Ceraic Tiles

1830 - 1900

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INTRODUCTION.

During the nineteenth century the art of tile making became an industrial process. Tiles were applied as decoration in every possible way. They can be seen in churches, hospitals, bars, butcher shops, homes and public buildings of all kinds. The vast majority of these tiles were mass produced by big potteries like Mintons and Maws. Ceramic tiles became so popular and their use was so widespread, that the manufacture of decorated tiles became one of the "Art Industries" of the period.

In this thesis I wish to trace the development of mass production techniques of the pioneers of the tile industry in Britain and to discuss the various manufacturing methods in relation to decoration. I would also like to show examples of decorated ceramic tiles in Dublin.

SADLER & GREEN, PRINTED TILES 1770 - FIRST ATTEMPT OF MASS PRODUCTION WITH A PRINTED TILE.

PART ONE. Development of mass production

The history of tile making goes back as far as the 4th Millennium, B.C., to the decorative ceramics of the Ancient Near Eastern civilization. In Europe tiles were not in general use until the second half of the twelfth century A.D. when the monastic potters started to make encaustic tiles. Dutch tiles of the seventeenth century are well known and the English Delft of the following century have recieved their share of recognition. In 1830 Samual Wright was granted a patent for the manufacture of ornamental tiles by mechanical means.

There were three English centres of tile production in the eighteenth century, London, Bristol, and Liverpool. They produced the first mechanically decorated tiles, using a transfer process that was to revolutionise the ceramic industry. Sadler produced 1200 earthenware tiles of different patterns at Liverpool. After they were fired it was generally agreed that they were better than those that had been printed by hand. It is significant perhaps that they could also be sold for half the price. When Josiah Wedgwood first became acquainted with this process he was strongly critical of printing decoration , but it was not long before crates of biscuit fired pots were travelling from Liverpool to Burlain, returning with printed pattern upon them, that had been executed by Sadler & Green for Wedgwood. This printing technique allowed a great deal of detail and suitability in design. The quality of the hand painted tiles had degenerated considerably in the attempt to produce too many too quickly. But with this new process any amount of time could be spent on the original drawing, since to decorate the actual tile would take only a few seconds. As well as the practical benefits that were attached to this invention, it also liberated eighteenth century tile design from the traditional and overworked motifs of the old deft tiles.

The new Liverpool designs were fresh lively and of interest. Some 250 of them were recorded with scenes of gallentry and sport, two series depicted actors and actresses in their principle stage roles. (Plate 1).

The work of Sadler & Greene gives an important contrast to the development of the nineteenth century. They had succeeded in mass producing the decorative element in the tile, but the tile itself was still cut and shaped by hand, a laborious business that involved beating out the clay, cutting it to the required size, and slowly drying it. It had to be handled several times before it was in a fit state to be fired. It was not until the tile body could be made with the same ease and speed as it was decorated that industrial production was really underway. The man effectively responsible for this development was Herbert Minton (1793 - 1858).

Minton's was established in 1793 by Thomas Minton. But it was his son Herbert who was responsible for the firms involvement in the production of tiles. Herbert Minton joined his father in the business in 1814, and it was in 1828 that he first became interested in reviving the lost art of making encaustic tiles. These tiles were made by a completely different process to the simple wall tiles that Sadler & Green were using. They were thicker and heavier, and instead of having a surface decoration, the pattern was set into the body of the tile to a depth of about $\frac{1}{8}$" using a different kind of clay. The inlaid pattern was baked into the body during the

firing process. This was a skill that died with reformation and the closing of the monasteries between 1540 - 60.

Minton's were not the only people investigating the commercial possibilities of tile manufacture. Another man was working on the same idea at the same time. Quite independently, Samual Wright, a potter from Shelton, had been carrying out research, and in 1830 he was granted a patent by the Crown for the mechanical production of encaustic tiles. Wright made some attempt to manufacture by means of this process, but did not meet with any commercial success. Minton had found other work to pressing to allow a full investigation into the matter. He eagerly bought a share in the patent and began to develop and perfect the technique. Wright retained an interest and held a ten per cent royalty on all the tiles during the fourteen years the patent lasted. These tiles were made with a plastic clay body, the shape of the pattern was impressed using a plaster mould and was indented and filled with different coloured clay in slip form. The patent reads:- A manufacture of ornamental tiles, bricks and quarries for floors, pavements and other purposes. First these articles are fired of fine clays, and firing them until semi-vitrified. Second ornamenting them in various colours and various patterns similar to the patterns on a carpet etc.

The patterns were impressed by moulding them in moulds of plaster of paris in metal frames. The articles are reduced to the same size thickness by a cutting instrument worked from a machine which keeps the article at the same true level.

Wright's patent lasted until 1844 when it was bought by Minton's and Chamberland's of Worcastor. In the same year an article appeared in the Gentlemens Magazine offering a catalogue with seventy seven designs for tile pavements. But the fortunes of the firm were varied, and the entire stock was sold to John Hornby Maw, (1800 - 85) a retired businessman, who had made his fortune as a manufacturing chemist. By the 1890's Maw's had become the largest tile manufacturer in the world. In the early years however, it was Herbert Minton who was responsible for the pioneering work, and it is hardly surprising that when a new technique for producing ceramics was invented he was first in the queue to buy a share in it.

One particular process, invented by Richard Prosser, from Birmingham and patented 17th June, 1840, was for making clay buttons. Minton saw that the process had far more potential. Prosser had developed a method of making buttons from dry or dust clay. The clay was compressed between two metal dies. The object was perfectly formed and ready for firing in a couple of seconds. Minton immediately bought a share in the patent, realising that if the process worked for buttons it could also be used for making tiles.

Production began at Stoke in August, 1840. They started with seven presses, one large press for making tiles, and six smaller presses forming buttons and tesserae for mosaic flooring. By September, 1842, altogether sixty two presses were in operation and the demand for white tiles was soon very great.

In 1841, the firm executed their first important art job - the floor of Temple Church in London. Minton had copied the

design from the Chapter House at Westminister Abbey (1253 - 59) and he felt that modert tiles were satisfactory imitations of the originals. (Plate 2).

The future of Minton's business was well established. By 1845 Mrs. Minton's nephew Michael Daintry Hollins, had been taken into partnership, and a year leter Samual Wright's son also joined the firm. Another nephew joined the firm in 1845, Colm Minton Campbell (1827 - 85). Monsieur Leon Arnoux (1816 - 1902), Art Director at Mintons for many years pioneered the discovery of glazing techniques in imitations of the old Moorish and Italian tiles. By 1850 Minton's had introduced a new series of opaque enamels that they called "Majalica Ware". In 1851 their tiles were exhibited at the Crystal Palace. In the same year a new technique for transfer printing tiles had been successfully developed under the patent held by Minton's in conjunction with Collins & Reynolds. (Plate 3). Some of the tiles of this sort were used to decorate the walls of the Smoking Room in the House of Commons in London.

By 1880 up to six colours were used in one tile to form a pattern that might be made from several hundred units. As a general principle it is possible to judge the date of an encaustic tile from the complexity of the patterns and the number of colours used. (Plate 4). As a very general guide, red tiles with a white figure are the earliest, then brown and buffs, blue tiles with yellow. Buff figures were popular in the 60's and were followed by a strong chocolate red with grey. (Plate 5). (Plate 6). Glazed tiles, often with a clean white body and a black or gold design were used towards the end of the century, and in the same period they were made with complicated patterns involving white, black, gold, pink, green, and blue. (Plate 7). (Plate 8).

But few encaustic tiles were used in domestic architecture after the turn of the century. By 1898 the rubber interlocking floor tiles were being introduced into England and America. The new rubber tiles were hard, durable, slip proof, coloured, and they did not break, and above all they were easier to lay. The new rubber tile could simply be cut to shape by hand and glued down. They were ready for a change, and encaustic tiles were about to become redundant. Mintons early success with encaustic tiles in 1843 was due to the fact that he introduced his product to some of the most influential men in the country, and also to a number of dignitaries. This was his way of tackeling the problem of marketing.

Nineteenth century art critics it seemed were always keen to praise the discrimination and good taste shown by Queen Victoria and Prince Albert. If they liked the tiles then a good start had been made. The second half of the century was the age of the great exhibitions which catered for every kind of product from many different countries, offering the public the opportunity to see exactly what there was to buy. Awards were made at the Crystal Palace in London in 1851, the English designers were soon to win an international reputation. In a tile catalogue from Maw & Co., it was announced that the firm had won medals in London, Operto, Dublin, Paris, Philadelphia, Melbourne and more than twenty others. The importance of such recognition is best seen in the case of the American tile of J.G. Low. Greatly impressed by the tiles of the Philadelphia Centennial Exhibition in 1876, Mr. John Low

PAGE FROM MINTON & CO'S. CATALOGUE 1842, MOST OF THE PATTERNS WERE IMITATED FROM MEDIVAL ENCAUSTIC TILES.

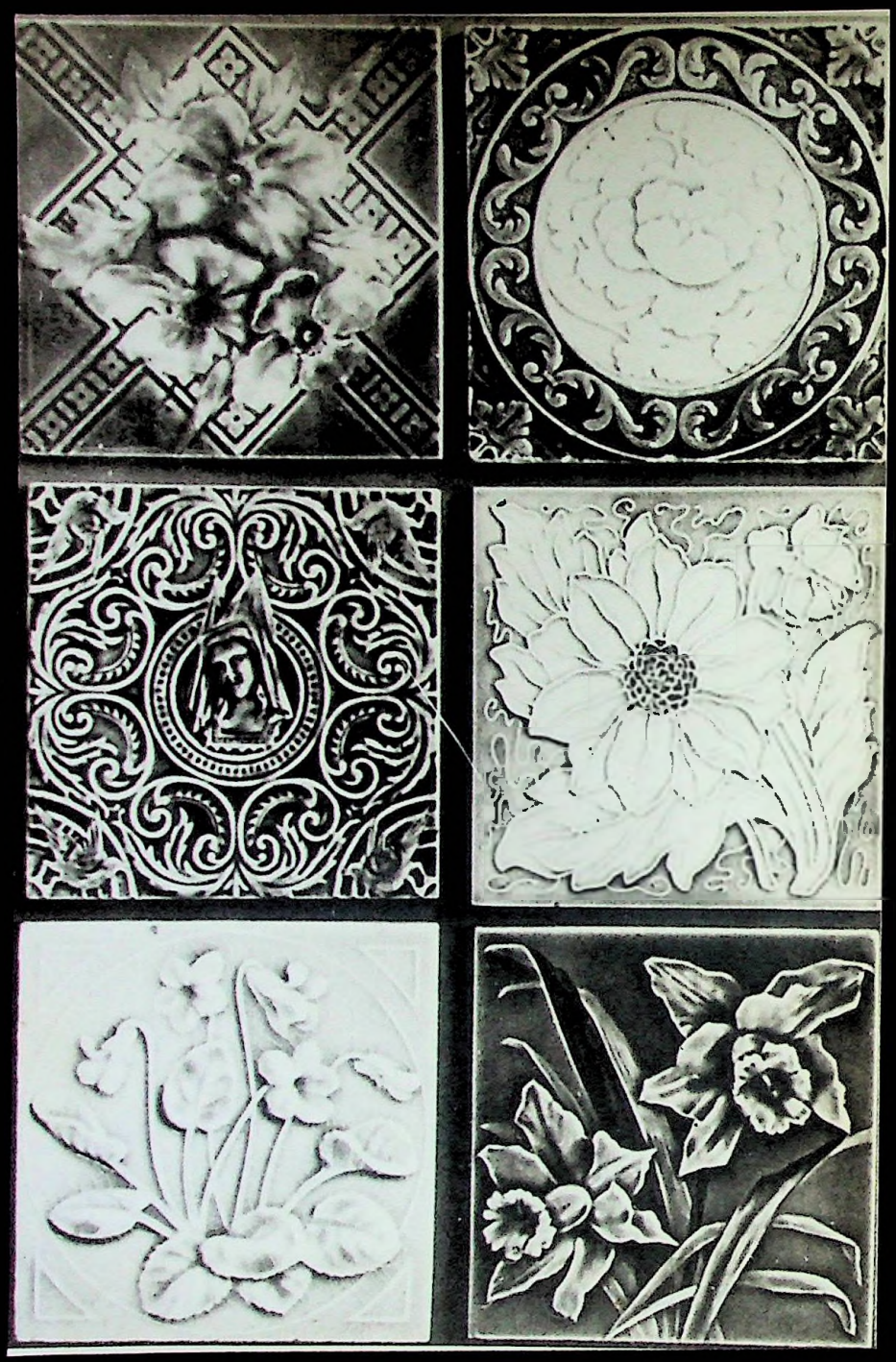

PLATE 3

MAJOLICA TILES, TOP LEFT, BROWN, GREEN AND BLUE.
TOP RIGHT, OLIVE WITH RED.
MIDDLE LEFT, BROWN WITH CENTRE IN LIGHT RELIEF 1891.
MIDDLE RIGHT, OLIVE GREEN, PLUM AND YELLOW.
BOTTOM LEFT, DARK GREEN ART NOUVEAU MOTIF 1905.
BOTTOM RIGHT 1880 GREEN.

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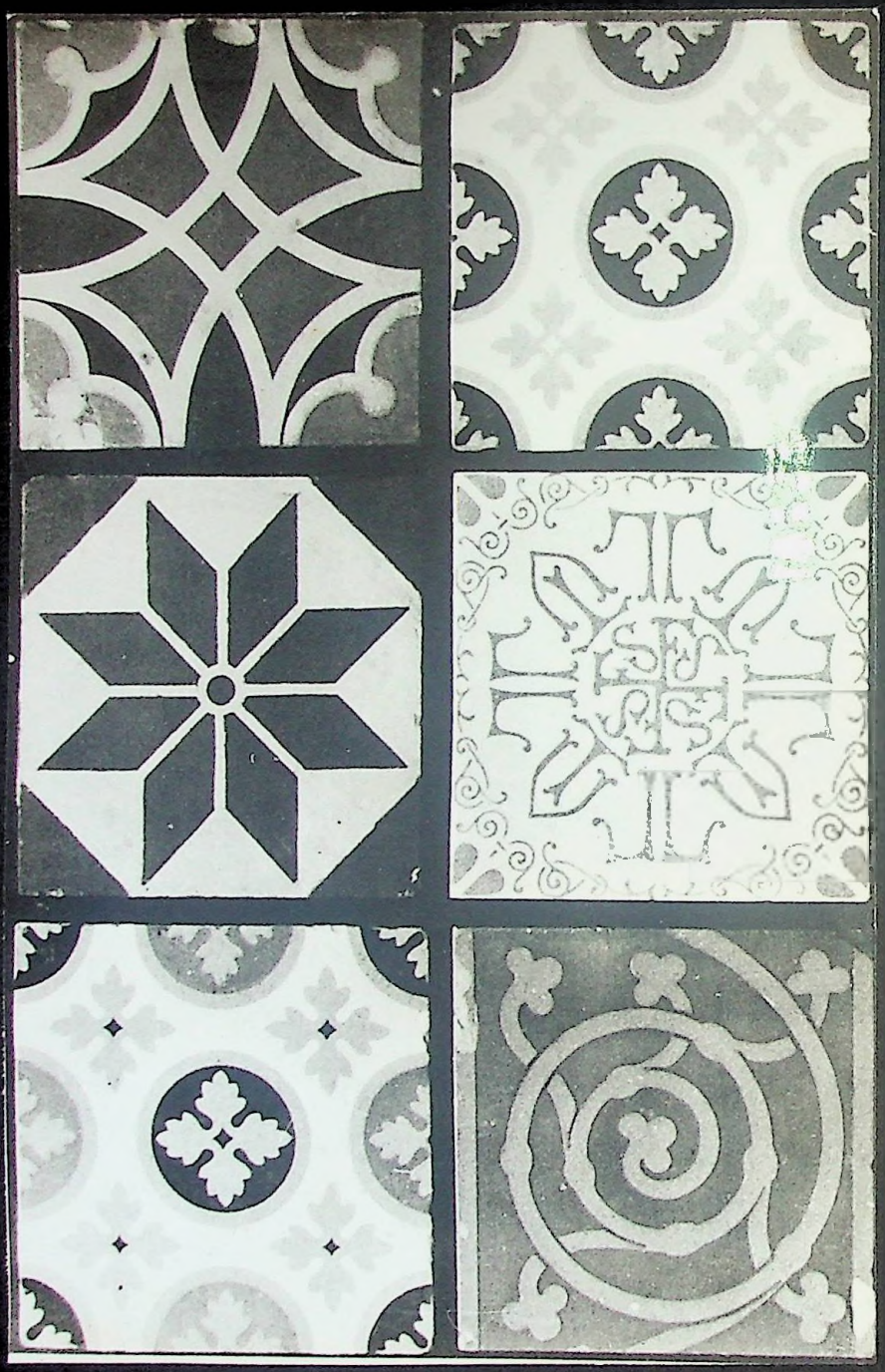
MINTON & HOLLINS CO., 1850, AN EARLY LITHO-PRINTED TILE MADE UNDER THE COLLINS & REYNOLDS PATENT, BLUE, BUFF, GREEN AND PLUM WITH WHITE BODY.



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VICTORIAN ENCAUSTIC TILES.

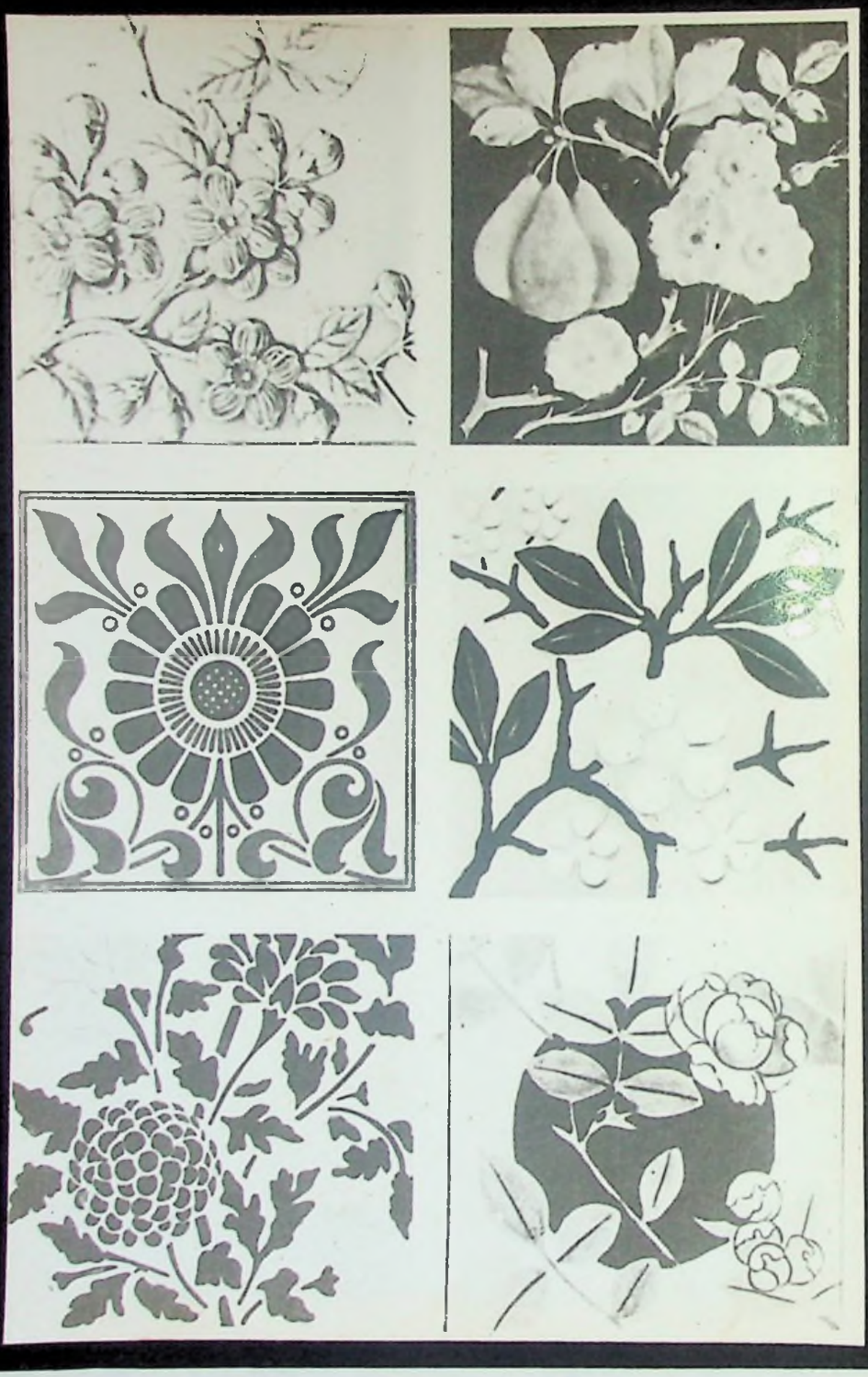


PLATE 6

TOP LEFT, DARK BROWN TRANSFER.
TOP MIDDLE, BROWN TRANSFER.
TOP RIGHT, BROWN TRANSFER HAND COLOURED YELLOW, GREEN AND WHITE ON GREY BISCUIT.
MIDDLE LEFT, DARK RED TRANSFER MIDDLE 1875, BROWN PALE RED TRANSFER.
BOTTOM LEFT, MINTONS CHINA WORKS, BUFF BODY WITH BROWN TRANSFER PATTERN.
BOTTOM MIDDLE, WEDGWOOD BRIGHT RED TRANSFER.
BOTTOM RIGHT, TWO TONE BROWN TRANSFER.

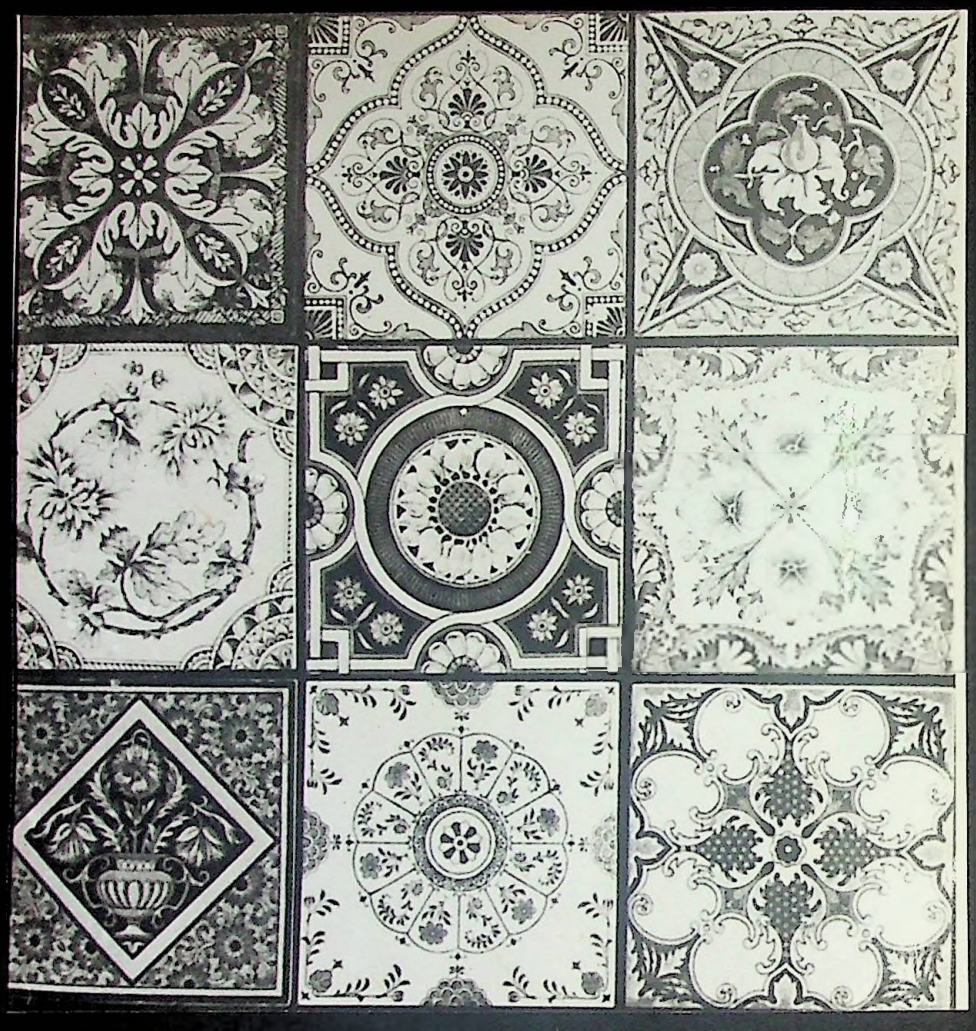


PLATE 7

TOP LEFT, MAJOLICA TILES WITH PINK AND GREEN GLAZE.
TOP RIGHT, POLYCHROME MAJOLICA TILE WITH BROWN BACKGROUND.
MIDDLE LEFT, WEDGWOOD PATENT IMPRESSED TILE 1884 RELIEF PATTERN ON WHITE BACKGROUND IN OLIVE AND BLUES.
MIDDLE RIGHT, WEDGWOOD PATENT IMPRESSED TILE 1884, GREY BODY WITH RELIEF PATTERN IN BROWN, GREEN AND WHITE.
BOTTOM LEFT, MAW & CO., 1875, BROWN AND OLIVE PROBABLY SPRAYED THROUGH STENCIL.
BOTTOM RIGHT, DOULTON & CO., 1880 TWO TONE BLUE LITHO-PRINTED TRANSFER.

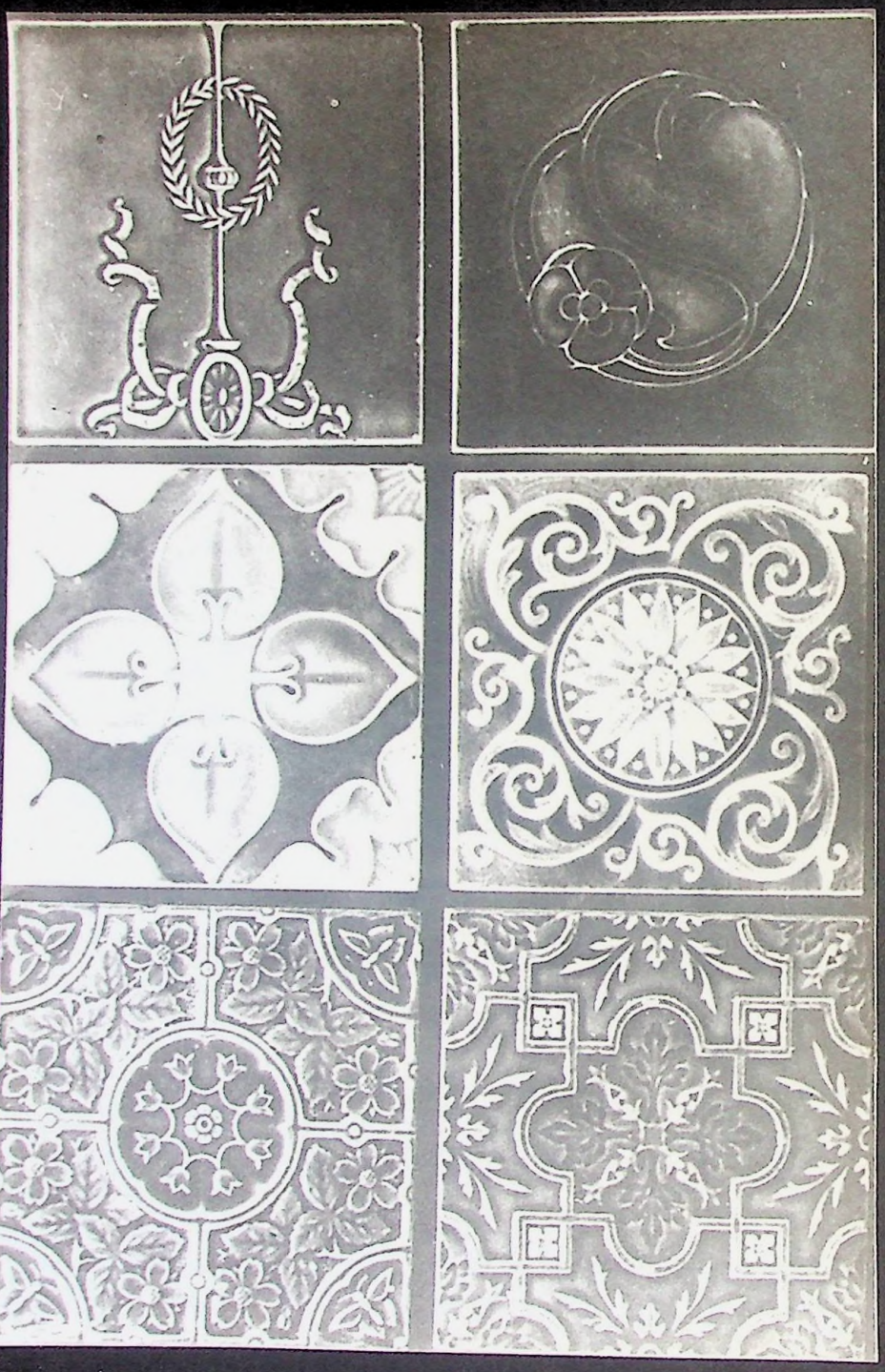
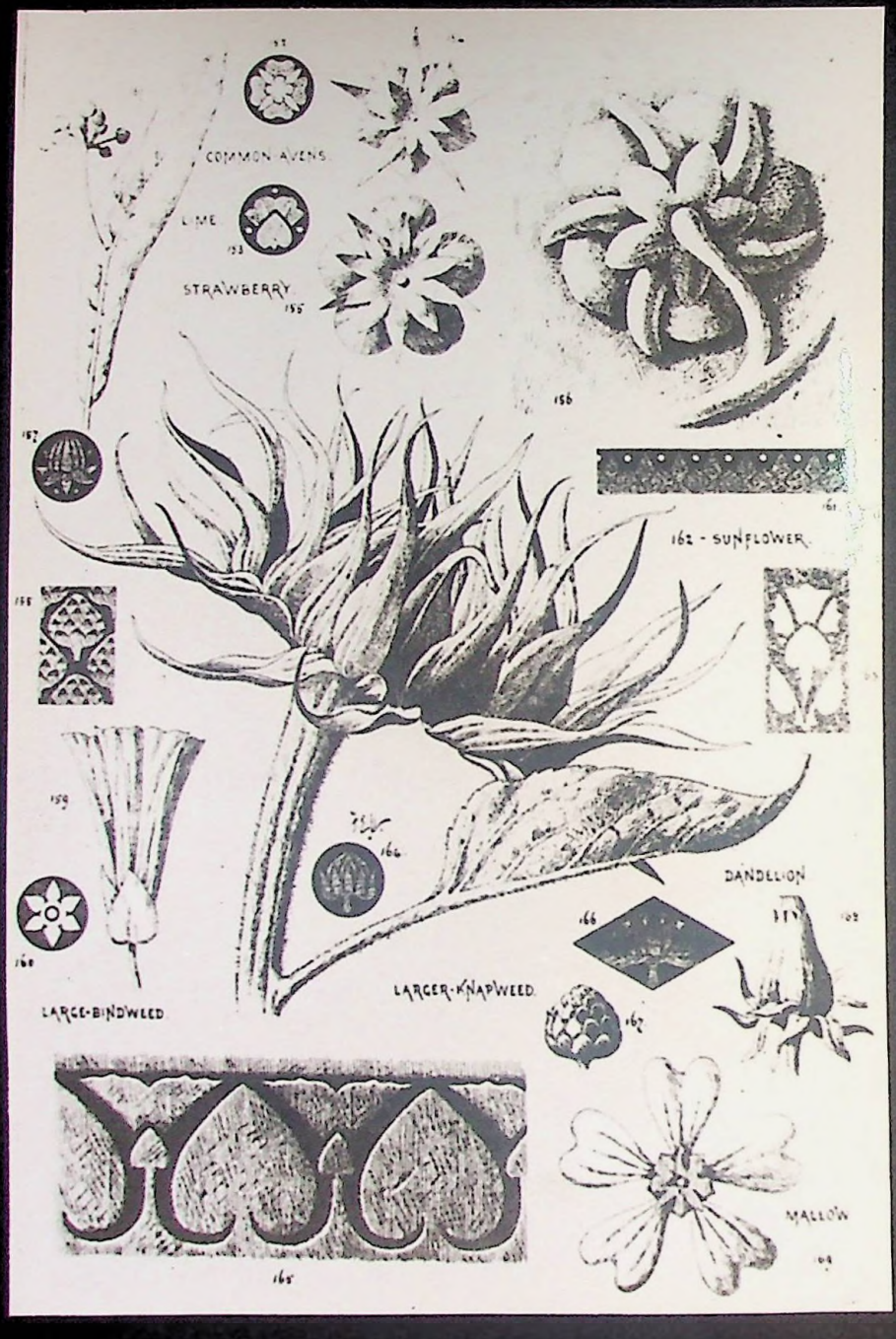


Plate 8



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DESIGN SHEET, TYPICAL OF THE STUDIES ABSTRACTING DECORATIVE MOTIFS FROM NATURAL FORMS 1870.

Plate 10

decided to set up his own factory. After one year he was competing with English firms at an Exhibition in Crewe, Cheshire, where he won the gold medal, and established his company as one of the foremost tile producers in the world.

Ideas in art and decoration were reflected by magazines, periodicals, and catalogues. They were the purveyors of good taste. The tile catalogues gave a good idea of the designs that were available on the market. They showed designs mostly for siz inch square tiles, such are more commonly found in Victorian fireplaces and hearth surrounds. Some of the designs are continuous over three or four tiles, set vertically or horizontally. Sunflowers growing in pots were a popular motif and the influence of Japanese taste is evident in some of the designs. (Plate 9). (Plate10).

Several ranges of tiles were produced with wild flowers, hawthorn, bramble, violets, and primroses. Such tiles could be applied, not only to fire places, but they served the same decorative function in the back of a wash-stand, or as part of a printed pattern on the wall.

PART 2. Manufacturing Methods

The Cistercian monks, who were the medieval tile makers, worked by hand. They flattened the clay themselves of such mechanical aids as they could devise, and the pattern was indented in the clay with the accuracy of the pattern. The man best equipped to draw and carve would have made the mould, and his less gifted companions would have been used to complete the work. The slip had to be dried and the pattern was filled with pipe clay. After a further drying period the tile was shaved flat. A glaze of sand and lead ore was sprinkled on the tile, and then the tiles were fired. This "honey glaze" as it was sometimes called, gave a yellowish tinge to the white pipe clay and protected the tile from dirt and erosion. It seems likely that each monastery made its own tiles, using local clays whenever possible.

Neither Minton or Wright could have known much more about the medieval encaustic tiles. It was not difficult to form the basic tile shape. The complication arose when the techniques had to be solved. The monastic potters probably drew on a long tradition of specialised local knowledge. But for Minton, Wrights patent of 1830 established little more than the right to the idea of making encaustic tiles. There was nothing to guide him except the results of continuous and inumerable experiments. It was five years before even he had a few tiles that were satisfactory. There was so many variables in the experiments that it was a matter of luck on how quickly he stumbled on the right results.

The manufacture of a tile begins when the clay is taken from the pits, some of which were opencast, others were some two hybdred feet or more below ground. The basic red clay that is natural to stoke were combined with other clays and additives to make the correct mixture for the body of the tile. Two clays of the same chemical composition might behave totally differently in the kiln, and the most satisfactory combination for all purposes could only be ascertained by large scale experiments. The mixture of the tile body might contain marls, or ball clay, Kaohin (china clay), flint and other substances. The difficulty was to find the right combination of these elements to ensure that the tiles eventually had the properties required. With encaustic tiles the chief problem, once accurate colour was obtained, was to ensure that the different clays on the surface of the tile fused together during the firing. It was a common failure for the inlaid section to shrink away from the body, owing to the different contraction of the two materials warping and cracking would often occur during the drying stage and yet the mixture that gave rise to this failure may well have behaved perfectly satisfactorily in the kiln.

Few details are available to give clues as to exactly how Wright and Minton managed to perfect their technique by 1844, when the patent was elaborated and renewed, the manufacturing process for encaustic tiles was as follows. The clay mixture was first cleaned and purified. Unwanted mineral traces had to be removed since they might stain the tile or set up a chemical reaction during the firing. The flint and larger grade materials were ground, and in the correct proportions the different parts of the mixture were run together and water added to make what was called "slip". The slip was sieved so

that only the fine suspended particles were used. The mixture was then dried on plaster bats which absorbed the water to bring it to a plastic state. After going through a pug-mill the clay was flatened and fired into a metal frame that shaped the tile. The frame had to be oversized to allow for shrinkage when the clay dried - a $6\frac{5}{8}$" square of wet clay reduced to approximately six inch square when the tile was finished. The relief pattern that formed the intaglio in the clay was placed at the bottom of the frame. A layer of fine clay was laid first, about a $\frac{1}{4}$ inch deep, which would eventually form the face of the tile. A band of coarser clay was then pressed with the frame and covered with another $\frac{1}{4}$ inch layer of fine clay. This sandwich had a dual prupose - most important it helped to prevent warping and secondly it meant that, although the surface of the tile was find and the image perfect, the bank of coarser clay ensured that the body of the tile was robust to the formation of the slip. A plate was put over the top of the frame and the layers of the clay compacted together.

The frame was then inverted and the plaster of paris die removed. The top surface of the tile was then exposed with the pattern indented into the clay. After a period of drying the coloured slip, a solution of fine white clay, which would be coloured with chemical ingredients was poured to allow for shrinkage, and at this stage the tile would have appeared very messy. After three days of drying, the surface of the tile was scraped clean and flat, and the design could then be seen, with sharp, clear edges. The tile was then removed from its frame and put on a shelf in the drying house for between two and three weeks before firing.

The process, as I have described here, was essentially manual. A few machines helped with the preparation of the clay, but that was the method used with the manufacturing of all earthenware at this time. In the 1830's they were levelled and scraped by hand.

By the time the patent was renewed in 1844, this process was done by machine. The tiles were passed beneath a rotating cutter that shaved the surface down, to a constant depth, leaving a perfectly smooth face. When this was done by hand it was easy for the surface of the tile to be slightly damaged, the machine gave a uniform and perfect finish everytime.

Until 1855 a good working day from one man produced between 200 and 220 moulded six inch encaustic tiles in two colours. Single colour wall tiles could be made from plastic clay at a rate of up to about 800 a day. In 1855, Samual Barlow Wright and Henry Thomas Greene invented a mechanical process for forming wet clay encaustic tiles, with the pattern indented but not filled. Plastic clay slabs could be cut at a rate of about 20 a minute, so that several thousand slabs might be cut during a full working day.

In 1863 Bolton & Worthington patented a method for making encaustic tiles from clay dust rather than plastic clay. The clay was cleaned and washed, but was dried for much longer than was necessary for the plastic clay process. This was done in heated troughs of refactory material. It was important to get exactly the right water content. When the clay was dry it was called "dust". It had natural cohesion and when under pressure in the mould, it compacted to form a

tile that could be handled without any further drying. The press consisted basically of a metal plate that was lowered onto the bed by means of a screw thread. The clay dust was compressed between the surfaces as the plate was lowered. (Plate 5).

Another important change was the development of the steam-driven press, which was the first used by Maw & Co., in 1873. This machine did not alter the character of the tiles, but it could produce them more quickly and with less manpower. A piston with a vertical pressure of eighty one tons, dropped on the mould, stamped the tile and withdrew. Everything in the pottery was changed to facilitate speed and production. Different methods of decoration could be worked at various speeds but the one aspect of production that invariably took time was the firing of the Kilns. The process changed very little, until the invention of the tunnel kiln just before the first world war, which was powered by coal.

METHODS OF DECORATION.

Victorian patterns had the benefit of a large cheap labour force if a new decorative process could be made to work in the kiln it would be economically viable, even if much of the work had to be hand done. The basic methods of decoration were as follows:

ENCAUSTIC DECORATION.

These tiles had a clay pattern embedded into the body of the tile. The two sections were fused together during the firing. The indentations in the slab were filled with coloured slips or dust clay. The composition of the different materials would produce different colours.

HAND PAINTING.

Using specially prepared colours the artist painted freely on to a tile that had a plain smooth surface. This technique was similar to using watercolours, but the effect was never certain until after the tiles had been fired. The painting was usually done on a white biscuit and after being decorated a clear glaze was applied. Hand painted tiles of this kind are usually easy to recognise because of the range of colours and tones that were used.

SCRAFFITO.

Many of the earliest tiles were decorated using this process. It is also the earliest way of working a pattern on a tile. The body of the tile is covered with one or more coats of slip and when dried the design is scratched into the coating revealing the colour of the body beneath.

TUBE LINING.

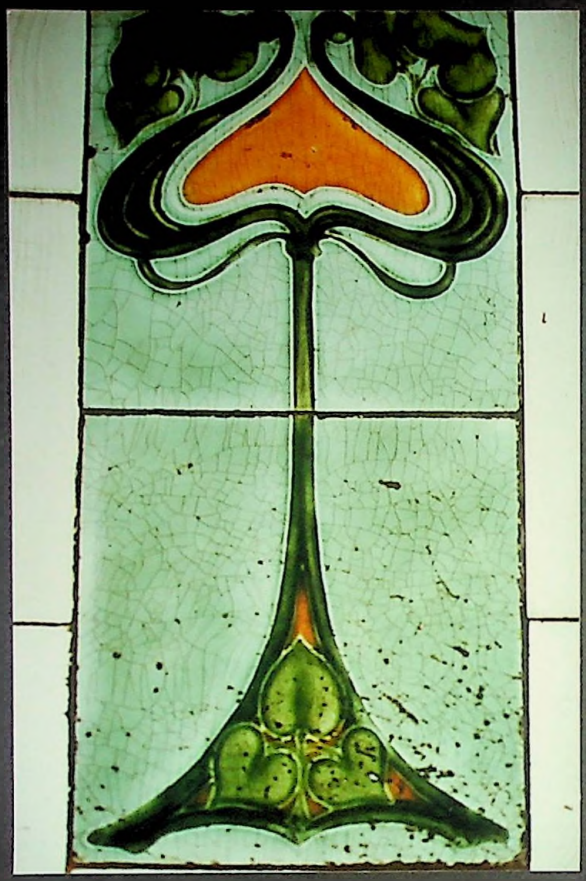
This tube was often used for mural work when areas of different colours were separated by small raised seams of clay, squeezed on to the tile, opaque or transparent glaze were then welded into the design. On individual tiles the effect is little different from that of an embossed tile which could be stamped to some design.

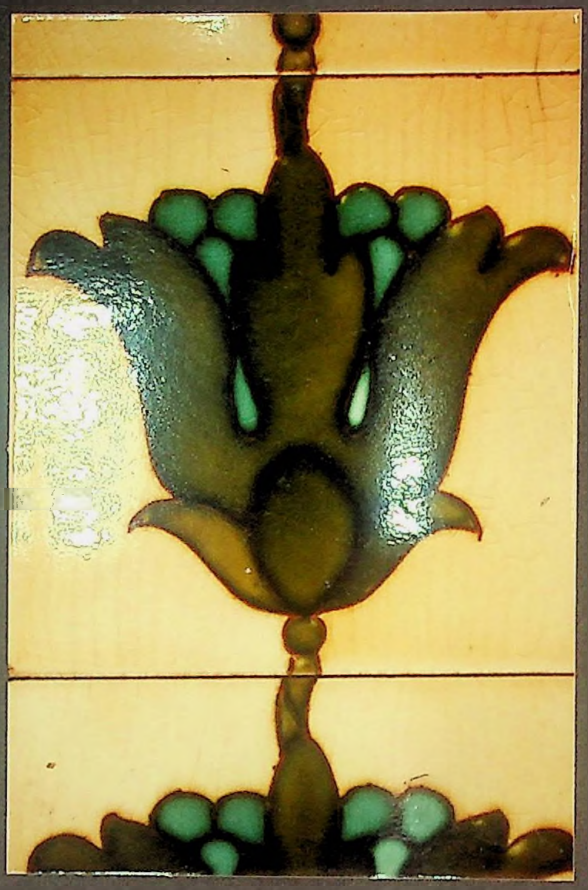
TRANSFER PRINTING.

The vast majority of tiles were printed and were often subsequently filled in by hand. The design was printed on to tissue paper transfer in a variety of colours, using engraved or etched plates. The tissue was first cut to shape and sized on one side with a special paste. The ink was prepared using powdered colours mixed with oil. The tissue was then soaked, placed on top of the plate and passed through the rollers. This plate was then left by the fire to dry, and the tissue later removed. The ink impression from the engraving remained glued to the paper, and the process repeated for each colour in the design.

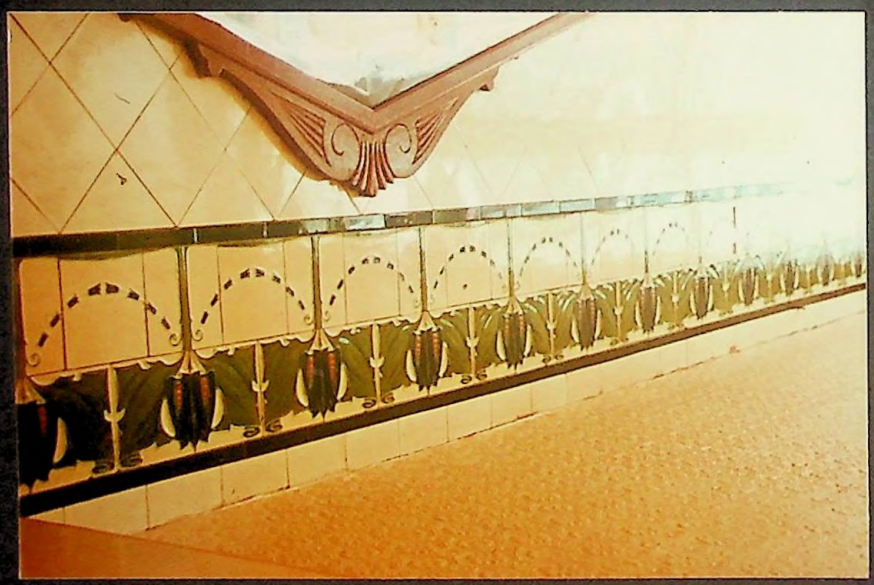
Transferrs printed by lithographic process were made in the same way, but flat areas of colour could be applied. The design was drawn or painted in wax on to a flat stone that received the ink from a roller. Outlines were less accurate but for broad areas of colour the process was more effective than hand printing because of eveness of the impression. (Plate 4).

SOME EXAMPLES OF DECORATED TILES IN DUBLIN, WHICH WERE MANUFACTURED IN ENGLAND IN THE 1900'S.





EXAMPLES OF TUBE-LINED TILES CAN ALSO BE SEEN IN DUBLIN:-
ENTRANCE TO THE WICKLOW HOTEL, WICKLOW STREET, AND
YOUKSTETTERS PORK BUTCHERS SHOP, DORSET STREET.



EXAMPLES OF MOTIFS BASED ON NATURAL FORM.

YOUKSTETTERS, PORK BUTCHER, DORSET STREET.

TWO COLOUR, PRINTED TILES FROM THE IVEAGH HOSTEL AND IVEAGH BATHS, DUBLIN.

FROM A BUTCHERS SHOP IN BALLSBRIDGE.