



LXXXV. Some account of the art of painting in enamel

Mr. Alfred Essex

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Typus Choreius ineptus. ♂. ♀.

Nigro-æneus; antennis piceo-rufis, basi apiceque nigris; pedibus piceis; tibiis apice tarsisque rufis.

Chorea nigro-ænea. Westw. loc. cit.

Encyrtus ineptus. Dalm. Esenb. Hym. Mon. 2. 255.

Sphenolepis inepta. Esenb. loc. cit. p. 258.

Obs. 1. Genus *Sphenolepis* Esenbeckii, omnino distinctum nec ad subfamiliam *Encyrtides* pertinet.

Obs. 2. Individua nonnulla feminea cum speciminibus apteris cepi, alas quatuor perfectas nigricantes possidentia. Hæc pro specie diversa non considero; sed potius individua evolutionem perfectiorem gaudentia; speciminibus alatis *Velix currentis* analogæ. Nihil inter insecta Hymenoptera huic simile adhuc observatum est.

AGONIONEURUS ALBIDUS, Westw.

Totus pallide flavescens-albidus; oculis obscuris; alis immaculatis albidis, longè ciliatis, callositate stigmatali magis conspicuâ quàm in *Ag. basalis*, angulum parvum cum margine alarum formanti, antennarum articulo 5to præcedenti multò majori.—Long. corp. $\frac{1}{3}$ lin. Expans. alar. $\frac{5}{8}$ lin.

Habitat —? In mus. nostr.

AGONIONEURUS SUBFLAVESCENS, Westw.

Totus pallidissimè flavescens; oculis ocellisque paulò obscurioribus; alis subhyalinis, flavido vix tinctis callositate stigmatali quàm in *Ag. albido* minùs distinctâ, antennarum articulo 3, 4 et 5 æqualibus.

Obs. Insectum vix conspicuum.—Long. corp. $\frac{1}{2}$ lin. Expans. alar. 1 lin. In mus. nostr.

Habitat in sepibus apud Sylvam Coombe, æstate 1835.

LXXXV. *Some Account of the Art of Painting in Enamel.* By Mr. ALFRED ESSEX.*

THE perusal of the excellent paper on Glass-painting which appeared in the Philosophical Magazine for December 1836, having revived an idea which I had formerly entertained of drawing up for publication a brief view of the allied art of PAINTING IN ENAMEL, I have now endeavoured to bring my intention into effect. This art is mentioned in some former papers in the Magazine, but as it is usually introduced merely incidentally, some further account may not be unacceptable to the present readers of this work.

Before proceeding to my more immediate subject, allow me to make a remark or two on that of painting on glass.

Mr. J. T. Cooper observes, in a paper on "the Composition of the Ancient Ruby Glass†," that "the chief difference between the ancient and modern ruby glass consists in the hardness, or infusibility of the basis on which it is flashed, that which is now manufactured being of flint, while the former is

* Communicated by the Author.

† Annals of Philosophy, Second Series, vol. vii. p. 105.

of the hardest crown glass; also the difficulty of obtaining it of any size, and free from cloudiness or opacity." These objections, I understand, apply equally to that which is made at the present time*; to which it may be added that the modern ruby glass is inferior to the ancient in this respect also, that while the latter, on being exposed to the heat of a glass kiln, preserves its colour unimpaired, that of the former suffers considerable injury by such exposure, in some cases becoming almost black. The importance of this difference will be duly estimated when it is considered that, in consequence, the modern ruby cannot be painted upon, as the heat required to fix the fresh colour would destroy the beauty of its original appearance. To meet this difficulty the modern artist has recourse to the following ingenious expedient. He paints upon a piece of plain glass the tints and shadows necessary for blending the rich ruby glow with the other parts of his picture, leaving those parts untouched where he wishes the ruby to appear in undiminished brilliancy, and fixes the ruby glass in the picture behind the painted piece. Thus in such parts the window is "double-glazed."

Your "Correspondent" says that "the material employed by the old glass-makers to tinge their glass red was the protoxide of copper;" but it would appear from the analysis made by Mr. Cooper that the colouring material was not copper alone, for he states that he obtained in the process "a copious precipitate of chloride of silver."

It is generally believed, as stated also by the author of the paper on "Glass-painting," that copper yields the green in enamel-painting. This statement is true if it is confined to the productions of those artists who practised painting in enamel prior to the late Mr. Charles Muss. He employed, as I do, the oxide of chromium to produce this colour, and discarded copper altogether: in the composition of enamel colours, I entirely reject also the use of iron and manganese.

In the paper on Glass-painting now referred to, it is observed that "the accounts to be found in various works respecting this curious art are by no means satisfactory or complete:" this observation may be extended, without offering the least violation to truth, to the equally curious and beautiful art of PAINTING IN ENAMEL. Writers on the subject of enamelling confound the art of painting *in* enamel, with those of painting *on* glass and porcelain, although these three arts are almost as dissimilar as their products,—a painted window, a richly ornamented vase, and an enamel painting.

Enamel is a substance having for its basis a white and per-

* Mr. Cooper's paper appeared in 1824.

fectly transparent glass. When a small quantity of oxide either of gold, silver, cobalt, copper, or some few others of the metals is added to this base it produces a coloured transparent enamel. This enamel is used on silver and gold, and is applied to the ornamenting of snuff-boxes, watch-cases, and various articles of jewellery. Previously to the application of the enamel, various patterns and devices are *bright-cut* in the metal with the graver or the rose-engine, and the cuts, reflecting the rays of light from their bright and numerous surfaces, exhibit through the richly coloured enamels a beautiful and gorgeous play of colours sparkling in varied forms with every change of aspect. Sometimes this enamelled *bijouterie* is further adorned with paintings in enamel, executed on rich transparent grounds, when, in some instances, a sunlike splendour is imparted to the whole scene by the rays of the engine-turned gold shooting from behind the mountains in a landscape, or diverging from the bosom of a lake. The enamel which, when painted upon, produces the most agreeable effect in these applications, is that which is opalescent, and which by enamellers is called *opal*; the soft cream-coloured and fiery appearance of the gem being imparted in this imitation by the oxide of arsenic.

When oxide of tin or of antimony is added to the transparent base mentioned above, the result is an opaque enamel. I suspect, but am not certain, that oxide of antimony enters into the composition of some of the Venetian enamels. I have made an enamel with it alone, as the colouring matter, whiter than some specimens of foreign manufacture, and having in a high degree the waxlike appearance formerly so much valued by the makers of enamel clock- and watch-dial plates. But oxide of tin is certainly the substance to which opaque enamel commonly owes its opacity and whiteness*.

The enamel used for making the plates upon which paintings in enamel are executed is imported from Venice. It is in the form of round cakes, varying in size from three to seven inches in diameter, and from half to three quarters of an inch in thickness, and weighing from half a pound to three pounds each. It is cream-coloured, heavy, less brittle than glass, is sufficiently hard to scratch crown-glass; its fracture is conchoidal and exhibits a resinous lustre, and it fuses at a temperature a little below that which will melt gold. Its com-

* There is a substance made at the glass-houses near London, the commercial name of which is *glass-enamel*, that owes its measure of opacity and whiteness to the oxide of arsenic. It is very glassy, brittle, easily scratched, readily fusible, and very white. It is used for making the common kinds of clock- and watch-dials and the white semi-opaque ornaments for the mantel-shelf, toilet, &c.

mercial value varies from 12 to 20 shillings per pound. I have not analysed it, but its constituents, as stated by various authors, are silica, an alkali, and the oxides of lead and tin, and, I suspect, as before observed, oxide of antimony also.

An *enamel colour* is, like enamel, composed of a colourless and perfectly transparent glass for its base and owes its colour to a metallic oxide. Thus silica, borax, and the red oxide of lead form a base or *flux* for some colours. The habitudes of the oxides require that each should be treated with reference to its peculiar qualities, for instance, the flux which when employed with gold is best adapted for the production of a beautiful colour, is inefficient if used with the oxide of cobalt.

The plates for paintings are prepared thus: a plate of gold, or more usually of copper*, is covered with three successive layers of enamel, the enamel having previously been ground in an agate mortar; each layer requiring to be passed through the fire and melted before the next is laid upon it†. The plate being thus prepared, the artist proceeds in painting the picture in a similar manner to the painter in oil or in water colours, accordingly as the subject may require. The principal difference is this, that instead of waiting for the colours to dry before proceeding to lay on another coat, the painter in enamel has his work passed through the fire. By this process the colours are completely vitrified, and are incorporated with the body of the plate. This is not so completely the case with paintings on glass and on porcelain. The colours on these usually adhere only to the surface, and, under some circumstances, they are known to chip off‡. Glass and porcelain, also, do not admit of being subjected to so high a temperature as enamel plates, and hence the colours for painting on those substances are manufactured to melt at a much lower degree of heat than those used by painters in enamel. This

* The French and other Encyclopædias state, that silver is used for this purpose; and Walpole, in his "Anecdotes of Painting, &c." says that Petitot used plates of silver. This cannot be correct, for silver has the property of cracking the enamel in all directions every time it is passed through the fire, and hence it becomes necessary to expose plates of that metal when enamelled, to a sharp heat, in order to flow the enamel, that the cracks may close. This it is obvious would effectually destroy the drawing of a picture if it did no other injury. Silver is therefore only used for transparent enamelling, but in this application it is not so rich and beautiful as gold, and is only employed when the high value of gold is an object of consideration, as in the silver stars which are worn by the members of certain orders of knighthood, masonic emblems, military ornaments, &c.

† For a particular account of the manipulations practised by the enameller, see the article ENAMELLING in Rees's Cyclopædia. In this article the details are minutely faithful, though with reference to dial-plates modern improvements have rendered obsolete most of the processes described in it.

‡ See Brongniart "On the colours obtained from the metallic oxides," &c. Phil. Mag. First Series, vol. xiii. p. 342 *et seq.*

property of easy fusion is obtained by the introduction of a larger proportion of oxide of lead or of alkali, or of both, into the composition of the colours; which superabundance renders the flux of the colours an *imperfect* glass, and consequently lays it open to decomposition, from the attacks of those gases, which, being continually evolved from putrescent and other substances, are ever floating in the atmosphere.

The difficulty of working the colours with delicacy, and the extreme care required in effecting this, render the process of painting in enamel slow, and hence it has seldom been applied with success to painting from life, but has usually been employed in copying*. Indeed its permanency obviously points out, as perhaps its most legitimate use, the transmission to posterity of faithful transcripts of those eminent works which time is daily injuring and is certain ultimately to destroy. To effect this object no other branch of art appears competent. Engraving is adequate to transmit light and shadow, design and drawing, but colouring is wholly unattainable by it. But how much of the beauty and merit of a fine work of art is dependent upon its beauty of colouring! Nor can the richness and sweetness of a good colourist be attained either on glass or on porcelain, the chemical action induced by these substances, when at a high temperature, being inimical to really good colouring, while that of enamel, on the contrary, tends to impart depth and sweetness to every tint. Another advantage possessed by enamel over glass and porcelain is worthy of notice, and this is, that while the latter do not admit of being subjected to the fire more than from three to five times, the former knows no other limit than the finish of the picture. Paintings in enamel are usually passed through the fire ten or twelve times, and indeed sometimes oftener. This unlimited application of his efforts affords to the artist the opportunity of imparting to his work the finish of a Gerard Douw and a Mieris, and also of attaining with precision the deep, rich, and sweet tones which are seen in the productions of Correggio, of Guido, of Rubens, and of Reynolds.

To obtain the richness of the master-colourists it is obviously necessary that the painter in enamel should be in possession of colours capable of emulating those of the painters in oil. In this however the artists of former times were sadly deficient†. But, fortunately for this durable and beautiful art,

* Walpole states of Petitot, that "His custom was to have a painter to draw the likeness in oil, from which he made his sketches, and then finished them from the life."

† Dr. Ure in his *Chemical Dictionary* gives, from the *Transactions of the Society of Arts*, what he terms "A valuable list of receipts for enamel colours." The unfortunate artist who shall attempt to make colours for the

the discoveries of modern chemistry have afforded the materials to supply this long-sought desideratum. From three of the metals which till lately were known but to chemists, and which were regarded as curiosities only, namely, platinum, uranium, and chromium, are already produced four of the richest and most useful of the colours on the palette of the painter in enamel. And doubtless we may look to this source for the means for further improvement. Before the introduction of oxide of platinum a positive rich brown was unknown in enamel*: this colour when produced by the mixture of others, as was previously the practice, was liable to alteration by repeated fires, becoming more opaque and meagre, and acquiring somewhat the appearance of common brown clay. With such a material how was it possible for an artist to obtain that deep, rich, and juicy transparency which is so highly and justly valued by every judge of painting, and which distinguishes the works of the great masters both ancient and modern? The oxide of platinum on the contrary yields a beautiful, indestructible, and richly transparent enamel brown, which no intensity or frequent application of the furnace can injure.

Mr. Cooper observes† that with the black oxide of platinum “we can now produce an enamel colour which preserves an intense black in the lighter shades, and is, moreover, capable of sustaining the most violent fire, without injury, which none of the former colours [blacks] will bear, without change.” On this I must remark that I have made many experiments with this oxide, but have never been able to produce with it an intense black enamel colour. A black it certainly will produce, but not of sufficient intensity to be useful to the painter. I have a black of great intensity which is unchangeable in the fire, and into the composition of which the black oxide of platinum does not enter. I have exposed this colour to the heat of an enamelling furnace about forty times without any apparent alteration of its tint or diminution of its intensity.

Colours proper for painting in enamel are not to be purchased: those sold for the purpose are adapted only for painting on china. I have devoted much time to their improve-

purpose of painting in enamel from these receipts will assuredly find, to his disappointment, that they are utterly useless. The statements made in books upon vitrifiable colours are really unaccountable, and truly does M. Brongniart observe in his essay, that “it is very remarkable, that if the processes described in these works were strictly followed, it would never be possible to form the colours for which they pretend to give recipes;” and M. Clouet is justified in exclaiming as he does of the authors, “None of them say what they ought respecting enamel.” (Phil. Mag., First Series, vol. vii. p. 3.)

* For this invaluable acquisition the enamel painter is indebted to the late talented and indefatigable Mr. Muss.

† Journal of the Royal Institution, vol. iii. p. 121.

ment for the use of my brother Mr. William Essex, Painter in Enamel to H. R. H. the Princess Augusta. One of the objects which I have endeavoured to accomplish, and in which I have not been unsuccessful, is, that they should be of the same colour when on the palette as they will be when they have passed through the fire. The colours possessing this property, the artist is enabled to see *while proceeding with his work*, the precise effect that will be produced after the painting has undergone fusion. Thus the power of attaining greater precision in imitating the original is secured.

In Brongniart's "Essay on the colours obtained from the metallic oxides and fixed by fusion on different vitreous bodies," which has been before quoted, it is observed that oxides "which adhere little to the great quantity of oxygen they contain, cannot be employed..... The colour they present cannot be depended on, since they must lose it in the slightest heat by losing a part of their oxygen." This assertion looks very well in theory, but I confess I was surprised to find such a statement put forth by an able practitioner. In his paper on the black oxide of platinum*, Mr. Cooper observes, "A curious property of this oxide should here be mentioned. When heated *per se*, or with combustibles, it is easily reduced, but when mixed with enameller's flux, it is capable of sustaining a very intense heat, without decomposition; indeed it has withstood reduction in the most violent degree of heat I was able to give it." To this may be added, that no colours are more to be depended upon, more indestructible in the fire, than those prepared from the oxides of platinum and of gold; and yet of the oxides of these metals it may be said, in the language of M. Brongniart, that they above all others "adhere little to the oxygen they contain," they standing lowest among the metals for affinity for oxygen†.

Every person at all acquainted with the receipts for enamels, as framed by those who had not that light to guide them which is afforded by modern chemistry, must be aware of the strange jumble which they almost universally present. Feeling certain that here, as in every other instance in which excellence is sought, simplicity was desirable, I have kept the attainment of

* Journal of the Royal Institution, vol. iii. p. 121.

† See a paper by V. Regnault in the Number for August, 1836, of the *Annales de Chimie et de Physique*, which appears to give the latest results on this subject. I am aware that it is conceived by Prof. Proust and others that the gold in the powder of Cassius, (which is employed to produce a purple colour in enamel,) is not in the state of oxide. Various considerations, however, have led me to a different conclusion, and I am much pleased to find that I am supported in this opinion by authority so eminent as that of the late Dr. Turner. See his *Elements of Chemistry*, Fifth Edition, p. 645.

different instances, and oxide of lead in six, and except one instance of introduction of the former substance, and two of the latter, the artist must of necessity be ignorant of the proportions in which they exist in the artificial compounds which he employs. Foreign substances also are present, such as iron, manganese, &c., which, although in minute quantities, are injurious and create confusion. These are not noticed in the foregoing analysis, because their introduction or omission, as likewise their proportions when introduced, are dependent upon accident and the pleasure of the manufacturer.

Let us now proceed to contrast this complex process with the result which some attention to the progress of chemical science has enabled the enameller of the present day to arrive at. The following are at once the materials and substantially the constituents of the green enamel colour which Mr. W. Essex has in use:

Silica.
Borax.
Oxide of lead.
Oxide of chromium.

Here the simplicity is such that all the substances which enter into the composition of the colour are known to the maker, and the proportions in which they shall exist are entirely within his command.

The enamelling-furnace, in which the smaller plates are prepared and the smaller paintings also *fired*, is a square space of about twelve inches in height, in depth, and in width, surrounded by solid brickwork, and opening into a vertical flue in which is a register for regulating the heat. It is elevated a convenient height from the ground, and has an iron plate hearth in front for the purpose of holding the plates and paintings both before and after they have passed through the fire. The bottom of the furnace, when prepared for use, is covered to about three inches in thickness with coke*, upon which the muffle is placed. The muffle has neither bottom nor back, and is surrounded

* The old enamel painters had a notion that no fuel but charcoal was suitable for an enamelling furnace. The late Mr. Hone held this opinion, and the late Mr. Grimaldi frequently had fires made with charcoal alone for his paintings, because, as was imagined, the colours "came out better;" but I never could discover that those paintings which were treated with charcoal displayed any superiority over those which were fired with coke. In conjunction with Mr. Muss I made several experiments to test the truth of this notion, and these proved it to be fallacious. Coke is by much the more convenient substance, as its combustion is slower, and consequently the heat can be maintained without interruption for a longer time by its means than with charcoal, than which it is also very much cheaper.

with coke except in front. An iron door, having an aperture in it the size of the front of the muffle, closes the whole. The entire draught of air supplying the furnace passes through the muffle. The plates and paintings are placed on thin slabs, made of tempered fire clay, technically termed *planches*. When the fire has burnt up sufficiently, the plate or painting, after having been dried by being placed on the iron plate opposite the fire, is gradually introduced under the muffle, the planch resting on the bed of coke. The greatest heat, it is obvious, will exist at the back of the muffle; it is necessary therefore that the picture should be turned while in the fire that it may be heated equally over its entire surface; this is effected by means of a pair of spring tongs. When the colours are seen to be properly melted the painting is withdrawn and placed on the iron hearth to cool. In this furnace plates are prepared and paintings fired from the smallest size up to about five inches in diameter; but for larger works a furnace of a different construction is required. The muffle of the large furnace has a bottom and a back, and its mouth is closed also by a door made either of iron or of fire-stone. From the circumstance of its thus being closed on all sides it has acquired the appropriate appellation of a *close muffle*, that before described being termed, in contradistinction, an *open muffle*; the essential difference being that while the entire draught of the furnace passes through the latter, it is wholly excluded from the former. In the large furnace the fire is placed under the muffle only, and is supported by iron grate-bars, the construction, in fact, closely resembling that of a common air-furnace. The draught passes between the bars and carries the flame into the flue, which commencing at the top of one of the sides of the fire-place, conducts it over the muffle, which it leaves, by means of flues constructed in the same plane with its bottom, on the side opposite to that at which it enters. The flame after enveloping the muffle plays against the bottom of an iron oven. This oven contains several shelves, and its use is, to *anneal* the paintings, this being necessary to prevent them from cracking when in the fire, which they would do if exposed suddenly to the heat of the muffle. The furnace is so arranged that the bottom of the annealing oven becomes of a dull red heat at the time when the muffle attains the proper state for receiving the paintings, and this is indicated by its interior becoming of a glowing orange heat, the muffle itself having to sustain a heat nearly adequate to the fusion of cast-iron. By this arrangement the paintings, as they are placed in the annealing oven while it is cold, are gradually heated until they arrive at a temperature at which they can with safety endure the much

higher heat of the muffle. They are likewise returned to the oven after they have undergone superficial fusion in the muffle, it being requisite that their cooling also should be effected gradually.

Painting in enamel having been reproached in the hearing of Mr. Muss as a style of art in which neither texture nor crispness was attainable, because, as was alleged, the colours when in fusion would flow smooth and mingle, Mr. M., being conscious that enamel possessed the capabilities of the styles both of oil and water, determined practically to vindicate his art from the reproach. For this purpose he painted that unequalled production in enamel, the Greyhound, which now forms part of His Majesty's collection. The original, by J. Ward, R.A., is painted with all that bold crispness for which the works of that eminent artist are celebrated, and in the enamel this peculiarity is faithfully preserved. By what means Mr. Muss accomplished this, is not fully known; but my brother, when copying a picture by Sir David Wilkie, having occasion for crisp painting, I undertook some experiments with the view of furnishing him with colour possessing the required quality of melting soundly, but retaining at the same time the sharpness and precision of form with which it had been touched on. The result of these experiments was the production of colour which, though completely vitrified, will, if required, retain even the sharpness of a needle point. In fact, transparency, crispness, and texture, (as indeed my brother's works may evince,) are now equally attainable in enamel as in any other mode of painting.

The nature of the material and the expense attendant upon attempts to produce large works have tended to restrict the dimensions of enamel paintings. Until the time of the late Henry Bone, R.A., Painter in Enamel to His Majesty, but few attempts had been made to extend the size beyond that suitable for trinkets. That artist, with amazing perseverance and industry, overcame innumerable difficulties, and exhibited annually, for a long series of years, enamels of large dimensions. Petitot, whose works are usually minute, painted, it appears, a picture "9 $\frac{3}{4}$ inches high by 5 $\frac{3}{4}$ wide* regarded by Walpole as indubitably the most capital work in enamel in the world"; but in this attempt he seems not to have been quite successful, for "the enamel is not perfect in some trifling parts*"; this picture is stated "to be in the collection of the Duke of Devonshire*." In the reign of Queen Anne an artist named Boit undertook a painting in enamel of the extraordinary size of

* Walpole's "Anecdotes of Painting."

“from 24 to 22 inches high by 16 to 18 wide.” He, however, failed to produce the picture, after having received an advance of 1700*l.*, and having expended upwards of 800*l.* in fruitless attempts to accomplish his object*. It appears, therefore, that the largest works which have been executed in enamel are, the Bacchus and Ariadne, after Titian, by Bone; and the Holy Family, after Parmegiano, by Muss.

Mr. Bone's picture measures 18 inches by 16½, and was painted after the original by Titian, now in the National Gallery. It was purchased of the artist by the late George Bowles, Esq., for 2200 guineas, and was subsequently in the possession of the Hon. Miss Rushout.

Mr. Muss's picture measures 20½ inches by 15¼†, and was painted after the original by Parmegiano, in the possession of Sir Thomas Baring, Bart. Upon the decease of the artist it was purchased by His late Majesty George IV., for the sum of 1500 guineas, and now forms part of the Royal Collection at Buckingham Palace. This great work then, it would appear, is the largest painting in enamel that has hitherto been executed.

It may be assumed that in general painting in enamel is best adapted for pictures of smaller size, yet in some cases circumstances may exist which render it desirable that a painting should be perpetuated in an enamel of even larger dimensions than those just noticed, and in the present state of the art no insuperable difficulty exists to the accomplishment of such an object.

Whether, participating in the general fate of the productions of man, paintings in enamel will, in the lapse of ages, alter, fade, and resolve into their original elements, is a problem the solution of which must be left to future generations. Nevertheless their power of extreme duration is established by the fact that some rude specimens of vitrified colours have been found in Egypt, which have existed between two and three thousand years, but which still appear as fresh as if they were but the productions of yesterday‡. This power of resisting decay renders enamel a valuable medium for conveying down the stream of time the likenesses of celebrated individuals. Portraits, whether executed in oil or in water colours, change in a comparatively short period, the rosy tints becoming pale,

* Walpole's *Anecdotes of Painting*.

† The plate was made for Mr. Muss by the writer of this paper.

‡ It does not appear that the Egyptians practised enamelling on metal. Specimens of gold inlaid with enamel exist in the collection of Egyptian antiquities at the British Museum, but none in which the enamel has been vitrified on the metal.

and the high lights fallow; and where the delicately transparent tints shed their deepening beauty opacity gradually supervenes. But those which are fixed in enamel will carry on unchanged to a period indefinitely remote the most delicate as well as the richest of the tints originally imparted by the pencil of the artist; and as he left the portrait of the sage, the poet, the warrior, and the beauty, so will they remain, when even the marble which portrayed their forms or told their history may have crumbled into dust.

35, Northampton-street, Clerkenwell, March 1837.

LXXXVI. *On Hydrate of Magnesia.* By G. O. REES,
M.D., F.G.S., &c.

To Richard Phillips, Esq., F.R.S., &c.

DEAR SIR,

SHOULD you think the following worthy of notice, pray favour me by inserting it in the Philosophical Magazine.

Your sincerely obliged,

59, Guilford Street, Russell Square,

G. O. REES.

May 16, 1837

It has been supposed by some chemists that magnesia is capable of uniting with water in several proportions, though no analysis seems to have been made of the artificial hydrate of that earth. The native hydrate of magnesia from America, analysed by Dr. Bruce, yielded in 100 parts,

Magnesia.....	70
Water	30—100.

A specimen of the same mineral from Unst, analysed by Dr. Fyffe, yielded in 100 parts,

Magnesia.....	69·75
Water	30·25—100.

The results of two analyses made by myself of the artificial hydrate agree very nearly with the proportions obtained by Dr. Fyffe from the native specimen. Thus in a first experiment 100 parts yielded,

Magnesia.....	69·63
Water	30·37—100.

A second experiment gave,

Magnesia.....	69·41
Water	30·59—100.

These specimens were prepared by digesting recently calcined magnesia in cold distilled water and then drying the