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Front cover: Veronese, *The Family of Darius before  
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Plate 1 Agostino Carracci, *A Woman borne off by a Sea God(?)* (NG 148), 1599–1600. Charcoal and white heightening on blue-grey paper, a grey wash applied over the whole, 203.2 x 410.2 cm. After cleaning and restoration.



Plate 2 Agostino Carracci, *A Woman borne off by a Sea God(?)*. Before cleaning and restoration.

# The Conservation of the Carracci Cartoons in the National Gallery

GABRIELE FINALDI, ERIC HARDING AND JUNE WALLIS

## Introduction

The cleaning and restoration of the National Gallery's two large Carracci cartoons, *Cephalus carried off by Aurora in her Chariot* (NG 147) and *A Woman borne off by a Sea God(?)* (NG 148) (Plates 1–3), was undertaken to arrest their deterioration, strengthen their physical structure, and improve their legibility. As a result of the Carracci Cartoon Restoration Project (1990–4) they have recovered their status as fine works of art instead of remaining merely interesting art-historical documents.

## The Farnese ceiling

The cartoons were made in preparation for two of the scenes on the painted ceiling of the Gallery in the Palazzo Farnese in Rome (Fig. 1). The Farnese ceiling has always been considered one of the finest achievements of Italian art, comparable with the Sistine ceiling and Raphael's *Stanze* frescoes. Commissioned by Cardinal Odoardo Farnese (1573–1626), it was designed and executed by Annibale Carracci (1560–1609) with some assistance from his older brother, Agostino (1557–1602). The ceiling, which celebrates the loves of the gods, is conceived according to a sophisticated and multi-layered decorative scheme which combines painted architecture, sculpture and stucco-work, flesh-coloured putti and *ignudi*, simulated bronze medallions, and a series of *quadri riportati*, or feigned paintings, showing mythological subjects derived principally from Ovid. Annibale began working in the Gallery in 1597 or 1598; he was joined briefly by Agostino for a few months in 1599–1600 and the ceiling was completed by 1601.<sup>1</sup> In addition to the two National Gallery cartoons, a large fragment of the cartoon executed by Annibale in preparation for the central scene of the *Triumph of Bacchus and Ariadne* survives in Urbino.<sup>2</sup>

## Mural painting and cartoon transfer techniques

When Annibale Carracci was given the commission to paint the Farnese Gallery he already had experience of mural painting, both in Bologna, where he had worked with his brother Agostino, and in Rome in the Camerino of the Palazzo Farnese itself. Recent restoration of the frieze in the Palazzo Magnani in Bologna has revealed that the technique employed there is almost certainly true fresco, that is, the pigments, suspended only in limewater, were applied on to freshly laid plaster.<sup>3</sup>

However, the method employed for the decoration of the Farnese ceiling appears to have been a combination of fresco and secco techniques (the latter being the application of pigment in some form of binding medium on to already dry plaster).<sup>4</sup>

Cennino Cennini describes both techniques in his *Libro del l'Arte* (1390s) and although he recognises the usefulness of painting in secco – ‘everything which you execute in fresco needs to be brought to completion and touched up in secco with tempera’ – he also underlines its dangers – ‘know that if you put in too much tempera the colour will soon crack and peel away from the wall.’<sup>5</sup> Although a general consensus did develop in favour of the superiority of true fresco painting, in practice murals entirely in fresco are rare because of the difficulties encountered in their execution (chiefly the speed required), and a combination of the two techniques, such as that used in the Farnese Gallery, is consequently far more common.<sup>6</sup>

The Carracci also followed conventional practice in their preparatory work for the decoration of the ceiling. Numerous preparatory drawings on paper were made: compositional studies, figure studies, drawings for decorative details such as the sculptural grisaille figures.



Plate 3 Agostino Carracci, *Cephalus carried off by Aurora in her Chariot* (NG 147), 1599–1600. Charcoal and white heightening on blue-grey paper, a grey wash applied over the whole, 202.5 × 398.8 cm. After cleaning and restoration.

After these came full-scale drawings, or cartoons, from which the designs were transferred to the ceiling.<sup>7</sup> Generally speaking this was done by one of two methods: the whole cartoon could be placed directly on to the plaster, or it could be cut up into a number of pieces and individual areas transferred section by section. If the outlines of the design had been pricked for transfer then coloured chalk powder was shaken (or pounced) through the holes in the paper to leave marks on the *intonaco* (freshly applied smooth plaster), otherwise the outlines were incised using a stylus so as to make depressions in the plaster.<sup>8</sup>

From the three cartoons which have survived for the ceiling it is clear that the Carracci did not use exclusively one method. The *Woman borne off by a Sea God(?)* and the Urbino cartoon were pricked for transfer and neither was cut up into smaller, more manageable pieces. Since it would have been physically impossible to manipulate a single piece of paper approximately 2m x 4m (in the case of the *Woman borne off by a Sea God(?)*) on to the ceiling, it must be supposed that the design was transferred by means of a ‘substitute’ (or intermediary) cartoon. A separate sheet of paper would have been placed behind the cartoon and both would have been perforated during the pricking procedure. The substitute cartoon would then have been cut up into smaller sections and used

for the transfer of the design.<sup>9</sup> These substitute cartoon fragments would normally have been discarded after use.<sup>10</sup> The advantage of using this method was that the original cartoon was preserved intact and could be re-used, kept as reference or teaching material, displayed or sold. Some cartoons were clearly intended for preservation from the outset.

By contrast, the cartoon for the Cephalus and Aurora scene was not pricked for transfer. It was cut up into sections, the design transferred on to the plaster by means of stylus indentation, and the cartoon subsequently reassembled. No traces of the stylus indentations survive on the cartoon itself since these would have been obliterated when the cartoon was pressed down on to its canvas support, apparently in the seventeenth century. Examination of the fresco reveals that the major cut divisions of the cartoon correspond, broadly speaking, to the *giornate* sections on the ceiling (the patches of fresh plaster applied to the ceiling and painted in a single working session) (Figs. 2a and 5). The artist also appears to have adopted the traditional practice of completing (where possible) whole figures or discrete sections of the painting in a single working session so that the contours or dividing lines in the composition would disguise the joins of the *giornate*.

## Agostino and Annibale

Within two years of the completion of the Farnese ceiling the two fresco scenes for which the National Gallery cartoons are preparatory, the *Cephalus and Aurora* and the so-called *Glaucus and Scylla* (Figs. 3 and 4),<sup>11</sup> were described as the work of Agostino. All the early sources concur on this point.<sup>12</sup> When Agostino began working on the ceiling the project was already well-advanced. A study of the overlaps and underlaps in the application of the *giornate* sections, which indicates the sequence of execution of parts of the ceiling, shows that when Agostino painted his two scenes much of the central area of the ceiling had already been executed (Fig. 5). The narrative scene of the *Glaucus and Scylla* was executed after the illusionistic frame, the bronze medallions, and the neighbouring terms and *ignudi* had already been painted.<sup>13</sup> The inscription, 1600 18 maggio, which was recently discovered just beneath the lower edge of the fresco, was made during, or close to, the time of the execution of the *Glaucus and Scylla* scene.<sup>14</sup>

The exact nature of the collaboration between Annibale and Agostino in the Farnese Gallery has long been the subject of speculation, but in almost all the modern literature the two National Gallery cartoons have been accepted as exclusively the work of Agostino.<sup>15</sup> Levey however, who treated the subject perceptively and at length, while accepting that the *Woman borne off by a Sea God(?)* was 'largely Agostino's work', proposed on stylistic grounds, and on grounds of quality, that Annibale, the superior draughtsman, could have executed the *Cephalus carried off by Aurora*.<sup>16</sup>

While recognising that almost no area in Carracci studies is more fraught with difficulties than that of distinguishing the various Carracci hands, to the authors of the present article it seems evident that the cartoon of *A Woman borne off by a Sea God(?)* is stylistically and qualitatively all of a piece and that it can reasonably be considered entirely the work of Agostino.<sup>17</sup> The tough parallel hatching, the schematic character of the female faces, and the laboured anatomy of the Triton on the right, all accord with Agostino's known drawing style. A series of preparatory drawings by Agostino, including a recently published compositional drawing (Plate 4)<sup>18</sup> for the *Cephalus*



Fig. 1 View of the Farnese Gallery, engraving by Giovanni Volpato (1733–1803). Rome, Istituto Nazionale per la Grafica.

and *Aurora*, indicate that he should generally be credited with the design and the execution of the cartoon for that scene. However, some parts of the cartoon, in particular the dog in the left foreground, are executed with an exuberant energy and a feeling for natural form more readily associated with Annibale's manner of drawing than Agostino's, and so it seems appropriate to allow for some measure of participation by Annibale.

Although the cartoon of *A Woman borne off by a Sea God(?)* has been extensively and very carefully pricked for transfer (see Fig. 6) (a tedious task that would have been carried out by a junior assistant), there are several significant differences between it and the finished fresco. The boy to the right of the central figure group did not survive into the fresco, the billowing drapery above the Sea God was simplified and the Nereid to the left of the central group was made to look down instead of up. The most significant change, however, was made in the figure of the conch-blowing Triton on the right side of the composition. In the

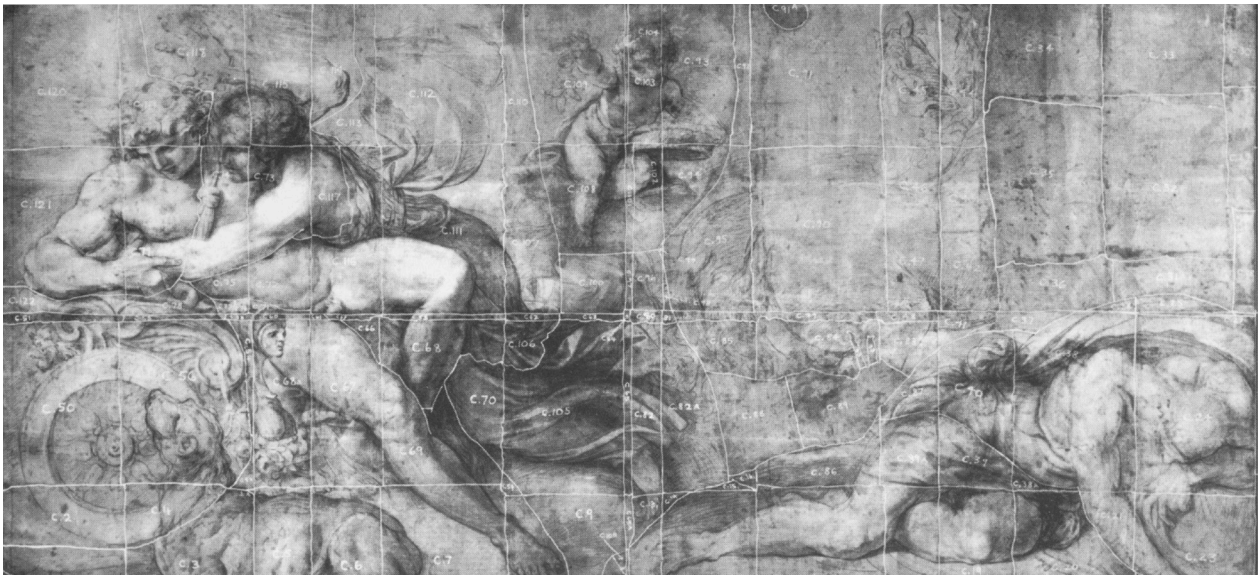


Fig. 2a *Cephalus carried off by Aurora in her Chariot*, showing separate cartoon sections outlined and numbered according to the order of removal from the canvas backing. The grid of horizontal and vertical lines corresponds broadly with the assembly of rectangular sheets joined together to form the cartoon. The other lines represent the cuts made for the purpose of transferring the design to the ceiling.

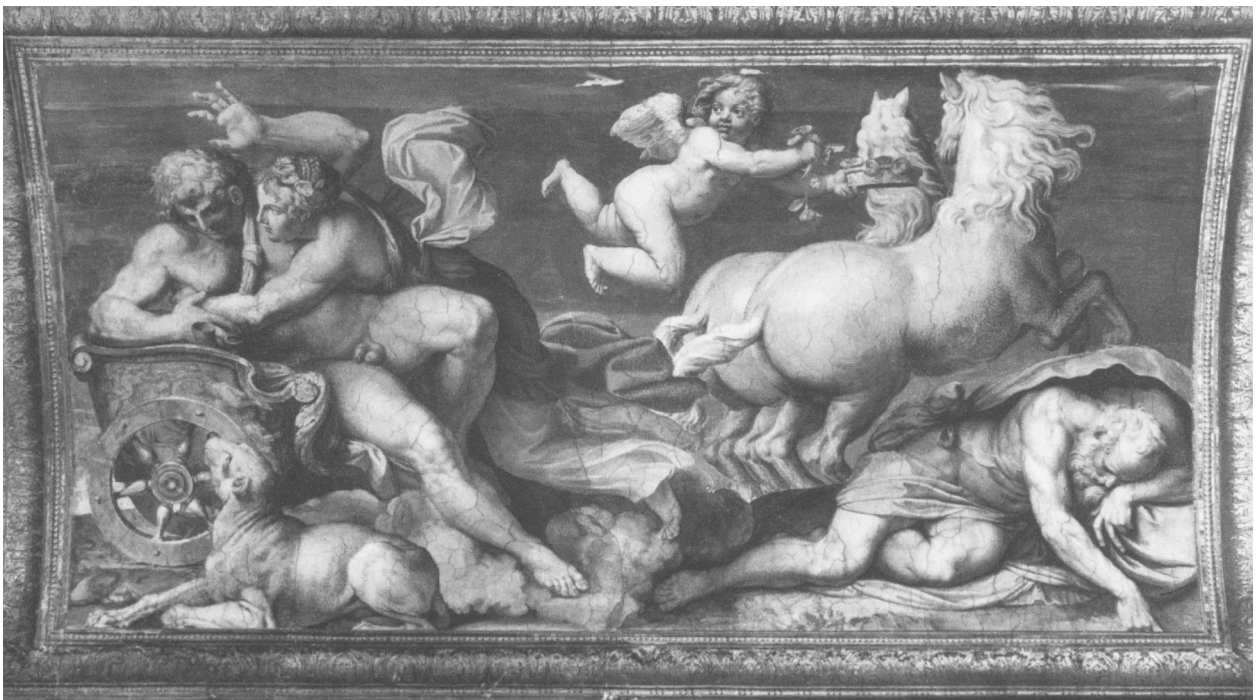


Fig. 3 Agostino Carracci, *Cephalus and Aurora*, 1599–1600. Fresco. Rome, Palazzo Farnese, Farnese Gallery.

fresco the figure turns its torso away from the spectator. The painted figure is based on a drawing universally attributed to Annibale (Malibu, Getty Museum) that must have been made after the National Gallery cartoon was completed.<sup>19</sup> The incorporation of Annibale's revision into Agostino's fresco would appear to

confirm that the younger brother held overall control of the fresco project.<sup>20</sup>

Agostino would appear to have changed his mind about several other details, both while the cartoon was being executed and after it had already been pricked for transfer. The drapery covering the lower part of the Nereid on the left



Fig. 2b *A Woman borne off by a Sea God(?)*, showing separate cartoon sections outlined and numbered according to the order of removal from the canvas backing.



Fig. 4 Agostino Carracci, the so-called *Glaucus and Scylla*, 1599–1600. Fresco. Rome, Palazzo Farnese, Farnese Gallery.

of the composition is drawn on two sheets of paper that were inserted in place of a section which had been cut out of the cartoon. The sheets were stuck together and then applied from the back of the cartoon (see Fig. 7). The contours of the drapery were then pricked for transfer with the rest of the design. The head

of the putto riding the dolphin is shown simultaneously in two alternative positions, frontally and in profile (a similar ‘swivelling’ head appears in the putto in the cartoon of *Cephalus and Aurora*), and although it is the profile view which is pricked for transfer, the frontal view was the one adopted in the fresco.





Fig. 5 Diagram showing the *giornate* scheme of the central part of the Farnese ceiling. The arrows crossing the joins in the plaster indicate the order in which adjacent sections of plaster were laid: the patch on which the arrow tip is shown overlaps the adjacent patch and was therefore laid after it. The so-called *Glaucus and Scylla* fresco was painted in seventeen working sessions, whereas the *Cephalus and Aurora* was executed in only eight (adapted from the diagram produced by C. Giantomassi in G. Briganti et al., *Gli Amori degli Dei, Nuove Indagini sulla Galleria Farnese*, Rome 1987).

There are fewer differences between the cartoon for the *Cephalus and Aurora* and the fresco itself. The principal change is the putto. In the fresco he bears a close resemblance to the putto bearing a torch on the right of the so-called *Glaucus and Scylla* fresco. The position of the leg of the dog has been altered in the fresco and the chariot decoration is much simpler. The cartoon has suffered some losses on account of the way in which it was used for the transfer of the design and at some point a clumsy effort was made to continue the contours of the composition from the original sheets of the cartoon on to the inserted section in the upper right corner.

The *giornate* divisions on the ceiling indicate that the so-called *Glaucus and Scylla* fresco was painted in seventeen working sessions, whereas the *Cephalus and Aurora* was executed in only eight (see Fig. 5). The difference in the method used for transferring the cartoon designs, and the more rapid rate of execution in the *Cephalus and Aurora* fresco are surely a sign of the artist's increased self-confidence and would suggest that the execution of the *Cephalus and Aurora* came after the *Glaucus and Scylla*.

## Provenance

Up to the present the earliest known reference to the National Gallery cartoons is in Jean-Baptiste Pierre Lebrun's *Recueil de Gravures au Trait*, his illustrated sale catalogue of 1809.<sup>21</sup> They were acquired by him in 1807 or 1808, almost certainly in Italy. It remains surprising that no earlier reference to the cartoons has yet been found since the fact that they were mounted on canvas, apparently in the seventeenth century, means that they were intended to be displayed. The history of the Urbino cartoon, which appears to have a seventeenth-century canvas lining too, is, on the other hand, well-known: it belonged to Domenichino, then to his pupil Raspantino and it hung for some years as a prized possession in the *studio* of Carlo Maratti's house in Rome.<sup>22</sup> The National Gallery cartoons were acquired by Sir Thomas Lawrence. They passed to Samuel Woodburn and were bought from him by Lord Francis Egerton (later Earl of Ellesmere) who presented them to the National Gallery in 1837.

## Preliminary examination: structure and condition

Although executed on blue-grey paper (see below), before treatment the two cartoons were overwhelmingly brown in appearance. The catalogue entry in J.R. Martin's work on the Farnese Gallery (1965) describes them as 'black chalk heightened with white on brown paper on canvas'.<sup>23</sup>

The cartoon of *A Woman borne off by a Sea God(?)* was so discoloured by a strong red-brown stain across the whole of the recto that the legibility of the image was severely affected (Plate 2). *Cephalus carried off by Aurora in her Chariot* was somewhat less discoloured but nonetheless had very obtrusive staining of the same type and colour as *A Woman borne off by a Sea God(?)* (Fig. 8). It had also been cut into many pieces for transfer (Fig. 2b). As a result of this process the entire upper right-hand section was lost, together with two smaller areas, one in the centre between the figures of Aurora and Tithonus, and the other below the feet of Aurora. Replacement sheets of a similar type had been added when the cartoon was attached to its canvas support.

The cartoons had been stuck directly on to the canvas supports with a mixture of animal glue and wheat starch paste and were attached to wooden stretchers. At a later date they had been 'strip-lined', that is, additional strips of canvas were attached around the edges to strengthen the ensembles. Both cartoons showed extreme cockling and undulation (Fig. 9).

Over the centuries the cartoons had absorbed a considerable amount of atmospheric pollution and this had played a large part in the overall deterioration of the paper, adhesive and canvas. In view of the generally poor condition and the disfiguring stains, caused by the migration of the old adhesive, it was vital that a programme of conservation and cleaning be undertaken in order to protect the cartoons from still further deterioration.

A project feasibility study conducted in March 1989 found that *A Woman borne off by a Sea God(?)* was made up of approximately 45 sheets of overlapping blue-grey paper with 31 pieces of 12cm wide blue-grey border paper. This colour only became apparent under magnification during testing procedures, when small



Plate 4 Agostino Carracci, *Cephalus and Aurora*, 1599–1600. Black and white chalk, slight traces of red chalk, on blue-grey paper, 282 × 430 mm. New York, Woodner Collection.

sections at the bottom right-hand corner were lifted and float-washed (sections C1 and C2 in Fig. 2b). The study also found that there were a large number of damaged areas (ruptures, fractures, abrasions and small delaminations from the old canvas support), many of which were a consequence of long-term deterioration and embrittlement. *A Woman borne off by a Sea God(?)* had a ‘worn’ appearance where extensive surface abrasion had occurred and the cartoon was predictably acidic, showing a range of pH between 3.68–4.14 throughout various areas.

The stability of the charcoal medium – due in large part to the penetration of the underlying adhesive layer acting as a fixative – was confirmed by tests using moisturised swabs of cotton wool. There also appeared to be a carbon-containing grey wash covering the surface of both cartoons.

## Technical examination

### *The paper*

The paper is handmade from off-white and blue linen rags and has a fairly rough surface texture.<sup>24</sup> The sheets were made in a ‘laid’

mould and a clear chain and laid wire structure is visible (Fig. 10). Due to the unevenness of pulp distribution in the mould only some sheets have a clearly visible watermark. This is a capital letter ‘M’ with a star above, in a shield. The watermark identifies the paper as having been made in one of the Fabriano mills in Umbria, which would have been a convenient source for artists working in Rome.<sup>25</sup> The ‘M’ denotes the papermaker and the watermark dates the paper to between 1580 and 1600.<sup>26</sup> The infill (repair) paper in *Cephalus carried off by Aurora* is a similar handmade paper but with a slightly rougher texture and greener colour. No watermark is visible in any of the infill sheets. Technical examination and analysis of the materials of the cartoons were undertaken by members of the Scientific Department at the National Gallery.

### *The canvas*

At least two different types of canvas (of different weave and texture) had been used to support each cartoon. Sections of canvas had been joined by a number of heavy seams causing extensive fracturing of the cartoon. Samples of the canvas support from *A Woman borne off by*



Fig. 6 Detail of Plate 1, showing the pricking of the outlines for the transfer of the Triton.

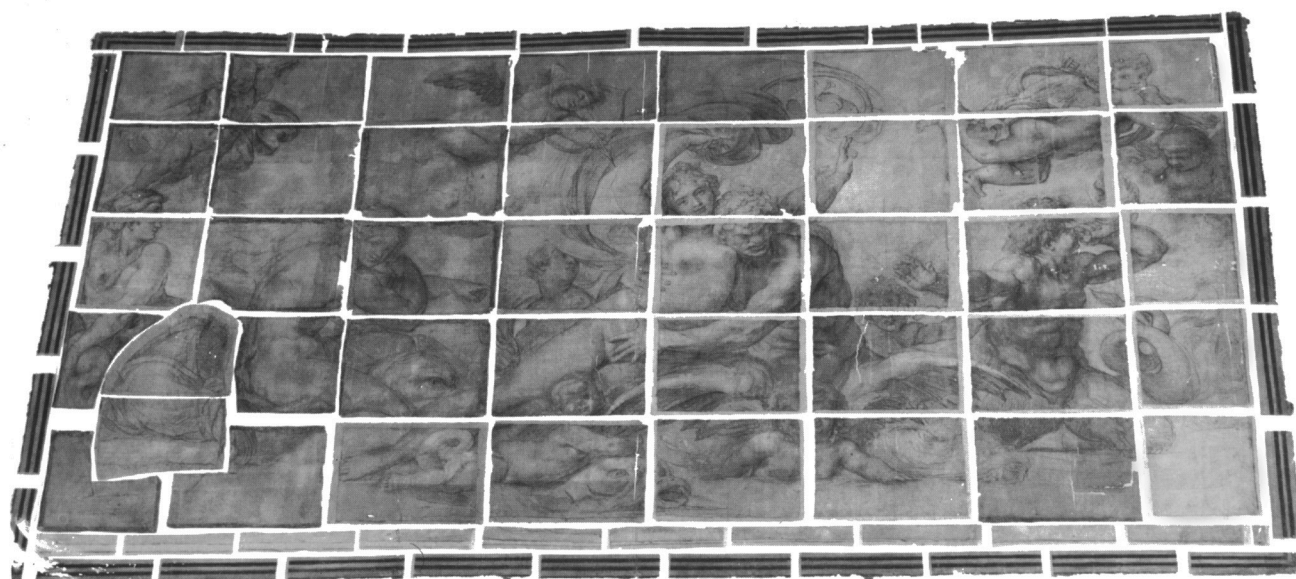


Fig. 7 *A Woman borne off by a Sea God(?)*, after separation into individual sheets.

*a Sea God(?)* were tested by the Department of Scientific Research at the British Museum and were found to date from within the period 1460–1670.<sup>27</sup>

#### *The adhesive*

The adhesive used to join the cartoon sheets together and to attach the cartoons to their canvas support was tested and produced a positive

modified Ehrlich Test reaction, indicating that the main adhesive is animal or fish skin glue. In addition, quite a strong positive indication was given to suggest the inclusion of some starch within this adhesive.

#### *Drawing media*

Identification of the drawing medium showed that this was not black chalk but charcoal (car-



Fig. 8 *Cephalus carried off by Aurora in her Chariot*, before cleaning and restoration.



Fig. 9 *A Woman borne off by a Sea God(?)*, in raking light, before conservation, showing extreme cockling and undulation.

bon black). There was also some evidence to suggest that there may have originally been areas of white heightening in chalk (gypsum), although this was obscured to a large extent by the presence of the grey wash, which was applied later.

#### *Other pigments*

Some traces of red pigment were found on the surface (recto) of *Cephalus carried off by Aurora in her Chariot*, and more traces of the

same pigment were found on the verso. Analysis showed this to be a red earth pigment, of the kind frequently used in fresco painting,<sup>28</sup> and a possible explanation for its presence is that it was off-set when the cartoon sections were placed in contact with the *intonaco*. No such traces were found on the verso of *A Woman borne off by a Sea God(?)*, which is consistent with the cartoon not having been applied directly to the ceiling.

One or two spots of a blue pigment were found on *A Woman borne off by a Sea God(?)*. These were identified by energy-dispersive X-ray microanalysis (EDX) as the blue cobalt-containing glass pigment, smalt, a material commonly used in the secco painting of areas of sky.<sup>29</sup> These spots could have appeared in the studio – they are not widespread enough to suggest off-setting from the ceiling itself.

#### *The grey wash: inorganic components*

The white material present in the paper was analysed and found to be gypsum (calcium sulphate dihydrate). It was mixed with a carbon black material which has the appearance of finely ground charcoal. Separation of the sheets of paper revealed that the wash did not extend on to the underlaps of the sheets. In the case of *Cephalus carried off by Aurora*, the wash covered areas of both the original cartoon and infill sheets. Where the cartoon had been badly registered on reassembly, the hidden areas of the original cartoon were found not to have been covered by the wash (Plate 5). This evidence clearly indicates that the wash was only applied at some time (possibly a considerable time) after the cartoons were stuck down on to their canvas supports.<sup>30</sup>

## Treatment

Following the initial feasibility study, it was decided to begin a programme of treatment. *A Woman borne off by a Sea God(?)* was treated first because it was the more discoloured of the two cartoons, and because it presented fewer potential problems given that it was made up of about 45 whole rectangular sheets of paper (Figs. 2b and 7), whereas *Cephalus carried off by Aurora* (which had been cut up for transfer) was made up of about 130 pieces (Fig. 2a).

The proposed conservation programme was as follows:

1. To dismantle the cartoon into individual sheet-size sections.
2. Remove old canvas support, old adhesive and repair work.
3. Float-wash to remove water-soluble discoloration.
4. Float-treat to recover original blue-grey colour of paper.

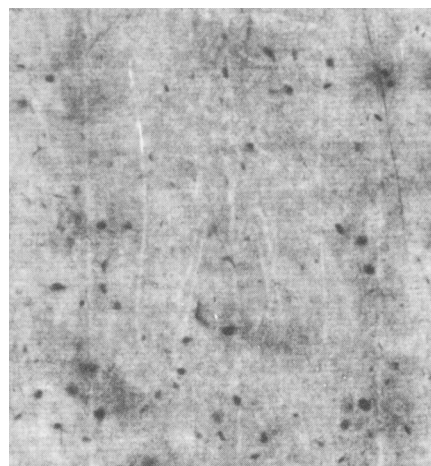
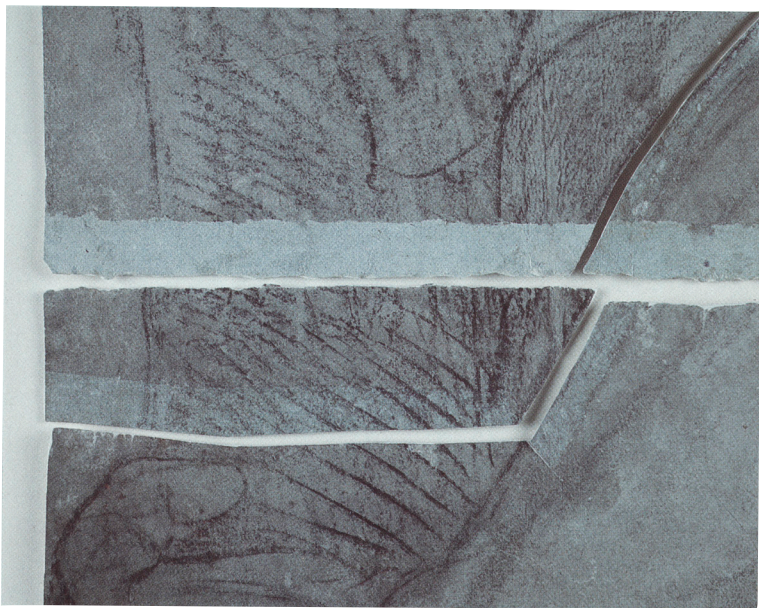


Fig. 10 *A Woman borne off by a Sea God(?)*. Chain and laid structure of paper in transmitted light and Fabriano watermark (capital 'M' with a star above, in a shield).

5. Deacidify the cartoons and repair them.
6. Lay on to new Japanese paper support.
7. Re-line on to ensemble of Belgian linen and a continuous sheet of 300 gm<sup>-2</sup> acid-free rag paper.
8. Stretch over new resin-bonded aluminium honeycomb solid support faced with museum rag board.

Work began in the lower right corner where the first main sections of the cartoon were lifted (C2 and C3 in Fig. 2b) using a combination of humidity generated by an ultrasonic humidifier and steam along the joins or overlaps (Fig. 11). These layers were carefully opened up to reveal the canvas support beneath, which could then be cut to release the cartoon section still attached to its piece of canvas. It could now be laid face down and the old support and adhesive removed from the verso. This process was repeated, removing the sections one by one until the cartoon was in pieces (Fig. 7).

The next stage was to reduce the water-soluble discoloration of each sheet in turn. This was achieved by float-washing the sections individually, supported on Bondina<sup>31</sup> membrane

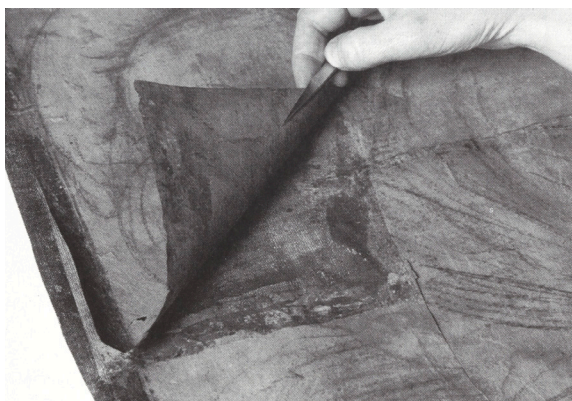


**Plate 5** Detail of disassembled sheets from *Cephalus carried off by Aurora in her Chariot* showing original blue-grey colour of the paper. Where the sections of the cartoon had been badly registered on reassembly after use, the hidden areas were found to have retained their original colour since they had not been covered by the grey wash and had also been preserved from exposure to light.

within a silk-screen stretcher laid over a tray of gently running cold water. This process was repeated until all sheets had been treated. The transfer perforations of *A Woman borne off by a Sea God(?)* did not give rise to any problems during treatment and did not split or separate.

In order to recover the original colour (blue-grey) of the paper, a further treatment was necessary using a 0.5% aqueous solution of calcium hypochlorite ( $\text{Ca}(\text{OCl})_2$ ) applied by the float-wash technique.<sup>32</sup>

Following treatment and deacidification with an aqueous solution of magnesium bicarbonate



**Fig. 11** *A Woman borne off by a Sea God(?)*. Lifting corner of cartoon section to reveal underlying adhesive.

( $\text{Mg}(\text{HCO}_3)_2$ ), repair work could now be carried out where necessary using excess paper from the old repair patches, which was very similar to that of the cartoon. A vacuum suction table was used for the repair of particularly damaged sheets and for localised stain removal.

At this stage each sheet was laid on to a new support of Japanese Okina paper,<sup>33</sup> using a wheatstarch/methyl cellulose adhesive.<sup>34</sup> Each section was allowed to dry naturally without pressure or strain, so that dimensional stability could be maintained throughout.

After all the pieces of the cartoon had been laid on to Japanese paper it was necessary to devise a method for the reassembly of the sheets on to the new rag paper and linen support. In the case of *A Woman borne off by a Sea God(?)* it was essential to understand how the sheets of paper had originally been assembled, and by studying the pattern of overlapped and underlapped edges it became apparent that they had been assembled in groups of six and four and that these had been put together to form a continuous sheet (the sheets along the top and bottom of the cartoon had been trimmed horizontally) (Figs. 12 and 7).<sup>35</sup> Having come to this conclusion it was possible to begin attaching the sheets on to the rag paper and linen support, starting in the centre where one sheet had underlapped edges on four sides.

A different approach was necessary for *Cephalus carried off by Aurora* because the sheets had been cut up into so many pieces for transfer. Again work began in the centre, but in this case account had to be taken of the *giornate* cuts as well as the overlaps and underlaps.

## Presentation

The new support system comprises Belgian linen, a continuous sheet of 300 gm<sup>-2</sup> rag paper and the resin-bonded aluminium honeycomb base (Fig. 13).<sup>36</sup> The linen and paper layer was stretched over and fastened to the edges of the aluminium support board.

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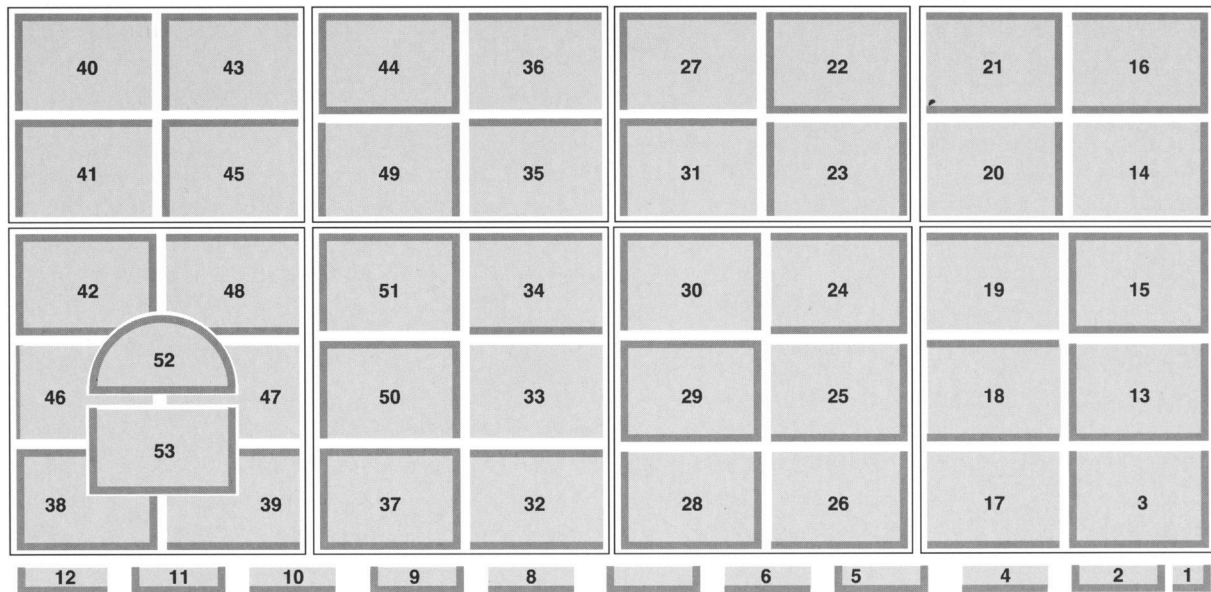


Fig. 12 *A Woman borne off by a Sea God(?)*. Diagram of original sheet assembly. The shaded edges of the individual sheets represent underlaps. The numbers indicate the order in which the sheets were lifted from the canvas support during disassembly.

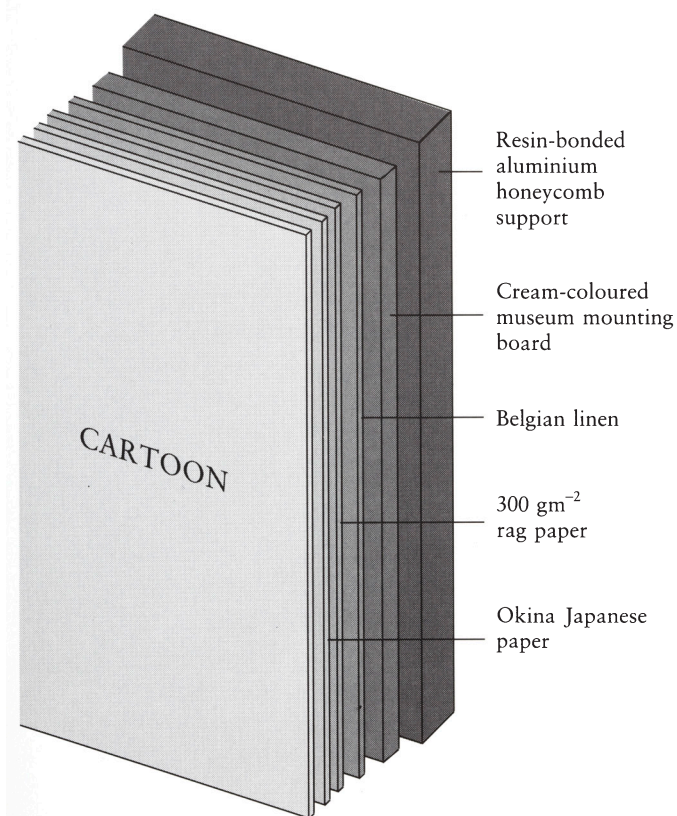


Fig. 13 Schematic view of support structure used for both cartoons.

Ing. Tommasini, Cartiere Miliani Fabriano Spa, Fabriano; Dr Sheridan Bowman, Department of Scientific Research, British Museum (for  $\beta$ -radiography and radiocarbon dating).

The Carracci Cartoon Restoration Project was sponsored by a substantial and generous gift from M. Daniel Wildenstein, through the American Friends of the National Gallery London, as a tribute to Sir Denis Mahon's contributions to the history of painting in Italy during the seventeenth century and particularly those in connection with the work of Caravaggio; a further generous contribution was made for the completion of the Project, also through the American Friends, by the Florence Gould Foundation, New York.

#### Notes and references

1. The principal contributions on the iconography of the ceiling are J.R. Martin, *The Farnese Gallery*, Princeton 1965, and C. Dempsey, "Et Nos Cedamus Amori": Observations on the Farnese Gallery', *The Art Bulletin*, 50 (1968), pp. 363–74. For the date of the execution of the ceiling see Martin, pp. 53–6; D. Posner, *Annibale Carracci: a Study of the Reform of Painting around 1590*, 2 vols, London 1971, Vol.II, p. 49; most recently G. Briganti, 'Nuove Indagini sulla Galleria Farnese', in G. Briganti, A. Chastel and R. Zapperi, *Gli Amori degli Dei, Nuove Indagini sulla Galleria Farnese*, Rome 1987, pp. 31–6.



2. Martin, cited in note 1, cat.71, p. 257; fig.178.
3. See R. Rossi-Manresi and A. Tucci, 'The "Stories of Romulus and Remus": A fresco frieze by the Carracci', *ICOM Preprints*, ICOM Committee for Conservation, 9th Triennial Meeting, Dresden, Los Angeles 1990, pp. 539–44.
4. See Briganti et al., cited in note 1, pp. 237–8.
5. Cennino d'Andrea Cennini, *The Craftsman's Handbook*, (translated by D.V. Thompson Jr), New York 1954, pp. 51–3. For a discussion of mural painting technique see E. Borsook, *The Mural Painters of Tuscany from Cimabue to Andrea del Sarto* (2nd edition), Oxford 1980, pp. xxivff.
6. While generally adhering to established practice, the Carracci seem to have evolved particular methods and made some technical refinements when working in secco on the ceiling paintings. Secco was used in areas where the design 'overlaps' from one *giornata* to another and also for blue areas – whether sky or clothing – where a layer of smalt (a potash glass coloured with cobalt oxide) was applied in fresco and the area reworked with azurite in secco, see Briganti et al., cited in note 1, p. 238.
7. In the fourteenth and fifteenth centuries, before paper became widely available, drawings were executed directly on to the plaster (*sinopia* drawings); this technique was largely replaced by the use of cartoons (It. *cartone*, paper). Cartoons were sometimes dispensed with by later artists (for example Michelangelo) when they were very confident of their technique and if they were executing the painting entirely themselves rather than handing the task over to assistants or pupils.
8. These transfer techniques were also used for painting decorative details, and in the Farnese ceiling they would have been used to trace the repetitive design of the *trompe l'oeil* frames around the paintings for example.
9. Traces of the dots formed during the pouncing of the outlines of the design on the plaster can be observed in many places, for example on the contour of the left shoulder of the Nereid on the extreme left of the fresco and on the upper contour of the right forearm of the dolphin-riding putto, see Briganti et al., cited in note 1, colour plates 20 and 28. The use of substitute cartoons was not innovative, see C. Bambach Cappel, 'Michelangelo's cartoon for the *Crucifixion of St Peter*', *Master Drawings*, 25 (1987), pp. 131–42; and 'A Substitute Cartoon for Raphael's *Disputa*', *Master Drawings*, 30 (1992), pp. 9–30, especially pp. 11–14. See also C. Bambach Cappel, *The Tradition of Pouncing Drawings in the Italian Renaissance Workshop*, unpublished Ph.D. dissertation, 2 vols, Yale University, New Haven 1988.
10. The inventory of possessions of Francesco Raspantino (1644), Domenichino's pupil and artistic heir, lists a set of substitute cartoons, probably by Domenichino, which had been preserved together with that artist's cartoons. They are described there as follows: *Un mazzo di spolveri diversi*, see R. Spear, *Domenichino*, 2 vols, New Haven and London 1982, Vol.I, p. 341. For discussion of two surviving substitute cartoons see Bambach Cappel 1987, cited in note 9, and T. Henry, 'Signorelli, Raphael and a "mysterious" pricked drawing in Oxford', *The Burlington Magazine*, 135 (1993), pp. 612–19.
11. There remains some uncertainty over the exact iconography of this scene. For a summary of interpretations see M. Levey, *National Gallery Catalogues, The Seventeenth and Eighteenth Century Italian Schools*, London 1971, pp. 56–61. The title *Glaucus and Scylla* is used for the purposes of reference in this article.
12. Lucio Faberio in his funeral oration at the memorial service for Agostino, held in Bologna in January 1603, stated: 'Ite, e mirate ... la Diana (sic), e la Galatea (sic), due quadri a fresco ch'egli dipinse nella galleria dell'Illustriss. Cardinal Farnese, dove il suo fratello Annibale, che tutto il resto v'hà dipinto...', C.C. Malvasia, *Felsina Pittrice*, 3 vols, Bologna 1678, Vol.I, p. 431. G. Mancini (*Considerazioni sulla pittura* [c.1620], ed. A. Marucchi and L. Salerno, 2 vols, Rome 1956–7, Vol.I, p. 217), G. Baglione (*Le vite de' pittori, scultori et architetti*, Rome 1642, pp. 105, 107) and G.P. Bellori (*Le Vite de pittori, scultori et architetti moderni*, Rome 1672, pp. 55, 57, 110ff.) also state the works to be by Agostino.
13. See Briganti et al., cited in note 1, pp. 34–5.
14. The inscription is reproduced in Briganti et al., cited in note 1, p. 24, fig.c. Briganti reads the digit 8 of '18' as a 6 and proposes that the date 16 May 1600 marks the recommencement of work on the ceiling following an interruption in its execution, see pp. 32–4. Recently (June 1994), Gabriele Finaldi was able to examine the inscription from the scaffolding erected in the Farnese Gallery and it was apparent that the digits very likely represented 18. On 18 May 1599 Fulvio Orsini, who was Cardinal Odoardo's librarian and who has been credited with assisting Annibale in producing the iconographic programme for the ceiling (by Martin, cited in note 1, although other authors have disagreed), died. The inscription may have been intended to record the event. To the left of this inscription, there are two other dates inscribed, '1598' and '1599', see Briganti et al., p. 24, figs. a and b, p. 32, but the significance of these dates and the implications for the chronology of the ceiling frescoes are not clear at present.
15. See, inter alia, H. Tietze, 'Annibale Carraccis

- Galerie im Palazzo Farnese und seine römische Werkstätte', *Jahrbuch der Kunsthistorischen Sammlungen des allerhöchsten Kaiserhauses*, 26 (1906-7), p. 124; R. Wittkower, *The Drawings of the Carracci in the Collection of Her Majesty the Queen at Windsor Castle*, London 1952, p. 134; Martin, cited in note 1, cats.80 and 82, pp. 259–60.
16. Levey, cited in note 11, pp. 56–61.
  17. It has been observed that the figure of the Nereid who points towards the central group is based on a figure in Annibale's *Diana and Callisto* in the Duke of Sutherland's collection. Agostino also used Annibale's figure in the famous engraving *Omnia vincit Amor* of 1599, see Martin, cited in note 1, p. 56.
  18. For a discussion of this drawing see *Master Drawings, The Woodner Collection*, exhibition catalogue, London, Royal Academy, 1987, cat.27; drawings for the figures of Aurora and Tithonus are in the Louvre, see Martin, cited in note 1, figs.188–9; another drawing related to the figure of Tithonus is in the Fogg Art Museum, Cambridge, Mass. (Inv.1975,91), see *Old Master Drawings from American Collections*, exhibition catalogue, Los Angeles, Los Angeles County Museum of Art, catalogue by E. Feinblatt, 1976, cat.89; a study for the figures of Cephalus and Aurora is with Colnaghi's, *An Exhibition of Master Drawings*, New York and London 1994, cat.13.
  19. See Martin, cited in note 1, cat.83, p. 260; fig.193. The reason for introducing this change may have been that Annibale wanted the scene to be more overtly referential to Raphael's *Galatea*. The Triton is in fact closely based on the amorous Triton on the left of Raphael's composition, see Martin, cited in note 1, p. 108. He may also have considered that the foreshortening of the Triton's right arm, which in the cartoon extends forcefully into the foreground space, was at odds with the relief-like character of the whole scene. Close examination of the Triton figure in the fresco revealed extensive pouncing marks along the outlines; this indicates that a new cartoon was made for the execution of the revised figure. Another study by Annibale for the Triton figure, which was once part of the same sheet as the Getty drawing, is in the Metropolitan Museum of Art, New York, see J. Bean, 'A rediscovered Annibale Carracci drawing for the Farnese Gallery', *Master Drawings*, 8 (1970), pp. 390–1.
  20. Bellori (1672) claims that the execution of the two frescoes was Agostino's but the invention was Annibale's (Bellori, cited in note 12, pp. 110–11). A study in pen and ink for the figure of Aurora by Agostino is on the reverse of a drawing of a *Bacchic Procession* by Annibale (Paris, Louvre), Martin, cited in note 1, cat.53, pp. 252–3; figs. 158 and 188. Annibale's drawings for the Triton in the so-called *Glaucus and Scylla* have been briefly discussed above. It is probable that Annibale made changes to the fresco after Agostino had finished it: the head of the winged putto in front of the Glaucus figure is painted on a single, unusually small, *giornata* section laid on the ceiling after the surrounding areas of plaster had dried. It has all the characteristics of a correction which involved hacking out some of the pre-existing fresco (by Agostino) and inserting fresh plaster. The Correggesque softness of the putto's head is more consonant with Annibale's work than Agostino's, see Briganti et al., cited in note 1, pp. 35–6.
  21. 2 vols, Paris 1809, Vol.I, nos. 80 and 81 (as by Annibale Carracci).
  22. See Martin, cited in note 1, p. 207, note 35. Francesco Raspantino kept it locked up in a box together with a large number of cartoons by Domenichino, see Spear, cited in note 10, Vol.I, p. 341. Raspantino did, however, have several cartoons on display in his house in Rome (p. 340). Maratti, who came to own part of the Raspantino collection, also had several cartoons on display in his Roman house. When he sold some of these to Pope Clement XI Albani in 1703 he made full-size copies to hang in their place, among these was his copy of the Urbino cartoon: *Un cartone copiato dal Sig.r Cav.re Maratti da quello che ebbe sua Santità di mano d'Annibale Carracci rappresentante 'il Baccanale' dipinto nella Galleria Farnese, grande come l'originale, ma non sano, con cornicetta bianca*, see R. Galli, 'La collezione d'arte di Carlo Maratti', extract from *L'Archiginnasio*, 22–3 (1927–8), p. 31, no.223.
  23. Martin, cited in note 1, cats.80 and 82, pp. 259–60.
  24. Most of the fibres were a translucent pale yellow colour but a number – about a tenth – were blue coloured. Analysis by Jennifer Pilc using high performance thin-layer chromatography (HPTLC) revealed that the dyestuff used for the blue fibres was indigo. This is a blue vegetable colouring matter obtained from either the woad or indigo plants and was commonly used to dye fibres from which fabrics were made. Its addition to white rags in papermaking may have been intended to mask the yellowish colour and impurities of the rags. Smooth white paper was considered the finest and was used for prestigious printed matter (for instance by Aldus Manutius in Venice). Coarse blue paper was probably inexpensive and therefore useful to artists for large-scale works. They also often chose it deliberately for smaller-scale works to provide a mid-tone for their drawing. Many of the preparatory drawings for the Farnese ceiling were executed on the same paper as the cartoons. Although much faded and in poor condition, the Urbino cartoon is almost certainly made of the same blue-grey paper.

25. The history of papermaking at Fabriano is discussed in a publication produced by the Miliani mill at Fabriano: A. Grimaccia, *L'arte della carta a Fabriano* (Cartiere Miliani Fabriano), Ufficio Promozione e Pubblicità Fabriano, Museo della Carta e della Filigrana, 1985; see also A.F. Gasparinetti, *Carte, Cartiere e Cartai Fabrianensi*, Milan 1938, and Harrison Elliot, 'The Oldest Paper Mill in the Western World and its Historical Background', *The Paper Maker*, 21 (February 1952), pp. 39–46.
26. See A. and A. Zonghi, *Monumenta Chartæ Papyraceæ Historiam Illustrantia*, III: Zonghi's watermarks, Hilversum 1953. This watermark was also identified in the blue-grey paper of the preparatory drawing in the Ian Woodner collection (Plate 4 in this article) which was described as 'possibly W within a circle', see *Master Drawings: The Woodner Collection*, exhibition catalogue, cited in note 18, p. 92.
27. Radiocarbon dating results were calibrated to show that there is about a 68 per cent chance that the true calendar date of the sample lies in the period 1505–1650. The 95 per cent confidence level for the calibration of this result lies between 1460–1670.
28. See Borsook, cited in note 5, p. xxviii.
29. See note 6 above and also Borsook, cited in note 5, p. xxviii.
30. The Urbino cartoon does not have this grey wash layer. It may be speculated that the wash was applied to the National Gallery cartoons in order to give them a more uniform appearance and perhaps to make them more attractive for sale.
31. Bondina is a polyester fabric used to support works on paper during aqueous treatments.
32. Following tests by Raymond White in the Scientific Department of the National Gallery, calcium hypochlorite was chosen as the preferred cleaning agent in place of a reducing agent, such as sodium borohydride or hydrogen peroxide, which can have a potentially destructive effect on indigo dyestuffs.
33. Okina is a Japanese long-fibred mulberry paper chosen to provide a strong flexible additional support for the cartoon sections.
34. Tests were carried out and a combination of wheatstarch and methyl cellulose adhesive was found to provide an appropriate degree of 'tack', together with enough 'slip' to register the individual sheets of paper on to their rag paper support.
35. When the sheets were removed from the backing canvas each was found to have a number on the reverse. The numbers ran consecutively from top left of the reverse of the cartoon to bottom right. The significance of these is not clear, but they may have been made to make it easier to identify and use the sections of the substitute cartoon cut up for transfer since the design on the substitute cartoon, made only with pin pricks, would be very difficult to read.
36. The aluminium base is light and provides dimensional stability over large areas. For additional rigidity the base is made up of two honeycomb panels, each 0.5 inch (1.25 cm) thick, bonded together. The acid-free museum rag board was laminated with Beva 371 heat-activated synthetic adhesive to the resin-bonded surface of the aluminium support using the Willard multi-purpose pressure table.