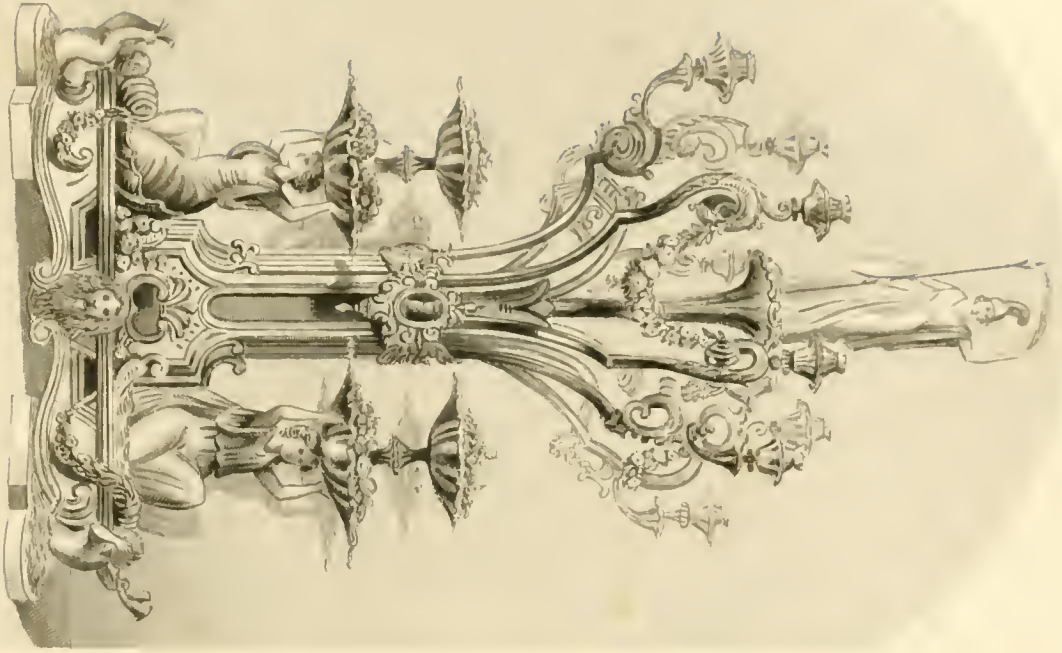
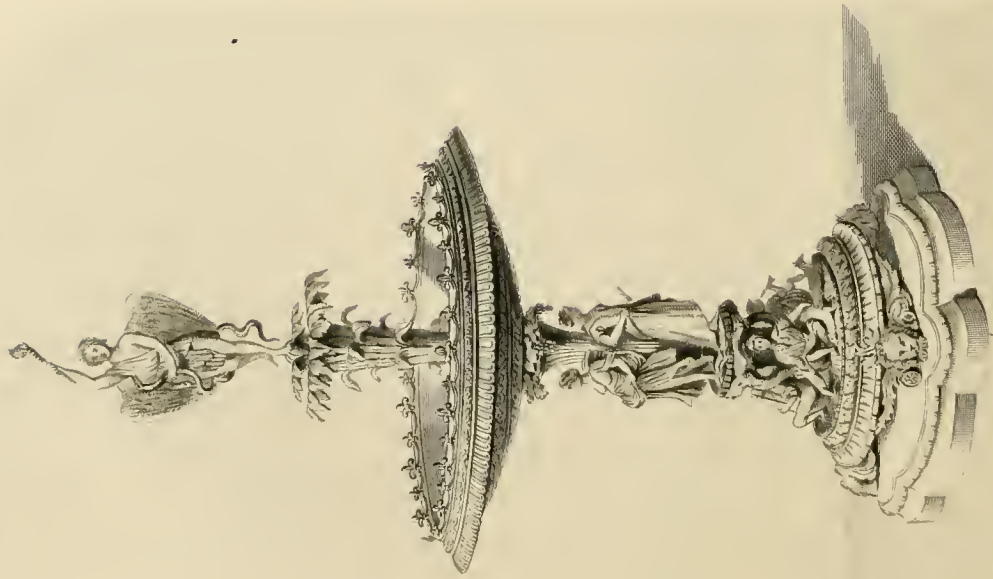


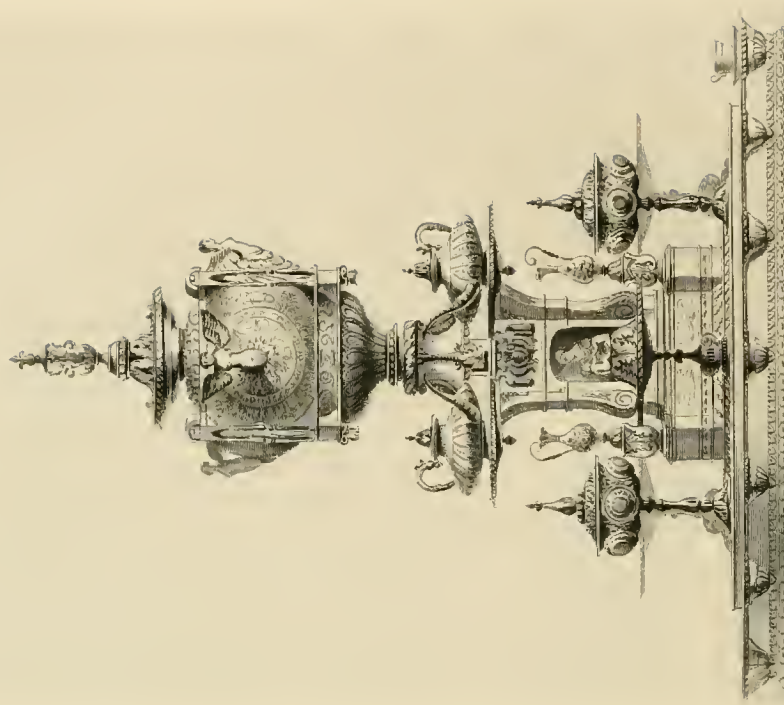
PLATE I

No. 1



SILVER VASE

By WAGNER BROS. IN



FOUNTAIN

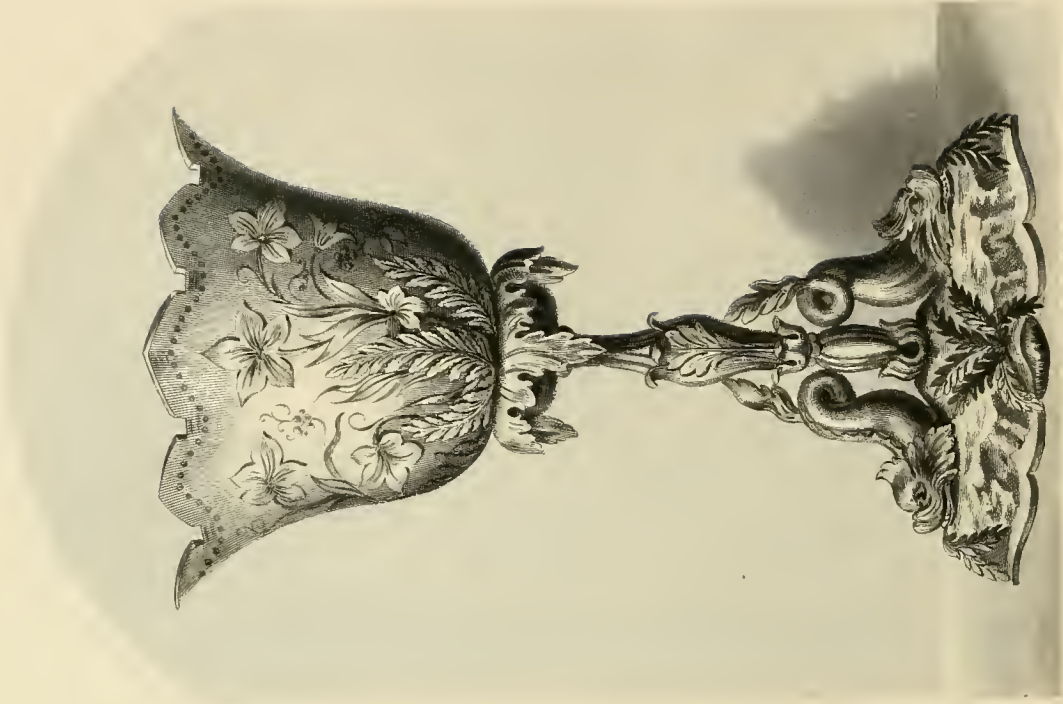
By WAGNER BROS. IN



PLATE I
THE URN

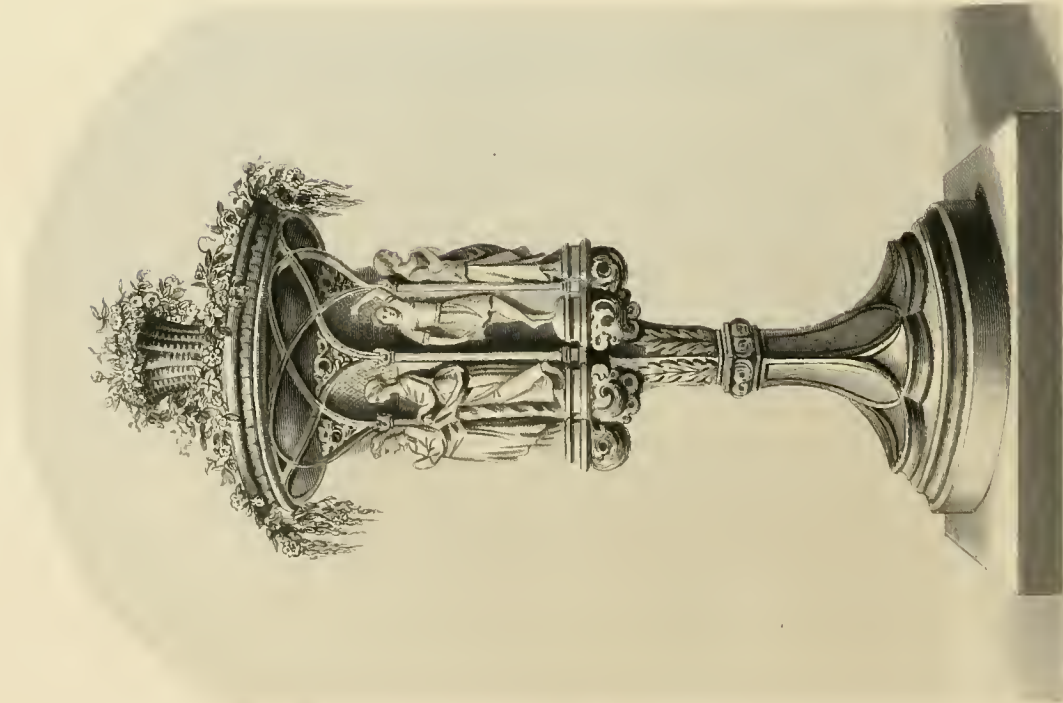


PLATE II
THE URN



Designed by Vincenzo Vanni. Executed by B. Marzari.

ORFÈVRE



Designed by Vincenzo Vanni. Executed by B. Marzari.

ORFÈVRE



FIG. 1. S. GIOVANNI A. C. V. 1700. ROMA.

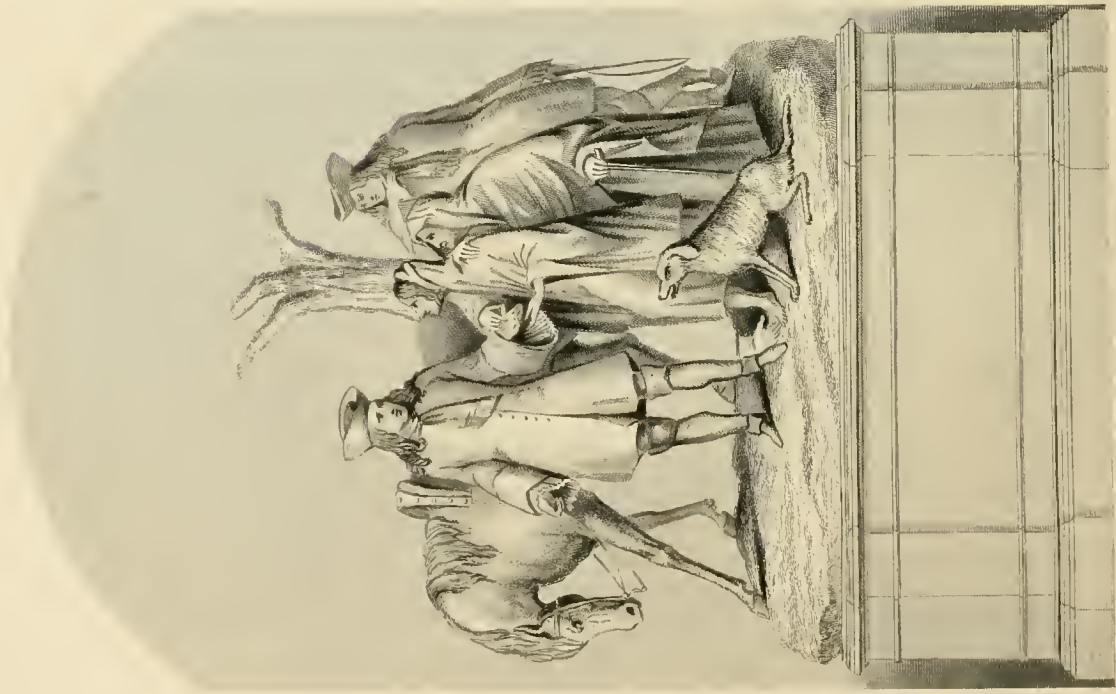


FIG. 2. S. MATTEO A. C. 1700. ROMA.



MONUMENT

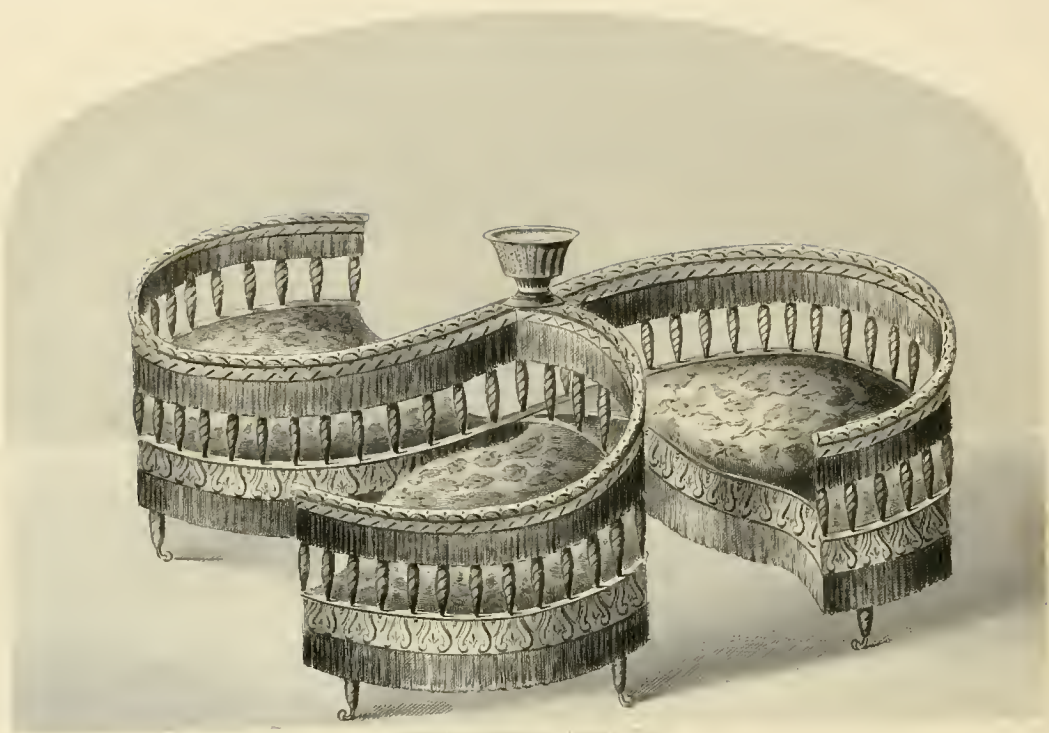
DES ÉLUS DE LA RÉPUBLIQUE, PAR M. FAUCHON, DÉPUTÉ, RÉPUBLIQUE FRANÇAISE



SCÈNE DE LA VIE DE ROGER DE DOVE

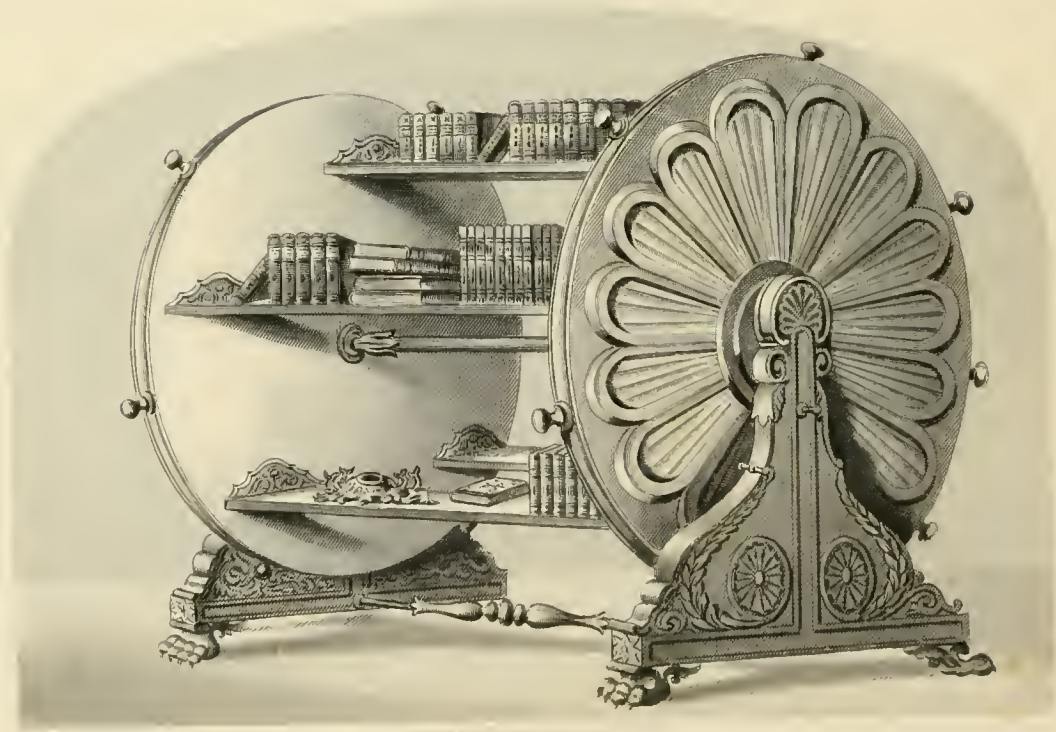
PAR M. FAUCHON





THE LIBRARY REVOLVER

DESIGNED BY J. H. BROWN FOR THE LIBRARY OF THE UNIVERSITY OF TORONTO





CRADLE
DESIGNED BY J. S. COOPER



CRADLE
DESIGNED BY J. S. COOPER



FISH

WATER CARRIER

PORK BEEHER

SLEEPING BRICKS

MODELS OF MEXICAN INDIAN CLOTHING, &c.

BY M. MONTANARI.



M.B.

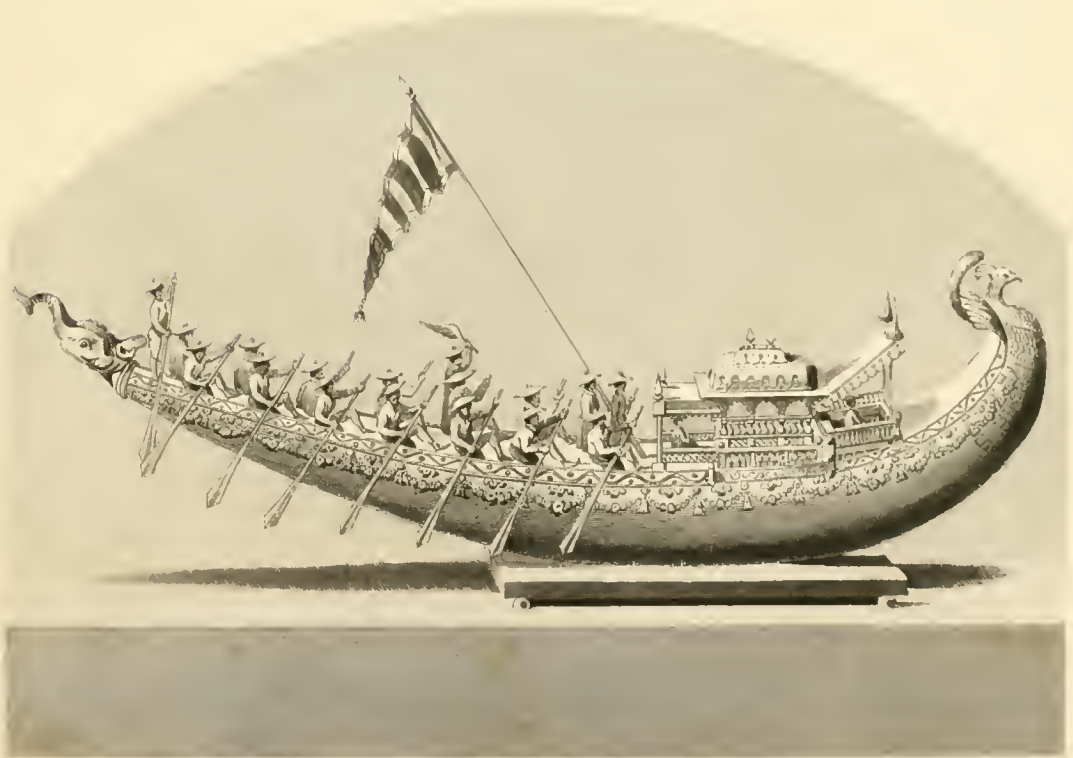
PLATE



THE KING AND QUEEN

THE ROOK AND BISHOP

THE CASTLES



MODEL OF A GALLEY

CONSTRUCTED BY THE ARTIST



Engraved and recut from a Drawing by H. Mason

SLEDGE FROM THE CANADIAN COURT



Engraved by G. Grawert, from a Drawing by H. Mason

SLEDGE FROM THE CANADIAN COURT



Fig. 1. — Caravan of the
Himalayas.



Fig. 2. — Porters.



Fig. 10. — CHANDELIER.

OR M. L. CHANDELIER

HAN. L. D. E. COGNETT & S. NEW. CO.

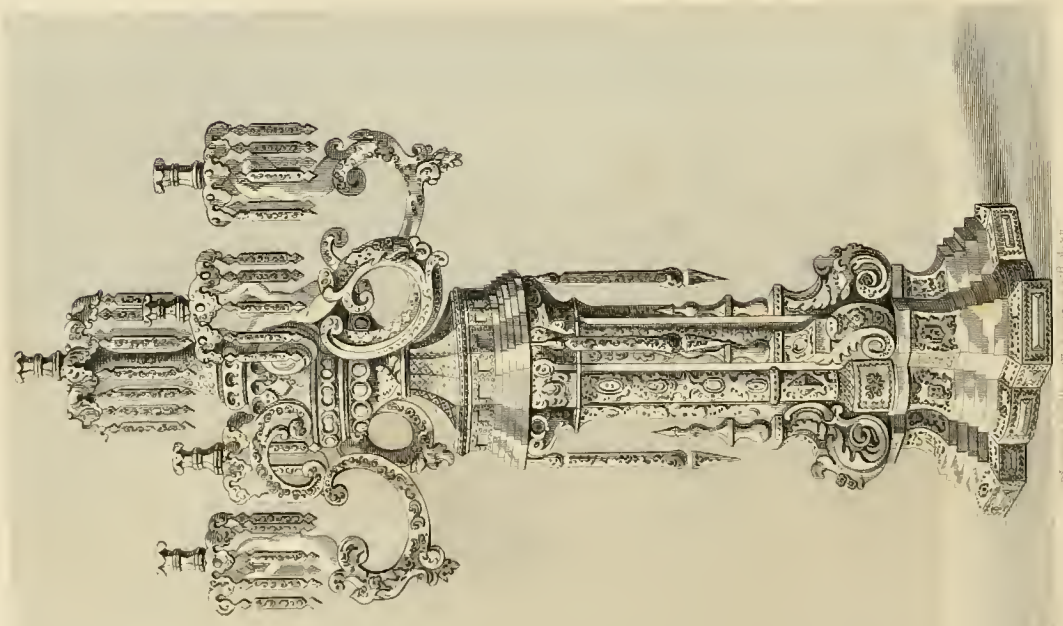


Fig. 11. — CHANDELIER.

OR M. L. CHANDELIER

HAN. L. D. E. COGNETT & S. NEW. CO.



THE MONUMENT TO THE MEMORY OF THE GREAT BRITISH STATESMAN



C
b. s. A. n Lib

and be overtaken by their neighbours? Say, rather, that all assistance shall be given to their efforts; that they shall be attended to, encouraged, and supported.'”—*Davy*.

“All the aspirations of youth are towards science, especially that depending on observation, but we quench the God-born flame by ‘freezing drenches of scholastic lore.’ In the language of ‘*Eothen*,’ ‘You feel so keenly the delights of early knowledge! You form strange mystic friendships with the mere names of mountains, and seas, and continents, and mighty rivers; you learn the ways of the planets and transcend their narrow limits, and ask for the end of space; you vex the electric cylinder till it yields you, for your toy to play with, that subtle fire in which our earth was forged. You know of the nations that have towered high in the world, and the lives of men who have saved whole empires from oblivion. What more will you ever learn? Yet the dismal change is ordained, and then, thin meagre Latin (the same for everybody) with small shreds and patches of Greek, is thrown, like a pauper’s pall, over all your early lore; instead of sweet knowledge, vile, monkish, doggrel grammars and graduses, dictionaries and lexicons, and horrible odds and ends of dead languages, are given you for your portion, and down you fall from Roman story to a three-inch scrap of ‘*Scriptores Romani*’—from Greek poetry, down, down, to the cold rations of ‘*Poetae Graeci*,’ cut up by commentators and served out by schoolmasters.’ Is this horrible quenching of all our youthful innate love of God’s truth, the education for the youth of a nation, depending for its progress on their development? How is it possible that dead literature can be the parent of living science and of active industry?

“I need not explain myself as meaning that our youthful aspirations point to science as a fit means for developing our intellectual capacities, and that boyhood is scarcely the time rudely to exercise all our longings for an acquaintance with the wisdom of creation, or to eramp and torture the mind by the acquisition of dead languages to the exclusion of all other knowledge. In quoting the beautiful language of ‘*Eothen*,’ I intend only to express the violence done to our natural instincts, and not to question the excellence of the means employed in teaching classics. It would ill become me, or any one, to speak disparagingly of the wisdom to be derived from a study of ancient authors, or to deny the immense importance of a knowledge of classical literature to education generally; nor should I like to see that education confined to stern realities, divested of the graces and poetry of polite literature. But I do, at the same time, vehemently protest against the exhaustion of all our youthful years by a mere classical tuition, especially in the case of that large class of the community who, by their exertions in industry, have confided to them, in a great degree, the prosperity of their country. As I do not think the teaching of classical literature, as practised in our schools, to be worthy of the name of education, neither do I apply that title to the communication of scientific knowledge alone—and you will observe that I have always spoken of it by the term ‘instruction.’—I am propounding no scheme of education, but strongly insisting that instruction in science should form an important part of the education of our youth.

“Do not conceal from yourselves that this is the vital difficulty of the question. You may, and I hope will, soon raise an Industrial University; but this should have its pupils ready trained before it adopts them. Now, it must from itself act downwards, instead of working from the schools upwards. Until our schools accept as a living faith that a study of God’s works is more fitted to increase the resources of the nation than a study of the amours of Jupiter or of Venus, our industrial colleges will make no material headway against those of the continent. In Paris we find a Central College of Arts and Manufactures, into which the students enter at an average age of nineteen years, already well trained in the elements of science, and going there to be taught how

61892

to use these elements for industrial application. Three hundred of the best youth of France are annually receiving at this college the most elaborate education; and the best proof of its practical value is the great demand among manufacturers for its pupils, a diploma from it being equivalent to assured success in life. Can you wonder at the progress making by France in industry, when she pours every year an hundred and fifty of these highly educated manufacturers into her provinces? A similar education to this is going on in almost all parts of Europe; but in England only one such institution exists. We have our University and King's College, it is true, and they are productive of much good, and similar colleges exist in Scotland and Ireland; but their instruction in science terminates just where the industrial colleges of the continent begin. In fact, the latter would be supplementary and a great support to the former. Government, acting on its own perception of right, in its first national recognition of these truths, now happily dawning on England, has established a school of mines; and the experience of this has shown that it is much appreciated, although it labours under the disadvantage of the want of a preliminary education in its pupils—compelling its professors, in its commencement, to be more elementary in their instruction than is well compatible with the proper objects of such a school. Now, while I urge the impolicy of a mere classical instruction to the youth of this country with all the expression which I can give to a matured conviction, do not suppose that I would wish to put all our youth in one Procrustean bed. I again allege, that it is the present system which follows this singular love of uniformity, and clips or extends the dimension of each youth to one common standard. It is against this very confined system that I protest. I think the glorious wisdom displayed in creation, even in the limited extent to which we are permitted to behold it, forms no unapt means of leading man to a worship of its Creator; and, sympathizing as I do to the utmost in our educational endeavours to unite and not to sever the acquirement of knowledge from that of religion—a union which, I think, is at once the glory, the pride, and the peace of England—I cannot perceive how the mere teaching of profane literature can tend to this end in any degree, so much as the reverential teaching of God's wisdom displayed in His works; especially when every step in advance of this knowledge produces a social amelioration of the human race. But, while I should regret to see our colleges retrograde one step in their teaching of classical literature, it is truly lamentable that Oxford and Cambridge so little encourage the sciences; for, until the colleges throw open their widest portals to these, the schools in the country, deriving their life from them, will do little to reform the present vices of a limited and exclusive education.

In this country we are, in many respects, remarkably unchangeable. Three professions—the church, the law, and medicine, were supposed, some centuries since, to represent learning, and, with a wonderful blindness, they are still accepted as all-sufficient. Industry, to which this country owes her success among nations, has never been raised to the rank of a profession. For her sons there are no honours, no recognised or social position. Her native dignity, if tacitly understood, has never formally been acknowledged. Science, which has raised her to this eminence, is equally unrecognised in position or honours, and, from her very nature, cannot attain the wealth which in industry solaces the absence of social position. This restriction of learned honours to three recognised professions has a lamentable effect both on the progress of science and of industry. Its consequence is, that each profession becomes glutted with ambitious aspirants, who, finding a greater supply than demand, sink into subordinate positions, becoming soured and disappointed, and therefore dangerous to the community. Raise industry to the rank of a profession—as it is in other countries—give to your industrial universities the power of granting degrees involving high social recognition

to those who attain them, and you will draw off the excess of those talented men, to whom the church, the bar, and medicine, offer only a slender chance of attaining eminence; and by infusing such talent into industry, depend upon it, the effects will soon become apparent. In foreign countries professions involving social rank and position arise with their requirements; in our nation we are content with a meagre classification, scarcely sufficient for the middle ages, and not even a reflection of our present wants. These considerations are not mean ones, for, as long as ambition exists in the human mind, their good or bad adjustment will exercise a beneficial or pernicious influence on society.

“In the establishment of institutions for industrial instruction, you, at the same time, create the wanting means for the advancement of science in this country. I have alluded in this lecture, and have shown in another, that the progress of science and of industry in countries which have reached a certain stage of civilisation ought actually to be synonymous expressions; and hence it follows that it is essentially the policy of a nation to promote the one which forms the springs for the action of the other. I think it, therefore, no mean advantage to this nation, that the establishment of industrial colleges will materially aid the progress of science by creating positions for its professors and for those who would willingly cultivate science, but are scared from it by the difficulties they have to encounter in its prosecution. The great Davy says, ‘Science, for its progression, requires patronage; but it must be a patronage bestowed, a patronage received with dignity. It must be preserved independent. It can bear no fetters; not even fetters of gold; and, least of all, those fetters in which ignorance or selfishness may attempt to shackle it. And there is no country which ought so much to glory in its progress, which is so much interested in its success, as this happy island. Science has been a prime cause of creating for us the inexhaustible wealth of manufactures; and it is by science that it must be preserved and extended. We are interested as a commercial people—we are interested as a free people. The age of glory of a nation is likewise the age of its security. The same dignified feeling which urges men to gain a dominion over nature will preserve them from the dominion of slavery. Natural, moral, and religious knowledge are of one family, and happy is the country and great its strength where they dwell together in union.’ Let me quote, also, from the immortal Bacon on this point—who, as lord chancellor, when he wrote could not be actuated by personal ambition,—‘And as founders of colleges plant and founders of lectures water, we must next note a defect in public lectures, whether in arts or professions, viz., the smallness of the salary generally assigned them, for it is necessary to the progress of the sciences that lecturers be of the ablest kind, as men intended for propagating the sciences in future ages and not for transitory use. And this cannot be, unless the profits content the most eminent in every art to appropriate their lives and labours to this sole purpose, who must, therefore, have a competency allowed to them proportionable to what might be expected from the practice of a profession. For, to make the sciences flourish, David’s military law should be observed—“that those who stay with the stores have equal with those who are in the action,” or otherwise the stores will be ill-attended; so lecturers in the sciences, as being the guardians of the stores and provisions, whence men in active life are furnished, ought to share equal advantages with them; for, if the fathers of the sciences be weak or ill-maintained, the children will feel the effect of it.’ I will not weaken this admirable opinion of Bacon by any remark of my own, for I believe it to contain the real cause of the low state of science in England. But, lest you should think my views partake too much of the *argumentum ad sacculum*, I will protect myself under the caustic wit of Diogenes, who, on being asked, ‘How it happened that philosophers followed the rich and not the rich the philosophers?’ answered, ‘Because the philosophers know what they want, but the rich do not.’

“ I must now conclude this lecture, already much too long, and I do so by once more recalling to your minds its general argument. Chemistry, viewed here as a type of science generally, has exercised immense influence upon manufactures, having increased human power, economised human time, and communicated important values to bodies apparently the most worthless. Foreign states have acknowledged the fact, that successful competition can only be attained by an attentive study of science—by making their sons of industry themselves disciples of science. England, except in one instance, has hitherto not recognised this truth as a principle of State, and hence her science languishes, and her capital has to import from other lands. This points to the necessity of the establishment of industrial colleges; but it implies, at the same time, an adaptation of juvenile education to the wants of the age. All this impresses itself upon my mind with a conviction as strong as that the glorious sun sheds its light-giving rays to this naturally dark world of ours. May the Exhibition be the means of raying forth this truth to our darkening industry! Do not dream of that Exhibition as a thing of the past; rather think of it as a glorious emblem of the future. When Neptune and Minerva disputed as to who should name the capital of Cecropia, the gods resolved that the right should be given to the one who granted to man the greatest benefit. Neptune struck with his trident the earth, from whence sprung a war-horse; while Minerva produced an olive-tree. England, though sharing with Neptune the empire of the sea, ratified the decision of the gods by rearing the emblem of peace. The Exhibition has been an olive-tree, the branches of which have now been spread among all nations, and success for the future will depend upon the care and wisdom with which they are tended, so as to grow into goodly trees. Do not let us, by severing industry from science, like a tree from its roots, have the unhappiness of seeing our goodly stem wither and perish by a premature decay; but, as the tree itself stretches out its arms to heaven to pray for food, let us, in all humility, ask God also to give us that knowledge of His works which will enable us to use them in promoting the comfort and happiness of his creatures. Our duties in this respect are clearly indicated in the motto of our catalogue:—

‘ HUMANI GENERIS PROGRESSUS
EX COMMUNI OMNIUM LABORE ORTUS,
UNIUSCUIUSQUE INDUSTRIÆ DEBET ESSE FINIS :
HOC ADJUVANDO,
DEI OPT: MAX: VOLUNTATEM EXSEQUIMUR.’ ”

THE EXHIBITION AS A SCHOOL OF INDUSTRY.

To pursue the difficult question of the tendency of mechanical production, and the influence of increased facilities upon the condition of the workman, would involve us in a greater length than we propose in this present chapter. Unquestionably, the immediate results are often suffering and hardship to individual workmen, and often to a whole trade. But we cannot quite address ourselves to the logic of arguments, that improved modes of production, which confessedly place the article within the reach of a greater number, are to be retarded, in order to benefit a minority; that the course of science is to be checked; that knowledge is baneful; and that either particular modes of production, or particular habits and manners in men, are to be kept up solely for the existence of particular trades and particular classes of artisans. Moreover, those who enter into these arguments are prepared to show, that the social machine rights itself in a much shorter time than might have been anticipated. We well recollect the fearful prognostications at the commencement of the railway system. Caricatures of distracted innkeepers and delighted horses were to be seen; and what was shown in caricature was true at least for the time, as to the innkeepers. The coaching glories of Lichfield,

Northampton, and St. Alban's, passed to places which had been too small to dread railways; new towns rose with wonderful rapidity, and the old became melancholy and deserted. We need not tell what every one knows; though let the artisan class bear in mind, that from the development of the railway system a great amount of new employment has been gained, and families once struggling against reverse of fortune are now contented and happy. And if we say the very innkeepers and horses had soon more to do than ever before, and that towns which had rejected railways got looped in, bitterly lamenting, then we shall have simply told the story of the last sixteen years. But the moral we cannot omit. It is, that the antidote to these temporary hardships must be supplied by education, by the development of mind in the workman; and for this antidote, the means existed in the Exhibition. By debasing the workman to a mere machine, it has followed necessarily that the human machine was superseded, sooner or later, by the superior mechanism which springs from mind. Immediate advantages of concentration of attention and subdivision of labour were the limitation; and it may not unreasonably be inferred, that the recent prevalence of insanity even has been the result. Improved education, and the development of mental energy, would not only lead to the discovery of new sources of employment, indispensable in a state of progress, but would, at the same time, substitute an honest pride and pleasure in the perfect execution of even mechanical work; the increasing want of which is a main cause of the inferiority of many works of art, and a constant source of annoyance to architects, and loss in buildings to the public. From the brickwork and joiner's work, or ironmongery in a house, down to a chair or an umbrella, lowness of price without the asserted durability, is universal; and the ingenuity, and even pleasure, which both dealers and workmen evince in the practice of a deception, is equalled by the readiness of the public to deceive themselves. As we cannot grasp the reasoning of a Chancellor of the Exchequer, that because chicory is sold, coffee has been available to a class which had not before used it, so we regret the prevalence of the delusion which exists in buildings as in every other commodity. Many amongst the class of building artisans appear to disregard directions as to work, for the mere pleasure of practising a deceit. For this pleasure, we must substitute the pride of producing a good work, and this antidote, we repeat, was to be found in the Exhibition. We could have hoped that the influence of the Exhibition would have been exerted in the removal of a delusion before referred to, namely, that expense and elaborate work are indispensable to the production of beauty. Beautiful, indeed, and suggestive as were many of the objects of the Exhibition, there appears to have been an entire absence of that cheap beauty which would be within the reach of all classes. The attainment of this object would have been the more desirable, since recent attempts to extend the influence of art, in association with objects of decoration and utility, have fostered rather than discouraged the delusion, and so have not advanced the objects of those who have made them. What has to be done, in fact, is to invest every form of utility with the attributes of art, and this alike from the most elaborate work of architecture, to the least important article of furniture, or the meanest utensil. Certain principles which have to be kept in view are alike in all these cases. They correspond with those which the most enlightened artists are endeavouring to bring to the regeneration of architecture; they are in many respects distinct from those which determine the forms of painting and sculpture, and, perhaps, have never yet been accurately perceived and exemplified in the architecture of any age. They depend, indeed, upon the constant recognition of the fact, that the reason must be satisfied as well as the eye delighted; and the want of this recognition is the great fault in the numerous designs for decorative objects, now held up to notice as excellent works of art. We think that the late Exhibition has afforded us the means not only of contributing to the advancement of

architecture, but of placing it in a position in which it has never yet stood; but there are particular circumstances in connexion with manufactured art which should be guarded against, although not precisely in the manner urged by those who deny the value of multiplication of copies. As for the collection of grates, ironmongery, furniture, and all those objects which afford interest to the architect, they could not be viewed without advantage—since the greatest difficulty is often felt in obtaining knowledge of the existence of particular inventions and contrivances. As a complete collection of these things, the Exhibition was, of course, not to be regarded. It is from the uses of the Exhibition, on which we have dwelt above, that its chief value will be felt.

CHAPTER XXVIII.

DECORATIVE FURNITURE AND UPHOLSTERY, PAPER-HANGING, ETC.—*Juries' Reports.*

CABINET FURNITURE, EARLY ACCOUNT OF—ITALIAN, FRENCH, GERMAN, AND ENGLISH WORK—FIRST INTRODUCTION OF MAHOGANY—MARQUETERIE INLAY—TARSIA-WORK—BUHL INLAY—MOSAIC INLAY—PARQUETERIE—PORCELAIN INLAY—MECHANICAL ACTION IN CABINET WORK—BILLIARD-TABLES—DECORATIONS—IMITATIONS OF WOODS AND MARBLES—PAINTED BLINDS—WAX-CLOTH HANGINGS—PAPER-HANGINGS, VARIOUS KINDS—MODE OF MANUFACTURE—MODE OF PRINTING—BEAUTIFUL SPECIMENS OF LANDSCAPE PAPERS, ETC.

It is important, both for strength and good effect of furniture, that the principles of sound construction be well carried out; that the construction be evident, and that, if carving or other ornament be introduced, it should be by decorating that construction itself, not by overlaying it and disguising it. It is not necessary that an object be covered with ornament, or be extravagant in form, to obtain the element of beauty: articles of furniture are too often crowded with unnecessary embellishment, which, besides adding to their cost, interferes with their use, purpose, and convenience. The perfection of art manufacture consists in combining, with the greatest possible effect, the useful with the pleasing; and the execution of this can generally be most successfully carried out by adopting the simplest process.

The jury, though fully sensible of the great beauty of many of the ornamental works in furniture collected at the Exhibition, yet regret that there have not been more specimens of ordinary furniture for general use; works whose merits consist in correct proportion, simple but well-considered design, beauty of material, and perfect workmanship. Few have the means of purchasing such beautiful works as the sideboard of M. Fourdinois, or the cabinets of M. Ringuet-Leprince, which come almost under the head of fine art, rather than of manufacture; and it is much to be desired that attention be directed towards improving the taste of those more ordinary objects that come into daily use by the many.

Cabinet furniture first became an article of general luxury about the beginning of the sixteenth century. At this period inlaid, as well as richly-carved furniture, was manufactured in Italy, and exported to various parts of Europe. Among the works exhibited by Italy, some were distinguished by great excellence, particularly in the carved examples. M. A. Barbetti, from Florence, exhibited a casket of great merit, most elaborately carved, introducing bas-reliefs of figures, ornaments, chimeras, &c. A large cheval-screen frame, by Luigi Marchetti, of Sienna, was very beautifully wrought with delicate ornaments, of

good taste. An oval medallion frame, by Pietro Guisti, was also a fine specimen of carving. M. B. Capello, of Turin, exhibited a very elegant inlaid table, a curruled chair, and a pedestal—all ornamented in very pure taste, in the Etruscan style, and of good execution.

In France, ornamental cabinet-work had acquired considerable reputation in the time of Louis XIV. Its manufacturers have, since then, continued to produce works of great beauty, and have brought the art of marqueterie inlay to a high state of perfection: this work consists in inlaying woods of a great variety of tints, in the form of flowers, ornaments, &c.; and was greatly advanced, in the last century, by Reisner, who produced very beautiful specimens. In buhl-work, also, wherein metals are inlaid upon grounds of tortoiseshell or ebony, or *vice versa*, the French have greatly excelled. This kind of ornamental inlay takes its name from M. de Boule, a celebrated French cabinet-maker, in the time of Louis XIV.

In Germany there has long been established cabinet-work of a high class, more especially for those exquisite ebony cabinets, inlaid with precious stones, and various woods and metals, surmounted with carved figures, and elaborately fitted with innumerable drawers and with perspective recesses—presents fit for kings and princes; of these an excellent example was presented in the ebony cabinet of M. Gröger, of Vienna, a most beautiful work, exquisitely finished. Cabinet-work, of a more useful description has been carried to a high state of perfection in Great Britain, whose manufacturers have studied to produce objects in which the prominent excellence is substantial quality and finished workmanship. It was in England that mahogany, now so generally used, was first employed for cabinet furniture, about 1720. Dr. Gibbons, an eminent physician, having had some planks of this wood given to him by his brother, a West-India captain, who had brought them in his vessel as ballast, wished to use them for a house he was building, in King-street, Covent-garden; but the carpenters complained that the wood was too hard; it was therefore laid aside as useless. Soon after, Mrs. Gibbons wanted a candle-box, and the doctor called in his cabinet-maker, Mr. Wollaston, to make him one of this wood, then lying in the garden. He also declared that it was too hard. The doctor said he must get stronger tools. The candle-box was completed and approved, insomuch that the doctor then insisted on having a bureau made of the same wood, which was accordingly done; and the fine colour, polish, &c., were so pleasing, that he invited his friends to come and see it. Among them was the Duchess of Buckingham. Her grace begged some of the same wood from Dr. Gibbons, to make a bureau for her also; on which the fame of mahogany and Mr. Wollaston was much raised. The wood became the fashion, was much admired, and from that time has continued to be used for furniture more than any other. It will not be possible to give a description of the various details of the manufacture of cabinet-work; but an account of some of the more ornamental processes and results connected with it may be desirable. Of these the marqueterie inlay is one of the most beautiful and interesting. In this work the design, having been first drawn on paper, and properly coloured, is pricked with a fine needle, so that the outline of the ornament or other objects can be pounced on the various coloured woods proposed to be employed; these outlines being carefully marked in, are cut with a fine watch-spring saw, worked in a lathe; in most cases the wood forming the ground is cut with that forming the ornament, so that a piece cut out of white wood corresponds exactly, in shape and size, with the opening left in black wood, in which it therefore fits, and forms the required pattern.

Tarsia-work, or the art of inlaying woods, had been practised from a very early date in Italy, and extensively employed in the decoration of wall-panelling; and remains of this kind of work, revived by Fra Giovanni di Verona, in the fifteenth century, still exist in some of the Italian churches. The earlier specimens of this work were executed in

woods of different shades, but natural hues; afterwards, when flowers, birds, and coloured ornaments were introduced, various stained woods were employed; these, in most cases, have the disadvantage of fading, but in the admirable specimens of marqueterie inlay exhibited by M. Cremer, of Paris, the woods were stained by the process of M. Bouchenè, which gives them a permanent dye to a considerable depth. Notwithstanding, however, the beautiful effect of this work, it is desirable to adopt, as far as possible, the employment of woods of natural hues, as being more harmonious and more consistent with the nature of the work. In those ornaments which are shaded, the effect is given by immersing the pieces in hot sand. The various parts being cut, one of the required tints in the proper form are then placed according to the design, and fixed on paper; afterwards they are applied, like veneer, to the piece of furniture: being mounted, they are cleaned off, and slightly polished, and the finer lines are then engraved. Buhl inlay is manufactured by exactly the same process, only that metals, tortoiseshell, and ebony, are here the materials employed; the nature of the design is somewhat different, depending more upon simple outline forms. There were many beautiful specimens of this kind of work in the Exhibition, more particularly the cabinets of M. Fortner, of Wurtzburg, Bavaria, where the figures and ornaments were designed and finished with infinite taste and skill. There is another kind of inlay applied to furniture, which may be called Mosaie inlay. The beautiful boxes made in India gave some good specimens of this work, in ivory and metal, equalled, however, by the inlaid furniture and boxes of M. Marcelin, of Paris. The extraordinary table of Senor Perez, of Spain, gave a fine example of this style of work, executed entirely in minute portions of wood; the same principle was carried out in a table, by Nye, of Tonbridge Wells. Where the patterns assume geometric forms, this kind of work is executed by laying together slips of wood or metal, &c., in the particular forms required; these united slips are then cut transversely, and affixed to the grounds as in marqueterie. Immediately connected with inlaid cabinet-work is the manufacture of parqueterie, for floors; in this work the same principle is carried out as in marqueterie, only on a bolder scale: woods of different colours are cut to pattern, and inlaid one in the other, or so arranged as to produce very beautiful effects for floors. The specimens exhibited of MM. Couvert and Lucas, and M. de Keyn, of Belgium; of MM. Leistler and Son, of Vienna; and of Mr. Miller, of Russia, showed the perfection to which this art has been brought.

A very beautiful novelty at the Exhibition was the introduction of porcelain inlaid in furniture, like marqueterie, by Messrs. Rivart and Andrieux; in these examples, not only were panels of porcelain inserted, but the painted flowers were cut to form, and inlaid like the ornamental woods. In the cabinet of Mr. Dowbiggin, of London, porcelain, of a very high class of art, was mounted in the panels and pilasters; and M. Gambs, of St. Petersburg, contributed a cabinet in tulip wood, mounted in or-molu, containing beautiful panels in porcelain. M. A. E. Ringuet-Leprince introduced carvings of ivory, mounted with or-molu, on one of his cabinets, with excellent effect; and in his most beautiful ebony cabinet for medals, relieved with exquisite carvings, fine stones were inlaid so as to form part of its decoration. Many of the pieces of furniture owed much of their attraction to the metal ornaments with which they were mounted; but the ebony cabinet of M. Barbedienne combined, in the very element of its construction, bronze ornaments and figures, of a high class of art, so arranged as to form one united whole. Of the carved furniture in the exhibition we have already given ample description: we shall therefore pass over to another branch of cabinet-work, which merits particular notice—that in which mechanical action is introduced; the specimens exhibited by MM. Daubet and Daumaret, of Lyons, were most ingenious and curious; in their secretaire, which was full of contrivances, one key

unlocks all the drawers. These run in the most easy and perfect manner, if touched in the slightest degree; and the closing of one particular drawer shuts and fastens all the others. M. Krieger, of Paris, also exhibited some furniture of excellent mechanical action, such as card-tables, toilets, &c.; and M. Von Hagen, of Erfurt, had a cabinet of fine workmanship, in which the secret mechanism was skilfully carried out. In the Austrian collection were some curious chairs and furniture, by M. Thouet, of Vienna, in which the wood, inlaid with metal lines, was bent to the required forms, without the usual framing. Many excellent billiard-tables were exhibited: in one, by M. Bouhardet, of Paris, the carving was of very beautiful design; another, by M. Knill, of Vienna, was handsomely mounted in bull inlay; and the inlaid cues of this manufacturer were very beautiful specimens. The billiard tables of Messrs. Thurston, and of Messrs. Burroughs and Watts, of London, were of simpler construction, but solid, and of excellent workmanship.

Decorations.—The specimens exhibited under this head were decorations for walls and ceilings, imitations of woods and marbles, and painted blinds. Several of the ceilings under the galleries of the exhibition building were decorated with more or less taste, principally in the Arabesque style. One, painted by Signor Montanari, of Milan, in one of the Austrian departments, deserved particular notice: it was a carved ceiling, executed with great breadth of effect. The imitation of gold was excellent, and the general treatment was full of spirit and force. In wall decoration Mr. Morant exhibited a handsome panel, mounted with gilt ornaments and mouldings; the latter upon a ground of looking-glass. In the centre of the panel was painted a figure, surrounded by foliage Arabesque. Mr. Moxon's panelling, over a chimney-piece by Mr. Thomas, in the English furniture court, was a tasteful specimen of decoration; and the imitations of woods and marbles, by this gentleman, were executed in a very superior manner, united with an ornamental character of a high class. Messrs. Holland, of Warwick, exhibited table-tops in imitation of marbles, ornamentally arranged in the old Italian style, with good effect. Mr. Kershaw's imitations of woods were also very excellent; and those by Messrs. Nicoll and Allen, of wood and marble, had also considerable merit. Some of these imitations of wood were painted on glass, the polished surface of which gave great finish to the work. Among the painted blinds, those by M. Bach Peres, of Paris, were considered good specimens. The wax-cloth hangings, by M. Vivet, of Paris, were painted ornamentally in the style of Francis I., and were stated to be so prepared as to resist the effects of moisture.

Paper-hangings.—Paper-hangings form a manufacture of considerable importance, carried on in most of the principal cities of Europe, employing many artists and designers, and thousands of operatives; consuming also vast quantities of paper, colours, wool, and metal. They are important, also, because they may be made the means of extensively diffusing taste for art; and, from the low price of the cheaper kinds, enabling the humblest mechanic to give to his home an air of elegance and comfort. It is difficult to determine the period when paper-hangings were invented. They are supposed to have been first made in China; and the introduction of these hangings into Europe probably suggested the manufacture here. They may be divided into three kinds—the flock, the metal, and the coloured; and each of these seems to have been invented at a different time, as an imitation of a distinct material. The flock, to imitate the figured tapestries and stuffs; the metal, in imitation of the gilt leather hangings; and the coloured, as a substitute for painted decoration. It is generally allowed that flock hangings were first manufactured in England, and invented by Jerome Lanier, who obtained a patent in the reign of King Charles I., dated May, 1634, and carried on his art in London. In this patent it is stated “that, by his endeavours, he hath found

out an art and mystery of affixing wool, silk, and other materials, of divers colours, upon cloth, silk, cotton, leather, and other substances, with oil, size, and other cements, to make them useful for hangings and other occasions, which he calleth Londriniana; and that the said art is of his own invention."

M. Savary, in his *Dictionary of Commerce*, 1720, says that tonture-de-laine, or flock-hangings, were first made at Ronen, but in a coarse manner, being only used for grounds, on which, with flocks of different kinds, were formed designs of brocades. They essayed to imitate tapestry-hanging, but not successfully; and at last a manufactory was established at Paris, in the Faubourg St. Antoine, and there flowers and grotesques were introduced with success. The manufacture is thus described by him:—"The artist having prepared his design, drew on the cloth with a fat oil or varnish the subject intended to be represented; and then the flocker, from a tray containing the different tints of flocks, arranged in divisions, took the colours he required, and sprinkled them in a peculiar manner with his finger and thumb, so that the various shades and colours were properly blended, and an imitation of the wove tapestry produced." These descriptions, though detailing the manufacture of flock-hangings, yet do not allude to the use of paper as a ground, nor to blocks for printing. A French author, writing in 1723, says that paper-hangings, called tapestry in paper, were, till lately, only employed by the country people for their cottages, or by small tradesmen in their shops and rooms; but towards the end of the seventeenth century, the manufacture was raised to such a point of perfection and beauty, that besides the quantities that were exported abroad, and to the principal cities of the kingdom, there was scarcely a house in Paris not decorated with it. The manufacture at that time is thus described:—"The design, having been drawn in outline on paper, pasted together, of the size required, was then divided into parts of a suitable form, and given to the carver or wood-engraver, to cut the design on blocks of pear-tree, much in the same manner as at present. The outline thus cut was printed in ink, with a press, on separate sheets of paper: when dry, these were painted by hand in distemper colours, and afterwards joined together, so as to form the required design. Grotesques and panels, in which were intermingled flowers, fruits, animals, and small figures, were then executed by the above process." M. Reveillon, of Paris, is considered to have introduced many improvements in this manufacture, and was celebrated for the beauty of his productions in the latter end of the last century. The pillage of the workshops of this manufacturer in the Faubourg St. Antoine was one of the first incidents of the revolution in 1789.

In England this manufacture continued from the time of Lanyer, and obtained a high reputation. In 1712, a duty of $1\frac{3}{4}d.$ per square yard was imposed; and a Mr. Jackson, who established a factory at Battersea, for paper-hangings of classic design in chiaro-scuro, writes, in a work published in 1754, in praise of his own productions, and condemns the fanciful paper-hangings at that time so much used, comparing them with the Chinese. In the year 1786, there was established at Chelsea a manufactory for paper-hangings of a very superior description, by George and Frederick Echarchts. Works excelling even those of the present day were produced at this place; some of the blocks used are at present in possession of the writer of this report: they have great merit in the designs, and are some of them eight feet in length. These manufacturers carried the art to its highest point in England; they printed not only on paper, but also on silk and linen, and employed a number of artists, in addition to workmen and children. Mr. Sheringham, of London, also excelled at that time in decorative paper-hangings. During the present century, the French have not only restored this branch of manufacture to a high state of perfection, but have also introduced many important improvements, such as the embossed flocks and the shading of flocks, the perfect

imitation of chintz, improvements in the satin-grounds, and the introduction of work printed from engraved cylinders.

In England, the trade was protected by a duty of 1*s.* per square yard, up to the year 1816, when sir Robert Peel reduced it to 2*d.* This high duty acted almost as an exclusion to foreign makers, and there was therefore no competition with them, nor any inducement to improve. Since that time, however, the English manufacturers have made great progress in their art, both in style and workmanship, the trade has greatly increased, and the improved productions are sold at a greatly reduced price. They have, besides, applied themselves to the improved application of machinery, by which very beautiful papers are made at an extremely cheap rate.

The process of manufacturing ordinary paper-hangings, as now carried on, may be thus briefly described:—"The pattern being first carefully drawn, is then pricked, and the outlines of the various tints are pounced each on a separate wood block made of pear-tree, mounted on pine. These blocks are pressed on the sieves of colour, and then applied to the paper, each block following the other on the guide marks left by the previous impression. An idea may be formed of the enterprise and labour required to produce some of the decorative paper-hangings for the Great Exhibition, by stating that more than twelve thousand have been employed on a single one of them. In making flock-paper, the pattern is first printed in size, and then with a preparation of varnish or japan gold size. When this is partly dry, coloured flock, prepared from wools, is sifted on the varnish pattern, to which it adheres. Great improvements have been made of late years in this manipulation, more especially by French manufactures. Paper-hangings, where gilding is introduced, are prepared much in the same way as for flock: the leaf-metal is laid on the varnish pattern, or, if worked in bronze powder, it is brushed over with a hare's foot. The English manufacturers have attained great perfection in the preparation of metal-papers. The gilding having to encounter the damp and variable climate, is most severely tested; but by means of good material, careful manipulation, and a preparation washed over it, it remains unchanged for a considerable period."

Paper-hangings have been printed in England by means of hand-machines for many years, the papers being made in lengths of twelve yards, or single pieces, in one or two colours, and these colours falling separately on the ground. It was not until about ten years since, what is now understood as machine-printing was fully introduced; and this was done by Messrs. Potter, of Darwen, who, by means of steam-power, artificial drying, and an endless roll of paper, were enabled to produce patterns with good effect, by surface-roller-printing in several colours, on the principle of calico-printing: specimens showing fourteen colours were exhibited by this house. Messrs. Heywood, Higginbottom, and Co., of Manchester, have also effected great improvements in the manufacture, and exhibited patterns showing twenty colours made by fourteen rollers; and Messrs. J. Woollams and Co., of London, likewise exhibited excellent specimens made by machinery, in addition to those they make by block-printing. These machines are now each capable of printing from one thousand to one thousand five hundred pieces per day; and, although the work is not equal to block-printing in the solidity or permanence of the colours, yet the small price at which it is produced commands an extensive sale, superseding, to a great extent, the cheaper kinds made by hand. The above remarks apply only to paper-hangings of the cheaper qualities, for machine-printing has not yet been successfully applied to those with glazed or satin grounds. There is also another evil which it is most desirable to remedy—the colours are liable to run, without great care, in the hanging. There were very beautiful specimens of paper-hangings in the Great Exhibition; works which not only possessed considerable artistic excellence, but also showed great progress in the manufacture.

France has justly acquired a high renown for her works in this branch of industry. M. Delicourt, of Paris, exhibited a tapestry-like picture, entirely printed by blocks, representing a chase in a forest, surrounded by a rich, ornamental frame, with pilasters containing animals, birds, and attributes of the chase: twelve thousand blocks were required to execute this most creditable work. He likewise exhibited flower decorations, entirely executed in flocks, of which there were about seventy different shades; also very beautifully-finished plain flock-papers, called silk and wool. His two bas-reliefs of *The Descent from the Cross*, and *The Resurrection*, were good specimens of printing. M. Zuber, of Rixheim, exhibited one of his beautifully-executed landscape papers—one of a series of works for which this house is so celebrated; it represented the floral vegetation of the four quarters of the globe, and the richness and brilliancy of the colouring and the perfect workmanship were alike remarkable. M. Zuber also exhibited many other excellent specimens of the various kinds of paper-hangings, &c.: he is, besides, the author of many improvements in this trade. Messrs. Mader, of Paris, exhibited a picture representing a garden-scene—a very clever example of paper-printing, left, perhaps purposely, in a state where a few touches, by the hand of a clever artist would complete a beautiful effect. A well-executed figure in a panel, and other decorations of flowers and ornaments, besides some specimens of the more ordinary kinds of paper-hangings, attested the skilful workmanship of this house.

The English manufacturers of paper-hangings have produced many beautiful specimens also, both as decorative, damask, chintz, and flock-papers; those made by machinery have been previously alluded to. Messrs. Townsend and Parker, of London, exhibited paper-hangings of various kinds, of considerable beauty of design and execution; two of their decorations introduced fruit, flowers, and arabesque ornament of excellent execution. Messrs. Hinchliff and Co., of London, also produced good specimens of decorative and other paper-hangings; and the collections of Messrs. Williams and Co., and Messrs. Turner and Co., included many examples, showing that the art is well carried on in this country. Messrs. Spörstin and Zimmermann, of Vienna, exhibited paper-hanging decorations for ceilings, &c., in good taste. They have also adapted the process of block-printing in distemper colours, as a cheap form of illustrating works of science and art; the specimens they exhibited gave illustrations of machinery in isometrical perspective, very beautifully executed. M. Devis, of Brussels, exhibited a large collection of paper-hangings, more particularly in flock, of excellent execution. M. M. Rahn and Vetter, of Warsaw, forwarded a collection of paper-hangings, which possessed considerable merit, both as regards design, colouring, and execution.

CHAPTER XXIX.

DIGBY WYATT, ESQ., ON FORM IN THE DECORATIVE ARTS.

PRELIMINARY REMARKS—INFINITE VARIETY OF NATURE—FITNESS AND SIMPLICITY—CONTRAST—
CONSIDERATIONS ON ARCHITECTURE AND SCULPTURE—OPTICAL DELUSIONS—IMITATION—
ORNAMENT, ETC.

“It has pleased the beneficent designer of ‘the world, and all that therein is,’” says our accomplished lecturer, “not only to surround man with the ever-varying and inexhaustible beauties of nature, and to endow him with the gift of sight to perceive her

graces; but he has been pleased also to confer upon him a mind to understand, and a hand to imitate them. These gifts are clearly talents committed to our charge, and to be accounted for by us. The same power—

‘That gave us in this dark estate
To know the good from ill,’

conferred upon us also an unerring natural test to distinguish the beautiful from the mean or ugly. That test is the sensation of delight which invariably accompanies our recognition of beauty, moral or physical. Whenever the powers of the mind are concentrated upon any of the great external evidences of Omnipotence—upon ‘the heavens above, or on the earth beneath, or on the waters which are under the earth’—it is impossible to refrain from pouring forth a tribute of silent but heartfelt admiration; and at such moments the Creator, as if to mark his approbation of the sacrifice, lulls for a while all memory of earthly pain or care, and pours peace and happiness into the soul. Thus it is that ‘a thing of beauty is a joy for ever.’ It is impossible to examine the smallest object upon which the skill of divinity has been exercised—a shell, a flower, or an insect—without feeling a longing to know somewhat of the mysterious laws which make that individual specimen of design so perfect, and without experiencing a desire to emulate the marvellous powers of creation. The first sensation of the exercise of such powers we feel to be godlike. Thus it is that man naturally attempts, in his feeble way, to emulate the loftier faculties of divinity; and thus ‘tis to create, and in creating live a being more intense, that we endow with form our fancy.’ From such exertions spring all that is ideal or poetical in every art.

“Whenever we attempt to penetrate the wondrous system that makes all nature one vast harmony it is impossible to refrain from feeling that—

‘God moves in a mysterious way
His wonders to perform;’

and that it is as yet our portion only to see the full light of his majesty as ‘through a glass darkly.’ Enough, however, is still apparent to teach us that there are conditions of harmonious relation which pervade the most exquisite forms in divine creation; and it is only while catching a faint reflection from their glories that we can hope to succeed in the slightest degree, in throwing a veil of beauty over our comparatively insignificant productions. The first operation indispensable to any attempt to define the principles which should determine form in decorative art, must obviously be an investigation into those conditions of divine design in concord with which all human attempts at its imitation must be moulded, before a supreme sensation of delight can be produced. The occurrence of such a sensation we have already pointed out as the constant and unerring test of real beauty. We purpose, therefore, in the first place, to draw such general inferences together, concerning the great scheme of design manifested in the noblest works of nature, as we have been enabled to collect, either from the experiences of others, or our own study of the subject. The second operation must evidently be, to trace the application of these general inferences to the various material branches into which the different necessities of man, or his sympathies, have divided all those decorative arts which minister to his cravings for enjoyment on all occasions. We purpose, therefore, in the second place, to take a rapid survey of the principal members of that great family, and to point out some of the innumerable enactments of nature, specially affecting several of the most important individual ‘departments of practical art.’ Never in the whole history of the past has such a body of appropriate illustration of this branch of our subject been collected as was brought

together in the vast extent of the ever-memorable Palace of Industry; and it was impossible to examine carefully the rich store of material enclosed within its glassy walls, without gathering some few valuable hints. In entering on the first division of our, perhaps, too ambitious attempt, we are overcome with a sense of the infinite minuteness of our knowledge of the great conditions of creation. We recognise an almost universal beauty throughout the works of nature by the exercise of some faculty, as intuitive as memory, and not less inexplicable when we essay to predicate concerning its ineffably mysterious constitution. It has been well observed by some metaphysical writers, that in the development of the intellectual powers, the first effort is to realise, the second to enjoy, and the third to reason. In obedience to this theory, the first and constant effort of every child is to feel, to see, to use its senses, and to verify the fact of its existence by ascertaining its physical relation to all by which it is surrounded. Its second and occasional effort is to eat, to drink, to smell, to show pain and pleasure, likes and dislikes, and to observe and treasure up such experiences as can affect its subsequent enjoyment. The third effort is to exercise the gift of thought, and to form conclusions by other processes than those of direct sensation. Now we, as respects our knowledge of divine beauty, can be regarded only as very little children; and, if we would improve upon our condition of ignorance, instinct leads us onwards through parallel states of progress. Let but the first effort of one totally uneducated in art be to see and to feel nature, to look upon her works with an observant eye, and he will almost instantly find himself led on by unerring sensations of delight to the second stage of advancement. In that stage he will enjoy, discriminate, select, store in his memory, and at length endeavour either to reproduce, or cause to be reproduced, those natural objects, contact with which has caused him the greatest amount of pleasure. Thus the first phase of all art is rude direct imitation. No sooner does he arrive at the full development of his secondary condition, than he passes into the third. He begins to speculate upon the sensations he experiences, upon the phenomena of recurrence, and on the means whereby he may be enabled, by his own description or imitations of the original types, to convey to others the pleasures he himself derived from a contemplation of them—thus the ignorant may grow into the connoisseur, and thus the child into the artist.

“A knowledge of the sequence of these natural phases of transition points out the course by which alone special education in decorative art can be brought to a successful issue. Surround the pupil with every attainable example of general beauty of form, if he is to be a general artist or draughtsman; make him acquainted with all the antecedent productions in his speciality, if he is to be a special designer. Show him only as much as possible of what is good, whether general or special; then his sense of enjoyment will teach him selection, and he will store his memory with the best. Practise his hand as you educate his senses, and the feeling of power will soon come upon him. Reason will assert its empire, and inquiry will be stimulated. Once roused, effort will succeed effort, and thus in time the pupil will grow into the master. As it is impossible to arrive at correct theories in science, except by the analysis of accumulated observations—firstly, of things; secondly, of properties; and thirdly, of relations—so it is impossible to assume any general conclusions concerning divine design without passing through the three stages of realization, enjoyment, and reflection. When we take into consideration, on the one hand, the shortness of life and the limitation of the powers of man, and on the other, the extent and illimitable divisibility of matter and its incessant changes in form and application, we cannot but feel conscious in how slight a degree the best disposed and most talented student of nature can have become acquainted with her innumerable phenomena, a thorough knowledge and enjoyment of which we have shown to be indispensable to any just general conclusions. It is only by the transmission from generation to genera-

tion of accumulating experiences and deductions, that the very few points we are about to indicate have been assumed as universal recurrences in the external forms in which nature pours forth her bounteous gifts to man. The first quality with which the observer must be struck is the infinite variety of form which pervades creation. On attempting to reason concerning it, he perceives its dependence upon the functions each object, and the component parts of each object, are ordained to fulfil; hence he will at once recognise the fact, that form is in every case, if not dependent on, at least coincident with, structural fitness. When the most complex flower is submitted to the test of a scientific botanical examination, no particles are found to be adventitious—all are concerned in fulfilling the appointed functions of vegetable physiology. As those functions vary with the growth of the plant, so in every case does its form—changing from tender bud to blooming flower, and from blooming flower to reproductive seed-pod, as each successive change of purpose progresses. Infinite variety and unerring fitness thus appear to govern all form in nature. While the former of these properties demonstrates her infinite power of complexity, the latter restrains the former, and binds all in beautiful simplicity. In every case ornament appears the offspring of necessity alone; and, wherever structural necessity permits, the simplest lines, in every case consistent with the variety of uses of the object, are adopted. Thus, the principal forest-trees, which spring erect and hardy from the ground, in their normal state, uninfluenced by special conditions of light or heat, shoot straight aloft, with boughs equally balanced on all sides, growing so symmetrically, that a regular cone or oviform would, in most cases, precisely define their outline; and thus the climbing plants, from their first appearance, creep along the ground in weak and wayward lines, until they reach something stronger and more erect than themselves; to this they cling, and from it hang either vertically or in the most graceful festoons; to each its character of form as of purpose—to each the simplest line consistent with its appointed function and propriety of expression. From nature's delight in simplicity, man probably derived his earliest perception of geometrical figures. The term horizontal at once betrays the source from which our idea of such a line may have been derived. Upon the horizon, as a base, endless perpendiculars are erected in every plant that pierces the soil at right angles to its tangent. A plain in nature furnishes the idea of a plane in geometry. Every variety of triangle is indicated by the outline of the snow-clad peaks of the loftiest mountains; every kind of cone by their substance. The thin clouds that sweep along the sky at sunset, hanging over the distant blue line of the ocean, form exquisite parallels; and where cut by the lines of trees and plants suggest every variety of square and oblong, rhombus and parallelogram. Where compactness is indispensable, the honey-yielding hexagons abound; and in her endless variety of crystals, nature has furnished us with models of the most exquisite solids. In the rainbow we have her noblest arch; in the parabola at once one of her most graceful curves and most elegant formulæ of projection.

“While a consideration of the quality of fitness binds us to simplicity, that of variety, as if in counterbalance, conducts us to a just recognition of the value of contrast throughout all the works of creation. Simplicity becomes appreciable only when opposed to complexity; while complexity itself will, on analysis, be found to consist only of the combination of parts, individually of extreme simplicity. The researches of Mr. Penrose have lately developed many of the most interesting phenomena respecting the ‘simultaneous contrast of form;’ and have not only demonstrated the fact of the scientific acquaintance of the Greeks with their peculiarities, but have shown how essential an attempt to apply such knowledge has been to the production of those exquisite monuments which from the first moment of their creation to the present time, have maintained a position of unquestionable supremacy over every other work which human art has yet

produced. The general result of Mr. Penrose's investigation tends to the assumption, that no two lines can come in contrast with one another, either in nature or in art, without the direction of the one acting, either attractively or repulsively, upon the other, and tending to diminish or exaggerate the mutual divergence of both lines, *i. e.* to increase or lessen to the eye the angle at which they meet. Thus, if to a perfectly horizontal line another be drawn, meeting it at an angle of six degrees (about half the angle at which the inclined sides of the best Greek pediments leave the surface of the cornice), it will be difficult to convince the eye, as it traces the direction of each line, that the angle has not been materially increased by an apparent deflection of the base line, and an apparent very slight drawing down of that with which it actually forms an angle of six degrees only. In order to remedy similar apparent distortions in their monuments, the Greeks have given Entasis, or swelling to their columns, inclination of the axes of their pillars towards a central line, a tendency outwards to their antæ, and exquisite convex curves to the horizontal lines of their cornices and stylobates, which would otherwise have appeared bent and crooked. Nature, in working out her harmonies of contrast, abounds with similar optical corrections. The infinitely gentle convexity of her water sky-line is precisely corrected into perfect apparent horizontality by contrast with any line at right angles to a tangent to its curve. It is by attention to the optical effects produced by the impact of lines upon one another in nature, that the artist can alone store his mind with the most graceful varieties of delicate contrast. Thus it is alone that he can appreciate the extreme beauty of her constant, minute, and generally inappreciable divergence from the precise mathematical figures, in approximation to which simplicity demands, as we have already shown, that her leading forms should be modelled.

"We have now arrived at a recognition of the four principal elements which invariably concur in producing those emotions of delight, which may be regarded as infallible tests of our contact with real beauty in the productions of nature—variety, fitness, simplicity, and contrast. Before leaving our consideration of these elements, we cannot refrain from drawing attention to that which is the crowning illustration of the effects of their co-operation—the human body; that theme, upon the re-production of the external features of which the highest powers and the profoundest study have been lavished by the greatest artists of all time. In its structure, the anatomist, aided by microscopic examination, discovers a *variety*, to which that of the Great Exhibition was monotonous itself; a *fitness*, to which the most exquisite machines therein contained displayed no parallel; a *simplicity* of external form, which, without the slightest display of all that marvellous internal mechanism, confines the whole in a space precisely adapted for the free working and protection of every part, and yet covers all with a soft and undulating surface, the curves of which are gentleness and *simplicity* itself. *Contrast* between curve and curve, between one line of limb and another, produces in motion incessant *variety* of expression, still in obedience to the bounding conditions of simplicity. The swelling muscles, increasing as the angles of approach are diminished by their action, counteract otherwise apparently ungraceful concavities, and in that loveliest of created things, the perfect female form, every quality of beauty is freely and exquisitely balanced and united.

"To recapitulate the sequence of these four great impressions, we may state, that when the attention of the student of nature is first concentrated earnestly upon her works, his senses are bewildered by the variety of her charms. His first discovery will probably be that of the perfect individual fitness of some one object upon which he may fix for analysis; he will subsequently recognise fitness as universal. In perfect fitness he will marvel at perfect simplicity; and as he becomes acquainted with normal forms, isolated or at rest, he will learn to gather general impressions when he witnesses their combination, or varying forms in contrasted action. As from this point his experiences increase, he will

begin to appreciate marvellous affinities; he will find certain conditions universally forming the basis of propriety in all imitations of nature. Thus he will recognise that she has a style of form and detail peculiar and appropriate to every material in which she works, and that this style of form and detail is, in every case, modified by the exact method in which her operations of manufacture are conducted. Of this no more perfect illustration can be given than the lines of fibrous reticulation which constitute the substance, and at the same time form the ornament, of every leaf that blows. In the aggregate of every class he will trace general character, while the slightest variety of structure will infallibly be testified by some change in external outline. Gradually form will become with him an index to all leading attributes; a clue by which he will at once recognise the relation of bodies, or their properties, to one another. Thus, from form alone he will soon discern at a glance what materials, and how, any particular object he may examine has been executed. This index or clue, be it remarked, never misleads; the 'lamp of truth' never in nature burns dimly, nor with fallacious fires; never refuses to illuminate those who incline to learn in a truthful and reverential spirit. One material in her productions never looks like another. Rocks have their rugged outlines; minerals their appropriate crystal; metals their colours and glittering aspects; timber its bark and cellular section; flowers their delicacy and evident fragility; even transparent bodies their varying angles of refraction; water its glassy surface when at rest, and unmistakable curves when agitated. Never does a flower look like a piece of metal; never a piece of timber like a rock.

"As the student's acquaintance with these consistencies in nature increases, his power of generalizing will become developed. He will learn to separate constants from accidents, and to trace the distinctive lines which convey the idea of each general family of materials, or modes of formation. He will begin to select, and to treasure up in his memory, those symbols of expression with which nature indicates the leading characteristics of every variety of objects she produces. On the amount of the artist's acquaintance with such conventionalities, or, in other words, with the written language of nature, will entirely depend his possible success in producing by his labours sensations of delight at all equivalent to those excited by the aspect of her noblest works. Direct imitation will do next to nothing; fanciful and ignorant invention still less: it is alone by his power of wielding her weapons of expression, and making in all cases the form and the object strictly concordant, as she does, that the artist may aspire to emulate the power of giving delight, which, above all others, appears to be her paramount prerogative. Time will not permit our dwelling further upon the general inferences deducible from a study of the wonderful beauties of nature. Enough may, however, have been enunciated concerning the most palpable principles, to warrant our assertion, that there exist conditions of harmonious relation which pervade the most exquisite forms in divine creation. It will be our pleasing task now to show, how essential it is that we should catch a faint reflection from their glories, before we can hope to succeed in the slightest degree in throwing a veil of beauty over our comparatively insignificant productions.

"In entering on the second division of our subject, we shall endeavour to trace the application of principles analogous to those on which we have lately dwelt—in the first place, generally; and in the second, to the respective leading and special departments of practical art. In the first place, then, it may be observed generally, that the endless diversity of men's tastes, and the ever-changing conditions of their education and association of ideas, demand for their productions a *variety* almost as incessant as that which pervades creation. Whenever that craving after variety has been gratified, irrespective of *fitness*, novelty has degenerated into frivolity, design into conceits, and style into mannerism and vulgarity. Without a due attention to *simplicity*, fitness has

never been adequately carried out; attention has been diverted from a proper estimate of every work of art or object of manufacture; and false impressions concerning its true and legitimate functions have been generated.

“ Contrast teaches us to give a due relief to all to which we would desire to call attention. A sudden break in a long straight line, a slender necking in a continuous sweep, a sudden concavity in a generally convex outline, a bold projection starting forward from an even plane, right lines opposed to curves, segments to sections of the cone, smooth to rough surfaces, conventional forms to direct imitations of nature, all carry out the desired object, and are every one subject to the phenomena of simultaneous contrast of form. To obviate such optical delusions, allowances must be made in every case by the artist; many such corrections are constantly perceived and effected by the eye; but few, alas! by rule. In reference to such corrections, it is justly remarked by so ancient a writer as Vitruvius, that ‘ the deception to which the sight is liable should be counteracted by means suggested by the faculty of reasoning. Since the eye alone,’ he continues, ‘ is the judge of beauty, and where a false impression is made upon it, through the natural defects of vision, we must correct the apparent want of harmony in the whole by instituting peculiar proportions in particular parts.’

“ When we turn to a consideration of the united action upon human design of the general principles of consistency, exhibited in the works of nature, we find that of all qualities which can be expressed by the objects upon which our executive ability may be occupied, the noblest, and most universally to be aimed at, is plain and manly truth. Let it ever be borne in mind that design is but a variety of speech or writing. By means of design we inscribe, or ought to inscribe, upon every object of which we determine the form, all essential particulars concerning its material, its method of construction, and its uses; by varying ornaments, and by peculiar styles of conventional treatment, we know that we shall excite certain trains of thought and certain associations of idea. The highest property of design is, that it speaks the universal language of nature, which all can read. If, therefore, men be found to systematically deceive; by too direct an imitation of nature, pretending to be nature; by using one material in the peculiar style of conventionality universally recognised as incident to another; by borrowing ornaments expressive of lofty associations, and applying them to mean objects; by hiding the structural purpose of the article, and sanctioning, by a borrowed form, the presumption that it may have been made for a totally different object, or in a perfectly different way—such men cannot clear themselves from the charge of degrading art by systematic misrepresentation, as they would lower human nature by writing or speaking a falsehood. Unfortunately, temptations to such perversions of truth surround the growing designer. The debilitating effects of nearly a century’s incessant copying without discrimination, appropriating without compunction, and falsifying without blushing, still bind our powers in a vicious circle, from which we have hardly yet strength to burst the spell. Some extraordinary stimulant could alone awaken all our energies, and that stimulant came—it may not, perhaps, be impious to esteem providentially—in the form of the great and glorious Exhibition. It was but natural that we should be startled when we found that in consistency of design in industrial art, those we had been too apt to regard as almost savages were infinitely our superiors. Men’s minds are now earnestly directed to the subject of restoring to symmetry all that had fallen into disorder. The conventionalities of form peculiar to every class of object, to every kind of material, to every process of manufacture, are now beginning to be ardently studied; and, instead of that vague system of instruction by which pupils were taught, that anything that was pretty in one shape was equally pretty in another, a more correct recognition of the claims of the various branches of special design, and the necessity of a far closer identi-

cation of the artist with the manufacturer, in point of technical knowledge, have been gradually stealing upwards in public estimation. Let us hope that success will crown exertion, and that in time the system of design universally adopted in this country will offer a happy coincidence with those lofty principles by means of which the seals of truth and beauty are stamped on every emanation from the creative skill of divinity.

“ In approaching the more directly, though not essentially, practical portion of our subject—that of the application of nature’s principles to some of the special departments of practical art, represented in the Exhibition, we shall premise by a few considerations on architecture and sculpture, and the plastic arts. It would be difficult to imagine a juster and more comprehensive view of the extent of direct imitation admissible in each department of the fine arts than that which was presented in the *Appendix to the Third Report of the Commissioners*, by Sir Charles Lock Eastlake. In a note to one of those important essays the writer observes, that ‘the *general* style of the formative arts is the result of a principle of selection, as opposed to indiscriminate imitation. It consists, therefore, in qualities which may be said to distinguish those arts from nature. The specific style of any one of the arts consists in the effective use of those particular means of imitation which distinguish it from other arts. Style is complete when the spectator is not reminded of any want which another art, or which nature, could supply.’ Now, the specific style of architecture is especially worthy of study; since, not only do similar conditions pervade all branches of design into which structural forms enter as principal elements, but of all the arts it is obviously the least imitative, and the most abstract. The effects of delight which can be produced by it, are dependent, not upon a reproduction of any objects existing in creation, but upon a just display by the architect of his knowledge of those subtle general conditions, a few of which we have recognised as pervading every perfect work of nature. The beauty of civil architecture, we are told by the best writers upon the subject, depends upon—1st. Convenience; 2nd. Symmetry, or proportion; 3rd. Eurythmia, or such a balance and disposition of parts as evidences design and order; and, 4thly, On ornament. In too many modern buildings, alas! we find that either convenience has been attended to and all other qualities left to chance, or, what is still worse, ornament alone aimed at, and all other considerations disregarded. Let us, for the sake of example, trace the operation of the principles to which we have alluded, all of which will be found to have their origin in the provisions of nature. The wise architect will begin by considering the purpose of his building; and will so contrive its plan and leading form, as to fulfil all the utilitarian objects for which it was proposed to be constructed; in other words, he will be governed by a sense of *convenience* or *fitness*.

“ He will then consider how all the requisites can be most agreeably provided, and harmonious proportion combined with an expression of purpose. He will find, on recurring to nature, that every substance suitable to be employed in construction, exhibits endless *variety* in strength, weight, and texture. He will study these various qualities, and by experiment ascertain that each material possesses a certain scale of proportions, and a certain series of solids, by the employment of which, in fixed positions, its functions may be at once most economically and most fitly employed. Acting on such data, he will distribute his lines of sub-structure, his columns of support—his load supported, his walls to resist the driving of the elements; and he will assign to each its special proportion and form—never confounding those of one substance with another—never using iron as he would stone, or wood as glass should be. Thus aided by his sense of the functions of each portion of the structure, the material of which it may be constructed, and its condition of relative importance, the architect adjusts the appropriate dimension of every part. His work is as yet, however, only half done; his materials require bringing into graceful

and regulated distribution. At this point, Eurythmia, the original of 'the fairy order,' steps in, bringing geometry in her train. Doors, windows, columns, cornices, string-courses, roofs, and chimneys, are instantly disposed so as to contrast with, and balance one another, showing, by the symmetry of their arrangements, the artist's appreciation of that method and evidence of design which indicate the restraining power of mind over matter throughout all nature—wild as her graces may occasionally appear. The crowning difficulty yet remains behind in the adjustment of appropriate ornament. In all other departments of his art, the architect employs only pure abstractions, harmonizing with his general deductions of leading principles of beauty: in his application of ornament, however, his resources are somewhat more expanded. All decoration, the forms of which are borrowed from nature, to be pleasing, must undergo a process of conventionalizing; direct imitation, such as that which would be produced by casting from a gelatine mould, would infallibly disappoint, since the perfect reproduction of the form would lead to demands for reality—in colour, in texture, and in other qualities which it might be utterly beyond the power of any other material or processes to render, than those which nature has herself employed in the original. The duty of the architect is, therefore, to study, first of all, to employ such forms as harmonize and contrast with his leading lines of structure; and then, in those few instances where, for the sake of adding more immediately human interest to his work, or for explaining its purpose more directly, he may desire to suggest the idea of some object existent in nature—then, and in such a case, it is his duty to symbolize rather than to express, and to strive to convey an idea of particulars and qualities only, instead of to make a necessarily imperfect reproduction, which conveys no idea at all. As a general rule, the less closely the artist attempts to embody nature the more safe he will be, but as there are, we conceive, some few cases which justify a nearer approximation than is generally admissible, we shall proceed to enumerate the most important of them, premising that, paramount over every other consideration, must reign an exact regard to the conventionalities incident to the material employed, and the absolute necessity of arranging the forms of the ornament, so as to contrast rightly with the adjacent geometrical lines of structure.

“1st. That imitation may approximate to nature only in an inverse ratio to the resemblance of the material in which the work is to be executed to the object to be copied. Thus, the smoothness of flesh may be imitated with delicacy in white marble, and the idea of rock-work only conveyed in the same material by a completely formal and geometrical method of representation. 2nd. That as imitation, in all cases, interests and attracts attention, it becomes necessary to restrict its use sparingly to particular situations; thus, we may, on the one hand, with propriety employ decorations suggestive of natural types, in those few important points on which we wish the eye to dwell, such as the centre of a façade, the principal doorway, or window, the starting of a staircase, or the end of a boudoir; but if, on the other hand, we employed in such leading situations mere conventional patterns, and in less important parts, ornaments in convention approaching imitation, then we should find attention concentrated on those meaner portions of the structure, and the really principal features of the design passed over and neglected. A striking illustration of the consequences of this want of discrimination was shown by the sculptor Lequesne, in his various groups in the great Exhibition; the care he bestowed in working up his accessories, his weeds, foliage, rocks, earth, and everything else, almost entirely neutralized the interest which should have been excited by the finished treatment of the flesh of the unhappy mother and her miserable infant. The admiration which might otherwise have been given to his two groups of dogs and boys, were completely absorbed by admiration at the patience with which 'each particular hair' was made to curl. To all the above-described faults the works of M. Etex offered a truly remarkable

contrast, the labour in them being applied at exactly the right points. 3rdly. That, where ornament is contrasted by evident connexion with geometrical lines of structure, conventional imitation may be introduced. Thus, in many of the marble chimney-pieces in the Exhibition, and in much of the furniture, the structural forms of which made regular panels, or conventional frame-work, the introduction of nicely-carved flowers or fruit, of the size of nature, and in low relief, produced an agreeable effect. Where, in others (and more particularly in some of the Austrian), the foliage, scrolls, cupids, and all sorts of things, completely ate up the whole surface, and made up the whole structure, the effect was eminently objectionable. 4thly. That where the copy differs absolutely in bulk from the original, minutiae of surface detail may be introduced. Thus, when we reduce a subject, such as a bunch of grapes, from the round or full relief to the lowest relieve, much of the conventionality which would otherwise be essential may be dispensed with. 5thly. That considerable differences of scale in things of unvarying dimension, justify an approach to natural form. Thus, when we materially diminish in our reproduction any object, the smallest size of which is generally known never to equal that to which it is lowered in our copy, we may safely attempt as close a conventional transcript as the material in which we work admits of. On this account delicate flowers, such as those which decorate small Dresden china vases, and which are executed with such skill in biscuit by Mr. Alderman Copeland, Mr. Minton, Mr. Grainger of Worcester, and others, form not unappropriate ornaments when confined to a scale considerably smaller than nature. In cases, however, such as that of the Dresden white camelia tree of the Exhibition, where an attempt is made to copy nature on her own scale, the effort altogether fails, and the labour, so far from giving pleasure, is utterly useless and becomes a trick not less inimical to good taste than the veiled figures. 6thly. That where, in ornament, the leading forms are geometrically disposed, as in regularly recurring scrolls or other curves, which could never take so formal a position in nature, a rendering of her spirit, though not of her substance, may be permitted in the leaves and accessories. Thus, in much of the elaborate wood-carving produced by Mr. Rogers and others, the artificial disposition alone of the beautifully executed objects redeemed many of the groups from the charge of too close a reproduction of nature.

“ Before proceeding to the subject of sculpture, we would fain offer one or two remarks concerning what is called style in art, for fear lest our recommendations to systematic study of elementary principles should be misapprehended. In what are generally understood as styles in the history of art, such as the Grecian, the Roman, the Gothic, the Renaissance, &c., may be recognised deeply-interesting accumulations of experience concerning the nature of men's intuitive affections for certain concatenations of form. Styles are usually complete in themselves; and though not of uniform excellence, are still generally concordant among all the various members that compose them. Whatever may have been the dominant form in each, or whatever the favourite set of ratios, proportion usually pervades each whole monument, as it may be generally traced in a few detached mouldings. Styles, therefore, may be regarded as storehouses of experiments tried, and results ascertained, concerning various methods of conventionalizing, from whence the designer of the present day may learn the general expression to be obtained, by modifying his imitations of nature on the basis of recorded experience, instead of his own wayward impulses alone. Canova, Gibson, and many of the greatest masters in art, held and hold the creed, that nature, as developed in the human form, can only be rightly appreciated by constant recurrence to, and comparison with, the conventionalities of the ancient sculpture of Greece. Mr. Penrose has shown us what beautiful illustrations of optical corrections in line may be gathered from the study of her architectural remains. Mr. Dyce, who has made himself deeply acquainted with ancient styles, thus expresses

himself on the subject :—‘ In the first place,’ he remarks, ‘ the beauties of form or of colour, abstracted from nature by the ornamentist, from the very circumstance that they are abstractions, assume in relation to the whole progress of the art the character of principles or facts, that tend, by accumulation, to bring it to perfection. The accumulated labours of each successive race of ornamentists are so many discoveries made—so many facts to be learned, treasured up, applied to a new use, submitted to the process of artistic generalization, or added to. A language and a literature of ornamental design are constituted ; the former of which must be mastered before the latter can be understood ; and the latter known before we are in a condition to add to its treasures. The first step, therefore, in the education of ornamentists, must be their initiation into the current and conventional language of their art, and by this means into its existing literature.’ By this last passage, we may fairly assume that Mr. Dyce would recommend, first the study of the conventionalities of the student’s speciality, and then as much as life is long enough to learn. The great previous error in art-education has been to grasp at so much vaguely, and attain so little practically.

“ The modifications which nature receives at the hands of the intelligent sculptor are so various, and frequently so subtle, that it would require a volume to enumerate them, and an Eastlake to write it. We can glance but at a very few. The first condition of the highest class of sculpture is, that it should be allied with the noblest architecture, to which it should serve as an inscription, explaining to those capable of reading its ideal expression those purposes of the structure which it is not in the power of architecture alone to convey. In all such cases *fitness* prescribes the subject—*simplicity*, its sublimest treatment—*contrast*, the general condition of the lines of its composition. In order to give to his works that commanding language which speaks to the heart (the phonetic quality in Mr. Fergusson’s admirable theory of beauty in art), the sculptor requires to select from his observation of the expression of individual forms, those precise lines, which, he learns from study and experience, invariably convey the particular sensations it is his office to communicate to the mind of the beholder. It was by some such process that an approach was made by the Greek sculptors of old to attain an embodiment of their conceptions of divinity, and the *beau idéal* in loveliness of form. The peculiar refinements of form and texture which fall within the especial province of the sculptor to carry to their highest pitch of perfection, he constantly heightens by availing himself of the effect on the senses of the simultaneous contrast of form. Thus he exaggerates the roughness of the hair and the coarse texture of every object coming in contact with his flesh, in order to give to it the exquisite smoothness of nature ; he introduces straight lines, equally balanced folds, and angular breaks into his draperies, in order to bring out the tender sweeping curves of the outlines of the limbs he so gracefully disposes. His is, of a truth, the happy art which begins by collecting all that is most sweet and fresh ; and then by one additional touch, one further artful contrast, he ‘ throws a perfume on the violet.’ In sculpture, as in every other of the decorative arts, changing circumstances bring ever-changing conventionalities ; and, as supreme arbiters over the propriety of one and all, still preside our original great principles—*variety, fitness, simplicity, and contrast.*”

CHAPTER XXX.

ON COLOUR IN THE DECORATIVE ARTS.

COLOUR EMPLOYED IN ARCHITECTURE BY THE ANCIENTS—COLOUR DEVELOPES FORM—
COLOURING OF THE GREAT EXHIBITION—IMITATIONS—FLOWERS, ETC.—MURAL DECORATIONS
—REMARKS ON ARCHITECTURAL EDUCATION—PROGNOSTIC FOR THE FUTURE.

HAVING made our readers acquainted with Mr. Digby Wyatt's admirable definition of the principles which should determine Form,—we will now turn to the no less successful attempt of Mr. Owen Jones to define those which should regulate Colour, in the decorative arts:—"It can scarcely too often be repeated," says our author, in the commencement of his learned discourse, "that among the many advantages which must result to England from the gathering of the products of the world's industry in the great exhibition, no one is so prominent as that we have thereby learned wherein we were deficient; and although we may gather from the lectures which have already been delivered before this society a high idea of the power, wealth, and industry of this great country; of the untiring enterprise which gathers from a distance the products of every clime; of the persevering industry which makes them available to the wants of man; and we may further witness the constant struggle to utilize every gift of nature, till truly it may be said, nothing has been made in vain; yet, side by side with success, we have seen much of labour wasted, much knowledge imperfect, much energy misapplied: and when we leave the field of science and industry and turn to art, we have to learn from the Great Exhibition a fruitful lesson; from leading the van in the march of progress, we must fall into the rear, and suffer to pass before us nations whose efforts we have hitherto but imperfectly appreciated.

"In the employment of colour we were not only behind some of our European neighbours, but, in common with these, were far outstripped by the nations of the east. Let us endeavour to trace the cause of this, and, if possible, discover the principles which in their case have led to so signal a success. As architecture is the great parent of all ornamentation, it is from the study of architectural monuments that we shall best obtain a knowledge of the principles which govern the employment of ornament and of colour generally. In all ages but our own, the same ornaments, the same system of colouring which prevailed upon their buildings, pervaded all they did, even to their humblest utensils: the ornaments on a mummy-case are analogous with those of the Egyptian temple; the painted vases of the Greeks are but the reflex of the paintings of their temples; the beautiful cushions and slippers of Morocco of the present day are adorned with similar ornaments, having the same colours as are to be found on the walls of the Alhambra. It is far different with ourselves. We have no principles, no unity; the architect, the upholsterer, the paper-stainer, the weaver, the calico-printer, and the potter, run each their independent course; each struggles fruitlessly, each produces in art novelty without beauty, or beauty without intelligence. The architect, the natural head and chief of all who minister to the comforts and adornments of our homes, has abdicated his high office; he has been content to form the skeleton which it should also have been his task to clothe, and has relinquished to inferior and unguided hands, the delicate modelling of the tissues and the varied colouring of the surface: who can wonder at the discordance and incongruity of the result? Until very recently, the employment of colour on buildings has had but few advocates in this country; we are still imbued with the prejudices left us by our immediate ancestors and developed in our early education. Although we now know

that many of the monuments of antiquity were entirely covered with colour and ornament, while of others we have evidence that they were partially painted, and are further bound to conclude that they were entirely so, yet this is still disputed, and not long since the Royal Institute of British Architects were unable to vanquish this prejudice amongst their own body; and it remains to this day with them, alas! a disputed question, to what extent the monuments of Greece were coloured. There are artists more willing to believe that the Greeks were imperfectly organised for the appreciation of colour, and consequently misapplied it, than that the defect can lie with ourselves, and our imperfect knowledge of what they did and why they did it. I will ask you to believe that the stupendous monuments of the Egyptians, the Greeks, the Arabs, and other eastern civilisations, with the nearer to us Gothic buildings of our own forefathers, were not in vain covered with a most elaborate system of ornamentation requiring colour for its development, but rather in obedience to a patient observation of nature's works, where we find everywhere colour assisting in the development of form and adding many charms which but for this were wanting. In asking you to watch the means by which these additional charms were given, I do not wish you to understand that what the ancients did we should now repeat, but should follow them only so far as we find they acted on principles by them universally recognised and running through all time, and which we may now presume to be discovered truths, and therefore not wisely to be rejected."

Our lecturer proceeds to lay down a series of propositions, which he endeavours, successfully we think, to establish as axioms, and from them justifies the practice of the ancients in colouring their architecture. "Colour," he observes, "is used to assist in the development of form, and also to assist light and shade, helping the undulations of form by the proper distribution of the several colours. And these objects are best attained by the use of the primary colours on small surfaces, and in small quantities, balanced and supported by the secondary and tertiary colours, on the larger masses. There are many who will object that the primary colours are the delight only of the savage and the uncultivated, but I answer that the primary colours are never vulgar or discordant when properly applied; the defect will lie, not with the colours, but with the want of skill of the hand that applies them. They must be used as in nature, with a sparing hand, on small surfaces, and in small quantities; the secondaries and tertiaries in larger masses, and on larger surfaces, atoning for their lesser brilliancy by their greater volume. We find in the works of the Egyptians, Greeks, Arabs, and Moors, during the best periods of their art, this beautiful law invariably followed: but, on the contrary, when the art of each civilisation declined, the primaries are no longer the ruling harmonies; the secondaries and tertiaries, from being subordinate became dominant, and muddiness and indistinctness resulted. In Egypt, during the reigns of her native kings, the primaries mainly prevailed; whilst under her Greek rulers art languished, and being practised rather from imperfect tradition than from poetic inspiration, the secondaries usurped the place of the primaries, and the beautiful harmonics which had before been produced by their combination were lost. When the truly enchanted palaces of the Moors fell into the hands of the Catholic kings, who despised a civilisation they were unable to appreciate, the true principles which the Moors had learned in their worship and observation of nature's works were despised and rejected, because, as now, not understood. Their blues and reds were repainted with green and purple, without law or reason." Our author next proceeds to show that the primary colours should be used on the upper portions of objects, the secondary and tertiary on the lower. And he illustrates the practical working out of his propositions by referring to the colouring he adopted for the interior of the Great Exhibition, which, after running the gauntlet of much adverse criticism, was ultimately favourably received by the public.

We extract some valuable remarks on "imitations;" such as the graining of woods, &c. :—"The principle which should regulate the employment of imitations has never yet been defined: it appears to me, that *imitations are allowable whenever the employment of the thing imitated would not have been inconsistent.* For instance, there can be no objection to grain a deal door in imitation of oak, because the mind would be perfectly satisfied if the door were oak; but it would be an absurdity and abuse of means to paint it in imitation of marble. Again, the practice of covering the walls of halls and staircases with paper in imitation of costly marbles, is very objectionable; because the employment of marble to such an extent would be inconsistent with the character of most houses, and, consequently, the sham is much too glaring: on the contrary, were the pilasters and columns of a hall only painted, the objection would cease, seeing that the mind would be satisfied with the reality. A violent instance of the abuse of graining existed formerly in the Elgin Room at the British Museum, where beams on the ceiling, thirty feet long, were splashed in imitation of granite. Here was a manifold absurdity, as no granite beam could have supported itself in any such situation. The door-jamb of an opening, on the contrary, might be imitation granite without inconsistency, as in such a situation granite would be useful as indicating strength. In the outcry against the mode of colouring I proposed for the interior of the Great Exhibition, my opponents fell into an error of this kind; led away by the desire of having the metallic character of the building expressed, the majority were in favour of colouring the whole of that vast edifice in imitation of bronze, entirely forgetting that the employment of so costly a material for such a structure would have been impossible, and would have had the further disadvantage of being too weak to stand: therefore its imitation would have been an absurdity, quite independent of the artistic objections to such a mode of colouring, which were many. The mode I adopted treated the whole as a painted surface, and the eye was left at liberty, and was quite able to distinguish the material painted, by its form and scantling; no one, as was so often prophesied, mistook the columns for wooden posts, because no wooden posts could have existed in such a form under such circumstances."

With respect to flowers or other natural objects our author is of opinion that they should not be used as ornament, but conventional representations founded upon them, sufficiently suggestive to convey the intended image to the mind without destroying the unity of the object they are employed to decorate.

"We find this law universally obeyed in all the best periods of art, and equally violated when art declines; those who conventionalised the most were the Mahomedan races; who, forbidden by their creed to represent living forms, carried the conventionality of ornament to the highest perfection. The Egyptians, with whom every ornament was a symbol, yet took care so to use them as never to violate a sense of propriety. The Greeks equally conventionalised in their ornament; and, although the law will not appear to hold good in their application of sculpture to architecture, yet we see here they adopted a conventional treatment both of pose and relief, and very different to that of their isolated works. In the later Gothic buildings the floral ornaments have a much nearer approach to nature, and are less conventional in arrangement than those in the earlier buildings. In the early illuminated MSS. the ornaments were conventional, and their illuminations were in flat tints with little shade and no shadow; whilst in those of a later period highly-finished representations of natural flowers were used as ornament, casting their shadows upon the page; the illuminations, also, were highly-finished pictures, evidently unfit for the pages of a book where the affected relief was in danger of crushing. The Chinese, whose works, however wanting refinement and art-knowledge, yet steer clear of this; and all their figures, buildings, flowers, are so conventional in treatment, that they never shock the eye or destroy the unity of the object which they decorate. If our proposition, then,

be sound in theory, and be fortified by the practice of past ages, it applies with great force to the mural decorator, the paper-stainer, the calico-printer, the weaver, and the potter; and, in fact, to all engaged in the decorative arts. It is evident, that one of the first principles to be attended to in the adornment of the walls of an apartment is, that nothing should disturb their flatness; yet it is very difficult to find a paper that does not in some way violate this rule: they are either large masses of conventional foliage, generally a variation of the eternal acanthus-leaf surrounding patches of unbroken colour, or representations of fruits or flowers twisted into the most unwarrantable of positions.

“We say that all direct representations of natural objects in paper-hangings should be avoided: first, because it places these objects in unseemly positions; secondly, because it is customary in almost every apartment to suspend on the walls pictures, engravings, or other ornamental works, and therefore the paper should serve as a background, and nothing on it should be obtrusive or advancing to the eye. Diaper-patterns in self-tints are safest for this purpose, but when varieties of colours are used, the oriental rule of so interweaving the form and colour as that they may present a neutralised bloom when viewed at a distance should never be departed from. The prevailing colours of the walls of rooms hung with printed paper should, of course, vary with the character of the room and the aspect. Halls and staircases look well hung with green, because the eye on entering a house is generally fatigued with the strong glare of daylight, and the green is the most refreshing. Studies and dining-rooms look well with dull reds in diapers or flocks, which may be enriched with gold; these form good back-grounds for engravings or pictures, but the reds or greens must never be positive colours, but low-toned and broken, so as not to disagreeably impinge upon the eye. In drawing-rooms, where the paper has to do more towards furnishing and beautifying a room, they may be more gay: almost any tone and shade of colour heightened with gold may be used provided always that the colours are so arranged and the forms so interwoven that a perfect balance be obtained and the eye never attracted to any one portion.”

Our lecturer concludes with a few remarks on the necessity of an architectural education on the part of the public. “I have endeavoured,” says he, “to establish, that, in all times but our own, all ornamentation resulted from architecture; that in the present age we have no guiding principle in its design or unity in its application; that the architect had abandoned to inferior hands that which was his especial province. I have described much of the disorder which has resulted from this, and have still more to add on the same subject. I will further endeavour to establish two points: first, that the education of our architects must undergo some change before we can hope that architecture and its attendant arts shall faithfully represent the wants, feelings, and faculties of our time; and, secondly, that this result can never be effectually obtained till a much higher amount of art-knowledge exists in us as a nation. How is any change for the better to be brought about? It is certain that the production of a national style must be, as it ever has been, a work of slow development; yet, if never attempted, the problem never can be solved. It seems to me, now that we have so many schools devoted to the improvement of design as applied to manufactures, and that a movement in this direction, aided by this society, is receiving a fresh impulse, that if the government were to undertake to gather together all the records of the past, and would disseminate that knowledge with correct principles for making use of it, a vast stride would be made in the right direction.

“The system of architectural education followed in France is very superior to that pursued in this country. Here the young architect is apprenticed to an architect in practice as to a trade, and is engaged for five or seven years on the works of his master: he gains thereby a good knowledge of construction and of the business of an architect,

but has but little opportunity of studying architecture as a fine art. In France, on the contrary, besides the drawing-schools which exist in every town, where the young may obtain much elementary knowledge, there are in Paris many studios where professors devote their time to the instruction of a large number of pupils, making them thoroughly acquainted with the works of every period, and giving them a thorough knowledge both of architecture as a fine art and of construction in theory. The pupils of these various studios are mostly attendants at the Architectural Academy, where they once a month produce designs in competition for a given subject; and they are assisted in the formation of these by their professors. One consequence resulting from this system is, that we see in France at any given period a much greater unity in the character of their works; and there is not that disorder and waste of forces which we see in this country, where each architect is pulling in a different direction. Works executed in France have a family resemblance not to be found in those of this country; the influence of the professor is much more felt, and schools of architecture are thereby formed, much as were the ancient schools of painting.

“All these architectural students do not become architects; those who do so, when they have finished their studies, become clerks of the works under government architects, where they learn the practice of their profession, and ultimately practise on their own account. Many of those who have not been sufficiently advanced, or who want government influence to be so placed, turn to other professions connected with architecture; become decorators and designers for manufacturers. It is this cause which gives to the designs of France the superiority they have. Mostly all their designers have had an architectural education. I do not mean to say that the French have made much more progress towards the formation of a national style than we have; what they have done is, that, at any one period, they have carried out the reproduction of any extinct style with much more unity. The fashion, as long as it lasted, has been general; and we do not see in France, as we see here every day, the building of one style of architecture, the decorations of another, and the furniture of a third, with every variety of age and period. However, it is the kind of education as pursued in France which I think it would be useful if our government could be prevailed upon to foster. The schools of design have not hitherto produced any marked improvement in the designs of our manufacturers, and have been conducted as if it were the intention only to make painters. The study of the human figure has been carried to excess, and much labour wasted upon it; useful as it is for refining the taste and teaching accurate observation, yet it is a round-about way of learning to draw for the designer for manufactures. I may here remind you that the Eastern nations, who appear to excel all others in their works of ornamentation, are forbidden by their creed to make any representation of the human figure; and it is, probably, to this cause that we may attribute their excellence in ornament. I cannot but feel, that if the education of the government schools were made more architectural, much real benefit would result to this country; besides that the study of architectural forms must be the best preparation for the designer of ornament, they would do more good in helping to make architects than painters, to whom individuality is less of an evil. Architects should be educated in masses, because it is their duty to give expression to common wants and common feelings. The opposite system has been in use in this country, and has most assuredly failed. The knowledge we have acquired of the works of past ages has been procured by individual efforts, but, unfortunately, with but small results. Each has been tempted to exaggerate the importance of the style of his predilection, and which he undertook to illustrate. That a little knowledge is a dangerous thing has proved most true in architecture and its attendant arts. As each new architectural publication appears, it immediately generates a mania for that particular style.

When Stuart and Revett returned from Athens, and published their work on Greece, it generated a mania for Greek architecture, from which we are barely yet recovered. Taylor and Cressy did as much for the architecture of Rome. The travels of Belzoni and his successors produced the Egyptian Hall, and even Egyptian-faced railway tunnels. The celebrated French work on the architecture of Tuscany, and Letarouilly's 'Modern Rome,' have more recently inspired us with a desire for Italian palaces.

"The works of the elder Pugin and Britton, with a host of followers, have flooded the country with Gothic buildings; with which, notwithstanding the learning and research they exhibit, I must frankly avow I have but little sympathy. I admire and appreciate the Gothic buildings, which were the expression of the feelings of the age in which they were created; but I mourn over the loss which this age has suffered, and still continues to suffer, by so many fine minds devoting all their talents to the reproduction of a galvanised corpse. Instead of exhausting themselves in the vain attempt, who will dare say that, had these same men of genius, as they certainly are, directed their steps forward instead of backward, architecture would not have made some progress towards becoming, as it is its office, the true expression of the wants, the faculties, and the sentiments of the age in which we live? Could the new wants be supplied, the new materials at command, the new sentiments to be expressed, find no echo to their admonitions? Alas! iron has been forged in vain—the teachings of science disregarded—the voice of the poet has fallen upon ears like those of the deaf adder, which move not, charm the musician never so wisely. More than this; instead of new materials and processes suggesting to the artist new forms, more in harmony with them, he has moulded them to his own will, and made them, so to speak, accomplices of his crime. The tracery of Gothic windows, generated by the mason's art, have been reproduced in cast-iron; the Doric or Greek temples, which owe their peculiar form and bulk to the necessities of stone, have been but a hollow iron sham. We have gone on from bad to worse: from the Gothic mania we fell into the Elizabethian; a malady, fortunately, of shorter duration; for we then even worshipped not only a dead body, but a corrupt one. We have had an Italian mania without an Italian sky; and we are even now threatened with the importation of a Renaissance mania from France. It would be most unfortunate if the attention which has been directed to the peculiar beauties of the East Indian collection of the Great Exhibition should result in an Indian mania; but if this disease, like measles, must come, the sooner it comes and goes the better. What we want to be convinced of is, that there is good mixed with evil in all these styles; and I trust, when each has strutted its brief hour on the stage, recording for posterity the prevailing affectation of the day, we shall. We want to be convinced that all these styles do but express the same eternal truth, though in a different language: let us retain the ideas, but discard the language in which they are expressed, and endeavour to employ our own for the same purpose. We have no more business to clothe ourselves in mediæval garments, than to shut ourselves in cloisters and talk Latin; to wrap ourselves in Indian robes, than to sit all day on divans, leading a life of voluptuous contemplation. After the expression of so much heresy, I must beg to say that the fault does not at all lie with the architectural profession, to which I esteem it an honour to belong. The fault lies with the public; the public must educate themselves on this question. Architects, unfortunately, can but obey their clients; this one will have an Elizabethian mansion; this clergyman can admit no other than a mediæval church; this club of gentlemen must be accommodated in an Italian palace; this mechanics' institute committee must be located in a Greek temple, for there alone wisdom can be found or philosophy taught; this railway director has a fancy for Moorish tunnels or Doric termini; this company, again, an Egyptian suspension-bridge—the happy union of

the alpha and the omega of science; the retired merchant must spend his surplus in Chinese follies and pagodas. And, to wind up the list of these melancholy reproductions, I will cite the worst I ever saw, though, fortunately, not an English one. In the case of a client, who, requiring a steam-engine for the purpose of irrigation for his garden, caused his architect to build an engine-house in fac-simile of one of the beautiful mosque-tombs of the caliphs of Cairo. The minaret was the chimney-shaft. Nothing was omitted; even the beautiful galleries, which you all know were used for the purpose of calling the Moslem to his prayers, here surrounded a chimney without a means of access.

"I again repeat, the fault lies with the public; an ignorant public will make complaisant and indolent architects. Manufacturers, again, will always tell you, in answer to a reproach for the bad designs they produce, that they are only what the public require, and will have: let us trust that this excuse will no longer avail them. The Great Exhibition has opened the eyes of the British public to our deficiencies in art; although they were unable to suggest better things, they were found quite able to appreciate them when put before them. There must be on the part of manufacturers, architects, artists, and all who in any way minister to the wants and luxuries of life, a long pull and a strong pull, and a pull altogether; they have one and all, like dramatic authors, written down to the taste of the audience, instead of trying to elevate it. The public, on the other hand, must do their part, and exercise a little pressure from without.

"I know that I shall be told that the production of a new style of architecture is not so easy a matter; that it has never been the work of any man, or set of men, but rather something in the like of a revelation; for which, probably, we may be told to wait. Some will say architecture is a thing of five orders, discovered and perfected once for all, beyond which we cannot go, and all that is left us is an adaptation of it to our own wants; others will tell you that a Christian people should have no other than Christian architecture, and will tell us to go back to the thirteenth century in search of architecture, and that beyond this there is no salvation; but I answer, that this architecture is dead and gone; it has passed through its several periods of faith, prosperity, and decay; and had it not been so, the Reformation, which separated the only tie which ever existed between religion and art, gave to Christian architecture its death-blow."

We will at present, however, detain our readers no longer than to quote the farewell words of our lecturer, delivered at a time when the destruction of the Great Building in Hyde Park was talked of.

Decidedly in favour of its preservation, for the new Crystal Palace at Sydenham was not then contemplated,—“There is no doubt whatever,” says he, “that the free mixing of the several classes which took place in the Great Exhibition has produced a feeling of higher appreciation of each other, both with the great and the humble; the great have a higher respect for the humble, the humble look with much less of envy on the great. Were the opportunity for this continued, the impression would become permanent instead of being transitory, or worse. This civilising influence, I say, would result from the empty building; but when we imagine, in addition, its vast nave, adorned with a complete history of civilisation recorded in sculpture from the earliest times to the present, with casts of the statues of our great men which now adorn our squares and public places, invisible from London smoke;—when we imagine the plants of every region, however distant, climbing each column, and spanning each girder;—the sides of the building set apart for the formation of collections, recording man's conquests over nature, where hundreds daily may be taught to see, with the mind as well as the eye, an education as necessary to the governors as to the governed; were such a scheme carried out nobly and lovingly, the success of the Great Exhibition would be, in comparison, failure itself. To effect this, and in further developing the movement in favour of

bringing art-knowledge within the reach of all, the government may do much, but the public must do more; it must depend for success on the co-operation of all. It is a movement that may not be delayed; we must be up and stirring, if we would not that England, in the midst of her material greatness, become a byword and a reproach amongst nations."

CHAPTER XXXI.

PRINTING.—*From the Juries' Reports.*

INVENTION OF PRINTING—ITS EARLY HISTORY IN GERMANY, FRANCE, AND ITALY—ITS INTRODUCTION INTO ENGLAND—GREAT IMPROVEMENTS IN THE ART—APPLEGATH AND COWPER—VAST INCREASE IN BOOKS—NEWSPAPERS—THE "TIMES"—AUSTRIA—PRUSSIA—SAXONY—ITALY—THE VATICAN—ENGLAND—CAXTON—BULMER—BENSLEY—WHITTINHAM, ETC., ETC.—CHROMOTYPY—PRINTING IN GOLD—PRINTING IN FRANCE, ETC., ETC.

AFTER the interval of four centuries, the date of the Great Exhibition of the world's industry was coincident with the anniversary of that of the invention of printing. It seemed as if all nations were assembled in the capital of England to celebrate the centennial birthday of the press—the most powerful instrument of their civilization. It is by the aid of printing that different nations have imparted to each other their thoughts and their feelings, and have received in some degree a combined existence. Without this marvellous bond, they would have been left to the ignorance and prejudices which foster nations' warfare, and could never have presented this admirable display of universal harmony and of general emulation. When we consider the great costliness of manuscripts at a former period, the difficulty of procuring them, and all the benefits of which society was devoid before the discovery of printing, every friend of study and of exalted intellectual speculations should deem himself fortunate in living at a period when so many stores of instruction are placed within the reach of all.

In every age, and in all countries, printing denotes the state of civilization, of which books are the reflex, and the history of the human mind is written in the progress of bibliography. Thus the first printed books of Germany were almost all devoted to theology and scholastic philosophy, while at Paris ancient literature occupied an equal rank with theology; thus, also at Rome, where the remembrance of ancient literature maintained a still stronger empire, printing, under the guidance of the bishops of Aleria and Teramo, principally reproduced the master-pieces of classic times. In France, however, under the influence of the chivalrous reign of Francis I., a great number of works upon chivalry soon appeared, and the desire of becoming acquainted with narratives so much in conformity with the prevailing taste, was one cause of the introduction of printing into England. Of the sixty-two works printed in England by Caxton, those upon theology do not amount to ten, the remainder being devoted to chivalry, to history more or less romantic, to literature, and to manners and customs. Without expatiating upon this subject, we will confine ourselves to observing that, at the period when the pope founded at Rome the celebrated printing-office for the "Propagation of the Faith," there was no corresponding activity on the subject in London; and, that, at the present day, whilst the great printing establishment of the "Propaganda" remains inactive, England, every year, sends forth to the world a million of Bibles and New Testaments.

Soon after its first origin, the art of printing had attained a great degree of perfection, and it was not till the second half of the last century that, owing to the efforts of Ibarra, in Spain; of Baskerville and of Bulmer, in England; of the Foulises and the Rnndimans, in Scotland; of Bodoni, in Italy; and of the Didot family, in Paris, any real progress can be pointed out. The types were better cut and better cast, the ink as good as that of the earliest printers, the paper was improved in its make, and the press-work more uniform. At that time the greatest admiration and astonishment were created by the rapidity with which, at each action of the lever, moved by the hand of the workman, all the pages which a whole sheet of paper was capable of containing, were imprinted at a single stroke; but this rapidity which enabled a workman to produce in one day more than a thousand transcribers could write, could not long suffice to supply the constantly increasing demands caused by the march of intellect.

About the beginning of the present century, Charles, the third earl Stanhope, by the invention of the press which bears his name, and a new process of stereotyping, more simple and more economical, had made a great improvement in the typographical art. Subsequently Messrs. Bauer and Kœnig, aided by the genius and knowledge of English engineers, and by the intelligence and perseverance of Messrs. Bensley and Walter, applied steam power to a new system, which created a revolution in the art of printing. In lieu of the platten, which the workman's arm slowly brought down upon the types, two cylinders printed with rapidity both sides of the sheet, whatever its size might be. In November, 1814, by means of this machine, which was subsequently much simplified, the *Times* newspaper was printed with a rapidity which surpassed Guttemberg's press even more than the latter did the hand of the transcribers. It might have seemed that the rapidity of production in printing could proceed no further; but, after having been repeatedly altered in its form, the printing machine appears before us now in an entirely novel shape; and we might believe, on seeing the *Times* newspaper printed by Applegath's new system, that the highest degree of speed had been attained, did not experience prevent mankind from assigning a limit to the perfectibility of human inventions, and to the inscrutable designs of Providence.

M. Kœnig's machines, patented in 1814, were far too complicated and expensive, and the inking too imperfect, for general adoption. They were superseded by Mr. Edward Cowper's machine, which he invented and patented in 1816. Almost all the large editions of modern works are printed by Cowper's machines, and the influence they have had on the publication of books of all kinds is far beyond any expectation entertained at the time the machine was invented. After it had been in use sometime, it was stated in court, by an eminent lawyer, (now a noble lord), that, "if it had not been for Mr. Cowper's machine, it would have been impossible to supply the demand for books:" this is not correct, for at that time the hand-press *did* supply the demand: but the striking and important fact is, that the *machine* created a demand, and called into existence books which, but for it, would scarcely have been thought of. As the machine-work from type and wood-cuts was far better than the ordinary printing of the day, booksellers were induced to print extensive editions, because they saw the machine could accomplish all they required. One of the first booksellers who availed himself of this power was Mr. Charles Knight, who projected the *Penny Magazine*, on a hint from Mr. M. D. Hill, Queen's counsel. Each number, published weekly, consisted of eight pages of letter-press, illustrated with good wood-engravings. The public was astonished at the cheapness and good quality of the work, but it was its immense sale which rendered it profitable; for some years it amounted to 180,000 copies weekly. Mr. Knight, whose services in the cause of educational literature entitle him to the highest praise, expended £5,000 a-year in wood-cuts for this work. The Cowper machine has been the

cause of the many pictorial illustrations which characterise so large a portion of modern publications. The *Saturday Magazine*, *Chambers' Journal*, the *Magazin Pittoresque*, in France, and numerous others owe their existence to this printing-machine. The principle of *cheap editions and large sales* soon extended to established works of a higher value. A remarkable instance of this was the edition of sir Walter Scott's works; instead of the old price of ten shillings, they were sold at five shillings a volume, and the demand created by this reduction of price was so great, that, although the printer had a strong prejudice against machines, he was compelled to have them, the presses of his large establishment proving totally unable to perform the work, which amounted to upwards of 1,000 volumes per day, for about two years. The Universities of Cambridge and Oxford have adopted Mr. Cowper's machines for printing vast numbers of Bibles, Prayer-books, &c. &c. A Bible which formerly cost three shillings, may now be had for one shilling. Mr. Cowper recommended the Religious Tract Society to put aside their coarse wood-cuts, to have superior wood engravings, and to print them with his machine. The Society adopted these suggestions, and the result is, that by sending forth well-printed books, it could now support itself by their sale, without any aid from subscriptions.

As to newspapers, the *Times*, for instance, prints about *thirty-five thousand* copies every day, and as this newspaper is of a very large size, often with a supplement, the aggregate amount is more than thirty acres of printed surface per day—a quantity that could not possibly have been effected by hand-presses. At the *Times* office there are four machines, invented by Cowper and Applegath, printing from 4,500 to 5,000 impressions per hour—a hand-press producing only 300 impressions per hour. The great point obtained in these machines is the perfect distribution of the ink, and the power of causing the type to pass under the inking-rollers twice for newspaper-work, or from four to eight times for book-work, thus insuring the type being well inked. The effect was so striking, as to induce Mr. Cowper to apply the inking-roller and table to the common press, and this method has entirely superseded the old printing-balls, and completely abolished the imperfect inking, technically called “monks and friars,” so frequently seen in books printed by the old system. The effect of Mr. Cowper's ingenious invention is, that books are well, cheaply, and quickly printed, an abundance of illustrations introduced, and the quality of printing improved all over the world; thus rendering literature accessible to millions.

Austria.—Printing invented at Strasburg and Mayence, and patronised by the emperor Maximilian, who obtained master-pieces from it at its commencement, appeared in the Exhibition, with a degree of splendour which caused general surprise. No less encouraged in our day by its present sovereign, the Imperial printing-office of Austria has proved itself equal to its duties, and has accelerated the progress of the art by numerous experiments of all kinds. Xylography, engraving, type-founding, stereotyping, whether by plaster moulds, or by means of gutta-percha and the galvano-plastic process, electro-metallurgis, by which fossil fishes and animals buried in the antediluvian era are reproduced upon paper; galvanography, galvanotype, chymitype, all those new appliances of art and science which dimly foreshadow an unknown future, were represented there; and lithography, that new sister of typography also appeared, with the new adjuncts of chromotypy and chromo-lithography.

By the side of so many objects relating to typography, we were compelled to admire the typographic plates, each measuring 540 square inches, formed by the galvanic process, and producing in copper, letters of all languages, from which many millions of copies may be printed without appearance of wear and tear.

Prussia.—Next to the imperial printing-office of Austria, we noticed that of M. Decker, the printer to the Royal Academy of Berlin. The large folio New Testament, the German

translation by Luther, was a master-piece of typographic art. The printing of it was perfect; the types were well cut and cast, the ink was black and brilliant, and the paper excellent. Great praise must also be accorded to the edition of the complete works of Frederick the Great, a literary and typographic monument of great beauty, raised by Prussia to its hero. The five volumes in large quarto, already published, were worthy in every respect, by their typographic execution, of the importance of such a work. M. Decker exhibited, amongst the specimens of types from his foundry, some Oriental types, engraved in part with the co-operation of the Academy of Berlin; and also specimens of brass rules, of great depth in the engraving, and of very superior execution. M. Liepmann's ingenious invention for printing in oil, from a mass of solid colours, as a substitute for semi-fluid printing inks, attracted the notice of the jury, and they hope that when it has been sufficiently improved, it may be a valuable adjunct to ornamental printing. M. G. Westermann, of Brunswick, showed a specimen of good printing, in the work entitled *European Gallery*, printed upon German paper. From Eberfeld, M. Baedeker's *German Bible*, in folio, was a specimen of small and neat type printing. M. Haenel, of Berlin, exhibited bank-notes and labels, in gold and colours, possessing some merit.

Saxony.—M. Hirschfeld's of Leipzig, and some other typographic establishments, maintain printing in an honourable position in Germany. In general, the jury have observed, in all the books exhibited in the German department, great improvements in the paper, in the clearness and neatness of the type, and the quality of the ink.

Italy.—Printing, soon after its discovery, was carried to Rome by some German printers. The popes, Sixtus V., Leo X., and Clement XIV., founded the celebrated printing-office of the Vatican, for the purpose of printing the works of the holy fathers and the Holy Scriptures, and of propagating the Catholic faith. Their beautiful Oriental types give this printing-office an honourable standing, but its publications are few, and do not keep pace with the progress of the times. The Vendelins of Spire, and the Jenson, were early established in Venice. They introduced some happy modifications into the types, by making them approach nearer to the beautiful letters of Roman inscriptions. The Aldi still further improved them, and invented the sloping types called *italic*. Their beautiful and erudite publications, are remarkable even in the present day, for their typographic execution. At the end of the last century, and at the commencement, of the present, Bodoni, a typographer of consummate skill, who was at the same time, the engraver and founder of the types which he so carefully printed, published his beautiful editions—true master-pieces—which have earned for him the highest renown; but in which, he perhaps sacrificed too much to typographical luxury. Italy sent but few typographical productions to the Exhibition; nevertheless, the Jury remarked with interest, the large folio volume of *the History of the Abbey of Alacomba*, skilfully printed at Turin, by MM. Chirio and Mina. The type was very beautiful, and each page was surrounded by a border, imitated from one of the exquisite manuscripts of the fifteenth century. The wood engravings have been multiplied by the galvanoplastic process.

England.—The first book printed by Caxton, after a long residence in the Low Countries, appeared in London, 1474; and it is worthy of note, that the first book in the English language was printed by him, not in England, but on the continent, in 1471. Almost all those which he printed, and which he translated himself, to please the Princess Margaret, sister of King Edward the Fourth, and at the solicitation of the great lords and ladies of that time, were devoted to chivalry. His types, and those of his successors, Wynkyn de Worde and Pynson, are a not very elegant imitation of the writing then used in England. Up to the time of Buckley, in 1733, the art of

printing made little progress in this country. It was Baskerville, who, in 1750, turning his thoughts from jappanning to type-founding and printing, first gave to the art a real impulse. He spent several years and much of his fortune before he was able to produce types to his own satisfaction. In 1757, he issued his first book—a “Virgil,” in quarto. Between this date and 1763, he printed those charming editions of “Milton,” “Addison,” the “Common Prayer,” the “Bible,” “Juvenal and Persius,” “Horace,” &c., which are still celebrated for their typographical beauty, and cause the name of Baskerville to be ranked among the most eminent men who have contributed to the improvement of the art of printing. The paper which he caused to be made was superior, and all his apparatus for printing, including his ink, presses, chases, punches, matrices, moulds, and types, were produced by himself, and were all great improvements. His process of drying and glazing his paper and ink, as soon as printed, by means of hot plates of copper, was expensive, and had some other faults; but the taste of the period was not then ripe for luxury in printing; and, notwithstanding too, he offered to print for the London booksellers within five per cent. as low as the printers they employed, he complained that he was unable to get work from them. Accordingly, in 1767, we find him writing to his old friend Franklin:—“After having obtained the reputation of excelling in the most useful art known to mankind, of which I have your testimony, is it not to the last degree provoking that I cannot even get bread by it?” Then, as now, many persons would encourage bad printing, because it was cheaper. His types, though rather lean for large books, were held in much estimation; and, in 1779, four years after his death, were sold to a literary society in Paris for £3,700, and were in 1784, first employed in printing Beaumarchais’ celebrated edition of “Voltaire,” in seventy volumes, a work at that day unsurpassed in typographical luxury. Thus ended the first real attempt at improvement in England.

At the end of the last century, Mr. William Bulmer and Mr. Thomas Bensley made a fresh progress in the art of printing. Their beautiful publications rivalled the most remarkable productions of France, Spain, and Italy; and the magnificent edition of the works of “Shakspeare,” in nine folio volumes, embellished with engravings after the most able artists of England, and printed by Bulmer with great skill, excited the zeal of M. Didot, who wished to raise in France a like monument to Racine, and printed a folio edition, unequalled for its typographical perfection. At the commencement of the present century, Mr. Charles Whittingham brought out the elegant editions, which have rendered the Chiswick press so celebrated. Until that time, no one had printed wood engravings so perfectly, by the application of *overlays*, necessary for obtaining gradations in the tints. This success encouraged the engravers to give to wood-cuts a fineness unknown in the times of Albert Durer, Wolmeguth, and other engravers, who were obliged to employ broad lines, the unevenness of the paper and the imperfection of the presses rendering the printing of fine lines impossible. At the present day, when speed is imperatively demanded by the public, the means of satisfying this demand, are everywhere numerous and powerful. The fact may be judged of in London by the printing-office of Messrs. Clowes (printers of the *Official Catalogues*, and of the *Reports by the Juries*), in which two steam-engines put in motion twenty-six printing-machines; and by that of the printing-offices of the *Times*, and other large London newspapers, which publish in the morning the long debates in parliament, so often continued until late in the night. This rapidity of execution would have appeared fabulous in the last century; and it ought to be remarked, that the speed does not, in England, in any way prevent the correctness of the work, which is in general remarkable, even in the immense daily newspapers. This advantage must be attributed, in a great measure, to the maintenance of the ancient custom of the printers in England. Here it is required that

there should be seven entire years' apprenticeship of every working printer, whether he is destined to be a compositor or a pressman. This beneficial custom, by means of which the workman becomes more skilful and more attached to his profession, is gradually re-establishing itself in all the countries in which, by reason of political commotions, it had fallen into disuse, to the great detriment of the art.

While in most other countries in Europe, the patronage of the government appears indispensable to the creation or the development of a great number of branches of industry, more or less intimately connected with the fine arts and science, England affords a striking instance of how they are capable of being matured and developed without this support. The strength of its institutions, its spirit of association, the immensity of its capital, and its indomitable perseverance, enable the typographic art to develop itself solely by its own resources. The Tract and Bible Societies, which have printed the Holy Scriptures in all languages, are a remarkable proof of the power of association, animated by a religious spirit. The numerous and voluminous encyclopædias, of which the *Encyclopædia Britannica* alone, in twenty-six large quarto volumes, has reached its seventh edition, and the large number of important popular publications, also prove the immense resources of this country.

Although neither of the great universities of Oxford and Cambridge took any part in the Exhibition, the jury commemorate the high merit of the Clarendon press in the one, and of the Pitt press in the other. During a long series of years, Oxford has been remarkable for the well-sustained beauty of its Greek and Latin publications, as well as of those in the English tongue. Mr. Parker, the bookseller of the university of Oxford, exhibited as a publisher, several works on mediæval architecture, remarkable for their correctness, the beautiful execution of the wood engravings, and the goodness of the paper.

The jury strongly regretted, and this regret has been recorded on their minutes, that almost the whole of the printers of England refrained from exhibiting the beautiful productions of their presses, owing to the instructions given to the local commissioners, which stated that printed books were inadmissible. However, some fine specimens of good printing crept in by mere chance, such as Messrs. Bradbury and Evans's beautiful work of Mr. Marryat, *Collections towards a History of Pottery and Porcelain*, neatly executed; Mr. Pickering's *Victoria Book of Common Prayer*, in large Old English type, the Rubrics in red. This book had been carefully collated with the sealed book in the Tower of London. It was on superroyal paper, made by Mr. T. H. Saunders, of Dartford, Kent; it was hand-made, hard tub-sized, from fine strong rags, without any artificial colour; the moulds were made expressly, the wires finer and closer placed, to imitate the old moulds. This is a supplemental volume to Pickering's series of the Common Prayer, which shows all the changes made in the Ritual from the Reformation to the Savoy conference. *The Booke of Common Prayer, noted by John Merbeke*. This is a verbatim reprint, showing what parts of the service were chaunted in the reign of Edward VI.; the notes are black, on red ledger-lines; the paper the same quality and make as the "Victoria Prayer-Book," but in water-leaf, without size. Also the first six books of "Euclid," with the diagrams and symbols printed in colours, which are used instead of letters, for the greater ease of learners: all these were from the press of Mr. Whittingham. Mr. Bagster's well printed and useful "Polyglot Bibles;" Mr. Mackenzie's, of Glasgow, good specimens of Church Text, illuminated with red capitals; Messrs Reed and Pardon's neatly executed specimen of their founts; Mr. Smith's specimens of Hercules Ellis's Poetry; Major Bell's well-got-up *Tables of Universal History*, &c. &c. The same principle which prevented the English printers from exhibiting their works also deprived the publishers of the opportunity of taking, at the great Exhibition of all Nations, that high position to which their beautiful and carefully edited works would have justly entitled them. The names of Longman,

Murray, Moxon, Bohn, Pickering, and of a great many others, are for ever inseparable from the history of English literature; and thousands would again have seen with satisfaction, and have shown with pride to foreigners, the numerous, cheap, neatly printed, and beautifully illustrated productions of Mr. Charles Knight, who, in ministering to the intellectual wants and pleasures of the people, has given in the right direction an impetus which is still felt in all branches of art and manufacture connected with this class.

Chromotype, or Printing in Colours.—Hugo di Carpi is said to be the original projector of printing chiaro-oscuro by surface block-printing. In 1754, *Jackson's Essays on the Invention of Engraving and Printing in chiaro-oscuro*, as practised by Albert Durer, Carpi, &c., was published. The editor in his preface states, that, "besides the superiority of taste," there is "yet a very essential advantage belonging to this mode, which is, that being done in oil, the colour will never fly off. By this means the same beauty continues as long as the paper can hold together." Unfortunately for this speculative opinion, after the lapse of 100 years, the colour of the ink did "fly off," for the specimens of the wood-cuts in oil scarcely retain any of the colours which were supposed to be imperishable as long as the paper lasted. The paper, on the contrary, continues good and strong to this day. The jury proceeds to state the causes of the neglect and decline of the art of printing in colours, and its subsequent revival in 1832, chiefly through the discoveries of Mr. De La Rue, and speaks in terms of high commendation of the plates executed by Baxter. M. Silbermann, of Strasburg, also received praise for the productions he exhibited, such as the painted window of the Strasburg cathedral, and some imitations of manuscripts, enriched with coloured vignettes, by surface printing.

Printing in Gold.—Dibdin, in his *Decameron*, states that "This country has also an honour and a treasure to boast of in Mr. Whittaker's 'Magna Charta,' printed in letters of gold, with illuminations. There are some copies on vellum, beautiful, splendid, and characteristic, beyond any similar work (I had almost said ancient as well as modern) which it has ever been my good fortune to behold. Indeed, taking it 'all in all,' those who have not seen such a union of typographical and graphical skill as those illuminated copies display, can have no idea of the extraordinary felicity of their execution." The method adopted by Mr. Whittaker is the following, for which the jury is indebted to the kindness of Mr. John Harris, who was employed on the work. The page is composed in moveable type in the usual way; a stereotype plate is taken. A piece of iron of the size of the page, about half an inch in thickness, is made hot, and placed on the table of an ordinary typographical printing-press; the stereotype plate is then placed on the iron plate, and gets hot, and leaf-gold of an extra thickness, of the size of the plate, is laid very carefully on the surface of the plate; then the paper or vellum is placed on the tympan in the usual way, having been previously sifted over with dried glare of egg and rosin, finely pulverised, which adheres to it in sufficient quantity; the tympan is then turned down, and the pull dwelt on. The degree of heat must be ascertained by practice; if the plate be too hot, the gold is dead and drossy; if too cold, then it appears bright but imperfect. This process is similar to that now used by bookbinders in block gilding with an arming-press. Printing in gold by letter-press soon followed the method of copper-plate gold printing. Messrs. Vizetelly and Branston were the first to apply it; and their visiting and address cards, printed by letter-press, from rose-engine plates, have never been surpassed for the brightness and beauty of execution. About the same period Mr. De La Rue, in conjunction with the late Mr. Balne, of Gracechurch-street, produced a large royal 8vo. edition of the New Testament, printed in gold, twenty-five copies of which were in pure gold powder. Nothing has since been produced equal to this unique edition. At the coronation of Queen Victoria, Mr. De La Rue undertook to produce the *Sun* newspaper printed in gold. The rapidity with which this had to be

effected was one of the many difficulties he had to encounter. Messrs. Clowes and Sons afforded him every aid by placing at his disposal the printing machines of their extensive establishment. Upwards of 100 persons were employed to rub the bronze on the printed sheets, which had to be brought from the printing-office in Stamford-street, as soon as printed, to Mr. De La Rue's works in Bunhill-row, to be there bronzed and finished. More than 100,000 copies were thus produced; 10,000 in time for the publication of the *Sun* on the coronation-day. Gold printing is now applied to numerous purposes in most countries. The following is the best method of producing good and bright results of letter-press printing. Take the best printer's varnish, grind it to a thick consistency with the best burnt sienna or brown umber, and reduce this with De La Rue's gold-size until it be of the thickness of thin treacle; ink the form in the usual manner, and when printed apply the bronze by rubbing it gently over the article with cotton wool. If leaf-gold or leaf-metal is required, it must be laid on carefully, and when dry, the sheets should be wiped, to clear them of the superfluous bronze or metal. The gold printing is much improved by its being passed over polished steel plates, bronze, and in metal, displaying a variety of specimens, all possessing merit.

Printing in France.—As early as 1470, printing was introduced into Paris by the influence of La Sorbonne: its progress was rapid. Rembold, the partner of Gering, Antoine Vêrard, Simon de Colines, Pignonechet, and others, carried the art of printing to a high degree of perfection. The typographical merit of the publications of Robert and Henry Stephens would itself be very remarkable, were it not surpassed by the high literary merit of those learned printers. The national printing-office of France was founded in 1640 by Louis XIII., who there collected the punches cut by Garamond by order of Francis I., and confided these punches to the most eminent printers of his time, who were honoured with the title of *Royal Printers*. Under the preceding reigns, this printing-office had distinguished itself by large publications, such as the collection of ordonnances of the kings of France, that of the fathers of the Church and of the Councils, and that of the Byzantine historians, &c. At the fall of royalty it became a vast establishment, in which was concentrated all the printing of the government departments—divided hitherto among private printing-offices. Napoleon confided the direction of it in 1809 to M. Marcel, who had accompanied the expedition to Egypt, and had founded a printing-office at Cairo. Making use of the types of the Propaganda of Rome, which had been removed to Paris, M. Marcel printed the Lord's-prayer in 150 languages. It was especially under the reign of Louis Philippe that the printing-office, then a royal establishment, improved its means of execution, and caused a great number of Oriental types to be engraved, under the special direction of the most learned Oriental scholars. The 150 foreign founts in the specimen-book of the national printing-office, offer an interesting subject of comparison with the rich collection of the Imperial printing-office of Austria. The jury particularly remarked the pure taste and perfect execution of the borders printed in gold and in colours, in imitation of the drawings and vignettes of the elegant Oriental manuscripts. The typographic execution, with reference to the types, the harmony, the clearness, and the purity of the designs executed by MM. Chenavard and Clerget, was perfect. Nothing could be more beautiful than the three volumes of the Oriental collection sent by the national printing-office. The jury found the bookselling business of Paris honourably represented in the Great Exhibition by MM. Renouard Baillière and Gaume; for the sciences and literature by MM. Langlois and Leclercq; and by M. Pagnerre for educational works; by MM. Banec, Gide, and Charles Texier for architectural works; by M. Mathias for his industrial and scientific library, so suitably adapted to the wants of mechanical science; and, lastly, by Madame

Huzard, for works upon agriculture. French printing was honourably represented at the Great Exhibition; for Paris, by M. Dupont, whose extraordinary productions of facsimiles, of old books, in the style of anastatic reproductions, and whose general specimens of printing, as exhibited, deserved particular mention; by M. Didot, who has raised monuments worthy of the old masters in his last three great publications,—The *The-saurus* of Stephanus, Dueange's *Glossarium*, and *Bibliotheca Scriptorum Græcorum*—all produced in a country village, the whole of the composition of the types being made by young girls; by MM. Plon, Brothers, whose books, albums, &c., were of great merit; by M. Claye, whose illustrated books were of the first workmanship; and for the provinces by MM. Mame, who exhibited books neatly bound and fairly printed, at most extraordinary low prices; by M. Silbermann; by M. Desrosiers, who, in a small provincial town, produced his *Ancient Auvergne*, &c., in a very creditable manner; and by M. Barbat, who exhibited illustrated volumes of the Scriptures.

The jury regretted that neither from Spain nor Portugal were there exhibited any proofs of the present state of printing in those countries. Denmark also was unrepresented. From Belgium and the Netherlands there were but few specimens. Russia displayed "a single broadside sheet." Sweden, some good specimens of printing bank-notes by letter-press. Persia sent some beautiful manuscripts only, and some books printed in Europe. Egypt had an interesting display of 165 volumes, printed in Arabic, in Turkish, and in Persian, at Cairo. Amongst these books some were enriched with Arabesque, tastefully executed by means of typography. These were printed upon a peculiar paper, manufactured at Boulae, by the old vat process. The pulp appeared to resemble that which is produced in China and in India by the use of raw materials, such as the bamboo and the banana-tree. It may be that the ancient papyrus is now re-appearing in Egypt under this new form.

United States of America.—It is well known that there are some works printed in the United States which give a more favourable idea of the productions of America than those which appeared in the Exhibition. The American printers contented themselves with sending a number of newspapers, the printing of which was not remarkable. From Canada, the jury noticed some beautiful types from the foundry of Mr. Palsgrave, at Montreal, who also exhibited some stereotype plates.

Australia.—The jury examined with real interest several works printed in Van Diemen's Land, at Hobart Town, by Henry Dowling; and two large volumes, accompanied with lithographs, likewise designed and printed in Australia. The same might be said of a work printed at Sydney, by William John Row.

It is to be regretted that—introduced as it now is, even to the confines of the earth—all the productions of the press were not represented in the "universal gathering;" for printing is a gift almost as necessary to man as speech, for the manifestation of his thoughts.

CHAPTER XXXII.

THE ORIGIN OF EXPOSITIONS.

MARQUIS D'AVEZE—CHATEAU OF ST. CLOUD—PLAN OF THE FIRST EXHIBITION—DIFFICULTIES AND EXPULSION OF THE MARQUIS—RENEWED ATTEMPT AT THE MAISON D'ORSAY—THE TEMPLE OF INDUSTRY—THE FESTIVAL OF LIBERTY—MAGNIFICENT CORTEGE—EXHIBITION OF ISOL—SPANISH AND BELGIAN EXHIBITIONS—VARIOUS LOCAL EXHIBITIONS IN ENGLAND—DESCRIPTION OF THE FRENCH EXPOSITION BUILDING, ETC.

NOT to fatigue our kind readers with too long a wandering among the numerous recesses of the Crystal Palace, or too close an investigation of its various treasures of industry, of science, and of art, we will endeavour, for a brief space, to diversify the scene and introduce them to the acquaintance of the Marquis D'Avèze, who has favoured us with an interesting account of

THE ORIGIN OF EXPOSITIONS.

Rather more than half a century since—1897—the first Exposition of the National Industry of France took place in the chateau of St. Cloud, under the presidency, and through the agency of the above-named nobleman. During the troubles of the revolution, he found that the royal manufactories of Sèvres and Gobelins had suffered, and that the workmen were wanting bread, though the warehouses were full of the choicest tapestry, china, and rich wares. To remedy this sad state of things, he bethought him of the sale of these products in a bazaar; and in a few days, he tells us, the castle-walls were gay with hangings and the floors bright with the carpets, and the tables with china and bijouterie. But the marquis has told the history of the affair so well, that we may use his own words:—"In the year V. of the Republic (1797), I had not yet quitted the Opera, when the minister of the interior summoned me to undertake the office of Commissiour to the Manufactures of the Gobelins (tapestries), of Sèvres (china), and of the Savonnerie (carpets). I had no need to stay long in these establishments, to perceive the misery in which they were plunged. The workshops were deserted: for two years the artizans had remained in an almost starving condition; the warehouses were full of the results of their labours, and no commercial enterprise came to relieve the general embarrassment. Scarcely can I depict the effect produced upon me by such a scene; but at that moment a sudden and luminous thought presented itself to my imagination, and appeared to console me for the miseries of the present in the hopes it offered for the future. I pictured to myself, in the most glowing colours, the idea of an exhibition of all the objects of industry of the national manufactures. I committed my project to paper; I detailed the mode of its execution; and prepared a report, addressed to the minister of the interior, which was written throughout by my own hand, and delivered by me to M. Lancl, then at the head of the section of arts and manufactures, in whose office the document in question should still exist. My report soon received the approbation of the minister of the interior, M. François de Neufchâteau, who commanded me to carry it into effect by every means useful and suitable to the government. The château of St. Cloud was then uninhabited and completely unfurnished; and this appeared to me the most appropriate and eligible spot for the exposition which I had projected, and likely to invest the exhibition with all the magnificence and éclat so necessary to attract strangers, and to further the sale of the objects exhibited, the produce of which might mitigate the sufferings of our unhappy workmen. The château of St. Cloud was obtained without

difficulty. I established myself there, and requested the attendance of MM. Guillamont, Duvivier, and Salmon, directors of manufactures. I explained to them the intention of the government, and found all these gentlemen ready to further this object with zeal and activity. In a few days, by their obliging exertions, the walls of every apartment in the château were hung with the finest Gobelin tapestry; the floors covered with the superb carpets of the Savonnerie, which long rivalled the carpets of Turkey, and latterly have far surpassed them; the large and beautiful vases, the magnificent groups, and the exquisite pictures of Sèvres china enriched these saloons, already glowing with the *chefs-d'œuvre* of Gobelius and the Savonnerie. The Chamber of Mars was converted into a receptacle for porcelain, where might be seen the most beautiful services of every kind; vases for flowers; in short, all the tasteful varieties which are originated by this incomparable manufacture. In the centre of the saloon, surrounded by all these beauties, was a wheel of fortune, containing lottery-tickets eventually to be drawn: every ticket was to obtain a prize of greater or less value; the price of each ticket was twelve francs. I had attained to this point, when the minister gave me an assistant in the person of M. Lessure, a young man of great merit, with uncommon zeal and intelligence. I had already, for some time, enjoyed the advantage of the services of M. Peyre, a young architect of exquisite taste and distinguished talent. He it was who superintended the arrangement of the exposition; and when this was completed, I referred to the minister to fix the day for its being opened. It was decided that this should take place in the month of Fructidor; but, previous to that time, a number of distinguished persons in Paris, and many foreigners, visited the exposition, and made purchases sufficient to afford a distribution to the workmen of the different manufactures, thus yielding a little temporary relief to their necessities. The fame of this forthcoming exposition inspired the citizens of Paris with an eager desire to enjoy it as soon as possible; they anticipated with impatience the 18th Fructidor, the day fixed for public admission to St. Cloud. The court-yard was filled with elegant equipages, whose owners graced the saloons of the exposition, when, in the midst of this good company, I received an official notice from the minister to attend him immediately, and to defer the opening of the exposition. I obeyed the mandate on the morning of the 18th. I waited on the minister, from whom I received an order to close the château. Already on the walls of our city was placarded the decree of the directory for the expulsion of the nobility, with an order for their retirement within four-and-twenty hours, to a distance of at least thirty leagues from Paris, and this under pain of death. My name was in the list; and, consequently, my immediate withdrawal was imperative. The barriers were strictly guarded, and it was impossible to pass them without the order of the commandant. My position was doubly painful: on the one hand, it was essential to obey the decree of the government; on the other, I had an account to render of all the treasures in the château of St. Cloud. I found no difficulty in explaining my situation to the minister and the commandant of the place, the Marshal Augereau. I requested him to furnish me with sufficient force for the protection of the château, in which so many precious objects were deposited. He gave me a company of dragoons, under command of Captain Vatiez, and ordered a passport for me, by means of which I could leave Paris and return to St. Cloud. I caused an inventory to be made in my presence, of all I left in the château. I closed the gates and delivered the keys to M. Marcéhau, the keeper, in compliance with the order of the minister. I posted the military which had been granted to me around the château, and, my duties fulfilled, hastened to obey the decree of the proscription. Such is the true and exact history of the first idea of National Exposition, and of the first attempt to realise that idea."

The modest narrative of the originator of these exhibitions was written by the marquis

so late as the year 1844, in reply to the reports of MM. Challamel and Burat, in which the honour of their origin was accorded to François de Neufchâteau. The labours of the marquis, however, in the cause of the industrial arts did not terminate with his compulsory retirement; for, on his return to Paris, at the beginning of the year 1798, he forthwith collected an exhibition of native art-manufactures within the spacious house and grounds of the Maison d'Orsay, Rue de Varennes. It was to be expected that the specimens of manufacture he assembled would consist entirely of costly goods, inasmuch as manufactures of any excellence were not within the reach of the great body of the people. The master-pieces of manufacturing skill were, therefore, to be found exclusively in the palaces of the rich; and from these abodes of luxury he withdrew the gorgeous cabinet-work and marqueterie of Rissoner and Boule; the clocks of Leroy; the gorgeous typographical productions of De Thou and Grolier; Sèvres and Angoulême porcelain; the master-pieces of Vincent and David; the choicest fabrics of Lyons; and other costly products of the artist and the artizan. The exclusive character of the exhibition was the result, not of D'Avèze's wish, but of the condition of French society. He led the way which has been so faithfully and happily followed; he created in the hearts of the manufacturing population of France, that enthusiasm for their calling—that anxiety for the excellence of their national manufactures, which have since distinguished them. MM. Challamel and Burat have been guilty of a palpable injustice towards the Marquis d'Avèze, by remaining wholly silent upon the subject of his enlightened labours in the cause of art-manufacture, in their zeal on behalf of the accomplished De Neufchâteau. The year 1798 was a most favourable one for an exhibition of native industry. Napoleon had achieved his most brilliant actions in Italy, and brought the war to a successful termination; the spoils of war had been inaugurated with prodigal pomp, and it was happily suggested that the little collection in the Rue de Varennes should be copied on a grander scale. The government, bearing in mind the efforts of the Marquis d'Avèze at St. Cloud, and more lately in Paris, determined to erect a "Temple of Industry" on the Champ de Mars. Here the triumphs of war had been celebrated, and here it was resolved that the nursing of peace should receive a national ovation: the olive should be intertwined with the blood-bespattered laurel; Lenoir should not be forgotten in the glory of the defenders of the *batterie des hommes sans peur!*

Augustin Challamel, in his *Histoire-Musée de la République Française*, vouchsafes not a word to the Marquis d'Avèze; but declares at once, and without preface, that only two of the *fêtes* of 1798 are worth notice, from the impulse which they gave to the industry and art of the country, viz., that of the foundation of the republic, and that of liberty held on the 10th of August. At first, M. Challamel tells us, François de Neufchâteau put a very happy and useful idea into execution; but the writer dexterously refrains from naming the progenitor of the idea, upon which the accomplished minister acted. Under the superintendence of De Neufchâteau, M. Challamel continues, a fairy building was erected to the west of the national altar, containing long streets of stores and shops. This was the first national exhibition of French industry. By exciting emulation amongst native manufacturers, and appealing to their pride, they had been prevailed upon to send specimens of their workmanship from far and near. In the outset, this exhibition was called "a fair;" but the importance given to it by the universal encouragement with which its establishment was met, soon gave it the complexion of a thoroughly national undertaking. On the eve of the opening of the exhibition, François de Neufchâteau, attended by a jury, the civil dignitaries, and the learned of all denominations, held a meeting within the building, and delivered a speech, beginning in these terms:—"We are no longer in those unhappy times when enslaved industry trembled to bring forth the fruits of her skill and meditation; when galling

enactments, monopolising corporations, and fiscal burdens bowed down the inventive spirit; when art, become at once the instrument and the slave of despotism, helped to rivet the chains about the citizen, and owed success to flattery, corruption, and the humiliation of a shameful servitude." This picture of commercial bondage is more forcibly touched upon in Jules Burat's *Historical Essay*. He tells us, for instance, that a special royal enactment was necessary to secure to Lenoir, the celebrated mathematical instrument maker, the benefits of his skill. Monopolising corporations stood in the way of all inventors who did not belong to them. Thus, printed cottons and silks were so long kept out of France by the efforts of the corporations of silk and cotton manufacturers. Arin Argand's lamps are well known now throughout the world; but it may be interesting to note the fact, that his invention was well nigh destroyed, at first, by the corporations of iron-founders and locksmiths, because he was not a member of either of these societies.

Reveillon, who first introduced the art of painting paper into France, had to contend with the most vexatious impediments thrown in his way by the corporations of printers, engravers, and manufacturers of tapestry, and only escaped these persecutions by obtaining for his establishment the title of "Royal manufactory," a privilege which eventually led to its destruction, after the breaking out of the Revolution. When the privileges of corporations could not be brought to bear upon inventors, royal interests stood in the way. The most absurd and obnoxious monopolies were conceded to favourite subjects, regardless of the misery that might accrue to a class of the people from their enforcement; and these, coupled with the jealousies of corporations and the tyranny of the throne, made France, throughout the seventeenth and the greater part of the eighteenth century, an unfruitful, if not a dangerous abode for a man with inventive faculties. The instance of Fosse Van Rahais' privilege is notorious. It appears that this individual obtained, in 1665, an enactment from the king, which secured to him and his posterity the exclusive right of manufacturing cloth within an area of thirty leagues from Abbeville. M. Burat declares, that the effect of this monopoly was to retard the improvement of native cloth-workers for a considerable period. Another instance of the disastrous effects of such a system of monopoly may be instanced in the law which shielded the porcelain of Sèvres, to the detriment of other manufacturers, as well as to the disadvantage of the general public, who could not afford to pay the prices demanded for the protected manufacture. The monopoly gave a value to Sèvres china, and kept it within the reach of the wealthy only; but we have not learned that the potteries of Sèvres have deteriorated from having to compete with those of other places. That which was formerly the exclusive enjoyment of the rich, has become the luxury of the many. This cannot be doubted; and there are few, even in the present time, who will be sorry to behold such a result of free competition.

The "Temple of Industry," under the control of De Neufchâteau, remained open only during the three last complimentary days of the year VI. of the Republic (1798); but it sufficed to excite the greatest enthusiasm throughout the country. Those who managed this exhibition, in concert with M. de Neufchâteau, unanimously agreed that the safest principle to adopt for the award of prizes was to entrust the decisions on the merits of the competitors to a jury composed of a selection of the most distinguished available men in science and art. This system was adopted, and was found to work so well that it has been adhered to ever since. This first jury consisted of nine men only; namely, Chaptal, member of the Institute; Vien, painter; Motté, sculptor; Molard, member of the Society of Arts and Manufactures; Gillet Laumond, Commissioner of Mines; Duquesnoy, of the Agricultural Society; Ferdinand Berthoud, chronometer-maker; Gallois, a literary man; and Darcet, member of the Institute. There is no printed copy of the report which they made; but M. Julien Lemer, in his *Manuel de*

l'Exposant, gives a list of the principal manufacturers to whom prizes were awarded. They are as follows:—"M. Breguet, whose name is European, in connexion with the improvement of watch and clock-making; Lenoir, to whose skill as a mathematical instrument-maker we have alluded more particularly; Didot and Herham, who exercised so direct an influence upon the improvement of printing; Dilk and Guerhard, whose painted china rivalled the beauty of that of Desarnod, described as the French Rumford; Conté, whose name is familiar to every artist, and to whom we are indebted for the application of machine-ruling to engraving; Clouet and Payen, who directed a vast chemical manufactory; and Denys de Luat (Seine-et-Oise), who exhibited cottons spun to all degrees of fineness, from the most common to No. 110."

The second *fête* noticed by Augustin Challamel is that of Liberty. This festival appears to have been almost exclusively devoted to a national and sumptuous acknowledgment of the grand results of science and art; and the trophies, which were at once its chief ornament and the conspicuous disgrace of the country (the master-pieces filched from Italy), were raised aloft in the streets to the wondering gaze of thousands. The *cortège* was one of the most magnificent spectacles on record. As early as nine o'clock in the morning, the citizens who were to take part in the procession assembled along the left bank of the Seine, where the triumphal cars, loaded with trophies, were ranged. The procession was divided into three distinct divisions. At the head of the first a banner was borne, on which was inscribed, "Natural History." Foremost in this division the professors and administrators of the Museum walked, followed by the choice scholars, who marched by the side of the cars. The first car was loaded with various minerals, surmounted with this inscription:—"Every day art discovers herein new properties." The second car was full of petrifications from Verona; and above these was written, "Monuments of the antiquity of the world." The third car contained the seeds of foreign vegetation, with the inscription:—"The palm, the banana," &c. The fourth car was crowned with living foreign plants, surmounted with these words: "They will increase our wealth and our pleasure." The fifth car was devoted to an African lion. The sixth, to a lioness. The seventh, to a lion from Sahara. The eighth, to a Swiss bear; and after these followed two dromedaries and two chamois. The ninth car was ornamented with agricultural implements from Italy, surmounted with this sentiment: "Ceres smiles at our trophies." The tenth car, which closed the first division, was loaded with two blocks of crystal, on which was inscribed, "The gift of the people of Valois to the French Republic." The banner which was borne at the head of the second division was thus inscribed:—"Books, Manuscripts, Medals, Music, and Oriental Type." "Science and Art are the support and ornament of Liberty." This banner was immediately followed by a chorus, singing patriotic melodies. Next came deputations from the scientific and literary societies; the principal actors from the theatres; the public librarians; the professors of the Polytechnic School; and, finally, the professors of the College of France, carrying a bust of Homer on an antique tripod, before which floated a banner thus inscribed:—"Seven cities disputed the honour of having given birth to him." Behind this bust followed professors of other learned societies, together with their most distinguished pupils. Then came six cars, covered with devices from Fontaine, Seneca, Delille, &c., which closed the second division. Upon the banner of the third and closing division, a sentiment from Lavallée was written:—"The arts seek those lands where the laurel flourishes." A choir of boys walked behind this banner singing appropriate snatches. Next came those pupils who had carried the last fine art prizes; and, after them, the custodians of the national galleries, the professors of painting, sculpture, and architecture, followed by their several classes; among whom a banner was carried, announcing "Specimens of the Sculpture of the Ancients." No less than twenty-nine

chariots laden with Italian spoils followed this banner. These desecrated trophies included the bronze gilt horses from the place of St. Marc, at Venice; the Nine Muses, Cupid and Psyche, the Venus (from the capitol), the Mercury de Belvidere, Venus and Adonis, the Egyptian Antinoüs and the Antinoüs de Belvidere, the Dying Gladiator, Trajan, Marcus Brutus, Ceres, the Apollo de Belvidere, and the Laocoön. Then followed a banner heralding the pictures, and thus inscribed:—"Flock hither, Artists; your Masters are here!" And what followed justified the gilded letters on the banner. Among other precious relics dragged through the streets on this occasion were Raphael's "Transfiguration," and the master-pieces of Domenichino, Romain, Titian, Paul Veronese, &c.; and these treasures were followed by the government authorities of Italy, decked with the tri-colour, and holding in their hand a crown of laurels. These closed this brilliant procession, which threaded the principal thoroughfares of Paris, and was at once a suggestive picture of the sagacity and insatiable greed of the conqueror. The method of its formation betrays what was passing in the mind of Napoleon at the time; and it is not unreasonable to trace the pacific and scientific character of this splendid day to the enlightened original idea of the Marquis D'Avèze, whose zealous efforts on behalf of the Gobelins and Sèvres workmen had attracted an unusual degree of attention, and could not have escaped the acute observation of Napoleon. It is right that the claims of the marquis should be fairly set beside those of his more pretentious rivals.

This first experiment was found to create such enthusiasm throughout the country, and to give such a healthy stimulus to native industry, by exciting an emulation of excellence among the manufacturers, that the government at once determined to repeat it annually. The nature of the prizes offered, or rather the regulations under which they were distributed, showed at once the undoubted superiority of English manufactures at the time to those of France, and the Gallic animosity existing towards this country. Government orders were addressed to the prefects of all the departments, directing them to form local committees empowered to decide upon the local products to be forwarded to the next exhibition. The prizes were to consist of twenty silver medals and one gold one, to be awarded to that competitor who should have opposed the most formidable rivalry to the looms of England. These directions were sent out by M. de Neufchâteau; but although, in this minister's circular, annual exhibitions were promised, the rapid current of public events, the wars, the fall of the Directory, and the establishment of the Consulate, retarded the opening of the second till 1801.

The time for this second exhibition was auspicious. The first consul, loaded with laurels from his wars, was wisely employed in cultivating and stimulating the arts of peace. He felt that his prosperity rested more in his sagacity and prudence in times of peace, than in his renown as a warrior. His splendid victories dazzled his adopted countrymen and flattered their pride; but he understood the French character too well to trust to that gratitude which was the mere echo of their flattered vanity. He therefore employed the leisure of temporary cessation of hostilities in paying visits to the workshops and great factories of Paris, Lyons, Rouen, Brussels, Liege, Aix-la-Chapelle, and Milan, in company with his illustrious and sagacious friends, Berthollet, Monge, and Chaptal (the framer of the report on the first exhibition). Everywhere he stimulated the manufactures by promises of the future, and by an anxious solicitude for their prosperity. Whether from selfish or purely patriotic motives, is a question of debate; but that Napoleon always acted sympathetically with the people at large, cannot be doubted. He attended to their requests, and respected their wants, and called the public market the "Louvre of the common people," therefore he re-built and enlarged it. He declared "the rabble" to be the only aristocracy on which he could depend in critical times; and his internal administration of affairs demonstrates the sincerity of this conviction.

in his mind. He paid his acknowledgments to talent in a prompt and most complimentary manner. When he suddenly came across a man of rare abilities—as Ternaux, the founder of many fine factories—he would pluck the cross from his own breast, and decorate him in the presence of whoever might be in the way at the time. Instantaneous action was the secret of his power. He was as quick to execute as to resolve; he could not understand the word “hesitation.” He had the faculty of seeing an entire question at a glance; and thus his rapidity of action seldom led him to commit errors of judgment. Instances of his judicial errors are rare; and, moreover, are so well repaired on the instant, that their evil effect is seldom palpable. During the commercial crisis under the Imperial sway, while irritated by the news of maritime reverses, he ordered all English goods found in the country to be burnt. This command raised a loud deprecatory clamour, and he at once saw the impolicy of which he had been guilty. The reparation he made was imperial—about twenty-one millions were advanced to the industrial community.

Upon the occasion of this great Exhibition, a quadrangle of the Louvre was used, and the greatest success attended the experiment. Similar expositions took place in 1802, 1806, 1819, 1823, 1827, 1834, 1839, 1844, and 1849. The last was esteemed the most splendid and successful of any hitherto held in Paris. It took place in a temporary palace erected in the Champs Elysées, which covered more than five acres of ground. There were 4,494 exhibitors, and the productions, ranged for the inspection of the curious, were considered as evidencing a decided advance on every thing of the like kind before exhibited.

In these last two expositions, an immense variety of raw material, machinery, and manufactures was exhibited. In every department an increase of taste was apparent; and cheapness of production seemed to have been an object of as earnest pursuit as those of quality and taste. Indeed, after these two expositions, France may well claim the high honour of having originated, cherished, and completely established National Industrial Exhibitions. It is true that other nations have partially followed her example; but no other people have given them so systematic and regular a basis as one of their established institutions. The Bavarian and the Belgian governments have, within the last few years, instituted Industrial Exhibitions, in imitation of those of France, and they have been attended with great success and popularity. In Spain, also, National Expositions of Industry have been held with more or less success. The first Spanish Industrial Bazaar was held in 1827, and had 297 exhibitors; the second in 1828, with 320 exhibitors; the third, in 1831, with 228 exhibitors; the fourth, in 1841, with 214 exhibitors; and the fifth, in 1845, when 325 exhibitors represented the genius, trade, and industry of Spanish manufacturers.

In our own country, during the last ten or fifteen years, there have been a great many local exhibitions of arts and manufactures, but they were all in the character of bazaars, to raise funds for particular objects, with the exception of the very limited exhibitions held by the Society of Arts in 1850. Manchester, Leeds, Birmingham, Dublin, and other towns have successfully held such bazaars, chiefly composed of the productions of the surrounding country; the one which most nearly approached the French Expositions, in the variety and extent of the national productions displayed, was the Great Free-trade Bazaar, held, for twelve days, in Covent-garden Theatre, in 1845, which not only was eminently successful as a bazaar, but excited the greatest public interest as an exhibition of our manufactures. From these displays, then, sprung the idea of the Great International Exhibition in Hyde-park. Of the French Exposition building, Mr. Digby Wyatt, in his report, says:—“The vast edifice which has been erected to contain the specimens of manufacture selected for exhibition in the year 1849 is situated on the same site as that occupied by a similar building in the year 1844. The Carré de Marigny, on which it has been placed, is a large oblong piece of ground, abutting on the main avenue of the

Champs Elysées, and, as a site, offers every possible advantage, being of a gravelly soil, already efficiently drained, and standing on the line of a continually-moving series of public conveyances. The Champs Elysées, though at some considerable distance from the great centre of Parisian population, are still so universal a place of resort, that they may be fairly assumed to be "in the way" of even the poorest classes of the community. The elevation may be admirably seen from all the approaches to the building, and it has the advantage of being in immediate proximity to the residence of the President of the Republic. The whole plot of the present building (exclusive of the agricultural department) covers a vast parallelogram of 206 metres by 100 (about 675 by 328 feet English), round the outline of which runs a gallery about 90 feet wide, divided into two avenues by a double range of pilasters. In the centre of each avenue is a set of stalls, placed back to back, for the exhibition of merchandise; and both between the central pilasters, and round, and upon the walls, other objects are placed; so that, on traversing either of the four gangways (each about ten feet wide) the public have upon their right and left hands objects for inspection. In the part of the building appropriated to large machinery, of course this system cannot be carried out with the same regularity. The vast parallelogram, enclosed by a somewhat similar gallery in the year 1844, was left as one magnificent hall, within which were placed the most important objects; in the present building we find it divided by two transverse galleries, similarly arranged to those we have described, forming three court-yards, the central one being about 140 feet square, and the two lateral ones 80 feet by 140 feet. The central court-yard is open to the sky; in the middle rises an elegant fountain, placed on a platform of turf, and around are disposed sheds for the exhibition of flowers and horticultural ornaments and implements. One of the lateral courts (enclosed) receives a large collection of objects in metal-work, cast-iron, &c., and the other contains an immense reservoir, in which all the drainage from the roofs is collected, so as to form a supply of water immediately serviceable in case of fire. In addition to this great building, which corresponds with that previously erected, there is this year constructed a vast shed, for the exhibition of agricultural produce and stock. It extends to a length rather greater than the width of the great parallelogram, and is about 100 feet (English) wide. Its construction is ruder than that of the 'Palace,' but it is not on that account less effective. It appears to have been originally contemplated to fill the whole of this gigantic hall with cattle, &c., and to place the agricultural implements in a large narrow gallery intervening between it and the main building; but as the stock of animals forwarded for exhibition has not proved so large as was anticipated, it has been half filled with semi-agricultural machines, and the whole of the long narrow gallery alluded to crammed with stoves, and miscellaneous domestic mechanism. The whole of the building is constructed of wood, the roofs being covered with zinc. Of the latter material 400,000 kilogrammes, equal to 4,000 tons, are stated to have been used; and of the former nearly 45,000 pieces of timber. The cost of this building is understood to have been about £18,000. Of the permanent building erected by the King of Bavaria at Munich, for periodical exhibitions, or even of Kroll's Winter Garden, since burned down, it is needless to dilate. It was 310 feet long by 82 broad, at the widest part. The building for the Birmingham Exposition of 1849—the first in this country, really so called—covered a space of 10,000 square feet, and a corridor of 800 feet more, connected the temporary building with Bingley-house, within the grounds of which the Exhibition took place. It was open to the public in September, 1849, at a cost of £1,300.

CHAPTER XXXIII.

TELESCOPES, ORRERIES, GLOBES, AND MODEL MAPPING.—*From the Juries' Report.*

TELESCOPES—VARLEY AND SON—ROSS—CALLAGHAN, ETC.—BIRON—KINZELBACH—ORRERIES—FACEY—PLANT—PLANETARIUMS—NEWTON AND SON—LE FEUVRE, BRAKE, ETC.—RICHARD'S GEOGRAPHICAL INSTRUCTOR—DETOUCHE AND HOUDIN'S URANOGRAPHIC APPARATUS—GLOBES—JOHNSTON—NEWTON AND SON—FLETCHER, REDHOUSE, ADORNO, ETC.—MODEL MAPPING—SCHOELL—IBBETSON, ETC.

THE telescope is an instrument of such high importance, that it ought to command at all times, from opticians, the incessant direction of their attention to its improvement, and the bringing it to the highest possible state of perfection. In the Exhibition, if we except those affixed to astronomical instruments, there were but few telescopes. Of those the larger were for the most part good. Wray exhibited one with discs of a solid substance, instead of flint glass, which deserved commendation, as a deviation from the beaten path, that may conduce to new and important results. There were few samples in the Exhibition of optical glass; but all were good, and gave great promise of an increase in the use of large telescopes. Simms exhibited several object-glasses made of English glass; and Chance contributed a noble piece of apparently pure flint glass, of no less than twenty-nine inches in diameter. Daquet sent some wonderfully pure glass, both crown and flint. Of lenses and prisms, there was not one British contributor; France stood alone in the exhibition of some very beautiful work, which reflected high credit upon Bayerle and Bertaud. Of physical optics, there was but one extensive exhibitor, viz., Duboseq Soleil, France, who had a beautiful collection of most delicately constructed instruments, adapted for physical investigation. Of microscopes there were a good many exhibited; among which the English microscopes were found to stand pre-eminent.

Telescopes.—Varley and Son exhibited an apparatus to be used in Gregorian telescopes, consisting of three small speculums, grouped together on one stem, and fitted into a telescope, under adjustment from the eye-end, by means of which any one of the three might be used at pleasure, so that the power may be changed without losing sight of the object. Within the tube were placed two slides, one near the eye-end, adjustable by a screw; the other near the object-end, which might be moved to and fro. The latter carried three small speculums, of different foci, mounted on a steel axis, held in a stiff frame. At the bottom of the axis was placed a toothed wheel and rack-work. This rack was kept from moving by a long bar proceeding from the first slide, so that it could not move with the slide on which it laid; by this arrangement, on moving the slide, the wheel upon it rolled against the rack, and so presented the next speculum. The angles at which the speculums are opposed to each other on the block determines the number of teeth, or portions of the circle required to present each speculum. The diameter of the wheel determines the distance that such portion of the wheel must traverse to put each speculum in true focus. The slide nearest to the eye-end is moved by a long bar, attached to it by means of a screw, whilst its near end lies on the other slide, and over the loop-hole. The bar has a screw handle on the outside of the telescope, by which to pull or push the further slide, and also to clamp it fast to the near side when in the right place. This clamping connects the two slides, and causes both to obey the adjusting screw. In order to determine the exact places at which to clamp, the bar is furnished with three notches, whose distance corresponds with the

difference of foci; a tooth snaps into each noten as it arrives; the hand of the observer feels this snap, and the object reappears at the same instant the screw is made fast. Having brought each speculum to its right distance, its perfect position is effected without trouble. The speculum wheel has three pins; against one of these a notch in the bar is urged by a spring, which holds its corresponding speculum perfectly in place, and in addition, moves the wheel and rack a little further than the hand and bar had formerly done. This simple action separates the two hooks, and thereby detaches the apparatus from each speculum whilst it is in use, leaving it at liberty to be governed only by its pin, and the notch in the bar already mentioned; the speculum by these means is held perfectly in its place. A cylindrical cap, as a protection from the weather, is made to slide over the speculums, and affords a dark margin round the pencils of light. This contrivance has been applied to telescopes of eight inches focal length, and six inches aperture. The Gregorian form of telescope is the shortest, and consequently best supported on the stand; and possesses many advantages, as compared with others of equal power; from its large proportionate aperture, it gives a smaller disc to the stars, and does not require a deep eye-piece, but it is desirable to obtain power by deeper and smaller speculums.

Varley and Son also exhibited a portable Gregorian telescope, of two inches aperture, and six inches focus. It was mounted on a brass stand, and admitted of being readily packed away in a small box. When held against a post or tree, the foot and telescope formed a firm triangular bearing. Ross exhibited a telescope of three feet focal length, and two and-a-half inches aperture, of English flint glass, which, examined on test objects at 150 yards, was found to perform well. A council medal was awarded to Mr. Ross for this telescope, in connection with microscopes. Callaghan exhibited a telescope intended for use in deer-stalking. Salmon exhibited several day and night telescopes, intended for ships' use, which were good for their price. Richardson, Boyle, Wray, and others also exhibited a variety of telescopes of different degrees of merit. Buron, of France, exhibited a telescope, the object-glass of which was of rock crystal, four feet two inches in diameter, and six feet three inches in focal length. Attached to the telescope was a finder, which embraced a field of view from 5° to 6° , and had cross wires, which owing to the great illumination of the field, might be seen during the darkest night, and consequently brought the star into the centre of the field. On examining this instrument it was found to be perfect in every respect. It was fixed upon a very steady cast-iron stand, furnished with three small castors, brought into operation by means of rack-work, when necessary to remove the instrument. M. Buron also exhibited another telescope of about the same dimensions, which was found to be good, and also many telescopes of various sizes. Many of the portable ones were tried, and their performance was found to be very good; they were at the same time remarkably cheap. A council medal was awarded to M. Buron. Lebrun also exhibited several good, and remarkably cheap, achromatic telescopes. Kinzelbach, of Wurtemberg, exhibited an achromatic telescope of about two and-a-half inches aperture, and twenty-three and-a-half inches focus, constructed on the dialytic principle, in which the correction of the dispersion of the crown lens was performed by a flint lens of only half the aperture, placed midway between the crown lens and the joint focus; a principle of compensation originating theoretically, we believe, with the late Mr. Rogers, of Leith, and carried into practice with much success by Plössl. This instrument was found to give very perfect images, with no uncorrected colour; this, together with its being the only telescope of the kind exhibited, and the construction deserving of encouragement, induced the jury to consider it worthy of a prize medal. Busch, of Prussia, received honourable mention for a variety of useful telescopes.

From telescopes we naturally turn to orreries, planetariums, and astronomical machines.

It was a matter of regret to the jury that the time and ingenuity which were devoted to the several machines of this class in the Exhibition, had not been better directed. Those exhibited did not indicate any improvement over the many which had been constructed—one only, perhaps, excepted, viz., a vertical orrery of large dimensions, made by a working man, after his own design, and it is understood, without ever having seen an orrery of any kind. The time, ingenuity, and expence, devoted to machines of this kind are wasted; they are of no use to the student of astronomy, and the erroneous impressions which they give are always displeasing to the eye of the astronomer. Facey's vertical orrery, however, is the best adapted for the lecture-room of any that has hitherto been constructed. As it has been already described in a preceding chapter, we shall merely observe that the jury very properly awarded to the inventor a prize medal. Plant also exhibited an orrery which deserves mention. The sun was represented in it by a luminous body, and the seasons, phases of the moon, and other natural occurrences were clearly shown. It would be used to the greatest advantage in a darkened room, when the sun of the orrery would best show the various changes attendant upon the different motions of the several bodies.

Newton and Son exhibited a planetarium for educational purposes, intended to show the diurnal and annual motion of the earth and moon, also the respective position of their satellites. It was exhibited for cheapness. Le Fenve also exhibited a useful orrery for schools; and Masset, of Switzerland, received honourable mention for an extremely useful, simple, and cheap planetarium. Brake exhibited the model of an instrument called a Periphan, which readily showed the time of the sun rising and setting at any place exterior to the frigid zones, and various other phenomena of an analogous nature. Matthews exhibited an astrorama. This was a concave representation of the heavens upon a small umbrella, which opened and closed at pleasure. The material with which it was covered was perforated to show the places of the larger stars. Richards exhibited a "geographical instructor," a piece of mechanism in which the sun (represented by a gilt ball elevated on a wire) was presented vertically, to every point of the earth between the tropics, by a compound movement to and fro, corresponding in extent to the time of the sun's declination at the moment. The law of this movement was given by a train of clock-work, of which one peculiarity was the prolongation of the axis of the globe into a very long pinion, so as to allow the teeth of the driving-wheel to act upon it, however far displaced from a mean position. Another—that of the communication of the rotary motion from the *primum mobile* by a hook-jointed axis—the to-and-fro motion of the pinion prolongation of the axis not allowing the clock-work to be centrically placed in some point in that direction. Detouche and Houdin (France) exhibited a uranographic apparatus (erroneously described in the catalogue as a monographic apparatus); it consisted of a table about six feet in diameter, in the centre of which was a lamp representing the sun. The earth, with the moon attached, was carried round on an arm, by a piece of clock-work, the *primum mobile* of which was not a spring or any internal power, but the roller on which the mechanism rested, and which revolved as the earth was carried round on the table. This, by a train of wheel-work, communicated to the earth its diurnal motion, preserved the parallelism of its axis, and gave to the moon all the movements imitative of real ones. This mechanism was the invention of M. Guénal.

Globes—A. K. Johnston, exhibited a terrestrial globe, thirty inches in diameter; it showed the geological structure of the earth, indicated the currents of the air, trade-winds, monsoons, &c.; also the currents of the ocean, trade routes, and isothermal lines, or lines of equal temperature. The stand, which was executed by N. Davidson, of Edinburgh, was carved in walnut, and was of elaborate and elegant design. A prize

medal was awarded by the jury for this globe. Newton and Son exhibited a large manuscript celestial globe, six feet in diameter. The positions of the stars were laid down from their positions as calculated for the year 1860. A variety of other different-sized globes were also exhibited by Messrs. Newton, which were distinguished by good finish generally, and by cheapness. A prize medal was awarded to them by the jury. Fletcher exhibited a pair of terrestrial globes, which were well made and finished; and one case, showing the various stages of globe-making, which was interesting. Redhouse exhibited a model of the moon in high relief, the craters, mountains, &c., being modelled from actual observation, with a one-foot reflector, power about fifty-five, and the occasional use of a refractor, power ninety, (the use of the latter being procured only at the expense of a journey of thirty-five miles). We were reminded, by the sight of this interesting object, of those beautiful lines in Milton, wherein he describes the "ponderous shield" of the fallen archangel, likening it to

"The moon whose orb
Through optic glass the Tuscan artist views
At evening from the top of Fesolé,
Or in Valdarno, to descry new lands,
Rivers, or mountains in her spotty globe."—*Paradise Lost*, Book I.

The jury, however, although they bestowed their commendation upon this globe, were of opinion that the scale of height had been pitched too high; and that the effect was injured rather than improved by silvering or gilding portions of the surface, the whole being composed of a dark material. Adorno exhibited a globe twenty-five inches in diameter, with the celestial and terrestrial maps super-imposed one upon the other; also a globe of papier-maché, divided into forty-eight pieces, to be taken to pieces and rebuilt at pleasure; and a skeleton globe, to show how to rebuild the globe in its frame. The power of taking the globe to pieces was convenient for package and removal, as well as for the convenient study of any part of it. They were well made. Stoker exhibited an angular terrestrial globe, intended for the solution of geographical problems. It is adapted for use as a common terrestrial globe, by unscrewing the cog-wheel attached to the spindle at the south pole, and substituting the horizon and meridian, the former being screwed in the upright of the stand, the latter being placed upon the globe, the angular motion given to which is designed for the better explanation of the changes of the seasons. Mr. Stoker also exhibited a spherical geographical clock, to show the difference of time between two given places whose longitudes are known, and intended to be of more general use than those ordinarily constructed. Bentley exhibited a plain globe. The northern and southern hemispheres were printed on circular pieces of card-board, each hemisphere moving under a brass meridian, which confined it to its place, and afforded the same facility as an ordinary globe for working problems. Paxon exhibited a lunarium, with a contrivance for showing the phases of the moon. Marratt exhibited a Russell's globe of the moon, mounted as originally sold, with movement in brass, for exhibiting the vibrations, &c., in longitude and latitude. Good exhibited a new method of illustrating the effect of the earth's diurnal motion upon the plane of a pendulum's oscillation. It consisted of one end of a radius arm, fixed in the centre of a globe; the other end being adjustable in a vertical plane, and therefore to any latitude, was made to revolve so that its time of revolution varied as the sine of latitude; the time of the revolution of the globe being its measure. Gilbert exhibited a portable celestial and terrestrial globe, made of tissue-paper, and inflated with air. The celestial globe was adapted chiefly for the use of the lecture-room, and might be made of any convenient size. The terrestrial was twelve feet in circumference, and was inflated either by means of an air-pump, or by simply raising it to and fro from the floor, by which means it might be

effectually filled in a few moments. These globes may be folded into a very small compass.

Kummer, of Prussia, exhibited a terrestrial globe in relief, four feet in diameter. The execution was excellent; not only were the elevations attended to with great care, but also highlands of moderate elevation, and the courses of rivers, received the same degree of attention. A prize medal was voted by the jury to M. Kummer for this globe. Goodyear, of the United States, exhibited inflated globes two feet in diameter, of India-rubber or silk, varnished with the former material—also India-rubber maps. Grosselin (France) exhibited georamas and uranoramas to be used as lamp-shades; also some very good and distinct celestial globes, in which the figures and constellation boundaries were neatly and prettily laid down, so as not to confine the representation of the stars. Ziehermayer (of Austria) exhibited a small terrestrial globe, enclosed in a glass sphere, on which the celestial spheres and stars were traced. By means of mechanism, the places of the sun and moon among the stars were shown. Reidl, of Austria, exhibited a small globe of the moon, about ten inches in diameter; the engraving was of a sepia colour, somewhat faintly tinted, and of a selcno-topographical rather than a pictorial character. Some of the principal names were inserted. It was mounted on a brass pillar, with a horizontal circle, showing lunar longitudes, and a vertical one for latitudes; the lunar axis was vertical.

Relief, or Model Mapping.—Denton exhibited specimens of model or relief mapping, in its various stages, with all the tools necessary for use. The base of the model exhibited was of slate, a material which may be procured of sufficient thickness to bear any weight in a horizontal position, may be ground sufficiently thin for framing, and may also be worked to the smoothest possible surface: thus containing the qualities necessary for the work in question, the use and accuracy of which are dependent upon the material upon which the superstructure is raised. To represent the altitudes depicted in the contour map, a simple mechanical process is adopted; slips or ribbons of thin copper, cut parallel, of different breadths and of any length, are prepared. Each breadth represents a contour, and is proportioned to a certain elevation: after careful measurement with the altitudes which they are intended to represent they are each adjusted and secured in their true position. The model so prepared is ready for covering with plaster of Paris, a substance well suited to give a finished appearance to the work. After the plaster is dry, the whole should be scratched down until the light edge of each copper ribbon peeps to the surface. The model is thus prepared for the reception of the oil colours intended to trace upon it the geographical details of the country. The jury awarded a prize medal to Mr. Denton. Schoell (Switzerland) exhibited a model in relief of Mount Sentis, and the mountainous regions about Appenzell, including a surface of about 150 square miles. It was executed with great spirit and distinctness, and was accompanied by a chart on a smaller scale of the same region (scale 1 to 25,000), containing the data for its construction, consisting of a minutely elaborate series of contour or level lines, which covers the whole area, and is carried into every detail. The merit of the execution was enhanced by the plastic material of the model, as well as the apparatus used in its construction, being of the artist's own invention. This work was considered by the jury to merit a prize medal.

Ibbetson exhibited an exceedingly well-executed relief model of the Isle of Wight, on a scale of three feet to one mile, the elevation being on the same scale. The geographical and geological features of the country were carefully delineated. A prize medal was awarded to captain Ibbetson. We cannot dismiss the subject of model mapping without a few words on its beauty, utility, and agreeableness. How pleasant must it be to retrace among the miniature mountains and valleys our former wanderings, or, if yet "untravelling," to anticipate, with all the freshness of youth, a first exploring of the fairy precincts, so elaborately and so correctly laid down. With such a map before us we

may climb the Jura, dip into the pastoral valleys of Switzerland, and ascend, without fear of disappointment from clouds or tempest, the loftiest summit of Mont Blanc; sail upon the peaceful lakes, and rove among the vineyards of the south; pass over into classic Italy, and wend our way to the Eternal City, without apprehension of extortionate douaniers, fleecing landlords, or ruthless brigands. We may trust ourselves upon the bay of Naples, even in its stormiest mood—for that *pezzo di cielo* is not always exempt from trouble—visit its azure grotto, mount up to Vesuvius, peep into its fearful abyss, and, in our way down, tread over the ruins of Pompeii and Herculaneum, although we enter not the subterranean cities. But we must pause in our career, or our readers may complain of the distance and difficulty of return. One word to those who have extensive libraries:—none of them can be considered as complete without a good assortment of Model or Relief Maps.

CHAPTER XXXIV.

PIPES AND AMBER MANUFACTURES.

TOBACCO—DR. JOHNSON—LORD BYRON—DIFFERENT KINDS OF PIPES—MEERSCHAUM—AMBER—METHOD OF OBTAINING—VARIETIES OF—PIPES—GERMANY—BRITISH COLONIES—PRIMITIVE PIPES OF INDIA—CHINA—FRANCE—TURKEY, &c. &c.—SNUFF-BOXES—POUNCET-BOX—SCOTCH MULL—CUMNOCK BOXES—AUSTRIAN, CHINESE, AND INDIAN BOXES, &c.

“Boy, bring an ounce of Freeman’s best.”

SUCH was the exclamation of Dr. Jonathan Swift, in the days of “good Queen Anne,” when the use of the “Indian weed” was universal in our island, when the poet and the philosopher alike owned its inspiration, and when the elergy, the quorum, and the squirearchy vied with each other in their devotion to the pipe and the bowl. Dr. Johnson, however, observes, that there was less drinking in his time than there was among our ancestors, owing to the change from ale to wine. “I remember,” says he, “when all *decent* people in Lichfield got drunk every night and were not the worse thought of. Smoking has gone out. To be sure, it is a shocking thing, blowing smoke out of our mouths into other people’s mouths, eyes, and noses, and having the same thing done to us. Yet I cannot account, why a thing which requires so little exertion, and yet preserves the mind from total vacuity, should have gone out.” Had the worthy doctor lived to the present time he would have seen the custom very generally renewed among all classes of the people. The poor as well as the rich, the young as well as the old, have adopted the practice of smoking; and although it has been denounced by the hygeist, as well as by the sterner moralist, it is still unchecked among us, “*viresque acquirit eundo.*” Nay, some of our most esteemed poets have been lavish in their praises of the soothing intoxication—witness the testimony of the noble bard, whose muse, we regret to say, is not always on the side of decent propriety; however eloquently he may advocate the habit, to which he himself was so strongly addicted. We quote the well-known lines from his poem of the *Corsair* :—

“But here the herald of the self-same mouth
Came breathing o’er the aromatic south,
Not like a “bed of violets” on the gale,
But such as wafts its cloud o’er grog or ale,
Borne from a short frail pipe, which yet had blown
Its gentle odours over either zone,

And, puff'd where'er winds rise or waters roll,
 Had wafted smoke from Pertsmouth to the Pole,
 Opposed its vapour as the lightning flash'd,
 And reck'd, midst mountain-billows unabash'd,
 To Eolus a constant sacrifice,
 Through every change of all the varying skies.
 And what was he who bore it?—I may err,
 But deem him sailor or philosopher.
 Sublime tobacco! which from east to west
 Cheers the tar's labour or the Turkman's rest;
 Which on the Moslem's ottoman divides
 His hours, and rivals opium and his brides;
 Magnificent in Stamboul, but less grand,
 Though not less lov'd, in Wapping or the Strand;
 Divine in hookas, glorious in a pipe,
 When tipp'd with amber ——."—*Byron.*

Leaving, however, the more serious discussion of this subject to abler pens, let us see what were the appliances and means displayed in the Great Exhibition towards the enjoyment of such recreation as is afforded in the use of the much-esteemed production of tobacco. Of the raw and manufactured article itself there was an abundant supply. Tobacco, cigars, cheroots, and snuffs were sent in great quantities from all parts of the world, and to several of the exhibitors prize medals were awarded. Before we discuss the merits of the pipes contributed from almost every quarter of the globe, we will notice the materials chiefly employed in their manufacture. These are clays of different kinds, woods of several descriptions, mother-of-pearl, horn, ivory, and bone; but the names euphonious to the ear of the genuine smoker are amber and meerschaum. The latter substance is devoted entirely to his use; and the former, though not entirely his own, pays to him a very considerable tribute, in the form of mouth-pieces. The genuine meerschaum was held in high estimation in England, as early as the year 1609; since Dekker appears to refer to it in his *Gull's Horn-book*, when he wishes his gallant to be able to discourse "which pipe has the best bore, and *which burns black*, and which breaks in the burning." Meerschaum is a mineral of somewhat rare occurrence. It consists of magnesia, silica, and water, and may be called a hydrated silicate of magnesia. Its colour when pure is quite white, but it is frequently combined with silicates of iron and alumina, which give it a yellow or brown colour. It is met with in various localities, in Spain, Greece, and Moravia; but by far the largest quantity is derived from Asia Minor, it being chiefly dug in the peninsula of Natolia, near the town of Coniah. Formerly, the material was roughly fashioned on the spot into bowls, which were more elegantly carved in Europe. The art was especially cultivated in Pesth and Vienna, where it formed an extensive and important branch of trade. These rough bowls still occur in commerce; but by far the greater part of the meerschaum is exported in the shape of irregular blocks with obtuse angles and edges, requiring careful manipulation with the aid of water, in order to remove irregularities and faulty portions.

Previous to the mechanical treatment of the meerschaum for making the bowl, it is subjected to a certain preparation. It is soaked in a liquified ungent composed of wax, oil, and fats. The wax and fats which the substance absorbs, cause the colours which meerschaum assumes after smoking. Under the influence of the heat produced by the burning tobacco, the wax and fats pass through all the stages of a true process of dry distillation, the substances thus formed become associated with the products of the distillation of the tobacco, and by their diffusion through the meerschaum, all those gradations of colour which are so highly prized by the connoisseur are produced. The large quantity of meerschaum parings that are left in roughing out the bowls would

entail considerable loss, unless some process had been devised of rendering them available. A species of meerschaum bowl has long been known in commerce under the name of *Massakopfe*, which is made from the parings; these are triturated to a fine powder, boiled in water, and moulded into blocks, with or without the addition of clay. Several specimens of composition pipe-bowls and cigar-tubes were exhibited in the Austrian section. These bowls are distinguished from real meerschaum by their greater specific gravity, and their freedom from those little blemishes which result from the presence of foreign bodies in the natural meerschaum.

Amber.—The most extensive use of this elegant material is for the manufacture of the mouth-piece, an essential constituent of the genuine meerschaum and Turkish pipe. Up to the present day, amber mouth-pieces continue in great request in the East, where they fetch very high prices, instances of which will be quoted. There is a current belief in Turkey that amber is incapable of transmitting infection, and as it is a great mark of politeness to offer the pipe to a stranger, this supposed negative property of the amber accounts, in some measure, for the estimation in which it is held. In the Christian countries of Europe, ivory, bone, and horn, have, to some extent, usurped the place of the more costly material, which is reserved for the higher class of pipes. Amber is also much employed in numerous small fancy articles, especially for beads, broaches, necklaces, and ear-rings. The Exhibition furnished also examples of its being worked occasionally into candlesticks, salvers, pipe-tubes, and other larger articles. The coarser descriptions and chips of amber are also employed for the manufacture of varnish, and the preparation of amber-oil and succinic acid, which it yields by distillation at a moderate temperature.

The mode of obtaining amber is peculiarly interesting. The greater part is found on the coast of Prussia Proper, especially between Königsburg and Dantzic; it is distinguished as terrestrial and marine amber; the former is dug in mines, and is generally found in alluvial deposits of sand and clay, associated with fossil wood, iron pyrites, and alum shale. Amber is also found in some other countries, but never to any amount. The marine amber is cast ashore during the autumnal storms on the coast of Pomerania and Prussia Proper. It is then picked up, or fished for with small nets. There were several fine specimens of both descriptions of amber in the Austrian section and in the Prussian section. The opinions respecting the origin of amber are very divided; some hold the view expressed by Tacitus, in his *Germania*, that it is a resin exuded by certain coniferæ, traces of which are frequently observed among the amber. Others assume it to be a species of wax or fat, having undergone a slow process of putrefaction; and they base their views upon the fact, that chemists are able to convert cerous or fatty substances into succinic acid by inducing oxidation artificially. It is quite certain that at one time amber must have been liquid, for numerous small animals are found enclosed within it; these, for the most part, are insects belonging to an extinct species of *Arachnida*. There were numerous and excellent specimens of amber enclosing insects in the Prussian section, and others in a case, which obtained favourable mention, from D. T. Tessler, who sent a specimen containing the leg of a toad. Our readers may probably remember the lines of Pope on this subject:—

“ Pretty, in amber to observe the forms
Of beetles, butterflies, or grubs, or worms;
The things we know are neither rich nor rare,
But wonder how the devil they got there.”

The process which nature thus employs for the preservation of the structure of extinct insects, is one which the microscopist successfully imitates by embalming his delicate dissections in Canada balsam between two slips of glass.

There is evidence of the extreme antiquity of amber in the fact, that the Phœnicians of old fetched it from Prussia. Since that period it has been obtained there uninterruptedly, and no diminution in the quantity annually collected has been perceived. The different kinds of amber are distinguished by varieties of colour and degrees of transparency. It is found of all shades of yellow, from the palest primrose to the deepest orange, or even brown. In point of clearness, amber varies from vitreous transparency to perfect opacity, specimens being obtained nearly as white as ivory. It is, however, rarely found in this state, and is chiefly used for cameo ornaments, and is mounted on darker amber, which forms the back ground. Several examples of its employment were exhibited in the Prussian section. Of the different varieties of amber, the straw-yellow, slightly cloudy, translucent specimen is the most rare, and is preferred by the orientals to all others, and is purchased by them at extravagant prices. There were but few specimens of it in the Exhibition. Amber, as is well known, possesses the property of attracting, when rubbed, light substances, such as straws, which was the first electric phenomenon ever observed. Having made these general observations on the character of amber, let us examine what was presented to us in the Great Exhibition under the heads of Pipes and Amber Manufactures.

GERMANY.

“No one will be surprised,” it was observed, in the Reports of the Jury, “that this land of smokers bore off the palm in the manufacture of pipes and amber; nor that her exhibitors outnumbered those of all other nations collectively.” We have ourselves observed, wherever the German language is spoken, the use of the pipe to be universal; all of every rank and age indulge in the dreamy luxury—every roof is redolent of smoke; at all hours, and in all situations the pipe is available. “From morn to noon, from noon to dewy eve,” the practice continues; the clerk over his ledger—the artist beside his easel—the student and the listless lounge—the prince and the noble, alike participate in the soothing intoxication; even the labourer in the field cannot plough, or sow, or reap without the pipe depending from his lips; while the soldier and the sailor claim a double allowance of the infatuating weed, and chew as well as smoke. *Mais revenons a nos moutons.* All the states of Germany, however, did not contribute equally, the pipes being chiefly from Austria, and especially from Vienna, and the amber manufactures from Prussia. The meerschaum works of the Viennese were unrivalled, as regarded taste in design and excellence in execution; the carving of many of the pipe-bowls and cigar-tubes being examples of highly-cultivated art. Most of the fancy pipe-tubes, composed of horn and mother-of-pearl, were more curious than graceful; the cherry-tree tubes were in great variety, and were good examples of this component of the long pipe; besides these, there were large numbers of bone and wood mouth-pieces, and others made of amber, the latter being beautifully worked. The meerschaum-pipes from Prussia were not numerous, nor were they so elaborate as those of Austria. The Prussian section presented such a series of amber specimens which are not likely to be again collected; the manufactured amber did not, however, evince much feeling for artistic design on the part of the exhibitors, whose merits rested principally on the excellence and dilliculties of the workmanship. The contributions from the other parts of Germany consisted of meerschaum and other pipes from *Bavaria*, which were not remarkable; porcelain pipes from *Hamburg*, and clay pipes from *Nassau*. Those from Hamburg were of fancy forms, and those from Nassau were chiefly plain, which were sold at exceedingly low prices.

BRITISH COLONIES.

British Guiana.—T. G. Duggin sent a specimen of a pipe, or rather tube, used by the aborigines for smoking tobacco, called a *winna*; it resembled a cheroot in outward appearance, but was hollow, so as to contain the tobacco. It is said to be made from the rind of the fruit of the manicole-palm, from the river Berbice. It may be remarked that such tubes, made of paper covered with the leaf of tobacco, are now manufactured in England. *Canada* contributed a collection of well-made clay-pipes. The *Indian* collection contained examples of the costly and beautifully-ornamented cocoa-nut and lac Hookahs, mounted in silver, with their rich tubes or snakes, and the simple pipe composed of two pieces of bamboo, one for the bowl, cut close to a knot, and a smaller one for the tube. These primitive pipes are in common use amongst the poorer natives of India, and yet Dr. Royle cites an extemporary pipe sometimes used by the natives, which surpasses even this in simplicity; the amateur makes two holes, one longer than the other, with a piece of stick in a clay soil, inclining the stick so that they may meet; into the shorter hole he places the tobacco, and applies his mouth to the other, and thus luxuriates in the fumes of the narcotic herb. There was, likewise, a specimen of the Singoo opium-pipe, which is of very small dimensions, the tube not being larger than a thimble. The opium is placed in the bowl, and ignited by placing a piece of charcoal on it, which is effected with a small pair of tweezers, which found a place in the interesting and well-arranged collection.

CHINA.

The habit of smoking is very general in China, being common to both sexes in all classes of society, and at all ages. In every part of this vast empire the tobacco plant is cultivated, and consumed both as snuff and for smoking. So prevalent is the habit, that little girls and boys are commonly seen smoking, and from this early period, it is persevered in by its votaries through life. It is always customary to offer visitors a cup of tea and a pipe. M. Natalis Rondot estimates the number of smokers in China as at least one hundred millions, and states that pipes are made in enormous numbers, and in an almost infinite variety of forms; they were of three classes, the water-pipe, the straight-pipe, and the opium-pipe. These Chinese pipes are generally very long, and the bowl very small, it being usually made of nickel-copper. The only contribution, however, was from Dr. Berncastle, who sent an opium-pipe and appurtenances.

FRANCE.

The examples consisted of clay-pipes only, from two exhibitors; they were very numerous, and exceedingly well manufactured, but their forms were not such as to sustain that high reputation for graceful design which this country enjoys. This is to be attributed to the class of persons for whom the pipes were intended, and who prefer a pipe-bowl moulded into the form of some grotesque head, with staring eyes, to the most elegant figures which could be devised. Very large quantities of these pipes are exported to England, Germany, Italy, the United States, and other countries, and are much esteemed on account of the very excellent quality of the earthenware of which they are formed. Their superior texture, it appears, is due in some measure to the clay of which they are chiefly composed, but principally to the great skill of the manufacturers in compounding it with other materials. To give some idea of the extent of the pipe-manufacture at St. Omer, it may be stated that one of the exhibiting manufactories—that of Dumeril, Sons and Co., employs 450 work-people, and produces annually 100,000 gross, or nearly fifteen million pipes, varying in price from one penny per

dozen to threepence each; and that the other—that of L. Fiolet, employs 850 work-people, and produces 200,000 gross, or nearly thirty millions of pipes, consuming 7,874 tons of clay in their manufacture.

In the Turkish collection were numerous rich examples of the *Narguilé*, or water-pipe, in some cases composed of silver, and ornamented with precious stones; the flexible tube, or *Marpitch*, used with the *Narguilé*, is formed with a spiral wire covered with leather, over which another wire is coiled, so as to fall between the interstices of the inner spiral. The Turks, in smoking the *Narguilé*, inhale the fumes into the lungs, and never consume the last portions of tobacco, as the smoke becomes too pungent. There were numerous examples of the long-pipe, or *Kablioum*, and the short-pipe, or *Chiboque*, with the cherry-tree, jasmine, wild-plum, and ebony tubes; and likewise the crude gimblets, with which these tubes, five feet or more in length, are bored. In boring the tube, the Turk places it above the gimblet, and thus gets quit of the chips; after boring the hole half-way, he meets it from the other end of the stick. The wild cherry-tree, which is principally used, seldom occurs free from defects in the bark, to repair which, so that the reparation cannot be discovered, is the chief difficulty. There were examples of *Lules*, or pipe-bowls, used with these tubes—they are composed of the red-clay of Nish, mixed with the white earth of Rousthouek. They were very graceful in form, and were in some cases ornamented with gilding, but as the Turk prefers a fresh bowl each time, the plain ones are chiefly employed on the score of economy. It is not unusual in Turkey to compute distances, or rather the duration of a journey, by the number of pipes which might be smoked in the time necessary to accomplish it. The *Imanes*, or amber mouth-pieces, exhibited in the Turkish section, surpass those of any other in splendour. One exhibitor sent four of choice amber, which were worth together, £1,000; besides these, there were three groups from distinct exhibitors; in the case of one was noticed an amber cigar-tube, which is one of numerous instances of the innovations upon Turkish customs by the introduction of European ideas.

There were also specimens of pipes exhibited from Egypt, Persia, Sardinia, Tunis, Tuscany, and the United Kingdom, many of which were deserving of commendation. The number of exhibitors of pipes and amber was forty-nine, of whom ten were holders of a prize medal, and eighteen obtained honourable mention.

Snuff-boxes.—From the tobacco-pipe to the snuff-box, the transition is easy. “The word ‘snuff,’” says the *Jury Reports*, from which we extract these remarks, “is an inflexion of the old northern verb ‘sniff’; and it existed as a term of strong inhalation through the nostrils, or of angry impatience, long before the invention of the substance to which it now gives a name. Out of the latter signification, was the colloquial expression of the sixteenth and seventeenth centuries, to ‘snuff pepper,’ or to take ‘in snuff.’ It will be remembered that this last phrase occurs in Shakspeare’s *Henry IV.*, in immediate connection with a small box containing perfume, as displayed by the courtier who enraged Hotspur:—

‘He was perfumed like a milliner;
And, ’twixt his finger and his thumb, he held
A pounce-box, which ever and anon
He gave his nose, and took’t away again;
Who, therewith angry, when it next came there
Took it in snuff.’

From the pounce-box the perfumes, whether moist or dry, were inhaled into the nostrils; but it was probably not until a century after the general encouragement of tobacco in England, that the finely-granulated leaf became commonly established as a pungent perfume, and at length introduced the costly and elegant snuff-box.”

So early, however, as the beginning of the reign of James I., a "taker of tobacco," was to be furnished with an apparatus greatly resembling that of a modern Scotch mull, when supplied with all its accustomed instruments, like the ram's-head boxes mounted in gilt silver, and displayed in several parts of the Great Exhibition. "Before the meat came smoking to the board," says Dckker, in his *Gull's Horn-book*, in 1609, "our gallant must draw out his tobacco-box, *the ladle for the cold snuff into the nostrils*, the tongs and priming-iron, all which artillery may be of gold and silver, if he can reach the price of it." Both the practice and apparatus of taking snuff are described by Howell, in 1646, as quite common in other countries; since he says, "The Spaniards and Irish take tobacco most in powder or smutchin, and it mightily refreshes the brain; and I believe there's as much taken this way in Ireland as there is in pipes in England. One shall commonly see the serving-maid upon the washing-block, and the swain upon the ploughshare, when they are tired with their labour, take out their boxes of smutchin, and draw it into their nostrils with a quill; and it will beget new spirits in them, with a fresh vigour to fall to their work again." The word erroneously printed "smutchin" by Howell, is accurately *sneeshin*, a vulgar name for snuff, which causes sneezing: and hence "sneeshing-mill" (sometimes corrupted into *mull*), is the Scottish name for snuff-box. Down to the middle of the eighteenth century, the "sneeshin-horn," with the spoon and hare's foot attached to it by chains, appears to have been regarded as so completely a national characteristic, that when Baddeley played Gibby in *The Wonder*, with Garrick and Mrs. Barry, he came on the stage with such an apparatus.

In the early part of the eighteenth century, in England, fashionable snuff-boxes had probably reached the highest degree of variety and luxury. In the *Tatler*, published on Tuesday, March 7th, 1710, several gold snuff-boxes are noticed, which came out last term; but that a new edition would be put out on Saturday next, which would be the only one in fashion until after Easter. "The gentleman," continues the notice, "that gave fifty pounds for the box set with diamonds, may show it till that time, provided he goes to church, but not after that time, there being one to be published on Monday, which will cost four score guineas." These costly articles so happily satirized by Steele, are represented as the productions of a fashionable toy-man, named Charles Mather, popularly known under the name of the "Bubble Boy."

The *Scotch snuff-box*, which has long been renowned for the perfection of its hinge and the close fitting of the cover, is cut out of solid wood, the description chiefly employed being the sycamore or plane-tree. Mr. W. Chambers states that this is the timber used at Old Cumnoek; and that a piece of rough wood which costs twenty-five shillings, will make snuff-boxes to the value of £3,000. In the manufactory of the Messrs. Smith, of Mauchline, which is one of the largest, about eighty artisans are employed, who have been instructed in the works. The workmen earn from sixteen to twenty-four shillings per week, according to their skill and the department in which they are engaged; and the women from seven to nine shillings per week. An artist capable of making a copy of an oil-painting, earns thirty shillings per week. There were two exhibitors of snuff-boxes in the Austrian section, one of whom, P. Bigaglia, contributed some beautiful specimens, composed of a sparkling glass, called artificial aventurine, which is a silicate of oxide of copper. The reduced copper exists in the form of minute crystals, which, under the microscope, present a most splendid appearance. The other exhibitor sent examples of papier-maché snuff-boxes, remarkable for their cheapness. In the Chinese court there was a beautifully-carved snuff-box, sculptured out of English cannel-coal, which was taken to China for that purpose by the exhibitor, Captain Shea. The carving, which, it appears, occupied the Chinese artist a fortnight, cost the exhibitor only £2 sterling.

The *Indian* courts contained several examples of snuff-boxes, the most curious being—the gourd snuff-boxes, mounted in gold and silver, from Scinde; a snuff-box made from a cocoa-nut, highly polished; another from the bilva fruit; and a beautiful specimen made from buffalo-horn, inlaid with metal. *St. Helena* contributed snuff-boxes made from the willow-tree under which the remains of the great Napoleon reposed until their removal to France, and also from a willow-tree which he planted behind the library at Longwood. From *Van Diemen's Land*, J. Milligen exhibited several specimens, interesting from the variety of the materials from which they were made; comprising a globular snuff-box turned out of the tooth of the sperm-whale, which is employed in the colony for stick-heads and similar purposes; a turned snuff-box of iron-wood; one of the Huron pine; and one of the musk-wood of Tasmania. The beautiful examples of snuff-boxes in the French department were as peculiar in their style as the Laurence-kirk snuff-boxes in theirs, and the manufacture of them appears to be confined to France if not to Paris. These boxes, which were quite remarkable for the accuracy with which the hinge was made, and the close fittings of the lid, were usually lined with a veneer of tortoiseshell, very highly polished. The outside, or body of the box, was composed of various materials, as ivory, tortoiseshell, and rhinoceros-horn, and also of petrified wood and other woods, as the maple, the olive, rosewood, and several sorts of palms cut across the grain. Some examples were very tastefully, *not showily*, ornamented with neat gold and silver mounts; but none, perhaps, were more elegant than those made of the palm-tree, cut across the grain.

We will not, however, pursue our investigations any further upon this subject. If our readers consider we have already dwelt too long upon it, we shall take shelter under the great names that are to be found among those who have patronised the snuff-box. What illustrious personages might we not cite. The shade of the great Napoleon rises before us; and——but a more familiar example will suffice. Of Sir Joshua Reynolds it is recorded by Goldsmith, that—

“When they talk'd of their Raphael's, Correggio's and stuff
He shifted his trumpet—and only took snuff.”

CHAPTER XXXV.

SILKS.

FIRST MENTIONED BY ARISTOTLE—ALLUDED TO IN THE NEW TESTAMENT—DESCRIBED BY BASIL
—GALEN—ABUNDANT IN CHINA—ITS INTRODUCTION INTO EUROPE—MODE OF PREPARATION—
DIFFERENT VARIETIES OF—OPINION OF THE JURY ON FRENCH, ITALIAN, TURKISH, INDIAN,
CHINESE, AND ENGLISH SILK — SILK MANUFACTURES — SPITALFIELDS — MANCHESTER—
COVENTRY—RIBBONS—SHAWLS.

HAVING in a former part of this work devoted a chapter to textile materials—worsted, alpaca, and mohair; we shall now turn our attention to the costlier production of the

“————— Millions of spinning worms
That in their green shops weave the smooth hair'd-silk,”

and premise our observations with the following able historical account by Professor Owen in his admirable lecture on the “raw materials” from the animal kingdom.

“From a product of the most gigantic of animals,” says the learned lecturer, “I next

proceed to notice one derived from a seemingly insignificant insect; yet it is the most costly of all raw materials for textile purposes,—I allude to silk. The most valuable kind of silk, and that which is the subject of the most extensive and pains-taking culture, is the secretion of the larva of a species of moth, indigenous to China, called, *par excellence*, the ‘silk-moth,’ and by entomologists *Bombyx mori*, from its native and favourite food, the leaves of the mulberry-tree. Raw silk was imported into Europe long before first the insect which produces it; but the antiquity of this raw material for the richest of our textile fabrics, by no means goes so far back as that of wool. There is no certain reference to silk in any part of the Old Testament; the Hebrew word so rendered by King James’s translators (Ezekiel, xvi., 10, 13) may signify “fine flax;” and the learned Braunius concludes that silk was unknown to the Hebrews. The first definite mention of silk, with a notice of the creature producing it, is in the fifth book of the *Historia Animalium* of Aristotle. He indicates the island of Cos as the place where silk was woven into cloth: and he mentions (cap. xix., p. 850, Duval) four states of the insect which produces silk, under the terms *skolex*, *kampe*, *bombulios*, and *nekudalos*; and these terms were understood by ancient writers after Aristotle, and no doubt correctly, to signify the states which modern entomologists would call the ‘young larva,’ the mature or ‘spinning larva,’ the ‘pupa,’ with its cocoon, and the ‘imago,’ or perfect insect. In the New Testament, the use of silk is mentioned once unmistakably (Revelation, xviii. 12). The beautiful illustration of the Christian doctrine of the resurrection, which Basil, in the year of our Lord 370, drew from insect-metamorphoses, shows plainly that he had obtained his facts by a perusal of the famous zoological treatise of Aristotle:—‘What have you to say, who disbelieve the assertion of the Apostle Paul concerning the change at the resurrection, when you see many of the inhabitants of the air changing their forms? Consider, for example, the account of the horned worm of India, which, having first changed into a caterpillar (*eruca* or *veruca*), then in process of time becomes a cocoon (*bombylius* or *bombulio*), and does not continue even in this form, but assumes light and expanding wings. Ye women, who sit winding upon bobbins the produce of these animals—namely, the threads which these Seres send to you for the manufacture of fine garments—bear in mind the change of form in this creature, derive from it a clear conception of the resurrection, and discredit not that transformation which Paul announces to us all.’ Galen judiciously recommends silk threads for tying blood-vessels in surgical operations. The Roman poets and satirists made frequent mention of the luxurious silken clothes and attire, which were introduced at an enormous expense during the period of the empire. The silk so obtained was exported from Persia and India; but whether the *Bombyx mori* had been introduced into those countries at that period, or whether the raw material was obtained from China, is uncertain. That silk was most abundant in China we learn from the oldest records of the singular people inhabiting that country, where, from an early period, not only the mandarins, but all persons in easy circumstances, as well male as female, have worn silk, satin, or damask clothes. Even the uniforms of the soldiers were made then, as now, of this elsewhere considered so valuable material. Of the wild original of the *Bombyx mori* there is the same incertitude as with regard to most domesticated animals. The description which is given by M. Bertin in his work entitled *China, its Costumes, Arts, and Manufactures*, seems to refer, as M. Latreille remarks, to the large *Phalœna atlas*. The wild silk-worm is there said to curve a leaf into a kind of cup, and then to form a cocoon as large and nearly as hard as a hen’s egg. These wild cocoons are so strong and so compact, that the insects have great difficulty in extricating themselves, and therefore remain enclosed from the end of the summer to the spring of the following year. These moths fly well. The domestic silk-moth, on the contrary, soon extricates itself, and has very feeble powers of flight. The wild silk-moth feeds

indifferently on the ash, oak, and nagara; the *Bombyx mori*, as its name implies, feeds by choice, if not exclusively, on the leaves of the mulberry-tree.

"I have now to speak of the introduction of the silk-worm into Europe. According to Procopius, the *Bombyx mori* was first introduced into Europe in the reign of the Emperor Justinian, by two Nestorian monks who had travelled in Serinda,—which, whether it be India or China is uncertain,—and who succeeded in bringing a quantity of eggs,—secured (according to Photius) in a hollow cane,—to Constantinople, where they were hatched, and the larva fed and reared on the leaves of the black mulberry. The breeding of silk-worms in Europe was confined for six centuries to the Greeks of the Lower Empire. In the twelfth century, the rearing of silk-worms and the manufacture of silk were introduced by Roger, king of Sicily, into Palermo, whence this important branch of industry was rapidly and successfully established in Italy, Spain, France, England, and subsequently in most of our colonies possessing a suitable climate. Silk is a secretion of a pair of long glandular tubes, called 'sericteria,' which terminates in a prominent pore or spinnaret on the under-lip. Before their termination they receive the secretion of a smaller gland, which serves to glue together the two fine filaments from the two 'sericteria;' the apparently single thread being, in reality, double, and its quality being effected by the equality, or otherwise, of the secreting power of the 'sericteria.' The silk-worm commences spinning when it is full-grown, in some convenient spot affording points of attachment for the first-formed thread, which is drawn from one part to the other until the body of the larva becomes loosely enclosed by the thread. The work is then continued from one thread to another, the silk-worm moving its head and spinning in a zigzag way, in all directions within reach, and shifting the body only to cover the part which was beneath it. The silken case so formed is called the 'cocoon.' During the period of spinning the cocoon, which usually takes five days for its completion, the silk-worm decreases in size and length considerably; then casts its skin, becomes torpid, and assumes the form of the chrysalis. The main object of the silk-worm breeder is to obtain cocoons of a large size, composed of a long, strong, very fine, even, and lustrous thread. These properties of the silk were found realised in the highest degree in the specimens transmitted from France, in which country the development of the silk-worm has for a long period exercised the care and pains of many able silk-worm breeders, and of late years has been the object of systematic advancement by the Central Society of Sericulture of France. Much skill is exercised—I wish I could add without cruelty—in the art of killing the pupa and extracting it from the cocoon, and in preparing the latter for unwinding the delicate thread; heat being the agent of destruction in most of the processes, as it seems to have been in the remotest historic times in China. The method there employed, according to the old French missionaries in China, is as follows:—'The extremities of the cocoon are first cut off with a pair of scissors; they are then put in a canvas bag and immersed for an hour or more in a kettle of boiling lye, which dissolves the gum. When this is effected, they are taken from the kettle, are pressed to expel the lye, and are left till the next morning to dry. Whilst they are still moist the chrysalis is extracted from each cocoon, which is then turned inside out to make a sort of cowl. They are then easily wound into thread.

"An accomplished author, who has celebrated the Great Exhibition in a work full of apt and striking allusions, beautifully apostrophises the 'wondrous worm, self-shrouded in thy silken tomb! Anon to emerge in brighter form, on higher life intent; but that stern man thy mystic transformation intercepts, with fatal fires, consuming tenant for the sepulchre.' The results of all the most approved modes of rearing the silk-worm and preparing the cocoons were exhibited, and might be studied with advantage, in the Crystal Palace. The *Bombyx mori*, having been bred and reared under the special care and

management of man during a long succession of ages, may be regarded as a domesticated species of insect; and it has become the subject, as in the higher domesticated races, of varieties, of which those called 'Sina,' 'Syrie,' and 'Novi,' in France, are examples. The 'Sina' variety of the silk-worm is known and esteemed for the pure whiteness of its silk, the thread of which is fine, but weak, and not very lustrous. The 'Syrie' variety is of large size, produces a cocoon abundant in silk, but the thread is rather coarse, and inclines to a greenish tint. The 'Novi' race is small, but the cocoons are firm and well made, and the silk has a yellowish tint. The specimens of cocoons and raw silk exhibited in the French department were numerous, and the degrees of excellence hardly to be discriminated in the finest examples selected for the award of the prize medal. With regard to the superior quality of these raw silks and cocoons, the jury, by their recommendation of the award of the Council medal to the 'Central Society of Sericulture of France,' desired to testify their admiration of the specimens exhibited by many members of that society, and their appreciation of the important influence which it has exercised in the improvement of this beautiful and valuable product of the animal kingdom. The jury, however, justly gave the honour of their first notice to the beautiful specimens shown by Major Count de Bronno Bronski, exhibitor of unbleached silk and silk cocoons from the Château de St. Selves, near Bordeaux, in the department de la Gironde. The cocoons were remarkable for their large size and regularity of form, and the silk for the unusual length of the thread, its natural pure white colour, its fineness, and lustre. The circumstances under which this superior quality of silk was obtained are certified in a report by a committee of the Agricultural Society of the Gironde, dated 28th April, 1847, to be as follows:—'In 1836 Major Bronski reared separately the eggs of the three varieties, 'Sina,' 'Syrie,' and 'Novi.' In 1837 he set apart the cocoons of the varieties 'Syrie' and 'Novi;' and on the exclusion of the *imago*, or perfect insect, he associated the males of the 'Novi' with the females of the 'Syrie;' and the hybrid ova were hatched at the ordinary period in 1838, the operations being repeated in 1839 and 1840. With regard to the race 'Sina,' M. Bronski, in 1837, separated the white from the black worms as soon as they were hatched. He then selected the largest and best shaped cocoons, and made a special collection of the eggs from the moths excluded from those cocoons. This procedure was repeated in 1838 and 1839; but in 1840 he associated the males excluded from the large cocoons of the black worms with the females excluded from those of the white worms. In 1841 he associated the males of the 'Sina' race with the hybrid females obtained from the above-described crossings of 'Novi' and 'Syrie' breeds. By these and similar experiments M. Bronski at length appears to have succeeded in obtaining a race of silk-worms not subject to disease, producing large and equal-sized cocoons of a pure white colour, the silk of which was equal in all its length, strong, and lustrous, and presenting an average length of thread of 1,057 metres.

"Very beautiful examples of raw silk were also transmitted from different parts of Italy; and amongst the Italian silks the first mention was due to those exhibited in Tuscany, which showed well all the desirable qualities of the cocoons and thread. From these the jury selected for the award of the prize medal the specimens of raw silk from silk-worms, fed upon leaves of the Philippine mulberry, exhibited by Professor Savi, of Pisa. In the department of Sardinia, the jury selected as deserving, for their excellent qualities, the prize medal, the silks exhibited by Messrs. H. Jacquet and Co., Messrs. Casissa and Sons, and Messrs. Rignon and Co. Many of the silks exhibited in the department of Turkey were of a very fine character, exhibiting a good length of thread, with the qualities of fineness, strength, elasticity, and lustre. The jury had great pleasure in awarding the prize medal to the School of Sericulture at Broussa, as well as to some private exhibitors from Turkey. Very fine examples of silk were shown in the Indian

department, from which the jury selected, as meriting the prize medal, the following: D. Jardine, of Calcutta; Watson, of Surdah, Bengal; Mackenzie Brothers, of Bengal; Jennings, of Commercally; W. M'Nair, of Surdah, Bengal. Besides the silk from the ordinary silk-worm (*Bombyx mori*), called in India *pat*, specimens of stronger and coarser kinds of silk were shown, from the *tussur*-moth (*Saturnia mylitta*), which feeds on the leaves of the *terminalia catappa* and *zizyphus jujuba*. The cloth woven from this silk is called '*tussur-cloth*,' and is made at Midnapore. The *moonga* silk is from the *Bombyx saturnia*, which feeds upon the same trees as the *tussur*. A piece of *moonga*-silk cloth, made in Assam, was exhibited. The *Phalena cythia* produces the *eri* silk. This species feeds upon the *ricinus communis*. The *eri* cloth is also woven at Assam. It is observed in India, that the *pat*, or true silk, from larvae of the *Bombyx mori*, fed on mulberry-trees grown in a strong clay soil, is generally better, the cocoons being larger and of better colour. "In the Chinese department the quality of the silk developed in the native country of the silk-worm was worthily illustrated by the specimens exhibited by Yun-kee, of Shang-hae; to whom the jury, therefore, adjudged the prize medal. I must not quit the subject of silk without, finally, offering a tribute of praise to specimens of silk, from silk-worms reared on leaves of the white mulberry, at Godalming, Surrey, and exhibited by Mrs. Catherine Dodge, which, considering the unfavourable conditions of climate, showed qualities that deservedly elicited the award of honourable mention from our jury."

SILK MANUFACTURES.

There were few departments of the Exhibition which were examined with more interest than that of the silk manufacture, since it was one of those in which the well-known reputation and long-tried skill of our French neighbours promised to subject us to the severest test. Many well-meaning and intelligent people believed that, as regards our silk trade, if in no other department of manufacture, the Exhibition would have had a fatal tendency; since it would inevitably have shown us the poverty of our own productions, especially in an artistic point of view. Spitalfields was lukewarm, if not positively hostile. Macclesfield could not see its way until the eleventh hour; and it was only the fear of being absent, and thus suffering judgment to go by default, that led to any movement in either of these localities. Manchester and Coventry had some hopes that there might be points in which they might excel, and consequently set about the work with more spirit and determination, and the fullest possible intention of winning if they could, but, if beaten, that it should not be for want of a trial. Without claiming for our silk manufactures any super-excellence either of taste or judgment, it is not too much to say that there are points in which they certainly stand pre-eminent; and when the question of quality is discussed, no one need fear the results. Of late years there has been a constant tendency to avoid the production of decorated silks, and to pay more and more attention to those of a plain character. This has arisen since the period at which the restrictive duties were taken off French silks; and the manufacturer, who formerly depended upon his clandestine means for obtaining patterns of these foreign productions, and using them as designs for his own trade, was compelled to forego his piracies, and depend upon some original source. Now, unfortunately, he had altogether neglected the cultivation of the taste and talent around him; and in his hour of need the slender artistic means which he had been compelled to provide for the purpose of copying, failed him as a source of that originality by which alone he could hope to stand.

The disquietude, therefore, of the silk manufacturers of this country, and more particularly of Spitalfields, is to be accounted for in the fact that they were totally unprepared for such a competition as that in which they were called upon to take part; and having been so long used to depend upon others rather than upon themselves, they were certainly

not in the best possible condition to exert themselves with any effect. The display actually produced, however, only served to prove how much more might have been done had this habit of self-reliance been cultivated a little earlier, and the innovations of taste been regarded rather as a means whereby an extension could be given to trade, than as ruinous to certain exclusive interests which were never, after all, really benefited by the so-called protection afforded by antique restrictions. The examples of British silk manufacture occupied the gallery immediately at the head of the first staircase on the south side. The Spitalfields, or metropolitan silks, and the Coventry ribbons, were displayed in glass cases next the nave, and the Macclesfield and Manchester productions in a parallel line on the other side of the staircase. Nearly every class of silk goods was represented, and manufacturers, wholesale and retail dealers, were, strangely enough, found in competition, or at least in comparison, with each other. Messrs. Campbell, Harrison, and Lloyd, of Friday-street, City, exhibited some excellent specimens of figured moiré antique damask, rich brocades, and velvets. Stone and Kemp, Spital-square, a rich assortment of plain and fancy silks. Isaac Boyd, some admirable specimens of silk furniture damasks; and other houses kept up the reputation of Spitalfields for parasol silks, gros-de-Naples, satins, and velvets. Two specimens exhibited by the Spitalfields' School of Design, as the production of pupils of that institution, were practical illustrations of its utility when properly directed. The crowning representation, however, of Spitalfields, was the silk trophy, set up by Messrs. Keith, in the central avenue. This richly-clothed and decorated object formed a decided feature of the Exhibition, and consisted of a parallelogram of mirrors, with a wing at each of the angles, on which were draped the richest furniture damasks, in well-selected and effective colourings. The structure was divided into three tiers, and rose to the height of forty feet, above which were placed the flags and banner. The lower tier displayed the broad silks of the largest patterns; and, at certain angles, these were reflected in the mirrors, whilst selections of silks were arranged upon a plinth which supported the whole, an ornamental *fascia* completing the first compartment. From this rose the second tier, in which, however, too many silks were crowded, and the effect was impaired in consequence. Great credit is due to Messrs. Keith and Co. for the spirit and energy they displayed in taking up this costly illustration of their trade single-handed; and the examples of silk of which it was formed were, with a few exceptions, equally creditable to their skill and taste as manufacturers. Messrs. James Houldsworth and Co. were the exhibitors of silk from Manchester. Their specimens were all of a very high character. The large silk banner which occupied the centre of their compartment was executed specially for the Exhibition, and was composed of silk grown and manufactured in England. It was intended as a memorial of the late Mrs. Whitby, of Newlands, Southampton, who devoted so large a portion of her time and fortune to the promotion of the growth of silk in England, and was manufactured by Messrs. Houldsworth for her friend, Mrs. Wist. The embroideries by machinery, for which Messrs. James Houldsworth and Co. have been so long noted, were here displayed in all their accuracy of "repeat" and brilliancy of effect. Indeed, in all departments of the manufacture, this house sustained its reputation in a most satisfactory manner, the arrangements of the display being at once tasteful and effective. Messrs. Whitworth and Proctor's specimens, of a totally different class, were very admirable. Messrs. Harrop, Taylor, and Pearson's goods, which filled a glass case of similar design to that of Messrs. Whitworth and Proctor, thus balancing the arrangement on each side of Messrs. Houldsworth, were of a class for which Manchester is noted—plain silk goods, of excellent quality, at a comparatively low price; and it was as specimens of this class only that they were exhibited. At the back of the Manchester specimens, a miscellaneous collection of examples in silk and silk manufac-

tures was placed. In the centre, and occupying the largest portion, were some very excellent examples of furniture damasks, manufactured and exhibited by Mr. W. Grosvenor, of Kidderminster. The other exhibitors comprised those from Leek and Derby; and an interesting case of illustrations of the growth and process of silk manufacture, from the eggs of the silkworm to the finished goods, by Messrs. Hadwin and Sons, Heyroyd Mills, near Halifax; with specimens of dyed silks by Holdforth and Sons, of Leeds. The Macclesfield exhibitors were grouped together in a large glass case at the head of the stairs; and the special productions of that town were worthily represented by Messrs. Brocklehurst and Sons, H. and T. Wardle and Co., and Critchley, Brinsley and Co.; ladies' silk handkerchiefs and small silk shawls being the leading features. Of the colouring of many of the specimens the Jury spoke in the highest terms of commendation.

Ribbons.—The staple productions of the ancient city of Coventry occupied a prominent situation in the central south gallery, next to the nave, and were displayed in a long glass case, of more pretension to architectural beauty than was realized in its construction. Of the display here made it is only right to premise, that Coventry has hitherto aimed at manufacturing cheap ribbons, in which great effect is obtained at the smallest possible amount of labour and the minimum quantity of material; and the examples shown were, with very few exceptions, intended to illustrate the regular manufacture of the various houses who united to make this exposition of the ribbon trade. Each of the leading firms was represented, and each had evidently endeavoured to display the leading features of its own special trade. Thus, Messrs. Sturdy and Turner exhibited samples of ribbons remarkable for beauty of design and the application of steam power to their manufacture; and Messrs. Sharpy, Odell, and Jar exhibited illustrations of a medium quality of goods manufactured at Coventry. In order, however, to show how far the ribbon weavers of Coventry are capable of going beyond the ordinary character of goods upon which they are usually employed, and by the manufacture of which the commercial status of that city is kept up, it was wisely resolved, by a few spirited individuals, that a ribbon should be manufactured, and the cost of its production be defrayed by subscription, in order to ensure the production of such a specimen as would prove the capability of the Coventry workmen to produce better things than they usually have credit for, and to show that the element of price was always to be considered in the production of excellence. The ribbon thus manufactured, under the especial superintendence of a committee of manufacturers appointed for that purpose, was exhibited in the central compartment of the glass case which was set apart for its display, in a variety of colourings. Unfortunately, an engraving would give no adequate representation of the special beauties of this example; an illustration would, therefore, be useless, as its colourings, and the arrangement of its parts for the purposes of weaving, constitute the primary elements of its excellence; and, without believing that it is the very perfection of design and workmanship in ribbon manufacture, it was extremely interesting, as showing how far the energies and talent of our countrymen may be developed by judiciously-exercised encouragement, and the stimulus of an extraordinary circumstance, such as this Exhibition has proved to many of our manufactures. Let the Coventry men take a lesson from this, and, indeed, the Spitalfields men might do the same; and let them take care to produce at least one first-rate specimen of their skill every year for the future, as a point of perfection at which their artisans should aim as far as possible, even in their ordinary productions.

Shawls.—The valuable and interesting display of British shawls was most judiciously arranged in the gallery on the south-western side of the transept, the London and Norwich contributions being placed in a series of elegantly-designed glass cases; and those

of Paisley in suitable compartments, either covered with glass or open, according to the character of the goods. When the great variety of production in this department of textile fabrics alone is taken into consideration, and it is remembered that the design may range from the most intricate India prize patterns to the most primitive of plaids, and yet present decided features of excellence *per se*, the importance of its complete illustration will be at once acknowledged. Nor is this application of the arts of design to be confined exclusively to the production of the patterns by the loom alone, since, of late years, most important improvements in the decoration of shawls have been effected by the application of printing by blocks; and the success which has attended this method was fully exemplified by the very beautiful and unique specimens exhibited by Mr. Charles Swaisland, of Crayford, Kent, one of the last of those London printers whose reputation has been eclipsed by the mechanical contrivances and rapid methods of production of their Lancashire rivals. The *barège* shawls of this unrivalled printer have long held the command of the market: and the selection exhibited will only serve to enhance the reputation acquired by the experience of nearly half a century. Messrs. Kerr and Scott, of St. Paul's Church-yard, exhibited largely and in great variety, alike in printed and woven fabrics. Messrs. Webber and Hairs, of Milk-street, City; and Messrs. Keith and Shoobridge, of Wood-street, also displayed an admirable selection. The Norwich exhibitors, too, made a most interesting display in both shawls and figured poplins, brocades, and chinés. The Paisley contributions were very extensive. The Indian long shawls of Mr. R. Kerr have been held in high esteem for many years past, and the specimens he exhibited sustained his reputation. The gay colours of many of the tartan shawls and plaids grouped well with the more sober hues of the fancy plaids, in which tertiary tints and neutrals were admirably contrasted with the vivid colours of broad borders and fringes. Many of the printed shawls were very excellent; and the embroidered ones, though out of place here, served to give effect to those around.

TALLIS'S HISTORY AND DESCRIPTION

OF

THE CRYSTAL PALACE.

CHAPTER I.

WARREN'S LILY AND BEE—DAY IN THE CRYSTAL PALACE—THE QUEEN'S VISIT—VERRIER AND ADAMS—THE TRUE PHILOSOPHER'S STONE—PROFESSOR OWEN—VOLTAIRE'S "ZADIG"—A BEWILDERED POET—THE BEE, ETC.

WE have already, on several former occasions, placed before our readers the lucubrations of learned men, of grave philosophers, and scientific writers, on the varied contents of the Crystal Palace; and we trust they have been edified accordingly. We now therefore propose, in order to combine amusement with instruction, to present them with some of the lighter flowers of literature which have been showered upon the same path; and we accordingly invite them to a short acquaintance with an imaginative little work by Mr. Warren, *The Lily and the Bee*, a well-chosen title, admirably suggestive to the practical mind of the whole aspect of the Exhibition—the lily representing beauty and art; the bee industry, organization, and labour. To keep the lily and the bee more constantly together than they have hitherto been—to wed art to labour—is one of the results we may in future hopefully look for. Our author plunges at once *in medias res*; we shall follow his example, and commence with—

"*Day in the Crystal Palace!*—There was music echoing through the transparent fabric. Fragrant flowers and graceful shrubs were blooming and exhaling sweet odours. Fountains were flashing and sparkling in the subdued sunlight: in living sculpture were suddenly seen the grand, the grotesque, the terrible, the beautiful; objects of every form and colour imaginable, far as the eye could reach, were dazzlingly intermingled; and there were present sixty thousand sons and daughters of Adam, passing and re-passing, ceaselessly: bewildered charmingly; gliding amidst bannered nations—through country after country renowned in ancient name, and great in modern: civilized and savage. From the far East and West, misty in distance, faintly-echoed martial strains, or the solemn anthem! The soul was approached through its highest senses, flooded with excitement; all its faculties were appealed to at once, and it sank for a while, exhausted, over-

whelmed. "Who can describe that astounding spectacle? Lost in a sense of what it is, who can think what it is like? Philosopher and poet are alike agitated and silent; gaze whithersoever they may, all is marvellous and affecting; showing new thoughts and emotions, and awakening oldest memories and associations—past, present, and future, linked together mystically, each imaging the other, kindling faint suggestion, with sudden startle. And where stood they? Scarce nine times had the moon performed her silent journey round the earth, since grass grew, refreshed with dew and zephyr, upon the spot on which was now a crystal palace, then not even imaged in the mind of its architect—now teeming with things rich and rare from well nigh every spot of earth on the terraqueous globe, telling—oh grand and overwhelming thought!—of the uttermost industry and intellect of Man, in every clime, of every hue, of every speech, since his Almighty Maker placed him upon the earth." With similar fecundity of imagination our author pursues the subject through several pages, in language perhaps a little overstrained, for the ear of ordinary mortals, but always glowing and enthusiastic, while his sentences are frequently enriched with a profusion of quotations as well from Holy Writ as from the works of our most esteemed authors, with the treasures of which his mind appears fully imbued. The visit of the queen to the various countries represented in the Exhibition is thus described:—"Yonder comes the queen! Not hideous shot, nor shell, tears open a crimson path; but one is melting before her,—melting with love and loyalty. All unguarded! No nodding plume, nor gleaming sabre, to startle or appal: she is moving amongst myriads—silent myriads—unheard by her, but not unfelt, their thoughts fondly flowing while she passes by. 'O, all from foreign lands, uncovered be awhile; behold a solemn sight—

A nation's heart in prayer:
And hear their prayer,
God save the Queen."

And he then recalls by a few words some of the principal events and persons connected with each country. The best part of the book is, where the writer is most like himself, and is alluding to some few (a limited list) of the great ones of the day. Let us take a sentence or two in proof of our assertion, that it contains much that suggests thought. "Yonder are the twin sons of science, Le Verrier and Adams—a noble pair, in noble rivalry—England and France! Speaking modestly of their sublime discovery, though one which would have gladdened the heart of Newton—Uranus, saith one,—discovered by the father of our living Herschel, at once doubled the boundaries of the solar system; and, at a distance of eighteen hundred and twenty-two millions of miles, is observed somewhat disturbed in performing its journey: the two astronomers separately bent on discovering the cause, by a rare application of transcendent science, succeed at length in detecting the attractive influence of a remote unseen orb, a new planet: Neptune,—as far beyond Uranus as he beyond Saturn! at thirty times our own distance from the sun: two thousand eight hundred and fifty millions of miles off: moreover, not only pointing out where a planet would ere long be found, but weighing the mass of the predicted mysterious visitor, numbering the years of his revolution, and telling the dimensions of his stupendous orbit."* And elsewhere, after a long array of

* Given, says a Scotch astronomer,—in recording this amazing stretch of science and intellect,—the position, mass, and periodic times of two planets, the astronomer is able, though it is no easy task, to calculate the perturbation which each will produce on the other. But the problem resolved by these two French and English astronomers, viz., *given the perturbation to find the position, mass, and periodic time of an unknown disturbing body*, is one of such infinite difficulty, that certainly few astronomers believed it possible.

ancient names, recalled by the genius *loci*, he welcomes Des Cartes, Galileo, and Newton, with—

“Ye later Ones!
At length ye come, bringing the light
Through the dreary night
Long struggling, through the priestly fear
That light could light extinguish,
Truth contradict the Truth!
O, foolish fear.”

Our author has much to say on the subject of gems and diamonds and the Koh-i-Noor, but suddenly he breaks off, being told by “an ancient philosopher,” who like himself was gazing at the wonders of the place, that he knew of a *stone*, not far away, infinitely more to be prized than the Koh-i-Noor—“wonderful to the world, if but the world would hear.” We hope our readers *will*, however the world may be inclined. But to our text. It is the true “Philosopher’s Stone”—a marvellous relic of remotest antiquity. “In cold Canada! a slab of plain grey stone, under deep strata for ages hid; inscribed by Nature’s mystical finger with faintest character for reading of instructed eye. Millions of ages since have passed. When flourished the forests turned to coal, is but as yesterday in comparison of that far distant day, when that sea so gently kissed, or boisterously beat upon that ancient shore. There, all along that shore, those sands, now, this stone, a reptile crawled, slowly, painfully:” let us turn, however, to the note which explains, in less hyperbolical phrasology, this extraordinary relic:—

“The stone in question was transmitted to this country a few months since, by a Canadian geologist; who, not being a naturalist, entertained no suspicion that the marks which had arrested his attention, were the traces of an animal. He thought them likely to have been produced by the trail of a long sea-weed. He requested our far-famed zoologist, Owen, to examine the mysterious marks, and decipher them, if he could. After much thoughtful scrutiny, that gentleman found them to be small prints, occurring in regular succession, in pairs—extending in two parallel linear series, *with a continuous groove, midway* between them. Then he observed that one of the prints was larger than the other in each pair; and that both the larger and smaller print were short and broad, with indications of toes at their fore-part; and that the intervals between each pair, of the same side, were much less than those between the right and left pairs. Hence he inferred, that the impressions in question must have been produced by some *animal*, that had crawled or walked along that oldest of sandy shores; that such animal had been a quadruped, having the hind-feet larger and wider apart than the fore-feet—both fore and hind-feet being very short; and that the limbs of the right and left side were wide apart; wherefore the creature must have had a rounded and broad trunk, supported on short limbs, with rounded and stumpy feet, capable of taking only short steps. Then as to the midway groove—he at first suspected that it might have been produced by the trail of a *tail*. The impression was well defined throughout, midway between the right and left limbs: shallower, where the foot-prints indicated a steady rate of motion—(how delicately exact the observation!)—deeper where that motion had been retarded, and the animal’s body had rested awhile on the sand. Hence the sagacious naturalist concluded that this midway groove impression must have been made by some hard projecting covering of the belly—such as would be made by the breast-plate of a tortoise. The broad trunk; the short steps; the stumpy feet, hardly capable of carrying the trunk clear of the ground—all this deducible solely from these faint foot-prints—seemed to bespeak the tortoise. *Experiment succeeded observation*. Owen betook himself to lord Bacon’s realised Atalantis the Zoological Garden in the Regent’s Park,

and caused the living reptiles there to crawl over soils carefully prepared, so as to receive and retain distinctly the traces of their transit. The tortoise was found to have left impressions almost identical, or very closely resembling those preserved in the ancient rock: which had been ascertained to belong to the first-formed class of rocks, deposited from the sea. Prior to the discovery of this stone, geologists had not obtained evidence of the existence of any but the lowest organized plants and animals, such as zoophytes and marine mollusca, in these rocks. This stone may therefore be regarded as an exponent of indefinitely remote antiquity, referring high organization to a period infinitely beyond all previous supposition, or even imagination. The traces of the showers which may have beaten on the tortoise, as suggested in the text—'Behold the trace of the passing shower! That may have beat upon his horny back'—were sagaciously detected by an eminent living geologist, and deciphered from impressions made by the rain-drops falling on the soft sand; and the direction of the wind then blowing, by the unusual depths of the rain-pits, and the unequal height of its little circular wall, as the shower struck, obliquely, the ripple-ruffled surface. It is only on a *tidal* shore that such impressions can be received and retained: received during the ebb, and covered by fresh layers of fine sand at the flood. The traces of the ancient showers and winds, however, were not seen on the specimen deposited in the Crystal Palace, but on others now in London." What an admirable illustration of the Baconian process of arriving at results, by observation and experiment is here exhibited.

Our readers may perhaps recollect an account in Voltaire's *Zadig*, of a similar instance of sagacious observation and felicitous deduction. Indeed, it is so closely parallel with that of our modern philosopher, that we cannot refrain from quoting the passage. "Zadig," says Voltaire, "made it his especial study to observe the habits and peculiar instincts of plants and animals, and he consequently soon perceived in them a thousand differences, where other men would only see a mechanical uniformity. One day, threading the paths of a little wood, he saw running towards him one of the queen's eunuchs, followed by several officers of higher grade, who appeared in the greatest consternation, running here and there, like men beside themselves, in search of some precious object.—'Young man,' said the chief eunuch to him, 'have you seen the queen's favourite spaniel?' 'It is a spaniel bitch,' quietly observed Zadig: 'You are right,' replied the chief eunuch. 'And it is a very small one,' returned Zadig—'she has lately pupped; she is lame of the left fore-foot, and has very long ears.' 'You have doubtless seen it,' said the chief eunuch, quite out of breath. 'No,' replied Zadig, 'I have not seen it, nor did I even know whether the queen ever had such a dog or not.'

"Now, precisely at the same time it so happened, through one of the ordinary freaks of fortune, that the finest horse in the king's stable had broke loose from the hands of the groom in the plains of Babylon. The chief huntsman and all his subordinates were as anxious in its pursuit, as the chief eunuch after the dog. The master of the horse enquired of Zadig, if he had not seen the king's palfrey pass that way. 'He has the smoothest gallop in the world,' observed Zadig; 'he is five feet in height; his hoofs are remarkably small; his tail is three feet and-a-half in length; the studs of his bridle are of gold of twenty-three carats; his shoes are of fine silver.' 'Which road did he take? where shall I find him?' interrogated the huntsman. 'I have seen no such horse,' said Zadig, 'nor have I ever heard speak of him.'

"The chief huntsman and the chief eunuch both thought that Zadig had stolen the horse and the dog; they caused him to be brought before the council of the grand Desterham, who condemned him to the knout, and to perpetual banishment in Siberia. The sentence was hardly passed when both the horse and the dog were found. The learned judges were consequently under the painful necessity of reversing their decision; in lieu thereof,

they however condemned Zadig to pay a fine of four hundred ounces of gold, for having asserted that he had not seen, what he most assuredly must have seen. This fine was duly paid; after which, Zadig was allowed to plead his cause before the grand council of Desterham; his speech was to the following effect:—"Stars of justice, profundities of science, mirrors of truth, having the ponderosity of lead, the hardness of steel, the brilliancy of the diamond, and much affinity with gold, since it is permitted me to speak before your august assembly, I swear to you by Orosmales, that I never cast eyes upon the respectable animal belonging to the queen, nor upon the sacred courser of the king of kings. I will relate what actually occurred. As I was directing my steps towards the little wood where I afterwards met the venerable eunuch and the most illustrious grand huntsman, I observed upon the sand the traces of an animal, which I readily made out to be those of a small dog. Between the foot-marks, wherever the sand was a little elevated, I noticed a slightly indented furrow, which led me to conclude that the dog must have been a female, whose teats were hanging low, and consequently that she must have produced a family very recently. Other marks of a different character showed that the surface of the sand on the outside of the fore-feet had been regularly and slightly disturbed, from which I surmised her ears were of considerable length; and as I remarked that the sand was always less hollowed by one foot than by the three others, I naturally inferred that the dog of our august queen was a little lame, if I may venture to say so."

In an equally ingenious manner, Zadig accounts for the accurate description he had given of the king's palfrey, the particulars of which he had also gathered from a variety of indications he had made upon the road. The judges were all in a transport of delight at the extraordinary proofs of Zadig's profound and acute discrimination, and immense was the applause that was lavished upon him. His fame was trumpeted about by the courtiers on every side, although some of the venerable magi were of opinion that he deserved to be burned alive as a sorcerer. The king however thought otherwise, and the fine which he had paid of four hundred ounces of gold was ordered to be restored to him; which was accordingly done with great pomp and ceremony by the officers of the court, who retained, however, in their own hands, the moderate sum of three hundred and ninety-eight ounces, out of the four hundred, for legal expenses; besides which Zadig was expected to compliment the officials with a handsome gratuity. But we must now take leave of the sage and sarcastic philosopher of Ferney, and revert once more to the pages of *The Lily and the Bee*.

We select his description of "a bewildered poet," lost in the intricate mazes of the Fairy Palace. "Yonder is a musing poet: gazing silently eastward—westward—northward—southward: above—below: everywhere pouring a living tide of wonder—nor silent—nor noisy—a strange hum—a radiant flood of light—many-hued objects, now glittering brightly—then glistening—fainter and fainter, till lost in distance: whence come faintly the strains of rich music—intermingling mysteriously with the gentle hum around him. Gliding about, forms of exquisite beauty, most delicate loveliness—living, eclipsing the sculptured beauty, at which it is looking, with blushing consciousness. Yonder, a fair daughter of Eve, before the mother of all living: her shuddering eye glancing at the serpent, her ear catching the deadly whisper. Far away, in shape and gesture proudly eminent, Satan—as it were showing all the kingdoms of the world, and the glory of them in a moment of time. There they are! great nations, new and old, with their bright banners streaming: helm: lance: sabre—scimitar. See there, solemnly silent all. Crusaders—the crashing of a mailed throng—soundless—banners—the crescent—cross—fierce-gleaming Saracen—Saladin—Cœur-de-Lion—glorious De Bouillon. * * * A dim religious light—Dante—Tasso—Milton—Shakspeare—there they are! Could

they see but this—or he, with eyes like theirs—be stirred with thoughts like theirs—ah! sinking deeper still in reverie—dreamy—delicious! * * Still the hum—the dazzle.

Gifted one—up, laureate! wake! Ay—it is no dream—but radiant reality—up, laureate, with thy lyre, and rapturously sweep its thrilling strings! Give forth strains, echoing through all time to come, surpassing Pindar's, as thine his theme transcendeth far —.” How far the strains of the poet laureate are likely to out-rival those of Pindar we will not take upon ourselves to decide. Our old friend Horace observes—

“Pindarum quisquis studet æmulari,
Jule, ceratis opè Dædaleâ
Nititur pennis, vitreo daturus
Nomina ponto.”

Leaving, however, the “gifted one,” to recover of his bewilderment, we will turn to Mr. Warren's address to that industrious little insect, the bee—

“That at his flowery work doth sing,”

and select a few of the most striking passages.

“O, artificer consummate! exquisite! ‘O, besy bee, withouten guile!’ on thee I gaze! I, in this hive of mine, thee, in thine!—Dear insect! I would speak with thee! I feel a sympathy of kin with thee!—Whence camest thou, mysterious little one? Co-tenant of the globe with me! were thy first parents twin tenants of the garden, paradise, with mine, all happy, bright and beautiful, and freshly into being called, by God? * * * After six thousand years of slaughter and of spoil, ye still are with us, plying your innocent toils—ye victims! rivals! monitors of man! * * * Exhibitor of industry, I do misgive me that I see, in thee, a small unmedalled one!—In this our palace hive! our royal hive! were ye ordained to gather for yourselves alone, and not for us, though from our flowers? Ye skilled ones! why keep your science all to yourselves? For sixty centuries we taste, luxurious, what you gather and prepare, but have not learned your art, and cannot supersede your toils! * * * * Your structure and your doings, little Mystery, perplexed great Aristotle. And, twenty centuries since past away, a mystery shrouds you yet—seen deepest into by a blind bee-lover!” * * * Behold its architecture! In a note on this passage, we are told that the geometrical form of each cell constructed by the bee, is absolute perfection, as far as we are able to judge of the objects had in view; and has excited the admiration and amazement of ancient and modern mathematicians. At what precise angle the three planes of the hexagonal prism ought to meet, so as to secure the greatest strength and commodiousness with the least possible waste of materials, is a problem of the highest mathematics, resolvable only by the aid of the infinitesimal calculus, or problems of *maxima* and *minima*. Maclaurin, the worthy disciple of Newton, by a fluxionary calculation, succeeded at length in determining the required angle, precisely. It was the very angle adopted by the bee!

These sagacious insects ventilate their hives. How this indispensable process was carried on, baffled the research and speculation of ages. At length the mystery was solved, and recently. The bees appointed for the purpose, stand waving their wings—with a motion different from that used in flight—with untiring energy; and, to gain the full effect of it, *first attach their feet firmly to the floor*, and by these means, cause distinctly-perceptible currents of air to circulate through the hive! Before we close our remarks on this interesting little volume, we will indulge our readers with the following graphic description of—

· NIGHT, IN THE CRYSTAL PALACE.

“The seventy thousand gone; All gone, and I ALONE! How dread this silence!

The seventy thousand, with bright sunshine, gone, and I alone—and moonlight, all irradiates solemnly. All gone!—the living stream, with its mysterious hum—my brethren and my sisters! gone! From every clime, of every hue and every tongue! But a few hours ago, all here: gleeful, eager, curious all, admiring, all—instructed, thousands—some stirred with deep thoughts, and fixed on musings strange. But now, thus far on in the night, all, all, asleep—past, present, future, melted into ONE! Dream-dazzled some—seeing all the world, and all its denizens, at once—in every place, at once—hearing again the murmur—hum—the pealing organ.—Ay, all alone. The very bees, wearied, are all asleep, in yonder hive of theirs, save where before the porch, stand tiny sentinels, within, without—all vigilant, as ours.

“There’s not a breath of sighing air to wake yon sleeping flowers, or stir the leaves of yon high trees, stately sentries o’er the flowers. Yon banners all hang waveless—their proud devices now scarce visible—embleming nations, restless! stern! in battle order seeming even yet!—startled some, convulsed but recently. But now, at length, ASLEEP—all here sleeping grandly secure, serene, reliant—lately worn with war and tumult: now soothed into repose by sights and sounds of an unwonted unity, and peace, and concord, as though they owned the presence awful, of Him who maketh wars to cease in the world, saying, be still, and know that I am God.”

Our transcendentalist continues his meditations, till he becomes completely bewildered, and confesses that he does not well know whether he is awake, or sleeping, or dreaming; in the meanwhile the ghosts of the mighty dead, taking advantage, we suppose, of the fitness of time and place, and finding their subject “apt,” as the ghost in *Hamlet* says, gradually arise before him—“All solemn, amazed—a royal group! great conquerors—Alexander—great Ciesar too—Napoleon.” Then we have Alfred, our Saxon monarch, who is heard to repeat a portion of the extant poem, given at length in *Turner’s History of the Anglo-Saxons*. Then appear the shades of Aristotle, Bacon, Archimedes, Cicero, and a whole host of philosophers, until—and we do not wonder at it—the beholder of all these supernatural appearances becomes himself alarmed, and trembling, exclaims, as our readers, we doubt not, will also be tempted to do, “Awful ghosts, away!” The pope nevertheless pays him a visit, but meets with so little courtesy at his hands, that he is glad to hide his diminished head, and with his delusions and his falsehoods, and “his counterfeited key,” to vanish out of sight, as the awful shade of Newton strides majestically past, “shedding light.” But we will not dwell any longer on the visionary ecstasies that our author continues to experience throughout the livelong night, but rather, with him, hail the approach of morn, before whose welcome presence it has been the custom, from time immemorial, for all ghosts and goblins to depart quietly to their several resting-places, and to cease from troubling the inhabitants of this lower world. We shall close our chapter, and take leave of our learned author, with the following poetical invocation:—

“ Sweet sun of early morn!
 Freshening all nature, sleeping till thou wak’st them up
 Cheering the sons of men—
 Wake, too, ye dewy flowers!
 Ye, too, deep hidden in the dark, have slept the livelong night
 Under your tree sentinel
 Night hath passed, and dawns the day!”

CHAPTER II.

SCULPTURE—*concluded.*

THE "FIRST SORROW," BY MACDOWELL—LINES BY ALARIC WATTS—TITANIA, ARIEL, PUCK, BY LOUGH—THE MOURNERS—FOLEY'S WANDERER—PANORMO'S CARACTACUS—VILLA'S HAGAR AND ISMALL—JEHOTTE'S MADONNA—ANCIENT BRITON, BY ADAMS—THE ADORATION OF THE VIRGIN, BY GEERTS—SHIPWRECKED SAILOR BOY, BY SIBSON—RETURN OF THE PET DOVE, BY FARRELL—ANDROMEDA, BY BELL—SABRINA, ETC.

"Yet once more, O ye laurels, and once more
Ye myrtles brown, with ivy never sere,
I come to pluck your berries ———."—*Milton.*

And here we pause in our quotation: with the "harsh" and the "crude," we desire no acquaintance. In our last chapter on sculpture, in taking a temporary leave of the interesting topic, we promised our readers a final examination of the sculptor's labours in the Crystal Palace, a last survey of the ground from which we had already gathered so many bright and beautiful flowers. We now, therefore, propose to conduct them, for the last time, into the hallowed field, and, like the careful gleaner, collect the remaining produce of the cultivated soil, in order to transplant it into our valuable pages; wherein, through the combined efforts of the pen and the burin, the gifted artist may reasonably hope to escape the yawning gulf of oblivion, and be enabled to exclaim with the Roman poet—

"Non omnis moriar."

With this idea before us, we ask our readers to accompany us in an imaginative ramble through the vast fabric which it is our province to describe, and once more bestow their attention on the various specimens of the plastic art, which, within its fairy precincts, creative genius, from every clime, had so profusely lavished. Let us enter, therefore, on our field of observation, and use, as Pope advises, our critical acumen discreetly.

We will begin with Macdowell's beautiful portraiture of "The First Sorrow" of a lovely girl weeping over her dead bird, a production which we have already briefly noticed in these pages. On bestowing a second glance upon it, the following touching lines, called forth from the gentle muse of Alaric Watts, ever ready to sympathise in the finer feelings of the heart, returned to our remembrance:—

"Tis her first sorrow; but to her as deep
As the great griefs maturer hearts that wring,
When some strong wretch, undreamed of bids us weep
O'er the lost hope to which we loved to cling!

The Bird is dead;—the nursling of her hand,
That from her cup the honied dew would sip,—
That on her finger used to take his stand,
And peck the mimic cherry on her lip.

The willing captive that her eye could chain,
Her voice arrest, howe'er inclined to roam,
The household god (worshipped, alas! in vain),
Whose radiant wings flashed sunshine through her home,—

Pressed to her bosom, now can feel no more
The genial warmth of old he used to love;
His sportive wiles and truant flights are o'er:—
When was the falcon tender to the dove?

"'Twas but a bird;" but when life's years are few,
 How slight a thing may make our sum of bliss!
 Cold is the heart that needs be taught anew,
 Trifles oft form the joys that most we miss!

The soft, pure wax of Childhood's ductile breast
 Will yield an impress to the gentle touch;
 They ear who make its little griefs their jest,
 Slight ills are sorrows still, if felt as such.

"'Twas but a bird," the world's stern stoic cries,
 "And myriad birds survive as fair to see;"
 "'Twas but a bird to *some*," her heart replies,
 "But playmate, friend, companion—all to *me*!"

'Tis her first sorrow,—and she feels the more
 That sorrow's name she scarce hath known till now;
 But the full burst of keener anguish o'er,
 A softer shade hath settled on her brow.

The bitter tears that would not be repressed
 Are dried, like dew-drops on the sun-touched leaf;
 The deep, wild sobs that lately stirred her breast
 At length have yielded to a tenderer grief.

She weeps no more,—her very sighs are stilled,—
 A tranquil sadness breathes from her sweet face;
 As though her mind, with soothing memories filled,
 Had nothing left to sorrow—but its grace!

The Sculptor marked the change with earnest eyes;
 He knew the phase whence fame might best be won;
 And when her grief assumed its loveliest guise,
 He struck her chastened beauty into stone!"

Thus it is that images of the beautiful or the sublime are "twice blessed," first as endless sources of enjoyment to those with whom they originate, and again as calling forth in kindred minds, answering images, reflecting the same refinement of ideas, under equally captivating diversity of form. If, however, the poet is occasionally inspired by the sculptor, the reverse is far more frequently the case. Witness the bard of Avon, whose delightful creations in the fairy dream of a midsummer night, and in the still wilder imagery of *The Tempest*, appeared to have captivated the imagination of the sculptor Lough, in his personification of "Ariel," that "delicate sprite,"—in "Titania," queen of the fairy race, and in the mischievous "Puck," or "Robin Goodfellow, that shrewd and elfin sprite," who says of himself—

"I am that merry wanderer of the night,
 I jest to Oberon, and make him smile,
 When I a fat and bean-fed horse beguile
 Neighing in likeness of a filly-foal;
 And sometimes lurk I in a gossip's bowl,
 In very likeness of a roasted crab;
 And, when she drinks, against her lips I bob
 And on her wither'd dew-lap pour the ale."

We did not, however, recognise in the heavily-draped figure of the sculptor the airy being of the poet, who undertook to—

"Put a girdle round about the earth
 In forty minutes."

Neither could we trace in his countenance that inimitable expression of fun and mischief which sir Joshua Reynolds so admirably impressed upon the canvas, in his celebrated

picture (painted, we believe, for the Shakspeare Gallery) of "Puck," or "Robin Good-fellow," seated upon a mushroom. In "Titania," Mr. Lough has been more successful, inasmuch as he has imparted to his marble a considerable degree of grace and elegance in this representation of the queen of the fairy race, although we must at the same time observe that there was too much of earthly reality about his conception, to convey adequately to our minds the rapt imagination of the poet. The same remark may also apply to "quaint Ariel," that "fine apparition" of the poet's brain, whose magic song—

"Come unto these yellow sands,"

even now visits our ears, with the ravishing notes of Henry Purcell, that unrivalled master of melody, and fully equal in beauty and fertility of invention to the most celebrated of the favoured sons of Italy.

Mr. Lough also exhibited an equestrian plaster group entitled, "The Mourners," which had numberless admirers amongst the idlers who thronged the main avenues of the Palace of Industry; and it spoke home to the feelings of many of that extensive class whose hearts are always "open to a tale of distress." If the heart, therefore, were the only guide to be consulted in the consideration of works of design, undoubtedly Mr. Lough might be said to have achieved a very great success. In point of sentiment, however, even of every-day sentiment, there did appear to us a little extravagance and inconsistency in placing a horse and a Christian widow in a partnership of sorrow. For even supposing the horse had a right to indulge his feelings on the occasion of the loss of a good master, as well as the bereaved wife, he might have been kept a little in the back-ground; at least, the woman should not have been called upon to bestow any of her attentions upon the dumb animal, when she should have been exclusively engrossed with the appalling sight of a husband, untimely slain. These are errors of poetic judgment, which throw sentiment into ridicule, and reduce art to the level of an Astley's melodrama. As for the idea of the group itself, it was obviously taken from Horace Vernet's celebrated picture of "The Dead Trumpeter." In that work, however, the sentiment is more consistently carried out; the mourners over the corpse of the soldier who has just been shot dead from off his saddle, are the horse and a favourite dog, who licks the yet bleeding wound. The horse by his startled look and cautious tread, tells the whole story, which is true to nature. But there is no arbitrary and artificial blending of brute instinct and human sorrow. Finally, we must add, that the subject, from the very form of the outline of the objects introduced, whilst very appropriate for a painting, was wholly improper for a work of sculpture, unless in the modified form of a bas-relief.

Foley's "Wanderer," told a plaintive tale of the "winter's wind," which blows and whistles about him, and threatens to tear his cloak from his back. He casts an appealing look to heaven, and struggles on still against its vigour.

"The Liberation of Caractacus," by Panormo, a student of the Royal Irish Academy, although somewhat roughly modelled, and not very correct in point of drawing, was yet an expressive piece of sculpture. The incident represented is well known to all readers of our country's history. Caractacus, after nine years unequal combat with the Romans, is subdued and taken captive, along with others, to Rome. Whilst being paraded through the magnificent streets of that city, he exclaims in a tone of sublime melancholy, "How is it possible that a people who are possessed of such magnificence at home, should envy me a poor cottage in Britain!" The emperor Claudius was so affected by the homely truth of these few words, which he overheard, and the noble and interesting bearing of his royal captive, that he immediately ordered him to be set at liberty, together with the rest of the prisoners.

We have already noticed the subject of "Hagar and Ismael" from the chisel of Signor Strazzi, of Milan, as well as that of Max, of Prague; and to both these sculptors we awarded the praise that was justly due to them. We now have to make favourable mention of a small marble group on the same subject by Signor Villa, of Florence, who has chosen a different point of time from that selected by the other two artists. Hagar, in the present instance, was applying the bowl of water to the parched lips of her son. There was not perhaps the same amount of poetic interest in this case as in the others; but what the subject afforded, Signor Villa did ample justice to in his very pleasing and carefully executed composition.

A "Madonna," by Jehotte, was treated in a manner peculiar to the Belgian school, combining great study and laboured effects, but very little of the true inspiration of genius. In accordance with the doctrine of the Roman catholic church, Mary was treated as the principal object in the group, while the infant Christ held a subordinate position. The mother was represented as bruising the head of the serpent; contrary to the orthodox and obvious meaning of the words of the prophecy:—"Her seed shall bruise thy head."

Among other objects worthy of attention, we must notice the following specimens:—"The figure of an Ancient Briton, looking out as a scout," executed in plaster by Mr. Adams, which evinced considerable spirit and originality of conception. A superb group by Mr. C. Wyatt, representing, in life-size, a horse and dragon, "the faithful friend of man trampling under-foot his most insidious enemy." This was a noble conception, intended to typify the triumph of the intellectual power over the sensual and brutal tendencies of man, the horse being the representative of the nobler quality, and the traditional serpent the emblem of the other.—"The Adoration of the Virgin," by Geerts, of Louvain. This subject, always attractive to poets and painters, was treated in a manner at once novel and refined. The angels grouped round the mother of Christ—singing at her feet, and crowning her with glory—were well conceived, and happily realised in this highly-finished *alto-relievo*.—"The Shipwrecked Sailor-boy," well executed in plaster by Mr. Henry Sibson, of St. John's-wood, was situated on the west side of the north transept, near the refreshment-stall. The boy held in his right hand a miniature of his mother. On the pedestal was the following inscription:—"Almighty Father! Oh protect my poor widowed mother." He appeared to be cast by the last wave on a low rock just above the water's level. It was a performance that was certain to enlist the sympathies of all mothers who have sons at sea. It seemed almost a realisation of the refrain of the old song:—

"His purse soon filled with foreign gold
He hastened home with joy;
When, wrecked in sight of port, behold
A wretched cabin boy."

"The Return of the pet Dove," by Farrell, was exceedingly creditable to the state of the plastic art in the Emerald Isle. The idea sought to be embodied was highly poetical, and the execution was fully worthy of the subject. This, with the same artist's "Early Sorrow," a weeping child, were placed in the British Sculpture Court. We must also bestow a favourable glance at the "Andromeda," by J. Bell, certainly one of the most graceful of Mr. Bell's numerous productions, and it was most satisfactorily cast by the Colebrook-dale Company. Descending to details, we may object with justice to the elaborate treatment of the chain, and to its very artificial disposition. It must be obvious, that such a chain, so disposed, could not have been attempted in marble or plaster; and the pains bestowed upon it, and ostentatious manner in which it was

displayed, the material happening to be metal, betrays an error in judgment. There is no honour in producing in bronze an article which any manufacturer could make by the dozen; the chain incident should therefore have been neglected, or treated conventionally, as almost beneath the attention of the artist, instead of being seized upon and made the most of, as was evidently the case. This work was subsequently purchased by Her Majesty.

Among the specimens of minor works of art, the statuette of "Sabrina," from the porcelain manufactory of Messrs. Copeland, held a high place. We omitted, in our article on "Statuary Porcelain," to notice this sweet damsel who

"Commended her fair innocence to the flood,"

and who, received by the nymphs that in the waters played,

"Underwent a quick immortal change."

She was represented sitting, as Milton beautifully describes:—

"Under the glassy, cool, translucent wave,
By the rushy-fringed bank,
Where grow the willow and osier dank,"

having left her "sliding chariot,"

"Thick set with agate and the azure sheen
Of turkis blue and emerald green,"

ready to come at the invitation of the spirit to the aid of the brothers and the enchanted lady. "Sabrina is her name, a virgin pure;" and surely never was "virgin pure" more admirably portrayed.

Before we conclude this our final chapter on the sculpture of the Great Exhibition, it will not, we hope, be considered inappropriate if we allude to a question that has lately been agitated, respecting the selection of some fit object of sculpture, to commemorate the brief but glorious existence of the great wonder of the age. Numerous meetings have been held, at which wealth and talent were ably represented, but judgment did not, in an equal degree, prevail in the council. The *haute noblesse*, favouring one of their own *caste*, proposed to erect the equestrian statue of Richard Cœur de Lion, by the Baron Marochetti, a performance of unquestionable merit, as we have before stated, as a fitting memorial of the Great Peace Congress of 1851. Funds were immediately raised for the purchase of the statue from the worthy baron, and the public were made acquainted with the idea. But the outcry against so unheard-of a proposition as the setting up the statue of a warlike king of bye-gone days to celebrate a peaceful establishment of the present period, was so loudly raised in the leading journals, particularly in the columns of the *Daily News*, that the final carrying it out appears to be, for the present at least, abandoned. In the meanwhile counter-propositions have been suggested of a more appropriate nature, such as the adoption of a group of some of our most learned and scientific men, the true glory of our nation, whose labours contributed so largely to the success of the undertaking; or if a royal personage was considered to be indispensable, why, it was asked, should not a statue of Prince Albert, the original proposer of the Great Exhibition, be placed, *in memoria perpetua*, on the very spot where the graceful fabric stood? By no one, however, was the insane idea more eloquently denounced than by one of our most popular writers on all subjects connected with the interests of his country and the benefit of the world at large—Mr. James Silk Buckingham—whose admirable remarks we beg leave to present to our readers. We shall quote his own words.

"At the same moment, too, that we are boasting of our love of peace, and deservedly honouring our queen and her consort for the establishment of the Great Exhibition of

1851, as the 'Temple of Peace,' to teach all nations the practice as well as doctrine of universal brotherhood—we are engaged in an attempt to make new conquests of Burmah, Ava, and Pegu, in the East; and summoning the *élite* of the nation to raise a large subscription for the purpose of setting up, in the metropolis, as a 'Memorial of this Universal Peace-proclaiming Exhibition of 1851,' the equestrian statue of Richard Cœur de Lion, one of the greatest invaders and marauders that Europe ever produced; who began life by rebelling against his father, while yet a mere boy—who carried on a horrible war against his elder brother, in which neither party gave quarter—who renewed the war against his own parent, and besieged him in his castle of Chalon, during which siege his father died;—who, after his capture of Acre, in the Crusades, refused to receive a ransom for the prisoners he had taken, and murdered 5,000 of them in cold blood, while his soldiers were celebrating the religious fête of the Assumption of the Blessed Virgin;—who subsequently hung a whole garrison of Christians in France, even after they had offered to surrender, and soon after died of a wound in the castle of Chalon, after a nominal reign of ten years over England as its monarch, though he had never spent a single year of all these ten within his own dominions; a man characterized by the three great vices of 'pride, avarice, and voluptuousness,' and whose whole life was a career of blood and murder! Such are the men whom our chief nobility have met and subscribed largely (to the extent of several thousand pounds) to honour—700 years after his ignominious death—by setting up his statue in the capital of their own country, where thousands are pining in want, ignorance, intemperance, prostitution, and profligacy and crime, for which it is difficult to raise funds to carry forward the necessary agencies for their reformation! If we needed more statues for the adornment of the metropolis, in addition to those of the kings, princes, dukes, admirals, and generals, which form the majority of the present number; and especially if we wished such statues to commemorate an Exhibition intended to promote 'peace and good will among men;' we might surely make a better choice than this of 'Cœur de Lion,' as we have yet no public statue in any of our squares or parks to our most successful navigator, Cook—our most adventurous traveller, Bruce—our purest founders of colonies, Oglethorpe and Penn—our greatest astronomer, Newton—our chief philanthropists, Howard, Clarkson, and Wilberforce—not one of our loftiest and most religious poets, Milton and Young—our most uncorrupted patriots, Marvell, Sidney, and Hampden—our most philosophic statesman and orator, Burke—or our great social reformers, Lord Ashley and Father Mathew—each of whom are worth a hundred 'Cœur de Lions' for their own merits and deeds, and still more for the beneficial examples of their lives, patterns worthy of exciting the emulation and imitation of mankind, and having much more in harmony with the Great Exhibition of the Temple of Peace, than the ferocious blood-spiller, who had no greater virtue than that of the brute beast whose name is incorporated with his own; as if to be 'lion-hearted'—of which millions are to be found among the most ignorant and vicious of mankind—was to possess all the virtues that could elevate and adorn humanity, and like charity, 'cover a multitude of sins.' Alas! for the wisdom of the nineteenth century!"

To this we may add, that if we must have a crowned potentate of bye-gone times, surely the annals of our history afford us a better subject in king Alfred, one of the most amiable and enlightened monarchs that ever sat upon a throne, the glory of our Saxon race, and one who was designated, even by Voltaire himself, who never can be suspected of partiality in our behalf, as the most perfect pattern of royalty, and the most exemplary king ever recorded in the page of history.

CHAPTER III.

MACHINERY.

CANADIAN FIRE-ENGINE—FRENCH FIRE-ENGINES—ENGLISH FIRE-ENGINES—INJECTING APPARATUS FOR PRESERVING WOOD—PROCESS OF INJECTION DESCRIBED—DR. BOUCHERIE'S PLAN—AGRICULTURAL MACHINES.

ALTHOUGH we have not heretofore devoted an entire chapter to "Machinery," still we have on several occasions made mention of some of those most astonishing productions of human ingenuity and contrivance which were so profusely displayed within the capacious walls of the Crystal Palace. "Ample space and verge enough" was there for all that was offered to the public admiration; and well did science and skill respond to the call that was made upon them. The majestic locomotives, the giants of the Railway, we have already had under consideration. We now propose to examine a few other specimens of machinery which the manifold requirements of civilisation have elicited from the inventive genius of mankind.—And first with respect to fire-engines. In the Canadian apartment a fire-engine was exhibited, built by Messrs. Perry of Montreal, which merited especial notice and commendation. Unlike the fire-engines of this country, it worked transversely, instead of horizontally. It was also said to combine, with lightness and neatness, greater power than any similar engine in Europe, whilst the simplicity of its construction enabled it to be worked with fewer men and more ease. It was also equally suitable for hot or cold climates, as these extremes meet in Canada. These were, by the builder, said to be the principal merits of the engine, though its capabilities have been, as yet, but partially tested; estimating these, however, by other engines built on a similar principle, and at work in Canada, the following are considered to be within its range:—with a cylinder of seven inches and a stroke of sixteen, it will lift a supply of water thirty feet, and playing from the extremity of a fifty-foot hose, it will send a jet from a one-inch nosel from 170 to 180 feet vertically, and 210 feet horizontally, or it will send two streams each 150 feet vertically, and 170 feet horizontally. In the building of the engine exhibited, every evidence of care had been bestowed, as it was generally understood in Canada that it was the intention of the Fire Engine Company in Baltimore, United States, to have sent their engine, which is of the same dimensions, and cost above one thousand pounds, to be exhibited at the world's fair. In a spirit of generous rivalry, the Montreal commissioners connected with the Exhibition came forward to support the Messrs. Perry in their determination of sending their engine; and it is a subject of regret to the Canadians that the United States should have held back from the competition. But notwithstanding the merits which the engine might possess, the gaiety of its appearance, we think, in some measure, tended to impress the mind with an idea of its unfitness to bear the wear and tear of engines of British construction. This, however, does not in the slightest degree affect the principle upon which it is built; that must remain the same, whether good or bad. Perhaps the desire to catch the eye had something to do in influencing the makers. But be this as it may, we are all aware that the practical mind of England is apt to be offended rather than pleased with anything that trenches upon the province of the *toy* manufacturer in regard to a machine of so momentous a character as a fire-engine. It must, however, be remembered that in Canada the fire-engines are the property of different volunteer companies, composed, in the various towns, of young men, among whom great rivalry exists. Trials of the merits of their respective engines are so frequent as to be with them a sort of relaxation and amusement, whilst in all *fêtes* and

processions they take a prominent part, and by the splendour of the banners they display on such occasions, added to the diversity of their costumes, greatly enhance the life and spirit of the scene. The engine before us was adorned with paintings of the principal edifices in Montreal, an east and a west view of the town, and others of minor description, which were not inappropriate. The French exhibited two or three fire-engines which had little pretensions to engineering skill, but were marked by that light, convenient elegance which usually distinguish their contrivances. They had no pretensions to contest the palm with Canada or England in this department, but would seem to have taken their position rather as pieces of simple portable ingenuity than of skilful mechanical construction. In one of the British machine compartments, several fire-engines appeared from the manufactory of Mr. Merryweather, Long-acre. Amongst the rest was one of an exceedingly ingenious and useful description for the suppression of fires in dwelling-houses. This was called a *cabinet* fire-engine; and notwithstanding the different forms which fire-engines have been made to assume since their first invention (about two hundred years ago), the appearance of this showed that variety is not yet exhausted. This engine was produced at the request of the Duke of Norfolk, and was one of the most compact and efficient ever constructed. In outward appearance it resembled a small cabinet upon castors; and upon removing the mahogany top, a complete fire-engine was discovered, worked by a folding handle, with an apparatus capable of being rendered available at a moment's notice. The strength of one woman was sufficient to work it, and the whole did not occupy a space exceeding thirty square inches. Mr. Merryweather also exhibited his London brigade fire-engine, which is dignified with the cognomen of "Prince Albert;" also a farmer's fire-engine, a branch pipe of which was furnished with a *spreader*, by means of which the water can be thrown over a large surface—an invaluable appendage in the event of fire in corn or hay-stacks, weather-boarded buildings, and such like. This machine was also exceedingly portable, being easily capable of conveyance from place to place by one man. It had, moreover, the advantage of being so simple in its construction as to be understood at a glance, and managed by any person of ordinary capacity.

Such is a brief but necessary notice of the fire-engines exhibited in the Crystal Palace; and whilst we can bestow a well-merited compliment upon the Canadian production, we cannot shut our eyes to what appeared to us as a fault, being evidently too unsubstantial for the rapid and severe duties which such engines are so frequently called upon to perform.

Injecting Apparatus for the Preservation of Wood.—We have already briefly referred to the various specimens of timber, forming the Canadian trophy. Many loads of Canadian timber were used in the construction of the Crystal Palace; and we find, from official returns, that no less than 1,060,000 loads of Canadian timber were used in this country in the year 1850. If to this we add the timber imported from Norway, Sweden, Russia, &c., forming what is called the Baltic timber, we get an aggregate amount of nearly 1,700,000 loads of timber, actually applied to various purposes in one year, in addition to 80,000 loads of staves used in the manufacture of casks, &c. The value of this timber and staves is not short of £5,000,000. We have, unfortunately, no means of correctly ascertaining either the quantity or value of the oak, ash, elm, beech, fir, larch, poplar, and other wood, the produce of our own soil, used in a year; but this cannot be less in value than £2,000,000. We thus get a grand total value of £7,000,000 spent for timber in one year. Now, continued supplies of wood are required not only for the construction of new buildings, railways, bridges, ships, &c., but also to replace that which has rotted and decayed. This rotting and decaying of wood is a source of considerable expense, as we have not only the cost of new wood to provide for, but the expense of taking up the

decayed, and substituting sound timber in its place. Various plans have, from time to time, been adopted with the view of preventing the great loss thus sustained. Some of these processes we will mention, inasmuch as they were practically illustrated by specimens exhibited; but, before doing so, it may be as well to say a few words on the cause of this rotting and decay of wood, and the principle on which the remedy is founded. All wood contains what is called albumen, an essential ingredient in vegetable bodies, entering largely into the composition of the sap, or what we may term the life-blood of the tree, which circulates through the system. As long as this albumen is supplied with sufficient moisture to retain it in a soluble condition, so long will it be liable to enter into a kind of fermentation, especially if placed in damp or ill-ventilated situations, and often even where the ventilation is perfect, and the atmosphere in its ordinary state of humidity. If a piece of green timber—that is, timber recently felled, and therefore containing this albumen in a perfect state of solution, in the moisture of the wood—be employed in the construction of a house, the albumen undergoes fermentation, and the rot and decay of the wood speedily follows. The fermented albumen affords a food highly relished by a certain class of microscopic insects, whose keen perception soon leads them to find out its presence. These penetrate the wood in all directions, in search of this food; and, in so doing, make innumerable small crevices in the wood, through which air and moisture enter. These combine with the nitrogen of the fermenting albumen, and cause a formation of an ammonia and its compounds, which favours the growth of the seeds of numerous microscopic plants, which are ever floating in the air, seeking a suitable resting-place where they may fulfil the functions assigned them of continued increase. The minute plants which spring up from these seeds, in their endeavours to reach the light, push their way through the fibres of the softened wood, until at last, by the combined agency of animal and vegetable life, the timber rots, crumbles away, and becomes unfit for further use either in buildings or utensils.

How is this waste and destruction of wood to be prevented? To a certain extent by thoroughly drying the timber in a current of air. This, however, takes considerable time to effect: for instance, a large piece of oak requires exposure for eight or ten years to dry it completely. This is demonstrated by the fact that it continues to lose weight for that period. We may apply heat to hasten the process of drying; but the wood, when exposed to the ordinary temperature of the atmosphere, absorbs moisture in quantity varying with the compactness of the wood. In a dry room, without a fire, the quantity of water re-absorbed by wood amounts, on an average, to ten per cent. As long as the albumen of the wood is supplied with sufficient moisture to render it soluble, so long will there be danger of dry-rot. The best plan, therefore, to adopt is, to render this albumen permanently insoluble, so that, however much moisture shall be absorbed, it cannot be brought into an active state again. For this purpose, Sir H. Davy recommended that the wood should be steeped in a solution of corrosive sublimate, a salt called bichloride of mercury by chemists, which has the property of forming an insoluble compound with the albumen, and thus preventing its further action. This process was commercially applied by Mr. Ryan; but from the expensiveness of the preparation, and the fear that the use of this poisonous salt might prove deleterious to the health of sailors inclosed within their wooden walls, as well as to persons residing in houses filled up with this prepared timber, the employment of corrosive sublimate has been abandoned. In Class IV., Mr. Bethell exhibited some specimens of timber, saturated with the creosote oil, obtained from wood and coal-tar. This is a very powerful preservative; but possesses the disadvantage of imparting a disagreeable odour, and increased inflammability to the wood. Mr. Payne exhibited specimens, prepared first by injecting a soluble salt of baryta into the pores of the wood, and then adding solution of sulphate of iron; by this means a

compact, solid substance (sulphate of baryta) is formed, which remains in the wood, thereby increasing its weight, and partly converting it into stone. Sir W. Burnett and Co. exhibited specimens prepared by injecting chloride of zinc into the pores of the wood. This substance renders the albumen perfectly insoluble, even in sea-water, does not communicate any colour or odour to the wood, renders it less inflammable, whilst its use is perfectly innocuous in a sanitary point of view.

Next comes the question as to the means to be employed to saturate the wood with any of these preservatives. Simple steeping or immersion of the wood in the liquid may be sufficient in some cases; but when a quantity of wood is to be operated upon quickly, an apparatus must be employed, constructed on the principle of the air-pump. For this purpose, the apparatus constructed by Messrs. James Burton and Sons, engineers, Holland-street, Southwark, were admirably adapted. Drawings of these apparatus were exhibited in Sir W. Burnett and Co.'s case, in Class IV., No. 7. The first of these apparatus consisted of a wrought-iron cylinder, of any required size, with mouthpiece and cover the whole diameter of the cylinder, perfectly air-tight, and capable of sustaining a vacuum of not less than 29 degrees, or 28 degrees at least, and also a pressure of 150 to 200 pounds on the square inch. The cylinder was fitted with a tram-way, made to run the whole length of the cylinder, so constructed as to receive the prepared wood on one line of rails, and, being then moved transversely, to allow of another charge of timber, to be prepared, being introduced into the cylinder. A considerable saving is thus effected, both in time and labour. The apparatus is worked by a steam-engine, provided with double-acting vacuum and pressure-pumps. The cylinder being charged with the timber to be prepared, the cover is fitted on, and the air contained in the cylinder and in the pores of the wood is withdrawn by the vacuum-pump, and the preservative solution injected into the cylinder by means of the powerful pressure-pump. In this way the operation is most efficiently performed, the solution thus penetrating large pieces of timber, and completely saturating them with the preservative fluid. The second apparatus was precisely similar in its application, but was mounted on a wheel-carriage for the convenience of transport from one place to another.

A clever French physician, Dr. Boucherie, of Bordeaux, suggested, and partly carried out, the idea of making the living tree perform the work of its future preservation as timber, by causing it to take up preservative solutions with the sap in its circulation through the tree. This he effected by cutting a large hole in the lower part of the tree, surrounding it with a body of clay filled with the preservative solution. By this means the fluid ascends through the pores of the tree, impregnates it completely, and finally kills it, when it is cut down and used. Dr. Boucherie has also injected wood with various coloured liquids, whereby he obtains imitations of foreign woods, &c., which have been applied to cabinet-making and inlaying. Specimens of woods coloured by Dr. Boucherie's process were to be seen in the French department of the Exhibition. Perfume may also be communicated to wood, and even to flowers in this way, thus enabling us "to paint the lily, and to throw a perfume on the violet."

Agricultural Machines.—Messrs. Barrett, Exall, and Andrews, of Reading, exhibited a large variety of agricultural implements, including ploughs, harrows, carts, mills, &c., of the newest description, and combining the best work with the last modern improvements. Among these, the four-horse thrashing-machine, for which a patent had been obtained, was worthy of notice. The patent, so far as it had reference to the thrashing part, consisted, among others, in the following improvements:—The introduction of a wrought-iron concave or breasting, formed of separate bars, with serrated faces, working through slots in the side of the machine, and brought nearer to, or carried further from, the drum by means of two circles. These work round its centre with a continuous

grooved worm cut on their faces by machinery, in which the ends of the breasting-bars move. This arrangement allows the breasting-bars to separate wider from each other, as well as more distant from the drum, and thus gives the larger corn (beans, peas, &c.) a wider space through which to escape when thrashed. This plan is admirably adapted to the various grains to be thrashed, and at the same time it is so simple, that it is not likely to get out of order. The patent machines thrash barley and all sorts of grain perfectly; they work with great ease; and, should any accident arise, by which a bar of the breast-work is bent or injured, it can be taken out and straightened by the men at the work without much loss of time. There were also several three and four-horse, and steam-power machines, made up very strongly, and fitted with combined wood, iron, and wire-breasting, giving the most approved thrashing surface. The drums were of wrought-iron, with wood beaters, iron-faced, and they were in all respects as well made and correct in their arrangements as any that are manufactured. The whole of the machinery connected with the machine was enclosed in a cast-iron cylinder, with a movable cap, revolving, when at work, on its upper surface. On the inner edge of the cylinder were a set of cogs, which worked into three loose wheels, and communicated the motion to a pinion on an upright shaft in the centre, on the bottom of which was fastened a bevil-wheel, working into a pinion which communicated the power to the outside, giving 33 revolutions for each circuit of the horse; so that if the horse travels round three times in a minute, 99 revolutions are given per minute to the lay-shaft. One of the chief peculiarities of this machine is its safety. Nothing can gain admittance into the cylinder, unless purposely placed there—it being as much enclosed as a watch.

We shall next notice *The Haymaking-machine*, which obtained a prize in the Great Exhibition. It had two motions—one for tedding or spreading the grass, &c.; and the other for lightly turning the hay when nearly made. The accomplishment of the reversing or forward action was obtained by a simple short lever, on the end of which were fixed the two pinion-wheels which impart the rotary motion to the flyers. The lever was set for the different motions by means of a thumb-screw, fitting into three recesses on the side of the wheel-box.

Boyd's Patent Double-Action Self-Adjusting Scythe was an extremely clever contrivance, possessing many advantages over the old-fashioned, dangerous, and ill-contrived implement, which has hitherto remained in the same normal state as when old Time first employed it. It was contrived to be put together without the assistance of a blacksmith or forge. The blade or handle might be adjusted to any angle at the will of the operator, enabling him to cut either field or lawn grass, without change of scythes, and also permitting him to cut from one to six inches from the root of the grass or grain, either in an inclined or upright position of the body. The blade might also be adjusted to cut a breadth of about two feet per stroke over the old scythe, effecting a saving of twenty-five per cent. in labour. Perfectly portable, and free from the danger attending those of the present day, it might be shut up like a knife, and carried or stowed away as easily and safely as any ordinary garden implement. Its utility to emigrants can be well imagined, when it is considered that sometimes a settler may have to send 50 or 100 miles to the nearest smithy to get the ordinary scythe set; and, perhaps, when so done, it may have to be returned more than once for alteration to the required angle. The blade, handle, &c., in this double-action scythe, are, moreover, firmly fixed without the assistance of blacksmith or wedges.

Messrs. Ransomes and May exhibited an improvement on *Biddel's Scarifier*—an instrument invented about thirty years ago, and successfully used to clean wheat, bean, and pea stubbles directly after harvest; to break up such parts of clover layers as may have failed in the plant; and to break up land after green crops, in May or June, in preparation for

turnips, coleworts, &c.; thus accomplishing fine and deep tillage, without bringing fresh earth to the surface-land, in preparation for barley and oats. The improvements upon this scarifier consisted in manufacturing it almost entirely of wrought-iron, and suspending the frame so that by means of a lever at each end, and corresponding catches, either side may be raised higher than the other, to suit sloping ground, or to allow one wheel to run in a furrow whilst the teeth penetrate the cultivated ground to a uniform depth. The teeth were also of wrought-iron, and were secured to the frame in such a manner as to allow of varying both their distances from each other, and the depth to which they are to penetrate, allowing also of setting them to suit surrounding lands. This instrument is said to effect a saving of time and tillage, improved cultivation, and involves a less expense in harrowing than under the general methods. The instrument obtained prizes at various agricultural meetings as well as at the Great Exhibition.

The Circular Saw-Bench and Hurdle-making Machine.—An ingeniously-contrived machine, invented by Mr. C. Burrell, of Thetford, Norfolk, was exhibited in Class IX., and was deserving of close inspection. It consisted of two parts. On one side was a saw-bench, with a circular saw to cut out the rails and bars. It had a bar with a parallel motion to guide the wood to the saw, and to gauge it to the proper thickness. On the other side were five boring-bits, set at any required distances, and fixed on the axes of cog-wheels, that are made to revolve by means of a pulley and driving-wheel. The rails to be morticed are placed in a long box in front of the boring-bits, and firmly held in the box by means of a clamp at the end. This box is made to slide forward by means of a lever, and a quadrant pinion and rack-motion attached to each end. When the lever is pulled towards the attendant, it moves the box with the rail close up to the boring-bits, which, upon being set in motion, instantly bore five holes through the rail. The box with the rail is then made to move sideways, when five other holes are cut through the same rail. The rail is then gradually moved back again, and the bits revolving cut out the intervening wood left between the two holes, and perfect the mortices. The edges of the bars are then cut with the machine, and they are ready for making hurdles.

The first place, however, among the agricultural machinery that was exhibited in the Crystal Palace, must be ceded to our Transatlantic cousins. In evidence of which we shall give a short account of M'Cormick's Reaping Machine, which has, for many years, been in constant use in all the wheat-growing districts of the United States; and, although numerous attempts have been made to introduce machines of a different construction, they have failed in every case—this possessing so many and great advantages over its competitors, not only in its manner of cutting, but also in the state in which it leaves the grain after it is cut. As a labour-saving machine, it has proved itself an invaluable aid to the already large number of agricultural implements in America; for, without its aid, it would be impossible to gather the crops of the western states. Why it has never before been brought under the notice of English farmers is strange, especially when, as is often the case, labourers have been so scarce. On trial in this country, it was perfectly successful; and so well were the jury, under whom it was tried, pleased that they awarded it the great gold medal. The machine has since been making a most successful tour throughout the various counties of England, succeeding everywhere to admiration. We may also add, that the cost of it places it within the reach of all who are engaged in farming operations.

Messrs. Ransomes and May, of Ipswich, contributed some very excellent specimens of their manufacture. A plough for two-horse draught, was especially deserving of notice. At the trial at Southampton it was shown that, by simply changing the mould-board, it would answer equally well for heavy or for light land; and, upon that occasion, it obtained the double prize of the Royal Agricultural Society. Several other ploughs

exhibited were also of a character to sustain the well-known reputation of this eminent firm, many of which had obtained premiums at the meetings of the Royal Agricultural Society in various parts of the country. The same firm also exhibited a corn and seed-dropping machine, for the purpose of depositing seed-corn similar to hand-dibbling, at equal distances, which it accomplishes with unerring precision, in seams made by coulter, which precede the depositors. A portable steam-engine, for thrashing, and other agricultural purposes, was deserving of commendation; as were also a cane-top cutting-machine, much employed in the West Indies, a patent straw-cutter, and a chicory-cutter; which latter machine excited considerable attention—consequent, perhaps, on the late excitement in the coffee trade. Croskill's patent elod-crushing roller elicited attention among the admiring *Palemons*, whom the fame of the Great Exhibition drew from their rural retreats, as did also various turnip-cutters, oat-mills, crushing-mills, oil-cake breakers, grass-plate cutters, hay-making machines, ploughs, harrows, rakes, hoes, &c., "*Quæ nunc describere longum est*," which this very interesting collection contained. Suffice it that they were each excellent in their several capacities. A one-horse harvest-cart was quite classical in form, and appeared well adapted for carrying large loads from the harvest-fields. It was made very light in weight, and, from the best materials being used, and good workmanship, was strong, and could be more readily loaded than the wagons in ordinary use. The contributions of Messrs. Ransomes and May were honoured by the jury with their special approval, and several medals were awarded to the firm.

CHAPTER IV.

FOUNTAINS.

ANCIENT FOUNTAINS—FOUNTAINS IN FOREIGN CITIES—PARIS—ROME—THE CRYSTAL FOUNTAIN—IRON FOUNTAIN, BY THE COLEBROOK-DALE COMPANY—FOUNTAIN IN IRON, BY ANDRE—FOUNTAIN IN TERRA-COTTA—FOUNTAIN BY THOMAS; ACIS AND GALATEA—FOUNTAIN FOR A MARKET-PLACE—KALLIDE'S FOUNTAIN; BOY AND SWAN—BRONZE FOUNTAIN, BY JABEZ JAMES, ETC.

Few objects in nature are more delightful than fountains; charming the eye, soothing the ear, and offering ready refreshment to the weary traveller. No wonder that they were early sanctified by religion, and eulogised by the poet, as in that sweetest of the odes of Horace—

“ O fons Blandusiæ, splendidior vitro,
Dulce digne mero, non sine floribus,” &c.

Most of the ancient Greek cities, Corinth in particular, were adorned with artificial fountains; and, at Pompeii, many are still remaining nearly perfect—they there appear to have been as much used for ornament and luxury in private houses, as for utility in the streets and public roads; and it is easy to trace in them how well the property of water to rise to its level, and the law by which fluids may be made to ascend in a vertical jet to a height proportionate to the pressure which acts upon them, was understood at the time of their erection. Perhaps no city in the world is at this time so lavishly supplied with fountains as modern Rome, though, probably, even her present abundance is not a tithe of what she had to boast of in her more “high and palmy state” under the first emperors. Throughout Italy, indeed, the passion for fountains has called forth the utmost elegance and ingenuity of fancy in their construction and their

ornaments—they form one of the chief features of attraction in every city; nor scarcely is the humblest village left without some attempt at one which forms a favourite spot for resort; and whilst the imagination is delighted with the sculptures and inscriptions they may display, the feelings of benevolence are gratified by the thought of their utility. It must be confessed, that, as has been justly remarked in the *Builder*, “in order to obtain a correct idea of what a fountain should be, it is absolutely requisite to cross the Channel, and visit some of the continental cities. In England, we have nothing that will convey the same notion: with all respect for the works of our countrymen, we are compelled to acknowledge, that the fountains at Chatsworth, Trafalgar-square, &c., are very inferior to those at Versailles, St. Cloud, or even those smaller celebrities in the Place de la Concorde, at Paris. And the same comparison will hold good with regard to works of lesser note. With us, if water is required in public places for the general use, it is supplied by means of exceedingly ugly iron pumps; while on the continent, the same beneficial result is arrived at by more ornamental means. In the markets, and other convenient places, conduits are erected, from which water is continually flowing, and is to be procured with very little labour. In no place are they to be more frequently met with than in Rouen. It is said, that previous to the revolution of 1792, there was a fountain near every church; and at the present time they are not less than thirty-seven in number; seven of which, viz., that of the Croix de Pierre, the Crosse, the Grossé Horloge, the Vieux Marché, the Pucelle, St. Maclou, and Lisieux, deserve particular notice—some, on account of their architectural merit; others, for the historical recollections connected with them.”

Fountains, indeed, are the first objects that strike the fancy of a real English traveller in his first visits to the continent. “I miss the fountains,” said a friend of our own on his return from Spain—a real John Bull in valuing his own country above all others: and we could sympathise in his feeling; for we also have often wished to see London adorned with such a mass of splendid architecture and such a sonorous fall of many waters as the fountain of Trevi displays in the Eternal City, or, as the Fontana Paolina, with its magnificent Ionic column; nor have we ever looked upon the sea-horses in the Piazza di Navona, or the figure of Neptune with his trident, or his attendant Tritons blowing their shells, or any other emblem of the deep, without thinking how much more appropriately they might be introduced as appendages to fountains in the metropolis of our own sea-girt isle, the flag of which waves triumphant on every coast in the habitable globe. But leaving out all these fanciful illustrations, how grand and simple are the beautiful fountains in the middle of the Piazza di San Pietro, throwing their glittering bodies of water into the air, to descend like showers of precious stones into basins of oriental granite, fifty feet in circumference—but we must not let our subject lead us beyond our limits. It is time, moreover, to speak of the specimens of fountains that were presented to the public in the Great Exhibition, the most prominent among which, and the most worthy of notice was unquestionably—

THE CRYSTAL FOUNTAIN,

which noble object, although we have already, in an earlier portion of this work, given a brief description of it, we shall again introduce to the notice of our readers, now that we are expressly devoting a chapter to the subject, and of which it, indeed, constitutes so essential a feature. And here we cannot do better than quote the following remarks of Mr. Digby Wyatt, in his elegant work on the *Industrial Arts of the Nineteenth Century*:—“Those,” he observes, “upon whose memories the first sight of the glorious transept of the Great Exhibition has stamped a clear and lasting image, cannot fail to remember that striking object which formed so conspicuous a feature in the middle ground of the picture then presented to their view.”

It would be difficult to imagine a central ornament more appropriate for a palace of glass than a crystal fountain; and there is no doubt, that as a striking novelty in the application of the material, and as a pleasing and graceful object in itself, it must, in a pre-eminent degree, have excited the interest and admiration of the foreign visitors, who responded to the invitation accorded to them on the occasion of the first Exhibition of All Nations. Never before had a piece of glass-work been executed, involving the treatment (in casting, cutting, and polishing) of blocks of glass of a size so large and of a purity so uniformly faultless. The firm by whose exertions this superb object was produced, were already favourably known to the public by the taste which has always characterised their ordinary trade-productions. Having been led, some years ago, to execute a splendid candelabrum in glass, for the late Pacha of Egypt, the Messrs. Osler acquired, in the course of its formation, such an amount of practical dexterity, as induced them to undertake, with confidence, the preparation of a still more magnificent ornament of a similar nature, twenty feet in height, expressly as a contribution to the Birmingham Exhibition, held at Bingley-house, in 1849. This latter work was purchased by the Nepaulese ambassador.

Excited by the admiration universally elicited by these productions, the Messrs. Osler determined that their chief contribution to the Exhibition of All Nations should far surpass their previous attempts. Mr. Follett Osler has communicated to Mr. Hunt's *Hand-Book to the Great Exhibition*, an interesting account of the difficulties which presented themselves in the course of executing the Crystal Fountain; and as we feel ourselves unable to describe in language more graphic than that gentleman has employed, we take the liberty of adopting his words:—"The experience gained in making the candelabra for Egypt has been of considerable use to us in making the great fountain; though the difficulties attendant on the latter work were far beyond what we anticipated when we first entertained the idea of its construction. Indeed, for some time it progressed so slowly, that we feared we should be obliged to abandon the undertaking. First, the moulding of such a large piece of glass is very troublesome and difficult, and the waste very considerable. The annealing also is very hazardous. If the kiln in which this process takes place is at all too hot, the work is bent out of form by its own weight; and if too cool, fracture is certain to take place, either immediately, or during the process of cutting—that is, grinding and polishing. This annealing, or cooling process, occupies a space of from six to seven days; and, as only a comparatively small portion of the whole can be made at once, much time is consumed. Such parts as have stood the moulding and annealing have next to be submitted to grinding: and here much additional risk is incurred; for every part is richly cut all over. Upwards of four tons of crystal-glass were used in the construction of the fountain now in the transept of the Exhibition. The principal dish is upwards of eight feet in diameter, and weighed, before cutting, nearly a ton. The shells round the base weighed nearly fifty pounds each previous to cutting. The public can really form no conception of the labour and troubles to be gone through in producing this work, though I think the glass-trade must be pretty sensible of it. After all, there is not only the glass, but the construction and engineering difficulties, if I may so call them, to be overcome. We have had the best advice and assistance of Mr. Barry, who has taken a great interest in the work, and he has aided us with his valuable advice. We look to this rich and massive style of work as opening a new feature in the trade, a smaller sample of which (a pair of candelabra) may be seen in our case in the gallery. These were executed by command of his Royal Highness Prince Albert, and were presented by him to her Majesty, on her birth-day, in 1849, and are placed in the drawing-room at Osborne. They are upwards of eight feet in height, and carry fifteen lights each." The glass produced by Messrs. Osler is remarkable for its extreme purity and brilliancy;

and when it is considered how fine are the proportions in which the various elements which constitute perfection in glass-manufacture require to be combined, and how the slightest impurities entail the gravest defects, it is not easy to realise to the imagination the amount of thought, study, and attention which the Messrs. Osler must have devoted to the production of this beautiful and extraordinary work.

Fountain and Ornamental Gates in Cast Iron, by the Colebrook-Dale Company.—From the glass we turn to the iron-founder, for he also had his fountain in the Great Exhibition; and, although it could not compete with the beautiful work we have just been eulogising, still it was a work which displayed the high degree of perfection which English manufacturers have attained in the present day, in the production of exceedingly large castings, of perfect precision of form, and homogeneity of texture. The accomplished and elegant writer whose opinions we have already quoted in our account of the crystal fountain, takes occasion, in the following passage, to bestow his meed of approbation upon the company which enriched, in so varied a manner, the numerous departments of the Great Exhibition:—"The point of view in which we must especially take occasion to commend the Colebrook-Dale Company, is in reference to the energy and liberality with which they seek to employ and reward the highest class of artists. The beauty of such productions as this Fountain, the Eagle-Slayer, and other works of a similar class, do credit alike to Mr. Bell, the sculptor, and to the company. We cannot but regard them as the beginning of a very important branch of industry; and so soon as scientific chemists shall have discovered a material which, superseding paint, shall effectually protect iron from oxydation, without destroying the perfection of its surface, or the sharpness of its angles, we have no doubt it will be very largely employed in the formation of objects of the highest class of art."

Fountain in Iron, by André, of Paris.—In the last French Exposition, M. André exhibited the elegant fountain in iron which subsequently attracted so much admiration in the Great Exhibition of All Nations. "Whilst there is much," says Mr. Digby Wyatt, in his beautiful work already cited, "in the design and execution of this fountain, it may still be remarked, that in common with most other works in metal of the present day, its ornaments are deficient in those peculiarities of style proper to the material. This defect probably arises from the circumstance that the patterns for iron-casting are made by wood-carvers; and thus we find that panels, eminently suggestive of joinery, and foliage and fruits, which might appropriately decorate cabinet-work, too frequently constitute the staple material of important designs carried out in iron. In the balcony-railings and open-work door-panels used in the modern street-architecture of Paris, the principle of lightness is admirably expressed; and even though painted in the most manifest stone-colour, the eye at once detects in them the peculiarity of the material." The iron-founder is much indebted to the exertions of M. Calla, who has executed a number of admirable works in the Palais Royal, the Tuileries, &c., &c., among which the colossal statues which adorn the beautiful fountain in the Place de Richelieu, attest at once his skill as a founder and the applicability of the material to such monuments.

Fountain in Terra-Cotta.—Berlin has long been celebrated for the excellence of its productions in terra-cotta. A signal evidence of the skill of the Prussian artist in that branch of art was the terra-cotta fountain contributed to the Great Exhibition by Mrs. Marsh, of Berlin, which, while it admirably illustrated the perfection of the manufacture, at the same time displayed a pleasing taste in composition, and great freedom and excellence in modelling. It was sent from the artist's manufactory at Charlottensburgh, in which are employed some of the most promising artists of Germany. As a tasteful ornament, suitable for a park or garden, this fountain would be very appropriate, and from the nature of the material could be erected at a small cost.

Fountain by Mr. Thomas.—This was a very elegant structure. Four emblematical figures served to throw up the water, while, in the centre, stood the exquisitely-carved figures representing Acis and Galatea. We all recollect the story as it is told by Ovid (*Metamorphosis*, xiii., verse 789), how the sea-nymph was beloved by the Cyclops, Polyphemus, whom she treated with coldness and disdain, while she bestowed her warm-hearted affection on Acis, a shepherd of Sicily; how the happiness of the two lovers was destroyed by the envious jealousy of the one-eyed monster, who, in order to rid himself of his rival, destroyed him, as he sat with Galatea at the foot of a rock by the sea-side, by hurling on his devoted head a huge mass of stone torn from the surface of the mountain; and how Galatea, inconsolable for the loss of her lover, and finding that she could not restore him to life, changed him into a fountain; while she herself was metamorphosed by the gods into a stream, the office of which was to supply its fountain lover. Virgil also tells us the same story in the *Æneid*. Few subjects in the whole range of classic lore have been more attractive to the poet, the painter, or the musician, than this of Acis and Galatea. Witness the charming songs of Gay, the rich and varied harmonies of Handel, and the magnificent landscape by Nicolo Poussin, certainly the most grand and romantic one that ever issued from a poet's imagination.

We next turn to *A Fountain for a Market-place*, by Mr. John Seeley, of the New Road, which for nobility of form, grace of outline, and entire adaptability of purpose, was entitled to the highest commendation. It stood in the western nave, a situation by no means suitable to display it to advantage, as there was not space sufficient for the magnificent *jets d'eau* it was capable of sending forth. It was designed by Mr. Papworth, of Great Marlborough-street, and was constructed of artificial stone. Of M. Kallide's *Fountain; Boy and Swan*—executed in marble for the King of Prussia, and cast in zinc by Messrs. Geiss, of Berlin, we cannot speak with much commendation. Let us pass on, then, to a small *Fountain in bronze*, by Jabez James, and pause awhile to admire the richness of its ornaments, its dolphins, and sea-monsters, and its presiding figure of "the stern god of the sea." This little fountain was well adapted for the decoration of a summer-house or a cottage verandah.

An Earthen-ware Fountain, by Ridgway, was also worthy of notice, as well as a fountain by Freen Roe and Haman, which stood in the north transept. But it is time to conclude our chapter, and to take leave of these agreeable objects—these fountains—

"———— That warble, as they flow,
Melodious murmurs."

CHAPTER XV.

HOROLOGY.

EARLY MODES OF MEASURING TIME—THE SUN-DIAL, ANTIQUITY OF—THE CLEPSYDRA—THE HOUR-GLASS—WHEEL-CLOCKS—CHIMING-CLOCKS FIRST KNOWN IN ITALY—MENTIONED BY DANTE—STRASBURG AND LYONS CATHEDRAL CLOCKS—HAMPTON-COURT CLOCK—DR. HENDERSON'S CLOCK—ELIZABETHAN CLOCK—CHIMING SKELETON-CLOCK—TIME-PIECE, BY LOVEJOY—CLOCK BY VITTOZ—ASTRONOMICAL CLOCK—ELECTRIC CLOCK—CLOCK BY FRANCIS, ETC., ETC.

We have already made some remarks upon the subject of Horology, and given a brief explanation of the principal technical terms relative to the different pieces of mecha-

nism employed in the construction of instruments for the measurement of time, from the ponderous church-clock, like that of St. Dunstan's, with its attendant giants, Gog and Magog, starting forth at the appointed moment to strike the hours with their ponderous hammers, to the fairy jewel that may be made to adorn a lady's finger in a ring; or, minuter still, to be enclosed in the end of a pencil-case, for the special benefit of the punctual, when they are making their memoranda, as exhibited by Mr. Elfroth, whose ingenuity was rewarded with "honourable mention;" or, most minute of all, those Lilliputian time-keepers, the production of M.M. Patek and Philippe, only the thirty-fifth part of an inch in diameter.

It may safely be assumed, that the earliest, as it was the simplest mode of measuring time, was by the direction and length of the shadow cast by the sun; hence the origin of the dial, which is supposed to have been invented by the Babylonians, and from them received by the Egyptians and Chinese, as, at a later period, also, by the Greeks and Romans: but it was certainly familiar among the Jews long before it was known to the latter nations; and especial mention of it is made in the thirty-eighth chapter of the prophet Isaiah, wherein he says—"Behold, I will bring again the shadow of the degrees which is gone down in the *sun-dial* of Ahaz, ten degrees backward." Probably the idea of the dial itself was suggested by watching the shadow of some tall tree, as it followed the course of the sun from east to west. So, as the momentary sight of an apple falling to the ground, catching the eye of a philosopher, gave birth to the sublimities of the Newtonian system of astronomy, to this simple and passing object we may be indebted for all the successive improvements in the noting of time, which have reached, in the present day, a degree of perfection which, as we have already observed, enables the mariner to calculate his course across the pathless ocean, as also the astronomer to look for the "sweet influence of the Pleides," and all the starry host, at the precise moment when they will be revealed to him, as they track the orbits marked out for them by their Maker's hand. Lalande, in his *Considerations sur l'Astronomie*, mentions having a watch in his possession which, for forty years, had not varied one second. "Astronomers," he adds, "can divide a second of time into ten parts, without varying one-tenth in any of them." The next step, after the dial, in the marking of time, appears to have been the Clepsydra, invented by Ctesibius, of Alexandria, the son of a barber, who lived about two hundred and forty-five years before Christ: this instrument originally consisted of ten inverted cones, one of which was hollow, and perforated at its vertex; the other solid, and made to fit exactly the former. The aperture in the one was so adjusted to its size, that, when filled with water, it emptied itself in the course of the shortest day in winter. As the length of the case was divided into twelve equal parts, it was easy to indicate twelve hours by the successive descents of the fluid: the same results could be secured by divisions, marked on the vessel itself, and the cones could be differently arranged so as to adapt the fall of the water to the varying length of the day. Pompey employed the clepsydra to limit the Roman orators in the length of their speeches—a very useful thing for modern orators too. Cicero says, in allusion to this—*Latrare ad clepsydram*. Julius Cæsar tells us, he found water-clocks in Britain; and it was by them he found the summer-nights were shorter in that country than in Italy. The clepsydra was succeeded by the hour-glass, which had a long reign—seldom, indeed, till within these few years, was a cottage considered complete without one; and beautifully are its kindly offices set forth by Bloomfield, the Farmer's Boy, in his touching little poem of *The Widow and her Hour-Glass*. But its original use is gone by; and little now remains to it, but to "point a moral," or to serve as a characteristic appendage to the insignia of the rival despots—Time and Death.

We will not stay to inquire into the authenticity of the scheme, imputed to the inge-

munity of good King Alfred, of measuring the hours he knew so well how to employ, by waxen tapers, divided into given lengths; because the fashion—singular enough to say of any fashion set by royalty—does not appear to have been followed: we must, therefore, proceed to the consideration of actual wheel-clocks, for the first idea of which Italy lays claim, as early as the year 510 of the Christian era; though, as no mention of the mode of its construction is made in her annals of science, we may be allowed to doubt the fact of her priority of discovery in this instance. Indeed, we might set up a counter-claim in the venerable person of St. Sebastian the Martyr, who lived in the third century, and in whose “Acts” mention is made of a machine answering to our modern notion of a clock, were it not for the impossibility of ascertaining the fact, on account of the original being sentenced to demolition by the holy zeal of two other saints and martyrs—Polycarp and Stephen—who were scandalised by its exhibiting the motion of the planets, under their pagan names. We must, however, concede to Italy the first actual mention of a chiming or striking-clock, as an article in familiar use, and that by no less a personage than the divine Dante—

“Indi come *horologio* che ne *chiami*,
Nel hōra che la sposa d’Idio surge
Amattinar lo sposo, perche l’ami.”—*Paradiso*, x. 30.

which is rendered, though somewhat verbosely—

“Like solemn chimes at noon of night
That call the spouse of God her faith to plight
And love for love with fervent heart return,
When sound to sound responsive vibrates clear.”

Dante was born in 1265, and died in 1321: we may presume, therefore, that in the intermediate period, clocks had become of general use. Leaving, however, the farther discussion of these points to the curious in *antiquitates minores*, we will proceed to the notice of what the Exhibition afforded as most remarkable in the productions of modern horologists.

Until the middle of the sixteenth century, clocks were of such bulk, that they could only be placed in the turrets of churches, monasteries, and other large buildings. Before their introduction, the monks used to be called to matins by the crowing of the cock. At Pekin, even in the present day, the hours are still proclaimed by striking a gong with a wooden mallet, as in the time when the Tartars first invaded China. Strasburg and Lyons long considered their cathedral clocks as one of their proudest boasts: the complicated mechanism of both is now fallen into decay, and the advancement of science has caused its renovation to be little wished for; as the introduction of any machinery, not absolutely necessary, is found to interfere with the main object of exactitude of time. The oldest clock in England is one still kept going at Hampton-Court, and bears the date of 1548, in the reign of Henry VIII. It was about this time that clocks began to be so far reduced in size as to allow of their being used in private houses, in halls, on staircases, and, of late years, on an appropriately-diminished scale, in drawing-rooms—of which, from the richness of their outward material, and the ingenuity, elegance, and variety of the devices and figures with which they are adorned, they may justly be considered as one of the most elegant as well as useful ornaments.

We have just observed that, with respect to clocks and other time-pieces, ingenuity of mechanism is secondary compared to exactitude of time; but we may now be allowed to mention an instance in which both were combined, by Dr. Henderson, of Liverpool, who exhibited an astronomical clock, of curious construction, which showed the minutes and hours of the day; the sun’s place in the ecliptic; the day of the month, perpetually, taking leap-year into account; the moon’s age, place, and phases; the apparent diurnal

revolution of the moon; the ebb and flow of the sea at any port in the world; the golden number, epact, solar cycle, Roman indiction, Sunday letter, and Julian period; the mean time of the rising and setting of the sun on every day of the year, with its terms, and fixed and movable feasts: the day of the week is also indicated, and the year registered for 10,000 years past or to come. To show the very great accuracy of the motion in this complicated clock, a few of the periods may be noted—namely, the apparent diurnal revolution of the moon is accomplished in 24 hours, 50 minutes, 28 seconds, and 379,888.268 decimals of a second, which makes an error of one minute too fast at the end of 1,479 years. The stars will make a revolution in 23 hours, 56 minutes, 4 seconds, and 09,087,248 decimals of a second, which gives an error of one minute too slow at the termination of 589½ years. The synodical revolution of the moon is done by the wheels in 29 days, 12 hours, 44 minutes, 2 seconds, and 873,544,288 decimals of a second; and this will give an error of one minute fast in 1,167 years. The clock is said to go 100 years without winding up. It contains about 170 wheels and pinions, and upwards of 300 distinct pieces. Mr. Bennet, of Cheapside, was a conspicuous contributor: among the various articles of horology that were exhibited by him, we were more particularly struck by a hall-clock, enclosed in a richly-carved oaken case, in the Elizabethan style, complete in all its particulars; it stood on a pedestal elaborately carved, both case and pedestal being of pollard oak. The artist's design was very intelligibly rendered by the workman, and the entire work was produced without the aid of metallic ornament. The clock was a complete three-chimes, in which a gong was introduced for striking the hours; the quarters being played by a peal of bells. This work was the first application of the artist to the production of that which hitherto has been left in the hands of the workman, and bids fair to open up a new era in the style of English hall-clocks.

A chiming skeleton-clock was exhibited by Messrs. Moore and Son, of Clerkenwell, which chimed the quarters on musical bells, and struck the hours on a powerful-toned cathedral bell. It played twelve different tunes, one every hour during the day. The frames, the pendulum, and the steel plate upon which the clock rested, were elaborately ornamented with enamel. The face of the clock and hands were also enamelled. The whole was very elaborately finished, and mounted upon a richly-carved walnut-wood stand. Considered as a work of art, it was highly creditable to the makers, who are clock-makers to the Board of Ordnance, the Emperor of Russia, and the Chinese government. A curious time-piece was exhibited by Mr. George Lovejoy, of Reading, consisting apparently of only a dial of glass, on the centre of which an index-hand turns and points to the correct time, without any visible mechanism. The dial, which is of clear glass, with the hours painted upon it, is bordered by a rim of brass, supported by an elegant pedestal. It strikes the hours and half-hours, and goes twenty-one days. The secret of this kind of clock lies, we believe, in the fact that, instead of one there are two glass plates, on the outer of which are the figures. These revolve by means of a ratchet-wheel and connecting-shaft, concealed in the brass rim and supporters, the works of the clock being hidden in the basement. This clock, having but one (the hour) hand, must evidently be worked by some such plan as we have indicated. A very elegant design for a clock was exhibited by Vittoz, in the form of a globe arising from a body of clouds; a cupid was drawing aside a drapery embroidered with the *fleur de lys*, which, it appears, had veiled the dial-plate, and from the folds of which an eagle is pluming its wings for its upward course: one little cupid, on the summit of the clock, is extending his hand towards it, whilst behind him another is triumphantly waving a *fleur de lys*.

An astronomical clock, invented by W. Wright, was at once curious and well-made. It showed the minutes, hours, days of the month, and months of the year; the rising and setting of the sun and moon; the moon's age, phases, time of her meridian passage,

and position relative to the sun; the time of high-water at Aberdeen, and the principal sea-ports of Great Britain, Ireland, France, America, Spain, Portugal, Holland, and Germany. It was arranged to go for a year without winding up. We have been informed that the inventor of this ingenious instrument is a working tailor. Unquestionably the clock shown at the Exhibition was worthy of high commendation, and would have done credit to a practised horologist. An electric clock, exhibited by Mr. Shepherd, demands our especial notice. The hands were outside the building, but the mechanism was in the south gallery, fifty feet below. In the electric clocks previously constructed, the pendulum, at each vibration, touched a metal stud in connexion with a voltaic battery, and by that means communicated instantaneous but temporary magnetism to a coil of wire enclosed within the bob of the pendulum, and caused it to be attracted by a combination of permanent steel magnets placed within the sphere of attraction. The impulse to the pendulum was consequently derived from repeated magnetic attractions; and, as voltaic batteries are constantly liable to variation, the movement of the clocks varied accordingly. In Mr. Shepherd's arrangement, the impulse was given to the pendulum by a spring, and the electro-magnetic power was employed only to relieve the pendulum from the action of the spring during the return of vibration. By this means the impulse is altogether independent of the varying power of the battery, and the action is constantly the same. The whole of the works of this great clock were kept in motion by a series of powerful electro-magnets; and, by means of an immense coil of copper wire, other clocks in the Exhibition were kept going.

We must not conclude our remarks upon clocks, without some observations upon the *face* of one, the idea of which might be extended, with results as profitable to morality as pleasing to taste. We allude to that exhibited by Mr. Francis, of Devonshire-place. "In this design," as is happily expressed in the *Illustrated Exhibitor*, "it is attempted to make the familiar face of a clock a medium through which a palpable waste of time may be more vividly brought to the remembrance of the time-wasters. Around the face of the instrument are drawn two circles, in which are inscribed numerous texts from Scripture, all tending to instruct us how 'to walk wisely, in a perfect way.' The idea is extremely ingenious." We must beg leave to add—the idea is more than ingenious, it is extremely commendable; inasmuch as it may be extended into many channels, which may lead to results of the highest importance to religion and morality. It was formerly the custom, in England, to inscribe texts of Scripture on the interior of the walls of places of worship—and a right, wise, and good custom it was; now only to be traced in some ancient humble village-church, where these inscriptions serve to exercise the school-acquirements of the young rustics in endeavouring to decipher them, and recall to the elders the lessons learnt in their boyhood, from the lips of pious mothers, mindful of the precept of the wisest of men—"Train up a child in the way he should go, and when he is old he will not depart from it." In Switzerland this excellent custom is carried still further: the outer walls of dwellings that seem to proclaim every comfort within, continually attract the eye of the traveller by texts of holy writ, which remind him that life itself is but as the journey of a way-faring man over rough roads and through bewildering paths, beset with perils by water and land; but cheered with the hope of finally reaching the desired haven of rest. How opportune, often, those friendly admonitions—how deeply do they sink into the heart—how long they are remembered—how forcibly they may return to the memory, at times when mere worldly wisdom fails to impart to us the support or consolation we may require! But we must not carry our moralising beyond the limits our friend, the time-piece, might point out to us: we will wind it up in the epitome of the Rose-clock—another ingenious though miniature monitor, depicting "Time and its doings" under the image of a rose, which, in its progress over the four limbs of a Maltese cross, that orna-

ments the back of the watch, represents in its bud, blossom, decay, and death, the four corresponding stages of human life. On one-half the margin, around the back, is engraved, on blue enamel—"Man cometh forth as a flower, and is cut down;" on the other—"It is sown in dishonour; it is raised in glory." The dial represents, in enamel, the rose-window of Westminster-abbey. The twelve hours show the names of the twelve apostles: on the bezil that holds the glass is engraved, in blue enamel—"He that taketh not his cross daily, is not worthy of me." Another lesson on the flight of time is more elegantly, because less formally, indicated in the design of Mr. Bell's Clock-case, which shows, in bas-relief, the hours, from the earliest "day's harbinger," that waits upon the rising of Aurora, to the latest--

"————— Twixt night and morn,
That marks of Heaven's high-arch the key-stone,"

circling round the enamelled dial of the time-piece, which represents the sun, in the centre of whose rays is the never-dying Phœnix, the glorious bird that resuscitates itself from its own funereal pyre. The case is supported by recumbent figures of Day and Night, which recalled to the travelled spectator the celebrated ones by Michael Angelo, at the foot of the tomb of Giuliano de Medice, in the Capella de' Principi, at Florence: the whole is surmounted by the figure of Psyche, that lovely personification of the soul, which most happily typifies the triumph of immortality over time.

We cannot close our remarks on this subject, without noticing the magnificent design, by Mr. Adams, of a clock in ormolu, exhibited by Messrs. Howell and James. It represents the hours circling in graceful dance, Apollo lashing the "fiery-footed steeds" of day; the Seasons displaying their attributes, and scattering fruits and flowers: the whole surmounted by Jupiter, the eagle at his side, and his sceptre in his hand, regarding with complacency the animated groups below.

CHAPTER VI.

WORKS IN PRECIOUS METALS.

ELECTROTYPE—ELKINGTON AND CO.—TRIUMPHAL VASE—SPOONS AND FORKS—TEA-SERVICE, BY DURRANT—MOBEL'S CENTRE-PIECE—ARK OF THE COVENANT, BY BENNETT—ANGELL, HUNT AND ROSEKELL, LAMBERT AND RAWLINS—CENTRE-PIECES—RUSSIAN CANDELABRA—CENTRE-PIECE FROM MOSCOW, ETC., ETC.

ALTHOUGH we have already, in a former chapter, under the head of Ornamental Silver, made mention of a vast variety of rare and expensive examples of skill and perfection, which the worker in precious metals displayed in the Great Exhibition, still so many more in that fairy palace on every side,

"In rich profusion, caught the eye of Taste,"

that we feel no apology to be necessary to our readers for resuming awhile the gorgeous description. Indeed, in the department of works in precious metals and jewellery, the Exhibition was rich to a degree calculated to excite equal wonder and admiration—admiration of the elegance and appropriateness of the designs; wonder at, and, we may add, respect for the wealth of the manufacturers, and the spirit and liberality with which they applied that wealth to the public display of the talent of their artists, and the skill of their

mechanics. It has been estimated, that the value of the British-made plate annually used in this country amounts to £1,200,000; and, in 1849, the exports in plate and jewellery amounted to the value of £233,058. The introduction of the beautiful art of electro-plating, like many other ingenious and important discoveries, was found out by accident, by Thomas Spencer, of Liverpool, and has greatly contributed to the multiplication of beautiful designs for the table and other ornamental purposes, which by electrotype can be produced for one-third of the cost of silver, which they fully equal in appearance, the beauty of which they retain for many years; whilst, by the same simple process, it can always be renewed, at comparatively trifling cost; and a still further advantage of the process is, that it may be applied with equal precision and perfection to copies, from the smallest gem to the largest statue, exhibiting all the accuracy and beauty of the original design. It has, indeed, no limits to the delicacy of its working, or the magnitude of the works produced; it will preserve or copy the down on an insect's wing, or cover the surface of a life-size statue, as in that of Geoffrey de Mandeville, Earl of Gloucester, A.D. 1215, modelled by J. G. Westmacot, at Rome, one of the most admired works in electro-bronze in the Exhibition, and now forming a principal ornament in the House of Lords.

It has been truly said, that the dome of St. Paul's might be gilt, and a man-of-war copied by the electric agency; in fact, there are no limits to its capability, save that of the size of the vessel to hold the solution, and the power of the battery, or magnetic machine, to generate and supply the electricity. It may, indeed, be averred, that no application of science to the cause of manufactures has achieved a more complete triumph, or been more generally adopted than that of electro-metallurgy: other discoveries have had their periods of infancy, childhood, and middle age; but the art of the electrotype appears to have sprung up at once into vigorous life and usefulness. One of the most magnificent articles in this department was a vase in the Elizabethan style, from the manufactory of Messrs. Elkington, Mason and Co., the original patentees of the invention in 1840. This vase was intended to figure the triumph of science and the industrial arts, as set forth in the Great Exhibition. The body of the vase represented astronomy, philosophy, poetry, and mechanics, in statuettes of Sir Isaac Newton, Lord Bacon, Shakspeare, and Watt. The practical operation of science and art were depicted in the four bas-reliefs between the figures, and their influence typified by appropriate figures at the base, the whole being surmounted, on the apex, by a figure of his Royal Highness Prince Albert, as originator and patron of the Exhibition, awarding the palm of honour to successful industry.

It would far exceed our limits to notice one-tenth part of the beautiful articles displayed in this department by various exhibitors, particularly in tea and coffee-services; but some few of them imperatively demand our attention: we cannot refrain from mentioning the spoons and forks, of which several hundred dozens can be produced in one day by means of a machine, in one portion of which a piece of metal is placed, which, after undergoing various operations, makes its appearance at the other side, of the ornamental shape or design required. Among the tea-services was a very magnificent production, entitled, *Fontaine à Thé*—quite a work of fine art—indeed, the most beautiful arrangement of tea and coffee-service, beyond all comparison, in this branch of art ever exhibited in this country. Anything so pure, so delicate, so harmonious, so artistic, was never seen before even in France, whose inventive ingenuity there really appears to be no hope of approaching. The entire service was composed of massive silver, whilst the workmanship in the modelling, chasing, and engraving, showed how high the reach of art may be carried by a tasteful designer, who is determined to excel. This service was valued at 2,000 guineas. When you approach the counter on which this exquisite *morçeau* was standing, it looked like a fairy pagoda, intended for some Chinese princess. The centre-piece was rather

