A New Way of Detecting Art Forgeries

The Microphotographic Study of Brushwork

By Prof. A. P. Laurie, Hewitt-Watt College, Edinburgh

Fig. 1.—Microphotograph of head in a Watteau. No. 55 in Edinburgh National Gallery.

Fig. 3.—Microphotograph of face from a Pater. No. 60 in Edinburgh Collection.

Fig. 4.—A representation of a genuine painting by Watteau. (No. 55 in the National Gallery of Edinburgh.)

Fig. 5.—Copy of the Watteau No. 55, which is apparently handled quite in the manner of the master.

Fig. 2.—Microphotograph of the head shown in Fig. 1, but from the copy of Watteau shown in Fig. 5.

Fig. 6.—Head of old man by Teniers. No. 817 in London National Gallery.

FOR some time I have been engaged in a series of researches, with a view to applying scientific methods to the identification of pictures and the exposure of forgeries. In the first place I began by making a careful investigation into the history of pigments with a view to deciding at what dates certain pigments were used in the history of painting, as it is obvious that if we have a knowledge of this, we can very often approximately date a picture, and so decide whether it was painted at the period to which it has been assigned. These investigations were carried out by the study of dated documents, such as Illuminated Missals, Venetian Ducali, and the Coram Rege Rolls in the Record Office, London, which are illustrated with miniatures from 1500 to 1700.

By means of these dated documents it has been possible to construct a fairly complete history of pigments, and to state very definitely when certain pigments came into use and other pigments ceased to appear upon the artist's palette. In addition, I have devoted considerable attention to the microscopic study of the surface of pictures, with a view to detecting repainting and identifying the pigments in position, and also to the microscopic identification of pigments, enabling one to deal with the very tiny samples which can be removed without injury to the picture.

These methods, then, enable one to decide whether the picture is a modern forgery, whether repainting has taken place, and also to date the picture itself approximately. In addition, it has been found that certain artists are accustomed to use certain pigments, so that the probability of a picture being by a given artist is strengthened if the pigment which he generally used is found upon it. It was while making these researches that I was struck with the amount of information which could be derived as to the painting of a picture, from the careful study of the brushwork suitably magnified. It is, of course, customary for all art connoisseurs to use a magnifying glass, but the information to be obtained is very much more reliable and useful if, instead of us-

ing the magnifying glass, careful microphotographs are taken of selected portions of the picture under examination.

In order to get successful results, the enlarged photograph should be taken directly on to the negative, the amount of enlargement depending on the style of the brushwork of the particular artist. As a rule, about three diameters are sufficient, but there are cases where enlargements up to as much as six diameters are of value for this purpose. By means of these photographs one is able to isolate the facts of brushwork without any confusing considerations, and one is able to compare side by side a series of such microphotographs.

Supposing, for instance, a picture is believed to be by a given artist, microphotographs of selected portions are taken and these are compared with microphotographs of pictures of undoubted authenticity by the same hand; while, if there is some other artist whose name is suggested as a possible author of the picture, microphotographs are also taken of his work, for comparison. In this way it is possible, in the case of a very large number of painters, to arrive at very definite conclusions. There are schools of painting, of course, which do not lend themselves to these methods, but, on the other hand, there are many artists whose individuality of brushwork is so marked and so characteristic as to make imitation impossible. The copyist or the pupil may imitate a master's general style, but each

man has his own way of laying on the paint which is characteristic.

During the time I have been investigating this method, I have been accumulating typical microphotographs of the brushwork of many of the great masters, and every day one is learning something new as to their methods, and also as to how far a man's brushwork varies, and how far certain characteristic touches remain throughout his career.

In the case of the painters of small pictures with minute figures, such as Teniers and Watteau, microphotographs of the whole of the face are usually most useful, and the enlargement may extend to five diameters on account of the minuteness of the brushwork employed by these artists. In the case of the life-size portrait painters, it is necessary to select some portion of the face into which the artist has put the greatest amount of careful work. On the whole, the eye usually gives the most information, magnified some three diameters. In the case of landscape artists, the painting of foliage is usually very characteristic. At the same time, it is usually advisable to examine the picture very carefully with a view to seeing whether there is not some piece of rapid and characteristic painting on which the artist, working very freely, has shown his peculiar methods. In the case of Velasquez, for instance, it is often found in some portion of the painting of the figure itself—a piece of drapery or a tassel or a bit of embroidery being painted in with a rapid and characteristic hand.

There are also obviously certain dangers in an investigation of this kind, owing to the fact that so many of the great artists employed their pupils to do the less important parts of their painting, and therefore we must not be led astray by assuming the work of a pupil to be the work of a master. It is for this reason that, as a rule, it is safer to compare the more important parts of the painting.

From the large number of photographs which I have made, I select one or two typical examples, in order to illustrate the various points. The

Fig. 7.—Brushwork of the "Spanish Admiral," which is attributed to Velasquez.

Fig. 8.—Brushwork in the portrait of Philip IV by Velasquez.

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(Concluded from page 232.)

incased and decked over like all of the car, which shows also general streamlines, and has a pretty, windowed observatory with a searchlight in its nose. A machine gun is to protrude through a gun port in the side—rather an antiquated practice. The engine room in the center contains auxiliary machinery—a ventilator for the ballonets, and dynamos for electric lighting and the wireless, of which the instruments are carried in the observatory in the nose. The Astra plant has also worked out an efficient system of swiveling propellers, to be installed in their next leviathan. This plan has given great satisfaction on a small scale in England, but will eventually become of vital necessity, as no force of men could handle a mammoth dirigible so efficiently and economically on the ground in landing and starting as 1,000 horse-power applied to a swiveled propeller. Theoretically it would take a handling crew of 2,000 men to equal it.

Newest Way of Detecting Art Forgeries

(Concluded from page 237.)

first shows a microphotograph magnified some two and one half to three diameters of one of the heads in the well-known Watteau in the Edinburgh National Gallery. The second is the same head from a very careful copy by an accomplished artist, which, except for the fact that it is newer and shows the absence of cracks, it is very difficult to distinguish by the eye from the original. This is clearly seen on comparing the photographs of the original and the copy. But the moment that the microphotographs are compared the weakness and inferiority of the brushwork in the copy is at once revealed, and also the want of delicate modeling in the drawing of the face and the ear. The third photograph is from the well-known Pater in the Edinburgh collection, and is of great interest as showing distinct resemblances to Watteau's methods, while, at the same time, the work is facile and shallow and wanting in the rich complexity and subtlety of the work of the master.

The sixth photograph is from the head of a man in the Teniers (No. 817) in the National Gallery, London, and is an interesting revelation of the brushwork of this great artist. I may say that his brushwork is extraordinarily minute, it being difficult to understand how he had sufficiently fine brushes to put in some of these tiny strokes, which it must be remembered are shown here highly magnified and are therefore almost too fine for the eye to see in the original picture.

The next two photographs are examples of the brushwork of Velasquez, and illustrate the importance of seizing the work of the artist in a carelessly rapid painting mood. One is taken from the tassel on the "Silver Portrait" of Philip in the National Gallery, London, and the other is taken from the tassel on the leg of "The Spanish Admiral." Certain authorities have suggested that "The Spanish Admiral" is not by the hand of Velasquez, but, while a larger number of photographs would be required for absolute proof, a comparison of the brushwork in these two examples goes a long way to prove that "The Spanish Admiral" is by the hand of the great master.

Examples of the application of this process might be multiplied indefinitely, but probably the accompanying photographs will be sufficient to illustrate the process. It must not be supposed, however, that it is sufficient to take one or two photographs of a picture in order to make a proper investigation. The picture ought to be carefully studied under the microscope with a view to examining for repainting, and identifying the pigments and mediums. Certain portions should then be selected as characteristic examples of brushwork, and these again compared very carefully with other pictures supposed to be by the same master, and the whole results of the investigation both by the microscope and camera considered to-

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gether in coming to any final conclusion.

These methods do not in any way supersede the work of the art expert. His opinion on the authenticity of the picture remains as valuable and important as ever. But they come in to assist him in his labors, to limit the problem that he has before him and to check by exact methods the conclusion at which he may have arrived; and in cases where art experts differ as to the origin of a picture, such methods go a long way to bringing the matter to a definite conclusion. As an example, I have been lately trying to decide who is the original painter of "The Old Grey Hunter" in the National Gallery, London, ascribed to Paul Potter, and the results obtained are at present before Dr. Bredius, who first suggested that this picture was by Verbeeck. I am also making a further inquiry into who is the painter of the portrait of Elizabeth Bas in the collection at Amsterdam. Dr. Bredius having suggested that it is probably by Bol, and not by Rembrandt.

The Tunnel Under the English Channel

THE question of the tunnel under the English Channel is quite the order of the day in the two countries interested, and especially among persons who are occupied with engineering and economic questions. Some interesting points about the proposed great work were set forth by M. Mommier, professor at the Central School and chief engineer of the North Railway, in a recent conference on the subject. From an economic standpoint the construction of the tunnel will mean an enormous increase in passenger and all kinds of traffic, and will be a source of prosperity to England, France and other nations. Capital will be easy to raise in both countries, and the cost is not expected to exceed \$80,000,000. Technical difficulties appear to be less than for such mountain work as the Simplon tunnel and others. What is intended for the channel enterprise is to work in the impermeable green chalk layer, and run two circular and parallel tunnels, with a railroad track in each tunnel. Military preoccupations have now lost nearly all their importance in England in view of the good relations between the two countries, and it is considered that the enterprise cannot but add to ideas of peace and concord. The main obstacle to the realization of the project comes from the traditionalism which prevails in England, as it is held that the success and special qualities of the race largely come from the insular position of that country. However, it is claimed on the other hand that such an idea does not fit into modern progress and that in the course of time it will lose its force, so that we may expect to see the project carried out at a not very distant date.

Earthquakes and Changes of Latitude

AS long ago as 1903 Prof. Milne called attention to an apparent connection between displacements of the terrestrial poles and earthquakes. He found that in years when pole-displacements have been relatively large, world-shaking earthquakes have been numerous, and vice versa. Milne did not believe that the molar displacement represented by these earthquakes was sufficient to cause the polar change, but thought that both might result from a common cause. This subject has recently been investigated mathematically by Prof. R. Spitaler, whose general conclusion is that the rapid axial displacement is the primary phenomenon and the earthquake secondary.

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