



***LEWIS  
F. DAY***

***WINDOWS:  
A BOOK  
ABOUT  
STAINED &  
PAINTED  
GLASS***



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**Lewis F. Day**

# Windows: A Book About Stained & Painted Glass

EAN 8596547027454

DigiCat, 2022

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# **PREFACE.**

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A stained glass window is itself the best possible illustration of the difference it makes whether we look at a thing from this side or from that. Goethe used this particular image in one of his little parables, comparing poems to painted windows, dark and dull from the market-place, bright with colour and alive with meaning only when we have crossed the threshold of the church.

I may claim to have entered the sanctuary, and not irreverently. My earliest training in design was in the workshops of artists in stained glass. For many years I worked exclusively at glass design, and for over a quarter of a century I have spent great part of my leisure in hunting glass all Europe over.

This book has grown out of my experience. It makes no claim to learnedness. It tells only what the windows have told me, or what I understood them to say. I have gone to glass to get pleasure out of it, to learn something from it, to find out the way it was done, and why it was done so, and what might yet perhaps be done. Anything apart from that did not so much interest me. Those, therefore, who desire minuter and more precise historic information must consult the works of Winston, Mr. Westlake, and the many continental authorities, with whose learned writings this more practical, and, in a sense, popular, volume does not enter into any sort of competition.

My point of view is that of art and workmanship, or, more precisely speaking, workmanship and art, workmanship

being naturally the beginning and root of art. We are workmen first and artists afterwards—perhaps.

What I have tried to do is this: In the first place ([Book I.](#)), I set out to trace the course of *workmanship*, to follow the technique of the workman from the twelfth century to the seventeenth, from mosaic to painting, from archaism to pictorial accomplishment; and to indicate at what cost of perhaps more decorative qualities the later masterpieces of glass painting were bought.

In the second place ([Book II.](#)), I have endeavoured to show the course of *design* in glass, from the earliest Mediæval window to the latest glass picture of the Renaissance.

Finally ([Book III.](#)), I have set apart for separate discussion questions not in the direct line either of design or workmanship, or which, if taken by the way, would have hindered the narrative and confused the issue.

The rather lengthy chapter on “*Style*” is addressed to that large number of persons who, knowing as yet nothing about the subject, may want *data* by which to form some idea as to the period of a window when they see it: the postscript more nearly concerns the designer and the worker in glass.

In all this I have tried to put personality as much as possible aside, and to tell my story faithfully and without conscious bias. But I make no claim to impartiality, as the judge upon the bench understands it. We take up art or law according to our temperament. I can pretend to judge only as one interested, to be impartial only as an artist may.

LEWIS F. DAY.



13, MECKLENBURGH SQUARE, LONDON.  
*January 29th, 1897.*

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## **NOTE IN REFERENCE TO ILLUSTRATIONS.**

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Theoretically the illustrations to a book about windows should be in colour. Practically coloured illustrations of stained glass are out of the question, as all who appreciate its quality well know. It may be possible, although it has hardly proved so as yet, to print adequate representations of coloured windows, but only at a cost which would defeat the end here in view.

*The EFFECT of glass is best suggested by process renderings of photographs from actual windows or from very careful water-colour drawings, such as those very kindly placed at my disposal by Mr. T. M. Rooke (pages [128](#), [159](#), [337](#)) and Mr. John R. Clayton (pages [51](#), [74](#), [98](#), [186](#), [207](#), [252](#), [286](#), [304](#), [342](#)), an artist whose studio has been the nursery of a whole generation of glass designers.*

*Details of DESIGN are often better seen in the reproductions of tracings or slight pen-drawings, little more than diagrams it may be, but done to illustrate a point. That is the intention throughout, to illustrate what is said, not simply to beautify the book.*

The direction of the pen-lines gives, wherever it was possible, a key to the colour scheme. Red, that is to say, is represented by vertical lines, blue by horizontal, yellow by dots, and so on, according to heraldic custom.

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# **WINDOWS, A BOOK ABOUT STAINED GLASS**

## **BOOK I.**

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## **CHAPTER I.**

### **THE BEGINNINGS OF GLASS.**

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The point of view from which the subject of stained glass is approached in these chapters relieves me, happily, from the very difficult task of determining the date or the whereabouts of the remote origin of coloured windows, and the still remoter beginnings of glass itself. The briefest summary of scarcely disputable facts bearing upon the evolution of the art of window making, is here enough. We need not vex our minds with speculation.

White glass (and that of extreme purity) would seem to have been known to the Chinese as long ago as 2300 B.C., for they were then already using astronomical instruments, of which the lenses were presumably of glass. Of coloured glass there is yet earlier record. Egyptologists tell us that at least five if not six thousand years ago the Egyptians made jewels of glass. Indeed, it is more than probable that this was the earliest use to which stained glass was put, and that the very *raison d'être* of glass making was a species of forgery. In some of the most ancient tombs have been found

scarabs of glass in deliberate imitation of rubies and emeralds, sapphires and other precious stones. The glass beads found broadcast in three quarters of the globe were quite possibly passed off by Phœnician traders upon the confiding barbarian as jewels of great price. At all events, glass beads, according to Sir John Lubbock, were in use in the bronze age; and, if we may trust the evidence of etymology, “bedes” are perhaps as ancient as praying.

Apart from trickery and fraud, to imitate seems to be a foible of humanity. The Greeks and their Roman successors made glass in imitation of agate and onyx and all kinds of precious marbles. They devised also coloured glass coated with white glass, which could be cut cameo-fashion—a kind of glass much used, though in a different way, in later Mediæval windows.

The Venetians carried further the pretty Greek invention of embedding vitreous threads of milky white or colour in clear glass, the most beautiful form of which is that known as *latticelli*, or *reticelli* (reticulated or lace glass), from the elaborate twisting and interlacing of the threads; but nothing certain seems to be known about Venetian glass until the end of the eleventh century, although by the thirteenth the neighbouring island of Murano was famous for its production. The Venetians found a new stone to imitate, aventurine, and they imitated it marvellously.

So far, however, glass was used in the first instance for jewellery, and in the second for vessels of various kinds. Its use in architecture was confined mainly to mosaic, originally, no doubt, to supply the place of brighter tints not forthcoming in marble.

Of the use of glass in windows there is not very ancient mention. The climate of Greece or Egypt, and the way of life there, gave scant occasion for it. But at Herculaneum and Pompeii, there have been found fair sized slabs of window glass, not of very perfect manufacture, apparently cast, and probably at no time very translucent. Remains also of what was presumably window glass have been found among the ruins of Roman villas in England. In the basilicas of Christian Rome the arched window openings were sometimes filled with slabs of marble, in which were piercings to receive glass (which may or may not have been coloured), foreshadowing, so to speak, the plate tracery of Early Gothic builders. According to M. Lévy, the windows of Early Mediæval Flemish churches were often filled in this Roman way with plaques of stone pierced with circular openings to receive glass.

Another Roman practice was to set panes of glass in bronze or copper framing, and even in lead. Here we have the beginning of the practice identified with Mediæval glaziers.

There is no reason to suppose that the ancients practised glass painting as we understand it. Discs of Greek glass have been found which are indeed painted, but not (I imagine) with colour fused with the material; and certainly these were not used for windows.

The very early Christians were not in a position to indulge in, or even to desire, luxuries such as stained glass windows, but St. Jerome and St. Chrysostom make allusion to them. It is pretty certain that these must have been

simple mosaics in stained glass, unpainted: one reads that between the lines of the records that have come down to us.

Stained and painted glass, such as we find in the earliest existing Mediæval windows, may possibly date back to the reign of Charlemagne (800), but it may safely be said not to occur earlier than the Holy Roman Empire. A couple of hundred years later mention of it begins to occur rather frequently in Church records; and there is one particular account of the furnishing of the chapel of the first Benedictine Monastery at Monte Cassino with a whole series of windows in 1066—which fixes the date of the Norman Conquest as a period at which stained glass windows can no longer have been uncommon. The Cistercian interdict, restricting the order to the use of white glass (1134), argues something like ecclesiastical over-indulgence in rich windows before the middle of the next century.

Fragments, more or less plentiful, of the very earliest glass may still remain embedded in windows of a later period (the material was too precious not to have been carefully preserved); but archæologists appear to be agreed that no complete window of the ninth or tenth century has been preserved, and that even of the eleventh there is nothing that can quite certainly be identified. After that doctors begin to differ. But the general consensus of opinion is, that there is comparatively little that can be incontrovertibly set down even to the twelfth century. The great mass of Early Gothic Glass belongs indubitably to the thirteenth century; and when one speaks of Early Glass it is usually thirteenth century work which is meant.

The remote origin of glass, then, remains for ever lost in the mist of legendary days. There is even a fable to the effect that it dates from the building of the Tower of Babel, when God's fire from heaven vitrified the bricks employed by its too presumptuous builders.

Coloured glass comes to us from the East; that much it is safe to conclude. From ancient Egypt, probably, the art of the glass-worker found its way to Phœnicia, thence to Greece and Rome, and so to Byzantium, Venice, and eventually France, where stained glass windows, as we know them, first occur.

It is probably to the French that Europe owes the introduction of coloured windows, a colony of Venetian glass-workers having, they say, settled at Limoges in the year 979.

Some of the earliest French glass is to be found at Chartres, Le Mans, Angers, Reims, and Châlons-sûr-Marne; and at the *Musée des Arts Décoratifs*, at Paris, there are some fragments of twelfth century work which may be more conveniently examined than the work *in situ*. The oldest to which one can assign a definite date is that at St. Denis (1108) but its value is almost nullified by expert restoration.

In Germany the oldest date is ascribed to some small windows at Augsburg, executed, it is said, by the monks of Tegernsee about the year 1000. There is also a certain amount of twelfth century work incorporated in the later windows at Strasbourg. The oldest remains of glass in England are, in all probability, certain fragments in the nave of York Minster. The more important windows at Canterbury, Salisbury, and Lincoln are of the thirteenth century.

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## CHAPTER II.

# THE MAKING OF A WINDOW.

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Since it is proposed to approach the subject of stained glass in the first place from the workmanlike and artistic, rather than the historical or antiquarian, point of view, it may be as well to begin by explaining precisely what a stained glass window is.

It is usual to confound “stained” with “painted” glass. Literally speaking, these are two quite distinct things. Stained glass is glass which is coloured, as the phrase goes, “in the pot;” that is to say, there is mixed with the molten white glass a metallic oxide which stains it green, yellow, blue, purple, and so on, as the case may be; for which reason this self-tinted glass is called “pot-metal.” This is a term which will recur again and again. Once for all, “pot-metal” is glass in which the colour is *in* the glass and not painted *upon* it.

It goes without explanation that, each separate sheet of pot-metal glass being all of one colour, a varicoloured window can only be produced in it by breaking up the sheets and putting them together in the form of a mosaic: in fact, that is how the earliest windows were executed, and they go by the name of mosaic glass. The glass is, however, not broken up into tesseræ, but shaped according to the forms of the design. In short, those portions of it which are white have to be cut out of a sheet of white glass, those which are blue out of a sheet of blue glass, those which are

yellow out of a sheet of yellow, and so on; and it is these pieces of variously tinted glass, bound together by strips of lead, just as the tesserae of a pavement or wall picture are held in place by cement, which constitute a stained glass window. The artist is as yet not concerned in painting, but in glazing—that is to say, putting together little bits of glass, just as an inlayer does, or as a mosaic worker puts together pieces of wood, or marble, or burnt clay, or even opaque glass.

There is illustrated [opposite](#) a piece of Old Burmese incrustated decoration, a mosaic of white and coloured glass bound together by strips of metal, which, were it but clear instead of silvered at the back, would be precisely the same thing as an early mosaic window, even to the completion of the face by means of paint—of which more presently. In painted glass, on the other hand, the colour is not in the glass but upon it, more or less firmly attached to it by the action of the fire. A metallic colour which has some affinity with glass, or which is ground up with finely powdered glass, is used as a pigment, precisely as ceramic colours are used in pottery painting. The painted glass is then put into a kiln and heated to the temperature at which it is on the point of melting, whilst the colour actually does melt into it. By this means it is possible to paint a coloured picture upon a single sheet of white glass, as has been proved at Sèvres.

Strictly speaking, then, stained and painted glass are the very opposite one to the other. But in practice the two processes of glazing and painting were never kept apart. The very earliest glass was no doubt pure mosaic. It was only in our own day that the achievement (scientific rather

than artistic) of a painted window of any size, independent of glazier's work, was possible. Painting was at first always subsidiary to glazier's work; after that, for a time, glazier and painter worked hand in hand upon equal terms; eventually the painter took precedence, and the glazier became ever more and more subservient to him. But from the twelfth to the seventeenth century there is little of what we call, rather loosely, sometimes "stained" and sometimes "painted" glass, in which there is not both staining and painting—that is to say, stained glass is used, and there is painting upon it. The difference is that in the earlier work the painting is only used to help out the stained glass, and in the later the stained glass is introduced to help the painting.



1. INCRUSTED GLASS MOSAIC, BURMESE (B. M.).

"PHOTO-TINT," by James Akerman, London W. C.

That amounts, it may be thought, to much the same thing; and there does come a point where staining and painting fulfil each such an important part in the window that it is difficult to say which is the predominating partner in the concern. For the most part, however, there is no manner of doubt as to which practice was uppermost in the designer's mind, as to the idea with which he set out, painting or glazing; and it makes all the difference in the work—the difference, for example, between a window of the thirteenth century and one of the sixteenth, a difference

about which a child could scarcely make a mistake, once it had been pointed out to him.

Here perhaps it will be as well to describe, once for all, the making of a mosaic window, and the part taken in it by the glazier and the painter respectively. It will be easier then to discriminate between the two processes employed, and to discuss them each in relation to the other.

The actual construction of an early window is very much like the putting together of a puzzle. The puzzle of our childhood usually took the form of a map. It has occurred to me, therefore, to show how an artist working strictly after the manner of the thirteenth century—the period, that is to say, when painting was subsidiary to glazing—would set about putting into glass a map of modern Italy. In the first place, he would draw his map to the size required. This he would do with the utmost precision, firmly marking upon the paper (the mediæval artist would have drawn directly on his wooden bench) the boundary line of each separate patch of colour in his design. Then, according to the colour each separate province or division was to be, he would take a separate sheet of “pot-metal” and lay it over the drawing, so as to be able to trace upon the glass itself the outline of such province or division. That done, he would proceed to cut out or shape the various pieces of glass to the given forms. In the case of a simple and compact province, such as Rome, Tuscany, Umbria ([overleaf](#)), that would be easy enough. On the other hand, a more irregular shape, say the province of Naples, with its promontories, would present considerable difficulties—difficulties practically insuperable by the early glazier, to whom the diamond as a cutting

instrument was unknown, and whose appliances for shaping were of the rudest and most rudimentary.

If with the point of a red-hot iron you describe upon a sheet of glass a line, and then, taking the material between your two hands, proceed to snap it across, the fracture will take approximately the direction of the line thus drawn. That is how the thirteenth century glazier went to work, subsequently with a notched iron instrument, or “grozing iron” as it was called, laboriously chipping away the edges until he had reduced each piece of glass to the precise shape he wanted.

It will be seen at once that the simpler the line and the easier its sweep the more likely the glass would be to break clean to the line, whereas in the case of a jagged or irregular line there would always be great danger that at any one sharp turn in it the fracture would take that convenient opportunity of going in the way it should not. For example, the south coast of Italy would be dangerous. You might draw the line of the sole of the foot, but when it came to breaking the glass the high heel would be sure to snap off (there is a little nick there designed as if for the purpose of bringing about that catastrophe), and similarly that over-delicate instep would certainly not bear the strain put upon it, and would be bound to give way. It should be mentioned that even were such pieces once safely cut (which would nowadays be possible) the glass would surely crack at those points the first time there was any pressure of wind upon the window, and so the prudent man would still forestall that event by designing his glass as it could conveniently be cut, without attempting any *tour de force*, and

strengthening it at the weak points with a line of lead, as has been done in the glass map [opposite](#). There is a jutting promontory on the coast of Africa, which, even if safely cut, would be sure to break sooner or later at the point indicated by the dotted line.

The scale of execution would determine whether each or any province could be cut out of a single sheet of glass, but the lines of latitude and longitude would give an opportunity of using often three or four pieces of glass to a province without introducing lines which formed no part of the design. That, however, would be contrary to early usage, which was never to make use of the leads as independent lines, but only as boundaries between two colours. There is a reason for this reticence. You will see that in the surface of the sea, where the latitudinal and longitudinal lines come in most usefully, it is necessary to use also other leads, which mean nothing but that a joint is there desirable. These constructional leads, when they merely break up a background, are quite unobjectionable—they even give an opportunity of getting variety in the colour of the ground—but when some of the leads are meant to assert themselves as drawing lines and some are not, the result is inevitably confused.





## 2. THE WAY A WINDOW IS GLAZED.

All that the glass gives us in our mosaic map is the local colour of sea and land—the sea, let us say, dark blue, the countries, provinces, and islands each of its own distinctive tint. When it comes to giving their names, it would be possible indeed on a very large scale to cut the letters out of glass of darker colour, and glaze them in as shown in the title word “Italy.” That would involve, as will be seen, a network of connecting lead lines. On a much smaller scale there would be nothing for it but to have recourse to the supplementary process, and paint them. The words Germany, Austria, Turkey, Naples, Sicily, and the rest would

have to be simply painted in opaque colour upon the translucent glass.

But, once we have begun to use paint, there are intermediate ways between these two methods of inscription, either of which would be adopted according to the scale of the lettering. These are shown in the names of the seas. In the word "Mediterranean" each separate letter would be cut out of a piece of glass, corresponding as nearly as possible to its general outline or circumference, and its shape would be made perfect by "painting out"—that is to say, by obscuring with solid pigment that part of the glass (indicated by dots in the drawing) which was meant to retire into the background. Presuming this wording to be in a light colour and the background darkish, this amount of painting would, as a matter of fact, be quite lost in the dark colour. In the lesser descriptions "Tyrrhenian" and "Adriatic Sea," each separate word, instead of each letter, would be cut out of one piece of glass (or perhaps two in the longer words), and the background would be painted out as already described.

Paint would further be used to indicate the rivers, the mountains, the towns, or any other detail it was necessary to give, as well as to mark such indentations in the coastline as were too minute to be followed by the thick lead. As a matter of practice, it is usual to paint a marginal line of opaque colour round the glass representing just a little more than that portion eventually to be covered by the flange of the lead, so as to make sure that that will not by any chance cut off from view what may be an important feature in the design.

For example, the mere projection of a lead which too nearly approached the delicate profile of a small face might easily destroy its outline. The glazier's lead, it should be explained, is a wire of about a quarter of an inch diameter, deeply grooved on two sides for the insertion of the glass. Imagine the surfaces exposed to view on each face of the window to be flattened, and you have a section very much like the letter **H**, the uprights representing the flanges, and the cross-bar the "core," which holds them together and supports the glass mosaic.

The process of painting employed so far is of the simplest; it consists merely in obscuring the glass with solid paint. This is laid on with a long-haired pencil or "tracing brush." The paint itself may be mixed with oil or gum and water, or any medium which will temporarily attach it to the glass and disappear in the kiln; for the real fixing of the paint is done solely by the action of the fire. The pigment employed consists, that is to say, of per-oxides of iron and manganese ground up with a sufficient amount of powdered flint-glass or some equivalent silicate, which by the action of the fire is fused with the glass (reduced to very nearly red heat), and becomes practically part and parcel of it.

Whenever a glass painter speaks of painted glass that is what he means—viz., that the colour is thus indelibly burnt in. After the middle of the sixteenth century various metallic oxides were used to produce various more or less transparent pigments (enamel colours as they are called to distinguish them from the pot-metal colours), but in the thirteenth century transparent enamel colours were as yet unknown to the glass painter, and he confined himself to

the solid deep brown pigment already spoken of—an enamel also, strictly speaking, but by no means to be confounded with the enamel colours of later centuries. Those were colours used for colour's sake; this is simply an opaque substance used solely on account of its capacity to stop out so much of the colour of pot-metal glass as may be necessary in order to define form and give the drawing of detail; and in effect the brown, when seen against the light, does not tell as colour at all but merely as so much blackness. The only colour in the window is the colour of the various component pieces of glass. Thus in the case of an early figure ([page 33](#)) the face would be cut out of a sheet of pinkish glass and the features painted upon it in brown lines; each garment would be cut out of the tint it was meant to be, and the folds of the drapery outlined upon the pot-metal. In like manner a tree would be cut out of green glass, its stem perhaps out of brown, and only the forms of the leaves, and their veining, if any, would be traced in paint. In the execution of the map there is no occasion for further painting than this simplest and fittest kind of work, little more than the glazier would himself have done had his means allowed him. And in the very earliest glass the painter was almost as sparing of paint as this: he did, however—it was inevitable that he should—use lines, whether in drawing the features of a face or the folds of drapery, which were not quite solid, and which consequently only deepened the colour of the pot-metal, and did not quite obscure it: he went so far even as to pass a smear of still thinner colour, a half tint or less, over portions of the glass which he wished to lower in tone. He began, in fact,

however tentatively, to introduce shading. Happily he was careful always to use it only as a softening influence in his design, and never to sacrifice to it anything of the intrinsic beauty and brilliancy of his glass.

The glass duly painted and burnt, the puzzle would be put together again on the bench, and bands of lead, grooved at each side to admit and hold the glass, would be inserted between the two pieces. These would be soldered together at the joints where two leads met; a putty-like composition or "cement" would be rubbed into the interstices between lead and glass to stiffen it, and make it air-and water-tight; and, that done, the window was finished.

It would only remain (what would in practice have been done before cementing) to solder to the leads at intervals sundry loose ends of copper-wire, eventually to be twisted round the iron saddle bars let into the stone framework of the window to support it; it would then be ready to be fixed in its place.

In contradistinction to the mosaic method of execution adopted by the thirteenth century glazier, a glass painter of the eighteenth century, and perhaps of the seventeenth, would, even though there were no necessity for longitudinal and latitudinal lines, cut up his window into oblong pieces of convenient size, only, of course, parallel and at right angles to one another.

The sea he might or might not glaze in blue glass; here and there perhaps, but not necessarily at all, an occasional province might be leaded in with a piece of pot-metal; but for the most part he would use panes of white glass, and rely for the colour of the provinces upon enamel. He would

have no need to separate his enamel colours by a line of lead, and where he wanted a dividing line he would just paint it in opaque brown. This method of glass painting forms an altogether separate division of the subject, not yet under discussion. It is referred to here only by way of contrast, and to emphasise the fact that, though we are in the habit of using the term stained glass rather loosely—though a stained glass window is almost invariably helped out to some extent by painting (unless it be what is technically known as “leaded glass” or “plain glazing”), and though a painted window is seldom altogether innocent of glass that is stained—there are, as a matter of fact, two methods of producing coloured windows, the mosaic and the enamelled; and that however customary it may be to eke out either method by the other more or less, windows divide themselves into two broad divisions, according as it is pot-metal or enamel upon which the artist relies for his effect.

Between these two widely different ideals there are all manners and all degrees of compromise, and methods were employed which, to describe at this point, would only complicate matters. It will be my purpose presently to describe in detail the steps by which mere glazing developed into painted glass, and how painting came to supersede glazing; to show in how far painting was a help to the glazier, and in how far it was to his hurt; to describe, in short, the progress of the glass painter’s art, to better and to worse; and to distinguish, as far as may be, the principles which govern or should govern it.

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3. ANCIENT ARAB WINDOW.

## CHAPTER III.

### GLAZING.

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The art of the glass painter was at first only the art of the glazier. To say that may seem like self-contradiction. But it is not so. On the contrary, it is almost literally the truth; and it is difficult to find words which would more vividly express the actual fact.

We are accustomed to think of a painter as using pigment always in some liquid form, and applying it to wood or plaster, canvas or paper, with a brush. Should he lay it on with a palette knife, as he sometimes does, it is painting still. If he could by any possibility put together his colours in mid-air without the aid of paper, canvas, or other solid substance, it would still be painting. This is very much what



the worker in stained glass, by the help of strips of intervening lead, practically succeeded in doing.

As a painter places side by side dabs of paint, so the glazier put side by side little pieces of coloured glass. (Glass, you see, was the medium in which his colour was fixed, just as oil, varnish, wax, or gum is the vehicle in which the painter's pigment is ordinarily held in suspension.) He could execute in this way upon the bench or the sloped easel quite an elaborate pattern in coloured glass; and although, in order to hold the parts together in a window frame, he had perforce to resort to some sort of binding, in lead or what not, he may still reasonably be said, if not actually to have painted in glass, at all events to have worked in it. In fact, until about the twelfth century, there were no glass painters, but only glaziers. Nay, more, it is to glaziers that we owe the glory of the thirteenth century windows, in which, be it remembered, each separate touch of colour is represented by a separate piece of glass, and each separate piece of glass is bounded by a framework of lead connecting it with the neighbouring pieces, whilst the detail added by the painter goes for not very much.