

*Respectfully Presented to*

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*by the Author.*

THE SUBSTANCE OF  
A LECTURE  
ON  
THE HISTORY AND MANUFACTURE  
OF  
STAINED GLASS WINDOWS,

PREPARED FOR AND READ TO THE MEMBERS OF THE

BOLTON MECHANICS' INSTITUTION,

ON 16TH DECEMBER, 1857,

BY

GILBERT J. FRENCH, PRESIDENT;

AND, WITH SOME SLIGHT ALTERATIONS, TO THE PATRONS, TEACHERS AND PUPILS

OF

DEANE CHURCH SCHOOLS

*(By desire of the Rev. H. Caldwell, M.A.),*

ON 5TH JANUARY, 1858.

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PRINTED FOR PRESENTATION.

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## ON STAINED GLASS WINDOWS.

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I HAVE very willingly accepted the invitation of your esteemed Vicar, to read to you some remarks on Stained Glass Windows, which I have thrown together for the use of the members of the Bolton Mechanics' Institution. I fear, however, you will find the subject one of rather limited interest; though I hope that by giving it an hour's attention, you may learn so much of its general principles and leading features as may enable you to appreciate beauties and to detect errors and defects when you visit strange churches; and that, too, without becoming chargeable with the serious fault of mis-spending your time.

Permit me to explain that I have no personal or pecuniary interest in the production of stained glass,—it is no part of my business. I am however very frequently consulted about them with reference to other matters of church ornament; and thus, though only an amateur, I have been able to collect a good deal of information about them.

The invention of glass is said to have been the result of accident: certain Eastern merchants made a fire on the sea-shore to cook their victuals; the shore was fine sand covered with seaweed; when the fire was burnt down, they found round about it a substance quite new to them, which proved to be glass. Nothing is more probable than such an accidental discovery, for the appearance of the two substances which when melted together form that useful commodity, are each of them opaque, and cannot in the least degree be seen through, while the result is one of the most clear and transparent substances known to art.

The two materials which when fused together form glass, are, fine sand or powdered flints, and some alkali or alkaline earth, as potash (which exists largely in seaweed), soda, or lime. They are mixed in certain proportions, and if perfectly pure and free from other substances, would when melted together produce a white, or rather, a colourless glass. But as the sand and the alkali have for the most part impurities, particularly oxides of metals, combined with them, though not visible to the eye, these metals have the effect of imparting colour to the glass. The most common is the oxide or rust of iron, which produces the dull green glass used for porter and wine bottles. But perfectly cleaned ingredients, with the presence of certain chemical agents used to counteract impurities which cannot otherwise be got rid of, give us colourless glass, a most valuable product, to which we are indebted for many of the greatest conveniences of civilisation;

into this I do not at present enter,—our business to night is with coloured glass.

I have said that the presence of a metal imparts colour to the fused mass of sand and alkali. This is usually done by adding a portion of the metal required to produce the desired colour to ingredients in the melting-pot. The produce is called pot-metal or pot-metal glass: it is blown in circular pieces or tables, with a yoke or bull's-eye in the centre, similar to the common window glass, and sometimes also cast into flat plates, and rolled.

Violet colour is produced by the metal manganese; green by chromium or copper; blue by cobalt; yellow by lead, antimony, or more frequently silver; red from tin or copper; deep purple and ruby from gold.

It must be remembered that the metals may be mixed in various proportions to produce different tints of colour, and also that the colours are variously affected by the greater or less degree of heat to which they may be exposed in the melting-pot: thus copper under certain circumstances gives a green, under others a red glass.

It is quite curious to notice the mysterious recipes which even so late as fifty years ago used to be printed about the modes of making this pot-metal: numerous ingredients were said to be needful which were of no use whatever; but it suited the makers to cover their operations with a shroud of secrecy, every one of them claiming to have some peculiar method of producing the colours, known to himself alone. Most of the discoveries were merely accidental—for instance, all the ancient ruby red glass was expensively coloured by mixing gold in the pot; yet a beautiful red may be, and now is, procured from copper. In a German glass-house, a copper ladle was used to lift from the pot portions of white melted glass. One day it was kept at this work for a longer time than usual, so that the bowl of the ladle became quite hot; suddenly it disappeared, having melted away in the white glass, which was afterwards found full of beautiful scarlet streaks. Now, though it was well enough known that the copper had imparted this fine colour, yet it was not until some years after, and with numerous fruitless experiments, that it could be again produced, and then only by bringing together fused glass and copper when each at a certain high temperature.

So deep is the colour which even a small proportion of gold gives to ruby glass, that if blown of ordinary thickness it would become opaque, and its beauty be entirely lost. To remedy this objection it is usual to pursue the following plan: the glass-blower takes up on the end of his iron pipe a certain required quantity of white or colourless glass, and this he dips into a pot of ruby, taking up a small quantity of it all over the white; he then blows the table of glass, which consists of white with a thin film of ruby on one side. This custom is very old, and the practice appears to have been used with the earliest specimens which have been met with. It must be obvious to you that any other colour could be treated in the same way, and tables of white

glass be made with coatings of blue, green, purple, or any other required colour; and also that colours may be produced by combining with each other in separate plates,—thus, a beautiful purple is obtained by blowing a film of ruby between two of blue, or by sheets of blue and yellow producing green. Yet, curiously enough, ruby only was made in this way until the time of Henry the Eighth, when blue was treated in a similar manner: it was not until quite lately that other colours were made after this plan. All such glass is called coated, or more commonly flashed glass. I show you some specimens of it, though without a minute examination you will be unable to distinguish them from the previously described pot-metal.

Flashed glass offers an advantage to the maker of windows which is not obtainable from pot-metal. By grinding off the thin coating of red, blue, or purple, or by eating it away with fluoric acid (a chemical expedient quite unknown to the ancient master), he can produce a white or (as will be afterwards described) yellow device upon a piece of ruby or blue glass. Here is a specimen of ruby with a white portion produced by grinding; and this is a bit of blue glass, the blue surface having been ate off with fluoric acid. I shall have occasion to call your attention to other examples afterwards.

There are many other little peculiarities in the manufacture of pot-metal and of flashed glass which I purposely omit. My wish is, to give you not a minute chemical account of the different processes, but merely a general notion of the way in which stained glass windows are made. I have said STAINED GLASS windows, for so they are generally called; but, in point of fact, the only true *stain* that can be given to glass is a yellow one: that is, yellow is the only colour which can be employed as a stain upon its surface, for other colours become part of the glass itself. The yellow stain is produced by the mode I shall now describe.

Chloride of silver (which acts so mysterious a part in photography) is mixed with about twelve parts of pipeclay, Venetian red, or yellow ochre; this is made into a thin paste with water, and the glass to be tinted yellow is covered with a coat of this paint laid on with a brush: when quite dry the glass is put into the furnace, and subjected to the required degree of heat. A portion of the silver enters into chemical combination with some ingredient of the glass, which is turned to a fine yellow; the clay remains unchanged, and may be washed or scraped off. The colour of the clay, whether dark Venetian red or white pipeclay, has no effect on the subsequent colour of the glass, though the old artists thought otherwise; the clay serves merely as a means of separating the silver into sufficiently minute portions, and of attaching it to the glass until it absorbs or unites with the silver. A few drops of sulphuric acid added to the paste before using it changes the yellow to a deep orange colour, and this is the only alteration that can be made with certainty. If a proper amount of heat be applied, the glass remains quite transparent, as in the

specimen I exhibit; but if it be over-burned, it is changed into something like china and becomes opaque.

The great advantage of this yellow stain is, that it can be applied partially, forming a yellow device on white glass, and turning to yellow also the white parts of flashed glass from which the colour has been removed by fluoric acid; or it may be applied to the white side of blue flashed glass, making it green, and acting similarly on other colours. This invention was introduced early in the 14th century, about the time of Edward I., and must have greatly increased the power of the ancient glass painter. I will afterwards show you specimens of old glass both before and after the invention of the yellow stain, which marked a very important era in the art, and by its presence or absence enables us to fix a date upon early work, for after its discovery the use of yellow pot-metal was nearly discontinued, so much easier was it to apply a yellow stain to white glass.

The ancient and the modern artists in stained glass windows rarely used materials of their own making; whether they required pot-metal, white, or flashed glass, they purchased them from various glass-houses, some of which were famed for their perfection in certain colours. That this was the case five hundred years since, is proved from accounts still existing of glass purchased for the old chapel of St. Stephen, Westminster, long used as the House of Commons. I find from receipts dated August 15th, 1351, that William Holmere was paid 3*l.* 18*s.* for blue-coloured glass; John Prentice was at the same time paid 1*l.* 0*s.* 8*d.* for white glass at the rate of 16*s.* per cwt.; Henry Steiverne was paid 1*l.* 14*s.* 8*d.* for red glass; and a few days after William Holmere again received 3*l.* 18*s.* for azure-coloured glass. Thus it appears that various makers prepared the different colours, and that Holmere was famous for blue, as there are many entries of purchases from him, mostly for that colour. At the present day I know of only two houses who make stained glass windows, and also manufacture coloured glass—the St. Helen's Crown Glass Company, Lancashire, and Messrs. Powell and Sons, of London.

Though yellow is the only colour which can be applied to glass as a stain, yet almost any colour can be fixed upon the surface of a sheet of glass in this manner. Suppose it is wished to paint on a piece of white glass, figures with various-coloured draperies: The artist takes pot-metal glass of the various tints required, pounds them into fine powder, mixes each with gum water, oil, or honey, to form them into a convenient paint; he then applies them to the surface of the glass, painting upon it with these materials the required picture. When all is thoroughly dry, the piece of glass is put into a furnace and subjected to so much heat as to melt the pounded glass, and also to melt—or at least soften—the surface of the white glass; the consequence is that the various-coloured powdered glasses adhere most firmly to the surface of the white upon which they have been placed, while the gum, oil, or honey has been entirely burned away.

The powdered glass however thus used loses much of its trans-

parency, and the colour of the powder is much less brilliant than that of the original glass from which it was made: it also darkens the white glass. Many most ingenious contrivances have been used to avoid this inconvenience, particularly by preparing pigments of great transparency, and mixing with them fluxes to induce their adhesion to the glass at a low temperature; still, the difficulties of this process are so great, and the risk of breakage in firing so considerable, that this method of painting on glass, called "enamel painting," is not very extensively practised, and only on small subjects (such as the one I now show you) for the decoration of dwelling-houses. The specimen is from my own small collection, and is a good example of old enamelled glass. It is a Flemish production, of about 200 years old, representing the Saviour after being scourged, crowned with thorns, and a mocking Jew presenting to him a reed instead of a sceptre. The work is enamelled on white glass; the flesh is delicately painted in brown; the seat on which the Saviour sits, and the Jew's coat, are blue; its sleeves, and the crown of thorns, green; the scourge at his feet, red; while a glory or halo of yellow stain shines round the sacred head. This is the most elaborate bit of old enamelled glass in my collection, and an excellent example of the peculiar style. You will notice that there is no lead-work in the central oval. The spotted border, roses, and foliage are all modern, and have been made to adapt the picture to the window in which it is usually placed.

Though I have said that enamel painting is not much employed in large windows, yet there is one enamel colour indispensably necessary to the artist. It is a brown tint, produced by rust of iron finely ground down and fused with a white glass that melts at a low temperature. This is again ground to a fine powder, and becomes a real enamel, which is used as a shade upon glass of every colour: it may be applied very thin, to show a light shade, or by repeated coats it will produce almost a black. Here is a small face and head, painted with brown enamel upon white glass. The effect, you will observe, is somewhat like that of a drawing in sepia; the brown is firmly fixed upon the white glass, and cannot be washed off, nor is the colour at all affected by sunlight; it is unchangeable, and, barring accident, almost indestructible.

Having now described and shown to you the materials used by the glass painter, I must for a moment beg your attention to what he does not, or at least should not, employ. Any colour mixed with clear varnish may be used to paint upon white glass; and, when nicely done, the effect is very good indeed, as the varnish but slightly impairs the transparency. But the sunlight soon eats away the colours, and the weather destroys the varnish, so that a glass picture painted in this way is sadly perishable.

About ten years ago a patent was taken out for a French invention, which promised great things for coloured glass ornamentation. Thin sheets of gelatine (a kind of transparent glue)

dyed of very bright colours, were placed between two plates of clear glass to protect them from the weather; but it was soon found that the colours of the gelatine were faded by the action of the sunlight, and the contrivance proved an entire failure.

To make a proper coloured window, the most imperishable materials should be used. Wherever oil paint or varnish has been employed, even in small quantities, it will eventually prove to be a cheat and delusion. I mention this, because I have more than once detected such a fraud in expensive windows.

I wish in a few sentences to point out to you a difference in the true meaning of two words which I must frequently use, but which are often confounded one with the other. The words are, *transparent* and *translucent*. A transparent window is one which can be easily seen through; it not only admits light, but objects beyond it are clearly visible to the eye: such are the windows used in our dwelling-houses. But a translucent window, while it always admits light, does not necessarily admit of objects being seen through it. The distinction is worth a brief consideration. In a dwelling-house, whether in town or country, we desire very properly to have such windows as may enable us to look upon the world without: we like to observe the objects passing in the busy streets—to see the beautiful landscape, the well-kept garden, or the ever-changing glories of the sky; hence we procure the clearest glass, and modern custom demands that it shall be in large sheets of polished plate, unbroken and undisturbed by cross-bars. But courts of justice, halls of legislative assemblies, studies, schools, and libraries do not require windows to be looked through, either from without or within; windows which are translucent alone, and not transparent, are best suited for such rooms. It is however for buildings employed solely for the worship of the Almighty, no matter their denomination, that translucent windows become of the greatest importance. There they are not merely a matter of fashion, or of mere decoration,—they become of use, almost a necessity. In church or chapel the worshipper desires to confine his eyes and his thoughts to the services in which he is employed, and should shut out all worldly objects and attractions. Hence it is that we find translucent windows to have been largely used in old churches; and for exactly the same reason they are now becoming very general in modern churches and chapels—not from mere fashion, as many suppose, but for purposes of absolute utility. Let me mention a case in point:

It is said that when Dr. Arnold became head master of Rugby schools he found the pupils restless and inattentive during the services in the chapel. And no wonder; for just outside the windows, which were then filled with the ordinary transparent glass, a colony of rooks had long been established in the tall trees. Even the best of boys could scarcely help watching them in their busy work,—building nests, stealing sticks, quarrelling, fighting, scolding, and flying about. This was a bad state of affairs, and a remedy was as desirable as it was difficult. It

would not do to drive the rooks away; they were old inhabitants and had a vested right to their trees and nests, while the doctor was but a new comer. He was, however, an eminently practical man, and soon devised a mode of pleasing all parties without offending the rooks. He proposed stained glass windows for the chapel, which were liberally subscribed for by the pupils and their parents. After their erection the rooks continued their busy work, but now quite unseen by the youths within. And this is said to have been one cause (though, doubtless, a very minor one), of the practical piety for which these young gentlemen became distinguished, not only at school, but which many of them carried into the world during their after lives; and where they, at the present day, still bear the character and designation of Christian gentlemen.

I will now describe to you the forms of church windows, which varied greatly at different periods, and endeavour to point out the peculiarities which distinguished the different styles of coloured glass placed in these windows, and for which they served as frames.

Although it is well known from historical records, that numerous Christian churches had been built of stone, in England, before its conquest by the Normans, under William I., yet as few vestiges of these churches remain, I do not call your attention to any style of (so-called) Gothic architecture earlier than that period. That which prevailed between the years 1066 and 1200, a period of 134 years, is called the Norman style of architecture. In it the walls were remarkably thick, and the windows very small and narrow with rounded tops. You will notice from the diagram I now place before you, that the wall is deeply splayed to the inside of the church, the obvious intention of this arrangement being to admit as much light and to exclude as much bad weather as possible; and the inference to be drawn from the arrangement is, that no glass whatever was used in such windows. Norman windows were placed high up in the wall, so that no person, either inside or outside the church, could look through them. Very little light could be supplied through them, but it should be remembered that at that time few people could read, or had books to read, so that but little light was required by the people worshipping in the nave of the church. The chancel where the services were read was usually better lighted with three windows of the same kind placed close together. History tells us that long before the Norman period glass windows had been occasionally used in some of the early cathedrals; but as no vestige of such glass is now to be met with, we have no certain knowledge of its peculiarities, and can only guess at them. Many modern churches have been built after these old Norman examples, as for instance Harwood church in the parish of Bolton; Christ church, on Bolton-moor, has had decorative additions all in the Norman style. Many Norman churches have had their windows enlarged, usually in some later style of architecture, to be afterwards described; and

these windows were often filled with glass, also of a better character: but in some cases, such as the restored Temple Church in London, stained glass windows have been introduced of the supposed period of the building, with very good effect.

I pass on to the next, called the Early English style, which succeeded the Norman about A.D. 1200, and prevailed for the succeeding eighty years, during the reigns of King John and King Henry III. You will easily recognise the windows of this period: they were long and narrow, and had sharp pointed tops like a surgeon's lancet, and for that reason they are usually called "lancet windows." They let more light into the church than Norman windows—not that they were always much larger in size, but because they were increased in number—two, three, four, or five being often placed close together, with only a very little bit of wall to separate them. They were always deeply splayed inside, with a smaller splay outside the church, and the glass was placed at the narrowest part of the opening. Parts of Furness Abbey were built in this style, but it was not much used in this part of Lancashire, which, at the time we speak of, was a very out-of-the-world district. Many modern churches have been built in the style of the Early English Gothic: Walmsley and Great Lever churches, and the Presbyterian chapel in Bowker's-row, are examples in the parish of Bolton, and the churches of St. Peter and St. Paul, Halliwell, in this parish, are modern examples; though I regret to say that some of them fail to do justice to this very elegant style of architecture.

A great change in the character of stained glass windows took place during the eighty years of Early English architecture. The earlier examples were of deep colours, mostly blue and red, with a very slight proportion of white or yellow glass. Small figure pictures were represented in medallions, on a ground of blue or purple; and the material appears to have been at that time expensive, as the glass forming the field or background of the pictures was seldom shaped into elegant forms, on the contrary, the leads which held the pieces together were usually humoured to the shape of the glass, the different pieces being built up like a random wall of masonry. This kind of glass, which was much more curious than beautiful, gave place to another style of surpassing elegance. White glass of a beautifully translucent, but not transparent kind, was arranged in graceful patterns, the leadwork flowing in finely curved lines. A very slight proportion of coloured glass was introduced in small medallions and other elegant forms. The finest examples of this kind of glass that I have met with are in the windows of York Minster called the Five Sisters. Those of you who have seen them will not have failed to remark them, and I heartily commend them to the notice of any who have yet to visit that most interesting cathedral.

Early English was succeeded by what is called the Decorated style of Gothic architecture,—not certainly a very appropriate

name, as Decorated churches are often particularly plain, though always very beautiful. You will notice that the opening of the window is much larger than before, and that it is subdivided by upright stone mullions to about one-half of its height, from which point the arch springs; the upper part or head of the window is beautifully filled in with flowing or geometrical tracery. This style prevailed from 1280 to 1380, just one hundred years, during the reign of the three first Edwards. The small openings in the head of Decorated windows, such as I indicate, were sometimes filled with coloured glass painted with flowers and foliage, very often with small figures of angels, but most frequently with picture subjects representing incidents in the life of our Saviour. I am able to show you two interesting ancient specimens of this style. One, which is tolerably perfect, is our Lord's Entry into Jerusalem, riding on an ass, his right hand extended in the act of blessing the people. The other is a picture of the Nativity of the Saviour: at the top are the heads of an ox and an ass, and under them the Bambino, or infant Saviour wrapped in swaddling clothes, exactly in the mode in which English babies were dressed at the time this glass was made. The figure of Joseph is easily made out, but an unfortunate fracture has greatly mutilated that of the Blessed Virgin; a large bit of the old glass has been broken out and another colour substituted. The halo or glory round the head still remains, and the drapery of the sitting female figure may be made out.

These interesting specimens have been doubtless stolen from some ancient Decorated church, or removed by some churchwarden who had no taste for antiquities. They are about 500 years old—probably older: this is proved by the total absence of yellow stain, the extreme thickness of the glass, the irregularity of its surface, the leadwork, which is not milled but cast, and the fact that the outside surface of the glass is full of small holes, about the size of pin-points, caused by very long exposure to the weather, and particularly by the action of sea air—an effect which is never met with except in the oldest glass.

I shall speak further about Decorated glass, but as my remarks will also apply to the style of window which succeeded it, called the Perpendicular, I will first point out the peculiarities of those windows. The Perpendicular is the last style of Gothic window to which I claim your attention: it is so called because the principal mullions of the windows, instead of diverging when they arrive at the spring of the arch, as in the Decorated, run *perpendicularly* up to the top, though much rich and delicate tracery is in many cases introduced between them. Perpendicular windows have also stone transoms passing across them horizontally from side to side. In any carefully minute account of stained glass it would be needful to point out certain differences which are always found to distinguish Decorated from Perpendicular work, but for our purpose this evening it will not be requisite to do so; their main points so closely resemble each other, that I shall speak of them together; first remarking, however, that through-

out the Perpendicular period the glass became gradually much thinner and more transparent, more even and regular on its surface, and that yellow stain was greatly used.

Decorated and Perpendicular windows were often filled with figures of glass representing our Lord and Saviour, the Blessed Virgin, the evangelists, apostles, prophets, saints, martyrs, and characters taken from the sacred writings. The custom commenced with the Decorated period, when it was a common practice to place statues of sacred personages both in the interior and on the outside of the churches. Now it is known from existing records, as well as from the evidence of portions of colour and gilding still found upon them, that these statues were richly painted in various colours; and also that the pedestals *on* which they stood, the back of the niches *in* which they stood, and the stone canopies of rich tabernacle-work *under* which they stood, were all similarly treated. If then you examine the separate compartments of a Decorated or a Perpendicular window you will notice that it nearly resembles the niches of a Gothic building; and to fill these niches with glass pictures of saints resembling in form and colour the statues placed throughout the church, was a consistent mode of decoration quite in accordance with the religious custom of the time. I cannot mention to you any ancient figure glass in this neighbourhood, but I may state that the east window of Bolton parish church, and the west window of the terra-cotta church at Lever Bridge, in the same parish, are good modern examples of Decorated glass in figures. While, for an excellent example of Perpendicular figure glass you need go no further than to your own venerable mother church of St. Mary in Deane, which has the great advantage of possessing the original ancient and characteristic stone mullions not enjoyed by the churches previously mentioned.

Though figures such as I have described were very frequently placed in Decorated and Perpendicular church windows, many of them were filled with small picture subjects and with sacred symbols and emblems of great beauty, and much less liable to lead to error than figures, many of which at the time of the Reformation were of an objectionable and irreverent character. These were very properly ordered to be removed; but unfortunately their destruction was accompanied by the smashing of many a beautiful and innocent religious picture, which can never be replaced. The small pictures were often arranged in such a manner as to demonstrate some of the leading doctrines of Christian religion, or to set forth a series of connected events from the history of the bible;—some-time events typified in the Old Testament were placed beside representations of their realisation in the New—as the brazen serpent, and the crucifixion of our Lord. The intention being always to present to the eyes of the people some striking illustration of Christian history or doctrine. There is a window of this kind in the south wall of the chancel of Bolton parish church, representing our Lord in six small pictures, either as himself a child, or ministering to and in company with children.

It was erected by subscription in memory of the late W. Bolling, Esq., long member of parliament for the borough. A window of similar character is now being constructed in testimony of the labours of Canon Slade, late vicar of Bolton: it is to contain pictures of those merciful acts for which special blessings have been promised, and will doubtless, when finished, prove to be a work of great excellence. It is to be placed in the north wall of the chancel of the mother-church of the parish of Bolton, immediately opposite the Bolling window.

Sometimes we find events of local historical interest recorded in stained glass, and where such have been preserved they are always of great value. I show you an accurate coloured tracing of glass now in the church of the neighbouring parish of Middleton. It represents a priest and sixteen archers kneeling in church and saying a prayer of thanksgiving for their safe return from the bloody battle of Flodden Field, to which they were led under the command of Edward Stanley, in the year 1513. Each archer carries his bow over his shoulder, his quiver of arrows at his side, and has his name inscribed over his head. They appear to have worn a uniform of blue cloth, but it must not be supposed that there is the slightest attempt to portray individual likenesses. Most of the names are now represented by families still resident in and about Middleton; and the subject is of interest to Boltoners, and to the inhabitants of Deane, when it is remembered that that town—and no doubt Deane also—furnished their quota of bold archers to fight in the same field under the same brave leader.

I now take the liberty of expressing a regret and a hope;—in my *regret* I think you will participate—it is, that no similar contemporaneous record is to be found in Deane church of the events in the life of George Marsh, the well-known martyr of the Reformation, closely connected as he was with this church and parish. He lived and died too late to have his eventful life recorded in glass; for, greatly beneficial as the Reformation was to the religion and liberty of this country, it had the effect of entirely setting aside the art of glass painting for several subsequent generations. But it is never too late to do a good work. My *hope* is, that I may live to see a modest window in your venerable church erected to the memory of the martyr—a picture window: the subjects, gathered from the quaint pages of Fox, should show the arrest of Marsh, his examination at Smithell's Hall, his indignant refusal of life with sacrifice of faith, his denunciation of error evidenced by the poetical impression of his footprint, his examination at Chester, his reading the litany in prison, and last of all, his cruel and awful martyrdom. I venture to think that such a window would be well placed in Deane church—that it would be looked upon with interest and pride by your descendants through many generations. There are some who think that stained glass windows are evidences of a leaning to Romanism;—a ridiculous error, which the window I have presumed to suggest would most emphatically refute. I dare not

venture to say any more on this subject, except to wish that its inscription might be in these, or some such words: "To the glory of God, and in memory of his martyr George Marsh, this window was erected by the inhabitants of the parish of Deane, and other friends of the Reformation, A.D. 1858."

The great window of York Minster is a Perpendicular one, of enormous size, the glazing measuring 75 feet in height by 32 feet wide. Here is a coloured engraving of it, which will assist my description. Not very long ago there existed the original contract for constructing the glass of this window; it is now lost, but copies of it remain, from which we learn, that in the year 1405—453 years ago—John Thornton of Coventry contracted with the Dean and Chapter of York to glaze the window in the space of three years; drawing and painting the figures and ornaments with his own hands. The materials and such assistance as he required were provided by the dean and chapter, who paid him as wages four shillings every week, five pounds at the end of each year, and ten pounds more when the work was finished. This window remains at the present day much as John Thornton of Coventry left it. The head—that is, the portion above the spring of the arch—has eighty-five different openings in the stonework, each filled with a figure of angel, saint, archbishop or other ecclesiastical dignitary. Beneath the spring of the arch there are one hundred and seventeen square glass pictures, representing incidents from the first books of the Old, and the last of the New Testament. They commence with the creation of the world in a series of seven pictures; then follow the events in Paradise, the expulsion, Cain and Abel (who are habited in dresses similar to those used in England at the time the window was made), the tower of Babel, the passage of the Red Sea, which is represented as in reality *red*, and other similar subjects, ending with the death of Absalom. Then follow eighty pictures all illustrative of the book of Revelations, some of them of most extraordinary character. The bottom row consists of nine pictures representing kings, archbishops, and bishops, in groups of three in each, except the centre one, which is supposed to be Archbishop Scrope at prayers.

Let me now try to explain how John Thornton set about his work. I am able to do this from information gathered from ancient records and accounts, particularly from those already referred to for glazing the windows of St. Stephen's chapel, which were executed under the charge of one John de Chester—that is, of an artist named John, a native of Chester. He had seven shillings, and employed other workmen under him at sixpence, a day, among whom we find a John de Coventry, probably the father or grandfather of that John Thornton of Coventry who fifty years afterwards commenced the York window; for trades at that time ran greatly in families, son succeeding father in the same occupation through many generations.

It is probable that his employers, the Dean and Chapter of York, would themselves fix on the subjects to be represented in

the window. John Thornton would make coloured drawings or cartoons on paper or vellum of each picture, in full size, marking in strong black lines the outline of each separate bit of glass: these black lines would be of the same breadth with the strips of lead to be afterwards used in joining the pieces of glass together. This first set of drawings would be carefully preserved. Another set would then be traced from them, without colour, but with the black lead lines carefully marked. These last drawings are cut with scissors along all the lead lines, leaving a margin of black about one eighth of an inch all round. Each bit of paper is now the exact shape and size of the pieces of glass required for the picture. The artist now selects pieces of glass as nearly as possible resembling the colour of the corresponding part in the first or coloured drawing, this he cuts to the size and shape of the paper. Cutting was a more difficult matter to John Thornton than it is to the modern glass-worker. The diamond was not used for the purpose—at least, in this country—until the beginning of the seventeenth century, in the reign of James I. True enough, the diamond was known to scratch glass before that time, for you may remember the anecdote of Queen Elizabeth and one of her courtiers, who, being ambitious to marry her, but somewhat timid withal, wrote with his diamond ring on the window of her private chamber—

“Fain would I clime, but much I fear to fall;”

to which the queen added with her own diamond ring, by way of reproof or encouragement,—it is hard to say which—

“If your heart fail you, do not clime at all.”

This incident, if true, occurred not very long before the diamond was used to cut glass. But John Thornton had to adopt other means. If the glass was thin he might cut it with scissors under water; but the usual way was to run a hot piece of charcoal along the line where he wanted the glass to sever, blowing it carefully with his mouth, to keep the coal red hot.

Glass of the proper colour, size, and shape being now prepared corresponding with each part of the picture, the shades would be painted with one or more coats of brown smear; yellow stain applied where it was required; the outlines of figures and drapery marked with strong lines of black; and where white or yellow patterns were to be taken out of flashed glass, they were now ground off. This being done, the pieces of glass are placed in a peculiar kiln, or muffle, upon plates of iron, but separated from each other and from the iron by layers of powdered chalk. Here they are exposed to so great a heat, as partially to melt or at least soften the surface of the glass: the brown smear adheres to it; the yellow stain penetrates into its texture; and when removed from the kiln the glass, after being cleaned, is usually ready to be leaded together, though sometimes it is necessary to repaint, and of course to reburn it,—which, however, should be avoided if possible.

The leading is usually done by another workman, who carefully solders the parts together, after having arranged them much in the way that children proceed with a dissecting map or picture. You will notice that in Gothic church windows of any style there is no great width between the stonework, so that the pictures are not leaded up into very large pieces; these are attached to iron bars, called saddle-bars, passing from mullion to mullion, and are easily secured. A copper wire guard is usually placed outside, to protect it from a chance blow from a stone thrown by any careless schoolboy. In these days, I am glad to say, there is little need for a guard against malicious stone-throwing,—none, I am sure, whatever from the boys of Deane schools, who cannot fail to protect rather than injure the fine old church, which they must be proud of.

Such a window as I have described is called a Mosaic window, because built up of various pieces of coloured glass; and the way in which John Thornton did his work is very similar to that of the artists of the present day, though improvements in chemistry and the mechanical arts have supplied them with many more convenient means of conducting the various processes.

You will, I fear, be tired of this long description, and want something to look at; I will therefore show you some specimens both of old and modern glass, all of Perpendicular or of Decorated character, among them you will find several coats of arms, which are always effective in glass. Some of these examples are from my own collection, others have been kindly lent to me by G. Shaw, Esq., architect, of Saddleworth.

(Numerous specimens having been exhibited and explained, he proceeded)—Permit me to explain, as I promised I would, how the yellow lions in this specimen are produced on the red ground in this shield. The ground is ruby flashed glass; the lions are marked on it in outline, and all the ruby except the lions is covered with a thin coat of bees'-wax and oil; when this is dry, a little wall of wax is built round the lions, and liquid fluoric acid poured over the surface of the glass, which soon eats away the ruby flash from the lions, but does not act upon the glass protected by the wax. When washed the lions would be white, but they are turned into gold colour by the application of yellow stain: the eyes, mane, and outline are marked with black or dark brown smear.

Many of the ancient figures in old church windows appear to have been very badly drawn, and the same fault may be with great justice brought against the modern artist, though the blame does not always rest with him; he has, in fact, little control over the work after the design leaves his hands. However well he may have arranged his lead lines, to suit the flow of drapery or to secure an elegant outline, the workman alters them or adds others, to serve his convenience or to make good the frequent accidents of breakage, as well as the warping of the glass, which often happens in the burning. However anxiously the artist may have prepared his design with reference to the sacred character

as well as the architectural decoration of the building in which it is to be placed; however carefully he may have selected the colours to please by harmonious arrangement, rather than to surprise and startle by brilliancy of contrast,—every part looking to his entire satisfaction on paper,—it too often happens that when the subject is produced in glass, the delicate arrangement of colours is disregarded, the draperies are cut across with ugly black lines, and the figures look as if they could not stand alone, with inexpressive and tipsy-looking faces, asking, as it were, for somebody to come and hold them up. You will quite understand this from the examples I now show you. This is a certain Henry Lord Beaumont, who went a pilgrimage to the Holy Land, and he is thus represented in the window of St. Peter's Church, Barton-upon-Humber. Very probably the original artist drew the figure in this form [showing a correct drawing]; but this tracing from the window is the way in which it has been reproduced in glass. You will notice how unpleasantly the dark lead lines cut across instead of falling into the shadows of the drapery. Here is another, Randal Meschines, said to have been a Norman Earl of Chester; he is thus represented in one of the windows of Brereton Hall, Cheshire, though it would no doubt have been a much truer and more complimentary portrait had it resembled this other drawing, which the artist probably intended it to have been.

The difficulties of painting figures (especially of a large size) successfully in glass are so very great, and moreover the danger of offending the religious feelings, perhaps the prejudices, of some persons (for even prejudices, when honestly entertained, should not be disregarded), are so considerable, that from much experience I do not hesitate to recommend the use of small pictures, or emblems, in a stained glass window as preferable to figures, and less liable to be misunderstood in the Church of England.

You shall now see two figures of modern glass, both made by my friend Mr. Shaw, where the beauties as well as the mistakes of glass painting may be detected. One is an original composition of great excellence: it represents a Norman king of England, in the mail armour of the time. I think it a picture of rare excellence, but it is not suited or indeed intended for a church. You will notice how nicely the leads which hold the separate bits of glass together fall into the dark portions of the picture. The other specimen is also a modern picture, by the same gentleman, but copied (with improved drawing) from a glass painting of the Madonna and Child in the church of West Wickham, Kent. Here you will notice some disagreeable lines, especially in the drapery; though the picture generally is very meritorious.

After the time of the Reformation some windows of rare excellence were executed on the continent, which deserve a passing notice. Here are engravings of five out of the fifty windows in the church of Gouda, twelve miles north of Rotterdam, in Holland. They are filled with glass in which all the styles of mosaic,

enamel, and stain are employed to add to their beauty. Each window was presented to the church by some potent king or wealthy city, and their armorial bearing, with portraits of their patron saints and sometimes of the kings themselves, are represented. In one of them—though not among those shown here to-night—which was presented to the church by Mary I. of England and Philip of Spain, her husband, they are both represented kneeling before an altar. These gorgeous works abound in heraldic ornaments, and allegories from ancient classical writers are also to be found in them.

If I have not tired you too much, I must ask you to go back with me to the commencement of the use of glass in church windows, while I describe a kind of glazing common to all periods, and even now extensively used in modern church windows copied from ancient examples—I mean the small diamond-shaped lozenges or quarries. They are found in the very oldest churches, generally of a yellowish-green glass, translucent but never transparent; often quite plain, but more frequently with some small, quaint device in brown enamel, such as this. After the invention of yellow stain, it was largely used in quarries, as in the next three examples, which are all copied from ancient windows. You will notice that the yellow stain and the brown together gave great richness to a quarried window. Some of the devices were often extremely curious, sometimes quite grotesque: here is a bird playing with hand-bells, and here a rebus (as it is called) on a man's name; it shows three rudely-drawn palm branches with a scroll on which is written *JON* on one side, and on the other *ER*, the whole reading *JOHN PALMER*, which was the name of the rector of the church at the time this window was glazed. There used to be an interesting instance of a similar rebus at Smithell's Chapel in this parish. During the lifetime of George Marsh, a certain squire or knight named Barton resided there, who appears to have ornamented the chapel with quarries bearing his rebus: here you see a barrel or *tun*, as it used to be called, and over it *BAR* in capital letters, the whole meant to read *BARTON*. Here, again, a large *A* intertwined with oak-leaves and acorns (the heraldic distinction of the family of Barton), beneath it another *tun* with a *bar* of wood across it, reading together *ANDREW BARTON*. You may remember that Smithell's Chapel was consumed by fire not long ago; happily the stained glass in the east window, some portion of which is of high interest, escaped injury and has been carefully preserved. The chapel is now in course of restoration, and I have no doubt that the interesting old glass will be again placed in the east window. I may just mention here that I some time ago saw at Smithell's Hall, by the kindness of Mr. Ainsworth, one of the most beautiful and delicately-finished small glass pictures I have ever met with. It is a foreign production of recent date, and combines mosaic, enamel, and yellow stain in its composition.

Windows with diamond quarries may be greatly enriched by the addition of such borders as these drawings I now show you;

and sometimes a portion of the lower corner is cut off, and a bit of bright-coloured red or blue glass leaded in the manner shown here. Medallions with symbolical devices were often introduced among the quarries with very good effect. Such a window may be seen in the chancel of St. Paul's Church, Halliwell, and one in the same style, with the addition of texts of scripture, has just been placed in the baptistry of Holy Trinity Church, Bolton.

It is by no means requisite that the quarries should all be of similar pattern: it is better that varied tints and devices be used, care being taken that white should predominate. Many beautiful early quarried windows had a stem running up the centre, from which little branches diverge to the right and left, bearing leaves and fruit, each quarry having on it a nicely drawn bit of stem, a leaf, or a bunch of grapes. There was much careful ingenuity expended on the design and execution of such windows.

Old glass quarries can be easily imitated in modern work. Here is an example, which closely resembles old glass, in translucency, thickness, texture, and colour: this glass is not blown, but cast in shallow moulds of iron, indented with the required device. These quarries may be enriched by the addition of yellow stain and brown enamel, as in this example. Moulded glass has been much used of late years with admirable effect, in windows with heraldic and symbolical ornaments, as in this device of a Lancashire rose, which is moulded in white glass, over which is placed a thinly blown film of ruby, to give it the required colour. Had the rose been made entirely of ruby glass, no light would have passed through it.

The three-light window in the chancel of Christ Church, Bolton, is for the most part filled with moulded glass, and has a very charming effect; the light passing through glasses of varied thickness sparkles as if reflected from so many precious gems. There is little doubt that great improvements will continue to be made by modern artists and manufacturers, particularly by the introduction of cut crystal and moulded glasses, surpassing in gorgeous splendour the greatest efforts of the old masters. At present the art is in a kind of second infancy, and is rarely allowed to try to walk alone. The prevailing fashion of the day is to imitate the works of the old artists, rather than to originate new designs; and as it is easier to copy defects than beauties, many modern windows are only ugly representations of those in old churches, showing rows of wry-necked figures with dislocated limbs, standing in impossible positions, and with their eyes looking in more than one direction. A better taste and more discriminating judgment is now, I believe, dawning upon the art. People will no longer be content with glass which, however ugly, is all right because it looks old;—they will demand that it should also be elegant and useful.

I fear that I have detained you much too long, though I have far from exhausted my subject. If, however, I have so far explained it as to enable my younger hearers to understand the

main points of the art of making stained glass windows, so that in going into a strange church or cathedral they may appreciate their beauty with a more hearty relish, my work for the evening is fully accomplished. To those more advanced in years and in education, and to you, Reverend Sir, I have to apologise for the intentional plainness, I may say indeed, rudeness of my explanations. The subject is one which tempts to an exordium on art, and the free use of scientific terms: all these I have purposely avoided, as I should be sorry that the youngest of my hearers, for whom this paper has been specially prepared, should be embarrassed by the use of unintelligible words.

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