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Tintoretto's Paintings in the National Gallery

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Part II: Materials and techniques

Part I of this article, 'Condition, history of restoration and recent treatment', appeared in Volume 3 (1979) of the *National Gallery Technical Bulletin*, pp.3–24. In referring back to Part I the relevant page and figure numbers will be given here in the text. Part I included colour reproductions of three of the four paintings there dealt with, the fourth, No.1130, *Christ Washing His Disciples' Feet*, being too large and dark a picture for satisfactory colour reproduction. In Part II black and white photographs are reproduced to scale in Figs.1–4 to serve as an *aide-memoire* to the reader.

The materials and techniques of three of the pictures, Nos.16, 1130 and 1313 were discussed in a previous article by the present author and Lorenzo Lazzarini in 1972 [1]. In that article photomicrographs of paint cross-sections from those three pictures were illustrated together with detailed descriptions of the layer structures. Since then No.4004, *Portrait of Vincenzo Morosini* (Part I, Plate 1, p.9) has been cleaned, examined and restored. Some further comparisons with major works by Tintoretto in Venice have also been possible [2].

Part II describes the materials and techniques of each of the four paintings the condition and treatment of which formed the subject of Part I of this article. Limitations of space prevent the detailed description of every sample taken from each picture (particularly in the case of No.1313, *The Origin of the Milky Way*, from which a large number of samples were possible) and only a summary of the main findings can be given. An attempt is then made to relate each of the four pictures to other of the artist's works examined, numbering now twenty-five. Although a small number compared with Tintoretto's total output, it includes major and datable works, particularly in the Church of the Madonna dell'Orto and the Scuola di San Rocco.

Results are based on examination of the paintings and their samples using the methods regularly applied in the Scientific, Conservation and Photographic Departments of the National Gallery and described for the most part in Volume 1 (1977) and Volume 2 (1978) of this *Bulletin*. Since then facilities for X-ray diffraction powder analysis have become available within the Scientific Department and the spectrophotometric method for identification of dyestuffs of lake pigments has now been supplemented by a system of thin-layer chromatography.

For history, iconography and provenance of the pictures in the National Gallery the reader is referred to Cecil Gould's *Catalogue of the Sixteenth Century Italian Schools* in which evidence for and opinions

concerning dates of paintings are summarized. Apart from major undertakings in Venice, few of Tintoretto's pictures are signed and dated or datable from documents. Dates cited for works outside the National Gallery collection are those which find general, though not necessarily universal, support in the art-historical literature. It should be noted that little is known for certain about the artist's earliest work, that is that executed before the age of about thirty.

No.16, 'S. George and the Dragon'

Size and format

62 × 39½ (1.575 × 1.003). Although the canvas is rectangular the painted composition has a round-arched top uncovered only in the most recent cleaning (see Part I, Fig.6, p.7 and Plate 2, p.9).

Date

Not signed or dated and the smallness of size and scale proves an obstacle to comparison with works of known date. Cecil Gould rejects an early date on the basis of the comparatively advanced stage of development of the landscape background and lighting effects, suggesting not earlier than the 1560s.

Support

Canvas, fine, close tabby-weave. As with the other



Figure 1
Jacopo
Tintoretto,
*S. George and
the Dragon*
(No.16),
canvas,
62 × 39½
(1.575 ×
1.003).



Figure 2 Jacopo Tintoretto, *Christ Washing His Disciples' Feet* (No. 1130), canvas, 79 × 160¾ (2.006 × 4.083). Reproduced ¾ to scale of Figs. 1, 3 and 4.

Figure 3 Jacopo Tintoretto, *The Origin of the Milky Way* (No. 1313), canvas, 58½ × 65 (1.48 × 1.65).

Figure 4 Jacopo Tintoretto, *Portrait of Vincenzo Morosini* (No. 4004), canvas, 33¼ × 20 (0.845 × 0.515).



three of the four pictures at present under discussion, the original canvas has been trimmed to the edges of the paint during some past lining operation and can be studied only in the X-radiographs. Fig. 5a shows the canvas weave in a full-size detail from one of the X-radiographs and a thread-count is given on the same page.

Ground

Gesso, of only sufficient thickness to cover the canvas threads. A fragment of the ground, stained brown and translucent from impregnation with glue (probably from relining) is seen in a paint cross-section from the blue sky in Plate 5a on p.47. Calcium sulphate was detected chemically, but at the time the examination of the picture was made X-ray diffraction was not available.

Preliminary drawing and underdrawing

A drawing in charcoal on blue-grey paper in Paris (Louvre, No. 5382), Fig. 6 is a preliminary study for the corpse of the dragon's victim.

On the picture itself little underdrawing is revealed by infra-red photography (an examination by infra-red reflectography has yet to be made). Whereas it might be expected that the presence of copper greens and blues in the landscape might be likely to mask any black underdrawing in those areas, it would be anticipated that any present beneath the pink of the Princess's cloak or the blue of her dress (ultramarine) would show up in an infra-red photograph. In fact the only really clear charcoal underdrawing is a jagged line where the top edge of the billowing cloak is folded over. Some underdrawing may be concealed by the heavy contours, sometimes in black, with which Tintoretto often finishes forms, as for example the body and limbs of the corpse of the dragon's victim and the legs of S. George's horse. These are clearly seen in the picture but even more strongly in the infra-red photograph. From fifteen paint cross-sections

prepared, three displayed scattered charcoal particles between the gesso ground and lowest paint layer, indicative of black underdrawing.

The pigments

Apart from lead white, charcoal black, and red, yellow and brown ochre pigments, the following were identified.

Blue

Natural (*lapis lazuli*) ultramarine of high quality in the dress of the Princess and the drapery of the corpse, unmixed with white in the deepest-coloured areas; with lead white in the blue of the sky.

Azurite (blue basic copper carbonate, $2\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$) mixed with lead white as an underpaint in parts of the sky, and also in the bluer areas of sea and landscape.

Green

Malachite (green basic copper carbonate, $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$) is the principal green pigment of the body colour of the landscape, mixed with lead white in the lighter, and lead-tin yellow in the yellower, passages. The irregular 'rocky' appearance of the particles under the microscope and the occasional blue azurite crystal and red-brown cuprite particle indicate the natural mineral form.

Verdigris (green basic copper acetate, $\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 2\text{Cu}(\text{OH})_2$) in particulate form was less in evidence than malachite, but its flat, flake-like particles of low refractive index was noted mixed with lead-tin yellow in the green of the landscape.

Copper 'resinate' greens were present as final glazes, in most areas browned to a greater or lesser extent, over much of the landscape (see Part I, p.5).

Red

Vermilion (red mercuric sulphide, HgS) was identified chemically only as a minor addition, in very fine particle size, to the more orange-tinged parts of the *mandorla* around God the Father, lead-tin yellow being the matrix. A thin scumble of tiny particles may be seen, and are identifiable microscopically, over a red lake glaze, in the cross-section of a sample from a point where the Princess's red cloak meets her blue dress (Plate 5c, p.47). It also looks as if vermilion might have been used around the mouth of the dragon.

Red lake pigments are conspicuous in the Princess's cloak and in the costume of S. George. What looks like a purple lake pigment outlines the scales and tail of the dragon but was not sampled.

Yellow

Lead-tin yellow (a double oxide of lead and tin) was identified microscopically and chemically in the yellow of God the Father's *mandorla*, but since no X-ray diffraction analysis could be carried out at the time, it is not known which of the possible two forms it is.

The medium

Cleaning and restoration of the picture took place before gas-chromatography of paint medium had

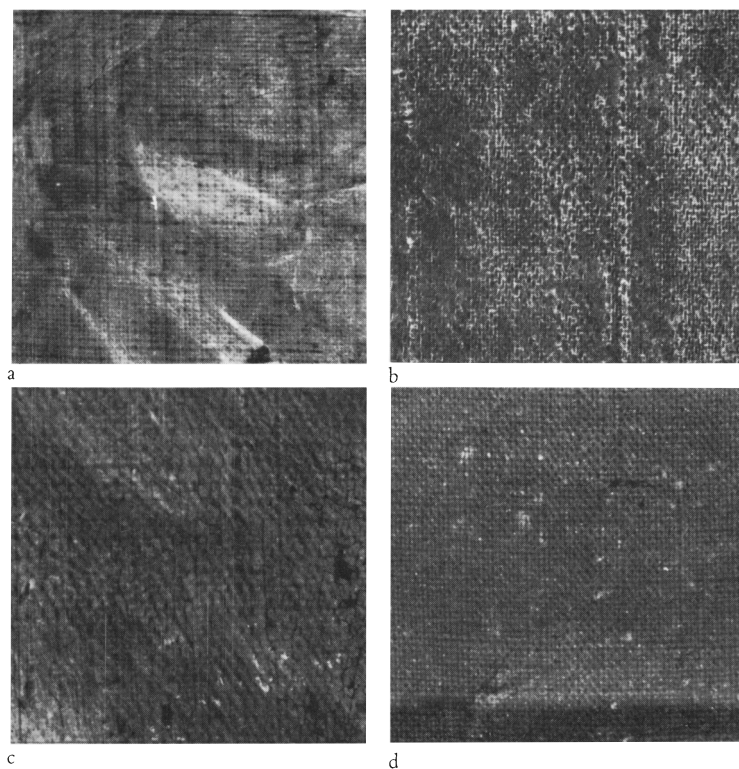


Figure 5 Canvas weave of four pictures by Jacopo Tintoretto as seen actual size in details from X-radiographs.

(a) *S. George and the Dragon* (No.16).

Plain (tabby) weave. Average thread count: warp (vertical on photograph) 18 threads/cm, weft 16 threads/cm.

(b) *Christ Washing His Disciples' Feet* (No.1130).

Twill $1\backslash 3$ on front surface. The twill pattern runs vertically on the lengths of canvas forming the upper half of the picture, horizontally along the length forming the lower half.

(c) *The Origin of the Milky Way* (No.1313).

Twill $1\backslash 2$ on front surface.

(d) *Portrait of Vincenzo Morosini* (No.4004).

Plain (tabby) weave. Average thread count: warp (vertical on photograph) $17\frac{1}{2}$ threads/cm, weft $14\frac{1}{2}$ threads/cm.

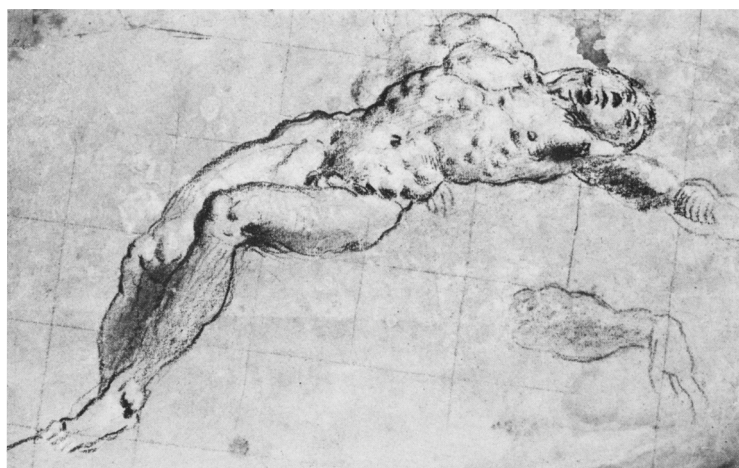


Figure 6 Jacopo Tintoretto, *Outstretched Male Figure*.

Charcoal drawing reinforced with white on grey-blue paper, $10 \times 16\frac{1}{2}$ (255 × 417 mm). Paris, Musée du Louvre, Cabinet des Dessins, n.5382 (recto).

become a routine method of analysis, but solubility, combustion and staining tests showed that the medium had the characteristics of drying oil.

The layer structure

In almost all of the fifteen paint cross-sections prepared the layer structure was quite simple. On the thin gesso ground which just covers the grain of the finely-woven canvas the painting was usually carried out in a single or double layer of paint, sometimes with an additional final glaze. A cross-section from the deepest blue of the sky is seen in Plate 5a, (p.47). The landscape usually had one or two opaque layers featuring malachite or azurite in combinations with lead white or lead-tin yellow with a final glaze of copper 'resinate'. There was overlapping of areas of paint in the region of God the Father, where a warmer-toned portion of the halo went over the pale yellow part. Two exceptions to this relatively simple and traditional system were noted. The first was in the Princess's blue dress where, instead of laying in the area initially in an opaque light or middle tone, Tintoretto has started with a dark glaze of ultramarine unmixed with lead white and applied directly on the gesso ground. Highlights in lead white are subsequently added, sometimes with a final thin glaze of ultramarine. The second exception is in the painting of the Princess's red cloak. In some parts the same method as for the blue dress has been used. For example, the edge of the cloak projecting out from the skirt to the lower left has been painted in glazes and scumbles of lake pigment without any solid underpaint and as a result the dark green paint of the foliage beneath shows through and darkens the tone. In other parts the red cloak exhibits a quite complex layer structure. The cross-section of a sample taken from the overlapping of the red cloak and the blue dress is seen in Plate 5c (p.47). The thin line of vermilion particles on the surface is puzzling, but there is no reason to suspect that it is a repaint.

General comment and comparison with other works examined

Although *S. George and the Dragon* does not seem, in the context of the National Gallery collection, a particularly small picture, it is so in the context of Tintoretto's *oeuvre* (several of his paintings in Venice may be 20 or 30 feet (7–10 m) in height or width, and his *Paradise* in the Ducal Palace is about 70 feet (22 m) across). Marco Boschini, the seventeenth century historian of Venetian art, in describing the *S. George* adds a marginal note, 'a painting which could be called a miniature' [3]. Not only the smallness of size but that of scale, with its attention to finish and detail makes it unusual, if not unique, among Tintoretto's output.

The rediscovery of the arched top and the painting's reinstatement as an altarpiece, as distinct from merely an easel painting, is of importance. The Renaissance altarpiece with round-arched top was well-established in Venice in the fifteenth century, in for example the altarpieces of the Vivarini and Bellini workshops. At a casual glance *S. George and the Dragon*, reframed in a

Renaissance altarpiece frame, might, with its comparatively smooth enamel-like surface and detailed finish, be mistaken for a wood-panel altarpiece of traditional form and technique. It has been noted in connection with Titian [4] that when Venetian painters began to paint on canvas in place of wood panel they continued to apply the traditional gesso ground which we find here used by Tintoretto on canvas. Gian Batista Volpato, the author of the 'Volpato Manuscript' quoted with regard to Titian's use of gesso grounds on canvas, was said to have been a pupil of Novelli who studied under Tintoretto. The manuscript takes the form of a dialogue between two painters' apprentices who discuss the relative merits of the 'old-fashioned', i.e. sixteenth century, method of priming a canvas with a gesso ground and the 'modern', i.e. seventeenth century, method of applying a ground of red ochre in oil medium. It will be seen that in other of his works Tintoretto was a pioneer of dark-coloured grounds.

The use of preliminary sketches on paper, such as that of the corpse of the dragon's victim, the squaring-up of the drawing for ease of transfer to the gessoed panel, and a preliminary black underdrawing on the gesso ground (though in the present case its extent and degree of detail is uncertain) would also be in the fifteenth century Bellini-type tradition, though it must be borne in mind that many painters of all schools and periods use preliminary drawings on paper and underdrawings on the preparatory layer of the picture itself. At the same time drawings were to some considerable extent discarded by Giorgione and by Titian in his earlier years [4].

The thinness and comparatively simple structure of the paint layers over most of the picture is, again, in the fifteenth century tradition. The most enterprising brushwork, complex layer structure and unorthodox techniques occur in the Princess's costume. Here much of the drawing has been done in the course of painting. Sometimes redrawing is done with the brush using lead white paint which of course shows up in the X-radiograph (see Part I, Fig.4, p.5); there appear white lines representing highlights of folds on the Princess's dress some of which are clearly *pentimenti*. Alterations made in lake pigment would not, of course, show up in the X-radiograph, but their presence might be inferred from the complex layer structure of the Princess's red cloak.

The somewhat limited range of pigments is also in accordance with an earlier tradition, though the use of natural malachite, rather rare in European easel paintings, will be seen to be a feature of Tintoretto's palette, as is his interest — almost amounting to an obsession — with red lake pigments.

The round-arched altarpiece form was used on occasion by Tintoretto throughout his life (early and late examples being the two canvases of *S. George, the Princess and S. Louis* now in the Accademia Gallery, of 1553 and the *Deposition* in the church of San Giorgio Maggiore, Venice of 1593–94). It would be of interest to examine some of the later arch-topped altarpieces. Tintoretto seems capable of altering his scale, style and technique to suit a particular

commission, subject or site and it could be that it was his intention to paint such altarpieces in a more 'traditional' technique.

The earlier of Tintoretto's works so far examined prove to have gesso grounds. They include *The Vision of the Cross to S. Peter* and *The Beheading of S. Paul* of the early to mid-1550s, both in the Church of the Madonna dell'Orto, Venice (but see below for the *Presentation of the Virgin in the Temple* of which they were the reverse when all three comprised the organ shutters); the *Worship of the Golden Calf* and *The Last Judgement*, both in the Madonna dell'Orto and both of 1560–62; *The Crucifixion*, mid-1560s, Accademia Gallery, Venice; the great *Crucifixion* in the Albergo of the Scuola di San Rocco, Venice. Numerous paintings on the ceiling of the Sala Grande of the Scuola di San Rocco dating around 1577–78 must, however, also be included, so that the use of a gesso ground may not be directly related to date. Some of the gesso grounds including those of *The Worship of the Golden Calf* in the Madonna dell'Orto and several of the paintings on the ceiling of the Sala Grande of the Scuola di San Rocco have what, in the experience of the author is a unique feature, the addition of a small proportion of *smalt* (a pigment consisting of ground-up blue glass which owes its colour to cobalt). If the purpose of the smalt were to give texture or 'tooth' to the gesso ground — and at present no further explanation can be offered — it would scarcely be required for the thin, smooth gesso ground of *S. George and the Dragon* from which it is indeed absent.

The immense size of the canvases listed above seems to make any comparison with *S. George and the Dragon* seem fairly ludicrous. The two smallest, the organ shutters from the Church of the Madonna dell'Orto, have a thick gesso ground incorporating smalt and in any case are painted in a much coarser, bolder technique (presumably to show up well from a distance) than the *S. George and the Dragon*, have a quite different colour range and rather lean 'dry-looking' paint. Among the major works, the *Adoration of the Golden Calf* (1560–62), taking into account as far as possible its enormous size, corresponds in relatively fine canvas, comparatively thin paint and simple layer structure, light tonality and careful and detailed treatment (in striking contrast to its companion piece, *The Last Judgement*, which is of enormous thickness and immensely complex layer structure).

However, thumbing through, as it were, the various samples taken from Tintoretto's paintings, the closest comparison, from the point of view of layer structure was quite unexpected. Not well-known, but a comparatively recent addition to Tintoretto's *oeuvre*, it is an altarpiece from the church of the Ognissanti, Feltre. It was published by R. Pallucchini in 1969 [5] as an early work (of the mid-forties). The picture had been transferred to the Accademia Gallery, Venice for cleaning and restoration at the time the author was just beginning work at the Laboratory of San Gregorio. Superficial comparisons are the size (1.85 × 1.20 for the Feltre altarpiece as compared with 1.575 × 1.003 for *S. George and the Dragon*) and the

round-arched altarpiece form imposed on a rectangular canvas. Like *S. George and the Dragon*, *The Madonna and Child Appearing to S. Victor and S. Nicholas*, has a gesso ground on a rather fine canvas. Comparatively simple in its layer structure, though perhaps with a fuller palette than *S. George and the Dragon*, the Feltre altarpiece really exhibits Tintoretto *traits* in the red drapery (cf. Plate 5a, 5b, 5c and 5d; p.47), although the blue is quite simply painted. This is not to say that the *S. George and the Dragon* is necessarily an early work. By comparison the Feltre altarpiece seems quite crude in treatment, particularly in its upper half, yet it has felicitous passages, such as the distant landscape glimpsed between the figures, and the still life of S. Victor's helmet, complete with *pentimenti* in the left foreground.

Colouristically a close analogy is Tintoretto's competition piece of 1564 for the smallish ceiling oval in the Albergo of the Scuola di San Rocco. It is a lavish display of ultramarine blue and crimson lakes, not repeated elsewhere in the series. The foreshortened figure, criss-cross drapery and outstretched shadowed hands of the Saint are reminiscent of those of the Princess. It is thought to have a white gesso ground.

No.1130, 'Christ Washing His Disciples' Feet'

Size and format

79 × 160¾ (2.006 × 4.083).

Date

Soon after 1556, from the date of the building of the Cappella del Sacramento in the Church of San Trovaso, Venice.

Support

Canvas, moderately coarse herring-bone weave. For canvas construction see diagram in Part I, Fig.15, p.18 and for canvas weave as shown on the X-radiograph, Fig.5b, with accompanying thread-count.

Ground

A thin coat of gesso, just filling the interstices of the canvas, followed by a layer of black ground consisting mostly of charcoal black (though one or two samples show multi-coloured particles in the ground indicating the addition of the presumed 'palette scraping' mixture found in No.1313, *The Origin of the Milky Way*. In some samples (see Part I, Plate 4a, p.10), the black ground exhibits dots or streaks of lead white within its thickness (see below).

Underdrawing

The underdrawing appears to have been carried out on the black ground in lead white paint with a coarse brush. Many of the sketchy white lines, in dry 'dragged' brush strokes, are visible to the unaided eye beneath thin dark surface paint, particularly in the outlines of the architecture in the upper half of the composition. The legs of the figure on the left seem just to have been left in the underdrawing stage apart from the laying in of the dark crimson cloak in glaze

colour. It may be recalled that the rudimentary drawing of these legs was until the most recent cleaning hidden by the later overpaint of a table. It is striking how closely the drawing of the legs, in lead white on a black ground, resembles the simplest of Tintoretto's drawings on paper of single nude figures, particularly in the summary curves indicating the knees, calfs and ankles. Parts of the huge figure on the extreme right is also left just sketched in. The lead white underdrawing is seen particularly clearly in the X-radiographs (see Part I, Fig.16, p.18), though unfortunately the picture has not yet been X-rayed all over to enable an X-ray mosaic to be produced. Whereas in some paint cross-sections a layer of lead white appears above the black ground, in the majority streaks and dots of lead white occur within the black layer (Part I, Plate 4d, p.10), either indicating that Tintoretto began drawing with the brush before the black ground was dry, or else that he corrected some parts of the underdrawing by reapplying the black ground.

The pigments

Blue

Natural (lapis lazuli) ultramarine identified in the upper paint layers of the blue drapery over the stool in the foreground (see paint cross-section Part I, Plate 4b, p.10).

Azurite in the robe of one of the apostles behind Christ.

Smalt (a powdered blue glass which owes its colour to the presence of a small proportion of cobalt) in the underpaint for the ultramarine blue of the drapery over the stool in the foreground. Discolouration seems to have taken place, as is often the case when smalt is used in oil medium [6].

Green

Malachite mixed with lead white in the opaque body colour of the bright green robe of the figure seated near the fireplace (for colour photomicrograph see Part I, Plate 4a, p.10).

Copper 'resinate' as a glaze in the shadows of the drapery mentioned above; thickly-applied and well-preserved in the rather crudely-painted pattern of the carpet covering the table.

Red

Red lake pigments in Christ's crimson robe, the carpet on the table, the deep purplish crimson of the dimly-discerned cloak of the unfinished figure on the extreme left and the red glaze on the darker of the floor tiles. The dyestuffs of three of these samples were identified by R. White using thin-layer chromatography: red glaze of Christ's robe, possibly *kermes*; deep purplish cloak of man extreme left, *madder*; red glaze on darker floor tile, *lac*.

Yellow and orange

Lead-tin yellow in Christ's halo; identified chemically; X-ray diffraction analysis then unavailable, so type used unknown.

Orpiment (yellow arsenic trisulphide, As_2S_3) was identified in the upper layer of the orange-yellow robe

of S. Peter (whose feet Christ is washing).

Realgar (orange arsenic disulphide, As_2S_2) was identified in the lower layer of the same orange-yellow drapery (see Plate 5e, p.47 for a cross-section).

The medium

Three samples (white impasto, brown-red flesh, red lake glaze) were submitted to analysis by gas-chromatography, the result in each case being *linseed oil*.

The layer structure

In some samples this was quite complex. The painting of Christ's crimson robe corresponded to that of the Princess's cloak in *S. George and the Dragon* in that some parts of the drapery had been laid in initially with red lake pigment directly on the ground, in this case a black ground. This system had also been followed in blue and green drapery, highlights being added on top in almost pure lead white with sometimes an added final glaze. In the sample from the orange-yellow drapery of S. Peter, the drapery seems to be laid in with realgar as the darker tone, orpiment highlights being added on top. The flesh is comparatively simply painted, often in a single thick, rather dry and granular, layer of lead white tinted with ochre.

General comment and comparisons

The complex system of seaming together pieces of canvas for the purpose of constructing a large painting (see Part I, Fig.15, p.18) is typical of Tintoretto. In large paintings by sixteenth century Venetian painters the author has often noted that the loom width of the canvas tends to be a little greater than 1 metre, often about 1.06 – 1.10 m (accuracy of measurement is not significant because of varying degrees of tension and glue sizing). It has also been noted that Tintoretto had no hesitation in joining up (or having his workshop join up) odd shapes and sizes of canvas to make a picture of particular format (in the Scuola di San Rocco some large paintings were encountered in which bits of canvas of three different types of weave were seamed together). Tintoretto's canvases vary in weave (sometimes as here a twill weave is used), coarseness and weight.

The black ground, even as here, on top of a gesso ground, constitutes a very early example of the changeover to dark grounds, predating the dark brown or red grounds introduced in the Bolognese school by the Carracci. Given a dark ground, it would seem sensible to carry out the underdrawing in white. White chalk might have been expected, but Tintoretto seems to prefer to execute a free and hasty underdrawing with the brush in lead white oil paint, hence the underdrawing is visible in the X-radiograph.

The palette has been augmented with the yellow and orange arsenic sulphides, orpiment and realgar, respectively, which remained firm favourites of Tintoretto throughout his career. Their occurrence has already been noted in Titian's *Bacchus and Ariadne* [4]. Rare in European easel painting in general, they are common in sixteenth century Venetian painting from Giorgione onwards. Red lake pigments used in a complex layer system are prominently featured in this

picture as in *S. George and the Dragon*.

The same method of painting drapery by building up from dark to light, first laying in the area with a glaze in the darkest tone, instead of with an opaque layer of light to middle tone, has been used as in the dress and cloak of the Princess in *S. George and the Dragon*. In the latter, however, the white ground continues to show through the glaze layer which would tend to become at the same time less saturated in colour yet more translucent with increase of refractive index of the oil medium with age (the refractive index of the oil medium would tend to become more or less equal to that of both ultramarine and lake pigments). In the case of the *Footwashing*, however, increase in translucency of the glaze layers with age would lead to general darkening and lowering of tone where glazes were laid directly on the dark ground. This effect, combined with wearing of the uppermost paint layers, may have led both to a general darkening of those of Tintoretto's works in which a dark ground has been employed, and to an imbalance of tone, the latter effect increased because the lighter-coloured areas, containing a high proportion of lead white, tend to be more thickly-painted and more resistant to abrasion than the glazes.

The author is convinced that the giant figures on the extreme left and right hand were never completed, either deliberately or by default. Ridolfi remarks that Tintoretto was so burdened with work that he could not give the same finish to all his paintings and it sometimes chanced that pictures by him were put on exhibition in a not quite completed state since he was always working in haste [7]. The Cappella del Sacramento in the Church of San Trovaso in Venice is a rather dark chapel, particularly in the corners of the wall on which the picture would have hung (it is now replaced by an early copy, see Part I, p.15 and Fig.14, p.17). The companion picture, a *Last Supper* still *in situ* on the opposite and lighter wall is a much lighter and brighter picture, despite a coating of old discoloured varnish. It is possible that Tintoretto knew what he could get away with and deliberately left unfinished those parts of the picture which would be least well seen.

An aspect of technique, or rather inept technique, is the rather shaky perspective of the tiled floor, which, as described in Part I of this article had, before cleaning, been overpainted in a plain buff colour possibly to disguise the uncomfortable angle at which the horizontal lines of the tiles met the bottom edge of the picture. Venice never had the same preoccupation with the theoretical aspects of perspective as Florence in the fifteenth century. Tiled floors figure quite often in Tintoretto's pictures. He seems to be more successful where straight lines going into vanishing points are not involved. For example the floor of blue, mauve and cream curved hexagonal tiles in the *Last Supper* from San Marcuolo, now in the Prado, Madrid, is quite convincing, although the picture is an early work of 1547, yet the red and fawn square-tiled floor in the late *Annunciation* in the lower hall of the Scuola di San Rocco is just as awkward as that in No.1130. Cecil Gould [8] has suggested that Tintoretto was

experimenting with the theories of perspective expounded by Serlio who wrote a treatise on architecture published in Venice in 1537.

Comparisons, from the point of view of layer structure and pigments, are interesting. Of the pictures so far examined three have *black* grounds (in the sense of being mainly charcoal black as distinct from dark brown or in effect, the dark brown of the 'palette-scraping' type (see below under No.1313, *The Origin of the Milky Way*). They are *The Presentation of the Virgin in the Temple* in the Church of the Madonna dell'Orto in Venice and the two late extraordinary tall mannerist canvases of *S. Mary Magdalen* and *S. Mary of Egypt* in the lower hall of the Scuola di San Rocco. These last two, however, are quite different in technique from No.1130, or from any other of the artist's work so far examined, in that they seem to be painted in very light impasto on the dark ground and colour added mainly in thin final glazes. *The Presentation of the Virgin*, however, is more comparable. There is thin gesso beneath the charcoal black ground and the range of pigments seems similar to that of the National Gallery *Footwashing*. In appearance it is a much more meticulously finished picture, possibly done in deliberate rivalry with Titian's version of the same subject (Tintoretto even revived the use of gold leaf to give an added sparkle to the gold mosaic pattern of the steps!). It is a picture of immense depth and contrast of tone and glows richly as the National Gallery's *Footwashing* might once have done. It may be dated c.1551–52 from the contract for the work. A cross-section is shown in Plate 5f (p.47) of the orange-yellow robe on the lower left for comparison with one from the orange-yellow robe of *S. Peter* in the National Gallery *Footwashing*. Both feature on top of the black ground a layer of realgar followed by a layer of orpiment. Lest things should seem too simple, however, it has to be pointed out that what previously formed the inside of the organ shutters of which the two halves of *The Presentation of the Virgin* were originally the outside, the *Vision of the Cross to S. Peter* and *The Beheading of S. Paul* of probably the mid-1550s were mentioned above as having a thickish white gesso ground containing small particles and being rather light in tone, freely painted in rather lean paint. This may serve to demonstrate that Tintoretto changed his technique according to subject or merely whim!

No.1313, 'The Origin of the Milky Way'

Size and format

58½ × 65 (1.48 × 1.65), but see Part I, pp.21–3 for evidence that about one-third of the composition has been cut off from the bottom.

Date

Dated by Cecil Gould c.1578 by comparison with the four Allegories of classical subjects painted for the Anticollégio of the Ducal Palace, Venice.

Support

Canvas. Moderately fine, tightly-woven single twill.

A full-size detail in Fig.5c of the X-radiograph shows the canvas weave. Single horizontal seam about 13 cm from the top edge.

Ground

A single layer of ground which to the unaided eye appears brown but under the microscope can be seen to consist of a brownish matrix of ochre in which are scattered not only particles of charcoal black, but multi-coloured pigment particles of lake, vermilion, smalt, azurite, malachite and even ultramarine. The medium appears to be drying oil. The ground is included in two paint cross-sections in Plates 5g and 5i (p.47). It is comparatively thin.

Preliminary drawing and underdrawing

A drawing on paper in the Accademia Gallery (Part I, Fig.19, p.22), once thought to be a sketch for the picture is now presumed to be a drawing after it but made before the mutilation of the lower part.

Underdrawing is seen from the radiographs (Fig.10) to have been carried out in lead white with a brush. There are many *pentimenti* showing the body of Juno to have been draped in an earlier stage of the composition and a mass of what seem to be rough sketches of heads of *putti* in the lower half of the picture. Not all these lead white outlines may be preliminary drawing on the dark ground, for Tintoretto has a tendency to make alterations in the course of painting by redrawing the contours of the forms either in white, sometimes in black or frequently in red lake (neither of the last two mentioned would appear in the radiograph, being visible only in paint cross-sections). Infra-red photographs only show the black outlining on the surface of the picture, for example the net on the right.

The pigments

Blue

Natural ultramarine in the blue drapery on the bed and that of Jupiter; mixed with lead white in the sky. A few particles incorporated in flesh paint of Juno.

Azurite in the wings of the *putti* and the plumage of the peacocks.

Indigo, as the dyestuff, in the darker plumage of the breasts of the peacocks, used as a final deep blue glaze.

Green

Malachite with *azurite* in the blue-green drapery (or cloud?) below the *putto* in the bottom right corner; in the underpaint of the greenish feathers of the peacocks.

Copper 'resinate' green as a glaze on the green of the peacock's feathers.

Red

Vermilion in the flame of the torch borne by the *putto* lower left and in the sash of the one lower right; mixed with lead white and red lake in the middle tones of Jupiter's cloak.

Red lake pigments in the body colour and glaze of Jupiter's cloak and the crimson and gold brocade on the bed. That of Jupiter's cloak was identified with

certainty by thin-layer chromatography as *lac lake*, and the same method showed that the drapery on the bed was likely to be the same lake pigment. In both cases the substrate was found by laser microspectral analysis to be aluminium hydroxide.

Yellow and orange

Lead-tin yellow in the stars and the brocade pattern of the drapery. Identified microscopically and chemically, but not by X-ray diffractions. (It should be noted that most of the rich golden-yellow of the drapery top left is merely a very strong-coloured yellow ochre.)

Orpiment and realgar as bright touches in the orange sash of the *putto* lower right and occasional isolated particles in yellowish flesh paint.

The medium

The analysis by gas-chromatography of two samples of paint, one brown and one white gave fatty acid ratios consistent with *linseed oil*.

The layer structure

This is of enormous complexity although the total thickness of paint is nowhere exceptionally thick. A good deal of the multiplicity of layers seems to derive from *pentimenti* on the part of the artist and from overlapping of different coloured areas of paint. For example the white of the bedsheet is painted over the red of the brocade coverlet, as may be seen in the paint cross-section of the white of the sheet illustrated in Plate 5g (p.47). There are *pentimenti* of Jupiter's blue and pink draperies. The flesh in all the samples taken has a most complex multi-layer structure, particularly that of the *putti* where dullish pink, brown and orange opaque layers alternate with thin lines of dark brown or black. Juno's flesh has in a sample from a shadow on the leg a greenish underpaint containing large particles of green earth, and a top layer of pale flesh pink with one or two scattered tiny specks of ultramarine. One feature which literally runs through the picture is the occurrence of intermediate thin layers of crimson lake glazes. An example can be seen in Plate 5i (p.47), in a sample from the yellow pattern of the crimson and gold brocade on the bed. In that instance it would be explicable as the streaking of one colour through another before the first was dry. In other instances it is less easily explicable except in terms of *pentimenti*. Crimson glazes run between the complex series of layers from which the blue-green parts of the wings of the *putti* are built up, although no red paint is visible on the picture surface in those areas.

General comment and comparisons

Similar single-twill canvas has been noted in other pictures in Venice, for example that of *The Ascension* in the Sala Grande of the Scuola di San Rocco. That the seemingly brown ground is composed of a mixture with multi-coloured pigment particles — including a few of quite costly colours like ultramarine, vermilion and red lake pigments — seems explicable if old palette scrapings were incorporated, perhaps boiled up with brown ochre, charcoal black and oil to make a brown oil ground. The scale on which Tintoretto worked

must have produced plenty of palette scrapings. Exactly the same type of ground was noted in the Scuola di San Rocco, particularly on pictures on the walls of the Sala Grande, more recently on No.4004, *Portrait of Vincenzo Morosini*. Closest in layer structure and general technique was the *Ascension* (Fig.7) in the Scuola di San Rocco, from the wall of the Sala Grande. It can be dated from records of the Scuola to c.1579 – 81, compared with c.1578 for the *Milky Way* as postulated on stylistic grounds by Cecil Gould. A cross-section from the wing of one of the angels on the upper right is shown in Plate 5h (p.47). Beneath the top white highlight are numerous layers including several thin lines of red lake pigment and a green layer. The ‘palette scraping’ type ground can clearly be seen. A further comparison of layer structure may also be made with a sample from the great central ceiling canvas of the Sala Grande of the Scuola, *The Brazen Serpent* which shows the complex structure of yellowish flesh paint, in the layers of which some brilliant yellow fragments of orpiment are visible (Plate 5j, p.47).

In a recent paper [9] Cecil Gould has discussed the X-radiograph and posed the question as to whether its complexity can be explained only by the existence of some other quite different composition or subject beneath the picture as we now see it. It would seem to the present author that given Tintoretto’s method of working at this stage in his career, the confused and complex image on the X-radiograph is not unexpected. He appears, like Titian, to work out his elaborate and highly original compositions on the canvas itself (with the aid only of a few preliminary rough sketches on paper of nude figures). Unlike Titian (or at any rate Titian in his earlier works in particular) he does not make alterations by blocking out whole areas with an opaque layer of paint before repainting, but redraws the composition using the brush with vigorous strokes. When this intermediate drawing is done in lead white it appears of course on the X-radiograph. Where it is done in black, or as seems so often the case with a red lake pigment it does not register on the radiograph, otherwise the latter might be even more confusing! Sometimes the swift drawing with the brush is left uncovered as in the ghostly outlined figures in the centre of the distant landscape of *The Ascension* (Fig.7) or those seen rushing under the porticoes in *The Transportation of the Body of S. Mark* in the Accademia Gallery. On the contrary, what is surprising is that despite the turmoil and striving to be seen in the X-radiograph *The Origin of the Milky Way* presents an apparently effortless and flawless degree of finish and surface rare in Tintoretto’s paintings. It is, with the four Anticollégio *Allegories* in the Ducal Palace, to which it has been compared, one of the most Titianesque of his pictures. It is instructive to compare the X-radiograph of *The Origin of the Milky Way* with what seems to be the only surviving preliminary drawing on paper of the complete composition for a painting, the *Venus, Vulcan and Mars* in Munich (Fig.9), the drawing being in Berlin (Fig.11). The drawing for *Venus, Vulcan and Mars* is in pen, wash and white highlights on blue



paper. It shares with the X-radiograph of *The Origin of the Milky Way* a multiplicity of swirling outlines, some in black and some in white, solid white highlights on the heads and limbs, which have the curious elongated oval shapes reminiscent of wooden lay figures to be found in artists’ studios (incidentally, in the drawing Tintoretto seems to have experienced a similar difficulty with the perspective of the tiled floor as that remarked upon in No.1130, *Christ Washing His Disciples’ Feet*). The mass of twisting lines done in black in the bottom left hand corner of the drawing is strongly reminiscent of the circular shapes seen in the X-radiograph of *The Origin of the Milky Way* (and hence drawn in lead white) which might be interpreted as clouds, heads of *putti* or drapery.

An even more convincing display of Tintoretto’s procedure, at any rate at this latish period, can be seen in a small unfinished painting in the Metropolitan Museum, New York (Fig.13 [10]) a study for the large canvas of *The Redeemer Adored by Doge Alvise*

Figure 7
Jacopo
Tintoretto,
The Ascension,
canvas,
212 × 128
(5.38 × 3.25).
Venice, Scuola di
San Rocco.

Mocenigo which decorates a wall in the Doge's palace in Venice and can be dated c.1581–84. Until comparatively recently the unfinished condition of the small *bozzetto* was hidden by overpaint (Fig.12). The dark patch near the lower left corner is an area of exposed brown ground on which is drawn *in black* a lion of S. Mark (black drawing on a brown ground is also to be seen in unfinished areas in *The Adoration of the Shepherds* in the Sala Grande of the Scuola di San Rocco, datable 1579–81). Recent examination of the 'brown' ground of the Metropolitan Museum picture has, however, shown that it is of the 'palette-scraping' type like that of *The Origin of the Milky Way* [11]. Just above this area is the already painted figure of an angel seated playing a lute, but on the paint surface his legs and drapery have been roughly redrawn in white paint (Plate 9a, p.48). In the sky there appear the floating forms of two unfinished figures (Plate 9b, p.48). The one on the left, the least finished of the two, consists only of the head and torso blocked in with white on top of the blue paint of the sky, then the contours heavily outlined with the brush in brown and a purplish brown lake pigment. There are also touches of a pink glaze on the flesh. The head and torso of this figure are very close in form both to the figures in the drawing for *Venus, Vulcan and Mars* and to those in the X-radiograph of *The Origin of the Milky Way*. It is obvious that such a procedure could only result in a confused image in an X-radiograph and at the same time a multiplicity of layers as seen under the microscope in cross-sections of paint samples. In fact the X-radiograph of the sketch shows yet another *pentimento*, a towering figure, presumably S. Mark presenting the Doge to the Redeemer, standing at the foot of the steps [12].

No.4004, 'Portrait of Vincenzo Morosini'

Size and format

33¼ × 20 (0.845 × 0.514), but probably cut down along the side and bottom edges (see Part I, p.8).

Date

Deduced to be c.1580–85 from comparison with dated portraits of the same sitter.

Support

Canvas, fine close tabby-weave, not dissimilar to that of *S. George and the Dragon* (but not much significance can be placed on this similarity, since Tintoretto used a wide variety of canvas; the fine weave may, though be relevant to the small size of the two works).

Ground

There seems to be a dark ground and in most of the samples taken there was a layer of the 'palette-scraping' type ground, described above in connection with *The Origin of the Milky Way*, but in this case with a thin gesso ground beneath, browned as usual from excess glue. Both layers seem however to be of rather irregular thickness and in one or two samples one or other of the two layers was absent, which might be

just the result of hasty or careless application not deliberate intent.

Underdrawing

The X-radiograph (of which a detail of the head is shown in Part I, Fig.3, p.4) shows not only blocking in of the face in rather streaky lead white, but also sketchy drawing lines in white on the dark ground. To the right of the sitter's head is a considerable *pentimento* done in lead white paint.

The pigments

Blue

Azurite in the sky and landscape.

Smalt as one or two isolated particles in an intermediate white layer in the building up of the lights of the crimson robe.

Green

Malachite in fine regular particles (possibly the synthetic variety?) in the green of the landscape.

Verdigris as tiny particles mixed with orpiment in the greenish gold paint of the curtain on the left which seems to have been painted out by the artist.

Copper 'resinate' green as traces in the same paint of the hidden curtain.

Green earth as scattered particles in the flesh paint of the face.

Red

Vermilion used sparingly in flesh paint and lips.

Red lake pigment in the crimson robe and the purplish arabesques on the golden sash. Microscopically samples from the two look identical, that on the gold sash presumably looking more purplish by contrast with the bright yellow. The dyestuff of both was identified as *kermes* by thin-layer chromatography.

Yellow and orange

Orpiment and realgar are both used in the gold embroidery of the stole. The distinctive orange hue of realgar used alone can be seen in two patches of the narrow border near the edge of the sitter's right shoulder (see Part I, Plate 1, p.9). Orpiment also occurs as the yellow pigment of the green-gold curtain on the left now covered by the brown paint of the background.

The medium

Identified as *linseed oil* by gas-chromatographic analysis.

The layer structure

This proved to be nearly as complex as that of *The Origin of the Milky Way*. One sample only was taken from the flesh of the face, from a small damage in an area of greenish half-shadow near the right hand corner of the mouth. On top of the gesso ground and a thin line of the brown ground, there was a thickish underpaint of lead white and brownish ochre with scattered particles of vermilion and green earth, then a top layer of similar composition but lighter in tone and lacking the green earth.



Figure 8
Jacopo
Tintoretto,
*The Origin of the
Milky Way*
(No.1313), after
cleaning and
restoration.



Figure 9
Jacopo
Tintoretto,
*Venus, Vulcan
and Mars*,
canvas,
52¾ × 78
(1.34 × 1.98).
Munich, Alte
Pinakothek.

Figure 10
Jacopo Tintoretto,
*The Origin of the
Milky Way*
(No.1313),
X-ray mosaic
(42 kV, 20 mA,
35 s).

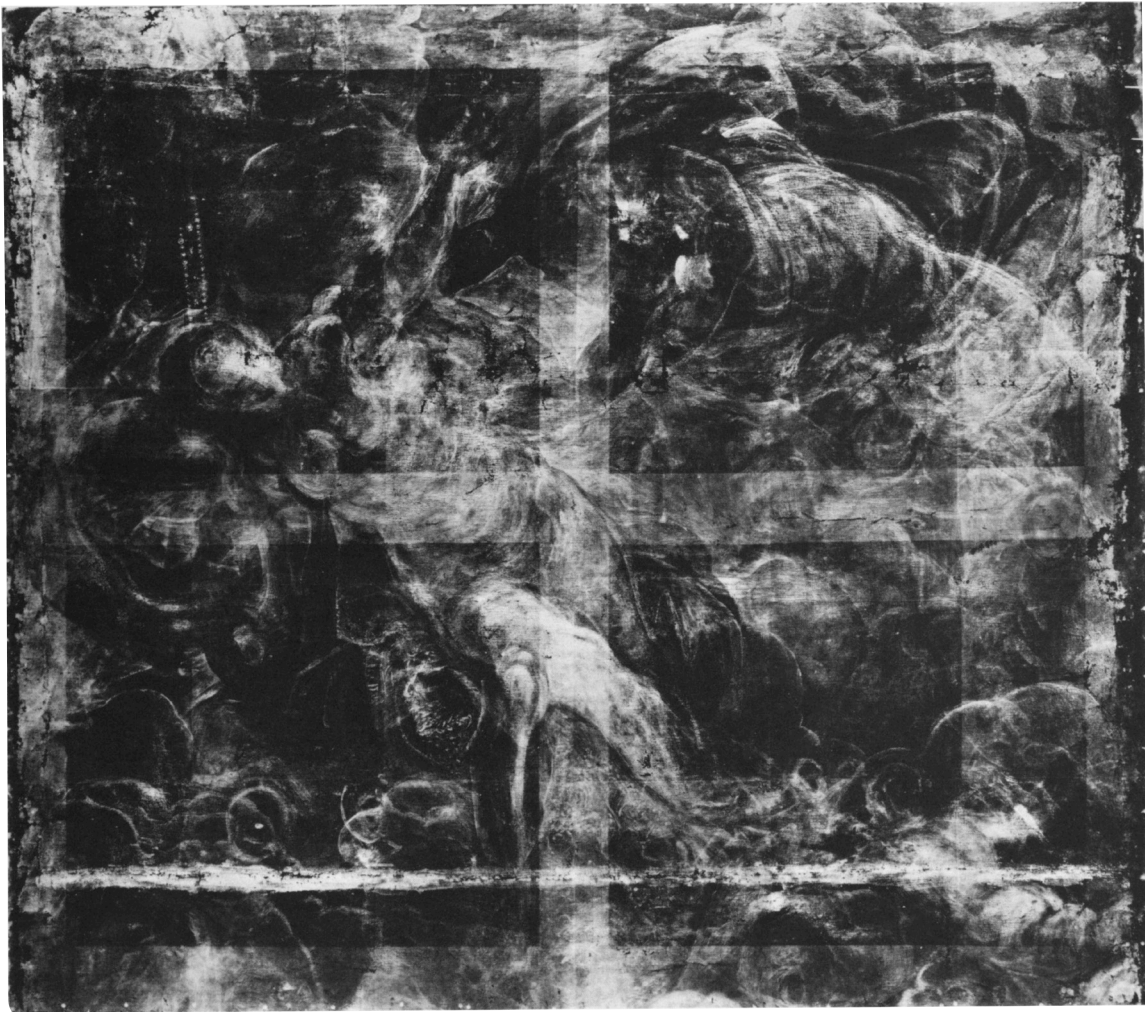
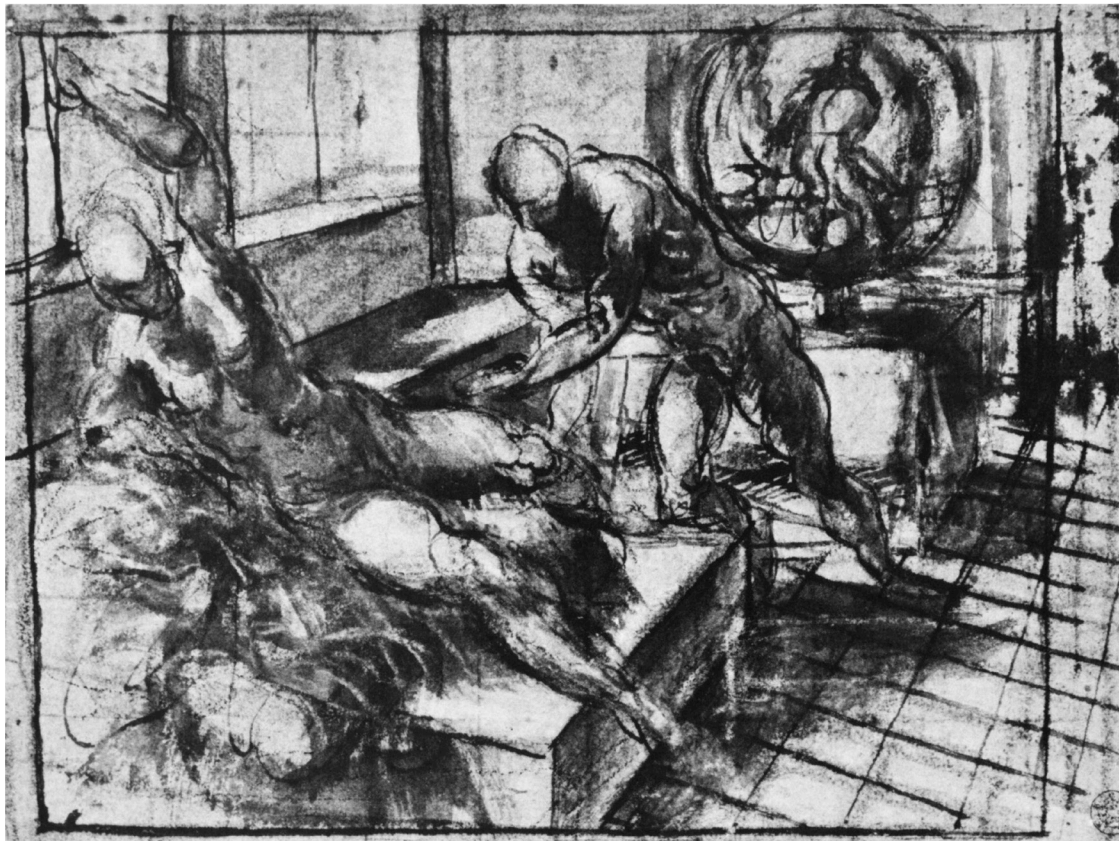


Figure 11
Jacopo Tintoretto,
Venus and Vulcan,
pen and brush,
black ink with
white heightening
on blue paper,
8 × 10¾
(204 × 273 mm).
Berlin,
Staatliche
Museen
Preussischer
Kulturbesitz,
Kupferstich-
kabinett.
Preliminary
drawing for the
painting shown in
Fig.9.



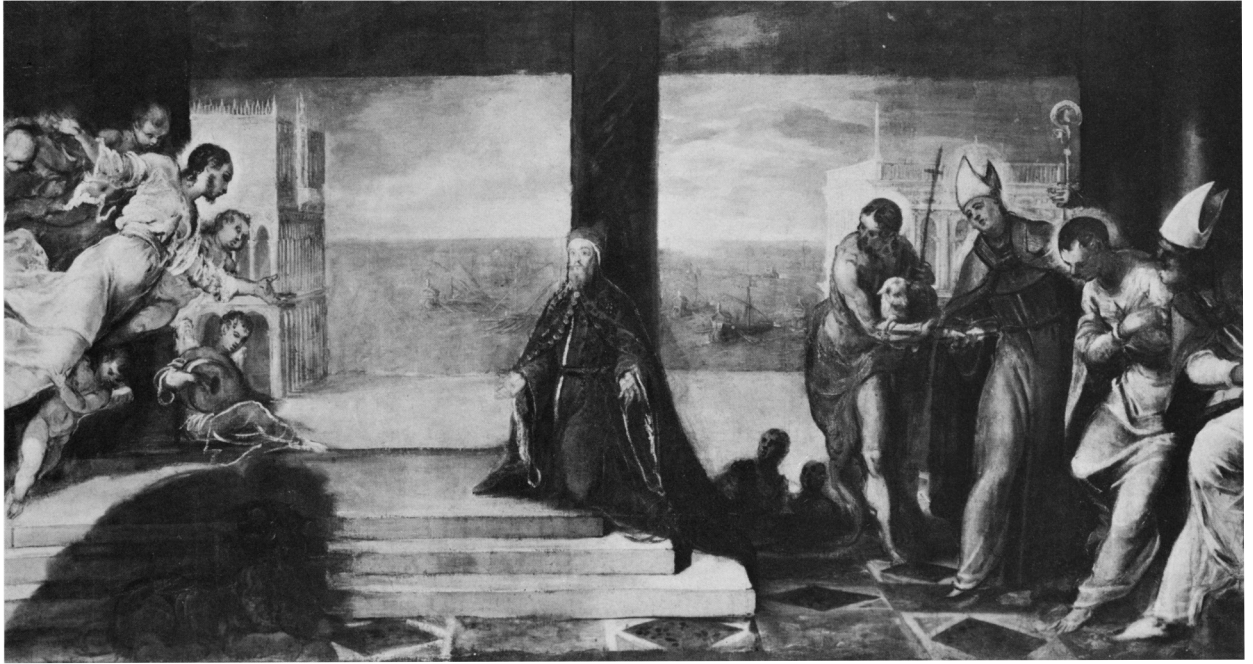


Figure 12 Jacopo Tintoretto, *Doge Mocenigo Presented to the Redeemer*, canvas, 38½ × 78 (0.977 × 1.985). New York, Metropolitan Museum. Photograph taken in 1944 before removal of overpaint from the sky.

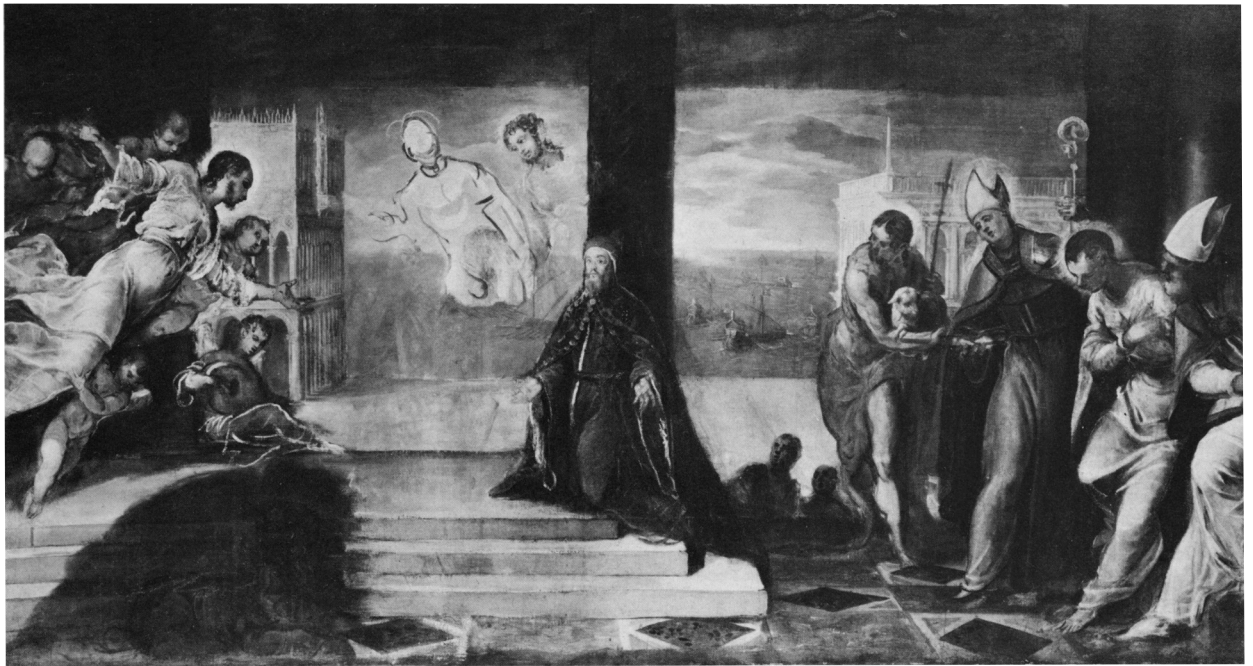


Figure 13 Jacopo Tintoretto, *Doge Mocenigo Presented to the Redeemer*, after recent removal of overpaint from the sky.

The crimsons of the robe and sash were remarkable. As in *S. George and the Dragon* and *Christ Washing His Disciples' Feet*, the crimson drapery was first laid in with a glaze layer of crimson lake pigment, nearly white highlights thickly applied then a final glaze of crimson. With a dark ground this tends to give brilliance in the lights but rather dark tones in the shadows, particularly with increased translucency of oil paint with age. Characteristic thin lines and streaks of red lake pigment run through and between the various layers, and some seem to have been painted wet in wet. The white paint of the fur has been thickly brushed into the still-wet crimson paint of the robe which has bled into it in some places giving a pink tinge. The gold embroidery is painted on top of the completed crimson robe so that the total number of layers is considerable, as can be seen in the photomicrograph of a cross-section of a sample (Plate 5k, p.47). The hidden curtain is painted in what amounts to almost a single layer of enormous glistening crystalline particles of orpiment interspersed here and there with traces of copper 'resinate' green (in defiance of the usual warning not to mix orpiment with copper pigments for fear of chemical interaction; perhaps that has been prevented by the oil medium). The landscape glimpsed through the window is a remarkably bold and summary bit of painting, executed just in streaks of blue and green using the dark of the 'palette scraping' ground to add texture and form.

General comments and comparisons

It must be confessed that until the recent cleaning of the *Vincenzo Morosini* the author had regarded the portraits as the least interesting of Tintoretto's productions. It was fascinating to see, however, in the course of examination, so many features appear which had been already noted in other and major works of the artist. The combination, for example, of orpiment and realgar with red lake glazes, particularly glazes *beneath*, occurred constantly in paintings in both the *Madonna dell'Orto* and the *Scuola di San Rocco*, and is almost a signature of Tintoretto. For comparison there is illustrated a cross-section of a sample of paint from *The Ascension* (Plate 5l, p.47).

It could be that the presence or absence of such characteristic materials and techniques could serve in classifying the large number of portraits of similar type into autograph works, studio productions and later copies.

Part III of this article, 'Tintoretto's Paintings in the National Gallery: A Note in Conclusion', will be published in the next issue of this *Bulletin*.

Notes and references

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2. The author wishes to thank the following: Dr Francesco Valcanover, Soprintendente delle Belle Arti for permission to examine works by Tintoretto in

Venice and for encouragement of the project; Dr Lorenzo Lazzarini of the Laboratory of S. Gregorio, Venice, for much practical help and valuable exchange of information; the Italian Art and Archives Rescue Fund and subsequently the Venice in Peril Fund, particularly Sir Ashley Clarke, for supporting early stages of the work in Venice of Dr Lazzarini and the author; the Samuel H. Kress Foundation and Miss Mary Davis for support in the later stages of that work.

3. BOSCHINI, Marco, *La Carta del Navegar Pitoresco* (Venice 1660), p.329; Edizione Critica, ed. A. Pallucchini (Venice-Rome 1966), p.362.
4. PLESTERS, J. 'Titian's "Bacchus and Ariadne": The Materials and Technique', *National Gallery Technical Bulletin*, 2 (1978), pp.38-9. Black underdrawing was notably absent from paintings by Giorgione recently examined; see LAZZARINI, L. in 'Giorgione, La Pala di Castelfranco Veneto', *Catalogue* (one of a series of the exhibition commemorating the quincentenary of the artist's birth, Castelfranco Veneto, 1978), p.46.
5. PALLUCCHINI, R., 'Inediti di Jacopo Tintoretto', *Arte Veneta*, 23 (1969), pp.35-7. The picture is reproduced in colour on p.35.
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7. RIDOLFI, C., *Le Maraviglie dell'Arte* (Venice, 1648); ed. Detlev, Freiherr von Hadeln (Berlin, 1914), Part II, p.63.
8. GOULD, C., 'Sebastiano Serlio and Venetian Painting', *Journal of the Courtauld and Warburg Institutes*, 25 (1962), Nos. 1/2, p.56.
9. GOULD, C., 'An X-ray of Tintoretto's "Milky Way"', *Arte Veneta*, 32 (1978), pp.211-13.
10. ZERI, F. and GARDNER, E.H., *Italian Paintings, Venetian School, A Catalogue of the Metropolitan Museum* (New York, 1973), pp.69-71. It is interesting that the sketch was once owned, and indeed purchased by Ruskin who was instrumental in the 'rediscovery' of Tintoretto's work in the nineteenth century.
11. The author expresses gratitude to the Metropolitan Museum, New York, and Mr John Brealey, Paintings Conservator at the Museum, for permission to examine the study for *The Redeemer Adored by Doge Alvise Mocenigo* and for supplying the photographs shown in Plates 9a and 9b and Figs.12 and 13; to Mr Mark Leonard of the Conservation Center of the Institute of Fine Arts, New York University, for kindly making available his unpublished thesis on the subject.
12. von SONNENBURG, H., 'Beobachtungen zur Arbeitsweise Tintoretto's', *Maltechnik-Restaur*, No.3 (1974), pp.133-43, reproduces the composite X-radiograph together with some interesting reconstructions of the painting procedure.

Plate 5 Jacopo Tintoretto.

Photomicrographs of paint cross-sections of National Gallery pictures (a,c,e,g,i,k) and of works by the artist in public collections in Venice (b,d,f,h,j,l), photographed by reflected light at 220× magnification; actual magnification on the printed page is 120×.

(a) *S. George and the Dragon* (NG No.16): Deep blue of sky.

1. Gesso ground, brown from excess glue.
2. Lead white and azurite underpaint.
3. Lead white and ultramarine.

(b) *The Virgin Appearing to S. Victor and S. Nicholas* (Church of the Ognissanti, Feltre): Blue of the Virgin's cloak.

1. Gesso ground (trace), brown from excess glue.
2. Lead white underpaint with one or two azurite particles.
3. Lead white and ultramarine.

(c) *S. George and the Dragon* (NG No.16): Overlap of the Princess's crimson cloak and blue dress.

1. Gesso ground (trace).
2. Lead white underpaint with large flake of red lake pigment included.
3. Thin blue layer tapering off to left of section; presumed to be underpaint of dress; azurite particles with a few which look like ultramarine.
4. Thick crimson 'glaze' layer of red lake pigment; one or two yellow particles included.
5. Line of yellowish white, not identified.
6. Thin line of intensely red 'glaze'.
7. Thick deep pink paint; lead white with large flakes of red lake pigment and granules of lead white visible.
8. Thin sprinkling of minute scarlet vermilion particles.

(d) *The Virgin Appearing to S. Victor and S. Nicholas* (Church of the Ognissanti, Feltre): Crimson of the Virgin's dress.

1. Gesso ground (trace), browned with glue.
2. Lead white and red lake pigment.
3. Crimson 'glaze' layer of red lake pigment.
4. Thin undulating blue layer consisting of ultramarine particles unmixed with lead white; could represent overlap of blue glaze of cloak with paint layers of red dress. The layer emerges at the paint surface at one point along the section.
5. Scarlet-red glaze layer of lake pigment.
6. Thin sprinkling of minute scarlet vermilion particles.

(e) *Christ Washing His Disciples' Feet* (NG No.1130): Orange-yellow robe of S. Peter.

1. Gesso ground, browned with excess glue.
2. Black upper ground layer, charcoal mainly, oil medium.
3. Realgar.
4. Orpiment as large glistening crystals.

(f) *The Presentation of the Virgin in the Temple* (Church of the Madonna dell'Orto, Venice): Orange-yellow of the sleeve of the bearded figure lower left corner.

1. Gesso ground (trace) browned with glue.
2. Black upper ground layer, charcoal mainly.
3. Realgar.
4. Orpiment as large glistening crystals.

(g) *The Origin of the Milky Way* (NG No.1313): White of bed sheet.

1. Brown 'palette-scraping' type ground containing pigment particles of various colours.
2. Deep crimson glaze of red bedcover.
3. Line of orpiment crystals, perhaps yellow pattern of red and gold brocade bedcover.
4. Thick lead white layer of sheet.

(h) *The Ascension* (Scuola di San Rocco, Venice): White highlight on wing of angel.

1. Dark brown 'palette-scraping' type ground with pigment particles of various colours, including smalt and vermilion.
2. Pale blue-green layer; verdigris and lead white.
3. Crimson 'glaze' of red lake pigment.
4. Lead white.
5. Crimson 'glaze' similar to layer 3.

6. Thick lead white with one or two large globules of red lake pigment.
7. Discoloured varnish.

(i) *The Origin of the Milky Way* (NG No.1313): Yellow brocade pattern of crimson bedcover.

1. Brown 'palette-scraping' type ground.
2. Line of crimson paint; lake pigment and a trace of lead white.
3. Pale pink paint; lead white and red lake pigment.
4. Light crimson layer similar to layer 2 above, but more lead white.
5. Very thick impasto of lead-tin yellow.

(j) *The Brazen Serpent* (Scuola di San Rocco, Venice): Yellowish flesh of arm of large figure lower left corner.

- [1,2] Thin gesso ground followed by brown 'palette-scraping' type ground (missing from this particular cross-section).
3. Underpainting of flesh; lead white, ochre, and occasional vermilion and orpiment particles; large diagonal crack.
4. Line of dark red 'glaze'.
5. Lead white with a few black and some unidentified green particles.
6. Lead-tin yellow with a few crystals of orpiment.
7. Thicker, paler yellow layer similar to layer 6.
8. Deep yellow glaze (pigment unidentified).

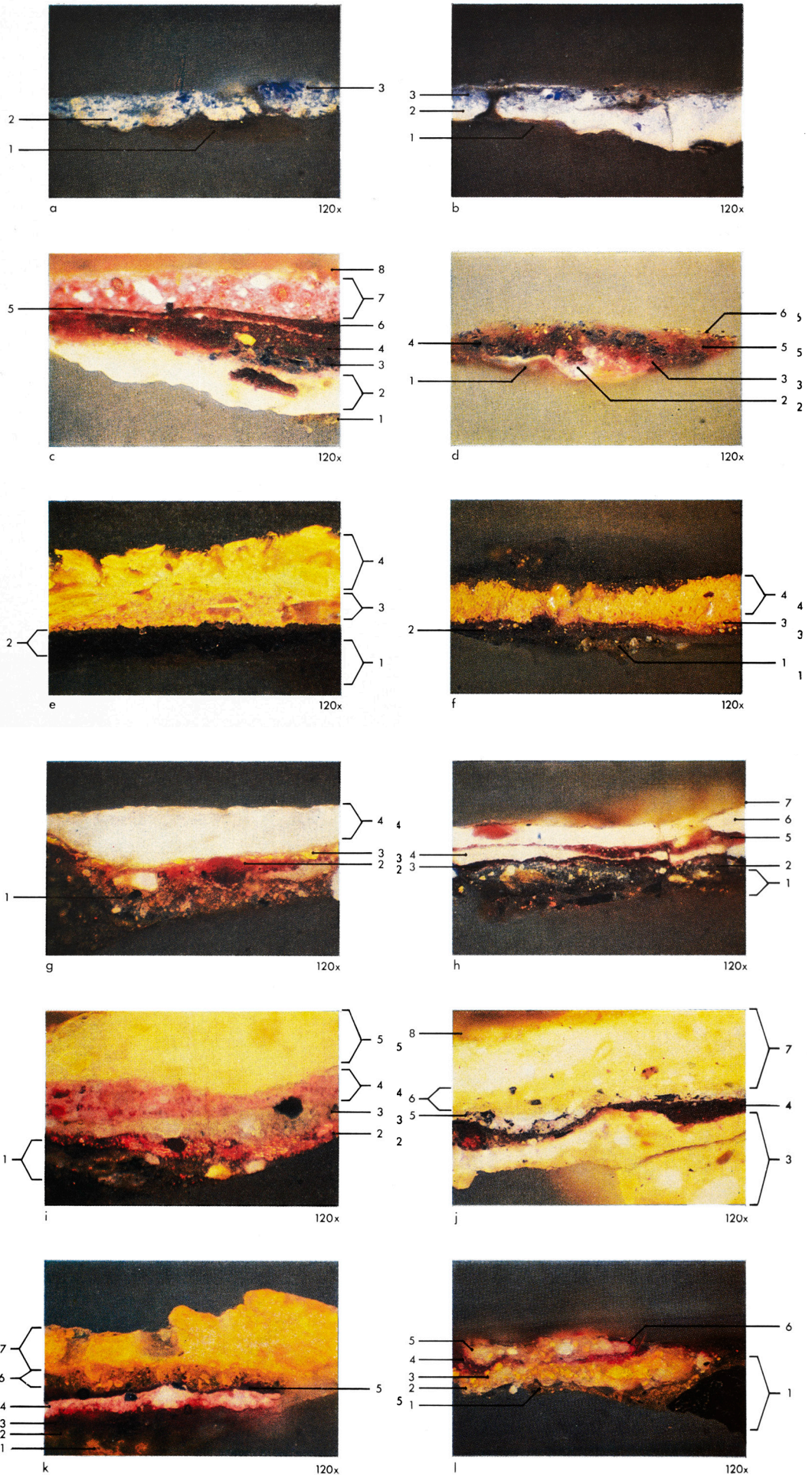
(k) *Portrait of Vincenzo Morosini* (NG No.4004): Orange patch on border of gold sash.

1. Gesso ground (trace), browned with glue.
2. Brown 'palette-scraping' type ground.
3. Crimson 'glaze' layer which seems to be the first laying-in of the dark red robe. The red lake pigment seems to have migrated to layer 4.
4. Lead white with crimson lake apparently from layer 3; a few blue smalt particles.
5. Intensely red glaze, presumably final layer of red robe.
6. Realgar with some yellow-brown ochre.
7. Orange-yellow impasto of realgar with some orpiment.

(l) *The Ascension* (Scuola di San Rocco, Venice): Yellow highlight on sleeve of angel (remnants of red glaze present).

1. Brown 'palette-scraping' type ground; on the right a large fragment of charcoal.
2. Ochre layer with a few blue smalt-like particles on the right.
3. Orpiment and realgar.
4. Crimson 'glaze' of red lake pigment.
5. Orpiment and realgar (large smalt particle on right).
6. Thin crimson glaze, lake pigment.

Plate 5
 Jacopo Tintoretto
 Photomicrographs of
 paint cross-sections.
 Full caption on facing
 page.



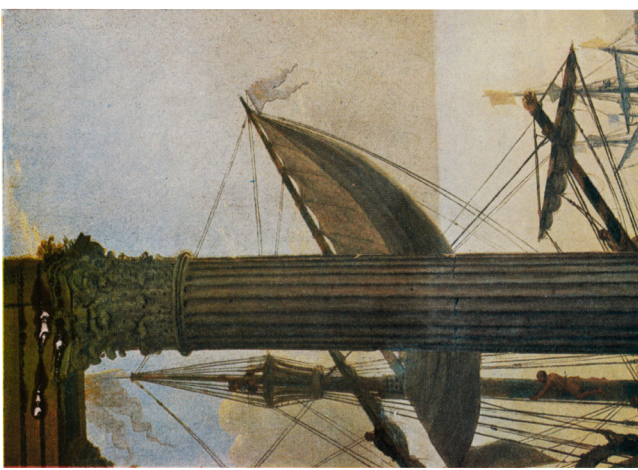


Plate 6
Claude, *Seaport: The Embarkation of the Queen of Sheba* (No. 14). After cleaning and restoration.

Plate 7 (Top right) Claude, *Seaport: The Embarkation of the Queen of Sheba* (No. 14). Detail during cleaning in 1979. Note the pentimento in the flag in the lower right corner, much discussed by the Select Committee of 1853.

Plate 8 (Bottom right) Claude, *A Seaport* (No. 5). Detail of the foreground before cleaning, showing the blanched paint of the left-hand figure's trousers, and some blanching in the landscape.

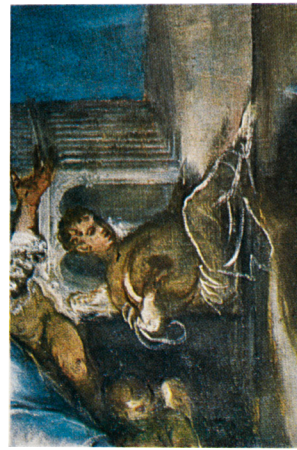


Plate 9a Jacopo Tintoretto, *The Redeemer Adored by Doge Alvise Mocenigo*, Metropolitan Museum, New York. Detail of seated lute player showing redrawing in white on top of the paint layer.

Plate 9b Jacopo Tintoretto, *The Redeemer Adored by Doge Alvise Mocenigo*, Metropolitan Museum, New York. Detail of unfinished figures in the sky.